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21st INTERNATIONAL KARSTOLOGICAL SCHOOL
"Classical Karst"

HYPOGENE SPELEOGENESIS (BETWEEN THEORY AND REALITY…)

GUIDE BOOK & ABSTRACTS

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Photo on front page
Bojan Otoničar (big calcite crystals from Cok Cave, Jelovica)

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from the surface. Calculation of saturation indexes with PHREEQC showed, that most samples from the wells were supersaturated with respect to calcite and undersaturated with respect to dolomite, which points to conclusion that dedolomitization can still be an ongoing process. However, before more firm conclusions will be possible, more sampling and further analyses are needed.
Keywords: Dedolomitization, PHREEQC, ground water chemistry, deep wells

Geochemistry and Mineralogy of the speleothems from caves on Mt.Velebit (Croatia)

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The aim of this study is to estimate a possibility of using trace elements as paleoclimate proxies in speleothems from some of the deepest caves of Dinaric karst located on Mt. Velebit (depth up to 1421 m). It is well known that there is an relationship between trace element content in speleothems and environmental conditions that can vary due to differences in climatic conditions on a surface, vegetation, chemical composition of bedrock, groundwater movement etc.
Methods used in analysis are semiquantitative mineralogical analysis using X-ray powder diffraction to determine mineralogical composition, inductively coupled plasma mass spectrometry ICP-MS and atomic absorption spectrometry (AAS) to determine geochemical composition. Differences in geochemical and mineralogical content show us possibility of using trace elements and mineralogical composition in analysis of palaeoenvironmental changes in Dinaric karst.
Keywords: X-ray, ICP-MS, AAS, speleothems, Mt. Velebit

Karst in Upper Cretaceous carbonate sediments in Bukovinian part of the Dniester Valley

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The region of Western Ukraine is famous mostly with karst developed in Neogene sulphate sediments (gypsum). It the same time there are other karstified sediments above and below the gypsum strata. Particularly, since the beginning of 20t^{h} century karst was described in the Cretaceous carbonate sediments (sandy limestone and carbonate sandstone). The karst forms in these rocks were described just as caverns and small cavities (up to 0.5m). Our research of fossil karst cavities in Cretaceous sediments in the Bukovinian part of the Dniester valley shows that sometime they may reach up to 5 m in diameter.
Cretaceous sediments in the region are characterized with great lithofacial variability even within each geological stage. Cavities size is controlled by the thickness of layers with prevailing of carboniferous material. The residual deposits in such cavities are represented with quartz sand.
Being overlying with thick pack of Neogene deposits, Cretaceous sediments could be influenced only by underground water. Therefore karst in these deposits could be only of hypogenic origin. This is confirmed by complex of indicator forms inside cavities.
Due to the presence of many karst springs with discharge up to 1 m^3/sec, associated with Cretaceous sediments, the karst processes in these strata are still active.

Keywords: Bukovyna, Cretaceous, sandy limestone, hypogenic karst

Concurrency of the lowest points of drainage basins with distribution of the caves in Zadar County

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This paper deals with concurrency/overlapping of caves with the lowest points of drainage basins (sink points) in Zadar County area. The goal is to establish are there any overlaps and in which degree do they occur and to test what are the possibilities of studying karst areas, from the aspect of sink analysis tool. The study area is divided on area with low relief energy (Ravni Kotari, Zadar County) and with high relief energy (Bojinac Velebit, Zadar County), in order to check whether there are differences in concordance of caves and sink points with regard to energy relief. Spatial analyzes were made in ArcGis 10.1. In order to perform the analyses, locations of caves were georeferenced, geological map of the area was digitalized and digital elevation model (DEM) was created based on the topographic maps of Zadar County. DEM is used to analyze the settings of the slopes on which caves occur and to create drainage basins, flow directions and sink points inside the studied area.
Keywords: cave distribution, drainage basins, GIS analysis, Zadar County, Croatia

Multidisciplinary study of the caves of Naica (Mexico): a review

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The caves of the Naica Mine (Chihuahua, Mexico) contain some of the World's most impressive secondary hypogene speleologenetic processes actually mainly known for their gypsum crystals that in the last ten years have attracted attention of scientific community.
In fact, the Naica cave patterns are not interpreted as strictly hypogene, but could have formed in a first stage by dissolution in meteoric water conditions along fractures, faults and bedding plains affecting the carbonate massif and, only later, superimposed by hypogenic features related to the mobilization of the polysulphide mineralization that filled the karst voids.
The ore deposits in Naica is of hydrothermal origin, resulted from the presence of a magmatic activity that took place about 26 million years ago, probably corresponding with the last magmatic stages in the Sierra Madre Occidental. Intrusion of this body and interaction with connate water of the sedimentary sequence created a hydrothermal system with high metal transport capacity brines. The interaction between hot water of meteoric origin (rising along main fault of Sierra de Naica mountain) and anhydrite lens, formed in the limestone during later stage of ore body formation, led to the formation of rare and complex speleothems.
For these reasons, since 2006 Naica caves are part of a multidisciplinary research project that covers main research fields, such as geology, physics, biology, and more recently, detailed studies have been carried out including mineralogy, geochemistry and hydrogeology.
A review on the state of the art knowledge on hypogenic features of Naica caves is presented.
Keywords: hypogene features, speleothems, gypsum crystals, Naica, Mexico