

January 2003

## **Acta carsologica Annotated bibliography of karst publications, no. 11**

Inštitut za raziskovanje krasa (Slovenska akademija znanosti in umetnosti)

Andrej Kranjc

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ACTA CARSOLOGICA

Volume 32 (2003), No. 1  
Letnik 32 (2003), Št. 1

SUPPLEMENTUM I



**ACTA CARSOLOGICA** is included into:

- Index to Scientific & Technical Proceedings® (ISTP®)
- Index to Social Sciences & Humanities Proceedings® (ISSHP®)

of Institute for Scientific Information (Philadelphia).

- *Ulrich's<sup>TM</sup>* International Periodicals Directory.

ISSN 1580-8157

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SLOVENSKA AKADEMIJA ZNANOSTI IN UMETNOSTI  
ACADEMIA SCIENTIARUM ET ARTIUM SLOVENICA

RAZRED ZA NARAVOSLOVNE VEDE  
CLASSIS IV.: HISTORIA NATURALIS

ZNANSTVENORAZISKOVALNI CENTER SAZU  
INŠTITUT ZA RAZISKOVANJE KRASA - INSTITUTUM CARSOLOGICUM

# ACTA CARSOLOGICA

Vol. 32 - No. 1  
2003  
Supplementum I

## **Annotated Bibliography of Karst Publications**

### **No. 11**

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

Collected and edited by  
Andrej Kranjc



LJUBLJANA  
2003

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Distribucija in prodaja - Ordering address:

Založba ZRC/ZRC Publishing

Gosposka 13, P.O.Box 306, SI-1001 Ljubljana, Slovenia

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Naslov uredništva - Editor's address:

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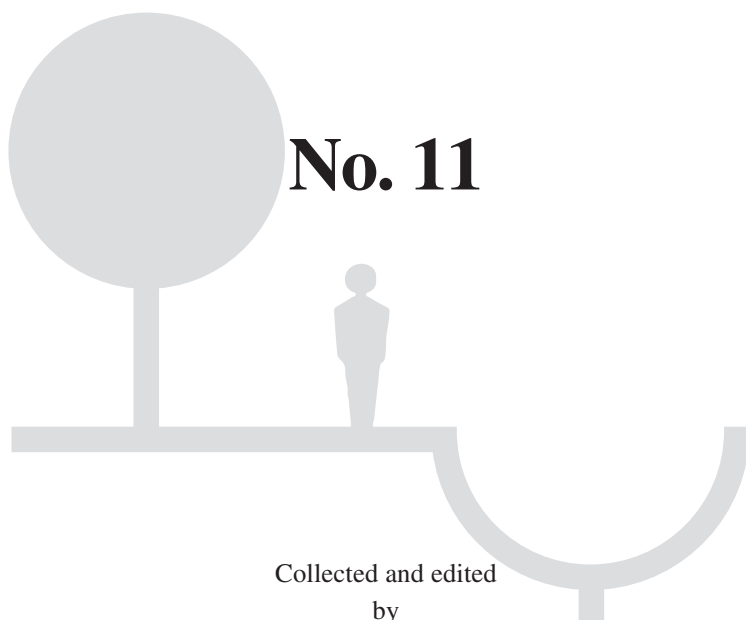
Tiskano s finančno pomočjo

Ministrstva za šolstvo, znanost in šport RS

Published by the financial assistance of  
Ministry of Education, Science and Sport RS

Chairman John Gunn  
Karst Commission  
International Geographical Union  
Association of the Geographical Societies of Slovenia

# **Annotated Bibliography of Karst Publications**



**No. 11**

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**ANDREJ KRANJC**

Karst Research Institute  
ZRC SAZU  
Postojna

**May, 2003**



## FOREWORD

This is the eleventh annual bibliography of global karst research published by members of the IGU Karst Commission and the seventh that it has been my pleasure to write the Foreword for. The Commission has one more year to run before the 30<sup>th</sup> Congress of the International Geographical Union at which the Executive will decide whether our Commission should continue. It is my hope that the evidence of the many publications listed in this and previous volumes, together with the forthcoming Encyclopedia of Caves and Karst Science which has many contributions from geographers as well as from colleagues in many other disciplines, will help to convince the Executive of the importance of having a Karst Commission within the IGU.

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. They are usually published within 6-8 months of year-end to ensure that colleagues, and particularly those who have restricted access to international journals, are kept aware of information of relevance to their own studies. Subsidies mean that the Bibliography can be distributed free to any member requesting a copy, and back issues of most issues are also available from myself. In previous Forewords I discussed the possibility of moving to purely electronic publication but there appears to be a continued demand for hard copy which we are pleased to meet. It is our intention to publish a 12<sup>th</sup> issue in 2004 and to make this a special issue for the IGC. Hence, I repeat my annual plea to members to keep sending hard copies of their publications to Andrej Kranjc, together with the abstract as an electronic file. If you have publications that appeared during the lifetime of the present commission (2000 - 2004) and which have not previously been recorded in our Bibliography will you please also send those to Andrej for inclusion in the 2004 special issue!

Finally, I would like to express my thanks to Andrej Kranjc and his colleagues at the Karst Institute, Postojna, for collecting and editing the material published in 2002 and to the board of Acta Carsologia for allowing the Bibliography to be published as a supplement.

April, 2003

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## YEAR 2001

- 11-1 Bognolo, Marco: Beetles (Insecta: Coleoptera) in the caves of the Sežana Karst. Naše jame, 43, 128-134, 2001.**

Between autumn 1999 and spring 2000 six caves have been investigated in the karst area near Sežana, both searching by hand and using traps for beetles (Coleoptera). Eventually, 22 species have been recorded, mostly belonging to the family Carabidae; one cholevid and two carabid beetles were actually troglobiontic, all the other species were troglophilic or accidental ones. Some details about the ecology and taxonomy of both species of the genus *Anopthalmus* are presented.

- 11-2 Celarc, Bogomir: Surveying the deep of cave Čehi 2 with barometer. Naše jame, 43, 85-90, 2001.**

The results of surveying the deep of cave Čehi 2 (Slovenija, Rombon) with barometer (height meter) Suunto, during the Speleological association of Slovenia expedition in November 2001, are presented. The results show quite good match with classical measurements.

- 11-3 Clarke, A.: Glow-worms in Tasmania. Australian Caver, No. 155. 17-21, 2001.**

The Tasmanian glow-worm, *Arachnocampa tasmaniensis*, is one of three Australian species. The glow-worm is the larval stage, which lasts 9 months to more than a year. They live inside long thin tubes of mucus and silk which trap flying insects. Their bioluminescence is used to attract prey.

- 11-4 Culver, David C ; Sket, Boris: Biološko zasledovanje stanja (monitoring) v jamah. Biological monitoring in caves (Abstract). Kras (Ljubljana), 49 (November 2001): 35-36, 2001.**

- 11-5 Fet, Viktor ; Kuntner, Matjaž ; Sket, Boris: Scorpions in Slovenia: a faunistic and biogeographical survey. In V. Fet & P.A. Selden (eds), Scorpions 2001. In Memoriam Gary A. Polis, pp. 255-265. 2001.**

- 11-6 Gams, Ivan ; Jože Gustinčič: Effects of winter cool air on speleothem (case of Divača, Vilenica and Gustinčič caves, classical Karst, Slovenia). Naše jame, 43, 8-23, 2001.**

Temperature and humidity of air penetrating in the old touristic Divača and Vilenica caves (and with it connected Gustinčič cave) through their karst windows were measured in the middle of the cold winter 2001/2002. Warming of air currents in the caves causes evaporation of the speleothem moisture thus effecting its colour and minor forms, in some cases also flowstone weathering. Indicated is dilemma, should man who worsened the natural air conditions for speleothem growth and colour repair his mistake or not.

- 11-7 Goldie, Helen S. ; Marker, Margaret: Pre-Devensian dolines above Crummockdale, northwest Yorkshire, UK. *Cave and Karst Science*, 28, 2, 53-58, 2001.**  
K.W.: doline, sediment, loess, mature karst, Yorkshire, UK.
- 11-8 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.**  
Landform evolution around the Mt Field Plateau has been strongly influenced by multiple stages of cold glacial climate. Only small glaciers were present during the late Last Glacial or Global Isotope Stage 2, but degraded moraines and the distribution of erratics indicate that ice cover was more extensive earlier when ice and meltwater invaded neighbouring karst areas and meltwater streams deposited gravel in caves. Weathering evidence suggests a significant glacial advance during Global Isotope Stage 4. Uranium-thorium dating of speleothems associated with gravels in proglacial caves suggests a major phase of gravel aggradation that post-dates Global Isotope Stage 5 and pre-dates Global Isotope Stage 2.
- 11-9 Kos, A.M.: Stratigraphy, sedimentary development and palaeoenvironmental context of a naturally accumulated pitfall cave deposit from southeastern Australia *Australian Journal of Earth Sciences*. 48(5): 621-632, 2001.**  
McEachern's Deathtrap Cave (G-49/50) is located in the Lower Glenelg region of southeastern Australia and records a Late Pleistocene to Holocene sedimentary record that has been directly influenced by surface processes during its formation. The sedimentary sequence contained within the cave is divided into lower, middle and upper sequences consisting of eight facies. The lower sequence represents the earliest phase of sedimentation, and groundwater fluctuations during the Last Interglacial period resulted in its erosion and redistribution deeper into the cave system. A decrease in the magnitude and frequency of flood events in the cave during the formation of the middle sequence indicates increasingly drier surface conditions prior to the Last Glacial Maximum. The middle sequence has a minimum age of 9840 +/- 290 a BP. Moving sand sheets during the Last Glacial blocked the entrance to the cave allowing flowstones to develop on the cave floor. The surface environment surrounding the cave was probably not as dry as contemporaneous inland sites because sedimentation continued to be dominated by flowing water during this period. Holocene sedimentation is represented by the upper sequence and reflects wetter cave conditions between 7680 +/- 160 a BP and 5700 +/- 110 a BP. A major phase of sediment accretion occurs after 5700 a BP and correlates to a phase of dune instability in the Lower Glenelg region. Flowing water remodelled the sediment cone sometime after 2240 +/- 100 a BP, which represents a period of increased surface runoff, although it is not clear whether this is due to climatic or anthropogenic influences.  
K.W.: caves, McEachern's Deathtrap Cave, palaeoenvironment, sedimentary history, stratigraphy, Victoria.
- 11-10 Mihevc, Andrej: Kačna jama - fojba. Naše jame, 113-118, 2001.**  
K.W.: cave use.

- 11-11 Orndorff, Randall C. ; Weary, David J. ; Šebela, Stanka: The geologic framework of karst in the Ozark Plateaus of South-Central Missouri. *Journal of Cave and Karst Studies of the National Speleological Society*, vol. 63, number 3, 114, 2001.**  
A regional geologic framework is required to understand the environmental impact of mining of lead and zinc proposed on large springs in the karst area of the Ozarks Plateaus of south-central Missouri. Information about lithologies, faults, joints, and karst features (sinkholes, caves, and springs) contributes to the development of a conceptual model of karst hydrogeology of the Ozarks. Conduits and caves along bedding planes and joints provide avenues for groundwater recharge, movement, and discharge. The trend of joints was studied to determine if they controlled orientation of cave passages and conduits.
- 11-12 Sket, Boris: An alternative biogeographical regionalization of Slovenia (as a possible clue for surrounding countries). *Annales (Koper), Series historia naturalis*, 11(1): Supplement-Abstracts, p. 7., 2001.**
- 11-13 Sket, Boris: The hydropetric habitat in caves and its inhabitants. Abstracts of the XV<sup>th</sup> International Symposium of Biospeleology, pp. 42-43, 2001.**
- 11-14 Sket, Boris ; Dovč, Peter ; Jalžić, Branko ; Kerovec, Mladen ; Kučinić, Mladen ; Trontelj, Peter: A cave leech (*Hirudinea*, *Erpobdellidae*) from Croatia with unique morphological features. *Zoologica Scripta*, 30(3): 223-229, 2001.**
- 11-15 Sket, Boris ; Draslar, Kazimir ; Drobne, Damjana ; Trontelj, Peter: Troglomorphism in leeches (*Annelida*: *Hirudinea*). Abstracts of the XV<sup>th</sup> International Symposium of Biospeleology, pp. 43-44, 2001.**
- 11-16 Šušteršič, France ; Čar, Jože ; Šebela, Stanka: Collector channels and deflector faults. *Naše jame*, 43, 8-22, Ljubljana, 2001.**  
Collector channels gather sinking underground streams in some Slovenian caves and redirect them for a long distance parallel to the polje margin. They have been formed due to permanent collapsing of the cave roof on the locations where they break through certain faults. These faults function like some kind of screens and they were termed deflector faults. They are marked by collapsing within the caves, and by collapse dolines on the surface. In two cases (Karlovice, Logarček) they are early Tertiary.
- 11-17 Trontelj, Peter ; Sket, Boris: Evolution of subterranean lifestyle in the leech genus *Dina*. Abstracts of the XV<sup>th</sup> International Symposium of Biospeleology, p. 45, 2001.**
- 11-18 Trontelj, Peter ; Verovnik, Rudi ; Sket, Boris: Cryptic speciation in Dinaric karst waters: molecular approaches reveal a new dimension of diversity. *Annales (Koper), Series historia naturalis*, 11(1): Supplement-Abstracts, p. 12., 2001.**

- 11-19 Verovnik, Rudi ; Trontelj, Peter ; Prevorčnik, Simona ; Sket, Boris: Speciation and recurrent cave invasions of *Asellus aquaticus* (Crustacea: Isopoda) in Slovenian karst as revealed by molecular markers. Abstracts of the XV<sup>th</sup> International Symposium of Biospeleology, p. 69, 2001.**
- 11-20 Vrhovec, Tomo ; Mihevc, Andrej ; Lauritzen, Stein Erik ; Lundberg Joyce: O starosti potopljenih stalaktitov v potopljeni jami pri otoku Galiola, Dalmacija, Hrvatska. Naše jame, 43, 31-37, 2001.**  
 In a submerged cave situated at Galiola, an islet near the island of Ist, Croatia, stalactite samples have been taken from depths of 15, 30 and 60 m. The dates obtained by the method of  $^{230}\text{Th}/^{234}\text{U}$  dating by counting alpha particles and using mass spectrometry indicated the ages of 293  $\pm$  211 -76 ka, 155  $\pm$  35 -27 ka, and more than 500 ka. Part of the sample material had to be rejected. The accuracy of the results is questionable due to the material, not entirely suitable for dating, and due to possible leaching of some uranium isotopes. According to the analyses, the samples are of great age. It may be concluded that speleothems from the submerged cave were not deposited during the last glaciation. They might have been formed in any of the preceding glacial periods or might have reached the present locality due to gradual sinking of the entire region.
- 11-21 Wiśniewski, Wojciech W.: [Speleological entries]. In: Popularna encyklopedia powszechna [The Popular Universal Encyclopaedia], ed. Forga, Bertelsmans Media, vol. 2, vol. 3. vol. 4, vol. 5, Kraków, 2001.**  
 vol. 2 - Baradla, Berger, Bielska Jaskinia, Boa Vista, Bou'Maza, Bozkowské dolomitové jeskyně, Brzozowa Jaskinia, Bullita Cave System, Bushmansgat, Carlsbad Caverns;  
 vol. 3 - Chelosiowa Jama, Cheve Sistema, Ciemna Jaskinia, Clearwater cave, Czarna Jaskinia, Dahredj, Darad, Demianowska Jaskinia, Dent de Crolles Réseau, Diabla Dziura w Bukowcu, Diktajska (Dhíktaio Andro), Dobosza Jaskinia, Dobszyńska Jaskinia Lodowa, Doux de Coly, Drach Cueva del, Drachenhauchloch, Duchłata, Dunaju Ponory, Dziura, Dziura w Dursztynie;  
 vol. 4 - Eagles Nest Cave, Ecos Gruta dos, Eisriesenwelt, Ejletyi Jaskinia, El Sótano, Fantastic Cavern, Faouar Dara, Feengrotten, Fighiera-Corchia, Fingala Cave, Font-de-Gaume, Franchthi, galeria jaskiniowa [cave gallery], Gamble's Cave, Gangusiowa Jama, Garma Cuvea la, Geldloch, Gigante Grotta, gipsowy kras [gypsum karst], Golondrinas Sótano de las, Gorgothakas, Goryczkowe Wywierzysko;  
 vol. 5 - Grand Cor Gouffre du, Grindului Avenul de sub, grota, "Grotolaz", Grzmiączka, Guácharo Cueva del, Hadessschacht, Hang Khe Rhy, Han-sur-Lesse, Hermannshöhle, Hirlatzhöhle, Hranická propast, Huautla Sistema, Humpleu Sistemul, Ilune Codule, Imotski crveno, Ispinigoli Grotta di, Jägerbrunntröghöhle, Jagodinska Peszczera.

## YEAR 2002

- 11-22 Ahmadipour, Mohamad Reza: The Role of Sarvak Formation in Supplying Pol-e Dokhtar Town (Iran) with Drinking Water. Acta carsologica, 31/2, 93-103, Ljubljana, 2002.**  
The Sarvak formation is the most karstified formation of the Bageston group, NW from town Pol-e Dokhtar. Its southern limb is karstified and the most important for the ground water. Three wells were drilled for supplying the drinking water to Pol-e Dokhtar. The pumping test (72 hours) was carried out. Analyses of oxygen-18 and deuterium indicated that the water is of meteoric origin. Water from the well1 has the minimal and from the well3 maximal concentrations of tritium which indicate different residence time. Chemical analyses show that the water is of  $\text{Ca} > \text{Mg} > \text{Na}$  and  $\text{HCO}_3 > \text{SO}_4 > \text{Cl}$  type. During the drilling water samples had relatively high  $\text{NO}_3$  (27 mg/l), which was reduced due to the protection of the area from agricultural activities. Due to this study, the town of Pol-e Dokhtar, which was facing serious problem of drinking water since before the Islamic Republic of Iran, has been solved.
- 11-23 Angelova, D.M.: Technogenic changes in the Zlatitsa-Pirdop graben system (Bulgaria). DepoTech 2002, 415-419, Leoben, 2002.**  
K.W.: ecology, copper, water pollution.
- 11-24 Aničić, Bogoljub: Sedimentne kamnine ali usedline. Dolomit. Proteus, 64, 316-319, Ljubljana, 2002.**  
K.W.: dolomite, genesis.
- 11-25 Appleyard, Steve: Palaeokarst in the Noondine Chert in Southwestern Australia: Implications for Water Supply and the Protection of Biodiversity. Helictite, 38(1): 17-19, 2002.**  
In southwestern Australia, karst features occur in geological formations other than the coastal calcarenites of the Tamala Limestone. The Noondine Chert was formed by the silicification of carbonate rocks and contains relict carbonate textures and palaeokarst features such as intense brecciation and the presence of subsurface voids. This geological formation is an important aquifer to the east of the Perth Basin where groundwater resources are otherwise limited, and the aquifer is highly vulnerable to contamination from agricultural land use. The Noondine Chert may also contain a rich stygofauna. This has not been taken into account in groundwater protection policies, and needs to be assessed as a matter of urgency.
- 11-26 Atapour, H. ; Aftabi, A.: Geomorphological, geochemical and geo-environmental aspects of karstification in the urban areas of Kerman city, southeastern, Iran. Environmental Geology, 42, 783-792, s.l., 2002.**  
K.W.: man's impact, subsidence.

- 11-27 Audra, Philippe ; Bigot, Jean-Yves ; Mocochain, Ludovic: Hypogenic caves in Provence (France). Specific features and sediments. Acta carsologica, 31/3, 33-50, Ljubljana, 2002.**  
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.
- 11-28 Audra, Philippe: Annotated bibliography of karst publications, 2001, n.9.-Karstologia, 39, 62, s.l., 2002.**  
K.W.: book report.
- 11-29 Baldini, James U. ; McDermott, F. ; Fairchild, Ian J.: Structure of the 8200-Year Cold event Revealed by a Speleothem Trace Element Record. Science, 296, 2203-2206, 2002.**  
K.W.: speleothem, trace elements, 8200-year cold event, Ireland.
- 11-30 Bayari, Serdar C.: A rare landform: Yerköprü travertine bridges in the Taurids karst range, Turkey. Earth Surface Processes and Landforms, 27, 577-590, s.l., 2002.**  
K.W.: algae, travertine, natural arch.
- 11-31 Bella, Pavel ; Gažík, Peter: Študijná cesta po krase a sprístupnených jaskyniach južných oblasti Japonska.- Aragonit, 7, 47-52, Liptovski Mikulaš, 2002.**  
K.W.: report, speleotourism.
- 11-32 Bella, Pavel ; Kensaku, Urata: Ovalne stropne kupolovité a kominovité vyhlbeniny v Jasovskej jaskyni. Aragonit, 7, 4-7, Liptovski Mikulaš, 2002.**  
K.W.: rock relief, speleomorphology.
- 11-33 Bella, Pavel ; Kensaku, Urata: Podsedimentové korozné tvary skalného georeliefu v Ochtinskej aragonitovej jaskyni. Aragonit, 7, 8-11, Liptovski Mikulaš, 2002.**  
K.W.: rock relief, solution.
- 11-34 Bella, Pavel ; Mihevc, A.: Speleogeneza Divaškega krasa. Aragonit, 7, 64-65, Liptovski Mikulaš, 2002.**  
K.W.: book review.
- 11-35 Bella, Pavel: Medzinárodná konferencia “Monitoring v krasových jaskyniach” (Škocjanske jame, 2001). Aragonit, 7, 60-61, Liptovski Mikulaš, 2002.**  
K.W.: report on conference.
- 11-36 Bella, Pavel: Sprístupnené jaskyne v okolí Belo Horizonte (Minas Gerais, Brazília). Aragonit, 7, 52-53, Liptovski Mikulaš, 2002.**  
K.W.: speleotourism.

- 11-37 Berov, B.L. ; Angelova, D.M.: Risk assessment and remediation of the mining complex in the northeastern part of the Sofia valley, Bulgaria. DepoTech 2002, 145-150, Leoben, 2002.**  
K.W.: geodynamics, subsidence, man's impact.
- 11-38 Berstad, Ida M ; Lundberg, Joyce ; Lauritzen, Stein-Erik ; Linge, Henriette: 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.**  
K.W.: Norway speleothem, oxygen isotopes, TIMS, Quaternary, paleoclimate, MIS 9, MIS 11, MIS 13, MIS 15.
- 11-39 Binet, S. ; Mudry, J. ; Guglielmi, Y.: Toward a methodology to quantify recharge and behaviour of Mediterranean karst aquifers from ground water measurements.- Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., -122, Malaga, 2002.**  
K.W.: conceptual model, methodology.
- 11-40 Bognar, Andrija/Edit.: Geomorphology of the Dinaric Mountain Belt in Croatia (Some examples). Excursion Guide-Book Carpatho-Balkan Workshop, 102 pp., Zagreb, 2002.**  
K.W.: karren, national park.
- 11-41 Bogolubov, A.N. ; Kamshilin, A.N. ; Volkova, E.N.: Possibilities of geoelectrical and seismo-electrical monitoring in investigations of the karst phenomena. Environmental Geology, 41, 760-764, s.l., 2002.**  
K.W.: geoelectrics, monitoring, methodology.
- 11-42 Bohnert, Jürgen: Ergebnisse der Tauchforschungen der Arbeitsgemeinschaft Blautopf in der Blautopfhöhle (7524/34) von 1997 bis 2001.- Mitteilungen des Verbandes der deutschen Höhlen- und Karstforscher, 48, 10-17, München, 2002.**  
K.W.: cave diving.
- 11-43 Bosák, Pavel: Karst processes from the beginning to the end: how can they be dated? Institute of Geology, Academy of Sciences of the Czech Republic, Rozvojová 135, 165 02 Praha 6, Czech Republic, 2002.**  
Determining the beginning and the end of the life of a karst system is a substantial problem. In contrast to most of living systems development of a karst system can be „frozen“ and then rejuvenated several times (polycyclic and polygenetic nature). The principal problems may include precise definition of the beginning of karstification (e.g. inception in speleogenesis) and the manner of preservation of the products of karstification. Karst evolution is particularly dependent upon the time available for process evolution and on the geographical and geological conditions of the exposure of the rock. The longer the time, the higher the hydraulic gradient and the larger the amount of solvent water entering



the karst system, the more evolved is the karst. In general, stratigraphic discontinuities, i.e. intervals of nondeposition (disconformities and unconformities), directly influence the intensity and extent of karstification. The higher the order of discontinuity under study, the greater will be the problems of dating processes and events. The order of unconformities influences the stratigraphy of the karst through the amount of time available for subaerial processes to operate. The end of karstification can also be viewed from various perspectives. The final end occurs at the moment when the host rock together with its karst phenomena is completely eroded/denuded. In such cases, nothing remains to be dated. Karst forms of individual evolution stages (cycles) can also be destroyed by erosion, denudation and abrasion without the necessity of the destruction of the whole sequence of karst rocks. Temporary and/or final interruption of the karstification process can be caused by the fossilisation of karst due to loss of its hydrological function. Such fossilisation can be caused by metamorphism, mineralisation, marine transgressions, burial by continental deposits or volcanic products, tectonic movements, climatic change etc. Known karst records for the 1<sup>st</sup> and 2<sup>nd</sup> orders of stratigraphic discontinuity cover only from 5 to 60 % of geological time. The shorter the time available for karstification, the greater is the likelihood that karst phenomena will be preserved in the stratigraphic record. While products of short-lived karstification on shallow carbonate platforms can be preserved by deposition during the immediately succeeding sea-level rise, products of more pronounced karstification can be destroyed by a number of different geomorphic processes. The longer the duration of subaerial exposure, the more complex are those geomorphic agents. Owing to the fact that unmetamorphosed or only slightly metamorphosed karst rocks containing karst and caves have occurred since Archean, we can apply a wide range of geochronologic methods. Most established dating methods can be utilised for direct and/or indirect dating of karst and paleokarst. The karst/paleokarst fills are very varied in composition, including a wide range of clastic and chemogenic sediments, products of surface and subsurface volcanism (lava, volcanoclastic materials, tephra), and deep-seated processes (hydrothermal activity, etc). Stages of evolution can also be based on dating correlated sediments that do not fill karst voids directly. The application of individual dating methods depends on their time ranges: the older the subject of study, the more limited is the choice of method. Karst and cave fills are relatively special kinds of geologic materials. The karst environment favours both the preservation of paleontological remains and their destruction. On one hand, karst is well known for its richness of paleontological sites, on the other hand most cave fills are complete sterile, which is true especially for the inner-cave facies. Another problematic feature of karst records is the reactivation of processes, which can degrade a record by mixing karst fills of different ages.

**11-44 Bosák, Pavel ; Hercman, Helena ; Mihevc, Andrej ; Pruner, Petr: High-resolution magnetostratigraphy of speleothems from Snežna jama, Kamnik-Savinja Alps, Slovenia. *Acta carsologica*, 31/3, 15-32, Ljubljana, 2002.**

The Snežna jama Cave is located in the Kamnik-Savinja Alps, NE Slovenia, in a Raduha Ridge. The cave is a huge, more or less horizontal fossil phreatic/epiphreatic conduit. It is penetrated by vertical shafts - invasion vadose (proglacial) caves. Close to the cave en-

trance, there is about 3 m high wall composed of speleothems - a complex sequence of flowstone with numerous breaks in deposition, six of them are principal. The lower part of the profile (about 85 cm) contains abundant terrigenous component (terra rossa-derived clay). Stalagmites developed in several periods are completely buried by nearly horizontal younger sequences of flowstone. Continuous speleothem log was recovered from the profile in a total length of about 2.4 m. The rock column was cut to cubes in the laboratory (2x2x2 cm) and studied both by thermal demagnetisation (23 samples, 12 steps - 20 to 620 °C) and alternating field method (98 samples, 14 steps - 1 to 100 mT). Magnetic properties identified the lithological boundary. In contrast to the upper part, the lower one shows both higher magnetic susceptibility and higher remanent magnetisation. The turn point can indicate important palaeogeographical change. Magnetostratigraphic log is composed of 7 normal and 6 reverse polarised magnetozones. The age of speleothems detected by the U-series alpha-counting spectrometry falls outside the method range, i.e. over 350 ka. Uranium isotopic equilibria indicate the age over 1.2 Ma. The age of the fill is pre-Quaternary, clearly older than 1.77 Ma. The most probable age from correlation with geomagnetic polarity timescales is about 3.0 to 5.0 or 1.8 to 3.6 Ma. Both possibilities can indicate the growth rate of speleothems of about 1.1 to 1.3 m per 1 Ma. The age of speleogenesis can be compared to some of unroofed caves in the area of the Classical Karst (SW Slovenia) connected with the Messinian period. Snežna jama was uplifted to high altitudes by younger (Plio-Pleistocene) uplift of the Alpine chain.

- 11-45 Bosák, Pavel ; Mylroie, John E. ; Hladil, Jindřich ; Carew, James L. ; Slavík, Ladislav: Blow Hole Cave: An unroofed cave on San Salvador Island, the Bahamas, and its importance for detection of paleokarst caves on fossil carbonate platforms. Acta carsologica, 31/3, 51-74, Ljubljana, 2002.**

The comparative study of a Quaternary carbonate platform (San Salvador Island, the Bahamas) and a Devonian Carbonate Platform (Krásná Elevation, Moravia) indicates a great similarity in karst evolution. Caves on both sites are interpreted as flank margin caves associated with a freshwater lens and halocline stabilised during sea-level highstands. The sedimentary fill of both caves is genetically comparable - beach and aeolian sediments with bodies of breccias.

- 11-46 Bozeman, Sue: The Selman Cave System: An Historical Perspective. NSS News, 60, 192-195, Huntsville, 2002.**

K.W.: speleological description + cave survey.

- 11-47 Brenčič, Mihael ; Prestor, Joerg ; Rikanovič, Rada ; Urbanc, Janko: Podzemna vodna telesa v okviru evropske direktive o vodah. Strokovni seminar Vodni dnevi 2002. Zbornik referatov, 91-102, Portorož, 2002.**

K.W.: hydrogeology, legislation.

- 11-48 Brilly, M. ; Mikoš, M. ; Petkovšek, G. ; Šraj, M. ; Kogovšek, J. ; Drobne, D. ; Štravs, L.: The experimental monitoring of the water regime in the Reka river. Acta carsologica, 31/1, 65-74, Ljubljana, 2002.**

The river Reka, with 422 square kilometres of drainage area sinks into the Škocijan Cave system, which was proclaimed by UNESCO as a World Heritage Site in 1986. In the seventies, the Reka river was one of most polluted rivers in Slovenia. During floods in 1999 and 2000, experimental measurements of velocity, water level, suspended sediment transport, chemical parameters and toxicity tests were conducted. The main tasks in the first stage of the investigation: check the equipment in field conditions and test the toxicity of water in particular cross sections. In the paper, the measurements and some discussion of the results and applicability of equipment are presented.

- 11-49 Burger, Paul: Pushing in the Deep South: Wind Cave's Southern Comfort. NSS News, 60, 207-213, Huntsville, 2002.**  
K.W.: cave exploration.

- 11-50 Buzjak, Nenad: Speleological features of "Žumberak-Samoborsko gorje" Nature Park. Geoadria, Volumen 7/1, 31-49, Zadar, 2002.**

The area of "Žumberak-Samoborsko gorje" Nature Park is located in the NW part of Croatia. Most of its area (333 km<sup>2</sup>) is built of karstifiable carbonate beds (limestones, dolomites and breccias) of Triassic, Jurassic and Cretaceous age. Due to its small thickness the depth of karstification is also small. Due to large areas build of less permeable beds (dolomite) and often alternation of permeable and less permeable/impermeable beds there are large areas of fluviokarst. The whole area is mostly rich in karst phenomena (dolines, blind valleys, caves and pits). The fluvial network is significant only in the areas with bigger share of less permeable or impermeable beds (Permian and Triassic mostly). In karst areas underground drainage predominates. In the article the characteristics of 51 speleological features were analyzed. Among them there are 25 caves and 26 pits. The length of caves is between 5 m and 1862 m, but short caves (up to 50 m long) predominate. Similar situation is in the case of the pits which are -5 to -49 m deep. According to passage morphology simple speleological features (only one main passage without any longer lateral passages) are the main type there. Speleological features were mostly developed in Upper Cretaceous limestone and breccia beds (33 caves and pits). In these beds the most complex caves occur. Although Middle and Upper Triassic dolomite covers most of the research area there is only 10 analyzed features developed. The reasons in its composition and its smaller resistance to mechanical weathering. In the dolomite there is more caves than pits. They are mostly of small depth and length. The passages are mostly of fissure cross-section and determined by fissure direction and dip. The passage widening occurs in places of fissure intersections or was determined by the dip of the strata (where the traces of more intensive denudation and breakdowns are clearly observable). In all caves and pits man can find all types of allochthonous and autochthonous sediments. The most present are cave clay, sand, pebble and rock debris. The first three sediment types as typical alluvial deposits occur in or near the beds of recent- and paleo streams. The rock debris and larger blocks were mostly produced in the underground by neotectonic movements or cryogenic process near the entrance. The occurrence of flowstone in larger amounts is mostly rare. Most of the speleological features have water only in form of dripping water. There are 6 caves with periodically water flow. 19 caves and pits are without any

water. According to its hydrogeological role in the regional karst drainage system there are periodical (4) and permanent (2) springs, periodical (2) and permanent (2) ponors and flowthrough caves (3).

- 11-51 Calitz, F.: Evaluation of the risk of the formation of karst-related surface instability features in dolomite strata occurring in the Lebowaqomo area, Republic of South Africa. *Environmental Geology*, 42, 499-504, s.l., 2002.**

K.W.: mapping, dolomite, collapse.

- 11-52 Cancian, Graziano ; Princivalle, Francesco: Caratteristiche mineralogiche delle argille di grotta nella Valle dello Judrio. La valle dello Judrio. Progetto di ricerca speleologica Judrio 2000, 119-130, Gorizia, 2002.**

K.W.: mineralogy, filosilicate.

- 11-53 Caresio, Giulio: Terra d'incanto.- Piemonte parchi. Speciale Parchi Europa, 17, suppl.1, 21-24, Torino, 2002.**

K.W.: speleotourism, park.

- 11-54 Carrasco, F.: Karst y medio ambiente. Perspectiva desde Andalucia (Espana). Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 19-29, Malaga, 2002.**

K.W.: regional karstology, nature protection, heritage.

- 11-55 Carrasco, Francisco ; Vadillo, Iñaki ; Liñán, Cristina ; Andreo, Bartolomé ; José Durán, Juan: Control of environmental parameters for management and conservation of Nerja Cave (Malaga, Spain). *Acta carsologica*, 31/1, 105-122, Ljubljana, 2002.**

The Nerja Cave receives on average more than 500,000 visitors per year. In order to know the possible impact in the underground environment by human visits, a monitoring network was installed since 1993, to control hourly several parameters. Also, since 1991 a hydrochemical control has been carried out in the drip water points of the cave and in the natural discharge points of the carbonate aquifer. This continuous record of physical-chemical parameters of drip water, its daily outflow, as well as temperature and relative humidity in the air, CO<sub>2</sub> concentration and rock temperature shows the human influence. The main changes in environmental parameters are the following: 1. cave air temperature rises 0.2 °C by 1000 visitors/day; 2. a daily increase between 2 and 3 % in relative air humidity, reaching saturation on summer days; 3. CO<sub>2</sub> concentration in air increases up to values between 500 and 700 ppm during low visitability periods and 10 times the background value during high visitability periods (2.800 ppm); 4. temperature of the rock rises between 0.02 °C and 0.15 °C/day, and (5) P<sub>CO2</sub> of drip water also presents variations, increasing during the big influx of visits and decreasing the saturation index of carbonated minerals.

- 11-56 Castiglioni, B. ; Sauro, U.: Paesaggi e geosistemi carsici: proposte metodologiche per una didattica dell'ambiente. (Engl. title: Karst landscapes and geo-ecosystems: methodological proposal for a didactics on the natural environments) In: Varotto M. & Zunica M. (a cura di) - Scritti in ricordo di Giovanna Brunetta. Dipartimento di Geografia »G. Morandini«, Università di Padova, 51-67, 2002.**

The concept of geo-ecosystem with special reference to the karst systems, of their components, processes and fluxes is discussed. Some conceptual itineraries for the studying and modelling of a karst geo-ecosystem are outlined. Examples of modelling and didactic applications are proposed.

- 11-57 Celarc, Bogomil: Primarne stenske oblike. Planinski vestnik, 102, 44-45, Ljubljana, 2002.**

K.W.: geology, primary rock feature.

- 11-58 Christenson, Keith: Expedition Chiriqui 2001, Western Panama. NSS News, 60, 4-9, Huntsville, 2002.**

K.W.: speleological expedition.

- 11-59 Cigna, Arrigo A. (Ed.): Monitoring of caves -Conclusions and recommendations. Acta Carsologica, 31/1, Ljubljana, 175-177, 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.

- 11-60 Cigna, Arrigo A.: Breve storia della speleologia italiana in Italia. Ist. It. Speleologia, Mem. XIII, s. II, 53-68, 2002.**

(Short history of the Italian speleology in Italy)

Some remarks on the recent history of the Italian speleology in Italy are here reported. The most important dates and the events which more influenced the evolution of speleology in Italy during the last century are also recalled.

- 11-61 Cigna, Arrigo A.: Il concetto di capacità ricettiva e la fruizione delle grotte turistiche Le Grotte d'Italia, Genga (Ancona), s. V,3, 27-33, 2002.**

(The concept of visitors' capacity and the development of the show caves)

Since a cave consists in an environment relatively isolated, its energy balance must not be modified by the transformation into a show cave. To this purpose the evaluation of the visitors' capacity (i.e. the maximum visitors' flow which does not change the main envi-

ronmental parameters beyond the natural fluctuation range). After a description of the main characteristics of the cave environment, the details for an evaluation of the visitors' capacity are reported. In particular the procedure to carry out the Environmental Impact Assessment for a cave is given. Also the problem of revitalisation of a show cave is here considered.

**11-62 Cigna, Arrigo A.: Modern trend in cave monitoring. Acta Carsologica, 31/1, 35-54, Ljubljana, 2002.**

Cave environment is sometimes rather fragile and a special care is required to keep its equilibrium. The evolution of cave monitoring since XIX century is described by reporting the first notes based on a qualitative approach to the problem until cave climatology was treated also from a mathematical point of view. The advantage of the development of theories was the possibility to obtain comparable results and forecast the evolution of a cave climate before irreversible modifications take place.

The most important parameters to be monitored are indicated by taking into account also the precision required for measurements according to the different aims of the researches. In recent years both important technological improvements have been obtained and the relative importance of each parameter has been reviewed according to the most advanced studies. Also an optimisation of cost and results is here considered. Then two case histories are also reported.

Kartchner Caverns, Arizona, USA, opened to the public in November 1999. Some preliminary studies have been performed in the cave in its natural status. Arizona Conservation Project, Inc. (ACPI) established 22 monitoring stations: from these specific areas, measurements of air, water, soil temperatures were taken. Humidity and carbon dioxide concentrations were also measured. An evaluation of the impact assessment was obtained and suggestions to improve the present situation were proposed.

The second case concerns Congo Cave i.e. the most important show cave in Africa with some hundreds of thousand visitors per year. The cave is presently monitored to ascertain its visitors' capacity. A simple monitoring network has been installed in September 2000 to be operated for one year. It consists in about 15 rugged data loggers distributed along the cave. Air and water temperature, carbon dioxide concentration, and relative humidity are measured and the values are transferred periodically by a shuttle into a computer outside the cave. The first results are here reported. A totally automatic monitoring network will be installed in the future after the results of the first simple network are achieved. In addition to the parameters measured by the first simple network, also air current and water level will be included in the automatic one.

**11-63 Cilek, Vaclav: Fenomen zakourených jeskyní: příčiny, význam a naprava. Aragonit, 7, 13-15, Liptovski Mikuláš, 2002.**

K.W.: cave, manganese coating, soot.

**11-64 Clarke, Arthur: A summary of recent cave & karst conservation issues in Tasmania. Australasian Cave & Karst Management Association Journal, 46, 43-47, s.l., 2002.**

K.W.: biology, nature protection.

- 11-65 Contos, A. ; James, J. ; Rogers, P. ; Prust, P.: Challenges in conservation of the microbial mantles in Nullarbor caves. in Henderson, K. [ed] Cave Management in Australasia 14, Proceedings of the 14<sup>th</sup> Australasian Conference on Cave and Karst Management. ACKMA, Carlton South. pp. 120-121, 2002.**  
Microbial mantles (also known as 'the fungus' or 'snotites') are found in many of the flooded passages of the Nullarbor Caves, Australia. 36 different organisms were detected within the sheets or tongues of mucoid material. The community appears to be chemautotrophic, with an energy source based on the oxidation of nitrite to nitrate. Above the mantles the rock appears to be etched or pitted to depths of 3-5 mm, indicating that the microbial community may be playing a role in speleogenesis. The mantles are threatened by growing diver activity and methods for their protection are discussed.
- 11-66 Cooley, T.: Geological and geotechnical context of cover collapse and subsidence in mid-continent US clay-mantled karst. Environmental Geology, 42, 469-475, s.l., 2002.**  
K.W.: covered karst, sinkhole, collapse.
- 11-67 Correa Lopez, Matthias ; Rosendahl, Wilfried: Über eine neue Höhle auf der mittleren Schwäbischen Alb - zur Geologie, Paläontologie und Speläologie der Zaininger Höhle (7523/12). Jber.Mitt. oberrhein. geol. Ver., NF, 84, 333-353, Stuttgart, 2002.**  
K.W.: cave, speleothem, dating, paleontology.
- 11-68 Cucchi, Franco ; Marinetti, Enrico ; Potleca, Michele ; Zini, Luca: Influence of geostructural conditions on the speleogenesis of the Trieste karst (Italy). Geologica Belgica, Karst and Tectonics, 4, 241-250, s.l., 2002.**  
K.W.: speleogenesis, geology.
- 11-69 Cucchi, Franco ; Zini, Luca: Underground Timavo river monitoring (Classical Karst). Acta carsologica, 31/1, 75-84, Ljubljana, 2002.**  
Some instruments that continuously measure height, temperature and conductivity of waters have been placed in 10 stations. The stations are located on the bottom of the cavities that reach the waters of the Timavo, the underground river that collects the hypogean waters of the Classical Karst. The preliminary analysis of the remarkable amount of data that has been collected up to now helps define the modalities of water circulation in depth better. There are three different types of flood wave, pumping effects in some tracts and mixing of different waters in other tracts.
- 11-70 Culver, David ; Sket, Boris: Biological monitoring in caves. Biološko zasledovanje stanja (monitoring) v jamah. Acta carsologica, 31/1, 55-64, 2002.**  
Twenty caves were listed to be inhabited by 20 or more species of obligate cave organisms. They represent a biological treasure trove. Five are or have been developed as tourist caves— Postojna-Planina Cave System (Slovenia), Baget - Sainte Catherine System (France), Shelta Cave (Alabama, USA), Mammoth Cave (Kentucky, USA), and Vjetrenica Cave (Bosnia & Herzegovina). For these and other tourist caves, there is a special responsibility to protect this fauna. For its exceptionally rich cave fauna as well as for some



historical reasons, this is particularly true for Slovenian caves. Fortunately, tourism and modification is almost always limited to a part of a cave. Where it is not, the fauna undoubtedly suffers. There are a wide variety of physical, chemical, and biological monitoring techniques that potentially can be used. Because chemical discharges and other environmental catastrophes may leave little if any long-term chemical signature, biological monitoring is critical. Pollution may be either directly detrimental to the cave fauna (if heavy organic pollution and inorganic pollution) or may enable surface species to outcompete the endemic cave fauna (in the case of slight organic pollution). Therefore, changes in the quantity of fauna have to be monitored as well as changes in its taxonomic composition. In the case of new tourist installations, the local cave and surface fauna has to be investigated prior to any modifications. Care must be taken with pitfall traps to ensure that sampling does not damage the populations. If a single species is the object of concern, then mark-recapture studies are usually possible. For biological monitoring, we recommend one of the following:

1. minimum-time census, rather than minimum-area census;
2. baiting in both terrestrial and aquatic habitats;
3. pitfall traps (baited or unbaited) in terrestrial habitats.

- 11-71 Currens, James C.: Changes in groundwater quality in a conduit-flow-dominated karst aquifer, following BMP implementation. Environmental Geology, 42, 525-531, s.l., 2002.**

K.W.: agriculture, water pollution, non-point pollution, nitrates.

- 11-72 Czaplewski, Nicholas J. ; Puckette, William L. ; Russell, Clayton: A Pleistocene Tapir and Associated Mammals from the Southwestern Ozark Highland. Journal of Cave and Karst Studies, 64, 97-107, Huntsville, 2002.**

K.W.: paleontology, mammalia, cave sediment.

- 11-73 Čekada, Miha: Pravopisno ustrezen zapis imen jam. Naše jame, 44, 71-79, 2002.**

Basic orthographic rules to spell geographic names are described. Based on examples from the Cave register, detailed rules and recommendations on the spelling of cave names are presented. This includes the spelling of capitals, the declination of cave names as well as the spelling of dialectal names. Examples of unsuitable usage are also mentioned, such as abbreviations, numbers and punctuation marks in the names, and orthographically wrong cave names, where suggestions for the correction of errors and inconsistencies are added.

- 11-74 Daoxian, Yuan: Hydrogeology and ecosystem of karst in the service of society. Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 41-43, Malaga, 2002.**

K.W.: ecosystem, global changes.

- 11-75 Davis, A.D. ; Long, A.J. ; Wireman, M.: KARSTIC:a sensitivity method for carbonate aquifers in karst terrain. Environmental Geology, 42, 65-72, s.l., 2002.**

K.W.: water supply, method, vulnerability.



- 11-76 Day, Michael ; Koenig, Susan: Cave monitoring priorities in Central America and the Caribbean. *Acta carsologica*, 31/1, 123-134, Ljubljana, 2002.**

Karstlands cover about 300,000 km<sup>2</sup> (50%) of the land area of Central America and the Caribbean. The number of caves is probably tens of thousands. Cave monitoring is uncommon throughout Central America and the Caribbean, and is generally accorded a low priority by agencies responsible for environmental management and conservation. Exceptions occur only in some protected areas and in a few commercial caves. Fundamentally, it is not recognized generally that there is a need to monitor caves. Beyond that, monitoring is limited severely by paucity of funding, equipment and qualified personnel. Cave monitoring clearly is warranted, however, because cave environments are inherently fragile and because the karstlands are under increasing developmental pressures. In these contexts, selected inventorying and monitoring programs seem advisable in at least some of the more significant caves. Such monitoring programs might focus on physical environments, historic and prehistoric remains, faunal populations, resource extraction, water quality and human visitation. Equally importantly, surface karst environments need to be monitored too, because degradation at the surface will almost inevitably be mirrored by deterioration in underground conditions.

- 11-77 Day, Michael: Sandstone Caves in Wisconsin. *The Wisconsin Speleologist*, 25, 1, 18-22, 2002.**

K.W.: pseudokarst, sandstone cave, Wisconsin, USA.

- 11-78 Debeljak, Irena: Dinozavri Krasa in Istre. *Kras*, 51, 38-41, Ljubljana, 2002.**

K.W.: paleontology, dinosaur, geology.

- 11-79 Debevec Gerjevič, Vanja: Medical survey of the staff working in Škocjan Caves. *Acta carsologica*, 31/1, 97-103, Ljubljana, 2002.**

The cave microclimate is distinguished by many parameters that could underlie some physiological changes in human body when exposed for an extended period of time. Beside temperature, air-flow, the absence of sunlight and humidity, which vary according to the location and structure of the underground space, radon radiation is present as well. Park Škocjanske jame, Slovenia, has been performing a regular and continuous monitoring of radon and its daughter products for about five years now. All measurements are done by the Institute for Occupational Safety, Ljubljana. The accurate evidence of time spent in the cave is kept for every member of the staff. This enables us to combine the data with radon concentration and determine the maximum dose of radiation that one has received during one year working period. According to national regulation and law, stated by National Health Inspector and Ministry of Health, a regular medical survey has been established. Detailed medical exams are performed each year or less frequently in order to prevent health problems. Blood tests enable us to observe radiation impact. In the following work a short overview of microclimates impacts will be presented as health and risk factors.

- 11-80 Debevec, Albin: Muzejska zbirka arheoloških najdb in zgodovina odkrivanja Škocjan-  
skih jam. Kras, 53, 10-13, Ljubljana, 2002.**  
K.W.: archaeological museum.
- 11-81 Delak Koželj, Zvezda: Cultural Heritage and Protected Areas. Acta carsologica,  
31/1, 165-174, Ljubljana, 2002.**  
The article is defining the role of heritage - conservation activity in sites of protected landscape and parks respectively; the activity which by all means surpasses the habitual working processes. It exposes the role of ethnologist - conservationist with the stress on inevitability of basic researches on the chosen site, which should serve as grounding for planning the complex development of the protected region (i.e.: the extent of content, heritage presentation, management, ...).
- 11-82 Denneborg, Michael ; Laumanns, Michael ; Schnadwinkel, Matthias ; Voigt, Stefan:  
German Speleological Campaign Cambodia 95/96. Berliner Höhlenkundliche  
Berichte, 6, 82 pp., Berlin, 2002.**  
K.W.: speleological expedition, report.
- 11-83 Dilsiz, Cüneyt: Environmental issues concerning natural resources at Pamukkale  
protected site, southwest Turkey. Environmental Geology, 41, 776-784, s.l., 2002.**  
K.W.: thermal spring, travertine, water pollution.
- 11-84 Donovan, Stephen K.: A karst of thousands: Jamaica's limestone scenery. Geology  
Today, 18, 4, 142-151, 2002.**  
K.W.: regional karstology, karst geomorphology, Jamaica.
- 11-85 Downing, Alison ; Oldfield, Ron: Botanists and mosses at Jeneolan Caves. Australa-  
sian Cave & Karst Management Association Journal, 46, 20-21, s.l., 2002.**  
K.W.: mosses, vegetation in cave.
- 11-86 Dreybrodt, W. ; Romanov, D. ; Gabrovšek, F.: Karstification below dam sites: a  
model of increasing leakage from reservoirs. Environmental Geology, 42, 518-524,  
s.l., 2002.**  
K.W.: hydraulics, construction, model, gypsum.
- 11-87 Dreybrodt, Wolfgang ; Gabrovšek, Franci: Basic processes and mechanisms govern-  
ing the evolution of karst. University of Bremen, Germany, Karst Research Institute  
ZRC SAZU, Postojna, Slovenia, 2002.**  
Models of karstification based on the physics of fluid flow in fractures of soluble rock and the physical chemistry of dissolution of limestone by CO<sub>2</sub> containing water have been presented during the last two decades. This paper gives a review of the basic principles of such models, their most important results, and future perspectives.  
The basic element of evolving karst systems is a single isolated fracture, where a constant hydraulic head drives calcite aggressive water from the input to the output. Nonlinear

dissolution kinetics with order  $n = 4$  induce a positive feedback by which dissolutional widening at the exit enhances flow rates thus increasing widening and so on until flow rates increase dramatically in a breakthrough event. After this the hydraulic head breaks down and widening of the fracture proceeds fast but even along its entire length under conditions of constant recharge. The significance of modelling such a single fracture results from the fact that an equation for the breakthrough time specifies the parameters determining the processes of early karstification. In a next step the boundary conditions for isolated fractures are varied by including different lithologies of the rock, expressed by different dissolution kinetics. This can enhance or retard karstification. Subterranean sources of  $\text{CO}_2$  can also be simulated by changing the equilibrium concentration of the solution at the point where  $\text{CO}_2$  is injected. This leads to accelerated karstification. At the confluence of solutions from two isolated tubes into a third one, mixing corrosion can release free carbon dioxide. Its effect to solutional widening in such a system of three conduits is discussed.

Although these simple models give interesting insights into karst processes more realistic models are required. Combining single fractures into two-dimensional networks models of karst in its dimensions of length and breadth under constant head conditions are presented. In first steps the Ford-Ewers' high-dip and low-dip models are simulated. Their results agree to what one expects from field observations. Including varying lithologies produces a variety of new features. Finally we show that mixing corrosion has a strong impact on cave evolution. By this effect micro climatic conditions in the catchment area of the cave exert significant influence. A common feature in the evolution of such two-dimensional models is the competition of various possible pathways to achieve breakthrough first. Varying conditions in lithologies, carbon dioxide injection or changing hydrological boundary conditions change the chances for the competing conduits. Karst systems developing at steep cliffs in the dimensions of length and depth are characterized by unconfined aquifers with constant recharge to the water table. Modelling of such systems shows that dissolution of limestone occurs close to the water table. The widening of the fractures there causes lowering the water table until it becomes stable when base level is reached, and a water table cave grows headwards into the aquifer. When prominent deep fractures with large aperture widths are present deep phreatic loops originate below the water table. A river or a lake on a karst plateau imposes constant head conditions at this location in addition to the constant recharge from meteoric precipitation. In this case a breakthrough cave system evolves along the water table kept stable by the constant head input. But simultaneously deep phreatic loops arise below it.

- 11-88 Droms, Yvonne: Exploring High in the Sierra Madre Oriental. NSS News, 60, 224-231, Huntsville, 2002.**

K.W.: speleological expedition.

- 11-89 Dunford, Brendan: Land-Use Change in the Birren Uplands, Co. Clare - Causes and Consequences. Farm & Food, 44-47, s.l., 2002.**

K.W.: land-use, agriculture, man's impact.

- 11-90 Eichenberger, Urs ; Jeannin, Pierre-Yves: Milandre. Une grotte influence le tracé d'une route nationale. Stalactite, 52, 4-9, La Chaux-de-Fonds, 2002.**  
K.W.: road construction, 3D model.
- 11-91 Fairchild, J.J.: High-resolution speleothem trace element records: potential as climate proxies. Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 377-380, Malaga, 2002.**  
K.W.: ion microprobe, palaeoclimates, palaeohydrology, trace elements.
- 11-92 Faivre, Sanja ; Reiffsteck, Philippe: From doline distribution to tectonics movements example of the Velebit mountain range, Croatia. Acta carsologica, 31/3, 139-154, Ljubljana, 2002.**  
The influence of tectonic forces on karst relief development has been studied using dolines as geomorphological markers. The strain and stress orientations have been calculated from the doline distribution, applying the centre to centre method (Ramsay, 1967; Fry, 1979). 623 local results have been obtained which were later injected into a 2D finite element model created in Castem 2 000 software. As the observed deformations are the consequence of the tectonic displacements, the numerical model tends to simulate the tectonic conditions, which are closely related to the observed deformations. The results were correlated with the GPS measurements as well as with the geological field mapping results and great coincidence was observed.
- 11-93 Ferrarese, F. ; Macaluso, T. ; Madonia, G. ; Palmeri, A. ; Sauro, U.: Solution and recrystallization processes and associated landforms in gypsum outcrops of Sicily. Geomorphology, 49, 25-43, 2002.**  
Some small areas of Messinian (Upper Miocene) age gypsum, outcropping in western Sicily, are described also by means of very large scale geomorphological maps. The morphotypes can be classified into two main categories: those that originated by solution and those that originated through recrystallisation. The types of karren can be explained as the results of the solution process under different hydro-dynamical behaviour; the dome-like hills and other related "expansion" forms can be explained by the same process that leads to the development of gypsum tumuli. The outcrops of gypsum lacking soil cover and influenced by alternating seasonal water conditions of surplus and deficit are affected by both solution and recrystallisation processes. The last processes are the result of the capillary upward motion of oversaturated water solution during the dry season giving origin to a "gypsum weathering crust" and influencing the geomorphological evolution of the outer surface.
- 11-94 Field, Malcolm S.: A Lexicon of Cave and Karst Terminology with Special Reference to Environmental Karst Hydrology. United States Environmental Protection Agency, II-VI, 1-214, Washington D.C., 2002.**

- 11-95 Field, Malcolm S.: Efficient hydrologic tracer-test design for tracer-mass estimation and sample-collection frequency, 1. Method development. Environmental Geology, 42, 827-838, 2002.**  
K.W.: tracer-test design, continous stirred tank reactor, breakthrough curves, advection-dispersion equation, functional relationship.
- 11-96 Field, Malcolm S.: Efficient hydrologic tracer-test design for tracer-mass estimation and sample-collection frequency, 2. Experimental results. Environmental Geology, 42, 839-850, 2002.**  
K.W.: breakthrough curves, flowing streams, porous media, tracer-test design.
- 11-97 Field, Malcolm S.: The QTRACER2 Program for Tracer-Breakthrough Curve Analysis for Tracer Tests in Karstic Aquifers and other Hydrologic Systems. United States Environmental Protection Agency, I-XIV, 1-179, Washington D.C., 2002.**
- 11-98 Fišer, Cene ; Sket, Boris ; Trontelj, Peter: The taxonomic complexity of the genus *Niphargus* (Crustacea: Amphipoda) and an approach to its elucidation. XVI International Symposium of Biospeleology. Abstracts, pp. 39-40, 2002.**  
The niphargid group of amphipods consists of more than 300 taxa, most of them subterranean inhabitants. They constitute a substantial part of the European groundwater biodiversity. Only a small number of markedly aberrant species could have been separated into separate eight genera, with only one to three species in each. The taxonomy of the genus *Niphargus* is a challange due to minor differences between forms and due to the mosaic nature of the intrageneric morphological diversity. The rank of many subspecies has nowadays been changed to species rank. The few attempts at division of the genus into subgenera are generally not accepted. Cladistic analyses are not expected to give satisfying results because of uncertainties in character polarisation.  
We here present the main ideas of an attempt to solve the taxonomical chaos. We are starting a morphological review of the niphargids. The first step includes a standardization of morphological descriptions, mainly of all “key species”. In this way we expect to find some clearer morphological discontinuities within the genus. An interactive key for identification should be generated. We will also search for a new possibility to split this complex genus into lower taxa based on a phylogenetic analysis of mitochondrial DNA sequences.
- 11-99 Ford, Derek: From pre-karst to cessation: the complicating effects of differing lithology and geologic structure on karst evolution. School of Geography and Geology, McMaster University, Hamilton, ON L8S 4K1, Canada, 2002.**  
Karst is created by groundwater circulating through caves and thus is profoundly affected by variations in bedrock lithology and structure. The Classical Karst is not a suitable model type area because its structures are too complex. Four more simple models are presented to frame pre-karst, karstification and karst cessation concepts of development in differing geologic structures, and illustrated with examples from Canada. Limestone purity, texture, dolomitization, frequency of penetrable bedding planes, and presence

of sulphate or salt interbeds are particularly important lithologic controls. Geologic structure is important at all scales, from local jointing to plate tectonic deformation and translocation. In some geologic settings it is an easy matter to define a set of "pre-karst" conditions but in others it seems irrelevant if not impossible: the same is true of cessation of karstification.

- 11-100 Foulkes, Hilary: Beyond the shaft zone in the Loferer Schacht.- NSS News, 60, 138-145, Huntsville, 2002.**

K.W.: cave, alpine karst.

- 11-101 Frisia, Silvia ; Borsato, Andrea ; Fairchild, Ian J. ; McDermott, F. ; Selmo, Enrico M.: Aragonite-calcite relationships in speleothems (Grotte de Clamouse, France): environment, fabrics, and carbonate geochemistry. Journal of Sedimentary Research, 72, 5, 687-699, 2002.**

K.W.: speleology, mineralogy, carbonate geochemistry, Clamouse Cave, France.

- 11-102 Gabrovšek, Franci: Razvoj krasa: od predkrasa do izginotja. Kras, 54-55, 12-13, Ljubljana, 2002.**

K.W.: report, karstology, evolution of karst, international symposium.

- 11-103 Gams, Ivan: Andrej Kranjc. Letop. Slov. akad. znan. umet., knj. 52, str. 118-119, portret, 2002.**

K.W.: biography, Kranjc Andrej, Slovenia.

- 11-104 Gams, Ivan: Kako kraški je primorski kras? : stereotip o krasu ne velja več. Kras, apr., št. 51, str. 10-11, 2002.**

K.W.: typical karst, karst afforestation, Kras (Classical Karst), Slovenia.

- 11-105 Gams, Ivan: Vpliv vdiranja zimskega mraza na jamsko okolje : Postojnska jama in primorske turistične jame. Proteus, nov., letn. 65, št. 3, str. 102-111, 2002.**

K.W.: speleoclimate, influence of cold, speleothem degradation, Slovenia.

- 11-106 Gams, Ivan: O krušenju, premikanju skalnih blokov in tektonskih dislokacijah v jamah v Sloveniji. Naše jame, 44, 14-25, 2002.**

In the contact zone of the Adriatic tectonic micro plate with the Euroasian plate, limestone and dolomite within the Dinaric and Alpine karsts of Slovenia are intensively crushed and the blocks are labile. Various established but rare cases of displacements, recorded in the Slovene literature, are listed. The shifted block behind the entrance to Planina Cave and behind the 60 m-high wall at the end of the 600 m-long blind valley of the river Unica is also described. Displacement of the upper strata exposed in the Luknja Cave has deformed the entrance, and deeper inside the cave an oblique dripstone connects the displaced roof with the stable block.

- 11-107 Gauchon, Christophe: “Histoire de la Spéléologie et de la Karstologie dans les Alpes, les Carpathes et les Dinarides”, ALCADI 2002, Gorizia. Karstologia, 39, 57-58, s.l., 2002.**  
K.W.: report, history of speleology and karstology, international symposium, Gorizia, Italy.
- 11-108 Gauthier, Daniel ; Pate, Daniel: Caving in the Suburbs at Boischatel. NSS News, 60, 132-137, Huntsville, 2002.**  
K.W.: speleogenesis.
- 11-109 Gill, Dave: The Gunung Mulu National Park and the World Heritage nomination - Sarawak, Malaysia. Australasian Cave & Karst Management Association Journal, 46, 32-36, s.l., 2002.**  
K.W.: nature protection heritage.
- 11-110 Gines, Angel: Geoecologia de las formas de lapiaz y correlacion entre ecosistemas karsticos.- Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 401-407, Malaga, 2002.**  
K.W.: micro features, karren, geoecology.
- 11-111 Goldscheider, N. ; Göppert, N. ; Pochon, A. ; Scholz, H.: Karst development in conglomerates of the Northern Alps and consequences for groundwater protection. Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 61-67, Malaga, 2002.**  
K.W.: karst in conglomerates, water protection, hydrogeology.
- 11-112 Goldscheider, Nico ; Neukum, Christoph ; Werz, Heike: Hydrogeologie und Trinkwasserschutz im alpinen Karstsystem der Winterstaude (Marktgemeinde Bezau, Bregenzerwald, Vorarlberg, Oesterreich). Vorarlberger Naturschau, 11, 9-58, s.l., 2002.**  
K.W.: karst in conglomerates, water protection, water supply.
- 11-113 Gonzales, R. ; Vadillo, I. ; Rodriguez, R. ; Carrasco, F.: Generacion de zonas redox por el lixiviado del vertedero de Mérida en el acuífero carbonatado de Yucatan (Mexico). Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 91-97, Malaga, 2002.**  
K.W.: karst hydrology, dumping sites, water pollution.
- 11-114 Greenslade, Penelope: Systematic composition and distribution of Australian cave collembolan faunas with notes on exotic taxa. Helictite, 38(1): 11-15, 2002.**  
Collembola (springtails) have been collected from caves in Tasmania, northwestern Western Australia, Victoria, New South Wales and Queensland more intensively in recent years than in the past. A sharp boundary in the composition of faunas of southern and northern Australia was found with the highest diversity of troglotic forms in southeastern Australia and Tasmania. No extreme examples of troglotic genera have yet been found in

Western Australia. A single record of *Cyphoderopsis* was made from Christmas Island in the Indian Ocean, a common genus in caves in Sumatra. The Jenolan cave system has been most completely sampled with nearly 100 samples from fourteen caves. This system contains over twenty species of which three genera, *Adelphoderia*, *Oncopodura* and a new genus near *Kenyura*, are exclusively troglobitic with locally endemic species of conservation and phylogenetic interest. Compared with some Tasmanian caves, the Jenolan fauna appears to harbour more species that are likely to have been introduced.

**11-115 Grimes, Ken G.: Short Note: Palaeokarst in the East Pilbara, Western Australia. *Helictite*, 38(1): page 20, 2002.**

Summarises some published information on an extensive, but little studied, area of palaeokarst developed on Proterozoic dolomites in the East Pilbara, WA.

**11-116 Grimes, Ken G.: Syngenetic and Eogenetic Karst: an Australian viewpoint. In: Gabrovsek, F. [ed.] *Evolution of Karst: from Prekarst to Cessation*. Institut za raziskovanje krasa, ZRC SAZU, Postojna. pp. 407-414, 2002.**

In syngenetic karst speleogenesis and lithogenesis are concurrent. Eogenetic karst and soft-rock karst are closely related terms. The distinctive features of syngenetic karst are: shallow horizontal cave systems; a general lack of directed conduits (low irregular chambers occur instead); clustering of caves at the margins of topographic highs or along the coast; paleosol horizons; vertical solution pipes which locally form dense fields; extensive breakdown and subsidence to form collapse-dominated cave systems, a variety of surface and subsurface breccias and locally large collapse dolines & cenotes; and limited surface sculpturing (karren). These features are best developed in host sediments that have well developed primary porosity and limited secondary cementation (and hence limited mechanical strength). Certain hydrological environments also assist: invading swamp waters or mixing at a well developed watertable; or, near the coast, mixing above and below a freshwater lens floating on salt water. Where these factors are absent the karst forms tend to be more akin to those of classical hard-rock or telogenetic karst.

K.W.: syngenetic karst, eogenetic diagenesis, soft-rock karst, calcarenite, solution pipes.

**11-117 Groves, Iain ; Gregory, Ian ; Carman, Cris.: Reliance - a new high-grade zinc silicate-oxide discovery in the Flinders Ranges. *MESA Journal*, 25: 6-10, 2002. [Dept of Primary Industries & Resources, South Australia, GPO Box 1671, Adelaide, SA 5001, Australia]**

The ore body is associated with a large, structurally-controlled paleokarst cavity (over 250 m deep, 100 m long and 80 m wide) that contain abundant sulphides in a mix of pure white quartz sand, hematitic clay and rubble. The cavity is developed in a Proterozoic dolomite. The timing and processes of the karst and the mineralisation is uncertain due to conflicting evidence. Other mineralised paleokarst cavities occur nearby.

**11-118 Günay, G.: Gypsum karst, Sivas, Turkey. *Environmental Geology*, 42, 387-398, s.l., 2002.**

K.W.: regional karstology, gypsum, water quality.



- 11-119 Habič, Špela: Ogrožena Unška koliševka. Planinski vestnik, 102, 43, Ljubljana, 2002.**  
K.W.: nature protection, collapse doline, Slovenia.
- 11-120 Hamilton Smith, Elery: Wandering here and there. Australasian Cave & Karst Management Association Journal, 46, 22-23, s.l., 2002.**  
K.W.: journey's report.
- 11-121 Hamilton Smith, Elery: (Ed. with Wong, Chape & Friedrich) Proceedings of the Asia-Pacific Forum on Karst Ecosystems and World Heritage. Environment Australia for IUCN. 88pp, 2002.**
- 11-122 Hamilton Smith, Elery: Caves and People. Presentation to Cave Expo Seminar, Samcheok, Korea. See in The Sustainable Management of Cave: Academic and Policy Implications, Samcheok City, Kangwon Development Research Institute, pp. 104 - 107. Also presentation in .ppt files, 2002.**
- 11-123 Hamilton Smith, Elery: Lighting Australian Caves / Ausztrál Barlangok Világítása. Proceedings International Conference on Cave Lighting / Előadások Nemzetközi Konferencia Barlangvilágítás. Hungarian Speleological Society / Magyar Karszt-és Barlangkutató Társulat, pp. 11-24, 2002.**
- 11-124 Hamilton Smith, Elery: Limestone Quarrying and Conservation Issues. (Concepts incorporated in main text and also appears in whole as Appendix C) Management of Land Use, Landscape and Biodiversity, being Substudy Report 11 in Towards a Sustainable Cement Industry. World Business Council for Sustainable Development. 2002.**
- 11-125 Hamilton Smith, Elery: Management Assessment in Karst Areas. Acta carsologica, 31/1, 13-20, Ljubljana, 2002.**  
The key management responsibility in World Heritage Areas is a two-fold one of preserving environmental integrity and quality while at the same time providing for broad-scale public access. Although there is some ambiguity in this mandate, there is no question that these two elements of management are complementary, and that one cannot fully assess one without consideration of the other. This leads to the key question of how management is able to meet the responsibility of this mandate. This paper reviews and assesses various conceptual approaches that have been or might be utilised. These include various visitor impact control schemes generally of U.S. origin; the three faceted (environmental /social /economic) sustainability approach and risk management strategies. This paper concludes that each karst area management agency must develop an on-going assessment plan that both deals with broad-scale issues while also meeting the distinctive challenges which are endemic to their own situation. Any of the approaches discussed may make a contribution to any one such plan.

- 11-126 Häuselmann, Philipp: UIS Cave Symbols: The definitive List. Acta carsologica, 31/3, 165-176, Ljubljana, 2002.**

A set of cave symbols used for underground mapping has been voted by national delegates of 12 countries in 1999. This symbol set is shown and, when necessary, explained. The UIS subcommission on topography is briefly presented and its aims outlined.

- 11-127 Hlavač, Jozef: Za Vladimirom Panošom. Aragonit, 7, 66, Liptovski Mikulaš, 2002.**  
K.W.: In memoriam.

- 11-128 Hodalič, Arne: Največja podvodna dvorana na svetu. Mladina, 7, 39-42, Ljubljana, 2002.**

K.W.: speleology, submerged collapse hall, Vougliameni, Greece.

- 11-129 Hötzl, Heinz: Karst groundwater protection. Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 33-39, Malaga, 2002.**

In 1884 J. Marinitsch started to measure and note down the data of temperature in the Škocjanske jame caves and nearby. The results for the period 1886-1914 are recorded in the "Höhlenbuch". During the year 1928 detailed microclimatic measurements are performed simultaneously on the surface and underground. In the years 1960-1962 the members of the Ljubljana University have carried on the meteorological observations in the cave and specially in the collapse doline Velika dolina. In 1992 Karst Research Institute started to monitor the temperatures. Later on 5 temperature recorders were placed into different parts of the cave. The results of the two years (May 1997 - May 1999) were analysed and are presented in this paper. Although the annual mean values are rather similar (10.6° and 10.1°C), there is a great amplitude between the monthly mean values (1.6° to 17.3°). The absolute temperatures range between -1.5° and 21.9°C. The most important factors are distance from the entrance, and the vertical position. The comparison between temperatures of the Reka river and the air temperatures bears an important correlation. Previous results of this short period already show that the part of Škocjanske jame, where the Reka river is flowing, is an extremely dynamic cave and the visitors cannot have much impact on its meteorology.

In conclusion we find that all cave theories such as those of Swinnerton (1932), Rhoades and Sinacori (1941), and the Four-state-model of Ford are reconciled. They are not contradictory but they result from the same physics and chemistry under different boundary conditions.

K.W.: GIS, water pollution, water supply, karst distribution.

- 11-130 Ilič, Uroš: Nove raziskave v Velikem in Malem Okencu. Naše jame, 44, 124-132, 2002.**

Malo Okence and Veliko Okence are springs of the Velika Ljubljanska river in Retovje near Verd. New research was done in both because data in the Cave Register are old and incomplete. In the southern spring, Veliko Okence 267 m of main passage was surveyed. Exploration has also continued in the northern spring, Malo Okence, where 240 m of passage was surveyed after the discovery of the continuation. The end of the cave has not

yet been reached and there is still much work to do. New cave surveys were carried out in both caves.

- 11-131 Jarc, Pavla ; Kladnik, Drago ; Rojšek, Daniel: Posočje A-Ž. Slovenija Total, 244 pp., Ljubljana, 2002.**

K.W.: lexicon, Soča river region, Slovenia.

- 11-132 Južnič, Stanislav: Treatises about the subterranean world in Ljubljana between 1678 and 1773. Acta carsologica, 31/2, 209-221, Ljubljana, 2002.**

We researched the books, papers, and manuscripts about the subterranean and karst phenomena available in Ljubljana in the time of Jesuit college. We used the data from Mayr's book catalogue of 1678. We analyzed the books in the Jesuit and other Ljubljane libraries. For the first time in historiography the special concern was put on published works and manuscripts of the Ljubljane Jesuits. We described how the knowledge accumulated in Ljubljana paved the way for pioneering karstology research in the last quarter of the 18<sup>th</sup> century.

- 11-133 Karp, D.: Land Degradation associated with sinkhole development in the Katherine region. Northern Territory Government, Department of Infrastructure, Planning and Environment. Technical Report No. 11/2002. 70 pp. Two 1:25,000 colour maps in pocket, 2002.**

Describes sinkholes in the Katherine region, NT. The karstic limestones that underlie the region pose engineering, environmental and planning problems. Many sinkholes formed prior to human settlement, but new sinkholes have been recorded in recent years. Triggering mechanisms include: changes in surface flow and ponding due to road, rail and subdivision constructions; leaky water and sewer lines; major floods (e.g. 1998) and land clearing for agriculture. Detailed 1:25,000 maps are provided showing sinkhole distribution, geology and land units.

- 11-134 Kempe, Stephan ; Rosendahl, Wilfried ; Wiegand, Bettina ; Eisenhauer, Anton: New speleothem dates from caves in Germany and their importance for the Middle and Upper Pleistocene climate reconstruction. Acta Geologica Polonica, 52, 55-61, s.l., 2002.**

K.W.: dating, speleothem, geology.

- 11-135 Kiernan, Kevin: Karst management in Turkey. Australasian Cave & Karst Management Association Journal, 46, 17-19, s.l., 2002.**

K.W.: nature protection.

- 11-136 Kim, Soo Jin: Origin of speleothems on a lava cave from Jeju Island, Korea. in Henderson, K. [ed] Cave Management in Australasia 14, Proceedings of the 14<sup>th</sup> Australasian Conference on Cave and Karst Management. ACKMA, Carlton South. pp. 122-123, 2002.**

Splendid speleothems are unusually developed on a small lava cave named "Dangcheomul

Cave” on Jeju Island, Korea. The surface of the cave is splendidly decorated with various forms of calcite speleothems. The speleothems have been formed by precipitation of calcite from ground water draining downward through fissures and pores in the basalt ceiling. The carbonate type for the formation of speleothems resulted from dissolution of aeolian shell sands (dune calcarenite) admixed with soils by acidic rainwater.

**11-137 Kiraly, Laszlo: Karstification and Groundwater Flow. Centre d’Hydrogéologie, University of Neuchâtel, Switzerland**

One of the principal aims of hydrogeology is to propose a reasonably adequate reconstruction of the groundwater flow field, in space and in time, for a given aquifer. For example, interpretation of the chemical and isotopic composition of groundwater, understanding of the geothermal conditions (anomalies) or forecasting the possible effects of industrial waste disposals and of intensive exploitation nearly always would require the knowledge of the regional and/or local groundwater flow systems. The problem of estimating the groundwater flow field in fractured and karstified aquifers is approached within the framework of a conceptual diagram showing the relationship between groundwater flow, hydraulic parameters (aquifer properties and boundary conditions), distribution of voids and geological factors. Autoregulation between groundwater flow and karst aquifer properties, duality of karst, nested model of geological discontinuities, scale effect on hydraulic parameters and use of numerical finite element models to check the interpretation of the global response of karst springs are some of the subjects addressed by the author. Inferences on groundwater flow regime with respect to the stage of karst evolution can be made only if the hydraulic parameter fields and the boundary conditions are known by direct observations, or estimated by indirect methods for the different types of karst. Practical considerations on the monitoring strategies applied for karst aquifers, and on the interpretation of the global response obtained at karst springs will complete the paper, which throughout reflects the point of view of a hydrogeologist.

**11-138 Klimas, A. ; Gregorauskas, M.: Groundwater abstraction and contamination in Lithuania as geoindicators of environmental change.- Environmental Geology, 42, 767-772, s.l., 2002.**

K.W.: hydrogeology, flood, global change.

**11-139 Klimchouk, Alexander: Evolution of karst in evaporates. Institute of Geological Sciences, Natl. Academy of Sciences of Ukraine P.O.Box 136, Kiev-30, 01030 Ukraine, 2002.**

Karst that develops in evaporites has many features in common with carbonate karst but it also has significant peculiarities imposed by specific features of evaporite geology and of dissolution chemistry and kinetics. Evaporites widely support different types of intrastratal karst but exposed types of karst (open and denuded) are less common than in carbonate rocks.

Dissolution of gypsum and salt is commonly assumed to be diffusion controlled, i.e. the dissolution rates follow a linear first-order law. Dissolution rates in gypsum are generally much higher than that of calcite and no switch to a high-order kinetics occurs until solu-

tion is saturated (or it occurs very close to saturation, as some recent studies suggest). This causes important consequences in speleogenesis and evolution of karst in evaporites. The early conduit development is extremely sensitive to variations of boundary conditions such as fissure aperture widths and hydraulic gradient, so that the range of variations, within which speleogenetic initiation of conduits occurs either almost immediately or unfeasibly long, is very narrow. The two opposed consequences are that evaporite karst either readily commences in deep-seated intrastratal settings or evaporite deposits survive through geologically long times of burial having experienced almost no karstification. Evolution of geomorphic and hydrogeologic settings is therefore very important in the development of evaporite karst. Moreover, changes due to human activity may induce and dramatically intensify evaporite karst.

Initiation of tight long lateral flow paths through evaporites is virtually impossible. In deep-seated (confined) settings conduit development can occur in gypsum where: 1) there is transverse circulation across the gypsum between the underlying and overlying aquifers in a multi-storey artesian system or, 2) there is lateral contact circulation along the bottom of the gypsum unit, with natural convection replacement of saturated water with aggressive water. Depending on structural and hydrogeologic conditions either maze caves or discrete conduits can form in deep-seated settings. In case of transverse speleogenesis, there is a specific hydrogeologic mechanism that suppresses speleogenetic competition in a fissure network and favours to development of maze patterns in gypsum. Deep-seated karstification of salt probably never occurs inside the rock but contact karstification along sides of along the bottom can be significant, commonly driven by natural convection. In open gypsum karsts conduit development is extremely competitive and it occurs only where fissures are wide enough, or hydraulic gradients are steep enough, to support undersaturated flow through fissures. Linear or crudely branching caves form, rapidly adjusting to the contemporary geomorphic setting and available recharge. Vertical pipes or pits form in the vadose zone where gapping tectonic fissures exist. No deep phreatic zone develops in open gypsum karsts.

In denuded (former intrastratal) karsts the presence of inherited solution porosity and wide fissures allows further conduit development to widely occur in both vadose and phreatic zones.

The direct field measurements of dissolution rates in gypsum show dramatic variations between different environments (flow components in an aquifer system), many of which are also characterised by high rate variations with respect to time. Overall karst denudation rates determined from mass balance differ much between types of karst according to characteristic hydrogeologic conditions and inheritance in karstification. The highest karstification intensity is commonly found in subjacent karsts, which also presents most severe subsidence hazard, and the lowest intensity is in deeply drained entrenched karst. Exposed settings do not necessarily imply high overall denudation.

- 11-140 Knez, Martin ; Pavlovec, Rajko: Škocjanske jame. ProGeo News, 1, 5-7, Uppsala, 2002.**

K.W.: cave description.

- 11-141 Knez, Martin ; Slabe, Tadej: Unroofed caves are an important feature of karst surfaces: examples from the classical karst.- Zeitschrift für Geomorphologie, N.F., 46, 181-191, Berlin -Stuttgart, 2002.**  
K.W.: karst morphology, unroofed cave, morphogenesis.
- 11-142 Kogovšek, Janja ; Petrič, Metka: Underground Water Flow from the Tržiščica Sinking Stream (SE Slovenia). Acta carsologica, 31/2, 75-91, Ljubljana, 2002.**  
A tracing test with injection of uranine in the sinking stream Tržiščica (SE Slovenia) was carried out at the hydrological conditions of recession from medium to low waters. Concentrated flow towards the springs Tominčev studenec, Javornikov izvir and Debeljakov izvir near the village Dvor in the Krka valley was proved. Apparent flow velocities between 2.4 and 4.6 cm/s were obtained, and the share of recovered tracer was estimated to 2/3 of the injected amount. In the Podpeška jama cave the tracer in lower concentrations was detected only after heavy rain occurred after two months of low water. The apparent flow velocity of 0.1 cm/s was calculated. Obtained results, together with the outcomes of the previous tracing tests, indicate that hydrological conditions significantly influence the underground water flow from the Tržiščica sinking stream.
- 11-143 Kogovšek, Janja: Multiparameter Observations of the Reka flood pulse in March 2000. Acta carsologica, 31/2, 61-73, Ljubljana, 2002.**  
This article aims to offer the results of temperature, pH, specific electric conductivity and dissolved oxygen measurements as well as analyses of nitrate, o-phosphate and chloride levels and biochemical and chemical oxygen demand in a flood pulse at the end of March 2000 when the Reka discharge at Cerkevnikov mlin increased from 13.2 to 112 m<sup>3</sup>/s. An estimation of pollution transport according to measured components and comparison with a smaller flood pulse in May 1999 are given.
- 11-144 Kranjc, Andrej ; Snoj, Marko ; Pleterski, Andrej: [How the Dravids(ians) and "Preslovenes" lived together in the caves of Kras and drank teran thousands years ago, not to mention other curiosities]. Acta carsol., letn. 31, št. 3, p. 183-186, 2002.**  
Polemik to the article by C. A. Hromník "Kras - Karst - Karašattu: whence the name?" in Cave and Karst Science, Vol. 28, No.2, pp. 79-88.
- 11-145 Kranjc, Andrej: Anthron. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 4, 2002.**  
The history of the first Slovene caving club Anthron (1889-1911) from Postojna, Slovenia.
- 11-146 Kranjc, Andrej: Historical overview and description of the caves. V: DEBEVEC, Albin, TURK, Peter, PERIC, Borut. The Škocjan Caves Regional Park. Škocjan: Park Škocjanske jame, p. 42-57, ilustr., 2002.**  
The history of exploration and investigation and the description of the Škocjanske jame caves.

- 11-147 Kranjc, Andrej:** [Društvo za raziskovanje podzemskih jam - Society for the exploration of underground caverns]. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 48, 2002.  
The history of the Society for the exploration of underground caverns, founded at Ljubljana in 1910, the predecessor of today's Speleological Association of Slovenia.
- 11-148 Kranjc, Andrej:** [Geology and geomorphology]. V: GABERŠČIK, Alenka (ur.). Jezero, ki izginja : monografija o Cerkniskem jezeru. Ljubljana: Društvo ekologov Slovenije, p. 19-25, ilustr., 2002.  
Chapter on geology and geomorphology in the monography of the karst polje - periodical lake Cerkniško jezero (Slovenia).
- 11-149 Kranjc, Andrej:** [Historical overview and description of the caves]. V: DEBEVEC, Albin, PERIC, Borut, TURK, Peter. Park Škocjanske jame. Škocjan: Park Škocjanske jame, p. 42-57, ilustr., 2002.  
The history of exploration and investigation and the description of the Škocjanske jame caves.
- 11-150 Kranjc, Andrej:** [Huda luknja cave]. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 80, 2002.  
Description of this water cave in northern Slovenia, being few times a show cave.
- 11-151 Kranjc, Andrej:** [Hydrological characteristics]. V: GABERŠČIK, Alenka (ur.). Jezero, ki izginja : monografija o Cerkniskem jezeru. Ljubljana: Društvo ekologov Slovenije, p. 27-37, ilustr., 2002.  
Chapter on hydrology in the monography of the karst polje - periodical lake Cerkniško jezero (Slovenia).
- 11-152 Kranjc, Andrej:** [International Speleological Union got permanent headquarters at Postojna: exeptional acknowledgment by the speleologists of the world]. *Kras*, okt., št. 54-55, p. 10, ilustr., 2002.  
An article on the occasion of declaring Postojna (Karst Research Institute) the headquarters of ISU and the solemn placing of the plate upon the wall of the building at Titov trg 2, Postojna.
- 11-153 Kranjc, Andrej:** [Kraus, Franz]. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 114, 2002.  
A short biography of the founder of the first speleological society (1879) in Vienna, author of the book "Höhlenkunde (1894) and important researcher of the karst of Carniola.



- 11-154 Kranjc, Andrej: [Nagl, Josef Anton]. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 140, 2002.**  
A short biography of the emperor's "Natural Rarities Cabinet" director at Vienna and important researcher of karst in Carniola (1748).
- 11-155 Kranjc, Andrej: [Palško jezero lake]. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 150-151, 2002.**  
Description of a small karst polje - periodical lake in the Dinaric part of karst in Slovenia.
- 11-156 Kranjc, Andrej: [Pekel cave]. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 153, 2002.**  
Description of a show cave in the so called isolated karst of Slovenia.
- 11-157 Kranjc, Andrej: [Perko, Ivan Andrej]. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 154, 2002.**  
A short biography of important Slovene speleologist, researcher, director of Postojnska jama and the author of the Karst Research Institute conception.
- 11-158 Kranjc, Andrej: [Petelinjsko jezero]. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 155, 2002.**  
Description of an uvala like karst depression - periodical lake in the Dinaric part of karst in Slovenia.
- 11-159 Kranjc, Andrej: [Podpeška jama cave]. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 160, 2002.**  
Description of a cave - resurgence in the Dinaric part of Slovene karst. First plan and description were published by J. W. Valvasor 1687.
- 11-160 Kranjc, Andrej: [Speleology]. V: GABERŠČIK, Alenka (ur.). Jezero, ki izginja: monografija o Cerkniškem jezeru. Ljubljana: Društvo ekologov Slovenije, p. 39-43, ilustr., 2002.**  
Chapter on speleology in the monography of the karst polje - periodical lake Cerkniško jezero (Slovenia).
- 11-161 Kranjc, Andrej: [Sveta jama cave]. V: JAVORNIK, Marjan (ur.), VOGLAR, Dušan (ur.), DERMASTIA, Alenka (ur.). Enciklopedija Slovenije. 1. natis. Ljubljana: Mladinska knjiga, 1987-2002, zv. 16: Dodatek A-Ž ; Kazalo, p. 192, 2002.**  
Description of a cave on the plateau of Kras, pilgrimage site from the 3<sup>rd</sup> century A.D., where J. W. Valvasor made his hydrological observations (before 1689).



- 11-162 Kranjc, Andrej ; Opara, Bogdan: Temperature Monitoring in Škocjanske jame caves. Acta carsologica, 31/1, 85-96, Ljubljana, 2002.**

1884 je pričel J. Marinitsch meriti in zapisovati temperature v Škocjanskih jamah in njihovi okolici. Meritve za čas 1886-1914 so bile zabeležene v "Höhlenbuch". Leta 1928 so potekale podrobne mikroklimatske meritve sočasno v podzemlju in na površju. V letih 1960-1962 so člani ljubljanske univerze opravljali meteorološka opazovanja v jami in v udornici Velika dolina. 1992 so v okviru Inštituta pričeli z rednimi beleženji temperatur. Kasneje so v različne dele postavili 5 avtomatskih termometrov. Analizirani so rezultati dvoletnih opazovanj (maj 1997 - maj 1999) ter predstavljeni v tem prispevku. Čeprav so si letni povprečki precej podobni (10,6 ° in 10,1 °C), kažejo mesečni povprečki velika nihanja (od 1,6 ° do 17,3 °C), medtem ko so bile absolutne temperature v razponu od -1,5 ° do 21,9 °C. Najpomembnejša dejavnika za razporeditev temperature sta razdalja od vhoda in vertikalna lega. Primerjava temperature vode Reke in temperature zraka pri Mačji brvi kaže visoko stopnjo korelacije ( $R^2 = 0,8994$ ). Predhodna opazovanja v tem kratkem času kažejo, da je del Škocjanskih jam, kjer teče Reka, izrazito dinamična jama in da obiskovalci ne morejo preveč vplivati na tamkajšnja meteorološka dogajanja.

K.W.: speleologija, varstvo jam, monitoring, temperatura, Škocjanske jame, Slovenija.

- 11-163 Kranjc, Andrej: 10 years of International Karstological School "CLASSICAL KARST" (1993 - 2002). Acta carsologica, 31/3, 7-14, Ljubljana, 2002.**

- 11-164 Kranjc, Andrej: Anthron Society (Postojna 1889 - 1911), the beginning of organised speleology in Slovenia. Acta carsologica, 31/2, 223-232, Ljubljana, 2002.**

In the middle of the 19th century caving and speleological activities were well developed in Kranjska (Carniola) already. F. Kraus took an interest in our karst by 1878. In 1879 he founded "Verein für Höhlenkunde" and a year later "Karst Comité". Soon afterwards he wanted to set up a branch of "Verein" at Postojna. In Planina he had 50 future members already. In summer of 1889 some villagers of Veliki Otok near Postojna discovered the entrance to so-called Otoška jama, making a part of Postojnska jama system. The dispute about the ownership and how to share the income of Postojnska jama aroused. And soon afterwards in Postojna the club Anthron was founded - a reaction to this discovery. Anthron was an exclusive club with limited number of members who must live in Postojna - and majority were members of Postojnska jama Cave (Managing) Commission. The Anthron members discovered an important part of Postojnska jama system, explored caves nearby and helped the best known speleologists of that time such as Kraus, Martel, Perko and Putick. When Speleological club was set up in Ljubljana and Perko announced the foundation of Speleological Institute at Postojna, the club Anthron was dismissed. Thus the documents prove that continuous organised speleological activity started in Slovenia in 1889.

- 11-165 Kranjc, Andrej: The history of karst resources exploitation: an example of iron industry in Kranjska (Slovenija). Theoretical and Applied Karstology, 15, 117-123, 2002.**

K.W.: iron industry on karst, pollution, Kranjska (Carniola), Slovenija.

- 11-166 Krofel, Miha: Jamski lev *Panthera leo spelaea* (Goldfuss) - največja pleistocenska mačka v Sloveniji. *Proteus*, 64, 411-416, Ljubljana, 2002.**  
K.W.: palaeontology, cave fauna fossil, cave lion (*Panthera leo spelaea*), Slovenia.
- 11-167 Kueny, Jeffrey A. ; Day, Michael J.: Designation of protected karstlands in Central America: a regional assessment. *Journal of Cave and Karst Studies*, 64, 3, 165-174, 2002.**  
K.W.: karst protection, regional karstology, karst inventory, Central America.
- 11-168 Ladišič, Borivoj: Kraška učna pot od Lebice do Krupe. *Naše jame*, 44, 49-163, 2002.**  
The paper deals with the route-marked educational trail on the surface of the low Bela krajina karst levelled surface in the vicinity of the Krupa river spring. Several caves, like Lebica, Malikovc, Judovska hiša and Bezgovica are described, as well as the large doline Vodenice and the Medvednic collapse doline. The paper also presents a warning on the potential for pollution by waste disposal in the area.
- 11-169 Lalkovič, Marcel: Objav jaskyne Driny vo svetle dnešnych poznatkov. *Aragonit*, 7, 43-46, Liptovski Mikulaš, 2002.**  
K.W.: speleohistory, Jan Prudik.
- 11-170 Lalkovič, Marcel: Viliam Rozložník - strojca objavu Gombaseckej jaskyne. *Aragonit*, 7, 42-43, Liptovski Mikulaš, 2002.**  
K.W.: speleohistory, speleotourism.
- 11-171 Laumanns, Michael: Ghar Alisadr, die längste Höhle des Iran. *Mitteilungen des Verbandes der deutschen Höhlen- und Karstforscher e.v.*, 48, 34-38, München, 2002.**  
K.W.: cave description, longest cave, Ali Sadr, Iran.
- 11-172 Lenaz, Davide: Minerali pesanti nella Grotta di Mulinvecchio (Valle dello Judrio). *La valle dello Judrio. Progetto di ricerca speleologica Judrio 2000*, 131-133, Gorizia, 2002.**  
K.W.: mineralogy, heavy mineral.
- 11-173 Lenaz, Davide: Mineralogia delle arenarie nelle valle dello Judrio (Flysch del Bacino Giulio). *La valle dello Judrio. Progetto di ricerca speleologica Judrio 2000*, 113-118, Gorizia, 2002.**  
K.W.: mineralogy, flysch, heavy mineral.
- 11-174 Lignier, Vincent ; Desmet, Marc: Les archives sédimentaires quaternaires de la grotte sous les Sangles (Bas-Bugey, Jura méridional, France). *Karstologia*, 39, 27-46, s.l., 2002.**  
K.W.: cave sediments, varves, paleoclimate.

- 11-175 Longo, Carlo Alberto ; Meneghini, Marco: Le grotte della valle dello Judrio. La valle dello Judrio. Progetto di ricerca speleologica Judrio 2000, 59-112, Gorizia, 2002.**  
K.W.: list of caves, description.
- 11-176 Longo, Carlo Alberto: Note sulla geologia della Val Judrio. La valle dello Judrio. Progetto di ricerca speleologica Judrio 2000, 11-17, Gorizia, 2002.**  
K.W.: stratigraphy, tectonics.
- 11-177 Lucas, S.A.: The Equilibrium Hydrogeochemistry of Davies Creek, Central NSW. in Brown, C., [ed], Proceeding sof the 23<sup>ed</sup> Australian Speleological Federation Conference, Bathurst, NSW. ASF, Broadway. pp. 20-30, 2002.**  
Davies Creek (32°40'S, 148°40'E) is a tributary of the Belubula River in central western N.S.W., Australia. It crosses both limestone and andesitic rocks. Springs that source Davys Creek are enriched in dissolved calcite (as  $\text{Ca}^{2+}$  and  $\text{HCO}_3^-$ ), resulting in one of the few calcite-precipitating streams in NSW. Tufa barrages occur. Coupled with atmospheric  $\text{CO}_2$  degassing, calcite precipitation has been shown to occur in regions of stream turbulence, where  $\text{CO}_2$  exsolution is at a maximum. Temperature influences the solubility of both  $\text{Ca}^{2+}$  and  $\text{HCO}_3^-$ ; and with samples taken over 16 months, this study allowed for seasonal interpretation. Results are consistent with previous research and present a valuable insight into the equilibrium hydrogeochemistry of Davys Creek.
- 11-178 Lynch, Erin: The Chinese Way. NSS News, 60, 252-255, Huntsville, 2002.**  
K.W.: speleotourism.
- 11-179 Maher, Igor: Slovenski jamarji v novih globinah. Planinski vestnik, 102, 60-61, Ljubljana, 2002.**  
K.W.: short notice, depth record, Čehi 2.
- 11-180 Maher, Igor: Škocjanske jame praznujejo. Planinski vestnik, 102, 60, Ljubljana, 2002.**  
K.W.: anniversary of cave listed in UNESCO.
- 11-181 Margon, Janez: Gabranca. Naše jame, 44, 113-124, 2002.**  
The Gabranca cave is periodic karst spring in the Košanska dolina valley. Members of the Luka Čeč Caving Club from Postojna dug through a sand filled passage in the cave and reached the depth of 214 m. The cave is composed of shafts and inclined galleries. Proteus anguinus has been seen in a sump where the dry part of the cave ends. The largest oscillation of karst water level in Slovenia has been observed in the cave, the lower parts of which are accessible only during summer low waters.
- 11-182 Martin, Marie ; Audra, Philippe: Contribution à la connaissance de l'hydrogéologie karstique du plateau de Calern (Alpes Maritimes, France). Karstologia, 39, 23-26, s.l., 2002.**  
K.W.: water tracing, karst spring, hydrogeology.

- 11-183 Martini, J.E.J. ; Marshall, C.G.A.: Noodsberg cave, une grotte dans les quartzites de la province du Kwazulu-Natal. Afrique du Sud. Karstologia, 39, 47-50, s.l., 2002.**  
K.W.: speleogenesis, quartzite.
- 11-184 McFarlane, D.A. ; Lundberg, J. ; Fincham, A.G.: A late quaternary paleoecological record from caves of southern Jamaica, West Indies. Journal of Cave and Karst Studies, 64, 117-125, Huntsville, 2002.**  
K.W.: paleoecology, paleontology, mammalia, cave sediments.
- 11-185 Medville, Doug: The Exploration of Big Red Cave, Hawaii. NSS News, 60, 164-167, Huntsville, 2002.**  
K.W.: coastal karst, cave.
- 11-186 Meneghini, Marco: Il fenomeno delle cavità artificiali e delle grotte utilizzate a scopi bellici nella valle dello Judrio.- La valle dello Judrio. Progetto di ricerca speleologica Judrio 2000, 155-182, Gorizia, 2002.**  
K.W.: First War, cave use.
- 11-187 Merritt, D.J., ; Baker, C.: Australian glow-worms. in Henderson, K. [ed] Cave Management in Australasia 14, Proceedings of the 14<sup>th</sup> Australasian Conference on Cave and Karst Management. ACKMA, Carlton South. pp. 117-121, 2002.**  
Australian glow-worms are poorly studied. There are at least three species of *Arachnocampa*. They occur in caves or rainforest gullies. A study is being done on a Queensland cave to assess the impact of tourism on the glow-worm population.
- 11-188 Meus, P. ; Demarets, X. ; Michel, G. ; Delloye, F.: Karst groundwater in Wallonia: towards a specific resource management.- Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 45-52, Malaga, 2002.**  
K.W.: hidrology, water supply, protection belt.
- 11-189 Mezgec, Marjana: Slivarski potok in Slivarske ponikve. Kras, 50, 48-49, Ljubljana, 2002.**  
K.W.: water supply.
- 11-190 Mezgec, Mirjana ; Žumer, Jože: Lipov drevored in jama Dimnice. Kras, 52, 36-37, Ljubljana, 2002.**  
K.W.: history.
- 11-191 Mihevc, Andrej ; Bosak, Pavel ; Pruner, Petr ; Vokal, Barbara: Fossil remains of the cave animal *Marifugia cavatica* in the unroofed cave in the Črnotiče quarry, W Slovenia. Geologija 45, 471-474, 2002.**  
The paper is a report on the discovery of tubes of a fossilised cave serpulid in a roofless cave in the quarry near village Črnotiče. The site and shape of the fossilised tubes are described. The animals lived attached to the scallops in the wall of the water filled pas-

sage. The passage was later filled with clay deposits, followed by a layer of sinter several metres thick. The roof of the passage has been removed by karst denudation and the sinter now reaches to the surface.

Fragments of tubes of animals of various sizes have been preserved, attached to the rock wall; those tubes that grew at a right angle to the wall have broken off but been preserved in the sediment. In terms of their dimension and shape the tubes remind one of the tubes of the more recent cave serpulid *Marifugia cavatica* Absolon and Hrabě. The dating of the nearby sediments by palaeomagnetic method show that the minimum age of the serpulids is 1.7 Ma, but greater age is more probable.

- 11-192 Miko, Slobodan ; Kuhta, Mladen ; Kapelj, Sanja: Environmental baseline geochemistry of sediments and percolating waters in the Modrić Cave, Croatia. Acta carsologica, 31/1, 135-149, Ljubljana, 2002.**

A comprehensive study of Modrić cave was undertaken to evaluate the baseline conditions before its utilization for tourism. Silty loams with guano contain abundant quartz, illite and taranakite and minor vivianite and high concentrations of Cu (2869 mg/kg), Zn (951 mg/kg) and Cd (28 mg/kg). Also sediments mixed with guano are enriched with light REE as well as elevated concentrations of U, Th, Rb and Hg. Sediments with bone fragments contain abundant quartz, illite, calcite and hydroxylapatite and minor carndallite and lower contents of heavy metals. All sediments analysed showed various degrees of contamination by Cu and Zn from dispersed guano. Most of the Zn and Cu in cave sediments and the hydroxyl-apatite crusts are mainly controlled by the iron and manganese hydroxide and the organic fractions, the organic fraction plays an important role in sediment samples with direct influence of guano and in hydroxylapatite crusts while in samples with bone fragments the hydroxide control is dominant. Guano influence on the percolating waters was observed in two cases in the left channel where due to the higher content of orthophosphates saturation in respect to hydroxyl-apatite is present.

- 11-193 Mikoš, Matjaž ; Kranjc, Andrej ; Matičič, Branivoj ; Müller, Jakob ; Rakovec, Jože ; Roš, Miljenko ; Brilly, Mitja: Hidrološko izrazje = Terminology in hydrology. Acta hydrotech., vol. 20, št. 32, p. 3-324, 2002.**

For international co-operation in the field of hydrologic research we prepared a multilingual glossary of hydrology with 1418 terms in this research field in four languages: English, French, German, and Slovenian. The glossary consists of terms, their most frequent synonyms and translation equivalents in all four languages along with their definitions. The glossary contains over 2000 expressions in each language.

- 11-194 Mingtang, Lei ; Xiaozhen, Jiang ; Li, Yu: New advances in karst collapse research in China. Environmental Geology, 42, 462-468, s.l., 2002.**

K.W.: GIS, risk assessment, sinkhole.

- 11-195 Mlakar, Ivan: On the origin of the hydrographic net and on some karst phenomena in the Idrija region. Acta carsologica, 31/2, 9-60, Ljubljana, 2002.**

Geological structure on the Pliocene paleosurface level in the nowadays 1000 m altitude

were reconstructed. The lithological and tectonical circumstances in that time played a decisive role in hydrographic net origin and also on Kanomljica, Nikova, Idrija and Belca rivers piracy. Landscape south and NW from Idrija fulfil all conditions to become classical region for initial karstification stadium examination, for that reason to this problems great attention have been paid. Particularly system of cross alpine faults and fissures played significant role on karst phenomena origin. With potholes theory the origin of Wild Lake have been explained and pointed out, that some dolinas at least have been projected already in period when Cretaceous limestones were covered by worse waterpermeable rocks. Anticline structures proved as the best indicator for karst rooms presence. On article end the results of 60 complete silicate analyses of nearly all Idrija's rocks in table shape are presented.

**11-196 M6ga, J6nos: Morphogenetical karst types of the Transylvanian mountains (Mt. Apuseni). Acta carsologica, 31/3, 115-138, Ljubljana, 2002.**

The most well developed karstic forms in the whole of the Carpathians emerged in the Transylvanian Mountains (Mt. Apuseni) situated between the Transylvanian basin and the Great Hungarian Plain. This phenomena correlates with the diversity of structure and rock formation, and to the multifold nature of denudation processes. My intention is to present a survey and morphogenetic systematization of the most interesting karstic regions.

**11-197 Mudry, J. ; Charmoille, A. ; Robbe, N. ; Bertrand, C. ; Batiot, C. ; Emblanch, C. ; Mettetal, J.P.: Use of hydrogeochemistry to display a present recharge of confined karst aquifers. Case study of the Doubs valley, Jura mountains, eastern France.- Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 123-129, Malaga, 2002.**

K.W.: hydrogeochemistry, isotope.

**11-198 Mulec, Janez ; Zalar, Polona ; Zupan Hajna, Nadja ; Rupnik, Maja: Screening for culturable microorganisms from cave environments (Slovenia). Acta carsologica, 31/2, 177-187, Ljubljana, 2002.**

Various microenvironments in three different caves were screened for the presence of indigenous culturable microorganisms: extremely weathered limestone in Pečina v Borštu and Martinska jama, cave silver and calcite rafts on the surface of subterranean ponds in Pečina v Borštu and calcite moonmilk speleotheme in Snežna jama of Raduha mountain. The counts of viable cells collected are supplemented with laboratory data necessary to establish genus or wider taxonomic group level identity of isolates. Besides other bacterial and fungal groups fluorescent pseudomonads are prevailing among isolates.

**11-199 Nagode, Miran: Najnovejše raziskave Velike ledenice v Paradani in jam ob njej. Naše jame, 44, 98-106, 2002.**

Above Vipava valley there is a large karst plateau Trnovski gozd. Plateau is well karstified, characteristic are glaciers or caves with permanent ice. In the past ice was extracted from the ice caves and used to cool the food on the boats and in trains.

The most known ice cave of the Trnovski gozd is Velika ledenica v Paradani. Cavers of the Logatec caving club are exploring caves since 1977. Till now we came 650 m deep, and the length of the cave is 4090 m.

- 11-200 Nicod, Jean: Karsts, paléo-géomorphologies, paléo-environnements. Panorama des recherches récentes en France (1992-2001). Géomorphologie: relief, processus, environnement, 3, 253-268, s.l., 2002.**

K.W.: paleogeomorphology, geosystem, crypto-corrosion.

- 11-201 Nicod, Jean: Pamukkale (Hiérapolis): un site de travertins hydrothermaux exceptionnel de Turquie. Karstologia, 39, 51-54, s.l., 2002.**

K.W.: travertine, hydrothermal spring, neotectonics.

- 11-202 Nicod, Jean: Sur la formation et l'évolution des dolines d'effondrement ... et varia.- Karstologia, 39, 61, s.l., 2002.**

K.W.: book review of Acta carsologica 29/2, 30/1.

- 11-203 Nicod, Jean: Problèmes d'environnement dans quelques cités antiques d'Asie mineure et du Proche-Orient. Méditerranée, 3.4, 111-120, 2002.**

K.W.: ancient cities, water use, seismic events, Asia Minor, Near East.

- 11-204 Norwick, Stephen A. ; Dexter, Leland R.: Rates of development of tafoni in the Moenkopi and Kaibab formations in Meteor Crater and on the Colorado Plateau, northeastern Arizona. Earth Surface Processes and Landforms, 27, 11-26, s.l., 2002.**

K.W.: desertification, tafon, morphogenesis.

- 11-205 Nunez, Roberto Porter: The cave of the marbles. NSS News, 60, 100-103, Huntsville, 2002.**

K.W.: regional speleology.

- 11-206 Ogorelec, Breda: Kaj o ustanovitvi parka pravijo domačini? Kras, 52, 34-35, Ljubljana, 2002.**

K.W.: regional park.

- 11-207 Osborne, R. Armstrong L.: Paleokarst: cessation and rebirth? School of Development and Learning, A35. University of Sydney, N.S.W. 2006, Australia, 2002.**

The transformation of active karst into paleokarst by burial, isolation or cessation of process is not necessarily permanent. Paleokarst structures and landforms can be and are exhumed or reactivated, sometimes on numerous occasions. There is not a great deal of similarity between the localities where exhumation and reactivation of paleokarst has been reported. Exhumation and reactivation however have not been reported in many karsts that are similar to those where they have been reported. Exhumation and reactivation appears to be favoured in four situations: - the margins of sedimentary basins overlying

grand unconformities, the axes of anticlines, narrow steeply-dipping impounded karsts and where paleokarst fill contains unstable minerals. Six processes are principally responsible for exhumation and reactivation: - per-ascensum speleogenesis, eustatic sea level changes, paragenesis, high density speleogenesis, glaciation, and large-scale meteoric speleogenesis. On some occasions karst landforms, particularly caves or segments of caves, may survive intact and unfilled for geologically significant periods of time. These may be completely isolated from the surface environment, or become reactivated by entrance formation due to breakdown, surface lowering or headward erosion. The intersection and reactivation of ancient open cavities and of exhumed cavities by "modern" caves may be much more common than is currently recognised. If caves have histories as long and as complex as the karsts in which they are developed then many "modern" caves will be composite features composed of interconnected "modern", relict and exhumed cavities excavated at different times by different processes. Unravelling these histories is the new challenge facing cave science. It will require caves to be studied in a much more detailed, thorough and systematic manner and will also require the application of new technologies in surveying, analysis and dating.

**11-208 Osborne, R. Armstrong L.: The new science of eastern Australian Caves: implications for management and interpretation. in Henderson, K. [ed] Cave Management in Australasia 14, Proceedings of the 14<sup>th</sup> Australasian Conference on Cave and Karst Management. ACKMA, Carlton South. pp. 2-7, 2002.**

New studies have challenged the earlier interpretations of the karsts of east Australia.

New concepts include:

Multiple karstification (paleokarsts);

Non-meteoric speleogenesis and mineralisation (caves associated with ore bodies, and evidence for excavation by warm waters from below);

Cave development in steeply dipping limestone (differs from the classic karst situation);

Varying degrees of invasion/intersection of caves by the present landscape;

Stoping and breakdown by vadose weathering of unstable minerals;

Paragenesis allows a large passage to be excavated by a small stream;

Cupolas are of uncertain genesis.

**11-209 Osborne, R. Armstrong L.: Significance and monitoring. Acta carsologica, 31/1, 21-33, Ljubljana, 2002.**

An inventory survey followed by a significance assessment process, are essential precursors to any cave monitoring program. Monitoring must not be seen as an end in itself, but as part of an integrated, significance-based management process. It is essential to know what is significant, the conditions necessary to maintain its significance and that the condition and integrity of significant elements are being maintained. For instance, if the significance of a mud deposit is not known, monitoring the condition of speleothems will not stop the mud deposit from being destroyed by high-pressure water cleaning. Similarly, there is little point in monitoring temperature if dust is the main threat to the significant elements. The only way to know that monitoring of environmental conditions is effective is to monitor the ongoing condition and integrity of the significant elements themselves.



Without this, lots of interesting data could be collected while the most important features of the cave are lost. Monitoring should therefore address the conditions necessary for the maintenance of significance and the ongoing condition and integrity of significant elements.

- 11-210 Ovčak, Tomaž: Unška koliševka, 1.. Planinski vestnik, 102, 57-58, Ljubljana, 2002.**

K.W.: nature protection, collapse doline, Slovenia. free climbing.

- 11-211 Palmer, Arthur N.: Speleogenesis in carbonate rocks. Department of Earth Sciences, State University of New York, Oneonta, NY 13820, USA, 2002.**

This paper outlines the current views on cave origin in carbonate rocks, combining ideas from a variety of sources. A typical dissolution cave develops in several stages that grade smoothly from one to the next: (1) Initial openings are slowly enlarged by water that is nearly at solutional equilibrium with the local bedrock. (2) As the early routes enlarge, those with the greatest amount of flow grow fastest. (3) These favoured routes eventually become wide enough that groundwater is able to retain most of its solutional aggressiveness throughout the entire distance to the spring outlets. This breakthrough time usually requires times on the order of  $10^4$  to  $10^5$  years and ends the inception phase of speleogenesis. (4) Discharge along these selected routes increases rapidly, allowing them to enlarge into cave passages rather uniformly over their entire length. Maximum enlargement rates are roughly 0.001-0.1 cm/yr, depending on the local water chemistry and lithology. (5) The cave acquires a distinct passage pattern that depends on the nature of groundwater recharge, the geologic setting, and the erosional history of the region. Branchwork patterns dominate in most carbonate aquifers. Maze caves are produced by any of the following: steep hydraulic gradients (e.g. during floods), short flow paths, uniform recharge to many openings, and mixing of waters that contrast in chemistry. (6) Enlargement rate usually decreases as passages become air-filled, owing to loss of aggressiveness as carbon dioxide escapes through openings to the surface. (7) The cave typically evolves by diversion of water to new and lower routes as the fluvial base level drops. (8) The cave is eventually destroyed by roof collapse and by intersection of passages by surface erosion. At any given time, different parts of the same cave may be experiencing different stages in this sequence.

- 11-212 Panuska, Bruce C. ; Boardman, Mark R. ; Carew, James L. ; Mylroie, John E. ; Sealey, Neil E. ; Voegeli, Vincent: Eleuthera Island Field Trip Guide. 11<sup>th</sup> Symposium on the Geology of the Bahamas and Other Carbonate Regions, 20 pp., San Salvador, Bahamas, 2002.**

K.W.: guide book, sea cave.

- 11-213 Petričević, Josip: Slovačka jama 2002 -dnevnik ekspedicije. Velebiten, 37, 8-16, Zagreb, 2002.**

K.W.: caving, deepest cave, Slovačka jama, Croatia.

- 11-214 Pipan, Tanja: 8<sup>th</sup> International conference on copepoda (ICOC) National Taiwan Ocean University, Keelung, Taiwan, July 21-26, 2002. Acta carsologica, 31/3, 179-180, Ljubljana, 2002.**  
K.W.: conference report.
- 11-215 Pipan, Tanja: A. Brancelj, J. Dobravec, A. Gabersčik, M. Gabrovec, R. Jačimović, Z. Jeran, G. Kosi, S. Lojen, D. Ogrin, N. Ogrinc, I. Rejec Brancelj, T. Simčič, J. Urbanc, O. Urbanc-Berčič, P. Vreča, G. Muri, M. Šiško: Visokogorska jezera v vzhodnem delu Julijskih Alp - High-mountain lakes in the eastern part of the Julian Alps. Nacionalni inštitut za biologijo in Založba ZRC, ZRC SAZU, Acta carsologica, 31/3, 181-182, Ljubljana, 2002.**  
K.W.: book report.
- 11-216 Pipan, Tanja: An interdisciplinary workshop Pattern and process in Balkan biodiversity. Koper (Slovenia), 25-28 September 2001. Acta carsologica, 31/2, 251-252, Ljubljana, 2002.**  
K.W.: workshop report.
- 11-217 Popit, Andreja ; Vaupotič, Janja: Indoor radon concentrations in relation to geology in Slovenia. Environmental Geology, 42, 330-337, s.l., 2002.**  
K.W.: regression, statistics, Radon.
- 11-218 Porter Nunez, Roberto: The Caverns of Agua Blanca in Tabasco. NSS News, 60, 11-14, Huntsville, 2002.**  
K.W.: speleoarchaeology.
- 11-219 Prevorčnik, Simona ; Verovnik, Rudi ; Sket, Boris: Diversity of *Asellus aquaticus* (Crustacea: Isopoda) subpopulations in the Postojna-Planina Cave System testifies for recurrent immigration of the species underground. XVI International Symposium of Biospeleology. Abstracts, p. 88, 2002.**  
Two pigmentally heterogeneous subpopulations of *Asellus aquaticus* (L.) from the initial subterranean parts of Pivka River (PPCS, Slovenia) are supposedly the result of the introgression of the expansive surface subspecies *A. a. aquaticus* (L.) Racovitza into the troglomorphic *A. a. cavernicolus* Racovitza. We tried to resolve their taxonomic status by the analysis of geographic variation in 59 morphometric characters of males from 38 localities in Slovenia and nine other countries. Except for the pigmentation heterogeneity, Multivariate Discriminant Function Analysis, Minimum Spanning Tree and Cluster Analysis, showed surprisingly low variation in all morphological characters within and between the two examined subpopulations. The indication of the absence of hybridization was confirmed by separate studies of male gonopod structures and by high nucleotide divergence values between the pigmentally heterogeneous and troglomorphic subpopulations in PPCS, obtained by RAPD technique. Mt-DNA sequencing, however, clustered both subpopulations within the group of epigean, as well as hypogean populations from much wider area (the Postojna-Planina-Cerknica triangle). Nevertheless, all analysis indicate

that the pigmentally heterogeneous subpopulations represent the initial stage in the troglomorphy of (an) independent immigration wave(s), genetically isolated from highly troglomorphic older cave subpopulations of the same phyletic group. This certifies an important role of *A. aquaticus* as a model organism elucidating the evolution of cave faunas.

- 11-220 Price, Liz: Some 19<sup>th</sup> century visitors to caves in Peninsular Malaysia. *Acta carsologica*, 31/2, 233-247, Ljubljana, 2002.**

Malaysian caves have been known to man since prehistoric times, when they were used as shelters, campsites or places of refuge. The oldest remains found in Peninsular Malaysia are a human skeleton dated at 11.000 years old. But it was not until the 19<sup>th</sup> century that records appear of caves being visited, generally by European visitors for recreation, curiosity or research. Research generally began in the 1880's, mainly by British colonial officers stationed in Malaya. The caves at Batu Caves were "discovered" and made known to Europeans in 1878. This article lists some of the visitors and describes some of the early research.

- 11-221 Quinif, Yves ; Quinif, Gilles: Méthodes et éléments de cartographie d'un paléokarst. L'exemple de la Carrière du Clypot (Hainaut, Belgique). *Karstologia*, 39, 1-8, s.l., 2002.**

K.W.: paleokarst, mapping, quarry.

- 11-222 Railsback, Bruce L. ; Dabous, Adel A. ; Osmond, J.K. ; Fleisher, C.J.: Petrographic and geochemical screening of speleothems for U-series dating: an example from recrystallized speleothems from Wadi Sannur Cavern, Egypt. *Journal of Cave and Karst Studies*, 64, 108-116, Huntsville, 2002.**

K.W.: geochemistry, petrography, recrystallization.

- 11-223 Ravbar, Nataša: Chinese karst terminology (Examples from tropical and subtropical karst). *Acta carsologica*, 31/2, 189-208, Ljubljana, 2002.**

Good knowledge of terminology in different languages is indispensable to be able to present correctly the results of scientific work, for international cooperation of experts and for translating professional texts. Purpose of the present article is to represent the typical Chinese karst landscape and to explain the terms used in the country. Although karst researches in China are carried out separately from the karst-sciences of western countries, terms such as *fengcong*, *fenglin*, *shilin* are enforcing gradually into international karst terminology. Question how to introduce new terms into narrower professional public sphere with old terms already established, is still remaining open. Sometimes this is necessary since a new term is of somehow enriched meaning or is gathering more information and improving the understanding. Appropriateness of such decision should be estimated by further discussions, which should be based upon familiarity with the problem and not upon the sentimentality towards the terms, if these have born more general meaning up to this time.

- 11-224 Ravbar, Nataša: Márton Veress, Tamás Nacsa, Peter Gruber, Ernő Tamás Horváth, György Kovács, Szilárd Somlai, Levente Szabó, Zoltán Zentai, Gábor Szunyogh Karsztfeljlődés IV (razvoj škrapelj) 176 str., BDF Természetföldrajzi Tanszék, Szombathely, 2000. Acta carsologica, 31/2, 253-254, Ljubljana, 2002.**  
K.W.: book report.
- 11-225 Rijavec, Jasmina: Brezno v Stršinkni dolini. Naše jame, 44, 79-85, 2002.**  
The cave known as Brezno v Stršinkni dolini is one of the caves that is connected with the underground course of the Reka river. This is indicated by the strong air current, which appears in the cave when the water level of the underground Reka is rising. The wind makes a loud noise and moves tree branches around the cave. Members of Sežana caving club have been digging in the cave, following the draught, for several years. Currently the cave is 228 m deep, with its floor at 116 m a.s.l. In Labodnica Cave (Abisso Trebicano), which is not far away, the flood water can reach a level of 115.6 m.
- 11-226 Rijavec, Jasmina: Udornice južno od Sežane. Naše jame, 44, 55-71, 2002.**  
Volumes of the collapse dolines in Sežana Karst that are described in the text are much larger than the volumes of any underground chamber known in the area. Most of the collapse dolines are old, and they have been reshaped by denudation. Nevertheless, they still display the characteristics of their collapse origin.
- 11-227 Ringrose, S. ; Kampunzu, A.B. ; Vink, B.W. ; Matheson, W. ; Downey, W.S.: Origin and palaeo-environments of calcareous sediments in the Moshaweng dry valley, Southeast Botswana. Earth Surface Processes and Landforms, 27, 591-611, s.l., 2002.**  
K.W.: geochemistry, x-rays, calcrete.
- 11-228 Rodriguez Pacheco, R. ; Fabregat, S. ; Dias-Martinez, R.: El desarrollo del karst en rocas non carbonatadas: el ejemplo de las rocas ultramaficas serpentinizadas en Cuba. Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 295-304, Malaga, 2002.**  
K.W.: geological map, heritage.
- 11-229 Rojšek, Daniel: Inventarisation of natural heritage enlighten by geological model of kras/karst. Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 267-272, Malaga, 2002.**  
K.W.: inventory, heritage.
- 11-230 Romanov, Douchko ; Dreybrodt, Wolfgang ; Gabrovšek, Franci: Interaction of fracture and conduit flow in the evolution of karst aquifers. Proceedings of the symposium Karst Frontiers: Florida and Related Environments. Special Publication, 7, 38-43, s.l., 2002.**  
K.W.: hydrochemistry, modelling.

- 11-231 Rowling, J.: Cataloguing helictites and other capillary-controlled speleothems. in Brown, C., [ed], Proceedings of the 23<sup>rd</sup> Australian Speleological Federation Conference, Bathurst, NSW. ASF, Broadway. pp. 46-56, 2002.**

In the 2nd Edition of Hill & Forti's book, "Cave Minerals of the World", helictites are described with three subtypes. Other capillary controlled speleothems described by Hill and Forti are Cave Shields and Welts. This article suggests the addition of some other capillary controlled speleothems to the list, then attempts to sub-divide the speleothem type "helictite" into further sub-types. The reason why is because there are several sub-types which can be recognised around the world as being of the same form, however there is no specific name given to them. Possibly this consistency of form is due to a common chemical or biological influence and cataloguing the forms is the first step in understanding what causes them. Forms include ribbon helictites, saws, rods, butterflies and "hands". Influences include multiple canals, gravitation, possible chemical changes, and crystal twinning. Materials include calcite, needle-form calcite and aragonite. Vaterite is touched on, however, it generally occurs in caves as the result of human intervention (pollution). Finally this article suggests that a better classification scheme could be done using a database rather than attempting to force a hierarchy onto disparate objects.

- 11-232 Sadiq, Abdulali M. ; Nasir, Sobhi J.: Middle Pleistocene karst evolution in the state of Qatar, Arabian Gulf. Journal of Cave and Karst Studies, 64, 132-139, Huntsville, 2002.**  
K.W.: morphogenesis.

- 11-233 Salomon, Jean-Noel: Les karsts de Nouvelle-Zélande. Karstologia, 39, 9-22, s.l., 2002.**  
K.W.: polygonal karst, cave, glowing worm.

- 11-234 Sanderson, Ken ; Bourne, Steven: Cave Temperatures at Naracoorte Caves. Helictite, 38(1): 7-10, 2002.**

Temperatures in four different caves at Naracoorte were logged for periods of up to two years, during 1998-2001. In Bat Cave temperatures near ground level were 19.0-21.1°C in the maternity chamber, and 10.3-15.6°C near the entrance. In Victoria Fossil Cave temperatures near the fossil chamber were 16.9-18.3°C. In Blanche Cave and the outer chamber of Robertson Cave temperatures were 9.4-15.0°C, with temperatures in the inner chamber of Robertson Cave 14.2-15.0°C. Cave chambers with little air flow had seasonally stable temperatures, and those with high air flow showed seasonal temperature variations of 5-6°C.

- 11-235 Sansević, Ana Katarina ; Bakšić, Darko: Pregled istraživanja Slovačke jame. Velebiten, 37, 2-7, Zagreb, 2002.**  
K.W.: caving, deepest cave, Slovačka jama, Croatia.

- 11-236 Sauro, Ugo: Quando in Lessinia c'era il grande gelo. (Engl. title: Once, when the Monti Lessini were in the deep cold) Quaderno Culturale - La Lessinia ieri oggi domani - 2002, 85-94, 2002.**

The paper delineates an overview of the periglacial environmental conditions of late Pleistocene in the karst plateau of Monti Lessini. Nivation niches, stratified slope depos-

its, mantles of loess like sediments, cryoturbation structures, peculiar types of rock glaciers, are proofs of how severe the climatic and environmental conditions have been in the areas not covered by local glaciers nearly 20 ka b.p.

- 11-237 Sauro, Ugo: Alcuni recenti fenomeni di crollo di tipo carsico nelle Prealpi Venete: aspetti morfodinamici e del rischio naturale. (Engl. title: Recent karst collapse phenomena in the Venetian Fore-alps: morphodynamical aspects and natural risks) In: »Le voragini catastrofiche: un nuovo problema per la Toscana.« Regione Toscana-Giunta Regionale - Dipartimento delle Politiche Territoriali ed Ambientali, 27-34, 2002.**

In the Venetian Fore Alps, karst collapse phenomena are well known by the inhabitants of the mountain areas. The natural risk of sinking, or of falling inside karst cavities is relatively high in some areas, especially for the pasturing animals.

Different morphogenetical types of open pits and collapse dolines are distinguishable: a) collapse of the roof of hypogean cavities, b) decapping of hypogean cavities as a consequence of the topographical surface lowering by erosional processes, c) speleogenesis and opening of cavities in relation with the dynamics of the epikarst, d) opening of cavities formed by the swallowing of filling materials inside hypogean voids, e) swallowing of covers of loose materials inside caves and open voids enlarging by karst processes; karst processes may also involve some covers, g) opening of small pits in intensely fractured rocky masses interested by seismic shocks and also by karst processes. Same examples of these different types are illustrated and discussed.

- 11-238 Sauro, Ugo: La tutela dell'ambiente carsico. (Egl. title: The conservation and planning of the karst environments) Atti Convegno: »La Speleologia Italiana agli inizi del Terzo Millennio: storia e prospettive.« Istituto Italiano di Speleologia, memoria 13, s. II, 85-91, 2002.**

The correct planning of the sustainable development, the protection, the mitigation of human impact and the restoration of the karst environments need a good knowledge of all the environmental system, starting from the modelling of the karst geo-ecosystems. To make this, it is necessary to study both all the main components of the natural systems and their dynamics, to collect many qualitative and quantitative data and to organise them inside the proper framework. A particular attention should be devoted to the responses to the different forms of human impacts. The Venetian Prealps are ideal fields for this type of study. Examples of environmental dynamics and of consequences of different impacts on some prealpine groups are discussed. The role of the speleologists is fundamental both for the collection of data about the underground component of the karst geo-ecosystems and for the contribution to the modelling of the same systems.

- 11-239 Sauro, Ugo: The Monti Berici: A peculiar type of karst in the Southern Alps. Acta carsologica, 31/3, 99-114, Ljubljana, 2002.**

The Monti Berici constitute the most southerly karst morpho-unit of the Southern Alps and a peculiar type of karst. The analysis of their topography, the identification of a "morpho-stratigraphy" of the relicts of surface planation and of the different types of

fluvial forms, and the recognition of the few elements of chronological significance present in this context, allow the delineation of a preliminary model of the geomorphological evolution of this mountain group. The main morphogenetical elements are of fluvial origin and have been determined, not only by the climatic changes, but also by the tectonic uplifting and/or by changes of the base level. The karst landforms have mostly evolved on the relict fluvial forms or in the context of relatively inactive fluvial forms. The age of the main forms extends over a very long time span, probably in the order of 15 million years. The preservation of very old forms can be explained by the peculiar geomorphological environment which was not affected by glacial erosion during the Pleistocene. The comparison of the evolution models of several karst morpho-units in the Southern Alps helps to understand the differences in their geomorphological styles.

- 11-240 Schmidt, F. ; Goldscheider, N.: Reconstruction of a paleo tower karst landscape in the Franconian Alb (Germany) using a GIS supported multiple regression approach. Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 69-73, Malaga, 2002.**

K.W.: statistics, paleokarst, regression, tower karst, GIS.

- 11-241 Shannon, C.H.C.: Flood effects in McKeowns Valley and Mammoth Cave, Jenolan caves, NSW. in Brown, C., [ed], Proceedings of the 23<sup>rd</sup> Australian Speleological Federation Conference, Bathurst, NSW. ASF, Broadway. pp. 33-38, 2002.**

Uses previously unpublished observations on stream flows in different parts of the surface and underground drainage to deduce possible connections and flood behaviour of the karst drainage of the northern part of the Jenolan Underground River, NSW, Australia.

- 11-242 Sharafi, A. ; Raeisi, E. ; Farhoodi, G.: The Effect of Darab Salt Dome on the Quality of Adjacent Karstic and Alluvium Aquifers (South of Iran). Acta carsologica, 31/2, 105-113, Ljubljana, 2002.**

Karstified carbonate formations are among the most important water resources in the south-central regions of Iran. If the karst water is not contaminated by salt domes, the electrical conductivity of water in the karst aquifer is less than 500  $\mu\text{S cm}^{-1}$  in the south-center of Iran. The study area is located in the southern flank of Shahneshin-Milk anticline, 200 km east of Shiraz. This region is situated in the Zagros Thrust Zone. The Tarbur karstic formation (Late Campanian-Maastrichtian) is outcropped on the southern flank of the Shahneshin-Milk anticline which is underlain by the impermeable Radiolarite formation. The Darab salt dome outcrops inside the karstified Tarbur Formation. Several springs emerge from the Tarbur Formation. The quality of all springs is in the range of unpolluted karst water except for three springs which are located near the Darab salt dome. The electrical conductivity of these springs range from 1200 to 2000  $\mu\text{S cm}^{-1}$ . Part of the alluvium near the Darab salt dome is salt-marsh which is bounded by two channels. The electrical conductivity in the salt-marsh below the water table is about 1400  $\mu\text{S cm}^{-1}$ , and it reduces to 400  $\mu\text{S cm}^{-1}$  at the lower depths. Run-off from the Darab salt dome and seepage from the channel with low quality water are probably the main reasons of salt-marsh development. A considerable amount of polluted Tarbur karst water does not flow to-



wards the marshland because, firstly, most of the Tarbur karst water discharges from the springs, and secondly, the alluvium aquifer is not affected by polluted water at lower depths.

**11-243 Shaw, Trevor R. ; Čuk, Alenka: Royal and other noble visitors to Postojnska jama 1819 - 1945. Acta carsologica, 31/1, Supplementum I, 1-106, Ljubljana, 2002.**

103 visits to Slovene caves by emperors, kings and the other rulers and by those related to them are recorded, mostly with portraits and photographs of their entries in the VIP visitors' book of Postojnska jama. The visitors came from Asia and S. America, as well as from most of Europe, and several of the family visits included children as young as 9. Whilst the identification of each visitor is one purpose of the paper, it seeks also to show the impact of the visits on the caves, their management and their publicity as well as in relation to some diplomatic problems. The Crown Princess Stephanie, aged 21, was enjoying the new paths and viewpoints at Škocjan while on a good-will visit to Trieste in 1885. Emperor Franz Joseph came to Postojnska jama in 1883, with strict security in force after a recent assassination attempt, and found that his guard of honour (of the fire brigade) was away fighting a fire. Descriptions by two of the visitors of their tours are printed. K.W.: Slovenia, Postojna, caves, history, royalty, Franz Joseph, Crown Princess Stephanie, Postojnska jama, Škocjanske jame.

**11-244 Sinreich, M. ; Zwahlen, F.: Feasibility of contaminant specific karst groundwater vulnerability assessment. Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 53-59, Malaga, 2002.**

K.W.: water pollution, degradation, man's impact.

**11-245 Sket, Boris: The evolution of the karst versus the distribution and diversity of the hypogean fauna. Oddelek za biologijo Biotehniške fakultete, p.p. 2995, 1101 Ljubljana, Slovenia, 2002.**

Within the biogeographical merodinaric karst areas, ranges of some stygobiotic species are in discord with actual drainage patterns. A number of such cases in Gastropoda and Crustacea are presented. Sometimes their ranges resemble the areas of hypothetical prekarstic paleodrainages. It has been supposed that after transition underground some species reside in those areas which they occupied before the advanced karstification. It has been shown that the interspecific competition may force a species to stay in the area of its origin. At least some rearrangements in their headwaters has to have occurred in the past if one such animal taxon is present in two actual drainages. A case is presented (*Monolistra caeca* in southern Slovenia), where the species distribution and racial diversity could give a hint to the paleohydrological assumptions.

**11-246 Sket, Boris: Živalski svet Kostanjeviške in Bizjakove jame (Fauna of caves Kostanjeviška jama and Bizjakova jama, Slovenia). In: Hudoklin, Andrej (ed.), Kostanjeviška jama. Jamarski klub Novo mesto & Klub jamarjev Kostanjevica na Krki, pp. 91-95, 2002.**

K.W.: cave fauna, Slovenia, Dinaric karst, Crustacea, Gastropoda, Coleoptera.



- 11-247 Sket, Boris: The evolution of the karst versus the distribution and diversity of the hypogean fauna.. In: Gabrovšek, Franci (ed.), Evolution of karst: from Prekarst to cessation, Ljubljana-Postojna, pp. 225-232, 2002.**

Within the biogeographical merodinaric karst areas, ranges of some stygobiotic species are in discord with actual drainage patterns. Some cases in Gastropoda and Crustacea are presented. Sometimes their ranges resemble the areas of hypothetical prekarstic paleodrainages. It has been supposed that after transition underground some species reside in those areas which they occupied before the advanced karstification. It has been shown that the interspecific competition may force a species to stay in the area of its origin. At least some rearrangements in their headwaters has to have occurred in the past if one such animal taxon is present in two actual drainages. A case (*Monolistra caeca* in southern Slovenia) is presented, where the species distribution and racial diversity could give a hint for paleohydrographical assumptions.

K.W.: biogeography, cave fauna, Dinaric karst, Isopoda, paleohydrography.

- 11-248 Sket, Boris; Paragamian, Kaloust; Trontelj, Peter: A census of the obligate subterranean fauna in the Balkan Peninsula. XVI International Symposium of Biospeleology. Abstracts, p. 64, 2002.**

K.W.: biodiversity, subterranean fauna, Balkans, Dinaric karst, biodiversity hotspot.

- 11-249 Slabe, Tadej ; Kranjc, Andrej: L'Institut pour la Recherche sur le Karst - IZRK (Postojna, Slovénie). Karstologia, 39, 55-56, s.l., 2002.**

K.W.: Karst Research Institute, Postojna, Slovenia.

- 11-250 Spate, Andy: Andysez 41. Let's construct a chess set -secrets of the epikarst. Australasian Cave & Karst Management Association Journal, 46, 37-39, s.l., 2002.**

K.W.: epikarst, erosion.

- 11-251 Springer, Greg: Cave exploration in "The D Word": Rites of Passage Beneath West Virginia. NSS News, 60, 36-40, Huntsville, 2002.**

K.W.: cave description.

- 11-252 Steele, Bill: Art Palmer, Peggy Palmer. NSS News, 60, 51-52, Huntsville, 2002.**

K.W.: interview.

- 11-253 Steward, Paul: True Tales of Terror from the Caves of the World. Kočevski Rog Caves. NSS News, 60, 267, Huntsville, 2002.**

K.W.: mass graveyards, Second War.

- 11-254 Surić, Maša: Submarine karst of Croatia - evidence of former lower sea levels. Acta carsologica, 31/3, 89-98, Ljubljana, 2002.**

During the last, Late Pleistocene-Holocene transgression, rising sea flooded a vast part of the Dinaric karst. Due to prevalence of carbonate rocks in the drainage area of most of the rivers on Eastern Adriatic coast, those rivers carry only approximately 20% of particulates

as suspended matter and the rest is dissolved. Consequently, many typical karst features such as karrens, dolines, poljes, caves, pits and river valleys and canyons as well, presently under the sea, can still be recognized. Beside these simply drowned features, some new ones were formed by the sea level rise. Those are submarine springs, so called vruljas, brackish coastal springs and marine lakes. The most significant evidences of former subaerial conditions are speleothems in submerged caves and calc tufa deposits of drowned paleo rivers. Both of them could be used for determination of the former low sea level stands.

- 11-255 Šajn, Srečko: Speleobiološka postaja v Postojnski jami. Lipov list, 44, 53-54, Ljubljana, 2002.**

K.W.: show cave, speleobiological station, Postojnska jama, Slovenia.

- 11-256 Šebela, Stanka: Neotektonika v sistemu Postojnskih jam. Raziskave s področja geodezije in geofizike 2002 : zbornik predavanj. Fakulteta za gradbeništvo in geodezijo, 5-9, Ljubljana, 2002.**

In the longest karst cave in Slovenia, Postojnska Jama Cave System (20 km), there are more examples of tectonic activity in cave passages when the cave was already formed. The best example is in artificial passage between Lepe jame and Črna jama where tectonic slickensides on cave sediments have been studied.

- 11-257 Šušteršič, Franc: Ljublanica - reka sedmerih imen. Kras, 50, 5-13, Ljubljana, 2002.**

K.W.: karst hydrography, sinking river, Ljublanica, Slovenia.

- 11-258 Šušteršič, France: Mitrej pri Rožancu - antični kamnolom. Rast, 13, 178-183, Novo mesto, 2002.**

K.W.: cave in mythology, roman quarry, Mitraeum, Slovenia.

- 11-259 Šušteršič, France ; Šušteršič, Simona ; Stepišnik, Uroš: Mladokvartarna dinamika Planinske jame. Naše jame, 44, 25-55, 2002.**

The development in Planinska jama during the last 100ka was very "vigorous", but it did not essentially affect the layout of pre-existing bedrock channels. Spatial interpretation of the sediments in Planinska jama revealed that in the early Quarternary, only the Pivka can be proven to have flowed through the cave. Its outlet switched between the present cave "entrance" and the Malni valley. After Würm I the Cerkniščica inundated Cerkniško polje. Gradual elimination of the main vertical ponors deflected the main stream westwards. This water found its outlet to Planinsko polje in the Malni valley, and blocked the outflow of the Pivka. The Pivka reopened a long-choked outlet in the area of the present cave "entrance" before the end of Würm II. Consequently, the Western and Eastern Branches of Planinska jama were washed clear of older sediments. Redeposition reached right across Planinsko polje, i.e. into Vranja jama.

- 11-260 Šušteršič, Simona: Two phase development of the upper Cerknjščica basin. *Acta carsologica*, 31/3, 155-164, Ljubljana, 2002.**

The Cerknjščica catchment area covers about 46.8 km<sup>2</sup>, and most of the area is built of upper Triassic dolomite. So, the differences in the surface roughness are mostly not due to variable lithology, but to different degrees of tectonically injured rock. Reconstruction of longitudinal profiles of the main river and of its tributaries revealed that there do not exist multiple terraces, as believed before. Rather, the river formed only two distinct levels. The older one is about 10-40 m higher, a wide, well equilibrated valley. It was formed by the predecessor of the present Cerknjščica, at the time when the river sank in the area of Begunje and continued its way towards Logatec underground. The younger level is controlled by the inrush of the river into Cerknjško polje. Sudden lowering of the erosion base, by the end of Würm, provoked rapid incision into the earlier surface, and the formation of canyon-like entrenchment.

- 11-261 Taminskas, J. ; Marcinkevicius, V.: Karst geoindicators of environmental change: The case of Lithuania. *Environmental Geology*, 42, 757-766, s.l., 2002.**

K.W.: geoindicator, monitoring, gypsum, sinkhole.

- 11-262 Tasler, Radko ; Novotna, Jirina: Julske Alpy "2001". *Speleo*, 35, 14-17, Praha, 2002.**

K.W.: speleological expedition.

- 11-263 Tavagnutti, Maurizio: Magia di una valle (le leggende della valle dello Judrio). *La valle dello Judrio. Progetto di ricerca speleologica Judrio 2000*, 183-214, Gorizia, 2002.**

K.W.: legend, ethnology.

- 11-264 Tavagnutti, Maurizio: Morfologie carsiche. *La valle dello Judrio. Progetto di ricerca speleologica Judrio 2000*, 25-57, Gorizia, 2002.**

K.W.: karst morphology, karren.

- 11-265 Thompson, Bob: Historic Paintings of Mammoth Cave. *NSS News*, 60, 108-113, Huntsville, 2002.**

K.W.: speleohistory, cave painting.

- 11-266 Trayes, Mary: Selected sea caves and coastal karst of the South Island's West Coast, New Zealand. *Australasian Cave & Karst Management Association Journal*, 46, 11-16, s.l., 2002.**

K.W.: coastal karst, sea cave.

- 11-267 Trofimova, Elena V.: Carbonate karst of Siberie and the Far East: intensity of the modern development. In: *Geomorphologie of the mountains and before the mountains*, Presidium of the Geomorphological Commission of RAS. Barnaul, 47-51, 2002.**

The karstic denudation is the principal characteristic in the modern development of the karstic regions. The estimation of the karstic denudation was accomplished using the method

of J. Corbel for the all area of Siberie and the Far East based on materials regarding the carbonate karst, on data of the comprehensive geological and hydrogeological surveys, as well as information about the runoff and chemical contents of the water of 125 river valleys. The considered magnitude varies from 1,1 to 62,0 mm/ millenium in the researched region.

**11-268 Trofimova, Elena V.: Processes of weathering in dynamic zone of cave Volglaya (Olkhon plateau). In: Hydrogeologie and Science of the karst, Perm N 14, 290-296, 2002.**

The observations under weathering processes were organized from 7 January February 1998 to 11 February 1999 weekly in cave Volglaya (40 km to SW from Irkutsk, L = 286 m, H = 86 m, dolomites of Lower Cambrien) situated in the fissure of side displacement formed as a result of block dislocation along the tectonic deformation. The observations were produced in niche, in dynamic zone of cave, using the plastic film, thermographes, hydrographes, aspiration psychrometres and soil thermometres. In winter the disintegration of the rocks is due to temperature and frost weathering as well as hydrotational and cryohydrotational weathering, in summer - by the temperature and hydrotational weathering. During all the year 13,28 mg/sm<sup>2</sup> of the rock is weathered near the entrence of the cave Volglaya.

**11-269 Trontelj, Peter ; Gorički, Špela ; Murko-Bulič, Jožica ; Sket, Boris: Molecular systematic studies of *Proteus* and *Niphargus* using mitochondrial DNA sequences. XVI International Symposium of Biospeleology. Abstracts, p 92, 2002.**

We present preliminary results of phylogenetic, taxonomic, and phylogeographic studies in two key taxa for European groundwater biodiversity: the widely distributed, species-rich amphipod genus *Niphargus* and the famous blind cave salamander *Proteus anguinus*. Both taxa are used as models for the analysis of "cryptic diversity" in the EU Project PASCALIS for the assessment of groundwater biodiversity. As a starting problem we attempted to identify the most appropriate mitochondrial DNA sequences for the analyses. A range of PCR primers has been tried out to optimize the amplification and sequencing of mitochondrial genes for the small and big rRNA subunit, the gene for subunit I of cytochrome oxidase (COI) and, in *Proteus*, the mitochondrial control region and ATPase gene. The amplified regions differed considerably in their variability levels. Both ribosomal genes turned out to be too conserved to resolve relationships between *Proteus* populations sufficiently.

**11-270 Turk, Ivan ; Skaberne, Dragomir ; Blackwell, Bonnie A.B. ; Dirjec, Janez: Assessing Humidity in an Upper Pleistocene Karst Environment: Palaeoclimates and Palaeomicroenvironments at the cave Divje babe I, Slovenia. Acta carsologica, 31/2, 139-175, Ljubljana, 2002.**

The article presents a new sedimentary-climatic model for explaining autochthonous clastic sediment in the Upper Pleistocene site, Divje babe I, Slovenia. The sediment analysed here was deposited during Oxygen Isotope Stages 1, 3 and 5 (OIS, OIS 3, OIS 5). The stress is on precipitation, which we explained on the basis of the quantity of authigenic structural aggregates in the sediment. We supported the results with quantitative analysis

of clasts with etched surface, which represent corrosion of the cave ceiling, and etched bones, which represent corrosion on the cave ground. We also analysed the relation between climate and cave bears, and Neanderthals and climate, on the basis of mass fossil remains and finds of artefacts. All analyses were made on the basis of three-dimensional sampling, i.e., in horizontal and vertical directions. We sampled 65 profiles over an area of 65 m<sup>2</sup>. Each profile had 35 arbitrary stratigraphic units (splits) with data on aggregates, etched bones, fossil remains and artefacts. In explaining the sediment characteristics that point to climatic parameters, we consistently took into account the Holocene standards for the site. We found that the climate in OIS 3 was colder and damper than in OIS 1 and OIS 5. People and animals responded to the climatic changes in OIS 3 with more visits to the cave, but not at the same time. The climatic change was presumably reflected in the microlocation of the cave mainly by the longer duration of snow cover.

- 11-271 Turk, Peter: Arheološka zbirka v parku Škocjanske jame. Kras, 53, 14-19, Ljubljana, 2002.**

K.W.: cave archaeology, archaeological collection, Škocjanske jame, Slovenia.

- 11-272 Turner, Ken: Chromophores Producing Blue Speleothems at Cliefden, NSW. *Helictite* 38(1): 3-6, 2002.**

Osborne (1978) has described in some detail the blue stalactites that occur in Murder and Boonderoo Caves at Cliefden, NSW and reports "that the colour is due to some impurity in the aragonite and not to refractive effects". In this study, small samples from the Boonderoo and Taplow Maze blue speleothems have been chemically analysed. Based on these chemical analyses it is suggested that the major chromophore is copper, with secondary contributions from chromium (Taplow Maze only) and perhaps nickel.

- 11-273 Uredništvo: Viktor Saksida - jamar in amaterski arheolog. Kras, 52, 24-29, Ljubljana, 2002.**

K.W.: biography, Saksida Viktor.

- 11-274 Urushibara-Yoshino, Kazuko: The Karst Terrain in Sendaihara, Abukuma Mountains, North Japan. *Bulletin of the Faculty of Letters, Hosei University*, (47), 163-173, 2002.**

The karst system on the Sendaihara plateau in Abukuma Mountains, northeastern Honshu, Japan was studied. In particular, discussion was made on the relation between karstification and tectonic movement. The study area is covered by marble, on which the effect of metamorphism during the age of Cretaceous. In central part of metamorphism, granite is dominated. According to the previous studies, five denudation levels and three peneplains were classified in the areas of granites. However, the river terraces, which can be used for the estimation of tectonic movement, were not remained in the study area, because of strong weathering of granites. The karst systems "between Nekoakushi ponor and Irimizudo karst spring" and "between Oniana doline and Abukumado karst spring" were made clear by measuring levels of altitude. Furthermore, modeling of palaeo-cave systems of both caves was tried. In Irimizudo, relative height between Odo and Medo, about 30m, shows

one of clear palaeo-systems. In Abukumado, the level of relative height about 30m (Takinegoten-Oniana cave) also show one of three palaeo-systems. It is considered that these palaeo-systems are a proof of tectonic movement in Abukuma Mountains. The ratio of movement will be clarify in the coming studies.

- 11-275 Vadillo, I. ; Andreo, B. ; Carrasco, F.:** Contamination of a karstic aquifer by leachates from a urban solid waste landfill.- *Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 85-90, Malaga, 2002.*  
K.W.: dumping site, water pollution, man's impact.
- 11-276 Varnedoe, Bill:** The Caves on Rapanui. *NSS News, 60, 41, Huntsville, 2002.*  
K.W.: description of caves.
- 11-277 Verona, Valentino:** Analisi generale della flora e della vegetazione circostante alcune grotte della valle dello Judrio. *La valle dello Judrio. Progetto di ricerca speleologica Judrio 2000, 19-24, Gorizia, 2002.*  
K.W.: botany.
- 11-278 Vias, J.M. ; Andreo, B. ; Perles, M.J. ; Carrasco, F. ; Vadillo, I. ; Jimenez, P.:** Preliminary proposal of a method for contamination vulnerability mapping in carbonate aquifers.- *Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 75-83, Malaga, 2002.*  
K.W.: vulnerability, COP method, aquifer.
- 11-279 Warren, Todd:** Terra incognita: The 2001 Cerro Rabon Expedition, Mexico. *NSS News, 60, 104-107, Huntsville, 2002.*  
K.W.: speleological expedition.
- 11-280 Wheeler, Betty:** George N. Huppert. *NSS News, 60, 25-26, Huntsville, 2002.*  
K.W. In memoriam.
- 11-281 Wilson, William L.:** Conduit morphology and hydrodynamics of the Floridan aquifer: moving to the next level - conduit modeling. *Proceedings of the symposium Karst Frontiers: Florida and Related Environments. Special Publication, 7, 5-8, s.l., 2002.*  
K.W.: hydrodynamics, modelling.
- 11-282 Wiśniewski, Wojciech W.:** 1950-2000. Half century of polish speleological periodicals. *Zacisk, 22, 18-19, Bielsko-Biała, 2002.*  
K.W.: speleohistory, bibliography, Poland.
- 11-283 Wiśniewski, Wojciech W.:** Mariusz Zaruski [- explorator of cave. Monography]. *Zeszyty Naukowe. Wyższa Szkoła Ekonomiczna w Warszawie, 1(27), 47-75, Warszawa, 2002.*  
K.W.: Mariusz Zaruski, speleohistory, regional speleology, Poland.

- 11-284 Wiśniewski, Wojciech W.: Pozzo del Merro. [A new world record of underwater cave depth]. Jaskinie 2(27), 5, Kraków, 2002.**  
K.W.: regional speleology, report, cave, depth record, Italy.
- 11-285 Wiśniewski, Wojciech W.: Waldemar Mucha. Taternik, 76/4(2001), 77-79, Warszawa, 2002.**  
K.W.: In memoriam, biography, regional speleology.
- 11-286 Wiśniewski, Wojciech W.: [A new in the world deepest inside cave pit - "Bojim, bojim" - above 450 meters vertical]. Jaskinie 2(27), 20-21, Kraków, 2002.**  
K.W.: regional speleology, report, Croatia.
- 11-287 Wiśniewski, Wojciech W.: [About Atlas of karst forms of the Plešivecka planina]. Spravodaj Slovenskej Speleologickej Spoločnosti 33/2, 51, Prešov, 2002.**  
K.W.: book review, regional speleology, Slovakia.
- 11-288 Wiśniewski, Wojciech W.: [About caves of the Plešivecka planina]. Jaskinie 2(27), 32-34, Kraków, 2002.**  
K.W.: book review, regional speleology, Slovakia.
- 11-289 Wiśniewski, Wojciech W.: [About diving in Polish caves]. Magazyn Nurkowanie 9(83), 42-45, Szczecin, 2002.**  
K.W.: speleohistory, cave diving, Poland.
- 11-290 Wiśniewski, Wojciech W.: [About karst, caves and Polish activity on New Guinea]. Taternik, 76/4 (2001), 45-47, Warszawa, 2002.**  
K.W.: speleohistory, regional speleology, report.
- 11-291 Wiśniewski, Wojciech W.: [About oldest printed mentioning related about a cave from Polish Tatra Mountains]. Zacisk 21, 22-23, Bielsko-Biała, 2002.**  
K.W.: speleohistory, regional speleology, Poland.
- 11-292 Wiśniewski, Wojciech W.: [Accidents in caves Cracov-Częstochowa Upland in 2001]. Taternik, 76/4 (2001), 56-57, Warszawa, 2002.**  
K.W.: accident, report, Poland.
- 11-293 Wiśniewski, Wojciech W.: [Caves]. In: Wielka encyklopedia PWN [The Great Encyclopaedia PWN], vol. 12, 461-464, Warszawa, 2002.**  
Encyclopaedic article.
- 11-294 Wiśniewski, Wojciech W.: [Excursion to the Skorocicka cave in a fantasy short-story of first half of 19<sup>th</sup> c.]. Materiały 36. Sympozjum Speleologicznego. Sekcja Speleologiczna Polskiego Towarzystwa Przyrodników im. Kopernika, Pińczów, 25-27.10.2002, 68-70, Kraków, 2002.**  
K.W.: speleohistory, cave tourism, Poland.

- 11-295** Wiśniewski, Wojciech W.: [Fiftieth Anniversary of the first diving in Polish cave (Zimna Cave 3.02.1953)]. *Materiały 36. Sympozjum Speleologicznego. Sekcja Speleologiczna Polskiego Towarzystwa Przyrodników im. Kopernika, Pińczów, 25-27.10.2002, 71-73, Kraków, 2002.*  
K.W.: speleohistory, cave diving, Poland.
- 11-296** Wiśniewski, Wojciech W.: [Speleological activity of Mariusz Zaruski]. *Materiały 36. Sympozjum Speleologicznego. Sekcja Speleologiczna Polskiego Towarzystwa Przyrodników im. Kopernika, Pińczów, 25-27.10.2002, 65-67, Kraków, 2002.*  
K.W.: Mariusz Zaruski, speleohistory, regional speleology, Poland.
- 11-297** Wiśniewski, Wojciech W.: [Speleological entries]. In: *Britannica - edycja polska [Polish edition]. [encyclopaedia]. vol. 24, vol. 25, Poznań, 2001.*  
Encyclopaedic articles about caves:  
vol. 24 - Macocha, Magura Pieszczerza;  
vol. 25 - Malham Me'arat, Mammoth Cave (USA), Mamutowa Jaskinia (Poland).
- 11-298** Wiśniewski, Wojciech W.: [Speleological entries]. In: *Britannica - edycja polska [Polish edition]. [encyclopaedia]. vol. 28, 29, 30, 31, Poznań, 2002.*  
Encyclopaedic articles about caves:  
vol. 28 - Muruk Hul, Naracoorte Caves, Nasib Bagus Lubang, Nettlebed Cave, Niaux Grotte de;  
vol. 29 - Nullarbor Plain, Ochłńska Aragonitowa [Cave];  
vol. 30 - Optymistyczna Jaskinia, Oregon Caves, Organ Cave, Orieszna (Oriesznaja Pieszczerza), Ox Bel Ha Sistema, Painted Cave;  
vol. 31 - Pech Merle Grotte de.
- 11-299** Wiśniewski, Wojciech W.: [Speleological entries]. In: *Geografia - encyklopedia szkolna [Geography Encyclopaedia]. Warszawa, 2002.*  
Above 50 speleological entries.
- 11-300** Wiśniewski, Wojciech W.: [Speleological entries]. In: *Popularna encyklopedia powszechna [The Popular Universal Encyclopaedia], ed. Forga, Bertelsmans Media, vol. 6, vol. 7, vol. 8, vol. 9, vol. 10, Kraków, 2002.*  
vol. 6 - jaskinie [caves], Jaszowska Jaskinia, Jaworzycka Jaskinia, Jaworzynka Jaskinia, Kras, Kras Morawski, Kras Słowacki;  
vol. 7 - Macocha, Magurska Jaskinia, Malham Me'arat, Malinowska Jama, Mammoth Cave, Mamutowa Jaskinia, Mroźna Jaskinia, Muruk Hul, Mylna Jaskinia, na Biśniku Jaskinia;  
vol. 8 - Niedźwiedzia Jaskinia, Nietoperzowa Jaskinia, Obłazkowa Jama, Optymistyczna Jaskinia, Padirac Gouffre de, Patkov gušt, Pech Merle Grotte de, Piatra Altarului Peștera;  
vol. 9 - Pierre-Saint-Martin, Postojna Jaskinia, Ptasia Studnia, Punkwy Jaskinia, Raj, Raptawicka Jaskinia;  
vol. 10 - Scărișoara, stalagmit, stalagnat, stalaktyt, studnia jaskiniowa [cave pit], Studnisko.



- 11-301 Wiśniewski, Wojciech W.: [Speleological entries]. In: Wielka ilustrowana encyklopedia powszechna [The Great Illustration Universal Encyclopaedia], Gutenberg Print, vol. 41, vol. 42, vol. 43, Warszawa, 2002.**

Encyclopaedic articles about caves:

vol. 41 - Portel, Postojna, Predjamska Jama, Ptasia Studnia. Punkwy Cave, Radochowska Jaskinia, - Raj Jaskinia, Raptawicka Jaskinia, Régourdou Grotte de;

vol. 42 - Rieseneishöhle, Roc-de-Sers, Rouffignac Grotte de, Sarawak Chamber, Sawickiego Cave, Scărișoara Ghețarul de la, Schneeloch, schronisko podskalne [cave shelter];

vol. 43 - Sieben Hengste-Hohgant, Sima Mayor de Sarisaiñama, Skorocicka Cave, Sloupsko-šošůvské jeskyně, Słowacki Kras [Slovensky Kras], Smocza Jama in Tatras, Smocza Jama, stalagmit, stalagnat, stalaktyt, studnia jaskiniowa [cave pit], Studnisko, syfon [siphon], Szanidar Cave, Szkocjańska Cave.

- 11-302 Wiśniewski, Wojciech W.: [The biggest caves of Poland. Stand in the middle of 2002]. Tatarnik, 76/4 (2001), 29-32, Warszawa, 2002.**

Lists of caves longer than 300 m and deeper than 40 m.

- 11-303 Wiśniewski, Wojciech W.: [The cave Sarma in Caucasus. A new, 7<sup>th</sup> cave "1500" m deep]. Tatarnik, 76/4 (2001), 50-51, Warszawa, 2002.**

K.W.: regional speleology, report, cave expedition, cave.

- 11-304 Wiśniewski, Wojciech W.: [The deepest caves of the world]. Góry i Alpinizm 2(93), 31-38, Wrocław, 2002.**

History of the dept record in the 20<sup>th</sup> century. Lists of 74 caves deeper than 1000 m with localisation; registers of geographical and administration units with 1000 m caves.

K.W.: speleohistory, depth record.

- 11-305 Wiśniewski, Wojciech W.: [XXXVI<sup>th</sup> Speleological Symposium in Pińczów (25-27.10.2002)]. Wszechświat 103/10-12, 297-301, Kraków, 2002.**

K.W.: report, speleology. Contains about 20 abstracts of papers.

- 11-306 Wood, P.J. ; Gunn, J. ; Perkins, J.: The impact of pollution on aquatic invertebrates within a subterranean ecosystem - out of sight out of mind. Arch. Hydrobiol., 155, 223-237, 2002.**

Pollution within a subterranean ecosystem caused gross staining of stream passages within a cave, although no visible impact was observed outside of the system. The source of the pollutant was identified in the surface catchment using water tracing experiments, and the direction and destination of water and pollutants within subterranean passages determined. Impacted sites and control sites were identified within the cave and compared to pre-disturbance data for the impacted cave and an adjacent system. The abundance and diversity of invertebrate taxa at impacted sites, downstream of the pollutant source, were significantly lower than in the pre-disturbance community and unaffected control sites.

- 11-307 Worthington, Stephen R.H.: Test methods for characterizing contaminant transport in a glaciated carbonate aquifer. Environmental Geology, 42, 546-551, s.l., 2002.**  
K.W.: hydrochemistry, water pollution, PCB.
- 11-308 Zelinka, Jan: Microclimatic monitoring in the Ochtinska aragonite cave. Karst and Environment/Carrasco, F. & Duran, J.J. & Andreo, B./Eds., 521-527, Malaga, 2002.**  
K.W.: monitoring, microclimate, aragonite.
- 11-309 Zelinka, Jan: Microclimatic Research in the Slovakian Show Caves. Acta carsologica, 31/1, 151-163, Ljubljana, 2002.**  
The paper deals with the activities of the Cave Protection Department of the Slovak Caves Administration in the field of speleoclimatic monitoring in the Slovakian show caves since 1996. The monitoring is concentrated on detail survey of basic climatic parameters processes (temperature, relative air humidity, dew point, air velocity, atmospheric pressure etc.) in by now studied show caves during minimally one year. The essence of obtained knowledge is to enhance cave protection in the practice of show caves, better understand the geoeosystems; determine visitors' influence, the period of regeneration and evaluation of possible negative influences. The results of the monitoring are used for determining the carrying capacity of individual caves, limits for visitors, guiding the management and other necessary measures. Presented caves were surveyed by priorities like: World Heritage site, ice caves, natural air mass communication with surface climate, potential threats - all in relation to cave utilization and operation. Technical equipment, as well as research methodology are described in detail in the paper.
- 11-310 Zhang, Chuanrong ; Day, Michael: A Web-Based Spatial Decision Support System for Lunan Stone Forest Landscape. International Conference on Computer Graphics and Spatial Information System, 653-661, 2002.**  
K.W.: karst protection, computer in karst protection, web, Shilin, Yunnan, China.
- 11-311 Zhang, Chuanrong ; Day, Michael: Development of a Spatial Decision Support System on the Internet for Conservation of Stone Forest Landscape in Lunan, China. Proceedings, UCGIS Summer Assembly, 1-14, 2002.**  
K.W.: karst protection, computer in karst protection, internet, Shilin, Yunnan, China.
- 11-312 Zorman, Tomaž: Mušja jama - Velika jama na Prevali. Kras, 50, 44-47, Ljubljana, 2002.**  
K.W.: cave description, cave archaeology, cave - sanctuary, Škocjanske jame, Slovenia.
- 11-313 Zorman, Tomaž: Ohranjati bogato in edinstveno naravno dediščino!. Kras, 52, 10-13, Ljubljana, 2002.**  
K.W.: natural heritage.

**11-314 Zupan Hajna, Nadja: Origin of fine-grained carbonate clasts in cave sediments. *Acta carsologica*, 31/2, 115-137, Ljubljana, 2002.**

In many samples of cave clastic sediments the high amount of carbonate clasts is significant. It was found out that their origin is usually in soft white zones of weathered carbonate rock on cave walls. Weathered zones of limestone or dolomite form on the cave walls when the selective corrosive is going on. 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.

**11-315 Zupan Hajna, Nadja: Osovnika jama, the cave in isolated karst in the east of Slovenia. *Acta carsologica*, 31/3, 75-87, Ljubljana, 2002.**

Osovnika jama has been discovered in 2001 during the exploitation of the Middle Miocene limestone in Pijevci quarry in the E part of Slovenia. Isolated subpanonian karst is typical of this part of Slovenia. This karst developed on small isolated patches of shallow limestone. Subpanonian isolated karst is a special type of karst on Lithothamnian limestone, where the surface karst forms are very well developed but no long caves were known. Osovnika jama is about 290 m long and now is the longest cave in this part of Slovenia. In this area the general dip of limestone beds is towards SE at dip angle 20°. The main tectonic structures of the area are in NW-SE and E-W directions. In the quarry, reef limestone is massive and fissured in E-W, NW-SE and N-S directions. The cave generally follows the NW-SE direction. The shape of channels still shows its formation in phreatic conditions; but mostly the transformation and formation of its channels in the vadose zone is expressed. At some time in this cave development allochthonous clastic sediments filled up the upper parts of the cave; afterwards they were almost entirely washed away. There are a lot of flowstone formations in this cave.

**11-316 Zupan Hajna, Nadja: Splošne značilnosti apnenca in dolomita. *Naše jame*, 44, 5-14, 2002.**

Susceptibility to the processes of karst and caves formation are among the most important factors characteristic of carbonate rocks. The most significant sedimentary carbonate rocks are limestone and dolostone, different in their mineral composition, mechanical and chemical properties and genesis. Carbonate rocks, by definition, contain more than 50% of carbonate minerals. Limestone and dolostone are composed predominantly of calcium and magnesium carbonates, the most significant minerals being calcite and dolomite.

Acta carsologica, 32/1, Supplementum I

Annotated Bibliography of Karst Publications  
No. 11

Izdala in založila  
Slovenska akademija znanosti in umetnosti  
in  
Znanstvenoraziskovalni center SAZU  
v Ljubljani

Grafična priprava  
Zdenko Rudolf Postojna

Tisk  
Tiskarna Lotos Postojna, 2003

Naklada 400 izvodov