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# ACTA CARSOLOGICA

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## **Annotated Bibliography of Karst Publications** **No. 12**

**International Geographical Union - Karst Commission**  
**Association of the Geographical Societies of Slovenia**

Collected and edited by  
Andrej Kranjc



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2004

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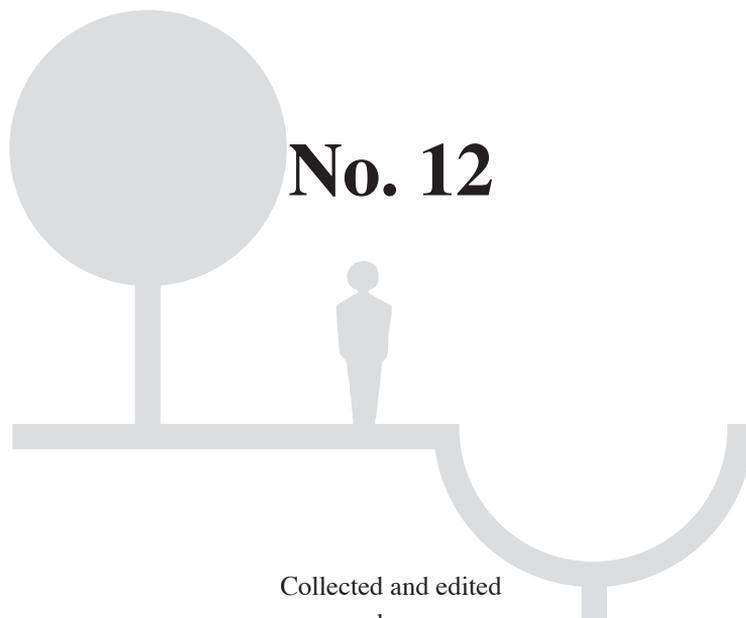
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# Annotated Bibliography of Karst Publications



**No. 12**

Collected and edited  
by

**ANDREJ KRANJC**

Karst Research Institute  
ZRC SAZU  
Postojna

May, 2004

No. 12 of the Annotated Bibliography of Karst Publications for the year 2003 is a special one: it is the last one of the four years term of Karst Commission IGU activities. Therefore it was decided to include also the publications from the whole term (2000 - 2003), which have been by different reasons omitted in the three previous numbers (9 - 11). In the first half of the year 2004 some important karstological publications have been edited and many Commission members sent us also the bibliography for the year 2004. Thus we included also the publications printed in this year (2004) but it has to be emphasized that not all the members have done so and that the material, gathered by May 2004 cannot represent the bibliography of the whole year.

*The editor*

## FOREWORD

This is the twelfth, and perhaps final, annual bibliography of global karst research published by members of the IGU Karst Commission. I say perhaps final as in August 2004, at the 30<sup>th</sup> Congress of the International Geographical Union in Glasgow, the IGU Executive will decide whether our Commission should continue for a further four year term. If they decide in our favour, as I hope they will, then the Commission will go forward with a new Chairman as the rules stipulate that no member shall serve more than 12 years on a Commission. Although it does not seem so long, that is indeed the length of my service, first as a member of the Commission on “Environmental Changes and Conservation in karst Areas”, Chaired by Ugo Sauro from August 1992 to July 1996; then as Chair of the Commission on “Sustainable Development and Management of Karst Terrains” from August 1996 to July 2000 and finally as Chair of the Karst Commission since August 2000. In this last editorial it is appropriate to reflect on what we have achieved, particularly over the past four years.

The overall aim of the IGU Karst Commission for the period 2000-2004 was simply “To promote geographical research on karst areas”. We have tried to do this through sponsorship of meetings and through publications. In 2001 two main meetings of the Commission were held, both within the framework of much larger meetings. The first was during the 13th International Congress of Speleology in Brasilia, and the second during the International Geomorphological Congress in Japan. The 2002 ‘main meeting’ of the Commission in Romania was a much smaller event held jointly with Romanian speleologists and coinciding with their annual Symposium on Theoretical and Applied Karstology. It was attended by 60 participants from eleven countries and selected papers were published in Volume 15 of the refereed journal “Theoretical and Applied Karstology”. In 2003 the main meeting was in Kentucky, USA and was again held jointly with other karst groups : IGCP 448, the IAH Karst Commission and the UIS. The meeting was well attended and a useful innovation was that each organisation held an open meeting so that we were able to exchange information on our aims and future plans. One point that clearly emerged from these open meetings was the degree of commonality between the groups aims, and also their membership!

While our meetings have undoubtedly been successful in promoting karst research, it is apparent that there are still relatively few geographers [which I here define as those with a degree in Geography] with an interest in karst, and that most of those geographers specialise in geomorphology and hydrology. It is disappointing that we have failed to generate a greater enthusiasm for karst amongst those with primary interests in biogeography and resource management, and there appears to be a dearth of interest in social and cultural aspects of karst, at least amongst members of the Commission. These would be good topics for a future Commission to address.

In addition to the formal meetings, the Commission also sponsors a ‘Speleological School’ in Poland and a ‘Karstological Summer School’ in Slovenia, both of which are held annually and which are aimed particularly at younger persons who have an interest in karst. These meetings have consistently been very well attended and provide excellent training opportunities but again it has to be admitted that geography students were not in the majority of those present.

The main publications of the Commission has been the annual bibliographies and it is appropriate to record our thanks to Kazuko Urushibara-Yoshino, who edited the first eight issues, and to Andrej Kranjc and his colleagues at the Karst Institute, Postojna who collected and edited the material

published in 2000-2003. Thanks are also due to the board of Acta carsologica for allowing the Bibliography to be published as a supplement. The aim of these Bibliographies is to provide abstracts, in English, of publications likely to be of interest to geographers and scientists in related disciplines who are corresponding members of the Commission. It is interesting to look back over previous issues and to reflect on both the number and range of contributions each year. Excluding the current issue, over 2500 research papers and monographs are listed making the Bibliographies a valuable source of information for karst scientists, particularly as they include publications that are not in 'mainstream' journals and hence are not picked up by the standard abstracting services.

There have been no other paper publications specifically by the Commission but in a joint venture with the Karst Hydrogeology and Speleogenesis Commission of the International Union of Speleology, we launched a virtual scientific journal entitled "Speleogenesis and evolution of karst aquifers" in 2003. This is available free of charge at: <http://www.speleogenesis.info/>. One matter of regret is that we were never able to establish a full web site for the Karst Commission. However, Alexander Klimchouk kindly agreed to provide space for IGU Karst Commission notices on the 'Speleogenesis' web site [<http://www.speleogenesis.info/>]. Finally in terms of publications, I hope readers will forgive me for mentioning the Encyclopedia of Caves and Karst Science which I edited and which was published late in 2003. This has many contributions from geographers as well as from colleagues in many other disciplines.

It is my hope that the evidence of the successful meetings, and the many publications listed in this and previous Bibliographies, will convince the Executive of the importance of having a Karst Commission within the IGU. However, it is important that those geographers who specialise in karst related topics continue to promote karst within the discipline and seek to involve colleagues in their research.

April 2004

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## YEAR 2000

- 12 - 1 **Baker, A.; Proctor, C. J.; Lauritzen, S. E.; Lundberg, J.: SPEP: High-Resolution Stalagmite Records of NE Atlantic Climate in the Last Millennium. PAGES Newsletter, 8(2), 14, 2000.**
- 12 - 2 **Cigna, Arrigo A.; Burri Ezio: Development, management and economy of show caves. Int. J. Speleol., 29 B (1-4), 1-27, 2000.**  
 The problems concerning the development of show caves are here considered by taking into account different aspects of the problem. A procedure to carry out an Environmental Impact Assessment (EIA) has been established in the last decade and it is now currently applied. Such an assessment starts with a pre-operational phase to obtain sufficient information on the undisturbed status of a cave to be developed into a show cave. Successively a programme for its development is established with the scope to optimise the intervention on the cave at the condition that its basic environmental parameters are not irreversibly modified. The last phase of the assessment is focussed to assure a feedback through a monitoring network in order to detect any unforeseen difference or anomaly between the project and the effective situation achieved after the cave development. Some data on some of the most important show caves in the world are reported and a tentative evaluation of the economy in connection with the show caves business is eventually made.
- 12 - 3 **Constantin, S.; Lauritzen, S. E.: Semnificatii paleoclimatice si speleogenetice ale continuitatii procesului de concreționare in Pestera Closani in cursul stadiilor izotopice 5-3. In: Onac, B.P., (Ed.) Lucrările Simpozionului: Realizari si perspective in studiul Cuaternarului din Romania. 7 aprilie 2000, pp. 25-29, Universitara Clujeana, Cluj-Napoca, 2000.**
- 12 - 4 **Faulkner, Trevor: Undersøkelse av kalksteinsgrotter på Helgeland [Studying limestone caves in Helgeland, Norway]. Translated into Norwegian by Ulv Holbye. Årbok for Helgeland, pp. 166-181, 2000.**  
 This article summarises cave exploration in Norway, reviews some of the caves reported by the various expeditions to the southern part of Helgeland up to 1996, and introduces the author's research project into the factors that have influenced the formation and development of these caves. 8 photographs, 3 maps and surveys.
- 12 - 5 **Ford, D. C.; Ewers, R. O.; Lauritzen, S. E.: Hardware and Software Modelling of Microchannel Development in Karst. In: Klimchouk, A., Ford, D.C. & Palmer, A.N., (Eds.) Speleogenesis: Evolution of Karst Aquifers, pp. 175-183, National Speleological Society, Huntsville, Ala, 2000.**
- 12 - 6 **Ford, D. C.; Lauritzen, S. E.: Speleogenesis of Castleguard Cave, Rocky Mountains, B.C. Canada. In: Klimchouk, A., Ford, D.C. & Palmer, A.N., (Eds.) Speleogenesis: Evolution of Karst Aquifers, pp. 332-337, National Speleological Society, Huntsville, Ala, 2000.**

- 12 - 7 **Goldie, Helen S.; Cox, Nicholas J.: Comparative morphometry of limestone pavements in Switzerland, Britain and Ireland. Z. Geomorph. N.F. Suppl.-Bd. 122, 85-112, 2000.**  
Clint and grike components of limestone pavements have been studied in nine areas of Switzerland, Britain and Ireland. Length and width of 1417 clints (limestone blocks) and width and depth of the same number of nearby grikes (solution fissures) were measured, allowing analysis of variability both between and within areas. All measures are highly variable and positively skewed in distribution. The most strongly correlated pair of variables is clint width and clint length. Using ratio of clint width to clint length as a simple measure of shape reveals that approximately equilateral clints are relatively uncommon, a pattern consistent across areas. Grike depth and width are only moderately correlated, suggesting that horizontal and vertical enlargement of grikes are not closely yoked. Detailed variations between (and to some extent within) areas appear related principally to depth and recency of glacial scour, post-glacial solution, tectonic disturbance and lithology. Almost all of the areas, however, have also been affected to some extent by artificial quarrying. The methods and results provide a basis for further detailed local or regional work.
- 12 - 8 **Kock, D.; Altmann, J.; Price, L: A fruit bat new to West Malaysia: Rousettus leschenaultii (Desmarest 1820) in Batu Caves. MNJ, 54 (1), 63-67, 2000.**  
K.W.: Fauna, bats, Dark Cave.
- 12 - 9 **Lascu, C.; Constantin, S.; Lauritzen, S.E.: Black Sea level Oscillations Based on Preliminary U-series dating of Submerged Speleothems from Pestera Piatra (Central Dobrogea, Romania). In: Onac, B.P. & Tamas, T., (Eds.) Karst Studies and Problems: 2000 and beyond. Proceedings of the joint meeting of Friends of karst, Theoretical and Applied Speleology and IGCP 448, pp. 72-76, Presa Universitara Clujeana, Cluj-Napoca, 2000.**
- 12 - 10 **Lauritzen, S. E.; Lundberg, J.: Meso- and Micromorphology of Caves: Solutional and erosional morphology. In: Klimchouk, A., Ford, D.C. & Palmer, A.N., (Eds.) Speleogenesis: Evolution of Karst Aquifers, pp. 407-426, National Speleological Society, Huntsville, Ala, 2000.**
- 12 - 11 **Lauritzen, S. E.; Mylroie, J. E.: Results of speleothem U/Th dating reconnaissance from the Helderberg Plateau, New York. Journal of Cave and Karst Studies, 62, 20-26, 2000.**
- 12 - 12 **Lauritzen, S. E.; Onac, B. P.: Isotopic stratigraphy of a Last Interglacial stalagmite from north-western Romania: correlation with the deep-sea record and northern-latitude speleothem. In: Onac, B.P., (Ed.) Lucrările Simpozionului: Realizari si perspective in studiul Cuaternarului din Romania. 7 aprilie 2000, pp. 20-21, Universitara Clujeana, Cluj-Napoca, 2000.**
- 12 - 13 **McFarlane, D. A.; Vale, A.; Christenson, K.; Lundberg, J.; Atilles, G.; Lauritzen, S.E.: New Specimens of Late Quaternary Extinct Mammals from Caves in Sanchez Ramirez Province, Dominican Republic. Caribbean Journal of Science 36, 163-166, 2000.**

- 12 - 14 **Onac, B. P.; Constantin, S.; Lauritzen, S.E.:** The palaeoclimate recorded in a Late Glacial to Holocene stalagmite from Ursilor cave (Romania): preliminary results. In: Onac, B.P., (Ed.) *Lucrările Simpozionului: Realizari si perspective in studiul Cuarternarului din Romania*. 7 aprilie 2000, pp. 13-16, Universitara Clujeana, Cluj-Napoca, 2000.
- 12 - 15 **Pulina, Marian; Andrejczuk, Wiaczeslaw:** [Karst and Caves]. *Wielka Encyklopedia Geografii Swiata*, t. XVII, 359 p., Wydawnictwo Kurpisz, Poznan, 2000.  
An overview of karst and cave science, with special reference to Central and Eastern European and cold climate karst. First part of the book is dedicated to karst phenomena in general, karstifiable rocks, processes, hydrology, geomorphology and types of karst. Special attention of authors is karst of extreme climate zones (tropical and polar) and kriokarst. Second part cover caves in general. Karst regions and caves of the World are presented in the end of the book.
- 12 - 16 **Skutlaberg, S.; Øvrevik, R.; Lauritzen, S. E.:** Karst hydrology in the Grønli- Seter system, Mo i rana, Norway. In: Onac, B.P. & Tamas, T., (Eds.) *Karst Studies and Problems: 2000 and beyond*. Proceedings of the joint meeting of Friends of karst, Theoretical and Applied Speleology and IGCP 448, p. 123, Presa Universitara Clujeana, Cluj-Napoca, 2000.
- 12 - 17 **Tyc, Andrzej; Czylok, Andrzej; Rahmonov, Ojmahmad:** Human impact and spontaneous regeneration of a karst-aeolian ecosystem in an anthropogenic desert near Olkusz (Silesian Upland, Poland). In: Barany-Kevei, I. & Gunn J. (Eds.) *Essays in the ecology and conservation of karst*. Special issue of *Acta Geographica Szegedensis*, XXXVI, 70-77, Szeged, 2000.  
The presence of thick, Quaternary sands covering Triassic and Jurassic carbonates, with well-defined karst-fissured aquifer has resulted in an unusual karst-aeolian ecosystem in eastern part of Silesian Upland (S Poland). The occurrence and specific properties of karst water discharging within fluvial-glacial and aeolian sands created conditions for development of unique floristic associations. However, intensive human activity, heavy industry and mining mainly, changed the ecosystem. Paper deals with history of human activity in the area of Olkusz Zn-Pb ore's exploitation district and conditions of development of anthropogenic sandy desert, establishment of specific human induced karst-aeolian ecosystem and discuss the problem of protection dilemma in this area. The protection dilemma is: to protect sandy desert that is unique in Europe but whose aeolian landscape is an artefact of human activity and will need to be artificially maintained in the future or to permit the area to be overgrown by means of spontaneous succession, thereby protecting the karst aquifer.
- 12 - 18 **Viehmann, I.; Lauritzen, S. E.; Onac, B. P.:** The Vartop cave man and his radiometric age. In: Onac, B.P., (Ed.) *Lucrările Simpozionului: Realizari si perspective in studiul Cuarternarului din Romania*. 7 aprilie 2000, pp. 22-24, Universitara Clujeana, Cluj-Napoca, 2000.
- 12 - 19 **Wika, Stanislaw; Ovchinnikov, Genadij I.; Trzheinsky, Yuri B.; Tyc, Andrzej; Szczyppek, Tadeusz:** [Development of natural processes on the Bratsk reservoir's banks]. *Institute of Earth's Crust, Siberian Branch of Russian Academy of Sciences*, 72 p., Irkutsk, 2000.

The book presents course of natural processes on banks of southern part of the Bratsk reservoir, as a result of human impact. Among active geomorphic processes karst are very important one. Several examples of karst phenomena induced by construction and operation of Bratsk reservoir, one of the largest in the World are presented.

**YEAR 2001**

- 12 - 20 Bárány-Kevei, I.; Botos, Cs.: Landscape-ecological problems in Aggtelek National Park with special regard to sustainable silviculture. *Ecológia (Bratislava)*, Vol. 20, Supplement 4, pp.151-156, 2001.**  
The Aggtelek National Park is situated in Northern Hungary. Thus, from the North, the National Park has joint border with the Slovak Karst Protected Landscape Area in the Slovak Republic. Considering the geology, landscape geography and cultural history of the region, these two protected areas form an integral unit and both were declared as biosphere reserves in 1979 (UNESCO's Man and Biosphere Program). The area of the Aggtelek National Park has being protected by law since 1978 and was declared as a National Park in 1985. The caves of the Slovak Karst and the Aggtelek Karst were inscribed in the UNESCO's World Heritage List in 1995. In our presentation we investigate the problems of the land use types of the Aggtelek National Park with special regard to the sustainable sylviculture. The presentation shows a planning method which is based on forestry as well as ecological factors, and applies Arc/Info GIS software.
- 12 - 21 Bárány-Kevei, I.; Goldie, H.; Hoyk, E.; Zseni, A.: Heavy metal content of some Hungarian and English karst soils. *Acta Climatologica et Chorologica, Universitas Szegediensis*, Tom. 34-35, 81-92, Szeged, 2001.**
- 12 - 22 Carstens, H.; Lauritzen, S. E.: Klimasvingninger er helt normalt. *Geo (Geo- og bergverksnytt)* 4, 8-9, 2001.**
- 12 - 23 Chenoweth, M.S.; Day, M.J.: Developing a GIS for the Jamaican Cockpit Country. In: *Geotechnical and Environmental Applications of Karst Geology and Hydrology*, ed. B.F. Beck and J.G. Herring, Balkema Publishers, 67-72, 2001.**
- 12 - 24 Chenoweth, M. S.; Day, M. J.; Koenig, S.; Kueny, J. A.; Schwartz, M.: Conservation issues in the Cockpit Country, Jamaica. *Proceedings of the 13<sup>th</sup> International Congress of Speleology* 2, 237-241, 2001.**
- 12 - 25 Constantin, S.; Lauritzen, S. E.; Stiuca, E.; Petculescu, A.: Karst evolution in the Danube Gorge from U-series dating of a cave-bear skull and calcite speleothems from Pestera de la Gura Ponicevei (Romania). *Theoretical and Applied Karstology*, 13-14, 39-50, 2001.**
- 12 - 26 Day, M. J.: Sandstone caves in Wisconsin. *Proceedings 13<sup>th</sup> International Congress of Speleology*, 1, 89-92, 2001.**  
(Reprinted in *The Wisconsin Speleologist* 25, 1, 18-22, 2002).
- 12 - 27 Goldie, Helen S.; Marker Margaret E.: Pre-Devensian dolines above Crummackdale, northwest Yorkshire, UK. *Cave and Karst Science*, Vol. 28, No. 2, 53-58, 2001.**  
This paper reports on a preliminary study of large Pre-Devensian dolines above Crummackdale Head, Yorkshire, UK. The distribution of these dolines has been plotted on 1:10,000 scale base maps, and selected dolines have been measured. All these large dolines

have acted as sediment depositories. Most contain fine sandy silt, yellow in the aerobic zone and grey below. This is interpreted as loess. These sediments pass upwards into peat or remnant peat that is shown to date from 9,000 B.P.

- 12 - 28 Gray, Alan: Thailand and Malaysia reconnaissance 24 February to 9 March 2000, Axbridge Cave Grp Jnl, Mar, p. 3-8, 2001.**

K.W.: Satun, Langkawi.

- 12 - 29 Gray, Alan: Thailand and Malaysia expedition 26 December 2000 to 14 January 2001. Axbridge Cave Grp Jnl, Mar, p9-64, (phot. surveys, map), 2001.**

K.W.: Yala, Satun, Trang, Langkawi.

- 12 - 30 Kiernan, K.; Lauritzen, S. E.: Dated speleothem evidence for uplift rates and terrace ages on the Tasmanian south coast. Zeitschrift für Geomorphologie 45, 159-176, 2001.**

- 12 - 31 Kiernan, K.; Lauritzen, S. E.; Duhig, N.: Glaciation and cave sediment aggradation around the margins of the Mt Field Plateau, Tasmania. Australian Journal of Earth Sciences 48, 251-263, 2001.**

- 12 - 32 Knez, Martin; Pavlovec, Rajko: Vilenica - one of the oldest show caves. ProGeo News, 1, 1-2, Uppsala, 2001.**

In Slovenia there are around 8000 karst caves registered. Vilenica, the cave in the south-west Slovenia near the Slovene-Italian border at Trieste has a slightly special place among them. In 1748 already the cave was described by order of Emperor Franz I, the description remained in manuscript. This cave is probably the oldest show cave in the world and by the time Postojnska jama was opened for tourists this was the most visited karst cave in Classical Karst. The entrance fees were introduced in 1633 already. It is said that in 1660 the cave was visited by Emperor Leopold. The karst cave Vilenica has mostly a historical value. Today it is well displayed and electrified being one of the most visited caves in Slovenia.

- 12 - 33 Knez, Martin; Slabe, Tadej: Karstology and motorway construction. In: 14th IRF Road World Congress, Published on CD, Paris, 2001.**

Karstologists took part in motorway construction planned in karst. In preliminary studies we have chosen laying out together with planners and by regular karstological control during the construction we studied newly discovered karst phenomena and helped builders to overcome the karst properties; at the same time we tried to preserve as much as possible of these phenomena. During the construction of the recent part of motorway more than 300 caves opened on 50 km of a foreseen roadway. Different types of caves reflect the evolution of through-flow and outflow aquifer due to underground water table and karst surface lowering. When planning and choosing the alternatives of laying out one must consider geological, geomorphological, speleological and hydrogeological circumstances and the integrity of karst regions where motorways are constructed. We tried to avoid important karst phenomena as are collapse dolines, large dolines, caves and karst walls and by impermeable construction of a roadway we tried to prevent the pollution flowing from it into

underground waters. During the motorway construction after earthworks uncovered the karst surface and in places the roadway is cut deeper into it or rocks excavated by tunnels, numerous karst caverns opened reflecting the development of aquifer. We investigated all the caves, we studied sediments and flowstone in them and we tried to preserve more important ones as caves are an important part of our natural heritage. These researches supplemented new knowledge related to formation and evolution of karst. In particular important are new achievements related to unroofed caves and to their shape on the karst surface which can be usefully applied by planning new road sections. According to new experiences we may recognize them on the karst surface even before the earthworks started.

- 12 - 34 Knez, Martin; Slabe, Tadej: Morphological characteristics of Lunan stone forests (China). In: Abstracts of conference papers, (Transactions, 22/4), The Japanese Geomorphological Union, C-127, Kyoto, 2001.**

The stone forests were formed by the denuding of carbonate rock previously covered with deposits and soil. In addition to underground factors and rain, their topographical position and the presence of karstic caves, their shape is determined primarily by the rock. They developed in horizontal and vertical strata tectonized by vertical faults and fissures. The various types of rock forest which have developed under almost identical conditions indicate that the diverse forms of the pillars are the result of the distribution and density of the fissures, startification and diverse composition of the rock. The rock forms on the pillars are divided into: subcutaneous, forms carved by rainwater and combined rock forms, which are subcutaneous rock forms co-formed or transformed by rainwater.

- 12 - 35 Knez, Martin; Slabe, Tadej: Unroofing of the cave system - an example of the Classical Karst. In: Speleology in the third millenium: sustainable development of karst environments, Proceedings, 80, Brasilia, 2001.**

Old caves are being exposed due to lowering and dissecting of a karst surface. The surface either uncovers or intersects them. In the first case the unroofed caves display the form of an oblong indentation and in the second a doline-like feature. Repeatedly intersected passage is shown as a series of described features. The most expressive are these features when the transport of sediments out of the caves is faster than the lowering of the nearby carbonate surface. A bigger cave system near Kozina indicates a diversity of exposing types. A smaller and already vacant passage was known before the earth works for motorway construction started. Other passages were filled up by fine-grained and gravel flysch deposits. Some of them have a thin roof other were roofless already. At the surface parts of a cave system are seen as a system of different indentations and doline-like features.

- 12 - 36 Kogovšek, Janja: Visoka voda jeseni 2000. Naše jame, 43, 68-74, Ljubljana, 2001.**

- 12 - 37 Kogovšek, Janja: How the Malenščica karst spring, Slovenia is feed - Results by environment and artificial tracers. In: Seiler, Klaus-Peter, Wohnlich, Stefan: New approaches characterizing groundwater flow: proceedings of the XXXI International Association of hydrogeologists Congress, Munich, Germany. Balkema, Lisse, pp.129-133, 2001.**

The Malenščica karst spring on Planina karst polje is captured for water supply of Postojna and Pivka communities. By tracing method of environmental tracers such as temperature,

- conductivity, nitrate, sulphate, calcium, magnesium, o-phosphate levels, turbidity and by artificial tracer Uranin, we studied the dynamics of inflow from separate contributing areas. After first intensive autumn rain the first to drain is the old water from well permeable part followed by squeezing of old water out of less permeable part of aquifer and consecutive rise in rapidly infiltrated rainfall and rise of secondary feeding by washing off the pollution.
- 12 - 38 Lauritzen, S. E.: Kjemiske likeveter og korrosjonskinetikk i karst. In: Lauritzen, S.E., (Ed.) *Karstmorfologi og Speleologi*, pp. 1-133, Geologisk Institutt, UiB, Bergen, 2001.
- 12 - 39 Lee-Thorp, J.; Holmgren, K.; Lauritzen, S. E.: Rapid climate shifts in the southern African interior throughout the mid to late Holocene. *Geophysical Research Letters*, 28, 4507-4510, 2001.
- 12 - 40 Linge, H.; Lauritzen, S. E.; Baker, A.; Proctor, C.J.: Luminescent growth banding and stable isotope stratigraphy in a stalagmite from northern Norway: preliminary results for the period AD 1734 to 955 BC. *Proc. 13. Int. Speleol. Congr. Brasilia*, 1, S15-S20, 2001.
- 12 - 41 Linge, H. C.; Lauritzen, S. E.; Lundberg, J.: Stable Isotope stratigraphy of a last interglacial speleothem from Rana, northern Norway. *Quaternary Research*, 56, 155-164, 2001.
- 12 - 42 Linge, H. C.; Lauritzen, S. E.; Lundberg, J.; Berstad, I. M.: Isotope stratigraphy of Holocene speleothems: examples from a cave system in Rana, northern Norway. *Palaeogeography Palaeoclimatology Palaeoecology*, 167, 209-224, 2001.
- 12 - 43 Linge, H. C.; Lundberg, J.; Lauritzen, S. E.: Isotope stratigraphy of Holocene speleothems: an example from Fauske, northern Norway. *The Holocene Submitted*, 2001.
- 12 - 44 Lundberg, J.; Lauritzen, S. E.: Isotope Stage 11, the "Super- Interglacial" from a North Norwegian Speleothem. In: Sasowsky, I.D. & Mylroie, J.E., (Eds.) *Studies of Cave Sediments*, p. 15, Kluwer Academic/ Plenum Publishers, New York, 2001.
- 12 - 45 Marker, M. E.; Goldie, H. S.: Pre-Last glacial karst dolines: distribution and differences. *Past, Present and Future. Monitoring and Managing Change at Malham Tarn. Field Studies Council, Malham Tarn Field Centre, Yorkshire*. Pp. 20-23, 2001.  
Preliminary work on large dolines, or surface karst depressions, up to 750 m in diameter, has been extended to wider areas of the Yorkshire Dales National Park. Dolines have been mapped and about 25% have been checked on the ground. The plateau area north of the field centre at Malham has a high density of deep, rocky large depressions. Clusters also occur east of Langcliffe and to the south of Malham Tarn. A map is presented indicating doline locations and the locations of old karstic features. The scale and location of the depressions suggest considerable age. The Craven Fault system influences their development. Widespread loess deposits are identified.

- 12 - 46 **Olsen, L.; Sveian, H.; Bergstrøm, B.; Selvik, S. F.; Lauritzen, S. E.; Stokland, Ø.; Grøsfjeld, K.: Methods and stratigraphies used to reconstruct Mid- and Late Weichselian palaeoenvironmental and palaeoclimatic changes in Norway. Norges Geologiske Undersøkelse, Bulletin 438, 21-46, 2001.**
- 12 - 47 **Olsen, L.; van den Borg, K.; Bergstrøm, B.; Sveian, H.; Lauritzen, S. E.; Hansen, G.: AMS radiocarbon dating of glacial sediments with low organic carbon content - an important tool for reconstructing the history of glacial variations in Norway. Norsk Geologisk Tidsskrift, 81, 59-92, 2001.**
- 12 - 48 **Skutlberg, S.; Øvrevik, R.; Hestangen, H.; Lauritzen, S. E.: The Gronli-Seter cave system, Mo i rana, Norway: morphology, hydrology and sedimentology. 10th spel. School, Postojna, 1, 1, 2001.**
- 12 - 49 **Tyc, Andrzej: Research and protection of the travertine mound and the cave in Laski, the Silesian Upland. Slovensky Kras, XXXIX, 161-169, Liptovský Mikuláš, 2001.**  
Travertine mound and cave developed in it, located in Laski, vicinity of Olkusz (South Poland) as well as their protection is presented in paper. The mound is located in the area of spread occurrence of Pleistocene sands overlying Triassic carbonates and shists. Travertine mound was formed in seepage spring zone inhabited by hydrophile mosses, while the calcification of mosses took place with contribution of ascending waters at normal temperature. Radiocarbon age of travertine was estimated for the period of 8350 BP to 2200 BP. Small, 8 m long, cave was formed due to removal of partly cemented sands in the base of travertine mound and later enlarge of crevice within travertine by water. This is only one cave in travertine in Poland. Recent hydrogeological conditions of the area of mound occurrence and land subsidence processes are presented. Author emphasises the role of local community in protection of this unique site.
- 12 - 50 **Tyc, Andrzej: [Most attractive objects and phenomena of inanimate nature of the "Orle Gniazda" Landscape Park]. Zespół Parków Krajobrazowych Województwa Śląskiego, 135 p., Dąbrowa-Gornicza - Bedzin, 2001.**  
The book deals with inanimate nature and landscape of "Orle Gniazda" (Eagle Nests) Landscape Park, the largest protected karst area in Poland (Cracow-Czestochowa Upland). General and detail descriptions of karst and caves of the area, as well as their protection cover important part of the book.
- 12 - 51 **Urlich, P. B.; Day, M. J.; Lynagh, F.: Policy and practice in karst landscape protection: Bohol, the Philippines. The Geographical Journal, 167 (4), 305-323, 2001.**

## YEAR 2002

- 12 - 52** **Andreo, B.; Vías, J.M. ; Perles, M.J.; Carrasco, F. ; Vadillo, I. : Jiménez, P.: Ensayo metodológico para la protección de aguas subterráneas en acuíferos carbonatados. Aplicación al sistema de Torremolinos. Jornadas sobre Presente y Futuro del Agua Subterránea en España y la Directiva Marco Europea. IAH-Spanish Chapter, 147-153, Zaragoza, 2002.**  
K.W.: Sierra de Mijas, South of Spain, Torremolinos, groundwater vulnerability mapping.
- 12 - 53** **Bárány-Kevei, I.; Hoyk, E.: Morphometrical parameters of Hungarian dolines. Theoretical and Applied Karstology Symposium, XVIII. Băile Herculane - Romania. May 24-28, 2002. pp34-37, 2002. <http://www.geocities.com/karstology/abstracts.pdf>**  
Morphology of dolines indicates the characters of doline-development depend on exogenic factors. The climate and the microclimate play the most important role of doline development. The soils covering the karst-forming rock, through the a-biogeneous and biogeneous processes going on in them, indicate the nature and the order of magnitude of the corrosion process. The paper permitted to identify first of all the connection between the doline asymmetry and ecological processes.
- 12 - 54** **Berstad, I.M.; Lundberg, J.; Lauritzen, S. E.; Linge, H. C.: Comparison of the Climate during Marine Isotope Stage 9 and 11 inferred from a speleothem isotope record from northern Norway. Quaternary Research, 58, 361-371, 2002.**
- 12 - 55** **Chiesi, M.; Cigna, Arrigo A.; Fadda A.; Fancello L.; Forti, P.; Grafitti, G.; Murgia, F.; Naseddu, A.; Perna, Giuliano: La Grotta delle Lumache di Buggerru (CA), risultati preliminari del monitoraggio ambientale e delle ricerche scientifiche finalizzati alla definizione del livello di fruibilità compatibile. Atti Convegno di Studio "Il carsismo e la ricerca speleologica in Sardegna, Cagliari, 23-25 novembre 2001. Anthéo, Boll. Gr. Speleo-Archeol. G. Spano, Cagliari, 143-160, 6. Dic. 2002.**  
[The "Grotta delle Lumache" of Buggerru (SA/CA 1827): preliminary results of the environmental monitoring and of the scientific researches aiming to the definition of the compatible fruition level].  
K.W.: Environmental monitoring, microclimate, show cave, Sardinia.  
From a couple of years the Italian Speleological Society is strongly engaged to avoid the possibility to transform a wild cave into a show cave, without preliminary studies to define its intrinsic characteristics in order to ensure, first of all, the complete safeguard of the cave, and also to supply useful elements to evaluate its peculiar visitor capacity as well as the main scientific and/or didactic interests. The microclimatic study put in evidence that inside the Lumache Cave the exchanges between external and internal atmosphere are rather small, while the water supply is scarce and is due only to the rainfall infiltration. Nevertheless the energy level of the cave is not very low on account of the solar energy which reaches the cave because it develops very close to the surface. This fact suggests, for the cave, a low to medium level of didactic and/or tourist frequentation (up to 30-50 persons per day) without causing a displacement of its environmental parameters larger than the natural fluctuations. Amongst the most important scientific results, are those achieved in the paleoseismicity of the area, in the ecological populations and in the archaeological

aspects. In the paper such scientific results are reported and discussed from the point of view of a possible transformation of the cave into a show cave, to be included into a wide general project of the eco-compatible tourism, which is now under definition for the whole "Parco Geominerario Storico e Ambientale" of Sardinia.

**12 - 56 Cigna Arrigo, A. (Ed.): Monitoring of caves - Conclusions and recommendations. Acta carsologica, 31/1, 175-177, Ljubljana, 2002.**

In order to reduce the human impact on cave environment, a show cave must be monitored. The most relevant parameters to be monitored are:

- Air temperature (°C)
- Water temperature (°C) (if applicable)
- Relative humidity (%)
- CO<sub>2</sub> concentration (ppm)
- Radon concentration (Bq/m<sup>3</sup>)

A frequency of four measurements per day (e.g., at 6:00, 12:00, 18:00 and 24:00) is suitable in most cases. A preliminary monitoring network should be operated at least for one year, and possibly for two, if it has to be replaced by an automatic monitoring network.

**12 - 57 Day, M. J.: The role of valley systems in the evolution of tropical karstlands. In: Evolution of Karst: From Prekarst to Cessation, ed. F. Gabrovšek, Založba ZRC, 235-241, Ljubljana, 2002.**

**12 - 58 Day, M. J.; Koenig, S.: Cave monitoring priorities in Central America and the Caribbean. Acta carsologica, 30/1, 123-134, Ljubljana, 2002.**

**12 - 59 Eberhard, Stefan: Jewel Cave Karst System, Western Australia: Environmental hydrogeology and groundwater Ecology. Augusta Margaret River Tourism Association Inc., Western Australia, 121 pp. 2002. (Available as a printed A4 report or as a PDF file on CD-ROM).**

A detailed study of the hydrology, ecology and management aspects of the Jewel Cave Karst System which is part of the syngenetic karst that forms in the Quaternary dune limestone belt along the western Australian coast. The system is a group of horizontal maze caves, with evidence of multiple stages of solution, draining, collapse, sedimentation and speleothem development - all of which are related to a complex history of water table fluctuations within a vertical range of 5 metres. The sequence is well calibrated by radiocarbon and uranium series dates for the last 35ka, and parts of the cave system are older than 627 ka. The system differs from cave patterns elsewhere in the region which have linear stream passage forms. The aquifer has a triple porosity comprising the intergranular matrix, joints and bedding planes and the cave conduits. The saturated zone has a thickness of 2-6 m and is perched on the granitic basement. The study was stimulated by a drop in the water table over the last 25 years that had affected the lakes in the tourist caves and possibly threatened root-mat and other aquatic cave communities. The most likely cause of the water table decline has been a reduction in groundwater recharge due to an increase in the dense understory vegetation and ground litter as a result of the decrease in fire frequency over the last 25 years. The species and communities present in the caves are documented.

- 12 - 60 Häuselmann, P.; Jeannin, P. Y.; Lauritzen, S. E.; Monbaron, M.; Schlüchter, C.: **Dating of continental ice oscillations by cave sediments. Poster, 2002.**
- 12 - 61 Hazebroek, Hans P.; Abang Kashim bin Abang Morshidi: **A guide to Gunung Mulu National Park. A World Heritage site in Sarawak, Malaysian Borneo. Natural History Publications, Nov, i-xii, 91 pp. (91 fig.), 2002.**  
K.W.: Covers all aspects of the park, but with little emphasis on caves.
- 12 - 62 Karp, D.; Lauritzen, S. E.: **Karst Landforms of the Tindal Plain, NT Australia 1:50 000. Lands Planning Environment. Northern Territory Government, 2002.**
- 12 - 63 Kasim, Osman; Rahimatsah, Amat; Suksuwan, Surin (eds): **Pearl of Perlis. Perlis State Park guide. Jabatan Perhutanan Negeri Perlis, 116 pp. (maps, photos), 2002.**  
The Perlis State Park contains Peninsula Malaysia's longest limestone range, and is an important area for its caves and biodiversity. Limestone, caves, flora, fauna, geology.
- 12 - 64 Keveiné Bárány, I.: **Jakucs László, a tudományszervező [Scientific organising of Jakucs László]. Karsztfeljlődés. VII. Szombathely. pp.11-17, 2002.**  
László Jakucs won the respect of all all karst scientist around the world and leaves a very fine scientific legacy. Lot of karst researcher known and followed his ideas on karst evolution. The paper summarise the scientific thesis and scientific organising activity of László Jakucs.
- 12 - 65 Keveiné Bárány, I.; Zseni, A.; Kaszala, R.: **A talaj és a növényzet nehézfém-tartalmának vizsgálata karsztos területen [Investigation of heavy metal content of vegetation and soil on karstic area]. Karsztfeljlődés. VII. Szombathely, pp. 297 - 315, 2002.**  
The heavy metal content of soils and plants in two dolines was examined in the karstic region of Bükk Plateau and Aggtelek Karst (North-East Hungary). The ecological condition can vary in short distances in dolines according to the different slope exposures so the characteristics of soils and plants are also variable. The paper introduces the results of heavy metal analysis of soils and plants.
- 12 - 66 Keveiné Bárány, I.: **Környezeti hatások a karsztökológiai rendszerben [Environmental impacts on karstecological system]. In.: Jakucs László, a tudós, az ismeretterjesztő é a művész. (Szerk.: Mészáros R.-Schweitzer F. - Tóth J.) pp. 139-150, 2002.**  
The paper discuss the environmental impacts which have changed the karstecological system. It shows the extreme microclimate of dolinas, degradation of the vegetation and the heavy metal contamination of karstic soils in Hungary.
- 12 - 67 Knez, Martin: **Škocjanske jame caves, Geology of Škocjanske jame. In: Gabrovšek, Franci: Programme and guide booklet for the excursions : evolution of Karst: from Prekarst to Cessation, 3-4, Postojna, 2002.**  
K.W.: bedding-plane, fault, Upper Cretaceous limestone, Paleogene limestone.
- 12 - 68 Knez, Martin; Šebela, Stanka: **Suggestion for some examples of geological heritage, Škocjanske jame caves and Postojnska jama cave system. In: Zupan Hajna, Nadja (Ed.). The use of modern technologies in the development of caves for tourism, Ex-**

**cursions guide book & abstracts, Postojnska jama, turizem, Karst Research Institute ZRC SAZU, 37, Postojna, 2002.**

The approach to present a geological heritage in show caves in Slovenia (Škocjanske jame caves and Postojnska Jama cave system) should be refreshed. The guides generally talk about speleological heritage, which includes also some examples of geological heritage as stalactites, stalagmites, paleontological remains, cave sediments, breakdown blocks. But geological elements as bedding planes, faults, fissures are discussed very rarely. From two Slovene show caves we can present also examples of interbedded slip, fault zone, chert lens, tectonic slickenside, etc. We suggest to add more geological information to regular show cave visits.

**12 - 69 Knez, Martin; Slabe, Tadej: Lithologic and morphological properties and rock relief of the Lunan stone forest. In: Gabrovšek, Franci (Ed.). Evolution of karst: from prekarst to cessation, Založba ZRC, 259-266, Ljubljana, 2002.**

Stone forests emerged when carbonate rock previously covered with sediment and soil became exposed. Along with subcutaneous factors, rain, their topographical position and karst perforation, their shape and size were primarily determined by the rock itself. The forests developed in horizontal or gently sloping rock strata cleft by vertical joints and fissures. Diverse examples of stone forests that formed in almost identical conditions show that the shape of the pillars is mainly the consequence of the distribution and density of fissures in the rock, its stratification, and different rock strata composition. The rock forms on the pillars are divided into subcutaneous forms, composed rock forms, and forms shaped by rainwater. The composition of the rock enables their creation and influences their shape and distribution.

**12 - 70 Kogovšek, Janja: Postojnska jama cave system, Polluted percolating water in Kristalni rov. V: Gabrovšek, Franci. Programme and guide booklet for the excursions : evolution of Karst: from Prekarst to Cessation. Karst Research Institute, ZRC SAZU, 17-18, Postojna, 2002.**

**12 - 71 Kogovšek, Janja, Petrič, Metka: Ogroženost kraškega sveta. In: Ušeničnik, Bojan. Nesreče in varstvo pred njimi. Uprava RS za zaščito in reševanje Ministrstva za obrambo, pp. 170-183, Ljubljana, 2002.**

**12 - 72 Kompare, Boris; Atanasova, Nataša; Babič, Renato; Panjan, Jože; Bulc, Tjaša; Cerar, Uroš; Rodič, Primož; Knez, Martin; Kogovšek, Janja; Petrič, Metka; Pintar, Marina: [Odvodnja avtocest in zaščita voda: analiza delovanja čistilnega objekta na krasu]. In: Vilhar, Matija (Ed.). 6. slovenski kongres o cestah in prometu, Zbornik referatov. Družba za raziskave v cestni in prometni stroki Slovenije, 93-102, Ljubljana, 2002. K.W.: highway, karst, water pollution.**

**12 - 73 Kompare, Boris; Atanasova, Nataša; Bulc, Tjaša; Cerar, Uroš; Knez, Martin; Kogovšek, Janja; Panjan, Jože; Petrič, Metka; Pintar, Marina; Rodič, Primož: [Zaščita hidrosfere pred spiranjem in dreniranjem z avtocest]. In: Gregorič, Matej, Krulec, Aleš, Holobar, Andrej (Eds.). Varstvo in kvaliteta pitne vode, Zbornik seminarja, 60-68, Ljubljana, 2002.**

K.W.: hydrosphere, highway, karst, water pollution.

- 12 - 74 Kueny, J. A.; Day, M. J.: Designation of protected karstlands in Central America: A regional assessment. *The Journal of Cave and Karst Studies*, 64 (3), 165-174, 2002.
- 12 - 75 Latiff, A.; Kasim, Osman; Yusoff, A. Rahaman; Faridah-Hanum, I.: Biodiversity and management of Perlis State Park. Physical, biological and social environments of Wang Mu. [Kepelbagaian biologi dan pengurusan Taman Negeri Perlis. Persekitaran fizikal, biologi dan sosial Wang Mu]. Dept. of Forestry (Jabatan Perhutanan) Perlis, 407 pp., 2002.  
The Perlis State Park contains Peninsula Malaysia's longest limestone range, and is an important area for its caves and biodiversity.
- 12 - 76 Lauritzen, S. E.: 'Grotto 2'; et Turbo Pascal program for grottekartlegging. *Norsk Grotteblad*, 22, 28-60, 2002.
- 12 - 77 Lauritzen, S. E.: Grotto 3.21. Program for processing, analysing and plotting of cave survey data, 2002.
- 12 - 78 Lauritzen, S. E.: Kompendium i Grottekartlegging. *Norsk Grotteblad*, 22, 1-27, 2002.
- 12 - 79 Lauritzen, S. E.: Marble Stripe Karst of the Scandinavian Caledonides. 25th NGW Meeting, Reykjavik, 1, 125, 2002.
- 12 - 80 Lauritzen, S. E.: Marble Stripe karst of the Scandinavian Caledonides: An end-member in the contact karst spectrum. *Acta carsologica*, 30, 47-79, Ljubljana, 2002.
- 12 - 81 Lim, Chan Koon; Earl of Cranbrook: Swiftlets of Borneo. *Natural History Pubs*, Jan, 171, pp. (132 figs, maps), 2002.  
Many caves in Borneo are home to swiftlets and their nest collection is an important and economic industry.
- 12 - 82 Lundberg, J.; Lauritzen, S. E.: The search for an arctic coastal karren model in Norway and Spitzbergen. In: Hewitt, K., Byrne, M.L., English, M. & Young, G., (Eds.) *Landscapes in Transition*. Pp. 185-203, Kluwer Academic Publishers, The Netherlands, 2002.
- 12 - 83 Onac, B. P.; Constantin, S.; Lundberg, J.; Lauritzen, S. E.: Isotopic climate record in a Holocene stalagmite from Ursilor Cave (Romania). *Journal of Quaternary Research*, 17, 319-327, 2002.
- 12 - 84 Østbye, E.; Lauritzen, S. E.; Moe, D.; Nordby, O.; Østbye, K.; Fredriksen, T.; Langhelle, G.: Vertebrate remains in Holocene cave sediments: excavations in the Sirijorda cave, northern Norway. I. Shrews (Soricidae). In manus, X, 1-25, 2002.
- 12 - 85 Petrič, Metka: Characteristics of recharge-discharge relations in karst aquifer. *Zbirka Carsologica*, Inštitut za raziskovanje krasa, ZRC SAZU, Založba ZRC, 154 pp, Ljubljana, 2002.

The book presents the analysis of relations between recharge and discharge of karst aquifers, i.e. input and output functions of karst system, which can be applied in order to define the characteristics of its functioning. Three different recharge-discharge models were set up. In the first one the measured precipitation and in the second the effective infiltration were used as the input component. In the third model also characteristics of the sub-system of unsaturated zone and the temporal distribution of the recharge in fast and slow component were taken into account. The functioning within the system was expressed by the transfer function between the input and the output signal, and the adequacy of individual models was evaluated according to the accuracy of the simulation, which is related to the transfer function's ability to reproduce discharges, on the basis of which it was determined. The improvement in the model's results, brought about by the introduction of the effective infiltration function instead of the precipitation, highlighted the significant influence exerted by the vegetation and processes in air and in the soil on the quantity and the temporal distribution of actually infiltrated water. The best results of the third model could be related to the existence of the certain mechanism that enables rapid entrance of the infiltrated precipitation water into karst drainage network and brings about as its consequence a typical reaction of karst springs, i.e. their rapid and intensively increased discharge. On the other hand, such mechanism enables a part of infiltrated precipitation to be temporarily stored during high waters and subsequently sustains the slower emptying of the aquifer also in period of low waters.

**12 - 86 Price, Liz: Dark Cave surveys. Malaysia Naturalist 55 (4), 38-39 (phot. surv.), 2002.** Dark Cave at Batu Caves, Malaysia has been well studied and documented over the last 120 years. Several surveys have been drawn and this article describes the various surveys.

**12 - 87 Pulina, Marian; Tyc, Andrzej; Zaba, Jerzy: The role of endogenic processes in evolution of karst in Central European Mesozoic platform (example of South Polish Uplands). In: Gabrovšek, Franci (ed.), Evolution of Karst: From Prekarst to Cessation, pp. 425-432, Ljubljana-Postojna, 2002.**

The paper deals with the geological conditions and karst of Cracow-Silesia homocline, the main part of the Central European Mesozoic platform, with reference to the Hamburg-Cracow fault zone, occurring in the Paleozoic base. In the discussed area the activity of Cracow-Lubliniec fault zone as segment of the Hamburg-Cracow transcontinental tectonic line, is manifesting by different phenomena till present-day times. Specific configuration of the base of the complex of Mesozoic carbonate rocks multiple occurrence of magmatic and hydrothermal phenomena as well as intensified emanation of juvenile CO<sub>2</sub> are connected with this activity from Paleozoic to Cainozoic. Symptoms of its activity and influence on karst evolution can be seen in presence of large morphological depressions of karst origin, specific peleo-karstic phenomena (with occurrence of Mississippi-Valley type of Zn-Pb deposits) and in contemporary hydro-geochemical environment. The theses presented in the paper, concerning the Cracow-Silesia Upland as well as cited examples related to the neighbouring regions put in new light the age of karst development and the contribution of endogenic processes in this development in relation to the role of climatic conditions.

**12 - 88 Trofimova, Elena: The moisture of the condensation in caves of Olkhon region (western shore of the lake Baikal). Theoretical and Applied Karstology, 22-24, Băile Herculane, Romania, 2002.**

The moisture of the condensation is the important component of the water balance, especially in the steppe karstic regions. The calculations of the moisture of the condensation for the Olkhon region were carried out using the data of the microclimatic observations during the five years in two caves - Mechta and Bolishaya Baidinskaya. According to our estimations the considered value is of 7,5 % of the annual average precipitations.

- 12 - 90 Zboray, Z.; Keveiné Bárány I.: Tájékológiai vizsgálat karsztos mintaterületen műholdfelvételek és térinformatikai módszerek segítségével [Landscape ecological investigation on karst with supporting of Landsat image and GIS method]. Karsztfejlődés VII. Szombathely, pp.149-159, 2002.**

The paper presents vegetation changes on the Nagy-Fennsík of Bükk Mountains. Patches of vegetation were limited with the help of aerial photos and Landsat image to show landscape change. The paper shows some possible application of GIS in karst research.

- 12 - 91 Zhang, C.; Day, M. J.: A web-based conservation spatial decision support system for the Lunan Stone Forest landscape. In: International Conference on Computer Graphics and Spatial Information Systems, ed., Onyang Zhiyun and Cong Shengri, China Meteorological Press, 653-661, 2002.**

- 12 - 92 Zhang, C.; Day, M. J.: Development of a Spatial Decision Support System on the Internet for conservation of Stone Forest landscape in Lunan, China. Proceedings, UCGIS Summer Assembly 2002, ([www.cobblestoneconcepts.com/ucgis2summer2002/zhang/zhang.htm](http://www.cobblestoneconcepts.com/ucgis2summer2002/zhang/zhang.htm)), 14 p., 2002.**

- 12 - 93 Zseni, Anikó: The role of soil cover in the evolution of karrenfelds. Proc. Symposium „Evolution of karst: from prekarst to cessation” (ed. F. Gabrovšek), 299-306, Postojna-Ljubljana, 2002.**

Soil samples were collected on limestone pavement areas of North England and on Karrenfelds of Aggtelek Karst and Villányi Mountain, Hungary. Samples are from different solutional and tectonical features of the limestone. During the examination the pH and carbonate content of soils were measured. The comparison of the Hungarian and English soils result in the following: (i): Great differences can be found in soil pH according to the different karstic features in the case of the English samples. In spite of the similarly rich variety of karstic features and forms in short distances in the Hungarian Karrenfelds the results show only minor differences in soil pH. (ii): The results of the English measurements verify that the soils with lower pH are related to deeper solution features. (iii): The neutral and weakly basic pH-values of Hungarian soil samples came from deep and well-developed solutional forms suggest the protection of the underlying limestone almost completely from dissolution (although the carbonate contents are low). (iv): Comparisons between soils, which connect directly and do not connect directly with limestone verify the proximity to limestone causes a higher soil-pH, while soils, which do not have direct contact with limestone have a lower, acid pH.

- 12 - 94 Zseni, Anikó: Karrmezők talajainak vizsgálata magyarországi és angol területeken (Investigation of the soils of karrenfelds in Hungarian and English areas). Karsztfejlődés VII., 281-295, Szombathely, 2002. (in Hungarian)**

- K. W.: limestone pavements, karrenfelds, karren-forms, dissolution of karren, soil-filling, soil-pH.
- 12 - 95 Zupan Hajna, Nadja: Postojnska jama cave system, Geology. In: Gabrovšek, Franci (Ed.). Programme and guide booklet for the excursions : evolution of Karst: from Prekarst to Cessation, september, 17th-21st, 2002. Postojna: Karst Research Institute ZRC SAZU, 6-14, 2002.
- 12 - 96 Zupan Hajna, Nadja: Postojnska jama cave system, History of exploration and tourism. In: Gabrovšek, Franci (Ed.). Programme and guide booklet for the excursions : evolution of Karst: from Prekarst to Cessation, september, 17th-21st, 2002. Postojna: Karst Research Institute ZRC SAZU, 20-22, 2002.
- 12 - 97 Zupan Hajna, Nadja: Chemical weathering of limestones and dolomites in a cave environment. In: Gabrovšek, Franci (Ed.). Evolution of karst: from prekarst to cessation, (Carsologica). Postojna: Inštitut za raziskovanje krasa ZRC SAZU; Ljubljana: Založba ZRC, 347-356, 2002.  
The weathered parts of carbonate bedrock on cave walls are a consequence of its incomplete chemical dissolution. The phenomenon is expressed in parts of the caves where walls are in contact with clastic fluvial sediments, wetted by percolation water or wetted by condensation water, and not rinsed by flowing or dripping water. The temperature in the cave is not an important parameter of weathered zone formation. Incomplete dissolution is characteristic both of Alpine and of Mediterranean caves. Limestone or dolomite are dissolved by corrosive moisture; the dissolution is distinctly selective and it goes on at intervals depending on inflow of new aggressive water. The weathered zone of limestone or dolomite is almost identical to the parent rocks in its chemical and mineral composition yet it is much more porous. During chemical weathering the amount of Mg, Sr and U is decreased, these components being leached out of limestone and dolomite. The amount of insoluble residue is usually higher in weathered limestones and in some other cases in fresh limestones which are not very common but it may occur.
- 12 - 98 Zupan Hajna, Nadja: Excursions guide book. In: Zupan Hajna, Nadja (Ed.). The use of modern technologies in the development of caves for tourism: excursions guide book & abstracts. Postojna: Postojnska jama, turizem: Karst Research Institute ZRC SAZU, 1-25, 2002.
- 12 - 99 Zupan Hajna, Nadja: Karst and caves in Slovenia In: ZUPAN HAJNA, Nadja (Ed.). The use of modern technologies in the development of caves for tourism, Excursions guide book & abstracts, Postojnska jama, turizem, Karst Research Institute ZRC SAZU, 48, Postojna, 2002.
- 12 - 100 Zupan Hajna, Nadja: Speleomorfološke in geološke značilnosti Beško-Ocizelskega jamskega sistema. In: Horvat, Aleksander, Košir, Adrijan, Vreča, Polona, Brenčič, Mihael (Eds.). 1st Slovenian Geological Congress, Črna na Koroškem, 9.-11. oktober 2002. Book of Abstracts. Ljubljana: Geološki zavod Slovenije, 106, 2002.

- 12 - 101 Zupan Hajna, Nadja: Relation between autochthonous chemical and mechanical erosion during karst caves development. In: Programme with abstract of papers and list of participants. Zagreb: Croatian Geomorphological Society, 43, 2002.**

Acquired knowledge of the composition of the carbonate rocks weathered zones and of the processes that are taking place during dissolution, as well as knowledge of the formation of autochthonous carbonate clastic sediments, the speleogenetic processes and the formation of karst cave passages may be additionally explained. It became manifest that the removal of the limestone from its primary place is not always conditioned merely by dissolution, but is in the case when water washes the exposed carbonate particles from the cave passages walls and mechanically carries them away, limited also by transportation. The occurrence of the incomplete dissolution of carbonate rocks within speleogenesis may represent an important factor for the formation of initial channels. During the chemical weathering the enlargement of pores and the expansion of their interconnections is consequentially leading to the formation of initial channels. Incomplete dissolution accompanied with the simultaneous washing away of the weathered rock is also accelerating the growth of passages. Hindrances to the passage's growth may occur only at a stage when they are still very small and may get filled up by the newly formed carbonate silt or clay. The accelerated enlargement of the passage's dimensions is conditioned by occasional or exceptional washing away of thicker weathered zones of limestone or dolomite which follows extremely abundant precipitations or floods.

- 12 - 102 Žumer, Jože; Zupan Hajna, Nadja: First research of submarine springs in front of Izola. In: Horvat, Aleksander, Košir, Adrijan, Vreča, Polona, Brenčič, Mihael (Eds.). 1st Slovenian Geological Congress, Črna na Koroškem, 9.-11. oktober 2002. Book of Abstracts. Ljubljana: Geološki zavod Slovenije, 107-108, 2002.**

- 12 - 103 Žumer, Jože; Zupan Hajna, Nadja: First research of submarine springs in front of Izola - preliminary results. In: Programme with abstract of papers and list of participants. Zagreb: Croatian Geomorphological Society, 44, 2002.**

Recently submarine springs were found in front of Izola. Nearby Paleocene limestone of Izola karst considered to be close to the sea bottom. On the coast it is covered with Eocene flysch sediments. Until now, six depressions were found to be springs of sulphuric thermal water, with temperatures between 20 and 30°C and estimated flow rates up to 1000 l/min. The depressions with strongest springs are funnel like with distinctive abysses on the bottom and relative depths up to 13 m. Depressions with lower flow rates are more flat.

## YEAR 2003

**12 - 104 Ahmadipour, Mohamad Reza: Karst Springs of Alashtar, Iran. Acta carsologica, 32/2, 244-254, Ljubljana, 2003.**

Alashtar area is situated in the western part of Iran. The Jurassic Cretaceous dolomitic limestone covers most of the area. There are 5 karstic springs named as Amir, Chenare, Zaz, Honam and Papi. All the springs except the Papi emerge from the Jurassic-Cretaceous limestone. The Papi Spring discharges at the contact of the Jurassic-Cretaceous and the Marly limestone of Eocene age. The springs show variation of discharge during the different periods. Faults and the lineaments are the main avenues for the emergence of the springs. The springs are responsible for the rivers in the plain. The fractures are classified as thrust and normal faults. The faults are mostly formed at the junction of the surrounding carbonate rocks which give a graben structure to the plain. The springs have an important role in recharging the plain. It is due to the fractures and the springs that the plain aquifer has a high potential of water. The discharge of some of the wells is more than 60 l/s. The discharge of the springs varies considerably during the year. Out of these, the Amir, Chenare and Honam springs are considered as permanent springs. The annual discharge of the springs is 111 MCM. The hydrochemical analyses of the springs show that all of them are of carbonate type.

K.W.: karst hydrology, karst spring, Alashtar, Iran.

**12 - 105 Alexandrowicz, Stefan Witold ; Alexandrowicz, Zofia: Pattern of karst landscape of the Cracow Upland (South Poland). Acta carsologica, 32/1, 39-56, Ljubljana, 2003.**

The relief of the Polish Jura Chain developed since Paleogene under climatic conditions changing considerably. Their main components are a peneplain crowned by numerous monadnocks, generated as hard-rocks on Upper Jurassic massive limestones (bioherms, carbonate buildups) surrounded by less resistant platy and bedded limestones of the same age. After the Miocene tectonic phase and following karstification deep valleys dissected the top surface of the plateau and cave levels connected with rocky terraces had been formed. During the Pleistocene the periglacial climate accelerated the congelifraction and relaxation of monadnocks. The modification of landforms and the environment in last ten thousand years, indicated by assemblages of molluscs was controlled by both climatic and anthropogenic factors. The geo- and biodiversity closely related to one another are still under the nature protection.

K.W.: karst relief, monadnocks, malacofauna, environment, nature protection, Cracow Upland, Poland.

**12 - 106 Andrejczuk, Wiaczeslaw; Klimchuk, Alexander: [Mechanisms of solution collapses and subsidence creation in gypsum karst at Foothill of the Ural Mts. (on the base of observations in Kungurska Cave)]. Geographia, Studia et Dissertationes, T. 26, 7-44, Katowice, 2003.**

Foothill of the Ural Mts. is classic example of gypsum karst, where significant areas of gypsum and anhydrite of Permian are karstified. Intense development of karst causes appearance of many problems of practical nature. Formation of solution collapses are among most important one. Paper deals with mechanisms of collapse and subsidence formation. Investigation were performed in the area of largest gypsum cave in the region - Kungurska

Cave. Three basic ways of collapse formation: (1) gravitation-fall (deflection and collapse of roof over empty spaces), (2) infiltration-fall (fall of roofs over vertical karst abimes - karst organ) and (3) karst-tunneling (when loose cover sediments washing into fissures and empty places of karst origin). The danger of collapse formation was discussed and methods of its estimation were proposed.

- 12 - 107** **Andreo, B.; Goldscheider, N.; Vadillo I.; Vías, J.M.; Neukum, C.; Brechenmacher, J.; Carrasco, F.; Hötzl, H.; Jiménez, P.; Perles, M. J. ; Sinreich, M.: Application of the Pan-European approach for the protection of carbonate aquifer in the pilot site of Sierra de Lívar (South Spain). International Conference on Karst Hydrogeology and Ecosystems, Bowling Green (EEUU), 23, 2003.**

K.W.: COST 620, Sierra de Lívar, karst, intrinsic vulnerability, specific vulnerability, hazards, risks

- 12 - 108** **Andreo, B.; Liñán, C.; Carrasco, F.; Jiménez de Cisneros, C.; Caballero, F.; Mudry, J.: Influence of rainfall quantity the isotopic composition (18O and 2H) of water in mountainous areas. Application for groundwater research in the Yunquera-Nieves karst aquifers (S Spain). Applied Geochemistry, 19 (4) April 2004, 561-574, 2003.**

K.W.: Sierra de las Nieves, 18O and 2H, catchement areas, karst network

- 12 - 109** **Angelova, Dora: Karst types in Bulgaria. Acta carsologica, 32/1, 9-18, Ljubljana, 2003.**

The karst in Bulgaria occupies an area of 26 170 km<sup>2</sup> or 22.7 % of the territory of the country. The karst water resources are estimated to be 2.3 billion m<sup>3</sup> or 11.6 % of the total water resources of the country. The interest in karst in Bulgaria has become higher during the last years because there are a number of practical problems that have to be solved. Karst in Bulgaria is characterized by great diversity due to the complex combination of factors (geological, tectonic, geomorphologic, hydrological and hydrogeological, climatic, etc.) and to the geodynamic development of this part of Europe. This work presents a new zoning of karst in Bulgaria. The following types have been distinguished: plain karst (the Danubian Plain); marine and transformed marine karst into plain and plain-marine karst (Black Sea subaqual and subareal plain); plateau-like karst (the Fore Balkan) and mountainous karst. The karst wetlands and karst phenomena provoked by paleoearthquakes are separately outlined and sample models for the different karst types, genesis, dynamics, lithostructural control, relations, etc. are presented.

K.W.: karst types, paleo and neokarst, zoning, Bulgaria.

- 12 - 110** **Angelova, Dora ; Belfoul, M'hamed Alaeddin ; Bouzid, Sophia ; Filahi, Mustapha; Faik, Farid: Paleoseismic phenomena in karst terrains in Bulgaria and Morocco. Acta carsologica, 32/1, 101-120, Ljubljana, 2003.**

During the recent years there has been a growing interest in recording and investigating the effects of paleoseismic events in surface and underground karst in almost all countries. Karst represents a reliable reference marker for understanding the potential seismicity in regions with instrumentally established low to moderate seismicity. The karst terrains in Bulgaria and Morocco occupy considerable areas. The disturbances in surface and underground karst had usually been provoked by catastrophic one-act events or by repeatedly activated movements by earthquakes. The catastrophic seismic events had disturbed the naturally

interrelated karst ecosystems and were the reason for rejuvenation, reactivation or attenuation of karst processes. The natural surface and underground relief had been partially or entirely destroyed; a new type of relief had been formed; the geological environment had been disturbed; changes occurred in the flowrate and direction of surface and underground karst water; wetlands of the gravitation type had been formed; natural caves, local grabens, rock-falls and landslides collapsed partially or entirely and terrains were subjected to subsidence and destruction; the ecological balance in urbanized territories had been disturbed. The present work considers the different types of paleoseismic phenomena in the karst terrains in Bulgaria and Morocco. Recommendations are given for the protection of these areas.  
K.W.: paleoseismic phenomena, karst, Bulgaria, Morocco, seismothems, seismogravitation forms.

**12 - 111 Aničić, Branka; Perica, Dražen: Structural Features of Cultural Landscape in the Karst Area (landscape in transition). Acta carsologica, 32/1, 173-188, Ljubljana, 2003.**

During a long historical continuity in the karst area a specific landscape type has evolved due to varied climatic, geomorphological, topographic as well as socio-economic conditions. This is characterized by great typological diversity based on authentic features both of natural and cultural origin. These have occurred as a consequence of balanced economic land-uses from early periods on. The main quality of these landscapes is derived from unique agricultural land-use patterns, which constitute one of the most valuable spatial heritages in the entire Mediterranean. However, the recent evolution, mainly in the socio-economic sphere, generated far-reaching impacts in the rural areas which largely affect the integrity and traditional harmony the karst countryside in general and the landscape in particular. The basic intention of the paper is to outline these transformations as a serious threat and immense loss of the national cultural heritage and to emphasize the great responsibility of this generation in these processes.

K.W.: Mediterranean Karst area, agricultural land-use patterns, cultural heritage, cultural landscape, Dinaric karst, Croatia.

**12 - 112 Atalay, Ibrahim: Effects of the tectonic movements on the karstification in Anatolia, Turkey. Acta carsologica, 32/2, 196-203, Ljubljana, 2003.**

Turkey has several types of karstic land-forms containing lapies (karren), caves, dolines, uvalas and poljes. Karstification is related also to the tectonic movements. Well-developed karstic features such as wide poljes, ground water and cave system are widespread in/on the Mesozoic comprehensive limestone in the Taurus Mountains. Karstification begun to develop towards the end of the Mesozoic by the uplift movements of the Taurus Mountains in general. Some large poljes were occupied by the Neogene lakes in which lime and clay accumulated. The fresh water lakes such as Lake Bey<sup>o</sup>ehir and Egirdir are found in the tectonic-karstic depressions. Underground river systems are found between the Lake Region (western Taurus) and Mediterranean coast. These river systems have been shifted towards the deeper parts of the limestone as the result of the progress of karstification and the vertical uplift of the Taurus Mountains (upper Tertiary, Early Quaternary). Caves formed as the result of vertical tectonic movements. These movements caused the lowering of the base level. So the karstification process have shifted from the upper level to deeper parts of the Taurus.

K.W.: karstification, karstic land-forms, Anatolia.

- 12 - 113 Audra, Philippe; Quinif, Yves; Rochette, Pierre: The genesis of the Tennengebirge karst and caves (Salzburg, Austria). Speleogenesis, The Virtual Scientific Journal, 1/1 (<http://www.speleogenesis.com>), 2003.**

Research has been carried out in the Tennengebirge Massif (Salzburg, Austria) with specific attention to karst morphology, cave systems, and sediments. This study reveals the genesis of the karst and the underground systems of the Tennengebirge, since the Oligocene. Large horizontal systems, which date back to the Miocene, were studied through the example of the caves Hornhöhle and Eisriesenwelt, which respectively represent Ruinenhöhlen (“cave ruins”) and Riesenhöhlen (“giant caves”). The Cosa-Nostra - Bergerhöhle System is typical of a mostly vertical large high-relief alpine cave. The main characteristic of this network is major development in the vadose zone. The shafts’ morphology is in “stairs beneath a faulted roof.” At greater depth they connect to a perched epiphreatic zone, which is typical of a dammed karst. The main underground sediments are of paleoclimatic and hydrodynamic significance, corresponding to hot, stable, or unstable environments (flowstones, reworked weathered rocks) and cold environments (carbonate varves, glacial pebbles). A preliminary study of the Tennengebirge sediments reveals significant information about its evolution throughout Pliocene-Quaternary time.

- 12 - 114 Audra, Philippe; Bigot, Jean-Yves; Mocochain, Ludovic: Hypogenic caves in Provence (France). Specific features and sediments. Speleogenesis, The Virtual Scientific Journal, 1/1 (<http://www.speleogenesis.com>), 2003.**

Two dry caves from French Provence (Adaouste and Champignons caves) were until now considered as “normal” caves having evolved under meteoric water flow conditions. A new approach gives evidence of a hypogenic origin from deep water uprising under artesian conditions. Specific morphologies and sediments associated with this hydrology are discussed.

- 12 - 115 Badino, Giovanni; Cigna, Arrigo A; Silvestro, Chiara: Valle d’Aosta e Piemonte. In: Madonia, Giuliana & Forti, Paolo (Eds.) - Le aree carsiche gessose in Italia. Ist. It. Spel., Mem. XVI, s. II: 123-129, 2003.**

The present state of the knowledge of the karst phenomenon in gypsum, which developed in Piedmont and Aosta Valley, is here summarised on the basis of the references available, the Italian geologic map (1:1000,000 scale), the regional technical maps of Piedmont and Aosta Valley and few personal investigations

K.W.: gypsum caves, Triassic, Messinian, Piedmont, Aosta Valley.

- 12 - 116 Baker, Clair: Australian Glow-worms - managing an important biological resource. ACKMA Journal, 53, 13-16, 2003.**

Knowledge of glow-worm distribution in Australia has been largely increased to now include far north Queensland and many sites through New South Wales and Victoria as well as previous known sites in Tasmania and New Zealand. Glow-worm populations were found in fragmented rainforest habitat and isolated wet cave systems. Molecular, reproductive and morphological findings indicate strong evidence for allopatric speciation (speciation due to geographic separation) between colonies and suggest up to six new species are present within Australia - in addition to the three known species (*Arachnocampa flava*, *A. richardsae*, and *A. tasmaniensis*). Several colonies are known for their small geographic

range and therefore have an increased need for protection. Threats to glow-worm populations include tourism, a parasitic wasp that infects the north Queensland population, and the restriction of one population to a single isolated cave.

**12 - 117 Bárány-Kevei, I.: Human impact on Hungarian Karst Terrains, with special regards to sylviculture. Acta carsologica. 32/2, 175 - 187, Ljubljana, 2003.**

This study represents the changes of Hungarian karst terrains due to human impact paying special attention to sylviculture. The functioning of the karst geo-ecosystem is considerably determined by the climate-soil-vegetation system, which will influence the dynamism of karst development. Most of the Hungarian karst terrains are the scenes of sylviculture. The plantation of non-adequate forest associations resulted the alteration of climate and soils, which resulted in the change of the intensity of karst corrosion. This paper focuses on the change of sylviculture in the Aggtelek National Park, a World Heritage site, and makes suggestions for optimal landuse.

**12 - 118 Bárány-Kevei, I.: The effect of climate, soil and vegetation on the environmental contamination of karstecological system. International Conference on Karst Hydrogeology and Ecosystems, June 3-6, Bowling Green, KY, USA, 2003.**

The functioning of the karst-ecological system is mostly influenced by extrinsic factors. In this complex system there is a close connection between climate, soil and vegetation (Bárány-Kevei, 1989). The change of any of these parameters will draw the alteration of the others. Recently different environmental effects influence the sensitive karst systems, one of which is the heavy metal pollution. In different ecological environments the behaviour of heavy metals differs too. In acidic soils covered by pine forests the mobility of heavy metals is high, and so they get to the infiltration zone and then into the karst water quickly. Some part of the heavy metal load is taken up by plants. If the soil is rich in organic materials and its pH value is high, the heavy metals are not mobile. The paper presents the influence of climate, soils and vegetation on the heavy metal load of some Hungarian karst areas.

**12 - 119 Bárány-Kevei, I.; Kaszala, R.: Heavy Metal Content of Soils on Karstic Area in North Hungary. The Annual Conference on Soils, Sediments and Water, this year, October 18-21, 2004, University of Massachusetts, Amherst. USA, 2003.**

Karst areas have specific karstecology system and on that system the soil plays important role in the relationship of the climate-host rock and the greenery. For this knowing the state of the soil is indispensable. The karst development and karstic frame at the surface and close to the surface result the interferences the carbonated rocks and water. The procession takes place mostly at the surface of the rocks and the aggregation soil of the burns which effects shallow soil layer. This involves that the properties of the soil claim on the process of the karst development and settle the whole dynamic of the running. The poster shows some result of experiment which search the relationship between the soluble and the complexed heavy metal content of the soil and the pH value together with the amount of the macro- and microelements which can get into the greenery.

**12 - 120 Bárány-Kevei, Ilona: Human impact on karst terrains, with special regard to sylviculture in Hungary. Acta carsologica, 32/2, 175-185, Ljubljana, 2003.**

This study represents the changes of Hungarian karst terrains due to human impacts paying

special attention to silviculture. The functioning of the karst geo-ecosystem is considerably determined by the climate-soil-vegetation system, which will influence the dynamism of karst development. Most of the Hungarian karst terrains are the scene of silviculture. The planting of non-adequate forest associations resulted the alteration of climate and soils, which resulted in a change of the intensity of karst corrosion. This paper focuses on the change of silviculture in the Aggtelek National Park, a World Heritage site, and makes suggestions for optimal land use.

K.W.: karst landscape changes, human impact on karst, silviculture on karst

- 12 - 121 Barczyk, Grzegorz: Karst and vaucluse springs from the Polish Tatra Mts. Results of long-term stationary investigations. Acta carsologica, 32/1, 145-155, Ljubljana, 2003.**

Karst (vaucluse) springs, transporting water from fissure-karst systems, result from karst development in the area. At the same time, they are the main source of information on the hydrography of the investigated karst area. Continuous monitoring of groundwaters and surface waters in the Tatra Mountains in Poland takes place for a long time. In the mid-70-ties, the team of Prof. D. Małeczka organized an observation network, with water marks along the main Tatra streams right to their outlets from the massif, and with observation points of the largest springs and vaucluse springs. Readings from water marks were collected several times each month by the observers (usually Tatra National Park employees). In 1998 the National Committee for Scientific Research approved a three-year research project entitled: "Determination of retention abilities and the dynamics of denudation in the karst areas of the Polish Tatra Mountains basing on stationary investigations of vaucluse springs". In accordance with this project, between November and December 1998 automatic limnimeters were installed in selected vaucluse (five) springs.

K.W.: Tatra Mts., karst area, stationary observations, karst springs.

- 12 - 122 Barkal, R.; Gopher, A.; Lauritzen, S. E.; Frumkin, A.: Uranium series dates from Qesem Cave, Israel, and the end of the Lower palaeolithic. Nature 423, 977-979, 2003.**

- 12 - 123 Batiot, Ch.; Liñán, C.; Andreo, B.; Emblanch, Chr.; Carrasco, F.; Blavoux, B.: Use of TOC as tracer of diffuse infiltration in a dolomitic karstic system: the Nerja Cave (Andalusia, southern Spain). Geophysical Research Letters, 30(22), 2179, 2003.**

K.W.: TOC, Nerja Cave, infiltration, unsaturated zone

- 12 - 124 Beguš, Tomaž; Kočevar, Marko; Prestor, Joerg; Sotlar, Klemen: Tunnels in karst and flysch in Slovenia. RMZ - Materials and Geoenvironment, Groundwater in Geological Engineering, 50/1, 17-20, Ljubljana, 2003.**

K.W.: Karst, tunnel, flysch, regional karstology, water resource, Slovenia.

- 12 - 125 Bosák, Pavel; Beneš, Vojtěch: Geophysical characteristics of epikarst: case studies from Zagros Mts., Islamic Republic of Iran and the Koněprusy region, Czech Republic. Acta carsologica, 32/2, 255-267, Ljubljana, 2003.**

Characteristics of epikarst zone were studied by geophysical methods, especially refraction seismics, combined with electrical resistivity and gravimetry measurements. Applied methods were equal in both regions, so comparable results were obtained. The interpreted

seismic boundaries follow the basal plane of epikarst (s.l.) and limit the epikarst zone from the geophysical point of view, i.e. zone with comparably low seismic velocities (mostly 1,000 to 3,000 m.s<sup>-1</sup>). The thickness of epikarst in the Czech Karst - the Koněprusy Devonian - is from 5 to about 60 m. The epikarst in Zagros Mts. reached up to 180 m (Cretaceous lms.). The differences of character and vertical extent of epikarst zone depend on entirely different geological structure and geomorphological setting (relief) and evolution of both sites, which established different conditions for the release of residual stress in the limestone massifs.

K.W.: epikarst, refraction seismics, Zagros Mts., Koněprusy Devonian, Islamic Republic of Iran, Czech Republic

**12 - 126 Benac, Čedomir; Rubinić, Josip; Ožanić, Nevenka: The origin and evolution of coastal and submarine springs in Bakar Bay. Acta carsologica, 32/1, 157-171, Ljubljana, 2003.**

The paper presents coastal and submarine springs in Bakar Bay. The northeastern coast of Bakar Bay abounds in springs, since there is the lowest lying contact between large karst aquifer and flysch lithogenetic complex which forms hydrogeological barrier. Studied area is situated between Črno and Žminjca locations, where water flows out in series of concentrated coastal and submarine springs as well as on the places of a diffuse outflow. A rapid raise of sea-level from the end of the Pleistocene changed the hydrogeological conditions so that coastal springs were submerged and new ones, at higher levels appeared. Some of submerged springs continued to throw out water, that is, they started to function as submarine springs (vrulja) due to a strong inflow from the background and high pressures. Some of them were not registered, although according to water balance analyses of wider area, widespread evidences of groundwater outflow could be expected. Their position reflects geological fabric of the area. Groundwaters have intensive flowing gradient. Their flowing out in hydraulically unstable zone have facilitated mixing of sea- water and fresh-water and as a result spring-water is usually brackish.

K.W.: coastal spring, submarine spring, sea-level change, Adriatic Sea.

**12 - 127 Benedik, Janja: Prirodoslovno društvo Slovenije v oktobru 2003. Proteus, 66/3, 121-122, Ljubljana, 2003.**

K.W.: workshop, caves, Slovenia.

**12 - 128 Benkovič, Monika: Bolgarija. Vodniki Ljubljanskega geografskega društva, Evropa, 2, 70 pp., Ljubljana, 2003.**

K.W.: excursion guide, Bulgaria.

**12 - 129 Bočić, Neven: Relation between Karst and Fluviokarst Relief on the Slunj Plateau (Croatia). Acta carsologica, 32/2, 137-146, Ljubljana, 2003.**

The Slunj plateau is part of the shallow Kordun karst. It extends from the westernmost part of river Una towards the northwest to the confluence of the Slunjčica and Korana, at an average height of 300 - 350 m of above sea level. It is 40 km long, and averages about 10 km wide. A larger part of the plateau of Jurassic and Cretaceous carbonate rocks has characteristics of e karst relief with numerous dolines. On the smaller part of the Paleozoic and Tertiary clastic sediments and Triassic dolomites, a surface fluvial network has been

- developed. The water streams emerging on that basis regularly disappear underground on contact with permeable rocks. During geomorphological evolution of this terrain the area which is being drained on the surface was reduced, and the traces were left in the form of blind and dry (fossil) valleys. The water streams moved from the surface to underground where they formed the underground channels, i. e. speleological objects. This work analyses the correlation between the formation processes of (today fossil) valleys and cave channels on three examples: 1) Cave system Matešičeva - Popovačka cave, 2) Ponor pod Kremenom cave and Baričeve cave, 3) Cave system Varičakova - Panjkova cave.  
K.W.: karst geomorphology, fluviokarst, contact karst, caves, Slunj plateau, Croatia
- 12 - 130 **Brelj, Savo; Döberl, Manfred; Drovenik, Božidar; Pirnat, Alja: Gradivo za favno hroščev (Coleoptera) Slovenije. 1. prispevek: Polyphaga: Chrysomeloidea (=Phytophaga): Chrysomelidae: Alticinae. Scopolia, 50, 279 pp., Ljubljana, 2003.**  
K.W.: fauna, Coleoptera, Alticinae, Slovenia.
- 12 - 131 **Brenčič, Mihael: Forecasting high groundwater levels for deeper excavations. RMZ - Materials and geoenvironment, 50/1, 65, Ljubljana, 2003.**  
K.W.: hydrogeology, underground water, forecast.
- 12 - 132 **Brenčič, Mihael: Hidrogeologija smetišč - odprti problemi in vprašanja. Geološki zbornik, Razprave, Poročila. 16.posvetovanje slovenskih geologov, 17, 10-14, Ljubljana, 2003.**  
K.W.: waste deposit, geology.
- 12 - 133 **Brenčič, Mihael: Nekaj hipotez o razvoju reliefa na jugovzhodnem predelu Mežakle. Geološki zbornik, Razprave, Poročila. 16.posvetovanje slovenskih geologov, 17, 15-20, Ljubljana, 2003.**  
K.W.: hydrogeology, morphogenesis, Slovenia.
- 12 - 134 **Brenčič, Mihael: Past and present experiences of highways construction in Slovenia - groundwater and highways interaction. RMZ - Materials and geoenvironment, 50/1, 61-64, Ljubljana, 2003.**  
K.W.: regional karstology, water pollution, construction, motorway, hydrogeology, karst hydrology, Slovenia.
- 12 - 135 **Bricelj, Mihael: Microbial tracers in groundwater research. RMZ - Materials and geoenvironment, 50/1, 67-70, Ljubljana, 2003.**  
K.W.: hydrogeology, water tracing, regional karstology, bacteriophage, tracer, Slovenia.
- 12 - 136 **Brook, G. A.; Embabi, N. S.; Ashout, M. M.; Edwards, R. L.; Cheng, H.; Cowart, J. B.; Dabous, A. A.: Quaternary environmental change in the Western Desert of Egypt. Evidence from cave speleothems, spring tufas, and playa sediments. Z. Geomorph. N.F., Suppl.-Vol. 131, 59-87, Berlin-Stuttgart, 2003.**
- 12 - 137 **Bruthans, Jiří; Zeman, Ondřej: Factors controlling exokarst morphology and sediment transport through caves: comparison of carbonate and salt karst. Acta carsologica, 32/1, 83-99, Ljubljana, 2003.**

In salt karst, very large amounts of sediment load could be permanently trapped underground, due to the high solubility of NaCl. Specific karst forms which have no equivalents in carbonate karst, occur there (huge underground alluvial fans, inlet caves). In a carbonate karst, on the other hand, only small portion of sediment carried by an allochthonous stream could be deposited permanently in the cave, otherwise the cave will become clogged (because of the very low solubility of CaCO<sub>3</sub>). Three carbonate karst areas with long-lasting development and fundamental differences in endokarst and exokarst forms were studied from many different aspects in the Czech Republic. The authors believe that there is only one primary difference between the Moravian Karst and diffuse recharge karst areas (Czech and Chýnov karsts): the frequency and orientation of fissures penetrable by groundwater. All other differences in exokarst and endokarst forms and hydrology are the results of primary difference and its influence on speleogenesis, especially on sediment transport and gradational features. In areas where only bathyphreatic and deep phreatic caves occur, blind valleys and common exokarst morphology never develop, due to the very low velocity of flow in karst conduits, which precludes transport of sediment load.

K.W.: exokarst, endokarst, karst evolution, speleogenesis, sediment transport, gradational features, salt karst, Czech Republic, Iran.

- 12 - 138 **Čekada, Miha: Parkirišče v jami. Bilten Jamarskega društva Železničar, 92-93, Ljubljana, 2003.**

K.W.: regional speleology, polluted cave, Slovenia.

- 12 - 139 **Celarc, Bogomir: Preliminarni rezultati geološkega kartiranja severovzhodnega dela Kamniško-Savinjskih Alp. Geološki zbornik, Razprave, Poročila. 16.posvetovanje slovenskih geologov, 17, 25-27, Ljubljana, 2003.**

K.W.: geological mapping, Slovenia.

- 12 - 140 **Chvatal, Matjaž/translated by Malečkar, Franc: Le domande sulla Slovenia: tutto quello che volevate sapere sulla Slovenia ... e non sapevate dove chiederlo. 94 pp., Kranj, 2003.**

K.W.: tourist guide, Slovenia.

- 12 - 141 **Choppy, Jacques: French terminology of speleological forms. Acta carsologica, 32/2, 102-103, Ljubljana, 2003.**

K.W.: description, interpretation.

- 12 - 142 **Cigna, Arrigo, A.: Il Centenario della Società Speleologica Italiana, 1903-2003. Atti 19° Congr. Naz. Spel., Bologna 27-31 Agosto 2003, 9-14, 2003.**

[The centennial of the Italian Speleological Society 1903-2003].

The history of the Italian Speleological Society is here summarised, from its foundation in Bologna in 1903, the establishment in Postojna of the Italian Speleological Institute in 1929, the re-establishment of the Society in Verona in 1950 to, finally, the reabsorption of the Institute within the structure of the Society itself in 1984.

K.W.: Italian Speleological Society, Italian Speleological Institute, history

- 12 - 143 **Cucchi, Franco: Geomorfologia e speleogenesi (della Grotta Gualtiero Savi). In: La**

**grotta dei sogni, a cura di C.A.I.-Trieste e R.A.-F.V.G., Ed. Graphart snc, 39-54, Trieste, 2003.**

Geomorphological characteristics and speleogenetical evolution of the Gualtiero Savi Cave, which covers an area of almost 4,000 metres and is the widest underground system in the Rosandra Valley (Trieste, Italy). It is a series of sub-horizontal galleries, structural gullies and large chambers located at 350 metres above sea level, and of a set of meanders, smaller caves and smaller galleries to be found at a lower level, approximately 50 metres above sea level.

K.W.: speleogenesis, karst, Rosandra Valley, Italy.

**12 - 144 Cucchi, Franco; Zini, L.: Gypsum karst of Zagros Mountains (I.R. Iran). Acta Carsologica, 32/1, 69-82, Ljubljana, 2003.**

Evaporite morphologies have attracted our attention during geological surveys on the Karkheh River, a water course that interests the chain of the Mountains Zagros in the western Iran. We recognized three types of karst in the evaporitic Gachsaran Formation as a function of the localisation along the syncline axis or along a fold side. There are sinkholes and suffosion dolines or caves and collapse dolines along the syncline axis, gently dipping galleries at the contact between limestone and gypsum following maximum dip.

K.W.: evaporites, tectonic, gypsum karst, Zagros Mts, Iran.

**12 - 145 Cucchi, F.; Piano, C.: Inquadramento geografico e geologico dei gessi in Italia. In: Le aree carsiche gessose d'Italia, a cura di G. Madonia e P. Forti. Mem. Ist. It. Spel., mem. XIV, s.II, 17-26, Bologna, 2003.**

Evaporitic lithotypes are sufficiently widespread and they essentially belong to three paleo-evolutionary phases: Permian, Triassic and Messinian (see attached map). Among evaporites gypsum is not usually predominant but it forms, however, especially that belonging to the Messinian, also thick and extended horizons. Generally, the outcrops are distributed along structural axes and stretched and thin. Only in Sicily are wide fields distributed on more levels. This fact has favoured the development of widespread hypogean networks and of various and well-developed epigean morphologies.

K.W.: evaporites, Permian, Trias, Messinian, geology, stratigraphy.

**12 - 146 Cucchi, F.; Piano, C.: Gessi del Friuli-Venezia Giulia. In Le aree carsiche gessose d'Italia, a cura di G. Madonia e P. Forti. Mem. Ist. It. Spel., mem. XIV, s.II, 149-154, Bologna, 2003.**

In the Friuli-Venezia Giulia region, where carbonate rocks diffusely crop out and the known caves are almost 7.000, the scarcity of significant gypsum outcrops can be observed in just one little cavity which opens into gypsum. Only in 1998 did the speleologists of "Circolo Speleologico Idrologico Friulano" present the "Grotta nel gesso in località Duroni" to the cave registry of Friuli-Venezia Giulia. The outcrops, present almost exclusively in the Carnic Alps, do not crop out diffusely in the area. In the mountain of Friuli the particular orographic setting and complex structural situation make numerous derangement phenomena be started up by the dissolution of evaporitic deposits. They are phenomena of progressive but slow evolution or phenomena of catastrophic evolution, depending upon how evaporites (practically gypsum, but also and not marginally the carried breccias) are involved in the derangement mechanism. Among the first it is possible to consider firstly the

accelerated erosion and the dissolution at the foot of the slopes resulting in the consequent starting up of instability phenomena; secondly the dissolution of evaporitic clasts within alluvial or morenial dissolved deposits with the consequent depauperation of the geotechnic characteristics; and thirdly the dissolution of evaporitic rocky substrata covered by dissolved permeable deposits resulting in vertical collapses. Among the second it is possible to consider the development of collapse dolines and the consequent formation of soffusion or subsidence dolines. The examples are numerous, they are often dramatical because of their consequences upon human activity and they are always emblematic because of their “ineluctability”.

K.W.: gypsum, Permian, Triassic, Carnic Alps, karst landscape.

**12 - 147 Čuk, Alenka: Development of the underground railway system on the example of Postojnska jama. Acta carsologica, 32/1, 225-242, Ljubljana, 2003.**

The problem of making visits to Postojnska jama more comfortable and easier was solved in 1872 when the first railway was put in the cave. The path through the cave did not have many ascents or descents; therefore it was decided that the carriages in the cave could be “driven by manpower”. After 1900 interest in visiting Postojnska jama increased. The Board of Postojnska jama constantly improved and “facilitated the cave traffic” and took care of the utmost comfort of the visitors. For all that, the small, manually operated railway was becoming less and less appropriate. The first test-drives with a locomotive were performed between April and June 1924. In April 1957 two new locomotives with batteries replaced the old, worn-out ones.

K.W.: caves, railway, carriages “driven by manpower”, locomotive, Slovenia, Postojnska jama.

**12 - 148 Darabos, G.: Observation of microbial weathering resulting in peculiar “exfoliation-like” features in limestone from Hirao-dai karst, Japan. Z. Geomorph. N.F., Suppl.-Vol. 131, 33-42, Berlin-Stuttgart, 2003.**

**12 - 149 Day, M. J.: Some observations on karst landscape ecology and conservation in Belize. Journal of Belizean Affairs, 5 (1), 31-45, 2003.**

More than half of the diverse ecological heritage of Belize lies within karst landscapes, yet the contribution of karst geomorphology and hydrology to the geographical and ecological patterns of soil, vegetation and wildlife has not been fully appreciated. The karst topography itself is highly variable; the critical element is the spatial and temporal distribution of water, which is dominantly subterranean. In a sense, karst landscapes are limiting, but they are associated with characteristic soils, distinct vegetation communities, and a diverse fauna. Approximately half of the total area of nationally protected land is karst, and some 68 percent of the karst landscape is afforded at least nominal protection in recognition of its ecological importance. This creates a great opportunity for further study of the relationships between the various components of the karst ecosystem.

**12 - 150 Day, M. J.: An assessment of karstic collapse hazards at Mount Rosser, Ewarton, Jamaica. In: Sinkholes and the Engineering and Environmental Impacts of Karst, ed. B.F. Beck, American Society of Civil Engineers, Geotechnical Special Publication 122, 40-49, 2003.**

Ground surface collapse and the resultant failure of industrial facilities are among the most serious potential hazards afflicting tropical karst terrains. Detailed site-specific subsurface studies provide the most acceptable way to detect imminent cavity collapse and sinkhole formation, but probabilistic studies allied with site assessment are valuable tools where such investigations are not warranted or not possible for other reasons. In the context of the proposed decommissioning, dewatering and revegetation of the red mud bauxite waste disposal pond at Mount Rosser, Ewarton, Jamaica, the risk of main and auxiliary dam instability and/or failure as a result of the development and collapse of underlying karst cavities (sinkholes) was assessed employing a probabilistic model developed from previous studies of collapses in differing topographic (landscape) positions within the Jamaican karst. This approach indicates that the probability of auxiliary dam failure within the expected life of the dams is between 0.5 and 3.0%, with a site average estimate of about 1.0%, and that the probability of main dam failure under the same scenario is between 1.0 and 3.0%, with a site average estimate of about 2.0%. A rapid geomorphological assessment (RGA) and site inspection revealed no evidence of factors that might exacerbate the potential for failure, and the overall assessment is that the Mount Rosser dams are unlikely to fail as a result of the formation or expansion of voids in the carbonate bedrock.

**12 - 151 Debevec, Albin; Peric, Borut; Turk, Peter; Klemen-Krek, Zofija; Kranjc, Andrej; Mihevc, Andrej; Slapnik, Rajko; Zorman, Tomaž; Kodrič, Ravel (Eds.): Il parco di Škocjanske jame. Škocjan: Park Škocjanske jame, 101 pp., ilustr., 2003.**  
Škocjanske jame Park description.

**12 - 152 Debevec, Albin; Peric, Borut; Turk, Peter; Klemen-Krek, Zofija; Kranjc, Andrej; Mihevc, Andrej; Slapnik, Rajko; Zorman, Tomaž (Eds.): Regionalpark Škocjanske jame. Škocjan: Park Škocjanske jame, 101 str., 2003.**  
Škocjanske jame Park description.

**12 - 153 Eberhard, Stefan: Nowranie Caves and the Camooweal Karst Area, Queensland: Hydrology, Geomorphology and Speleogenesis, with Notes on Aquatic Biota. Helictite, 38 (2), 27-38, 2003.**

Development of the Nowranie Caves includes both phreatic and vadose components, with prominent influences on cave geomorphology exerted by joints, bedding and past changes in watertable levels. Active circulation is occurring within a phreatic conduit at moderate depth (22-30 m) below the level of the present watertable. Slugs of flood water can penetrate well into the flooded section of the cave, and it appears that dissolutional enlargement of the conduit may be occurring under present conditions. Speleogenesis in Nowranie Caves incorporates deeper phreatic processes in addition to shallow phreatic (i.e. watertable) processes. A series of three fossil, or occasionally re-flooded, phreatic horizontal levels in the Nowranie Caves correspond with similar levels in other Camooweal caves, and reflect a regional pattern and multi stage history of watertable changes linked with cave development. The stacked series of cave levels may reflect episodic uplift, wetter climatic episodes, or a combination of both - possibly dating from early to mid Tertiary times. Caves and dolines are the major points for groundwater recharge in the Camooweal area, and these are susceptible points for injection of contaminants into the groundwater system. A climatic and distributional relict, and locally endemic, fauna is present in the

groundwater. The Nowranie Caves, and Camooweal area generally, has conservation significance as a karst hydrogeological and ecological system that has preserved a history of regional landscape and faunal evolution in northern Australia during the Quaternary. K.W.: Camooweal, karst, hydrology, geomorphology, speleogenesis, biota.

**12 - 154 Eberhard, Stefan; Humphreys, William F.: The crawling, creeping and swimming life of caves. In: Finlayson, Brian; Hamilton-Smith, Elery (Editors): "Beneath The Surface**

**A Natural History of Australian Caves".** UNSW Press, Sydney, pp. 127-147, 2003. This chapter covers terrestrial and aquatic invertebrate faunas and cave fish. It describes their ecological classification and different theories as to how they evolved to adapt to cave conditions, including the influence of continental drift and climatic changes and interactions between surface and underground systems. It also discusses the variety of terrestrial and aquatic cave habitats and the food chain. Finally the Australian subterranean fauna is described with examples from various regions. There is a special section on the calcrete aquifers of arid Australia.

**12 - 155 Ekmekci, Mehmet: Review of Turkish karst with emphasis on tectonic and paleogeographic controls. Acta carsologica, 32/2, 205-218, Ljubljana, 2003.**

This paper re-evaluates the karst phenomenon in Turkey basing on the controlling factors such as, the source of energy gradient, lithostratigraphy, type of erosion base and climate. Two major karst types described are a) evolutionary karst which implies continuous karstification but at different stage of maturation and b)rejuvenated karst which is formed by reactivating a formerly developed and subsequently ceased karst structure either by an uplift and/or a drastic decline of erosion base. Description of karst types considering both morphology and hydrogeology revealed that distribution of specific karst types is compatible with the neotectonic evolution of Turkey. Karst in all provinces except the Black Sea and Western Anatolian regions, is developed under the effect of the energy gradient provided by uplift. Different rates of uplift created different sub-types of karst. The climate effect was evaluated as a secondary factor for it has a role of shaping/re-shaping the karst forms rather than controlling the physical and chemical processes.

K.W.: karst, neotectonics, paleogeography, evolutionary karst, rejuvenated karst, Turkey.

**12 - 156 Faulkner, Trevor: The hydrogeology of crystalline rocks: pointers to tectonic inception mechanisms in karst. Proceedings of the International Conference on Karst Hydrogeology and Ecosystems, Bowling Green, Kentucky, USA, 3-6 June, Abstract, p. 20. 2003.**

Considerable advances have been made in recent years to understand the processes leading to the creation of the triple porosity hydrogeology described for karstic limestones. These have concentrated on the physics and chemistry of karst dissolution, during the inception and gestation phases of conduit evolution in sedimentary limestones, and then considered the phreatic enlargement, subsequent to breakthrough, into networks with high hydraulic conductivity. Since about the mid-1990s, the study of the hydrogeology of "crystalline" (i.e. igneous and metamorphic) non-carbonate "hard rocks" has shown that such rocks can also act as aquifers, especially towards the surface. Their discharges may supply natural springs and household wells and boreholes, flood mines, and put at risk the underground

containment of hazardous wastes. Fractures are utilised within the crystalline rocks (which have negligible primary porosity, and which do not develop solutional conduits), so that flow rates can exceed the breakthrough point that, in limestones, marks the transition from laminar to turbulent conditions, and fast dissolution. Similar processes should also apply to metamorphic limestones, and, indeed, to sedimentary limestones. In these cases, the slow inception and gestation phases of chemical inception may be bypassed, because some karst passages may develop under phreatic conditions, at high wall-retreat rates, immediately after the inundation of fractures formed tectonically. Further, the considerable knowledge of fracture geometries and modelling techniques, as developed for these “hard rock” lithologies, becomes available for use by karst hydrologists, when studying speleological inception and early conduit enlargement.

**12 - 157 Faulkner, Trevor: Giant Pots. Descent (175), p. 38 Dec. / Jan. 2003/4, 2003.**

Tim Barter's letter concerning a pot in slate near Betws-y-Coed (see Descent 173) appears to describe what in Norway is called a “jettegryten”: a Giant Pot. Jettegryter (plural) are rock-mills drilled by large boulders that were swirled around by huge deglacial outflows. They therefore have similar morphology to potholes formed in cave streambeds. Jettegryter can occur in any rock type. In Norway they are commonly in granite and mica schist, but I also know a group of twenty to thirty formed in metamorphic limestone, south of Korgen. The largest is 12.5m deep with a diameter of 6m. No karst caves are associated with these features, but some have captured recent drainage. Every jettegryten that I have seen is presently above and to the side of a large stream, which has deepened its valley below the lip of the pot during the Holocene. Some have been partly eroded away during this process, leaving an “open chamber”, as appears to have happened at Betws-y-Coed. The feature above the Afon Conwy presumably formed during the deglaciation of north Wales. This is the first reference to a possible jettegryten in the British Isles that I am aware of, but I have not searched the literature. This could be an interesting line of research for someone!

**12 - 158 Finlayson, Brian; Hamilton-Smith, Elery (Editors): Beneath The Surface: A Natural History of Australian Caves. University of New South Wales Press, Sydney, 216 pages, 2003.**

A natural history of Australian caves written for the intelligent layman but marred by a lack of systematic references to the literature. There are chapters on the following topics:

- \* Caves in the Australian landscape: their formation and character (J. Webb, K. Grimes and A. Osborne).
- \* Cave minerals and speleothems, and environmental reconstruction using them (J. James).
- \* Cave deposits: sediments and palaeontological deposits (L. Reed and D. Gillieson).
- \* Cave bats of Australia and their ecology (L.S. Hall and G. Richards).
- \* Other cave animals: vertebrate and invertebrate and their habitats (S. Eberhard and W.F. Humphreys).
- \* People and caves: A history of Aboriginal and European exploration and usage of Australian caves (E. Hamilton-Smith).

**12 - 159 Frelj, Martina: Geomorphology of karst depressions: polje or uvala - a case study of Lučki dol. Acta carsologica, 32/2, 105-119, Ljubljana, 2003.**

Lučki dol is a small depression, mentioned in the scarce literature about the karst of Dolenjsko and about the wider area between the Basin of Grosuplje and the valley of river Krka. It has been characterised very differently regarding the karstic form. So it has been named uvala, dry valley, blind valley and also karst polje. Among many definitions of karst polje the author has chosen the one stated by Gams. Although it is sometimes difficult to make a clear difference between uvala and karst polje, has the author made a conclusion, based on the geological, geomorphological and hydrological characteristics which were compared with definition of Gams, that Lučki dol is a small karst polje in the piezometric level.

K.W.: karstology, karst polje, geomorphology, Slovenia, Karst of Dolenjsko, Lučki dol.

- 12 - 160 Gaberščik, Alenka; Urbanc-Berčič, Olga; Kržič, Nina; Kosi, Gorazd; Brancelj, Anton: The intermittent lake Cerknica: various faces of the same ecosystem. Lakes & reservoirs (Print), vol. 8, pp. 159-168. 2003.**

The turnover of matter and through flow of energy in the intermittent Lake Cerknica is gained by exchanging of the wet and the dry periods, which either promotes or suppresses growth and development of organisms, depending on the season of the year. Any deviation from normal floods significantly affects the productivity of reed stands. Drainage of the lake prevents a constant presence of aquatic organisms, above all, planktonic species. Drying and wetting accelerate decomposition of organic matter. The input of nutrients into the lake by surface tributary revealed to be relatively high. The amount of nutrients in the lake water is lower, due to high buffering capacity of the densely vegetated ecosystem.

- 12 - 161 Gaberščik, Alenka, (Ed.): Jezero, ki izginja: monografija o Cerkniskem jezeru. Reprint. Ljubljana: Društvo ekologov Slovenije, 333 str. [In Slovene with English summaries of all chapters], 2003.**

The monograph on intermittent Lake Cerknica comprises 1) physical environment i.e. climate, geology and hydrology, 2) the presentation of the ecosystem, 3) presentation of different organisms 4) nature protection aspect, 5) socio-geographic aspect and 6) archeological and ethnological aspects

- 12 - 162 Gabrovec, Matej: Triglavski ledenik. Slovenija, Ekskurzije LGD, Evropa, 3, 5-18, Ljubljana, 2003.**

K.W.: excursion guide, regional speleology, Slovenia.

- 12 - 163 Gabrovšek, Franci: KWI interdisciplinary Workshop on Epikarst. Acta carsologica, 32/2, 321, Ljubljana, 2003.**

K.W.: workshop report.

- 12 - 164 Gams, Ivan: Kras v Sloveniji v prostoru in času. Založba ZRC, 516 pp., Ljubljana, 2003.**

K.W.: regional karstology, karstology, regional speleology, speleology, karst hydrology, speleohistory, karst morphology, man's impact, glossary, Slovenia.

- 12 - 165 Gams, Ivan: On the development of physical geography in slovenia and its present challenges. In: Natek, Karel (Ed.). Fizična geografija pred novimi izzivi, (Dela, 20), pp. 9-18, Ljubljana: Oddelek za geografijo Filozofske fakultete, 2003.**

The paper presents the development of physical geography in Slovenia as part of the complex geographical science, the topmost result of which have been the regional-geographical monographs on Slovenia. The author sees a challenge for the future development of physical geography in Slovenia in the competition of several, stronger and better equipped institutes with similar fields of work. According to the author's experience, only quantitative evaluation of the selected landscape phenomena can ensure the standard role, that is the only remaining role, of geography in local spatial sciences. Although public interest gives priority to human geography, physical geography, too, is granted an important role in view of the fact that the number of enrolled students of geography has been 2-3 times greater in the past few years in the extended network of high-school institutions.

K.W.: geography, physical geography, regional geography, history of geography, Slovenia.

- 12 - 166 Gedei, Peter: Čehi 2. Bilten Jamarskega društva Železničar, 100-106, Ljubljana, 2003.**

K.W.: regional speleology, Slovenia.

- 12 - 167 Goldie, Helen S.: Mature small-scale surface karst landforms in NW England. Poster presentation. British Geomorphological Research Group Conference, Oxford, 2003.**

Preliminary observations and measurements of well-rounded relatively small-scale (up to a few metres) surface landforms have been carried out in several Carboniferous Limestone areas of NW England. This scale has received less attention in work on mature karst features of these areas than have larger landscape components. Scale, shape and topographic situations indicate that these features are unlikely to have developed by dissolution in the c. 15 ka since the Devensian glaciation. Comparisons are made with apparently similar landforms in S. Spain and N. Hungary. Sites examined include: Gaitbarrows; Farleton Fell; Newbiggin Crag; Hutton Roof Crag; The Clouds; Great Asby Scar; Wharfedale, and the Malham Plateau. A morphometric method is suggested which could be applied to establishing to what extent similar elements of small-scale surface landforms found in the more clearly recently glaciated areas may also be survivals of pre-Devensian karstification. The extent of these small-scale mature karst elements in the NW England limestone areas supports the suggestion of a lesser role for Devensian glaciation in the evolution of these landscapes, and a greater role for the persistence of older karstification. A model summarizes relationships with other surface karst forms.

- 12 - 168 Goričan, Špela et al.: Spodnja in srednja jura bazena Hawasina v Omanu in primerjava s Slovenijo. Geološki zbornik, Razprave, Poročila. 16.posvetovanje slovenskih geologov, 17, 36-39, Ljubljana, 2003.**

K.W.: structural geology, palaeontology, Jurassic, Slovenia.

- 12 - 169 Hall, Leslie S.; Richards, Greg: Flying around underground: Cave Bats. In Finlayson, Brian; Hamilton-Smith, Elery (Editors): "Beneath The Surface: A Natural History of Australian Caves". UNSW Press, Sydney, pp. 111-126, 2003.**

Lists the 29 species of cave dwelling bats in Australia and discusses in detail, with examples, their varied usage of caves for maternity sites, hibernacula, dispersal stop-overs, and night

time feeding roosts. They describe the structural and other environmental factors necessary for a cave to be useful to bats.

- 12 - 170 Hamilton-Smith, Elery: People and caves: changing perspectives. In Finlayson, Brian; Hamilton-Smith, Elery (Editors): "Beneath The Surface: A Natural History of Australian Caves". Pp. 148-171, UNSW Press, Sydney, 2003.**

A history of the changing human usage and attitudes to caves starts with Aboriginal exploration, occupation, mining and art - which extended well into the dark zone in some areas. Early European settlers identified many caves and made some use of them as water sources or hiding places. The bone deposits at Wellington were recognised in 1830 and formed the birthplace of palaeontology in Australia. In the later 1800s, JT Woods at Naracoorte produced the first scientific arguments on the broader aspects of cave development in Australian conditions. At the same time a series of artists, engravers, photographers and writers popularised the caves and led to development of a tourist caves industry. The story of the development of the main tour cave areas at Jenolan, Naracoorte, Buchan, and south-west Western Australia is partly a list of striking personalities who explored and sold their caves to the public. More recently exploration on the Nullarbor included the use of light aircraft in 1939. The first caving club was formed in 1946 and the Australian Speleological Federation was formed in 1956.

- 12 - 171 Hladnik, Dejan: Jamarska šola 2001. Bilten Jamarskega društva Železničar, 85, Ljubljana, 2003.**

K.W.: speleological school, Slovenia.

- 12 - 172 Hladnik, Dejan: Jamarska šola 2002. Bilten Jamarskega društva Železničar, 86, Ljubljana, 2003.**

K.W.: speleological school, Slovenia.

- 12 - 173 Igo, H.: The occurrence of carbonate rocks and paleokarst in Japan. Z. Geomorph. N.F., Suppl.-Vol. 131, 1-15, Berlin-Stuttgart, 2003.**

- 12 - 174 Ilič, Uroš: Logarček nabira nove metre. Bilten Jamarskega društva Železničar, 19-25, Ljubljana, 2003.**

K.W.: regional speleology, cave diving, Slovenia.

- 12 - 175 Ilič, Uroš: Novosti v Velikem in Malem Okencu. Bilten Jamarskega društva Železničar, 26-31, Ljubljana, 2003.**

K.W.: regional speleology, cave diving, Slovenia.

- 12 - 176 Jager, Kristina: 1.jamarski raziskovalni tabor Velika vrata. Bilten Jamarskega društva Železničar, 60-62, Ljubljana, 2003.**

K.W.: regional speleology, caving camp, Slovenia.

- 12 - 177 James, Julia: The Crystal Gallery. In Finlayson, Brian; Hamilton-Smith, Elery (Editors): "Beneath The Surface: A Natural History of Australian Caves". Pp. 52-88, UNSW Press, Sydney, 2003.**

An introduction to cave minerals and their formation, including the influence of micro-organisms, is followed by a discussion of the different speleothem forms and types (calcite, aragonite, evaporite minerals, and others). There are sections on the use of speleothems to deduce environmental histories; cave entrance speleothems; the role of water and human activity in damaging or destroying speleothems and mineral deposits and finally a special section, by John Webb, on the phosphate minerals of the Skipton lava cave.

**12 - 178 Jeutter, Peter; Kogler, Sebastian: Expedition to Gunung Lanno, Kinta Valley, West Malaysia. IC, 2002, p. 44-47 (map, surv.), 2003.**

Gunung Lanno is a large limestone hill in the Kinta Valley, near Ipoh, Perak. The expedition studied the caves, the hill, flora and fauna.

**12 - 179 Južnič, Stanislav: Pedagoško in znanstveno delo bratov Gruber. Kronika, 51/2, 151-178, Ljubljana, 2003.**

K.W.: speleohistory, Gruber Gabrijel, Gruber Tobija, F. A. Steinberg, R. Bošković, history of physics, history of geology, karst hydrology, karst spring.

**12 - 180 Južnič, Stanislav: Hallerstein and Chinese Karst. Acta carsologica, 32/2, 299-306, Ljubljana, 2003.**

The life and work of the Carniolan scientist Augustin Hallerstein was described. Hallerstein's maps of the Chinese karst areas were discussed. The data about his travels through the karst regions were presented.

K.W.: Hallerstein, Jesuits, Carniola, China, karst, maps.

**12 - 181 Kashima, N.; Urushibara-Yoshino, K.: Fluctuation of Annual Solution Rate of Limestone Tablets in Shikoku, Japan. Ehime no Chigakukenkkyu [in Japanese], 7 (2), 15-30, 2003.**

The solution rates of limestone tablets, made of Lipica (Slovenia), Quilin (China), Chichibu (Japan), Shikoku Onogahara (Japan), and Rugado (Japan) limestones, have been observed from 1993 to 2003. The 10 years' results obtained from Shikoku Onogahara and Rugado are reported in this article as a conclusion. Fluctuation of annual solution rates has close relation to annual precipitation. The measured facts are as follows: Annual precipitation at both stations was more than 2,800mm in 1993, 1998 and 1999. In these wet years, solution rates were extremely high. Especially, those from B<sub>2</sub> horizons in soil showed high values, 1.0 - 1.3% of tablets weight. Also, in these wet years, they were 0.6 - 1.1% in the air 1.5m above the ground surface. In the dry years, 1994 and 1996, at both stations, annual precipitations were less than 2,000mm. In these years, solution rates of B<sub>2</sub> horizon at both stations showed lower values, 0.7 - 0.8%. On the other hand, they were 0.3 - 0.6% in the air 1.5m above the ground surface. The solution rate in B<sub>2</sub> horizon during these 10 years, the solution rates in the wet years showed 2 times higher than those in the air during the dry years. During these 10 years, the solution rates of B<sub>2</sub> horizon were always higher than those in the air. The solution rates of B<sub>2</sub> horizon are 1.8 - 2.0 times higher than those in the air 1.5m above the ground at both stations during these 10 years. The reason, why solution rates are high in B<sub>2</sub> horizon, is experienced by high value of CO<sub>2</sub> contents in soils during summer.

- 12 - 182 Kaszala, R.; Bárány-Kevei, I.; Polyák-Földi, K.: Heavy metal content of the vegetation on karstic soils. Acta Climatologica and Chorologica. Tom. XXXVI-XXXVII., pp. 57-62, 2003.**

The soil-vegetation system has a great importance to process in the karst-ecological system. Soils can buffer environmental impacts and they can change the karst system. Within certain limits, soils can bind the non-karstic materials (e.g. heavy metals) which enter the soil by deposition or any anthropogenic influent. The result of the soil acidification the heavy metals can get into the vegetation and the karst water system. The present paper describes investigations the heavy metal content of plants in relation to the exchangeable heavy metal content in the Aggtelek region, Hungary.

- 12 - 183 Keveiné Bárány, I.: Tájszerkezet és tájváltozás vizsgálatok karsztos mintaterületen [Investigation of landscape structure and landscape change on karsts], Tájökológiai Lapok I (2). pp. 145-151, 2003.**

The recent landscape ecological researches study the landscape potentials from the point of view of the possibilities of different uses in the future. The above-mentioned research is especially important on those sensitive areas, where the various environmental effects cause rapid changes. The study represents the changes in karst landscape structure due to human impact with special regard to silviculture in Bükk Mountain.

- 12 - 184 Kiernan, K.; Wood, C.; Middleton, G.: Aquifer structure and contamination risk in lava flows: insights from Iceland and Australia. Environmental Geology, 43, 852-865, 2003.**

Relatively recent recognition of the importance of endogenous lava emplacement mechanisms requires updating of groundwater models for some volcanic terrains because voids produced during lava inflation play a more significant role in their hydrology than has generally been recognised. Highly integrated, underground drainage systems in some very young lava flows in Iceland exemplify the potentially complex, fissured and conduit aquifers which can exist. Similarities between such aquifers and easily polluted, karstic conduit aquifers suggest greater research and more careful and protective management of some volcanic aquifers are warranted. Interpretation of aquifer structure can be impeded on very old lava flows by superimposition of sediments and accumulation of weathering residues but, if emplacement was by endogenous processes, then relicts of similar void systems may persist and pose similar hazards. K.W.: Groundwater, fissured aquifer, conduit aquifer, lava tubes, pollution.

- 12 - 185 Klinkon, Ines: 2.jamarski raziskovalni tabor Velika vrata. Bilten Jamarskega društva Železničar, 63-67, Ljubljana, 2003.**

K.W.: regional speleology, caving camp, Croatia.

- 12 - 186 Knez, Martin; Otoničar, Bojan; Slabe, Tadej: Subcutaneous stone forest (Trebnje, Central Slovenia). Acta carsologica, 32/1, 29-38, Ljubljana, 2003.**

The subcutaneous stone forest has been discovered during the construction of the industrial facilities at the NE edges of Trebnje (Fig. 1,2) and represents the first phenomenon of this type in Slovenia. Individual columns attain the height of up to 8 m and they display shapes that are typical of subsoil areas. Prior to the building interventions on the surface

this stone forest has not been so manifestly visible, since there were only peaks of columns that were protruding for several meters out of the thick soil, which could at first sight be considered and classified as smaller lapiaz. Regarding its shapes, size and manner of its formation we may compare it to the renowned Chinese, or more precisely said, the Lunan stone forests.

- 12 - 187 Knez, Martin; Slabe, Tadej: Lunan stone forests: morphology and development. In: Le karst de la craie en Normandie, Colloque et excursions, 23, Rouen, 2003.**

K. W.: Lunan stone forests, lithology, morphogenesis, rock relief.

- 12 - 188 Knez, Martin: Grotte de Škocjanske jame. In: Drobne, Katica (Ed.). De la mer Adriatique aux Alpes Juliennes (Italie nord-orient et Slovenie occidentale) - un parcours geologique sans frontieres, Znanstveno raziskovalni center SAZU, Dipartimento di scienze geologiche, ambientali e marine, Università, 41-43, Ljubljana, Trieste, 2003.**

Škocjanske jame near Divača is one of the largest and the most interesting cave systems in Slovenia, long about 5800 m. Since 1986 the cave is inscribed into the UNESCO World Heritage List of natural and cultural monuments. Škocjanske jame cave makes part of the Public Service Agency Park Škocjanske jame which covers a wider vicinity including collapse dolines and nearby lying natural and cultural monuments.

- 12 - 189 Knez, Martin; Kogovšek, Janja; Mihevc, Andrej: Karst I: [Škocjanske Jame]. In: Juvan, Grega; Černe, Alenka E.; Pavlič, Matevž U. (Eds.). Zbornik, Zveza za tehnično kulturo Slovenije, Gibanje znanost mladini, 13-32, Ljubljana, 2003.**

K.W.: Dinaric Karst, Kras, hydrology, Divaški kras, geology and morphology of Škocjan Caves, unroofed cave.

- 12 - 190 Knez, Martin: [Lezike in oblikovanje podzemnih rogov, Prelom v udornici Mala dolina, Zgornjekredni apnenci]. In: Zorman, Tomaž (Ed.), Škocjan educational trail guidebook, Park Škocjanske jame, Škocjan, 96, 2003.**

K.W.: fault, bedding-plane, Upper Cretaceous limestone.

- 12 - 191 Kogovšek, Janja; Diković, Sonja; Petrič, Metka; Rubinić, Josip; Knez, Martin; Hrvojić, Elza; Slabe, Tadej: Hydrochemical research of the Mlini spring, Istria. Ann, Ser. hist. nat., 13/1, 91-102, Koper, 2003.**

International co-operation is necessary for efficient study of karstic springs with recharge areas that extend in the territory of more than one country. Such example is the Mlini spring, which was studied in the frame of the Slovene-Croatian programme for scientific co-operation. The spring has been included into the network of the national monitoring of the Croatian waters since 1996, and in the planned research detailed measurements of physical-chemical parameters of water were carried out in the chosen water wave formed by intensive precipitation after longer dry period. Obtained results confirm the importance of such additional detailed monitoring, as it, at adequate hydrological conditions, enable us to detect extreme values of certain parameters of water quality which could not be detected by regular monitoring.

- 12 - 192 Kogovšek, Janja; Petrič, Metka: Tracing tests as a tool for the estimation of possible**

- impacts of human activities on karst waters - examples from Slovenia. RMZ-Mater. Geoenviron., 50/1, 161-164, Ljubljana, 2003.**  
 To protect effectively karst waters against negative impacts we should first have as much information as possible about the characteristics of karst aquifers. In our practice the tracing tests were proved as a very useful tool for the acquisition of such information.
- 12 - 193 Kogovšek, Janja: Značilnosti pretakanja padavin skozi vadozno cono Krasa. In: Kuchar, Miran. Raziskave s področja geodezije in geofizike 2003 : Zbornik predavanj. Ljubljana: Fakulteta za gradbeništvo in geodezijo, Ljubljana, 15-21, 2003.**
- 12 - 194 Košir, Adrijan: Litostratigrafska revizija zgornje krede in paleogena v jugozahodni Sloveniji. Geološki zbornik, Razprave, Poročila. 16. posvetovanje slovenskih geologov, 17, 92-98, Ljubljana, 2003.**  
 K.W.: lithostratigraphy, geological map, Slovenia.
- 12 - 195 Košir, Adrijan: Procesi akumulacije kalcijevega karbonata v rastlinskih koreninah in rizosferi: paleocenske kalkrete s Krasa in recentne analogije iz jugovzhodne Španije. Geološki zbornik, Razprave, Poročila. 16. posvetovanje slovenskih geologov, 17, 91-92, Ljubljana, 2003.**  
 K.W.: calcrete, calcium carbonate, rhizosphere, Kras, Slovenia, Spain.
- 12 - 196 Košir, Adrijan; Otoničar, Bojan: Trnovski gozd: Mesozoic carbonate platform depositional systems of NW Dinarides. Mednarodni geološki tabor Eugen 2003, 46-58, Kobarid, 2003.**  
 K.W.: regional karstology, palaeogeography, palaeokarst, Slovenia.
- 12 - 197 Kovačič, Gregor: Kraški izviri Bistrice (JZ Slovenija). Annales, Ser.hist.nat., 13/1, 111-120, Koper, 2003**  
 K.W.: regional karstology, karst hydrology, karst spring, water protection, Slovenia.
- 12 - 198 Kovačič, Gregor: The Protection of Karst Aquifers: the Example of the Bistrice Karst Spring (SW Slovenia). Acta carsologica, 32/2, 219-234, Ljubljana, 2003.**  
 Karst springs are important drinking water sources both in Slovenia and elsewhere in the world. Due to their specific structure, karst aquifers are in most cases highly vulnerable to pollution. Through the example of the Bistrice karst spring, the author highlights the problems of karst groundwater protection and presents the main shortcomings and weaknesses of the relevant legislation in force and of established practices in the field of the protection of karst aquifers in Slovenia. Despite relatively favourable conditions for water protection (scarce population, less intensive agricultural activities etc.) as compared with karst areas elsewhere in the world, many important karst springs in Slovenia are improperly protected. Water protection regimes are often established inappropriately and control over the implementation of protective measures is inefficient.  
 K.W.: Karst hydrology, Snežnik plateau, water protection zone, Waters Act
- 12 - 199 Kovačič, Gregor; Ravbar, Nataša: Karst aquifers vulnerability or sensitivity? Acta carsologica, 32/2, 307-314, Ljubljana, 2003.**

The concept of karst aquifer vulnerability mapping is commonly used for the determination of water protection zones and planning of land use in the background of the captured karst sources and wells. Several different methodologies for karst aquifer vulnerability mapping exist and the examination of scientific literature shows considerable variations in the definition of the term vulnerability. The authors suggest the distinction between the terms vulnerability and sensitivity of karst aquifers, since the former includes more information, which are required for efficient protection. The interpretation of the applied terms is founded on the conceptual background of the environmental vulnerability studies, which are declared with the Slovene 1993 Environmental Protection Act.

- 12 - 200 Krašovec, Marko: Jama Svetih treh kraljev. Bilten Jamarskega društva Železničar, 98-99, Ljubljana, 2003**

K.W.: regional speleology, aragonite, Slovenia.

- 12 - 201 Kranjc, Andrej: Balthasar Hacquet, predecessor of modern karstology. Hacquetia (Ljublj.), vol. 2, no. 2, pp. 129-138, ilustr., 2003.**

Balthasar (Belsazar) Hacquet spent 20 years of his life (1766-1787) in nowadays Slovenia where he was a surgeon and professor of anatomy at Ljubljana. But his main interest was natural sciences (geology, mineralogy, palaeontology, chemistry, hydrology, geomorphology, karstology as we call them nowadays). He travelled a lot across Carniola (Krain) and NW parts of Dinaric Mts. and published his observations in 4 volumes of *Oryctographia Carniolica* (1778-1789). He described and even explained many karst phenomena and karst features. According to our knowledge in many cases he was the first who tried this or whose explanation is right (for example underground water connections, geological development, corrosion). Hacquet discerned the difference between karst and normal relief. He also knew that the part of Carniola is called Kras (Karst), which seemed to him like "stony Arabia". He produced a map of Carniola and NW Dinaric Mts. with signs for lithology - the first geological map. He discerned limestone and dolomite, he wrote about a sort of corrosion of limestone, of different weathering, etc. Although it is difficult to find out his general perception of karst he knows that it is special type of landscape, that it is on limestone rocks which are soluble in water and that there are special geomorphological features, karst poljes and caves for example.

- 12 - 202 Kranjc, Andrej: Academician prof. dr. Ivan Gams : dedicated to his 80th anniversary. Acta carsologica, 32/2, 9-17, Ljubljana, 2003.**

K.W.: professional life, karstologist, speleologist, Gams Ivan.

- 12 - 203 Kranjc, Andrej: International Conference on life and work of Balthasar Hacquet : Idrija, Slovenia, October 9-10, 2003 (Hacquetia Vol. 2, No. 2, Ljubljana, 2003). Acta carsologica, 32/ 2, 319-320, Ljubljana, 2003.**

K.W.: Conference report, Hacquet Balthazar.

- 12 - 204 Kranjc, Andrej: Baltazar Hacquet (1740-1815) in naš kras : rudniški zdravnik v Idriji, učitelj na ljubljanskem liceju in na babiški šoli. Kras, Jan. 2003, No. 56, pp. 16-17, ilustr., 2003.**

K.W.: Hacquet Balthazar.

- 12 - 205 Kranjc, Andrej: Novejše smeri v krasoslovnih raziskavah [New trends in speleological research]. In: Natek, Karel (Ed.). Fizična geografija pred novimi izzivi, (Dela, 20), pp. 65-73, Ljubljana: Oddelek za geografijo Filozofske fakultete, 2003.**  
 Karstology is an interdisciplinary science - an integrated system of sciences related to karst similar as physical geography. Among the most important modern karstologists there are many geographers, in Slovenia also, for example Prof. Gams. Browsing the bibliography some new topics - new trends in karstological research stand out such as genesis and evolution of karst, speleogenesis, importance of microbiology, luminescence, clastic sediments, minerals, origin and development of speleothems (aragonite, aerosol, tuflactite), measurements of flowstone deposition (standard tablets), chemistry of speleothems, absolute dating of sediments. Hydrological research has to be carried out and to intensify even. From regional point of view there are less and less new discoveries despite the fact that the karstologists are visiting the most remote parts of the World. Looking through the publications the "classical" karst countries are neglected comparing with other parts of the World. The number of authors as well as publications in English is increasing. Some topics are noticeably prominent. Synthesis of acquired knowledge should be the task of geographers due to their fundamental education.
- 12 - 206 Kranjc, Andrej: Cenni storici e descrizione delle grotte. In: Kodrič, Ravel; Debevec, Albin; Peric, Borut; Turk, Peter; Klemen-Krek, Zofija; Kranjc, Andrej; Mihevc, Andrej; Slapnik, Rajko; Zorman, Tomaž (Eds.): Il parco di Škocjanske jame. Škocjan: Park Škocjanske jame, pp. 42-57, ilustr., 2003.**  
 About the history and the description of Škocjanske jame.
- 12 - 207 Kranjc, Andrej: Veda o podzemskih jamah se je rodila na Slovenskem [Cave science has been born in Slovenia]. In: Sitar, Sandi (Ed.). Prešernov koledar 2004, (Koledarska zbirka). Ljubljana: Prešernova družba, ilustr., pp. 99-109, 2003.**  
 K.W.: history of speleology, Schmidl Adolf, Die Grotten und Hoehlen... 1854.
- 12 - 208 Kranjc, Andrej: Blick in die Vergangenheit und Beschreibung der Höhlen. In: Kodrič, Ravel; Debevec, Albin; Peric, Borut; Turk, Peter; Klemen-Krek, Zofija; Kranjc, Andrej; Mihevc, Andrej; Slapnik, Rajko; Zorman, Tomaž (Eds.): Regionalpark Škocjanske jame. Škocjan: Park Škocjanske jame, pp. 42-57, ilustr., 2003.**  
 K.W.: history, description, Škocjanske jame, Slovenia.
- 12 - 209 Kranjc, Andrej: 1883 - prelomno leto za Postojno [1883 - turning point for Postojna]: (po arhivu Postojnske jame za leto 1883\*). In: Bogataj, Janez, Šajn, Srečko, Kranjc, Andrej. Sprehod skozi čas : ob 120. obletnici Turističnega društva Postojna. Postojna: Turistično društvo, pp. 27-28, ilustr., 2003.**  
 Foundation of Postojna Tourist Society and attempts to rent Postojnska jama.
- 12 - 210 Kranjc, Andrej: Maximovich E.G. & Maximovich N.G.: Geolog - karstoved K.A. Gorbunova (1925-1996) : (K.A. Gorbunova, geologist -karstologist, Summary p. 236-237), 240 pp., 16 fig., Kursiv, Perm 2002. Acta carsologica, 32/2, 325-326, Ljubljana, 2003.**  
 K.W.: book report.

- 12 - 211 Kranjc, Andrej: Cérémonique d'honneur et hommages aux karstologues français et slovènes, Jean Nicod et Ivan Gams. Karstologia, 1e sem., no. 41, pp. 55, 2003.**  
80 years of academician Ivan Gams and new correspondent member of the Slovene Academy of Sciences and Arts, prof. Jean Nicod.
- 12 - 212 Kunaver, Jurij: Contribution of Ivan Gams to the development of slovene karst terminology. Acta carsologica, 32/2, 19-28, Ljubljana, 2003.**  
The stage of the scientific terminology is by all means one of the indicators of the development of the scientific branch, to which it belongs. Therefore the publishing of the Slovene karst terminology in 1973 was an important event for further development of Slovene karstology. Still more, the efforts for a comparative national karst terminologies of former common state Yugoslavia were successfully achieved in publishing the Serbian and Croatian karst terminology also, a year later. In fact, the former Association of the geographical societies of Yugoslavia decided to give full support to its subcommission in preparing the project Karst terminology of the Yugoslave nations and to a joint Yugoslave symposium on Karst terminology, held in Ljubljana from 22-23th October 1971, both guided and organised by prof. Ivan Gams, who was also the original initiator of this idea. All this efforts were nevertheless combined and connected with the international work of that time to find most appropriate terms and definitions for the karst phenomena and to make them comparable in terms of national terminologies. Ivan Gams was therefore not only a most important promoter of the Slovene karst terminology and one of the leading persons of the scientific karstology in the time concerned but was due to his global ideas also one of the central persons in the international karstology.  
K.W.: Ivan Gams, karstology, terminology, Slovenia.
- 12 - 213 Labernik, Nace: Praznovanje diplom po jamarsko in še kaj. Bilten Jamarskega društva Železničar, 94-97, Ljubljana, 2003.**  
K.W.: society activity.
- 12 - 214 Lajovic, Aleš: Lučki dol. Bilten Jamarskega društva Železničar, 32-41, Ljubljana, 2003.**  
K.W.: regional speleology, history of exploration, Slovenia.
- 12 - 215 Lajovic, Aleš: Kras Lesnega Brda. Bilten Jamarskega društva Železničar, 42-53, Ljubljana, 2003.**  
K.W.: regional speleology, cave description, history of exploration, quarry, isolated karst, cave list, Slovenia.
- 12 - 216 Lauritzen, S. E.: Hamarnesgrottas speleogenese. Geolognytt, 2003.**
- 12 - 217 Lauritzen, S. E.: Interglasialt klima fra norske speleothemer- en oversikt. Geolognytt, 2003.**
- 12 - 218 Lauritzen, S. E.: Reconstructing holocene climate records from speleothems. In: Macay, A., Battarbee, R., Birks, J. & Oldfield, F., (Eds.) Global Change in the Holocene. P. 528, Arnold, London, 2003.**

**12 - 219 Liu, Hong; Zhou, Yan: The characteristics of Cave development in Shilin. Advance in earth sciences, 18/6, 891-898, Science press, Beijing, 2003.**

Shilin County, got her name after shilin karst forms is 86km south of Kunming, the capital city of Yunnan Province. The karst area covers 900km<sup>2</sup>. Among them 350km<sup>2</sup> are shilin karst landscapes, where have been set as state-level natural protected area. Cave is one of the most developed karst features too. From 1995 to 2000, there be around 70 caves have been explored. Based on their section shapes, location and hydrogeological settings differences, they could be classified into three types of caves. The first type is fracture-like cave, formed by the enlargement by water along fractures. There are innumerable such type caves developed in shilin landform areas. Such type of caves is small, 0.5~2m wide and 20~40m deep. Strictly, the cave is the outcome of shilin evolution. The second type of cave is horizontal caves, which mainly developed in the Fengcong ~shallow depression landscape areas, where right outside of shilin landscapes. Those caves are very complicated, no matter how from their shapes or genesis. The third type is slope caves, mainly distributes at Fengcong~depression karst areas or hillsides of lower mountains, where ground water table is around 100~150m deep. The cave commonly is connected with vertical shafts or collapse dolines as entrance. The fast flows play a great role for the formation of such type cave. Generally the cave development in Shilin County enjoys the following characteristics: (1) the cave development mainly concentrates in three elevation zones. (2) The development of cave is strongly controlled by the lithology of carbonate rocks. Most caves developed in Permian and Carboniferous carbonate strata areas. (3) Small and medium scales caves dominate absolutely. (4) Most caves have active water flow and are at the near water table stage. Due to the ceiling rock of caves is very thin, karst~windows are well developed. Most caves are water caves, which are normally shallow buried and (5) the orientation of cave passage obviously controlled by structure fissures and there is a great difference between caves of the east and west part of the region. In west, the orientations of caves are dominant by S~N or near S~N direction. But in east is the W~E or near W~E orientations predominant. The three water tracing tests in Tianshengguan area, the northeast part of Shilin has revealed the complicity of under~ground cave system of this region: the north~south and west~east directions underground water systems coexistences. In low~water period, the West~east conduit~fissure system work very well, but during high water level, some water drain in N~S direction. Obviously the caves show different stages of paragenesis. Caves suffered the alternation of several periods of deposition and periods of fast water flows and flood waters.

K.W.: Karst, Cave, Yunnan, Shilin.

**12 - 220 Lučić, Ivo: Vjetrenica. Pogled u dušu zemlje. 322 pp., Zagreb, 2003.**

K.W.: regional speleology, speleobiology, history of exploration, Bosnia and Herzegovina, Popovo polje, Vjetrenica cave.

**12 - 221 Marušin, Milan: Geological conditions - factor of origin of two different cave systems in two adjacent valleys (the Demänovská Valley and the Jánska Valley, the Low Tatras, Slovakia). Acta carsologica, 32/1, 121-130, Ljubljana, 2003.**

The Demänovská Valley is the most famous karst valley in the northern slopes of the Low Tatras. There the Demänovská Cave system is developed more than 30 km long. The similar karst valley, the Jánska Valley with dozens of underground karst phenomena is situated ten

kilometers to the east. The total length of these caves exceeds 30 km. The geomorphological, hydrological, and karst conditions of these two valleys are similar; nevertheless there are several outstanding differences between two cave systems developed in them. The whole of the Demänovská Cave system is developed within the eastern slope of the Demänovská Valley. On the contrary in the Jánška Valley significant caves are situated on both sides of the valley. Besides this difference the Demänovská Cave system is penetrable through the whole of its length whereas cave system of the Jánška Valley is not penetrable although connection of the underground spaces was proved by various methods. The described state is caused by different geological conditions in these valleys. Both cave systems are developed mostly in the Middle Triassic Gutenstein Limestones. But the Demänovská Valley is situated in the area which is built by monocline of the Krížnanský nappe. In the territory of the Jánška Valley there is the Chočský nappe which is tectonically very complicatedly framed.

K.W.: geological conditions, cave system, Gutenstein Limestones, Demänovská Valley, Jánška Valley, Slovakia.

**12 - 222 Mader, Brigitta: Observations on historical terminology: Grotte and Höhle in German texts. *Acta carsologica*, 32/2, 83-90, Ljubljana, 2003.**

The author treats the historical terminology for caves (Grotte, Höhle) used by German speaking authors and explorers in the Austro-Hungarian period with special emphasis on the etymology of the terms Grotte and Höhle, coming to the conclusion that those terms do not indicate a difference either from the speleological point of view or the linguistic one. The contemporary use of Grotte and Höhle in the Austro-Hungarian period is determined by linguistic conditions and influence of the Italian (bilingual or even trilingual situation) in the classical Karst region.

K.W.: karst terminology, Grotte, Höhle, Kras.

**12 - 223 Mader, Brigitta: Archduke Ludwig Salvator and *Leptodirus Hohenwarti* from Postojnska jama. *Acta carsologica*, 32/2, 289-298, Ljubljana, 2003.**

The author presents a historic preparation of a *Leptodirus hohenwarti* Schmidt recently found in the house of Eugenio Sforza (1820-1894) in Toscana. Because of the fact that Sforza has been the tutor and equerry of the Austrian Archduke and natural scientist Ludwig Salvator (1847-1915) a connection is presumed between Ludwig Salvator's natural history collections and the *Leptodirus*-specimen, which was in the author's opinion acquired in Postojna in 1863 on the occasion of Ludwig Salvator's first visit to the caves, accompanied by Eugenio Sforza.

K.W.: *Leptodirus Hohenwarti* Schmidt, speleobiology, history of speleology, Ludwig Salvator, Eugenio Sforza, L.W.Schaufuss, L.Ganglbauer, F.v. Hohenwart, F.J. Schmidt, Postojna.

**12 - 224 Marsico, Antonella; Gianluca Selleri; Giuseppe Mastronuzzi; Paolo Sansò; Nicola Walsh: Cryptokarst: a case-study of the Quaternary landforms of southern Apulia (southern Italy). *Acta carsologica*, 32/2, 147-159, Ljubljana, 2003.**

Cryptokarst is a karst developed beneath a permeable and not karstifiable formation by percolating waters. The permeable rock acts as a storage of water which feeds slow seepage and infiltration enhancing the alteration of bedrock. The resulting forms consist of depressions, filled by the covering sediments, and pinnacles. The sinking of the permeable cover can produce depressions on the topographic surface. Erosion of the cover exposes a

landscape characterised by pinnacles, ruinforms and dolines.

In the Apulia region, cryptocorrosion surfaces are characterized by solution pipes 4-5 meters deep and with variable width (from a few centimeters to about one meter). Pipes walls are covered by a brownish carbonate crust, from a centimeter to more than 10 centimeters thick. The continental sands are only found in these depressions. The cryptocorrosion process took place late in the Middle Pleistocene on Quaternary marine abrasion terraces covered by no-carbonate sandy-silty continental deposits. The process stopped before the Last Interglacial age in response of an abrupt climatic change that induces a calcium carbonate precipitation and the formation of a carbonate crust.

K.W.: Apulia, cryptokarst, solution pipes.

**12 - 225 Mastnak, Matjaž: Novi Proteus v Postojni. Proteus, 66/2, 77, Ljubljana, 2003.**

K.W.: Speleobiological station, exposition, Postojnska jama, Slovenia.

**12 - 226 Montagnari Kokelj, E.; Cucchi, F.; Mazzoli, T.; Mereu, A.; Zini, L.: GIS and caves: an example from the Trieste Karst (Nort-Eastern Italy). British Archaeological Reports (BAR), Int. Series 1145-2003, 63-71, 2003.**

Archaeological materials are present in more than 100 caves in the Trieste Karst (north-eastern Italy). Starting from systematic re-examinations of the prehistoric evidence, an interdisciplinary project has been elaborated with the main objective of discovering possible conditioning links between the geo-environmental characters of caves and the different uses made by the man in the past. This paper presents the principal elements of the project and the informatic solutions adopted for its realization.

K.W.: GIS, prehistory, Classical Karst, Italy).

**12 - 227 Montagnari Kokelj, E.; Bressan, F.; Cucchi, F.; Mereu, A.; Zini, L.: ARCHEOGIS of the Isonzo Valley (Nort-Eastern Italy) from prehistory medieval times. British Archaeological Reports (BAR), Int. Series 1145-2003, 73-77, 2003.**

The realisation of ArcheoGIS, the archeological map of the valley of Isonzo River (north-eastern Italy) is an example of a positive collaboration between public and academic institution, that has gone beyond the primary aim of the initial project, i.e. the identification of an archeological site suitable for a new systematic excavation. The methodology followed during the study, that has produced a dedicated database and has allowed to test a predictive application of a GIS, is described here in some detail.

K.W.: GIS, archeology, Isonzo River, Italy.

**12 - 228 Moses, C. A.: Observations on coastal biokarst, Hells Gate, Lord Howe Island, Australia. Zeitschrift fur Geomorphologie, 47, 83-100, 2003.**

Meso- and micromorphologies are described for a supratidal calcarenite coastal platform at Hells Gate, Lord Howe Island. Three morphological zones are identified and field and laboratory investigations elucidate their relation to process zonation. Pinnacles, similar to those described as phytokarst at other subtropical sites, are investigated and the role of biological processes in their formation is examined. Evidence for a selective biodistintegration is presented. The pinnacles at Hells Gate cannot be described as phytokarst but have biokarstic properties. This study contributes to ongoing discussions on the role of biological weathering in coastal environments.

- 12 - 229 Mrak, Berta: Jean-Yves Bigot, 2002: Vocabulaire français & dialectal des cavités et phénomènes karstiques, Spéléo-Club de Paris, 184 pages. Acta carsologica, 32/1, 255-256, Ljubljana, 2003.**  
K.W.: book report (in English).
- 12 - 230 Mrak, Berta: Jean-Yves Bigot, 2002: Vocabulaire français & dialectal des cavités et phénomènes karstiques, Spéléo-Club de Paris, 184 pages. Acta carsologica, 32/1, 257-258, Ljubljana, 2003.**  
K.W.: book report (in French).
- 12 - 231 Mrak, Berta: Comparison of French and Slovene Karstic and Speleological Terminology. Acta carsologica, 32/2, 91-103, Ljubljana, 2003.**  
The article compares karstic terminology of the two world Karst forces - Slovenia and France, whose scientists have been collaborating for a very long time. From the etymological point of view, the comparison shows that the two vocabularies exerted mutual influence on each other, which in turn brought about several errors when new terms were being adapted. The article also describes some differences in terminology and deviations in the typology of more specific terms, as well as points out great similarity between general terms. The comparison also deals with different lexical abundance of the two terminologies, and concludes with a presentation of some karstic phenomena unique in both countries.  
K.W.: karstology, speleology, terminology, France, Slovenia.
- 12 - 232 Necdet, Mehmet: Overview of the karst occurrences in northern Cyprus. Acta carsologica, 32/2, 269-276, Ljubljana, 2003.**  
Cyprus is at the easternmost part of the Mediterranean and is in the intersected zone between Eurasia, Africa and Arabic Plates. Karstification occurs as travertines or caves in Northern Cyprus in formation of different ages. Those formations are the dolomitic limestones of Kyrenia (Girne) Range of Jurassic - Upper Cretaceous; Gypsum Deposits of Messinian ages. Travertine terraces (Quaternary) are seen as characteristic at the northern edge of the Kyrenia Range. Secondary limestones of Holocene age were deposited on the older sediments and seen with some sort of karst features over the island. Karstic occurrences are seen as different size of open or sealed caves and the sinkholes in those formations mentioned above.  
K.W.: karst, Holocene karst, travertine, Kyrenia, Northern Cyprus.
- 12 - 233 Nicod, Jean: Les karsts Dinariques. Paysages et problèmes. Slovénie, Croatie, Bosnie-Herzégovine, Monténégro. Opera, Inštitut za raziskovanje krasa ZRC SAZU, 38/2, 183 pp., Ljubljana, 2003**  
K.W.: regional karstology, karst morphology, glossary, karst polje, Dinaric karst, contact karst, bibliography.
- 12 - 234 Nicod, Jean: A little contribution to the karst terminology : special or aberrant cases of poljes? Acta carsologica, 32/2, 29-39, Ljubljana, 2003.**  
A usual definition of polje states that it is "great closed karst basin with flat bottom, karstic drainage and steep peripheral slopes". But the Dinaric karst shows a wide range of poljes. The article discusses the main criteria of polje definition and the different degrees of evolution of the polje are emphasised. The essentials are gathered in the table with new tentatives

on classification of poljes and comparing the Dinaric karst with other Mediterranean and Alpine countries.

K.W.: karst terminology, polje, Dinaric karst, Alpine karst, Mediterranean.

- 12 - 235 Nicod, Jean: Understanding environmental problems in dinaric karst. In: Natek, Karel (Ed.). Fizična geografija pred novimi izzivi, (Dela, 20), pp. 27-41, Ljubljana: Oddelek za geografijo Filozofske fakultete, 2003.**

The main regions of the Dinaric karst, the Kras, the islands and low plateaus of the Dalmatian coast, present the types of land use typical of Mediterranean countries and which produce changes in the surface, e.g., deforestation and the adaptation of the karst surface for agriculture, the use of extracted stones and land reclamation. The evolution of the landscape and systems of adapting agriculture to karstic terrains in Kras and Dalmatian countries make it possible to establish comparisons with other karstic countries, i.e., Provence, the Causses and Puglia, conversely, this research provides better knowledge of the aspects and workings of Dinaric karsts, particularly the evolution of landscape, the growth of karren-fields and the geomorphological and hydrological changes in the poljes.

K.W.: karst, Karst, Dinaric Karst, geomorphology, karstology, land use, agriculture, evolution of landforms.

- 12 - 236 Okon, Dorota; Tyc, Andrzej (Eds.): Protection of inanimate nature. Proceedings of 10 International Course of Karst Area Nature Protection, Smolen-Zloty Potok, 25-27.09.2002, Zespól Parków Krajobrazowych Województwa Śląskiego, 50 p., Bedzin, 2003.**

Proceedings of the International Course of Karst Area Nature Protection organised from 1993 by authorities of landscape parks deals with karst areas of Poland, Czechia and Slovakia. Fourteen professional papers regarded to protection and sustainable development of protected karst areas of Poland and Czech Rep. are collected in the proceedings. In Polish and Czech with English abstracts.

- 12 - 237 Otoničar, Bojan; Slabe, Tadej.: Večfazno zakrasevanje zgornjekrednih in spodnjepaleogenskih apnencev pri Kozini. In: Horvat, Aleksander (Ed.). 16. Posvetovanje slovenskih geologov: Razprave. Poročila: Treatises. Reports, (Geološki zbornik, 17). Ljubljana: Univerza v Ljubljani, Naravoslovnotehniška fakulteta, Oddelek za geologijo, 125-131, 2003.**

K.W.: paleokarst, polyphase karstification, denuded caves, Kras.

- 12 - 238 Otoničar, Bojan; Košir, Adrijan; Debeljak, Irena: Late Cretaceous palaeokarst at Kozina. In: Juvan, Grega; Černe, Alenka E.; Pavlič, Matevž U. (Eds.). [Zbornik]. Ljubljana: Zveza za tehnično kulturo Slovenije, Gibanje znanost mladini, 33-45, 2003.**

K.W.: paleokarst, Adriatic-Dinaric carbonate platform, dinosaurs, Kras.

- 12 - 239 Pavšič, Jernej; Mikuž, Vasja: Upper Cretaceous vermetids from Paleocene conglomerate nerlow Mt. Nanos, W Slovenia. Razprave IV. razreda SAZU, 44/1, 225-237, Ljubljana, 2003.**

K.W.: Upper Cretaceous, palaeontology, snails, Vermetidae, Palaeocene, calcite tubes, Slovenia.

- 12 - 240 Pavšič, Jernej; Sket, Boris: Zgodovina ozemlja in njegovega živalstva. [History of the Slovenian territory and its fauna] In: Sket, Boris; Gogala, Matjaž; Kuštor, Valika; (Eds): Živalstvo Slovenije. Ljubljana: Tehniška založba Slovenije, pp. 25-40, 2003.**  
The geological history of the "Slovenian" territory, starting from the bottom of the warm Devonian sea somewhere south of the equator until recent postglacial times between approximately 45° 25' and 46° 53' of north latitude. Ecological conditions and fossil faunas during subsequent periods are described, including the formation of the subterranean fauna.
- 12 - 241 Parise, Mario; Federico, Antonio; Delle Rose, Marco; Sammarco, Mariangela: Folk karst terminology from Apulia (Southern Italy). Acta carsologica, 32/2, 65-82, Ljubljana, 2003.**  
Apulia region, in southern Italy, is one of the classical karst areas of the Italian peninsula, being underlain for most of its extension by intensely karstified carbonate rocks. The landscape presents essentially landforms of karstic origin, which have been the object of specific studies for a long time. The three main geographical sub-regions into which Apulia is generally divided (from north to south, the Gargano Promontory, the Murge plateau, and the Salento peninsula) have been characterized in the past centuries by complex and different social and historical events. These resulted in the development, from a linguistic point of view, of very distinct dialects in different parts of Apulia. The terms used to describe the karst landforms, both at the surface and underground, had subsequently been, and still are, extremely variable throughout the region.  
This paper illustrates some terms used in Apulia to designate and describe the main geomorphological manifestations of the karst landscape. An attempt is made to analyze the terms on the basis of: i) geographical distribution; ii) etymology, with reference to the local dialects; iii) morphological features and genesis of described landforms. Some cases of misuse of terms in the Apulian karst, even in recent times, are also pointed out.  
K.W.: karst, terminology, lama, gravina, etymology, Apulia.
- 12 - 242 Perpar, Igor; Potiskavec. Bilten Jamarskega društva Železničar, 54-57, Ljubljana, 2003.**  
K.W.: regional speleology, cave diving, Slovenia.
- 12 - 243 Peterlin, Stane: Marko Aljančič - sedemdesetletnik. Proteus, 66/1, 36-37, Ljubljana, 2003.**  
K.W.: Aljančič Marko - 70 years.
- 12 - 244 Petrič, Metka: Branka Trček, Epikarst Zone and the Karst Aquifer Behaviour. Acta carsologica, 32/2, 322-324, Ljubljana, 2003.**  
K.W.: book report.
- 12 - 245 Petrovčič, Jernej: Roparska jama. Bilten Jamarskega društva Železničar, 16-18, Ljubljana, 2003.**  
K.W.: regional speleology, history of exploration, Slovenia.
- 12 - 246 Pipan, Tanja; Brancelj, Anton: The fauna of epikarst : Copepoda (Crustacea) in**

**percolation water of Karst caves in Slovenia. Ann., Ser. hist. nat., 13/2, 223-22, Koper, 2003.**

Caves and karstic areas contain unusual organisms in a very specialized habitat. Some organisms live only in caves, where they can be located and characterized. Other species live in the small cracks and crevices that exist between the cave passages, where scientists cannot enter. Special attention is given to the stygobiotic species of copepods (Crustacea); their habitat is above the cave but under the surface in the so called epikarstic zone. Diversity dynamics of Copepoda were studied in six karstic caves. In some caves (Postojnska jama, Pivka jama, Črna jama) samples were collected once per week. In the other three caves (Škocjanske jame, Dimnice, Županova jama) we sampled trickles once a month, during 2000 and 2001. In total, 37 species were collected in the caves. From this habitat 11 species new to science were recognized. New species living there are particularly restricted in distribution to one or few trickles of water dripping from the ceiling. The results of the faunistic research indicate that biodiversity of Copepoda in epikarst is very high on a local scale and also over a wider area.

**12 - 247 Pipan, Tanja: Podzemeljska favna v prenikli vodi Županove jame. Grosup. odm., 38/12, 8, Grosuplje, 2003.**

K.W.: hypogean water fauna, Županova jama.

**12 - 248 Pipan, Tanja; Brancelj, Anton: Diversity and peculiarity of the epikarst fauna: a case study from six caves in Slovenia. In: Program. Charles Town: Karst Waters Institute, 2003.**

The karst subterranean environment has a distinctive fauna which occurs in many kinds of habitats. Stygobionts, i.e., obligate subterranean aquatic animals, inhabit the saturated and unsaturated zones of the karst underground. They are also found in seeps and drip pools filled by water from the epikarst, although their existence there is often quite ephemeral. Epikarst represents, in the hydrogeological division of the karst underground, the stratum that is closest to the surface. It is inaccessible for direct scientific research when using standard sampling procedure. The epikarst fauna has thus to be explored indirectly, by taking samples of the percolated water and pools in the caves filled with such water. Biodiversity, ecology and fauna of epikarst have only rarely been studied systematically. Copepoda (Cyclopoida and Harpacticoida; Crustacea) are the most numerous animal group in the epikarst. Recent systematic research of copepod community within the epikarst was performed in six caves in central Slovenia (Europe). Changes of faunal composition, its dynamic and distribution patterns were studied over one year sampling period. In percolation water and adjacent pools 37 species of copepods were collected. Ten species were ubiquitous and they are frequently found in subterranean environment presumably due to transportation from epigean habitats. The rest of the species were stygobiotic (27 species). At least 11 species new to science were recognized. Most species in trickles or pools were represented by few or even one single specimen. Due to the fact that the correlation between particular species and ecological parameters, especially ions, was statistically significant, copepods from epikarst zone show high level of ecological specialization. Finally, results of the faunistic research shown that biodiversity of Copepoda within the epikarst is high on a local scale as well as over a wider area.

- 12 - 249 Pipan, Tanja: Mednarodna konferenca o epikrasu = Interdisciplinary workshop on epikarst. Ann, Ser. hist. nat., 13/2, 305, Koper, 2003.**

K.W.: Conference report.

- 12 - 250 Pipan, Tanja: Ekologija ceponožnih rakov (Crustacea: Copepoda) v prenikajoči vodi izbranih kraških jam: doktorska disertacija = Ecology of copepods (Crustacea: Copepoda) in percolation water of the selected karst caves: dissertation thesis, 130, Ljubljana, 2003.**

Copepods are the most numerous animal group in the epikarst. The unsaturated karst zone remains inaccessible, if using standard research methods. The epikarst fauna has thus been researched indirectly by taking samples of percolation water. Due to the very small filters (60  $\mu\text{m}$ ) used in sampling method even the microscopic copepods were caught. In six karst caves a systematic survey was done in trickles and pools of percolation water. In percolation water and adjacent pools 37 taxa of copepods were collected. Ten taxa were designated as ubiquitous and are found frequently in subterranean environment but transported from the epigeal habitats by accident. The rest of the taxa are stygobitic (27 species) and 15 are endemic to Slovenia. From this environment at least 11 species new to science belonging to 7 genera were recognized. One species, *Bryocamptus borus*, is new to the Slovenian fauna. Males of *Morariopsis scotenophila* were found for the first time. Between 11 and 17 different taxa of copepods were found per cave regardless of its length. Of 37 taxa, only *Speocyclops infernus* and the new species *Parastenocaris* sp. 2 were found in all six caves. 16 taxa were found only in one location and 11 of these were stygobitic ones. Most species in trickles or in pools were represented by a single specimen. On the other hand, the fauna of copepods in percolation water is very rich. There is no correlation between the distance apart of the caves and the similarity of the fauna. The correlation between the thickness of the cave ceiling, temperature and the discharge on the one hand and the number of specimens on the other hand was no significant. The precipitation shows highly positive co-variation with the discharge. The copepod abundance in different types of pools was no proportional with the quantity of pumped water. Due to the fact that the correlation between single species and ecological parameters, especially ions, is statistical significant, copepods from epikarstic zone show high level of ecological specialization. The biodiversity of the epikarstic fauna can thus be used as the method for the studying and evaluation of influences of human activities on the subterranean habitats. The most common species present in many of the caves were no so dependent on either of the described parameters.

- 12 - 251 Prelovšek, Mitja; Černigoj, Tereza; Požar, Barbara: Naravnogeografske značilnosti kraške planote Snežnik. Slovenija, Ekскурzije LGD, Evropa, 3, 31-46, Ljubljana, 2003.**

K.W.: excursion guide, Würm, glaciation, karst morphology, Slovenia.

- 12 - 252 Price, Liz: Cave racers. Bat meals dead or alive. Malaysian Naturalist, 57 (2), 32-33, photos, 2003.**

The cave racer snake was seen to eat a dead bat in Dark Cave at Batu Caves, Malaysia. It is generally thought that racers normally eat live prey.

- 12 - 253 Pristavec, Jože: Dihalniki, pihalniki ter ostale pihajoče in dihajoče luknje. Bilten**

- Jamarskega društva Železničar, 76-78, Ljubljana, 2003.**  
K.W.: blow-hole, regional speleology, Slovenia.
- 12 - 254 Pristavec, Jože: Nove jame in zaledje Ljubljanice v masivu nad Bistrom. Bilten Jamarskega društva Železničar, 56-59, Ljubljana, 2003.**  
K.W.: regional speleology, history of exploration, Slovenia.
- 12 - 255 Ravbar, Nataša: The earliest Chinese karstologist Xu Xiake. Acta carsologica, 32/1, 243-254, Ljubljana, 2003.**  
The first real scientific exploration of karst and karst caves in south China was undertaken by Xu Xiake (1587 - 1641). Chinese karst was studied by Xu Xiake for more than thirty years. He described his journeys to almost half of the territory of the Ming dynasty in his book »Xu Xiake's travels« (»Xu Xiake youji«), that was first published in 1642. He dedicated a lot of time to the research of the underground world by describing subterranean rivers and lakes as water resources. He also made ground plans of some caves, marked their entrances and described different shapes of speleothems. He first described different ways of climbing in caves and methods for cave research. Altogether he visited over 300 caves. Xu Xiake first described different types of the tropical karst and focused on the characteristics and reasons of the tower hills origin. He introduced the term fenglin (peak forest), which is still used in the scientific literature. However, he is not only the father of the modern speleology, karstology, geomorphology and geography in the Chinese scale but in a worldwide sense.
- 12 - 256 Ravbar, Nataša: Drinking water supply from karst water resources (The example of Koprsko primorje, SW Slovenia). RMZ-Mater. Geoenviron., 50/1, 321-324, Ljubljana, 2003.**  
Water supply in Koprsko primorje is being founded on efficacious karst springs Rižana and Gradole and karst underground water, which is pumped in Klariči. Because of the increased need of drinking water, problems of water provision appear, especially in summertime. Enormous and still growing consumption of drinking water in Koprsko primorje is forcing into search for new efficacious water resources.
- 12 - 257 Ravbar, Nataša: Karstological School about karst terminology. Acta carsologica, 32/2, 317-318, Ljubljana, 2003.**  
K.W.: karst terminology.
- 12 - 258 Ravbar, Nataša: Kras - naš največji rezervoar : pitna voda. Delo, Znanost, 1. dec. 2003, 45/277, 12-13, Ljubljana, 2003.**  
K.W.: karst aquifer, drinking water resources.
- 12 - 259 Ravbar, Nataša; Zorn, Matija: Some characteristics of dolines of the kras plateau. In: Lacika, Ján (Ed.). Abstracts, (Geomorphologia Slovaca, 3, 1). Bratislava: Asociácia slovenských geomorfológov pri SAV, 3/1, 68, Bratislava, 2003.**  
Dolines are the most typical geomorphological feature of the karst relief in the temperate zone. Dolines vary greatly in their morphology and origin from (1) solution dolines and (2) "inherited dolines" (formed by the exposure of underground caverns through surface

erosion) to (3) collapse dolines. This article deals with the dolines in a selected area on the Kras plateau in southwestern Slovenia. Using geomorphological field mapping, we obtained the distribution, density, size, and depth of the dolines and tried to define their origin. A comparison was made between the dolines according to the local lithology, slope inclination, and exposition. The average density of dolines on the Kras plateau is well over fifty dolines per km<sup>2</sup>, and in some smaller areas the density reaches more than 240 dolines per km<sup>2</sup>. Most dolines in the area studied are solution dolines. They developed as surface features of the epikarst zone due to the locally more intense solution processes. Their density depends primarily on the local lithological conditions and slope inclination. In the area studied, the cave density is among the highest in Slovenia, reaching up to 2.4 caves per km<sup>2</sup>.

- 12 - 260 Ravbar, Nataša: 22nd speleological school in Cieszyn, Poland: (10th - 16th February 2003). Acta carsologica, 32/1, 259-260, Ljubljana, 2003.**  
K.W.:Speleological school report.

- 12 - 261 Ravbar, Nataša: Kraška terminologija: že enajsta mednarodna krasoslovna šola "Klasični kras". Kras, Sep. 2003, 61, 36-37, Ljubljana, 2003.**  
Karstological school report. Karst terminology.

- 12 - 262 Ravbar, Nataša: Karstological School about karst terminology. Acta carsologica, 32/2, 317-318, Ljubljana, 2003.**  
K.W.:speleological school report.

- 12 - 263 Reed, Liz; Gillieson, Dave: Mud and Bones: Cave deposits and environmental history in Australia. In Finlayson, Brian; Hamilton-Smith, Elery (Editors): "Beneath The Surface: A Natural History of Australian Caves". Pp. 89-110, UNSW Press, Sydney, 2003.**

The first part discussed the sources of cave sediments (detrital, chemical and organic) and the mechanisms of their introduction to the cave and their deposition (water, air, gravity and chemical) and of their subsequent chemical and physical modifications. This is followed by a discussion of bone deposits: The agents of animal and bone introduction, breakdown, dispersal and accumulation within caves; the palaeontological analysis of cave deposits; and then a set of examples of well-known bone deposits from eastern Australia, Naracoorte, Riversleigh and the far west.

- 12 - 264 Salomon, J.-N.: Karst system response in volcanically and tectonically active regions. Z. Geomorph. N.F., Suppl.-Vol. 131, 89-112, Berlin-Stuttgart, 2003.**

- 12 - 265 Sasowsky, Ira D.; Šebela, Stanka; Harbert, William: Current tectonism and aquifer evolution > 100,000 years recorded in cave sediments, Dinaric karst, Slovenia. Environ. Geol. (Berl.), 44, 8, 8-13, 2003.**

A natural conduit that had formed along a fault was exposed in Upper Cretaceous limestones during construction of a tunnel near Postojna, Slovenia. The conduit is filled with poorly indurated clastic sediments. Slickensides found on the margin of the sediment deposit show sinistral fault motion that is consistent with regional tectonism. Analysis of the sediments

revealed reversed magnetic polarity. The minimum age for latest movement on the fault, origin of the cave, and deposition of these sediments is 780 ka. Present-day tectonic stresses are concordant with the fault movement, and it is likely that the fault has been continuously active throughout growth, infilling, and hydrologic abandonment of the conduit. Based upon known and modeled growth rates for conduits, this system is recording a period of growth and abandonment that exceeds 100,000 years. The role that rock discontinuities play in groundwater flow may vary over these timescales, and it may be important to account for tectonism when evaluating the long-term evolution of aquifers.

- 12 - 266 Sasowsky, Ira D.; Curry, Megan D.; Watson, Donald W.; Christenson, Keith; Šebela, Stanka; Burkhart, Patrick A: Development of cavernous porosity in thin, flat-lying carbonates : the Vanport Limestone, Pennsylvania. GSA Abstracts with programs, 35, 6, 52, Seattle, Washington, 2003.**

The Vanport Limestone (Pennsylvanian) is a 0-6 m thick unit occurring in portions of the Appalachian Plateau of western Pennsylvania. It is underlain by shale and variously overlain by bauxite iron-ore, sandstone, shale, and coal. The limestone is notable for the presence of extensive conduit mazes, including Harlansburg Cave, which has a mapped length of 6.6 km. Previous workers have hypothesized that these conduits form from overlying diffuse infiltration, or from floodwater injection by adjacent streams. To understand the development of these features, we compared cave maps to local and regional measurements of joint directions in the Appalachian Plateau, calculated porosities, evaluated relationships between the caves and the land surface, reviewed drilling records, and made observations in quarries and caves.

- 12 - 267 Sauro, Ugo: Dolines and sinkholes: Aspects of evolution and problems of classification. Acta carsologica, 32/2, 41-52, Ljubljana, 2003.**

The doline is the most representative landform of the karst surface. The name derives from the word dolina, a Slav term indicating any depression in the topographical surface. For nearly a century, this name acquired widespread use and a well defined meaning in the international literature; as a result it is not possible to substitute it with another term such as "vrtača" or "kraška dolina", for example, as proposed by some authors (Gams, 1973, 1974). The use of sinkhole as a synonym for doline in the American literature has also created some ambiguity, because sinkhole is mostly applied in the sense of collapse doline or of cover doline. From the detailed studies of the dolines of different karst areas, it is possible to infer that the structure and the genesis of this form may be complex (Sauro, in press - a - and - b). The most correct way to define a doline is to add an adjective indicating a peculiar attribute. The most significant attributes are those linked to both the morphogenetical mechanism and the hydrological structure. On the basis of these attributes it is possible to distinguish several categories and types of dolines. Most importantly to understand a doline it is necessary to be able to reconstruct its history even if that may be complex, as some dolines formed by specific processes may later further evolve through different processes.

K.W.: doline, karst landforms classification, karst morphodynamics

- 12 - 268 Sauro, Ugo: The Dolina: Emblematic and Problematic Karst Landform. In: Natek, Karel (Ed.). Fizična geografija pred novimi izzivi, (Dela, 20), pp. 43-60, Ljubljana: Oddelek za geografijo Filozofske fakultete, 2003.**

Professor Ivan Gams research has given an important contribution to the study of the karst dolines. He described how the dolines began to develop as hidden forms before emerging as visible forms. The most common dolines are the result of the "accelerated corrosion" of the soluble rock in the central part of the depressions. From the study of the karst dolines it is possible to distinguish many types of form resulting from different genetical mechanisms. The characters of the populations of the dolines of seven rock-cut terraces on the Montello Plateau allow us to formulate a preliminary model for the evolution of the forms. In the Classical Karst it is easy to recognize how different sub-populations may coexist in the same area as a result of alternating favorable and unfavorable climatic environments.

K.W.: Ivan Gams, karst doline, karst morphogenesis.

- 12 - 269 Selleri, Gianluca ; Sansò, Paolo ; Walsh, Nicola: The karst of Salento region (Apulia, Southern Italy): constraints for management. Acta carsologica, 32/1, 19-28, Ljubljana, 2003.**

The Salento peninsula is a karstic area affected by relevant geological risk mainly due to surface water and groundwater. In particular, sinkholes have been used to convey underground large amount of surface waters (rain water, waste water, etc.) aiming to avoid the flooding of wide land surfaces. However, during the last ten years this input of surface water underground has caused several cases of rapid subsidence. In this paper, the detailed study of two areas which have been recently affected by rapid subsidence is reported.

K.W.: karst, sinkhole activity, collapse, Apulia, Italy.

- 12 - 270 Shaw, Trevor R.: Early electric lighting in caves - Postojnska jama, Slovenia, 1883-1929. Acta carsologica, 32/1, 189-204, Ljubljana, 2003.**

After some preliminary attempts in 1863, electric lighting was first used in Postojnska jama in 1883 for a visit by Emperor Franz Joseph. Alternative forms of bright light (lime-light in 1852, gas light in 1878) had been considered but not adopted. The permanent electric installation of 1884 was the third anywhere in the world. Its 12 arc lights were increased in later years. An "improved" system was fitted in 1901 but failed so often that it was replaced in 1906. An extensive new system was fitted in 1929. Errors in previous literature are corrected and much information published for the first time.

K.W.: caves, lighting, electricity, lime-light, Slovenia, Schmidl, Postojnska jama.

- 12 - 271 Shaw, Trevor R. ; Čuk, Alenka: The underground post offices of Postojnska jama, Slovenia, 1899 - 1945. Acta carsologica, 32/1, 205-224, Ljubljana, 2003.**

The only cave post offices to have been situated underground were in Postojnska jama. In 1899 the cave management, responding to the growing use of picture postcards, built a stone post office near Kongresna dvorana 500 m from the entrance. It was open by 15 August 1899, with a special "Adelsberger Grotte / Postojnska jama" cancellation authorised by the postal authorities. This building remained in use until 1927 (with the Italian "Postumia (Grotte)" postmark after 1922), when it was replaced by a new building 1,4 km inside the cave. Its last recorded use was 15 August 1945 when the cave was reopened under Yugoslav management.

K.W.: caves, Slovenia, Postojnska jama, post offices, philately.

- 12 - 272 Shaw, Trevor R.: Illumination for the Emperor's intended visit to Postojnska jama,**

**Slovenia, in 1856 (and used when he came in 1857?). Acta carsologica, 32/2, 277-288, Ljubljana, 2003.**

Three documents in the archives of Postojnska jama show that the arrangements for the planned visit of Emperor Franz Joseph to the cave in 1856 included the use of coloured lights and other special illumination as well as glass transparencies for labelling halls and speleothems. Although this visit was cancelled at the last minute, the Emperor did come to the cave 15 weeks later and it is shown that almost certainly the illumination was used then.

K.W.: caves, history, royalty, Franz Joseph, illumination, Postojnska jama, Slovenia.

**12 - 273 Sket, Boris: Groundwater quantity, groundwater quality, deforestation. 5th ICEF 23-27 March 2003, ETH Zurich, Environmental Future of Aquatic Ecosystems, p. 108, 2003.**

Deforestation has a many-sided influence on groundwater bodies. Besides preserving the natural enrichment ways of groundwater bodies, it produces and maintains a spongy upper soil layer which may capture a great part of the precipitation, store some water, and gradually release it to deeper layers. This way, some quantity of the surface runoff is diverted underground, which diminishes loss of water and erosion. On the other hand, forest may extract a high quantity of water from underground reservoirs and distribute a part of it into the atmosphere. The forest may also extract nitrates which are being accumulated in interstitial and cave waters; nitrates accumulation is directly from the surface as well as from the incomplete self-purification processes underground.

**12 - 274 Sket, Boris; Trontelj, Peter: Subterranean biodiversity in Slovenia and Western Balkans. Fauna Europaea Project, (eds O.T. Moldovan & S. Iepure), 4-8. Subsurface organisms : proceedings, Baile Felix, 30 March - 1 April, 2003. Romanian Academy, pp. 4-8, 2003.**

A report on the cataloging of troglobiotic fauna in the Western Balkans area (states of the former Yugoslavia). With 520 aquatic and 780 terrestrial troglobiotic species this area is extremely rich. The richest in aquatic fauna appears to be Slovenia with 200 species while Bosnia and Herzegovina have the richest terrestrial fauna with 290 species.

**12 - 275 Sket, Boris: O podzemnoj fauni, prvenstveno Vjetrenice (Cave fauna, the particular case of Vjetrenica). In: Lučić I., Vjetrenica, pogled u dušu Zemlje [Vjetrenica, insight into the Earth's soul] ArTresor, Zagreb, pp. 149-202, 2003. (In Croatian, English summary)**

A popular introduction into cave fauna and subterranean ecology in general. Description of very diverse habitats in the over 5700 m long cave in Hercegovina. Listing of all animal species with short comments. Approximately 110 species identified, including 35 terrestrial and 40 aquatic troglobionts. Ten species still known only from this cave or its close vicinity.

**12 - 276 Sket B., 2003. Subterranean fauna in Slovenia and southern Europe. In: Young, Juliette (Ed.). Priorities in biodiversity conservation and research in the acceding and candidate countries and their integration in the European research area. Białowieża, Poland: Mammal research institute, Polish academy of sciences, pp. 19-20, 2003.**

Deforestation has a many-sided influence on groundwater bodies. Beside preserving the natural enrichment ways of groundwater bodies, it produces and maintains a spongy upper soil layer which may capture a great part of the precipitation, store some water, and gradually release it to deeper layers. This way, some quantity of the surface runoff is diverted underground, which diminishes loss of water and erosion. On the other hand, forest may extract a high quantity of water from underground reservoirs and distribute a part of it into the atmosphere. The forest may also extract nitrates, which are being accumulated in interstitial and cave waters; nitrates accumulation is directly from the surface as well as from the incomplete self-purification processes underground.

- 12 - 277 Sket, Boris: Oblikuje se današnje živalstvo. In: Sket, Boris; Gogala, Matjaž; Kuštor, Valika; (Eds): Živalstvo Slovenije. Ljubljana: Tehniška založba Slovenije, pp. 41-54, 2003. [The recent fauna is being formed, in Slovene].**

The chapter explains the recent ecological and geographical conditions in Slovenia and the human impact on the fauna structure, including habitat alterations, species extinctions and species translocations. An innovative biogeographic regionalization of Slovenia is given, considering three types of biota (animals and plants) as to their spreading abilities. The biogeographic pattern of territorially bound species is based on relictual animals, which mostly avoided discomforts of climatic changes in different cryptic habitats. These are: the Dinaric (with particularly numerous endemic, and among them cave species), Southalpine, and the pre-Alpine--sub-Pannonian regions. The pattern of the river fauna concerns mainly fishes and few types of invertebrates. These species are divided between the Danube and the Adriatic drainages. Special are the relations within an area without a surface outflow (in karst). The territorially non-bound species are those freely distributing within ecologically appropriate territories following all climatic changes. These are the non-relictual parts of the fauna (and flora) in: high-alpine, submediterranean, alpine-dinaric and prealpine-predinaric, sub-pannonian regions.

- 12 - 278 Sket, Boris: Pestrost živalskega sveta v Sloveniji. In: Sket, Boris; Gogala, Matjaž; Kuštor, Valika; (Eds): Živalstvo Slovenije. 1. natis. Ljubljana: Tehniška založba Slovenije, pp. 917, 2003. [Diversity of the Fauna in Slovenia, in Slovene]**

The chapter compares the comparatively high richness of Slovenian fauna with some other countries. Diversity of the aquatic subterranean fauna seems to be by far the richest in the world while the terrestrial cave fauna lags only behind the SE parts of the Dinaric karst. Except for the vertebrates the fauna is still insufficiently investigated. Approximate species numbers are given in tables: these are altogether 21.500 metazoan species in continental habitats, comprising close to 3.000 "lower invertebrates", 18.000 insects and 575 vertebrates. The numbers of ca 1450 invertebrate and 240 vertebrate marine species are particularly approximate estimations.

- 12 - 278 Staut, Miha: Enajsta krasoslovna šola, Postojna, 2.-4.julij 2003. Bilten Jamarskega društva Železničar, 83-84, Ljubljana, 2003.**  
K.W.: karstological school, Postojna, Slovenia.

- 12 - 279 Staut, Miha: Poskus razlage razvoja jame Kubik kot primera jame v flišu. Bilten Jamarskega društva Železničar, 79-82, Ljubljana, 2003.**

K.W.: regional speleology, cave in flysch, speleogenesis, anhydrite, Slovenia.

- 12 - 280 Šebela, Stanka: Potresi v kraških jamah [Earthquakes in karst caves]. Raziskave s področja geodezije in geofizike 2003 : zbornik predavanj. Fakulteta za gradbeništvo in geodezijo, 5-14, Ljubljana, 2003.**

In karst caves broken and overturned stalagmites could be found. There are many examples of collapse chambers with fresh breaks of limestone blocks. For more 10 years researches about seismic and paleoseismic activities in karst caves in south France, Monaco, Bulgaria, Italy, Belgium, Portugal, Germany, Switzerland, Morocco, Turkey, Costa Rica and other countries are going on. In Slovene karst caves we have proofs for neotectonic activities. Reliable proofs for seismic activities haven't been confirmed yet.

- 12 - 281 Šebela, Stanka: The use of structural geological terms and their importance for karst caves. Acta carsologica, 32/2, 53-64, Ljubljana, 2003.**

Structural geological studies on karst areas operate with the same structural geological terms as on other geological regions. But because of special geomorphologic terms characterized for karst areas, some structural geological elements, which are in a special way connected with particular karst forms, are used as a special terms, different from those used on non-karstic areas. For Slovene karst we need to divide two most important structural elements that are important for development of cave passages, bedding planes and faults. And between bedding planes the ones that are tectonically disrupted are very favorable for development of initial cave passages. In the longest Slovene karst caves as Postojnska jama caves, Predjama and Škocjanske jame caves interbedded movements, thrusting and folding deformations, and tectonically broken zones (fissured, broken and crushed zones) are very favorable for initial, and also for older and younger stages of passage development.

K.W.: structural geological terms, karst caves, Slovenia.

- 12 - 282 Šmuc, Andrej; Otoničar, Bojan; Košir, Adrijan: Sedimentology of Mount Krn. Mednarodni geološki tabor Eugen 2003, 76-81, Kobarid, 2003.**

K.W.: sedimentology, geology, Julian Alps, Slovenia.

- 12 - 283 Šumrada, Janez: K vprašanju izvora Bathasarja Hacqueta. Zgodovinski časopis, 3-4(128), 347-361, Ljubljana, 2003.**

K.W.: B. Hacquet, biography.

- 12 - 284 Šušteršič, France: Mladokvartarni katastrofalni dogodki v Planinski jami. Geološki zbornik, Razprave, Poročila.16.posvetovanje slovenskih geologov, 17, 158-159, Ljubljana, 2003.**

K.W.: »catastrophe«, hydrogeology, Slovenia.

- 12 - 285 Šušteršič, France: Karst 2: karst caves, fields, springs and collapse dolines. Mednarodni geološki tabor Eugen 2003, 69-75, Kobarid, 2003.**

K.W.: regional karstology, excursion guide, Slovenia.

- 12 - 286 Šušteršič, France; Šušteršič, Simona: Formation of the Cerknjščica and the flooding of Cerknjško polje. Acta carsologica, 32/2, 121-136, Ljubljana, 2003.**

Detailed study of the upper Cerknjšičica's catchment and its sediments in Cerknjško polje revealed that the river turned this direction in the middle Würm, while in the more remote past, the input to Cerknjško polje (and to the caves) was completely karstic. Its alluvial fan cut the main vertical ponors, and deflected the main polje outflow westwards, indirectly into Planinsko polje. Consequently, recent hydrogeological conditions in Planinska jama are a direct consequence of development in Cerknjško polje.

K.W.: karst of Slovenia, Cerknjško polje, polje, Notranjski kras, flooding of poljes.

- 12 - 287 Šušteršič, France; Šušteršič, Simona; Stepišnik, Uroš: The Late Quaternary dynamics of Planinska jama, south-central Slovenia. Cave and Karst Science, 30/2, 89-96, Huddersfield, 2003.**

K.W.: regional speleology, speleogenesis, Quaternary, cave sediments, dynamics, karst hydrology, Slovenia.

- 12 - 288 Terry, J. P.; Nunn, P. D.: Interpreting features of carbonate geomorphology on Niue Island, a raised coral atoll. Z. Geomorph. N.F., Suppl.-Vol. 131, 43-57, Berlin-Stuttgart, 2003.**

- 12 - 289 Trček, Branka: Epikarst zone and the karst aquifer behaviour. A case study of the Hubelj catchment, Slovenia. , ISBN 961-90403-9-2, 100 str., Ljubljana, 2003.**

K.W.: regional karstology, epikarst, hydrogeology, aquifer, water tracing, methodology, bibliography, Slovenia.

- 12 - 290 Trček, Branka ; Veselič, Miran ; Pezdič, Jože: The vulnerability of karst springs - a case study of the Hubelj spring (SW Slovenia). RMZ - Materials and geoenvironment, 50/1, 385-388, Ljubljana, 2003.**

K.W.: regional karstology, aquifer, hydrogeology, hydraulics, natural tracer, vulnerability, karst spring, Slovenia.

- 12 - 291 Trofimova, Elena: Ice of lake Baikal as an indicator of the global warming of the Earth. Society and environment interaction under global and regional changes, 324-326, Moscow -Barnaul, 2003.**

Ice in the caves is the distinctive natural formation, which is tolerant to the changes of the climate in the discrete years. Using the information about the state of the glaciation in four caves of the lake Baikal during 26 years and about average annual temperatures of the air the decisive role of the increase of the temperatures in the degradation of the ice in researched underground systems was revealed. Maximum intensity - 10 cm in the year - was observed in cave Bolshaya Baidinskaya.

- 12 - 292 Trofimova, Elena: Ice deposits in caves of Priokhonie. Kungur ice caves: 300 years of the scientific and tourist activity, 246-250, Kungur, 2003.**

According to the origin of the coldness and accumulation of ice in the caves the underground cavities of Priokhonie are divided into three types: ones with a sack-shapes morphology, the cavity opened at both ends, which is distinguished by the change of direction of air draught in cold and warm seasons, and karstic pit.

By the genesis the following ice deposits are recognized in the caves: congelation ice,

sublimation ice, sedimentary-metamorphic and penetrating ice. Congelation ice includes the droplet-accumulative aufeises, aufeises-layers, mantle of glaciation, ice of the lakes and segregation ice. Sublimation ice consists of the ice needles and ice hexagons. Sedimentary-metamorphic ice is represented by the snowfields.

- 12 - 293 Trofimova Elena; Trofimov Alexei: Problems of the conservation of the caves of Irkutsk amphitheatre. Kungur ice caves: 300 years of the scientific and tourist activity, 278-282, Kungur, 2003.**

More than 200 caves are known in Irkutsk amphitheatre. All processes changing the caves are divided in two groups: natural and anthropogenic. The examples of the negative anthropogenic actions as the damage and the destruction of stalactites, stalagmites, the inscriptions by paint on cave walls and ceilings, etc. are considered.

- 12 - 294 Trontelj, Peter; Gorički, Špela : Monophyly of the family Proteidae (Amphibia: Caudata) tested by phylogenetic analysis of mitochondrial 12s rDNA sequences. Natura Croatica, 12, 113-120, 2003.**

The monophyly of the salamander family Proteidae has been under debate for nearly half a century. The main objection to a sister relation of the European genus *Proteus* and the North American *Necturus* states that their putative synapomorphies are in fact paedomorphic characteristics and may be the result of parallel evolution. In this study, partial sequences of the mitochondrial 12S rRNA gene were obtained for *Proteus* specimens from three populations spanning most of its geographic range. The phylogenetic analysis further included sequences from *Necturus lewisi* and *N. maculosus* as well as sequences from nine other representatives of extant salamander families. The support for the *Necturus* + *Proteus* clade was assessed under different outgroup combinations. The clade was supported with all outgroups and methods (parsimony, maximum likelihood, minimum evolution) used, the bootstrap support ranging from 67% using all taxa to 94% when certain taxa were excluded. With two outgroup combinations, the tree supporting proteid monophyly (= the most parsimonious tree) was significantly better than the shortest tree without monophyletic Proteidae ( $p < 0.05$ ) according to Kishino-Hasegawa-Templeton test. These observations suggest that the relatively low support for proteid monophyly in the complete assortment of salamandroid families was caused by an increase of phylogenetic noise from phylogenetically more distant taxa. Thus, the phylogenetic information from the analyzed portion of the 12S rRNA gene is consistent with a monophyletic Proteidae family, although the examined sequences are short and additional sequences are needed to further evaluate this lasting dispute in the systematics of salamanders.

- 12 - 295 Trzheinsky, Yuri B.; Tyc, Andrzej (Eds.): Human impact and karst ecosystems of Eastern Siberia. Guidebook for excursions. Regional Meeting 2003 of the IGCP 448 Project, World Correlation on Karst Geology and Its Relevant Ecosystems", Irkutsk, July 6-13, 2003, 43 p., Sosnowiec-Irkutsk, 2003.**

Detail description of two karst regions of Eastern Siberia (Russia) - Priangaria and Near-Ol'khon is the aim of the contribution. Karst regions of Priangaria located northwest of Irkutsk are situated along shores of Angara River and Bratsk reservoir. Reservoir, which is one of the largest artificial lake in the World, started operation in years of 1961-1967. It influence of contemporary functioning of forest-steppe karst ecosystem connected with

Cambrian and Ordovician carbonates and sulphate-carbonate rocks. Near-Ol'khon area is a part of recent Baikal rift system. Together with the Ol'khon Island it represent plateau, uplifted above Baikal Lake on 100-300 m and oblique to the shoreline of the lake. The area represent stripe karst developed in 5-14 km wide stripe along western shore of Baikal, between villages Buguldeika and Zama. Recent ecosystem is influenced by semi dry climatic conditions (precipitation 160-210 mm per year). Publication is a guidebook for the Regional Meeting of the IGCP 448 Project „World Correlation on Karst Geology and Its Relevant Ecosystems”, held in Irkutsk in July 6-13, 2003.

- 12 - 296 Turnšek, Dragica; Buser, Stanko; Debeljak, Irena: Liassic coral patch reef above the „Lithotid limestone” on Trnovski gozd plateau, West Slovenia. Razprave IV. razreda SAZU, 44/1, 185-331, Ljubljana, 2003.**

K.W.: palaeontology, corral, Jurassic, Liassic, Pliensbachian, Domerian, Slovenia.

- 12 - 297 Urbanc-Berčič, Olga; Gaberščik, Alenka: Microbial activity in the rhizosphere of common reed (*Phragmites australis*) in the intermittent lake Cerkniško jezero. In: Vymazal, Jan (Ed.). Wetlands nutrients, metals and mass cycling. Leiden: Backhuys Publishers, pp. 179-190, 2003.**

The intermittent lake Cerkniško jezero is an ecosystem with extreme water level fluctuations that constitute the most conspicuous feature and the driving force of the processes in the ecosystem. Extended shallow area of the lake is mainly covered by wetland vegetation, the common reed (*Phragmites australis*) being a prevailing species. Alternating of dry and wet periods drives the processes in soil, and affects mineralization of organic matter. The influence of different water regime and types of soil on ETS-activity was estimated on four locations in the lake. Significant differences among the locations were obtained. The highest activity at  $0.23 \text{ mg O}_2 \text{ g}^{-1} \text{ DM h}^{-1}$  was detected in terrestrial stand at Dujice, supported by the highest content of organic matter (up to 60 %). In the three other stands the mineral content was much higher, the organic layer thinner, and the ETS-activity was much lower. Monthly monitoring carried out at Dujice revealed variation in microbial activities among months and in the depth profile. The lowest values of ETS - activity (below  $0.04 \text{ mg O}_2 \text{ g}^{-1} \text{ DM h}^{-1}$ ) were determined during cold period. No correlation was found between ETS-activity and the availability of nutrients. All forms of nutrients (nitrate, nitrite, ammonium, and soluble phosphorus) were constantly present. Their concentrations varied and were not related to the water content in soil.

- 12 - 298 Urushibara-Yoshino, Kazuko: Karst terrain of raised coral islands, Minamidaito and Kikai in the Nansei Islands of Japan. Z. Geomorph. N.F., Suppl.-Vol. 131, 17-31, Berlin-Stuttgart, 2003.**

- 12 - 299 Timotej Verbovšek: Cave forms and origin of the cave Pečina v Zjatih (Matarsko podolje, Slovenia). Acta carsologica, 32/1, 131-144, Ljubljana, 2003.**

Cave lies in Matarsko podolje, in southwestern part of Slovenia. Surrounding beds are composed of limestones and limestone breccias of Cretaceous age. In the vicinity there are many dolines and collapse dolines. The entrance and final part of the cave are situated directly under the big dolines. Because of the small doline, which can be found above the middle part of the cave, there are many flowstone features. Obvious damages due to the

freezing and thawing are found along the most part of the cave, at the entrance there is a lot of cryoclastic gravel. Cave began to form in phreatic and later in epiphreatic conditions. Palaeoflow discharge indicates great amount of water.

K.W.: cave, Pečina v Zjatih, contact karst, dolines, speleology, Slovenia.

**12 - 300 Verovnik, Rudi; Sket, Boris; Prevorčnik, Simona; Trontelj, Peter: Random amplified polymorphic DNA diversity among surface and subterranean populations of *Asellus aquaticus* (Crustacea: Isopoda). *Genetica*, 119, 155-165, 2003.**

The ecological and evolutionary processes leading to isolation and adaptation of cave animals compared to their surface ancestors are not yet unequivocally understood. In this study the genetic relations of four cave and three surface population of the freshwater crustacean *Asellus aquaticus* in the Karst region of SW Slovenia and NE Italy were assessed using RAPDs as genetic markers. The results suggest that specialized populations from two caves invaded their subterranean habitat independently, and that their morphological similarity is a result of convergent evolution. Another, less specialized cave population seems to originate from a later colonization of a cave system already inhabited by a more specialized population, but the two populations do not interbreed. This series of temporally and spatially independent invasions has generated a diversity hotspot of non-interbreeding populations of a ubiquitous freshwater crustacean, which is uniform over most of its range. Genetic variability estimated by the percentage of polymorphic RAPD fragments was similar (86-91%) in most cave and surface populations. Substantially lower values (as low as 49%) were found in two cave populations affected by heavy pollution. Two a priori groupings of populations, traditional subspecies and hydrologically connected groups, were rejected as not significant by means of nested analysis of molecular variance (AMOVA). On the other hand, groupings revealed by UPGMA clustering displayed a significant component of among-group variance. An analysis of gene flow between populations using estimated migration rates confirmed these findings.

**12 - 301 Vías Martínez, J.: Vulnerabilidad y peligro de contaminación en el acuífero carbonatado de Torremolinos (Málaga). Centro de Ediciones de la Diputación de Málaga (CEDMA), 180 p., 2003.**

K.W.: Sierra de Mijas, South of Spain, Torremolinos, groundwater vulnerability mapping

**12 - 302 Vrvišcar, Boštjan: Odprava v Jamo na Vjetrenim brdima. Bilten Jamarskega društva Železničar, 68-75, Ljubljana, 2003.**

K.W.: regional speleology, cave expedition, deepest and longest caves, Dinaric karst, Croatia.

**12 - 303 Vrvišcar, Boštjan; Vrvišcar, Mojca: Jamarska šola 2003. Bilten Jamarskega društva Železničar, 87-88, Ljubljana, 2003.**

K.W.: speleological school, Slovenia.

**12 - 304 Webb, John; Grimes, Ken; Osborne, Armstrong: Black Holes: caves in the Australian landscape. In: Finlayson, Brian; Hamilton-Smith, Elery (Editors): "Beneath The Surface: A Natural History of Australian Caves". Pp. 1-52, UNSW**

**Press, Sydney, 2003.**

Describes the geological setting, formation and character of caves and surface karst features in the Australian landscape. Including caves in older hard limestones, in the younger soft Tertiary and Quaternary limestones, and in non-carbonate rocks (lava caves, caves in sandstone and granite, piping caves, sea-caves and fissure caves).

**12 - 305 Whittlestone, Stewart; James, Julia; and Barnes, Craig: The relationship between local climate and radon concentrations in the Temple of Baal, Jenolan Caves, Australia. Helictite, 38 (2), 39-44, 2003.**

Radon measurements were collected over a period of one year in a large chamber known as the Temple of Baal at Jenolan Caves, near Sydney, Australia. Correlation of radon concentrations with rainfall, surface air pressure and temperature confirmed that radon originating from different locations was predominant under different conditions. During periods of low rainfall, radon concentrations varied in strong anti-correlation with the surface air pressure, indicating that most of the radon was coming from remote locations of large pore or void volume in rock of limited permeability. On the other hand, in wet periods the observed radon levels were low and steady, suggesting a local source. In both wet and dry conditions the correlation of radon concentrations with rainfall on a time-scale of a few days was positive, proving that permeability of surface strata affected the ventilation rate in the cave. The study achieved a detailed understanding of radon concentrations in the Temple of Baal, and the main conclusion reached was that the magnitude and variation of radon concentrations in the Temple of Baal were closely related to the degree of water saturation in the local surrounds. K.W.: karst, radon, cave climate.

**12 - 306 Willis, Dick: Benarat 2000. International Caver, 2002, 37-43 (maps, surv. phot.), 2003. Gunung Benarat, Gunung Mulu National Park, Sarawak, Malaysia, BCRA.****12 - 307 Wraber, Tone: K ledinskemu imenstvu na ovršju Notranjskega Snežnika. Planinski vestnik, 103/11, 31-34, Ljubljana, 2003.**

K.W.: toponimy, doline, vegetation inversion, Slovenia.

**12 - 308 Xiang C.; Song L.; Zhang P.; Pan G.: The case study on soil fauna diversity in different ecological system in Shilin national park, Yunnan, China. Acta carsologica, 32/2, 187-194, Ljubljana, 2003.**

A preliminary study of the distribution and diversity of soil fauna in a sequence of ecosystem degradation in the Shilin National Park, Yunnan, China has been made. The degraded ecologic system includes 5 types of vegetation cover: (1) natural bush; (2) human planted cypress forest; (3) natural grass; (4) secondary grass and (5) bared red earth. A quadrate of 1m\_1m in each eco-tessera was sampled for soil fauna collection. The animals were obtained either by picking up or by heat-removing. The soil fauna were dominated by Acarina, Collembola, Nematode, Coleoptera, and Opisthokonta in these soils. However, Erchytraeidae, Araneida, Lepidoptera and Diptera were also common groups. The diversity index H turned to be less than 1.5, drastically decreasing with the vegetation degradation trend. In the karst soils, Parholaspidae was one of the most populous among the mites. The biomass of Trhypochthoniidae and Ologamasidae was very concentrated in the natural bush ecosystem, showing high sensitivity of mites to vegetation degradation. The biomass

ratio of Acarina to Collembola in the studied soils ranged from 0.70 to 1.50, which was in great discrepancy to the results reported of the natural soils at similar latitude. The small soil fauna biomass and less diversity indicated that the studied soil was in a state of deterioration of soil fauna habitats and, in turn, the soil ecosystem health. The results also evidenced that the soil fauna in the karst soil was definitely vulnerable as regarded to the sustainable development of the Shilin Park.

K.W.: Stone Forest; karst soils; fauna diversity; vegetation cover; ecosystem degradation

**12 - 309 Zhang, Chuanrong; Day, Michael; Li, Weidong: Landuse and Land Cover Change in the Lunan Stone Forest, China. Acta carsologica, 32/2, 161-174, Ljubljana, 2003.**

The Lunan Stone Forest is the World's premier pinnacle karst landscape, with attendant scientific and cultural importance. Ecologically fragile, it is also a major tourist attraction, currently receiving over 1.5million visitors each year. Conservation efforts have been undermined by conflicting economic priorities, and landscape degradation threatens the very foundation of the national park. Assessment of the current land cover in the 35km<sup>2</sup> core of the Stone Forest and an analysis of land cover change since 1974 in the 7km<sup>2</sup> Major Stone Forest reveal the extent of recent landscape change. Exposed pinnacle karst covers 52% of the 35km<sup>2</sup> study area, and about half of this is vegetated. Land use is dominated by agriculture, particularly in the valleys, but much of the shilin is devegetated and about six percent of the area is now built-up. Within the 7km<sup>2</sup> Major Stone Forest the built-up area increased from 0.15ha in 1974 to 38.68ha by 2001, and during that same period road length increased by 95%, accompanied by a 3% decrease in surface water area. Between 1980 and 2001, annual visitor numbers increased from 139,000 to 1,500,000 - a ten-fold increase. The need to reconcile economic development and landscape conservation involves both short-term versus long-term benefit and also the conservation of natural and cultural heritage.

K.W.: karst conservation, human impact, shilin, Lunan, China.

**12 - 310 Zhang, C.; Peng, Z.-R.; Li, W.; Day, M.J.: GML-based interoperable geographical databases. Proceedings, UCGIS Summer Assembly 2003.**

Many geographical databases have been developed using different programs and applications, but data acquisition and data sharing are still problematic because no interoperability exists among these different databases. This study presents a GML (Geography Markup Language) approach to building a geographical database in order to enable interoperability. As an open, non-proprietary industry standard, GML overcomes the problems of current GIS software proprietary data models and database structures. Compared with other standards, such as Geographic Data File (GDF) and Spatial Data Transfer Standard (SDTS), the GML approach has the advantage of enabling on-line data exchange. GML holds promise in providing a standard way to share and use existing spatial data over the Web. A GML-based interoperable geographical database for the conservation of the Lunan Stone Forest Landscape is implemented as a case study. Preliminary results show that the public can access and use the GML-based spatial database through a user-friendly interface, and that GML can deliver high quality vector data on the Web.

**12 - 311 Zlokolica-Mandić, Milena; Čalić-Ljubojević, Jelena: Propagation of a floodwave in karst during artificially generated recession - case study of Banjica spring (Bela Palanka, Eastern Serbia). Acta carsologica, 32/2, 235-243, Ljubljana, 2003**

During hydrogeological research in the area of the north-eastern foothills of Mt. Suva Planina in Eastern Serbia, a borehole of 100 m of depth was drilled in the vicinity of a lukewarm spring, Banjica. The borehole had an artesian discharge, which caused artificially generated recession in the adjoining spring Banjica. During this hydrodynamical test, great quantities of precipitation occurred in the hinterland of the spring, having the effect of a floodwave. The presence of two types of karst is obvious in the field - confined karst and covered karst. The hydrogeological response to the floodwave during artificially generated recession proved the presence of deep-seated karst also. This can be detected by comparative analysis of the hydrograph of the Banjica spring and the graph of pressures in the borehole. In this way, not only the presence, but also the characteristics of the karst can be proved (e.g. dimensions and types of karst conduits, relative age of karst, size and extension of the aquifer, etc.).

K.W.: karst hydrogeology, hydrodynamical test, floodwave, artificial recession, types of karst, Eastern Serbia.

- 12 - 312 Zseni, Anikó: Karsztos mintaterületek talajainak kicserélhető kationtartalma és nehézfém-terhelése [Nutrient management and heavy metal loading of soils of karstic model areas]. Karsztfelődés VIII., 273-295, Szombathely, 2003.**

The paper evaluates the nutrient and heavy metal content of soils of three Hungarian karst areas (Aggtelek Karst, Bükk Plateau and Western Mecsek). The aim of the research was state-assessment, the qualification of present state for giving information to the practical experts for formation of the future treatment and landscape utilisation. As the measurements show, the differences in the quantity of plant available nutrients are affected not only by the differences of soil types, but by the differences in geographical position (difference in climate, parent rock etc.). The vegetation has also an effect on the nutrient content of soils: available nutrient content is higher in the soils of forests than in soils of meadows. The examinations of heavy metals have shown the smallest loading in the soils of Mecsek: the heavy metal content of soils does not exceed contamination limit values. In the soils of the north-eastern karstic areas of the country in the case of Cd and Cr there are excesses of limit values; these are not significant ones but these soils belong to protected areas so the phenomenon has to be indicated. In case of chromium only a very small percentage of it is in available form in the soils so these metals do not pose hazard to the karst water and the plant-animal-human food chain. However, Cd is present mainly in mobile, available form in soils so it poses real hazard to the karst water and the plant-animal-human food chain, too.

- 12 - 313 Zseni, Anikó: Research of the soil reaction and carbonate content in karst areas of Hungary (Bükk Plateau, Aggtelek Karst). Proceedings of 4th Symposium on Karst Protection (Nov. 3-5. 2000. Despotovac), 87-90, Belgrade, 2003.**

K.W.: karst soil, soil reaction, vegetation of karst areas

- 12 - 314 Zseni, Aniko; Goldie, Helen; Bárányi-Kevei, Ilona: Limestone pavements in Great Britain and the role of soil cover in their evolution. Acta carsologica, 32/1, 57-67, Ljubljana, 2003.**

The goal of the research was to verify the connection between the solutional power of soil and the shape of rocky features in limestone. Soil samples from runnels, grikes, foot of

pavements, top of limestone, grass patches and dolines were collected on limestone pavement areas of North England and examined for the pH and carbonate content. The results of the measurements proved that the soils with lower pH are related to deeper solution features and that proximity to limestone causes a higher soil-pH.

K.W.: karst, limestone pavements, weathering, soil, North England.

- 12 - 315 Zupan Hajna, Nadja: Incomplete solution: weathering of cave walls and the production, transport and deposition of carbonate fines. (Carsologica). Postojna: Inštitut za raziskovanje krasa ZRC SAZU; = Karst Research Institute at ZRC SAZU; Ljubljana: Založba ZRC: = ZRC Publishing, 1-167, 2003.**

The main topic of this monograph is the weathering of carbonate rocks on the walls of cave passages. Of particular interest were the characteristics and peculiarities of the limestone and dolomite weathering processes, the type of solution and why all of the carbonate rock does not dissolve immediately. The results of incomplete solution of carbonate rock are weathered zones that remain on the cave passage walls. The most are weathered cave passage walls soaked by percolation water at the contact with sediments and walls exposed to condensation corrosion. On cave passage walls strongly weathered limestone and dolomite remain only where they are protected from further dissolution and mechanical erosion. During weathering the rock gradually discolours and by increased porosity loses its mechanical strength. Mineral and chemical composition of the weathered zone is almost identical to composition of parent rock, yet it is much more porous. Soluble remain of the incomplete limestone solution is opposed to general theories of karst origin as they accepted the opinion that limestone dissolves if affected by aggressive solution. In described cases an incomplete dissolution may just prepare the carbonate rock for the mechanical transport of its weathered particles by the flowing water. The transported carbonate particles of silt or clay size may accumulate in the cave passages as clastic cave sediments. In any case the speed of water flow must correspond to the rate of weathering in order to tear exposed particles from the rock surface.

- 12 - 316 Zupan Hajna, Nadja: Cave sediments in the Cave in the left tube of Kastelec tunnel. In: Horvat, Aleksander (Ed.). 16. Meeting of Slovenian Geologists : Treatises. Reports, (Geološki zbornik, 17). Ljubljana: Univerza v Ljubljani, Naravoslovnotehniška fakulteta, Oddelek za geologijo, 176-180, 2003.**

- 12 - 317 Zupan Hajna, Nadja: Relation between autochthonous chemical and mechanical erosion during karst caves development. In: Le karst de la craie en Normandie, Colloque et excursions, 10-11-12 Septembre 2003. Rouen, Université, 32, 2003.**

Incomplete dissolution prepares the carbonate rock for the mechanical erosion and transport of its particles. Where the weathered carbonate rock is in contact with water, both flowing and dripping, it may tear off the particles resulting from selective corrosion. Water carries them along cave passages and when its transporting power decreases, particles accumulate in the form of a fine-grained autochthonous carbonate deposit, in size of clay, silt or fine sand. The appearance of incomplete dissolution occurs in cave passages, as well as on the earth's surface. Carbonate rock covered by clastic sediments or soil will usually weather under them also. Weathered zones of carbonate bedrock may appear in caves of different geographical position and karst type; in Slovenia for example in Alpine and Dinaric karst

caves, where different speleogenesis containing limestone and dolomite of different genesis and ages is presented. The weathered zone of limestone and dolomite is soft when it is wet and solid when dry. The surface of a weathered cave wall retains all the structures and textures of carbonate rock: different laminations, fossils, calcite veins and micrite or sparite grains. The thickness of the weathered zone varies from less than a millimeter to several centimeters.

**12 - 318 Zupan Hajna, Nadja: Barka - a huge snow kettle in the area of Snežnik mountain, SW Slovenia. 4<sup>th</sup> Scientific Conference with International Participants: Research, Utilization and Protection of Caves, Tale, Slovakia, Abstracts of Papers, 6, 2003.**

Massif of Javornik-Snežnik is a high karst plateau dissected with large depressions and cone summits, formed by Jurassic and Cretaceous limestones and dolomites and their breccias. The highest summit is Mt Snežnik, 1796 m. On karst surface various dolines, snow kettles, karrens and numerous caves are developed. About 560 caves are known on the massif, most of them are shafts. In caves, having the entrances are higher than 900 m about sea level, ice is present. Snežnik region was glaciated during last glaciation, boundary-line of eternal snow was at elevation of 1250 m. There are glacial and periglacial sediments in the area. On the southern slope of Dedna gora (1293 m), on elevation of 1147 m, there is an interesting huge snow kettle (kotlič) and according to its shape the name Barka (Barge) is. It is developed in the Upper Cretaceous  $K_2^{2,3}$ , brown crystallised limestone that is dissected by some fault zones and fissure zones in different directions. The whole area is a large karren field in which developed snow kettles. The snow kettle is about 40 m long, 25 m wide and 20 m deep. Below E and W walls the ceiling of the shelter is hanging over a step all around the kettle where a polygenetic floor developed in some places the floor of the step is covered by frost rubble.

## YEAR 2004

- 12 - 319** **Andreo, B.; Goldscheider, N.; Vadillo I.; Vías, J.M.; Neukum, C.; Brechenmacher, J.; Carrasco, F.; Hötzl, H.; Jiménez, P.; Perles, M. J. ; Sinreich, M.: Sierra de Lívar, Southern Spain. In: Vulnerability and risk mapping for the protection of carbonate aquifers. Action COST 620, 183-200, 2004.**

K.W.: Sierra de Lívar, South of Spain, karst, intrinsic vulnerability, specific vulnerability, hazards, risks

- 12 - 320** **Aničić, Branka; Rechner, Iva; Perica, Dražen: Structural vocabulary of cultural landscape on the island of Krk. Acta carsologica, 33/1, 101-115, Ljubljana, 2004.**

Within the large-scale research project in Croatian cultural landscapes, a special place occupies the Mediterranean area, with its highly valuable cultural landscape structures. This area is characterised by authentic structures, which represent a valuable cultural heritage and an important element of the national identity. The island of Krk is particularly inspiring in this respect, due to an intricate cultural landscape typology that has developed there under the influence of natural features on the one hand, and the centuries-long agricultural activity on the other. This paper is the result of a research in its structural vocabulary in order to better understand and value these unique landscapes. The complex typological articulation was generated mainly by natural karst phenomena (karst valleys and fields, small dolinas, dry valleys), as well as various stone walls, terraces, and similar features, formed through the process of land cultivation. A considerable diversity of landscape units and patterns has been identified through particular structures which often turned out to be assets themselves, and which at the same time help to understand and interpret the outstanding value of the island's landscape.

K.W.: landscape typology, vocabulary, structural features, cultural landscape, rural landscape, island Krk

- 12 - 321** **Audra, Philippe: An overview of the current research carried out in the French Western Alps karsts. Acta carsologica, 33/1, 25-44, Ljubljana, 2004.**

Current research encloses karst systems geomorphologic approach, recent advances in study of karst structures which date back from the Upper Miocene. Karst genesis in Western Alps is brought up by systemic analysis, according to a geomorphologic approach. It uses the »karst immunity« that conserves old drainage structures and their associated sediments.

Karst landscapes can be sorted into horizontal and vertical forms. Speleothems are clearly connected to the presence of vegetation but they also can record geomorphic crisis. Clastic sediments reveal mechanical erosion. This approach concludes with karst genesis and speleogenesis reconstruction, which blend together evolution stages, environment characterization and processes. Researchers reconsider the preponderant part previously attributed to glaciers. Karst appears immediately when a gradient exists and when the aquifer is stripped of its impervious cover. Such conditions occurred from the Upper Miocene and sometimes before. Karst of the Pleistocene age are only met in the Inner Alps where cover stripping occurred later. Vertical systems composed of shaft series are old and become more complex. Field evidence refutes Ford's classification, which assigns a deep phreatic origin. A brief account of the present state of knowledge, according to region and researcher's scientific themes, allows establishing the last decade's advances. It also shows a disparity between

- the North and the South Western Alps, where Vercors appears to be one of the best studied massifs in the Alps.  
K.W.: karst, French Western Alps, geomorphology, karst sediments, geodynamic, paleoenvironments, cave genesis, glacial processes
- 12 - 322 **Audra, Philippe: Dent de Crolles Cave System, France. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 283-285, New York, 2004.**
- 12 - 323 **Audra, Philippe; Maire, Richard: Nakanai Caves, Papua New Guinea. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 538-540, New York, 2004.**
- 12 - 324 **Audra, Philippe: Vercors, France. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 754-756, New York, 2004.**
- 12 - 325 **Bárány-Kevei, Ilona: Bauxite Deposits in Karst. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 135-137, New York, 2004.**
- 12 - 326 **Bartholeyns, Jean-Pierre: Sustainable development of show caves and protection of a common heritage. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 195-199, Postojna, 2004.**  
The show caves meet all the criteria of a tourist attraction of choice. As such, they are not immune from a foreseeable evolution of tourism. As a common heritage, their protection calls for a management that must be both rigorous and independent of any economic self-interest so that they will forever remain showcases of excellence that will create, within the public, an awareness for the need to respect this fragile and irreplaceable, several thousand years old biotope.
- 12 - 327 **Beltram, Gordana: Ramsar Sites - Wetlands of International Importance. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 619-621, New York, 2004.**
- 12 - 328 **Bosák, Pavel; Mihevc, Andrej; Pruner, Petr: Geomorphological evolution of the Podgorški Karst, SW Slovenia: contribution of magnetostratigraphic research of the Črnotiče II site with *Marifugia* sp. *Acta carsologica*, 33/1, 175-204, Ljubljana, 2004.**  
The sequence of interior cave facies 9 m high is composed of cyclically arranged fluvial sediments (conglomerates, sands, silts, clays) in the lower part and by laminated to banded silts to clays in the upper part. Both parts are separated by pronounced unconformity associated with deep erosion of the lower part of the profile and tectonic tilting. The fill is covered by chaotic flowstone boulder breccia with red loamy matrix. One segment of the cavity wall was covered by tiny tubes of polychaetes worms comparable to Recent freshwater *Marifugia cavatica*. Both profiles show normal magnetozone with only one narrow

reverse excursion in each. The correlation of the obtained magnetostratigraphy log can indicate the Gauss chron (ca 2.5 to 3.6 Ma) or the other long normal chron. Črnotiče II site was filled in a substantially short time. Geomorphological evolution of the Podgorski karst plateau (Classical Karst, Karst Edge) since Miocene underwent complicated development with distinct phases of repeating phreatic speleogenesis (horizontal caves), vadose evolution (drawdown shafts), filling, fossilisation, exhumation, block tilting and rotation, uplift and planation.

K.W.: palaeomagnetism, geomorphology, speleogenesis, caves, cave fauna, Marifugia cavatica, Classical Karst

- 12 - 329 Cabezas, Jorge: New trends in cave management. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 123-128, Postojna, 2004.**

At the present time, we can speak of a general increase in the importance of cave tourism. There is a growth in the number of visitors and in the number of caves open for visits in the World. Of course, the exact situation of cave tourism is different in countries with a mature cave industry and a longstanding tradition, intermediate countries and countries where cave tourism is a new activity. New trends in cave management may affect different countries in various ways depending on the level of development of cave tourism in each one of them. There may be big differences among caves within a certain country or region too. However, new aspects affect all caves and the way they are managed.

- 12 - 330 Chirienzo, Mirona: The crystalline phase of the carbonate moonmilk: a terminology approach. Acta carsologica, 33/1, 257-254, Ljubljana, 2004.**

The crystals forming the solid phase of moonmilk deposits can grow from various solutions due to inorganic or/and organic processes. The terminology used so far to define the crystalline phase of the moonmilk is vast. However, if one applies for the widely accepted classification and terminology used in sedimentary petrology, this wide range of terms describing particular morphologies of carbonates may be narrowed to the following three categories: fiber crystals, polycrystals, and calcified filaments, and applied whenever the size and shapes of calcite crystals in moonmilk and their mutual interrelationships come into discussion.

K.W.: moonmilk, calcite crystals, terminology

- 12 - 331 Cigna, Arrigo A.: Climate of caves. In: J. Gunn (Ed.) Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 228-230, New York, 2004.**

The different aspects of the climate of cave are reported both from a historical point of view as well as by taking into account the present technological developments.

K.W.: cave, climate, monitoring, history.

- 12 - 332 Cigna; Arrigo A.: Vulnerability of the cave environment. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 185-191, Postojna, 2004.**

The problem of the environmental protection of a show cave is here analysed by taking into account different cave situations. The main sources of disturbance are considered and their consequences examined. The implications of the development of a show cave are also listed and some solutions are reported. For an easy implementation of the criteria here reported, some information on the instruments and devices available nowadays is summarised.

- 12 - 333 Čuk, Alenka; Shaw, Trevor R.: Royal and Noble Visitors to Postojnska Jama, Slovenia, 1857 - 1945. In: Zupan Hajna, Nadja (Ed.). **International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 99-102, Postojna, 2004.**  
Between 1857 and 1945 a total of 108 different emperors, queens, archdukes, grand duchess, etc. visited the cave, coming from Asia and America as well as Europe. Many were family visits with children as young as 9. Some individual visits are described, with some of the organizational problems.
- 12 - 334 Day, M. J.: Cone karst. In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 241-243, New York, 2004**
- 12 - 335 Day, M. J.; Chenoweth, M. S.: Cockpit Country cone karst, Jamaica. In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 233-235, New York, 2004.**
- 12 - 336 Day, M. J.; Kueny, J.: America, Central. In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 34-37, New York, 2004.**
- 12 - 337 Day, M. J.; Kueny, J.: Military uses of caves. In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 509-511, New York, 2004.**
- 12 - 338 Day, M. J.; Mueller, W.: Aves (birds). In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 130-131, New York, 2004.**
- 12 - 339 Day, M. J.; Tang, T.: Tower karst. In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 734-736, New York, 2004**
- 12 - 340 Debevec, Albin: Natural and cultural heritage protection and development in the Škocjanske Jame Park. In: Zupan Hajna, Nadja (Ed.). **International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 141-145, Postojna, 2004.**  
Slovenia has a long-standing tradition in the area of nature protection dating back to the end of the 19<sup>th</sup> and the beginning of the 20<sup>th</sup> centuries. Such an early interest in nature protection proves early awareness of the people living in this region of the necessity to preserve the beauty of nature, and it also shows the extensive natural wealth and its wide variety on a relatively small territory. At first, these early beginnings of statutory nature protection focused on the protection of individual valuable parts of nature, but they soon went

beyond protecting single items and started including larger areas. At a relatively early stage, Slovenia adopted an integral act, which tried to introduce organic protection of nature, but the time in the seventies was not yet the right one. An effective organic piece of legislation governing nature protection entered into force last year when the Nature Conservation Act was adopted. This Act was a major turning point and marked the beginning of a different attitude towards nature.

- 12 - 341 Dreybrodt, Wolfgang; Gabrovšek, Franci: Speleogenesis: Computer Models. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 677-681, New York, 2004.**

- 12 - 342 Dvorščak, Ksenija: Survey of Visitors to Postojna Caves in 2002, with a Comparison to the 1995 Survey. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 61-70, Postojna, 2004.**

During the summer we carried out a written survey of randomly selected visitors. We compared the results with those of a similar survey carried out in 1995. The sample consisted of 715 questionnaires. Just like seven years ago, the majority of those questioned were visiting Postojna Cave en route to a summer holiday destination, on their way home or as part of an excursion from their holiday destination. Families with children are still the largest group of visitors, though the share of older visitors is increasing. Most visitors make their own way to Postojna Cave, though agencies are playing an increasingly important role. The national structure of visitors has changed: Italian, German and domestic (Slovene) visitors still predominate but there are increasing numbers of visitors from Eastern Europe and Israel. The main reasons cited for visiting Postojna Cave are curiosity and the fact of having heard much about it. The most influential advertising medium is print - in the form of brochures and leaflets received at home, at the holiday destination or en route. The internet has become a very important medium. In comparison to 1995 visitors stay longer in Postojna and more of them stay overnight. They are also interested in other sights in the vicinity. The extent to which catering services are used has not changed. Every other visitor bought a souvenir.

- 12 - 343 Ekmecki, Mehmet: Change in perception of karst from morphology to morpho-hydrology: Turkish experience in comprehension of karst. Acta carsologica, 33/1, 131-142, Ljubljana, 2004.**

Since its establishment as a science in the end of 19<sup>th</sup> century, methods applied in the study of karst evolved from classification to a system approach providing prediction in x, y, z and t. Information collected to answer the question "what is it" followed by the questions "why and how" and "what if". The change in questions required collection of new information which in turn changed perception of karst by related scientists. An overall evaluation of the progress in karst studies postulates an evolutionary character. Four major stages can be defined with transitional limits to track the change in perception of karst in accordance with the progress in the applied methodology. After discussing the history of karst studies in Turkey, the author questions the reason why the track did not progress parallel to the general evolution of karst studies in the world. Considering the fact that change in percep-

tion has caused shifts in meaning of the concepts and terms of karst, it is proposed to define terms not only on the basis of form but the processes of formation and function.

K.W.: karst, methods, morphology, hydrology, terminology, Turkey

- 12 - 344 Fairchild, Ian J.; Tooth, Anna F.: Chemistry of Natural Karst Waters. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 213-215, New York, 2004.**
- 12 - 345 Fairchild, Stephen: Show cavern development and operation in the modern world. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 129-132, Postojna, 2004.**  
The author is the president of a multi-location show-cavern development and management corporation. He manages four show-caverns and one show-goldmine in California and has developed two caverns from the natural condition. Based on his experiences, observations are made on modern management techniques and technological views regarding cavern development. A summary listing possible items of concern is presented regarding show-cavern development either public or private. The ever more demanding complexities and requirements heaped on businesses and even government operations have forced a modern trend to consolidate in order to survive. Very heavily visited show caverns may be able to absorb the costs of management, but for less visited caverns that cost can be so burdensome as to make the operation not workable. For this reason it will be increasingly more advantageous to consolidate management with multiple caverns or even with other similar business operations. Forms of multiple location management may range from simple cooperation agreements to consortiums and corporations. In the last ten years there has been more technological development than the previous 200 years. And the process is accelerating.
- 12 - 346 Ford, Derek: Bear Rock Karst, Canada. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 137-138, New York, 2004.**
- 12 - 347 Ford, Derek: Canada. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 175-178, New York, 2004.**
- 12 - 348 Ford, Derek: Carbonate Karst. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 184-186, New York, 2004.**
- 12 - 349 Ford, Derek: Castleguard Cave, Canada. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 198-200, New York, 2004.**
- 12 - 350 Ford, Derek: Karst. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 473-475, New York, 2004.**
- 12 - 351 Ford, Derek: Nahanni Karst, Canada. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 537-538, New York, 2004.**

- 12 - 352 **Ford, Derek: Paleoenvironments: Speleothems.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 555-558, New York, 2004.
- 12 - 353 **Ford, Derek: Solution Breccias.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 660-661, New York, 2004.
- 12 - 354 **Ford, Derek: Speleogenesis: Unconfined Settings.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 684-686, New York, 2004.
- 12 - 355 **Gabrovšek, Franci: Kanin Massif, Slovenia-Italy.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 468-470, New York, 2004.
- 12 - 356 **Gauchon, Christophe: France: History.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 371-372, New York, 2004.
- 12 - 357 **Gerič, Barbara; Pipan, Tanja; Mulec, Janez: Diversity of culturable bacteria and meiofauna in the epikarst of Škocjanske Jame caves (Slovenia).** *Acta carsologica*, 33/1, 301-309, Ljubljana, 2004.  
 Epikarst zone becomes important site for hydrogeological, geomorphological and biological investigations. From the samples at four sites in Škocjanske jame caves where water tricklets constantly drip from the cave ceiling the meiofauna were identified. The sites were screened also for the presence of culturable bacteria. The viable cell counts were supplemented with morphological and biochemical data of the isolates. Results show that Gram-negative bacteria prevail in the percolating epikarst waters.  
 K.W.: bacteria, meiofauna, karst, epikarst, Škocjanske jame caves, Slovenia
- 12 - 358 **Giannopoulos, V.; Kambouroglou, E.; Kontaxi, C.: The contribution of the Ephorate of Paleoanthropology-Speleology to the development of the caves in Greece along with the consequent implications.** In: Zupan Hajna, Nadja (Ed.). *International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 192-194, Postojna, 2004.*  
 The Department of Paleoanthropology-Speleology, as the responsible section, by law, for the protection and research of caves all over Greece, has established the standards concerning the touristic development of the caves and the security measures, mainly the ones concerning visitors. In addition, within the primary activities of the Department, the problems arising and the implications involved during the formulation and design of the development works and natural factors become one of the main issues of research. Besides the aforementioned tasks, the Ephorate is being running research projects on specific topics such as palaeontology, archaeology, anthropology, etc., due to the vast number of caves of such interests.
- 12 - 359 **Gillieson, David: Asia, Southeast Islands.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 104-107, New York, 2004.

- 12 - 360 Gillieson, David: Chillagoe and Mitchell-Palmer Karsts, Australia. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 215-216, New York, 2004.
- 12 - 361 Gillieson, David: Floral Resources. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 360-362, New York, 2004.
- 12 - 362 Gillieson, David: Nullarbor Plain, Australia. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 544-546, New York, 2004.
- 12 - 363 Gillieson, David: Sediments: Allochthonous Clastic. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 633-634, New York, 2004.
- 12 - 364 Goldie, Helen: Ornamental Use of Limestone. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 550-551, New York, 2004.
- 12 - 365 Grimes, Ken G.: Syngenetic Karst. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 717-719, New York, 2004.
- 12 - 366 Güner, Yilmaz; Durukal; Sanal: The Importance Of Dim Cavern Among The Anatolian Caverns. In: Zupan Hajna, Nadja (Ed.). *International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 159-160, Postojna, 2004.*  
In Turkey nearly 4000 caverns big or small have been reported. But very few of them are open for public visits. So Dim Cavern has a unique position from the point of view of its location and strategies respecting its preservation and management. Dim Cavern is on the Mediterranean coast of Turkey, 12 km east of Alanya, on the south slope of the Dim Valley. Its altitude is about 230 metres above sea level and its located on the west side of Cebel Reis mountain. Dim Cavern is developed along the East West fault zone inside the Paleozoic crystallised limestone of Cebel Reis Mountain. It is composed of 4 main parts and a small lake where you can observe rich karstic formations. It was opened to public visit in 1998, and it is carefully preserved.
- 12 - 367 Gunn, John: Erosion Rates: Field Measurements. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 321-323, New York, 2004.
- 12 - 368 Gunn, John: Fluviokarst. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 363-364, New York, 2004.
- 12 - 369 Gunn, John: France, Southern Massif Central. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 372-374, New York, 2004.
- 12 - 370 Gunn, John: Limestone as a Mineralk Resource. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 489-490, New York, 2004.

- 12 - 371 Gunn, John: Peak District, England. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 575-578, New York, 2004.
- 12 - 372 Gunn, John: Quarrying of Limestone. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 609-611, New York, 2004.
- 12 - 373 Gunn, John: Radon in Caves. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 617-619, New York, 2004.
- 12 - 374 Gunn, John; Günay, Gültekin: Turkey. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 740-743, New York, 2004.
- 12 - 375 Gunn, John: Valleys in Karst. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 753-754, New York, 2004.
- 12 - 376 Hamilton-Smith, Ebery: Conservation: Protected Areas. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 245-247, New York, 2004.
- 12 - 377 Hamilton-Smith, Ebery: Karst Resources and Values. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 479-481, New York, 2004.
- 12 - 378 Hamilton-Smith, Ebery: Organic Resources in Caves. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 547-548, New York, 2004.
- 12 - 379 Hamilton-Smith, Ebery: Tourism and Caves: History. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 725-726, New York, 2004.
- 12 - 380 Hamilton-Smith, Ebery: Tourist Caves. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 726-730, New York, 2004.
- 12 - 381 Hamilton-Smith, Ebery: World Heritage Sites. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 777-779, New York, 2004.
- 12 - 382 Hebelka, Jiří: Agency for Nature Conservation and Landscape Protection of the Czech Republic Caves Administration of the Moravian Karst. In: Zupan Hajna, Nadja (Ed.). *International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 137-140, Postojna, 2004.*

More than 2000 caves have been discovered in the Czech Republic. Twelve of them are show caves. They are managed by the Agency for Nature Conservation and Landscape Protection of the Czech Republic. The Punkva caves in the Moravian Karst are the best

known and the most frequented caves. The general reconstruction of these caves was made in 1996. The aims of the reconstruction were especially: the protection of the caves as natural phenomenon, (the prevention of damage of the stalactite and stalagmite decorations, the limitation of growth „lampnflora“, the protection of natural micro-climate in the caves); increasing an aesthetic level and attraction of the sight-seeing way; and also increasing safety of visitors and workers of the caves. In terms of the reconstruction buildings and technical equipment of the caves were modernised in all-in cost 13.900.000,- CZK.

- 12 - 383 Jamnik, Pavel: Unusual injury of the moose's jawbone, found in „Franc-losovo brezno“ shaft above Glažuta near Ribnica (Slovenia). Acta carsologica, 33/1, 291-299, Ljubljana, 2004.**

The article deals with unusual bone damage with rounded edges, found on the lower jawbone of a European moose. The remains of its skeleton were discovered by speleologists in the abyss above Glažuta. This damage differs from those, caused by nature in caves and sediments. Small mammals leave different tooth marks when gnawing bones. Maybe the damage was caused by snails? The assumption that snails damage fossil bones was first presented in case of the holes in fossilized rhinoceros bones from Dolarjeva jama at Logatec.

K.W.: bone damage, European moose, small mammals, snails.

- 12 - 384 Jovanovič, Peter: A radon survey in show caves in Slovenia. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 219-223, Postojna, 2004.**

A survey of radon and radon decay product concentrations in several caves in a limestone region in Slovenia was initiated in 1986. In the period from 1989 to 1998, monthly surveys were undertaken in several caves are open to tourists or used for speleotherapy purposes. The reason for carrying out these surveys, were dose estimates obtained for the guides and medical staff working in the caves. Daily average radon gas concentration determined ranged from several 100 Bq/m<sup>3</sup> up to 27 kBq/m<sup>3</sup>. Annual doses estimated on the basis of various lung models ranged from 10 mSv to 85 mSv per year and per 2000 working hours. In the coming years we will continue with the measurements in caves with the highest occupancy times for visitors. The results from such monitoring measures will contribute to the establishment of an ordinance regulating the performance of measurements.

- 12 - 385 Kashima, Naruhiko: Akiyoshi-dai Karst and Caves, Japan. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 29-30, New York, 2004.**

- 12 - 386 Kashima, Naruhiko: Cheju-do Lava Caves, South Korea. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 212-213, New York, 2004.**

- 12 - 387 Kempe, Stephan: Natural Speleothem Damage in Postojnska Jama, Slovenia, Caused by Glacial Cave Ice? A First Assessment. Acta carsologica, 33/1, 265-289, Ljubljana, 2004.**

Natural speleothem damage has been known from Postojnska jama for a long time. Schaffenrath was the first to depict broken and leaning stalagmites on his famous pictures from the interior of the cave created in the 1820ies. Hohenwart (1832b) analysed some of these damages, clearly excluding rock fall or earthquakes as a cause. Here I first discuss the possibilities which could cause natural speleothem breakage in general. The most promising cause of wide-spread sinter damage, so characteristic for all central European caves, is cave ice. It must have formed in all caves during glacial maxima when permafrost spread throughout northern, eastern and central Europe. Consequently cave ice could be the most prominent factor in explaining non-recent speleothem damage. Next I present some of the historically known flowstone breakage such as Schaffenrath's "Broken Pyramid", and the "Doorstep". These are discussed in view of cave ice and an ad hoc model for the genesis of the Broken Pyramid is given. Then observations from the end of the side passages Pisanirov and Brezimski rov are presented. There we find masses of broken stalagmites and stalactites and speleothem fragments in precarious positions, they could not have fallen to. Cave ice offers an overall process to explain these observations. Thus it is suggested that all or parts of the Postojnska jama were filled with ice during the Last and earlier Glacials. If accepting speleothem damage as a consequence of glacial cave ice, then it should be possible to use it as a marker facies for the extent of the zero temperature line during the various glacials.

K.W.: speleothem, speleothem damage, speleoclimate, cave ice, Postojnska jama, Slovenia

- 12 - 388 **Kiernan, Kevin: Australia. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 120-123, New York, 2004.**
- 12 - 389 **Kiernan, Kevin: Religious Sites. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 622-625, New York, 2004.**
- 12 - 390 **Klimchouk, Alexander: Asia, Central. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 94-96, New York, 2004.**
- 12 - 391 **Klimchouk, Alexander: Caucasus, Georgia. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 200-203, New York, 2004.**
- 12 - 392 **Klimchouk, Alexander: Caves. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 203-205, New York, 2004.**
- 12 - 393 **Klimchouk, Alexander: Evaporite Karst. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 343-347, New York, 2004.**
- 12 - 394 **Klimchouk, Alexander: Krubera Cave, Georgia. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 487-488, New York, 2004.**
- 12 - 395 **Klimchouk, Alexander: Morphometry of Caves. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 524-526, New York, 2004.**

- 12 - 396 Klimchouk, Alexander: **Russia and Ukraine.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 627-629, New York, 2004.
- 12 - 397 Klimchouk, Alexander: **Soviet Union: Speleological History.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 661-663, New York, 2004.
- 12 - 398 Klimchouk, Alexander: **Speleogenesis.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 666-668, New York, 2004.
- 12 - 399 Klimchouk, Alexander: **Speleogenesis: Deep-Seated and Confined Settings.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 681-683, New York, 2004.
- 12 - 400 Klimchouk, Alexander: **Ukraine Gypsum Caves and Karst.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 745-748, New York, 2004.
- 12 - 401 Knez, Martin; Slabe, Tadej: **Highways on Karst.** In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 419-420, New York, 2004.
- 12 - 402 Knez, Martin; Šebela, Stanka: **Suggestion For Some Examples Of Geological Heritage, Škocjanske Jame Caves And Postojnska Jama Cave System.** In: Zupan Hajna, Nadja (Ed.). *International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 161-170, Postojna, 2004.  
The approach to presenting a geological heritage in show caves in Slovenia (Škocjanske Jame Caves and Postojnska Jama Cave System) should be refreshed. The guides generally talk about speleological heritage which includes also some examples of geological heritage as stalactites, stalagmites, paleontological remains, cave sediments, breakdown blocks. But geological elements as bedding planes, faults, fissures are discussed very rarely. From two Slovene show caves we can present also examples of interbedded slip, fault zone, chert lens, tectonic slickenside, etc. We suggest adding more geological information to regular show cave visits.*
- 12 - 403 Knez, Martin; Slabe, Tadej; Šebela, Stanka: **Karstification of the aquifer discovered during the construction of the expressway between Klanec and Črni Kal, Classical Karst.** *Acta carsologica*, 33/1, 205-217, Ljubljana, 2004.  
Sixty-seven caves were opened during the earthwork and excavation of the tunnel on the 6.5 km route section between Klanec and Črni Kal. By their number, old caves predominated. Two thirds of these caves were filled with deposits. The caves investigated contributed to our knowledge of the development of this part of the karst. The more than 450 m-long cave system of caves which we are trying to preserve was opened in the tunnel at Kastelec near the Škrklovica cave. Below the road, the passages of this system are connected with concrete pipes, leading from the roadside.  
K.W.: karstology, expressway construction, karst caves, Kras (Classical Karst), Slovenia

- 12 - 404 Kogovšek, Janja: Percolation water researches, Postojnska Jama. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 225-230, Postojna, 2004.**

More important results of percolation water researches in Postojnska jama from the beginning of the eighties to now were collected. Measurements and analyses carried through weekly or monthly intervals for several years were completed by detailed researches in a shorter time. In general the percolation water is supersaturated and deposits flowstone but there is also unsaturated percolation water that dissolves rock and previously deposited flowstone. At some places where we detected polluted water we studied the mass transport through cave roof, which has a different thickness. We used the method of water tracing by both natural and artificial tracers.

- 12 - 405 Kogovšek, Janja: Physico-chemical properties of waters in the Malenščica recharge area (Slovenia). Acta carsologica, 33/1, 143-158, Ljubljana, 2004.**

Basic physico-chemical properties of waters within the area of Malenščica are given, and so are the connections that they indicate. Dolomitic water of the Cerknjščica mostly flows into the Rak in Rakov Škocjan valley, while Kotličiči springs show the connection with Svinjska jama (cave) and Mala Karlovica. When water levels are low the Rak river at its swallowhole mostly comprises waters from Kotličiči, with Ca/Mg about 3, 5 and the lowest value 2,2 when the water levels are the lowest, when only the Cerknjščica sinks into Svinjska jama; this later reflects also in the water of the Malenščica. When water levels are high, the mixture of Rak and Kotličiči flows into the swallowhole, and Ca/Mg is about 4. The influx of waters from Pivka Valley is designated by higher ratio of Ca/Mg and higher values of pollution indicators, when the infiltration water from poorly conductive part of Javorniki is designated by Ca/Mg values about 5. Due to the complexity of the system there are still some unanswered questions left which can only be answered by carrying out additional researches.

K.W.: karstology, karst water, physico-chemical characteristics, recharge area, Malenščica, Slovenia

- 12 - 406 Kralik, Martin; Kranjc, Andrej; Meus, Philippe: Organic contaminants. In: Zwahlen, François (Ed.). Final report, (EUR, Environment, 20912). Luxembourg: Office for Official Publications of the European Communities, 2003, pp. 43-50, 2004.**

- 12 - 407 Kranjc, Andrej: Short history of cave tourism in Slovenia. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 55-60, Postojna, 2004.**

In Slovenia cave tourism is one of the oldest tourist branches. First of all let me mention the "pilgrimage" tourism in the caves of Sveta jama (Saint Servulus - Socerb) (jama=cave) above Trieste and Sv. Ivan v Čele (San Giovanni d'Antro or Landarska jama). At the beginning of the 17<sup>th</sup> century Vilenica cave was a real show cave and the Austrian emperor himself visited it in 1660. The signatures in Postojnska jama show that the cave was visited from

the 13<sup>th</sup> century onward. In Valvasor's book (1689) it is mentioned that he himself had once shown Postojnska jama to two Netherlanders and one Englishman. At the order of Trieste town F. Cassas in 1782 painted the most remarkable curiosities in the town's surroundings: among them are the pictures of Škocjanske jame. Also Proteus, the only then known underground animal attracted the visitors to Črna jama by the end of the 18<sup>th</sup> Century. A true organised tourism started at the beginning of the 19<sup>th</sup> century. In 1808 the cave called Pečina na Hudem letu was opened for tourists, followed in 1819 by Postojnska jama and Škocjanske jame. In Slovenia there were many other caves which could be visited beside those three mentioned above (for example Črna jama, Križna jama, Jama pod Babjim zobom, Škratovka, Željske jame), although they cannot be classified as real show caves. By the beginning of the 1<sup>st</sup> World War there were 10 show caves on the ethnical territory of Slovenia (within Austro-Hungary).

**12 - 408 Kranjc, Andrej: Baltazar Hacquet, a speleologist. Naše jame, 45, 56-63, Ljubljana, 2004.**

Baltazar Hacquet, born in France, lived mostly in Austria. He spent 20 years (1766-1787) in a nowadays Slovenia where he was a physician and professor of anatomy at Ljubljana. But his main interest was natural sciences (botany, geology, mineralogy, palaeontology, chemistry, hydrology, geomorphology, karstology as we call them now). He was a great traveller all over Carniola (Krain) and NW parts of Dinaric Mts. and he published his observations in 4 volumes of *Oryctographia carniolica* or "Physical description of the Duchy of Carniola ..." (1778-1789). He entered and described many karst caves and tried to explain some curiosities such as fog coming from cave entrance, ice in caves, speleothem formation, etc. His main reason for visiting caves was research but he was not without sport impulses either. He produced a map of Carniola and NW Dinaric Mts. with signs for lithology - the first geological map with a special sign for a cave and he also discerned limestone and dolomite.

**12 - 409 Kranjc, Andrej: Alpine and Ice Caves in Slovenia in older literature (17<sup>th</sup> to 19<sup>th</sup> century). *Acta carsologica*, 33/1, 61-71, Ljubljana, 2004.**

The first printed literature mentioning caves in a nowadays Slovenia dates to the 16<sup>th</sup> century already (description of Cerkniško lake, research of underground water connections) but description of alpine and ice caves does not appear before the 17<sup>th</sup> century. The most important and the best known is Valvasor's work "Die Ehre des Herzogthums Crain" (1689). Valvasor not only described caves and ice formations, he was trying to find out if the cave-ice is different from the ice formed on the surface during the winter. B. Hacquet visited some of the same caves a century later and in his work "Oryctographia carniolica ..." (1778 - 1789) explained the formation of ice more realistically. In the middle of the 19<sup>th</sup> century appears a real speleological literature, as Schmidl's work "Die Grotten und Höhlen von Adelsberg ..." (1854) is regarded as the first "modern speleological work". At the end of the 19<sup>th</sup> century the Gratzky's list of caves in Carniola (great part of the today's Slovenia) includes 7 caves from the Alps and 30 ice caves. The last are practically all out of the high mountains, where the ice caves are a normal feature. The 19<sup>th</sup> century literature including alpine and ice caves is very diversified, there are "classical" speleological works on ice caves as Fugger's "Eishöhlen und Windröhren" or Schwalbe's "Über Eishöhlen", and local literature or reports talking about extracting of ice for example.

K.W.: history of speleology, alpine cave, ice cave, Slovenia.

- 12 - 410 **Kranjc, Andrej: Dinaric karst. In: Gunn, John (ur.). Encyclopedia of caves and karst science, Taylor and Francis - Routledge, pp. 287-289, ilustr., New York, 2004.**
- 12 - 411 **Kranjc, Andrej: Kras, Slovenia. In: Gunn, John (ur.). Encyclopedia of caves and karst science, Taylor and Francis - Routledge, pp. 485-486, ilustr., New York, 2004.**
- 12 - 412 **Kranjc, Andrej: The best and the largest Encyclopaedia of Caves and Karst Science/ John Gunn, Editor, VII-XVIII, 1-902 pp. Acta carsologica, 33/1, 333-335, Ljubljana, 2004.**  
K.W.: book report
- 12 - 413 **Kravanja, Matej: New access to underground flow of river Reka in the cave Brezno treh generacij. Naše jame, 45, 63-69, Ljubljana, 2004.**  
Author reports about the digging in the Brezno treh generacij cave (kat. Nr. 3389). The decision for the enlarging the passages was taken because of the strong air current. In 53 actions several straits were enlarged. Through them the passage with underground flow of Reka river was reached, most likely in the inflow part of the Kačna jama cave. Because of the strengthening of the narrow passages in loose collapse material with retaining walls the lower part of the cave is not completely explored and surveyed yet.
- 12 - 414 **Lauritzen, Stein-Erik: Stripe Karst. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 705-706, New York, 2004.**
- 12 - 415 **Lowe, David, J.: Geoscientists. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 380-383, New York, 2004.**
- 12 - 416 **Lowe, David J.: Inception of Caves. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 437-441, New York, 2004.**
- 12 - 417 **Lowe, David J.: Speleogenesis Theories: Post - 1890. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 670-674, New York, 2004.**
- 12 - 418 **Mais, Karl: The influence of visitors on alpine show caves. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 201-208, Postojna, 2004.**  
A cave's characteristic features are usually preserved even after its development as a show cave. The construction of paths, stairs and illumination systems, however, may negatively affect or even devastate sediments, sites of finds or speleothems of scientific interest. On the one hand illumination during guided tours exerts a mostly persistent influence on the development of lamp flora, on the other hand the presence of visitors may disturb the natural conditions inside a cave. Investigations of this subterranean stress caused by show cave development and subsequent operation with guided tours are under way in several caves, among others in the "Dachstein Höhlen Park" in Obertraun, Upper Austria. The visitors'

influence can be distinctly detected in the Rieseneishöhle and neighbouring Mammuthöhle, but depends largely on cave wind activity. While there is no obvious persistent effect of visitors on the cave ice formations and the cave climate in the Rieseneishöhle -with their approximately 100.000 visitors annually -, negative effects of the general exogene climate are clearly documented.

- 12 - 419 Malečkar, Franc: Active cognition of the karst caves and surface. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 177-180, Postojna, 2004.**

The aims to visits of show caves, eg. to get to know the speleogenetic processes, speleobiology, importance of the environment protection, fragility of the karst ecosystems and efforts for cave explorations, can be obtained more successfully with involving of the visitors in active cognition. The guides present the problems and help visitors to solve them with all didactic methods. Such a technique of the presentation of the karst phenomenons is especially appropriate for pupils. In the article are presented some experiences in the Karstological exposition of the Daily Centre at the Centre for School and Outdoor Activities from Ljubljana, which could be used, according to the possibilities, at the other show caves and natural parks.

- 12 - 420 Middleton, Gregory: Australia: History. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 127-130, New York, 2004.**

- 12 - 421 Middleton, Gregory: Madagascar. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 493-495, New York, 2004.**

- 12 - 422 Mihevc, Andrej: Development of the tourist pathways in Škocjanske jame. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 117-120, Postojna, 2004.**

The pathways in Škocjanske jame started to be more systematically set up and maintained in the year 1823. These pathways could be separated into those intended for research and the tourist ones. Through the proceeding years they were subject to many improvements and transformations. Along the entire length of 5800 m of the Škocjanske jame they have created approximately 7650 m of cave pathways and in the cave's vicinity also additional 2500 m of surface pathways. The majority of these paths were put in place in the period between 1884 and 1905. Hand in hand with these alterations of pathways, the length and the direction of the tour around the cave were also changing. Initially, due this expansion of the pathways the duration of the visit to the more prominent parts of the cave increased, yet after 1960 the length of the tour around the cave was shortened from 2900 m to 1640 m. As a consequence of this step some of the most impressive parts of the cave were left out of the regular cave tour.

- 12 - 423 Mihevc, Andrej: Show cave entrances: the case of Postojna Cave. In: Zupan Hajna,**

**Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 107-110, Postojna, 2004.**

Since 1818 many interventions in the entrance parts of the Postojna Cave occurred. Two of the entrances were well managed and are well preserved so that they stand as an example of beautiful and fascinating entrance into the underworld. The other entrance, which was filled with gravel, was badly damaged and it consequently lost its former value. This paper presents the development of entrances in the long-term perspective and demonstrates how some of the entrances lost their natural shape and appeal and, by the same token, also their value as an attractive element of the show cave.

**12 - 424 Mihevc, Andrej: Traces of the cave bear in the cave Račiška pečina. Naše jame, 48-56, Ljubljana, 2004.**

**12 - 425 Traces of cave bear (*Ursus spelaeus*) from a cave in Slovenia are described. Preserved are footprints and claws marks in cave clays, partly covered by thin flowstone and claw marks made on hard flowstone on the cave wall. There are at least 26 traces, that were formed when the cave bears were touching for passage end or climbing up and sliding down the steep slope made of clay and flowstone.**

**12 - 426 Mihevc, Andrej; Škocjanske Jama, Slovenia. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 653-655, New York, 2004.**

**12 - 427 Mihevc, Andrej; Slabe, Tadej; Šebela, Stanka: Morphology of Caves. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 521-524, New York, 2004.**

**12 - 428 Negro, Paolo: Integrated ticketing system at Frasassi Caves. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 133-135, Postojna, 2004.**

The integrated ticketing system installed at the Frasassi Caves is constituted by the hardware and software components developed by the ticketing division of Tecnost Sistemi SpA. The equipment forms a functional and integrated system that complies with all the operational activities. The system has operator assisted ticket vending machines and ticket cancelling machines that control the visitors entry too. Besides these functionalities, the system has additional functionalities such as the booking, the controlling, the technical and book keeping analysis. This system can be integrated with the public information functionalities (displays) and self-service sales points (self service ticket vending machines). All the functionalities are guaranteed by equipment based on Personal Computers interconnected in LAN Ethernet. All the devices have access (directly or indirectly) to a common database resident on a mirroring server system. The devices update the server database on the basis of the processing and transactions made, and the information collected.

- 12 - 429 **Mrak, Irena: Minor karst landforms as an indirect method for datation - the case study Valley pod Košuto (Slovenia).** *Acta carsologica*, 33/1, 45-59, Ljubljana, 2004.  
The paper presents the Pleistocene morphogenesis research in the valley Pod Košuto. The area was one of the detailed studies in the wider research of the Pleistocene morphogenesis in Tržiška Bistrica river basin. Ice movements influenced the formation of valley Pod Košuto, but the research deals more with the genesis of the carbonate material that fills the right side of the valley. Researching the lithologic characteristics of the material, the measurements of particle roundness and with the help of the minor karst landforms measurements we offer the new view of the material deposition in the secondary - present location.  
K.W.: Pleistocene morphogenesis, minor karst landforms, moraines, rock fall material, valley Pod Košuto, Karavanke mountains, Slovenia.
- 12 - 430 **Mudry, J.; Coxon, C.; Kilroy, G.; Kapelj, S.; Surbeck, H; Vadillo, I.: Contaminants in carbonate-karst groundwater (Inorganic contaminants).** In: **Vulnerability and risk mapping for the protection of carbonate aquifers.** Action COST 620. 36-43, 2004.  
K.W.: Karst, inorganic contaminants, transformation processes, transport processes
- 12 - 431 **Onac, Bogdan P.; Constantin, Silviu: Europe, Balkans and Carpathians.** In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science**, Taylor and Francis - Routledge, 328-331, New York, 2004.
- 12 - 432 **Osborne, Armstrong: Paleokarst.** In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science**, Taylor and Francis - Routledge, 559-561, New York, 2004.
- 12 - 433 **Palmer, Arthur N.; Carlsbad Cavern and Lechuguilla Cave, United States.** In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science**, Taylor and Francis - Routledge, 192-195, New York, 2004.
- 12 - 434 **Palmer, Arthur N.: Hydraulics of Caves.** In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science**, Taylor and Francis - Routledge, 429-430, New York, 2004.
- 12 - 435 **Palmer, Arthur N.: Mammoth Cave Region, United States.** In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science**, Taylor and Francis - Routledge, 495-499, New York, 2004.
- 12 - 436 **Palmer, Arthur N.; Audra, Philippe: Patterns of Caves.** In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science**, Taylor and Francis - Routledge, 573-575, New York, 2004.
- 12 - 437 **Palmer, Arthur N.: Wind and Jewel Caves, United States.** In: J. Gunn (Ed.) **The Encyclopedia of Caves and Karst Science**, Taylor and Francis - Routledge, 775-777, New York, 2004.
- 12 - 438 **Papadopoulou-Vrynioti, Kyriaki: The role of epikarst in the morphogenesis of the karstic forms in Greece and specially of the karstic hollow forms.** *Acta carsologica*, 33/1, 219-235, Ljubljana, 2004.

The role of epikarst in the morphogenesis of the subcutaneous karren and the karstic hollowforms is different. Cavernous karren and subcutaneous kluftkarren, are covered with terra rossa and show the activity of water. They are developed in the epikarstic zone due to the diffused corrosion on the joints through a capillary aquifer, situated in the high vadose zone. The rounded tops and the cavities of those subcutaneous karren are formed due to the continuous and uniform corrosion, acting by soil moisture in the high part of the epikarstic zone. Karstic hollowforms are developed in carbonate layers only, and also on the contact of karstified and non-karstified but easily eroded rocks. In this case, a lot of material is produced for the formation of soils that fill these landforms. Uvalas and poljes usually develop in sites of old valleys or tectonic depressions through the process of widening of the joints in the subcutaneous zone and the lowering of the latter zone. Simultaneously there occurs the gradual impermeability of the zone and the reinforcement of the lateral corrosion. These forms are mostly formed above the piezometric level. The poljes - periodical lakes are created due to the development when they temporary reach epikarstic water-table.

K.W.: karst morphology, karren, hollowform, soil, erosion, diffused-lateral corrosion, epikarstic aquifer, piezometric tabel.

- 12 - 439 Paternost, Sabina: Contemporary trends in tourism and analysis of tourism in Postojna Cave. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 71-79, Postojna, 2004.**

Tourism is a sector which is achieving rapid development around the world. It is also a sector which is sensitive to external events such as political changes, although it has the positive quality of being able to recover fairly quickly from upheavals. The needs of tourists are changing, as is the desire to find new ways to satisfy them. Increasingly, tourists want individual treatment and a specialised range of services. We therefore need to adapt to changes and update the range of services on offer, in other words to look for varied and attractive ways for tourists to spend their free time and complement them with the new opportunities that development brings to the market. A modern range of services should be directed at various target groups and at their interests and financial capabilities. All of this can be achieved by improving services, managing and respecting the environment, complementing the range of services available with new additional services and introducing the new technologies which help us in this. I would therefore like to offer, in addition to a brief definition of the basic concepts in tourism, an overview of existing tourist trends and demand. Postojnska jama, turizem, d.d. has a long tradition in its particular sphere of activity, since Postojna is a relatively well-known tourist destination both at home and abroad. The company's performance is extremely dependent on the foreign market, which provides approximately 85 per cent of its visitors. Over the last ten years the number and structure of visitors to Postojna Cave and Predjama Castle have changed significantly. This is illustrated below. The analysis includes a market analysis of Postojnska jama, turizem, d.d. and an analysis of demand. The analysis of demand was done on the basis of the structure and number of visitors to Postojna Cave and Predjama Castle and a comparison of these figures with indicators at the national level.

- 12 - 440 Peric, Borut: Virtual presentation of Škocjanske Jame. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The**

**use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 121-122, Postojna, 2004.**

New and modernised ways of presenting show caves on the Internet – especially a virtual reality guide – was the subject of the discussion at last years Congress of the International Show Cave Association in Frossinone, Italy. I would like to present this kind of visit to the Škocjan Caves and the surface above them. The project has been carried out in collaboration with the photographer Boštjan Burger, who is the author of similar presentations of Postojnska and Križna jama Caves. Those who are not able to visit the park themselves thus have an opportunity of acquiring almost firsthand experience of the Škocjan Caves Regional Park. The presentation includes a map and a cross-section.

**12 - 441 Perica, Dražen; Marjanac, Tihomir; Aničić, Branka; Mrak, Irena; Juračić, Mladen: Small karst features (karren) of Dugi Otok island and Kornati archipelago coastal karst (Croatia). Acta carsologica, 33/1, 117-130, Ljubljana, 2004.**

Dugi otok Island and Kornati archipelago islands are characterized by karst morphology. Small karst features are particularly well developed along the coast in the swash zone, and significant differences can be observed due to different interaction of wave action, bedding attitude, bed thicknesses and lithology. Among other karren types, fissure- and network-type karren are particularly interesting, both of which start developing from initial root karren. The age of some of these small karst features can be estimated by their occurrence in ancient quarries, and we suggest their historic age. We can envisage the future development of these small coastal corrosion forms.

K.W.: karren, grikes, solution pans, corrosion, Dugi otok, Croatia.

**12 - 442 Petrič, Metka: Alpine karst waters in Slovenia. Acta carsologica, 33/1, 11-24, Ljubljana, 2004.**

Some basic characteristics of the alpine karst waters in Slovenia are presented. By the method of hydrological balance it was estimated that their groundwater reserves can supply a spring with an average discharge 115 m<sup>3</sup>/s. According to the comparison between the extent of the alpine karst and the EIONET-SI data base on springs it was stated, that for approximately 1200 alpine karst springs the total capacity (not the average discharge, but the amount of water that can be captured at low waters) is around 15 m<sup>3</sup>/s. At present only some 25% of these reserves is exploited for the water supply of around 240.000 inhabitants. Due to high vulnerability and different human impacts the quality of these water resources is endangered. Therefore it is necessary to protect them with adequate measures planned on the basis of accurate hydrogeological data. Present level of protection is unsatisfactory, as the water protection decree was accepted only for one quarter of captured springs. Additionally, the expert basis for such decree was prepared for a little less than one fifth of captured springs.

K.W.: alpine karst, springs, water supply, vulnerability, water quality, protection, Slovenia

**12 - 443 Pipan, Tanja: Fauna in the unsaturated zone in the Postojnska Jama Cave System (Slovenia). In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the**

**development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 181-184, Postojna, 2004.**

The Postojnska Jama Cave System is the longest cave system in Slovenia. The system includes 6 caves. Among them 3 caves Postojnska Jama, Pivka Jama and Črna Jama were the part of the investigated region. The differences of the species richness and the quantitative ratio of the copepods (Crustacea: Copepoda) is presented in trickles of the percolation water as well as in the puddles filled with percolation water. The intensive survey of two different habitats in three karst caves showed that ratio of copepods in the trickles of the percolation water is different than in the puddles. In Postojnska Jama we recorded a big difference in number of copepod species and their abundance between the trickles and puddles. In other two caves, which are part of the same cave system, but not of interest for tourism, we recorded in both habitats high populations of the specimens and mostly the same groups of specimens, which differed only in the frequency of their occurrence. 23 taxa of Copepoda are known from percolation water and from puddles filled with percolation water in the Postojnska Jama Cave System. Cyclopoida are represented by 4 taxa. Among 19 different taxa of Harpacticoida which were recognized there were 8 new species for science, belong to 7 genera. In Postojnska Jama we found 13 species of copepods, in Pivka Jama 14 and in Črna Jama 11 species of copepods.

**12 - 444 Pipan, Tanja: Subterranean fauna of copepods in percolation water of the karst caves. Naše jame, 45, 23-34, Ljubljana 2004.**

Fauna of copepods in percolation water of the karst caves is described. Copepods are the most numerous animal group in the epikarst. In six karst caves a systematic survey was done in trickles and pools of percolation water. In percolation water and adjacent pools 37 species of copepods were collected, 27 species are stygobitic. Between 11 and 17 different species of copepods were found per cave regardless of its length. Most species in trickles or in pools were represented by a single specimen. On the other hand, the fauna of copepods in percolation water is very rich.

**12 - 445 Price, Liz: An introduction to some cave fauna of Malaysia and Thailand. Acta carsologica, 33/1, 311-317, Ljubljana, 2004.**

Tropical caves of southeast Asia are often home to a wide range of cave fauna, ranging from microscopic invertebrates through to snakes and bats at the top of the food chain.. This food chain is dependant on the bats. Larger mammals, such as porcupine, goats and elephants may visit caves for shelter or food. Animals such as bats are useful to man, whilst the nests of cave swiftlets are harvested and fetch high prices on the market. Studies on cave fauna began at the end of the 19<sup>th</sup> century in Malaysia and Thailand.

K.W.: southeast Asia, Malaysia, Thailand, fauna, invertebrates, bats, swiftlets

**12 - 446 Glover, Ian; Price, Liz: Asia, Southeast: Archaeological Caves. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 107-109, New York, 2004.**

**12 - 447 Ramšak, Silvo: Show caves in Slovenia. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress,**

**Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 49-53, Postojna, 2004.**

Guided visits to caves are one of the ways in which Slovenia, the home of the original Karst, presents its natural wealth to visitors. Over twenty caves, including some outside the main Karst area, which differ greatly in terms of their attractions, the way they are run, and the way guided visits are organised, offer visitors the chance to benefit from the knowledge of professional and amateur cavers. This report also compares cave visits (in terms of numbers) before 1991 with the situation today. Cave managers belong to the show caves commercial interest group based in Postojna. Their first joint project is the Show Caves Route, which has already been running successfully for a number of years. To date, 64 people have visited all the caves on the route and have been awarded the Show Caves Route badge at a special ceremony.

**12 - 448 Ravbar, Nataša: Drinking water supply from karst water resources (the example of the Kras plateau, SW Slovenia). Acta carsologica, 33/1, 73-84, Ljubljana, 2004.**

In the past the biggest economic problem on the Kras plateau used to be drinking water supply, which has also been one of the reasons for sparsely populated Kras plateau.

Today the Water Supply Company provides drinking water to households and industry on the Kras plateau and the quantity is sufficient to supply the coastal region in the summer months as well. Water supply is founded on effective karst groundwater pumping near Klariči. Some water is captured from karst springs under Nanos Mountain as well.

In water supply planning in future, numerous other local water resources linked to traditional ways of water supply need to be considered. Eventual rainwater usage for garden irrigation or car washing, for communal activity (street washing) or for the needs of farming and purified wastewater usage for industry (as technological water) is not excluded.

K.W.: karst waters, human impact, drinking water supply, Klariči water resource, Kras plateau

**12 - 449 Ravbar, Nataša ; Šebela, Stanka: The karst periodical lakes of Upper Pivka, Slovenia. Acta carsologica, 33/1, 159-173, Ljubljana, 2004.**

At dry season the Pivka river appears between Prestranek and Rakitnik while near Zagorje the underground karst waters are about ten meters below the valley bottom of periodical Pivka river. High waters pour over the surface and fill stream valley of the Pivka river, which runs continually from Zagorje to the ponor of Postojnska jama. When the level of the underground water increases, also shallow karst hollows - uvalas are flooded and changed into more than 15 periodical karst lakes.

K.W.: karst periodical lake, uvala, Pivka, Slovenia

**12 - 450 Ritonja, Srečko: Normative Features of the Management and Protection of the Postojna and Predjama Cave Systems in the Future. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 1147-154, Postojna, 2004.**

The concepts of management and protection of subterranean caves used for tourism are closely linked. They are united by the belief that subterranean caves are not an infinite

natural resource, especially if interventions begin to be made according to the logic 'How to increase revenue from cave management?' This is precisely the dilemma facing the Postojna and Predjama Cave Systems, which next year pass over to management on the basis of a licence agreement between the State and the future managing body. That this is certain to happen is confirmed by the Decree on the Licence for Use of the Natural Features the Postojna and Predjama Cave Systems (Official Gazette of the Republic of Slovenia, 77/02), under the terms of which a future licensee will have to reach deep into his pocket. The Republic of Slovenia has decided that the holder of authorisation to manage the cave system will have to pay the State an average licence fee of 340 million tolar (€ 1,490,000) for every year of use. In other words one billion seven hundred million tolar in just five years. Whence and why this sudden speculative initiative on the part of a State which in relation to caves has hitherto only ever talked about restrained and protective methods of managing subterranean show caves? Since what is at issue here is not some 'appropriate level of licence fee' but an astronomical sum, we can immediately state that with the Decree mentioned above the Republic of Slovenia has laid new foundations in thinking on the management and protection of subterranean show caves with no regard for existing legislation.

- 12 - 451 Rivas, Antonio; Durán, Juan José; López-Martínez, Jerónimo: Spanish show caves as elements of the geological heritage. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 155-158, Postojna, 2004.**

The present work is a contribution to the knowledge of this specific part of the geological heritage and summarises the analysis of 51 show caves in Spain. There are more than 10.000 caves in Spain and more than 0,5 % of them are show caves; that means that karst and tourism have a very close relationship in this country. Spain is the second touristical country in the world. This must be considered to have a true perspective of the importance of show caves. However, the geological values of show caves have been always underrated in relation with the archaeological values, mainly in northern Spain, where the prehistoric paintings on the caves walls are considered the first and sole heritage. The geological elements are well known in the centre, south and the islands but this is only referred to the beauty of the speleothems and their similarity to a lot of things: animals, celebrities, tales, and so. There is not enough consideration of the geological elements in show caves not only by the tourism in general but the scientific community as well.

- 12 - 452 Sauro, Ugo: Asiago Plateau, Italy. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 116-119, New York, 2004.**

- 12 - 453 Self, Charles A.: The Internal Organization of Speleothems. Acta carsologica, 33/1, 245-255, Ljubljana, 2004.**

Speleothems are secondary cave mineral deposits whose internal organization can be studied by mineralogical techniques. The ontogeny of minerals is a technique developed in Russia whereby individual crystals and their aggregates are studied as physical bodies rather than as mineral species. This paper gives a concise guide to the terminology of ontogeny, as

applied to cave mineral deposits.

K.W.: speleothem, genetic mineralogy, ontogeny of minerals, mineral individual, mineral aggregate, kora, geometric selection.

- 12 - 454 Shaw, Trevor R.; Čuk, Alenka: Technical Developments For Tourism In Postojnska Jama, Slovenia, 1852 - 2002. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 91-98, Postojna, 2004.**  
One part of the cave was lit by electricity for the Emperors' visit in July 1883 but this was not permanent. Then in May 1884 an installation of 12 arc lights throughout the cave was completed, the second in the world. The problem of making visits to the cave more comfortable and easier was solved in 1872. Rail tracks were put into the cave, and the double-seated carriages ("factons") were "driven by manpower". In 1923 a complete underground railway system, from the cave entrance to Kalvarija, was built and on 2<sup>nd</sup> August 1924 the locomotive "Montania" hauled five four-seated carriages into the cave. Officially authorised post offices, with their own special cancellations, were built in the cave 500 m from the entrance in 1899 and 1,4 km inside in 1927.
- 12 - 455 Shaw, Trevor: Archaeologists. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 76-80, New York, 2004.**
- 12 - 456 Shaw, Trevor: Asia, Northeast: History. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 97-100, New York, 2004.**
- 12 - 457 Shaw, Trevor: Caribbean Islands: History. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 191-192, New York, 2004.**
- 12 - 458 Shaw, Trevor: Cerknica Polje, Slovenia: History. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 210-211, New York, 2004.**
- 12 - 459 Shaw, Trevor: Exploration Societies. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 350-352, New York, 2004.**
- 12 - 460 Shaw, Trevor: Speleogenesis Theories: Early. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 669-670, New York, 2004.**
- 12 - 461 Shaw, Trevor: Speleologists. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 686-689, New York, 2004.**
- 12 - 462 Shaw, Trevor: Speleothem Studies. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 689-690, New York, 2004.**
- 12 - 463 Shin, Youn-Chang; Kim, Jang-Gi: A Study of Role of Identity in Sustainable Development of Local City -Focusing on the Samcheok International Cave Expo 2002-. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International**

**Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 81-90, Postojna, 2004.**

Sustainable development is only possible through an integrated management system with global, national and regional interests and effort, not merely through the roles of distinct social units. Accordingly, this study attempted to verify how management strategies for sustainable development resulting from international cooperative support were adapted and utilized for Samcheok International Cave Expo Korea 2002. Managing strategies for sustainable development result from the effort of the current generation to supply future value of the region on recurring and organic levels, and not only on short-term, temporary or strategic selection. Future sustainable development needs to be based on the foundations of a future-oriented society, and so it is advised that a detailed management program through joint participation of regional organizations be put into effect.

- 12 - 464 Sket, Boris: Anchialine Habitats. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 64-66, New York, 2004.
- 12 - 465 Sket, Boris: Anchialine Habitats. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 64-66, New York, 2004.
- 12 - 466 Sket, Boris: Biodiversity in Hypogean Waters. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 141-142, New York, 2004.
- 12 - 467 Sket, Boris; Culver, David C.: *Biology of Caves*. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 148-151, New York, 2004.
- 12 - 468 Sket, Boris: Dinaric Karst: Biospeleology. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 289-291, New York, 2004.
- 12 - 469 Sket, Boris: Invertebrates: Minor Groups. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 457-459, New York, 2004.
- 12 - 470 Sket, Boris: Postojna-Planina Cave System: Biospeleology. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 603-604, New York, 2004.
- 12 - 471 Sket, Boris: Subterranean Habitats. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 709-713, New York, 2004.
- 12 - 472 Sket, Boris: Thermal Water Habitats. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 724-725, New York, 2004.
- 12 - 473 Sket, Boris: Vjetrenica, Bosnia-Herzegovina: Biospeleology. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 759-760, New York, 2004.

- 12 - 474 Song Linhua ; Liang Fuyuan ; Lin Junshue: Effect of natural factors on the environment of show caves. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 213-218, Postojna, 2004.**

The environmental changes in show caves have been of concern to the managers and speleo-scientists. Most scientists have recognised speleo-activities and tourist facilities as the main factors causing environment changes in show caves. In some case, natural factors strongly influence the cave environment. Heavy rainfall after long term drought causes a great amount of drops in Yaolin cave and CO<sub>2</sub> concentration was obviously increased from 490 ppm-800 ppm of October 30 (before raining) to 740 ppm - 1580 ppm of November 14, 1997 ( after raining). The measurement results show the temperature of drop water is 0.1 - 0.6<sup>o</sup> higher than the cave temperature. In the wet season, near 2000 rim pools were over flowing in the Rim Pool Hall of Huangxian Cave, Hubei, the average CO<sub>2</sub> content on October 6 was 2050 ppm, varying between 1800 ppm and 2300 ppm; the temperature was from 17.6<sup>o</sup> to 19.1<sup>o</sup>, average temperature 18.5<sup>o</sup>. While on August 20, 2001, when 90 % of the rim pools were dried out, it was only 950 ppm of average CO<sub>2</sub> concentration which varied from 900ppm to 1100 ppm, and the average temperature was 17.9<sup>o</sup>, fluctuating from 15.9<sup>o</sup> to 21.3<sup>o</sup>.

- 12 - 475 Song, Linhua; Lin, Junshu: Hongshui River Fengcong Karst, China. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 422-423, New York, 2004.**

- 12 - 476 Stepišnik, Uroš: Morphogenetic characteristics of Vrhnika collapse dolines. Naše jame, 34-48, Ljubljana, 2004.**

The author discusses the formation processes of Vrhnika collapse dolines. These processes can be roughly divided into processes of mass removal from the collapse doline, the processes of mass displacement inside the collapse doline and the processes of mass introduction from the surroundings into the collapse doline. The processes of mass introduction from the surroundings into the collapse dolines are discussed in detail, since they play a significant role in the formation of Vrhnika collapse dolines. These processes cause flattening of the collapse doline floors at approximately the same altitude. The floors are leveled by loamy sediment, deposited by floodwaters, which occasionally filled the collapse dolines. This process is still active inside the Grogarjev dol collapse doline and is the only known recent example of process of this kind on Slovenian karst.

- 12 - 477 Stepišnik, Uroš: The origin of sediments inside the collapse dolines of Postojna karst (Slovenia). Acta carsologica, 33/1, 237-244, Ljubljana, 2004.**

Several hundred collapse dolines are recorded on the Slovenian karst surface. Their floors are covered with boulders, scree or a soil layer. In ponor karst areas, where water transports significant amount of allochthonous material, many collapse doline floors are made level by deposits of loamy sediment.

This discussion relates to a detailed study of 15 collapse dolines near the Postojna cave system. Loamy sediment appears within several neighboring collapse dolines and covers their floors at approximately the same altitude. The sediment level preserved in the collapse

dolines is commonly at the same elevation as flood loam deposits within nearby caves. It transpires that the flattening of the collapse doline floors is a result of flooding inside the karst that extended above the original floors of the collapse dolines. It is possible to predict some of the sedimentation dynamics inside the karst on the basis of the elevations of the loamy sediments within the collapse dolines. On the other hand, it is also possible to find out about collapse doline development by studying the processes inside cave systems.

K.W: karst, collapse doline, cave sediment, Postojna karst.

- 12 - 478 Sulas, Antonello; Curreli, Roberto: Research into the long-term effects on the is Zuddas Caves caused by water extraction from the surrounding underground springs (Sardinia, Italy). In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 209-212, Postojna, 2004.**

The karstic system on the hill Monte Meana is separated in the paleozoic lithologies by a valley of tectonic origin. From a hydro-geological point of view, inside the Is Zuddas caves there is a phreatic system and a vadose system. This study was carried out subsequent to the completion of two drilled wells. Some flow tests were performed on these wells and were shown to have a flow rate of approximately 65 litres of water per second. Along with the sump a few wells that had been dug near the karstic complex were also monitored. The results were satisfactory since the water-table from which water was being extracted was not the same as that inside the cave or those in the nearby wells.

The future of engineering and technology for show cavern operations requires that we keep our development processes flexible to accommodate new and better future features, that can enhance the experience and lessen the impact on the cavern.

- 12 - 479 Szunyogh, Gábor: High-accuracy graphic representation of underground karst features and formations during cave mapping. Acta carsologica, 33/1, 319-328, Ljubljana, 2004.**

We attempt to develop a new method of cave mapping, which would be superior in terms of the amount and quality of the documented information, relative to the "standard" methods of cave survey. The method envisages that everything that can be seen in the cave which is being surveyed, e.g., corrosional features, cave formations, water bodies, fallen rock blocks, fractures in cave walls, artificial (engineering) structures, etc., must be represented on the map. The method employs the traditional system of map symbols; the accuracy of the produced map, however, approaches the accuracy of the engineering survey maps. The maps accurately render positions, shapes and dimensions of cave features: for example all stalagmites with diameters greater than ca. 10 cm, and all rock blocks with linear sizes exceeding 0.5 m are shown on the maps individually. In the report we will elaborate on the most important aspects of this mapping method, including stages of survey and mapping, system of drawing, map symbols.

K.W.: cave mapping, engineering, Baradla cave, Béke cave, cave atlas, detailed survey

- 12 - 480 Šajn, Srečko: Events in the Postojna Cave. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA**

**Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 103-106, Postojna, 2004.**

The Karst caves have always been mysterious places. Travelling underworld with a lit match or torch, whose faint, quivering light cast strange forms on the sinter walls and dripstone, was a unique and unforgettable experience. The nobility of the cave scenery, which could only have been created by nature, provides a perfect backdrop for events, which can further contribute to the enjoyment of “nature’s sculpture” (Henry Moore, Postojna Cave, 1955). When the luxuriant perfection of nature and the creativity of the artist take each other by the hand, the soul of the visitor must become enriched.

- 12 - 481 Šebela, Stanka: **The visit at the University of Bari and Karst Research in Apulia, Italy. Acta carsologica, 33/1, 329-332, Ljubljana, 2004.**  
K.W.: report

- 12 - 482 Šebela, Stanka; Kogovšek, Janja: **Postojna-Planina Cave System, Slovenia. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 601-603, New York, 2004.**

- 12 - 483 Tyc, Andrzej: **Cuba. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 271-272, New York, 2004.**

- 12 - 484 Tyc, Andrzej: **Europe, Central. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 331-333, New York, 2004.**

- 12 - 485 Vaupotič, Janja; Kobal, Ivan: **Unattached fraction of radon decay products as a crucial parameter for radon dosimetry in Postojna Cave. Acta carsologica, 33/1, 85-100, Ljubljana 2004.**

Short-term summer and winter monitoring was carried out at the lowest point in Postojna cave, on air concentrations on radon ( $C_{Rn}$ ) and radon decay products ( $C_{RnDP}$ ), the equilibrium factor (F) and unattached fraction of radon decay products ( $f_{un}$ ), barometric pressure (P), relative air humidity in the cave (RH) and air temperature outside ( $T_{out}$ ) and in the cave ( $T_{in}$ ), with the emphasis on  $f_{un}$ . Dose conversion factors (DCF) for mouth and nasal breathing were calculated from the  $f_{un}$  values (ranging from 0.10 to 0.68) and effective doses for the employees in the cave were obtained. These significantly exceed the doses based on the ICRP-65 methodology now in use.

K.W.: radon, radon decay products, unattached fraction, dose conversion factors, karstic caves.

- 12 - 486 Vías, J.M.; Andreo, B.; Perles, M.J.; Carrasco, F.; Vadillo, I ; Jiménez, P.: **The COP method. In: Vulnerability and risk mapping for the protection of carbonate aquifers. Action COST 620, 163-172, 2004.**

K.W.: Karst, groundwater, intrinsic vulnerability, COP method.

- 12 - 487 Williams, Paul: **Dolines. In: J. Gunn (Ed.) The Encyclopedia of Caves and Karst Science, Taylor and Francis - Routledge, 304-310, New York, 2004.**

- 12 - 488 Williams, Paul: Kaijende Arête and Pinnacle Karst, Papua New Guinea. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 467-468, New York, 2004.
- 12 - 489 Williams, Paul P.: Karst Evolution. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 475-478, New York, 2004.
- 12 - 490 Williams, Paul: New Zealand. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 540-544, New York, 2004.
- 12 - 491 Yuan, Daoxian; Cheng, Hai; Edwards, R. Lawrence; Dykoski, Carolyn A.; Kelly, Megan J.; Zhang, Meiliang; Qing, Jiaming; Lin, Yushi; Wang, Yongjin; Wu, Jaingyin; Dorale, Jeffery A.; An, Zhisheng; Cai, Yanjun: *Timing, Duration, and Transitions of the Last Interglacial Asian Monsoon*. Science, Vol. 304, 575-578, 2004.
- 12 - 492 Yuan, Daoxian: Yangshuo Karst, China. In: J. Gunn (Ed.) *The Encyclopedia of Caves and Karst Science*, Taylor and Francis - Routledge, 781-783, New York, 2004.
- 12 - 493 Zorman, Tomaž: Škocjasko Jame in the past and today. In: Zupan Hajna, Nadja (Ed.). *International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 111-116, Postojna, 2004.*  
 Visitors have been entering the Škocjanske jame since prehistoric times; the first arrangements for tourist visit were made in the late 19<sup>th</sup> century. A lot of effort was put into cutting tourist paths in rock walls and some of the paths are still used. The caves were included in the World Heritage List in 1986; since 1997 they have been managed by the Public Service Agency "Park Škocjasko jame, Slovenija". Now the management has two main goals that are not entirely compatible, which is likely to cause some ambiguities. On the one hand special stress has been laid on preserving natural environment and old technical achievements; on the other hand certain measures have to be taken to ensure safety of the visitors.
- 12 - 494 Zupan Hajna, Nadja: *Highlights of Karst and Caves in Slovenia*. In: Zupan Hajna, Nadja (Ed.). *International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 41-47, Postojna, 2004.*  
 In Slovenia karst covers 43 % of the surface; 35 % is on limestone and about 8 % on dolomite. Karst is developed in various carbonate rocks from Devonian to Miocene age. Slovenia, as a relatively small area, boasts numerous types of karst with all superficial and underground features, which are elsewhere in the world extended over several hundred kilometres. Related to geological, hydrological, morphological and landscape conditions in Slovenia karst is divided into three larger units: Alpine karst, Dinaric karst and intermediate pre-Alpine and pre-Pannonian isolated karst which are subsequently, due to morphological and hydrographical properties, subdivided into smaller regions. At this moment there are in the Cave Register of the Slovenian Speleological Association and Karst Research Institute

about 8000 caves. About 20 caves are arranged for tourist visits.

- 12 - 495 Zupan Hajna Nadja (Editor-in-chief), International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia; Postojnska jama, turizem, 1-239, Postojna, 2004.**

Collection of papers presented at 4<sup>th</sup> ISCA Congress at Postojna in 2002, where different authors presented the development of show caves and the use of new technologies in managing show caves, their presentation and new trends in their development. The other papers were about karst and show caves in Slovenia, developing of cave tourism and protection of cave environment in show caves.

- 12 - 496 Zupan Hajna, Nadja; Franjo Drole: Cave S 647 in the left tube of Kastelec tunnel. Naše jame, 45, 69-80, Ljubljana, 2004.**

During the construction of the tunnel Kastelec several caves were explored. The length of all new caves exceeds 500 m. In the left tube of the tunnel very interesting cave; S 647 is developed close to the natural cave Brezno na Škrklovci. The cave has no natural entrance, so it was protected against the influence from the surface. There are different sediments in the cave, flowstone as well as fluvial sediments, which are originating from the eroded flysch rocks. There are helictites and monocristalinic stalagmites, which express the special stable conditions of the cave. In the dried clays the calcite rafts were founded. The special entrance from the tunnel tube to the cave was builded.

- 12 - 497 Zupan Hajna, Nadja: Limestone and dolomite and the ways of their weathering. Naše jame, 45, 7-23, Ljubljana, 2004.**

As limestones and dolomites are transferred from the depositional environment into one with different physical and chemical parameters, they start to weather. Factors, which influence the weathering, are physical, chemical and biological. The most important are temperature, volume of precipitations, pH, organic matter, CO<sub>2</sub>, dissolved substances, the Ca/Mg ratio, the flow of the liquid, etc. The chemical weathering of limestone and dolomite is the most important factor for karst development.

- 12 - 498 Žumer, Jože: Guiding pupils in show cave Dimnice - almost 15 years of experience. In: Zupan Hajna, Nadja (Ed.). International Show caves Association. International Congress (4; 2002; Postojna). The use of modern technologies in the development of caves for tourism/4<sup>th</sup> International ISCA Congress, Postojna 21<sup>st</sup>-27<sup>th</sup> October 2002, Slovenia, Postojnska jama, turizem, 171-176, Postojna, 2004.**

At the last worldwide meeting of show cave managers in Postojna, almost 15 years ago, there was an intensive discussion about guiding pupils in show caves. Many problems were mentioned and few solutions seemed to be at hand. A successful attempt to solve many questions is presented after many years of experience. In the basic programme, the pupils are guided through the show cave Dimnice with fieldwork at stations characteristic from geomorphological, climatological, hydrological and biological points of view. In addition, another programme enables study of typical surface features and processes in combination with land use of the border karst on the contact of the flysch hills Brkini and karst valley Podgrajsko podolje.



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