

V INTERNATIONAL SYMPOSIUM ON KARST

MALAGA, SPAIN 14TH - 16TH OCTOBER 2014

Annual meeting of IGCP 598 Project of UNESCO

PROGRAM



12th and 13th OCTOBER

Pre-symposium Field trip

**5th INTERNATIONAL SYMPOSIUM ON KARST
MALAGA 2014, SPAIN 14th-16th OCTOBER 2014**

14th OCTOBER

8:00-9:15 Reception and Welcome

9:15-9:45 Opening ceremony

9:45-10:30 **OPENING PLENARY LECTURE: "Ground Water Flow in Karstic Terrain: Concepts and Progress". William B. White, Professor Emeritus of Geochemistry, The Pennsylvania State University**

10:30-11:00 Coffee break

Session 1. Karst Hydrogeology I: Miscellanea of topics

Chairmen: Zoran Stevanovic and José Benavente

11:00-11:15 Hydrogeological behavior of Karst Aquifers of Albania. R. Eftimi

11:15-11:30 Chemical, thermal and isotopic evidences of water mixing in the discharge area of Torrox karst spring (southern Spain). J.A. Barberá, B. Andreo

11:30-11:45 Characterization and dynamics of two karst springs in a soil-covered karst area, Lagoa Santa, Southeastern Brazil. P. Pessoa, A. Auler

11:45-12:00 The karst hydrostructure of the Mount Canin (Julian Alps, Italy and Slovenia). L. Zini, G. Casagrande, C. Calligaris, F. Cucchi, P. Manca, F. Treu, E. Zavagno, S. Biolchi

12:00-12:15 Analysis of groundwater pathways by high temporal resolution water temperature logging in the Castleton karst Derbyshire, England. J. Gunn

12:15-12:30 Oxygen isotope composition snapshot of springs' water in a karstified plateau. P. Malik, I. Slaninka, J. Švasta, J. Michalko

12:30-12:45 Integral porosity estimation of the Sierra de las Nieves Karst aquifer (Málaga, Spain). E. Pardo, J.A. Luque, J.J. Durán, A. Pedrera, S. Martos, C. Guardiola, P. Robledo

12:45-13:00 High Radium Concentrations in Swiss Jura Karst Soils; a Singularity? H. Surbeck

13:00-13:15 Groundwater geochemistry characterization as an input for karst network development model, Yucatan Peninsula, Mexico. A.I Maqueda, Ph. Renard and F. Cornaton

13:15-15:00 **Lunch time**

Session 2. Karst Hydrogeology II: Protecting karst media

Chairmen: Jacques Mudry and Francesco Fiorillo

15:00-15:15 An example of karst catchment delineation for prioritizing the protection of an intact natural area. V. Ristic, Z. Stevanovic, A. Maran, B. Vakanjac, M. Cokorilo

15:15-15:30 Attenuation of bacteriological contaminants in karstic siphons and relative barrier purifiers – case examples from Carpathian Karst in Serbia. L. Vasic, Z. Stevanovic, S. Milanovic, B. Petrovic

15:30-15:45 Extension of DRASTIC approach for dynamic vulnerability assessment in fissured area: Application to the Angad aquifer (Morocco). M. Amharref, R. Bouchnan, A.S. Bernoussi

15:45-16:00 Validation of vulnerability assessment using time series analysis – the case of the Korentan spring, SW Slovenia. G. Kovačič, N. Ravbar

16:00-16:15 An emblematic case of pollution of wells and karst springs supplying the city of Ragusa (South-eastern Sicily). R. Ruggieri

16:15-16:30 Mean Residence Time in Karst Water and Emergency Drinking Water Supply. M. Kralik, F. Humer

16:30-17:30 **Coffee break and Poster Session (Presentation of *PROTEKARST METHOD* for protecting karst regions)**

Session 3. Karst Hydrogeology III: Modeling

17:30-18:00 ***Lecture: Characterisation and Modelling of Karst Aquifers: State of Art and Perspectives. Martin Sauter (Head of Department Applied Geology. Professor at University of Göttingen, Germany)***

Chairmen: John Gunn and Augusto Auler

18:00-18:15 How karst areas amplify or attenuate river flood peaks? A response using a diffusive wave model with lateral flows. J.B. Charlier, R. Moussa, V. Bailly, J.F. Desprats, B. Ladouche

18:15-18:30 Comparison between hydrodynamic simulation and available data in a karst coastal aquifer: The case of Almyros spring, Crete Island, Greece. A. Archontelis, J. Ganoulis

18:30-18:45 KARSTMOD - A generic modular reservoir model dedicated to spring discharge modeling and hydrodynamic analysis in karst. H. Jourde, N. Mazzilli, N. Lecoq, B. Arfib, D. Bertin

18:45-19:00 Relating land surface information and model parameters for a karst system in Southern Spain. A. Hartmann, M. Mudarra, A. Marin, B. Andreo, T. Wagener

19:00-19:15 Neural Networks model as transparent box: towards extraction of proxies to better assess karst/river interactions (Coulazou catchment, South of France). L. Kong-A-Siou, H. Jourde, A. Johannet

19:15-19:30 Neural networks for karst spring management. Case of the Lez spring (Southern France). L. Kong-A-Siou, V. Borrel, A. Johannet, S. Pistre

19:30-19:45 Nonlinear System Engineering techniques applied to the Fuenmayor Karst Spring, Huesca (Spain). J. A. Cuchí, D. Chinarro, J.L. Villarroel

19:45-20:00 Trying to solve the inverse problem for karst aquifers; including 3D modeling, realistic conduits, flow and transport simulation. A. Borghi, P. Renard, F. Cornaton

20:00-20:15 Assessing freshwater resources in coastal karstic aquifer using a lumped model: the Port-Miou brackish spring (SE France). B. Arfib, J.B. Charlier

20:15-20:45 Annual meeting of IGCP 598 Project of UNESCO and Annual meeting of International Academy of Karst

21:00 **Welcome cocktail**

POSTER SESSION: 14th OCTOBER, 9:00-19:00

Groundwater isotopic characterization in Ordesa and Monte Perdido National Park (Northern Spain). L.J. Lambán, J. Jódar, E. Custodio
Methodological procedure for evaluating storage reserves in carbonate aquifers subjected to groundwater mining: the Solana aquifer (Alicante, SE Spain). A. Ruiz, C. Marín, S. Martos, C. Fernández, J.L. García, A. Pedrera, J.A. López Geta, J.A. Hernández, I. Rodríguez
Structural characterization of a karstic aquifer based on gravity and magnetics: Los Chotos-Sazadilla-Los Nacimientos (Jaén, SE Spain). A. Ruiz, J.P. González de Aguilar, A. Pedrera, S. Martos, J. Galindo, C. Martín
Fractal modeling and estimation of karst conduit porosity. E. Pardo, J.J. Durán, P. Robledo, C. Paredes
A three-dimensional karst aquifer model: the Sierra de las Nieves case (Málaga, Spain). E. Pardo, J.J. Durán, P. Robledo
Multi-scale assessment of hydrodynamic properties in a karst aquifer (Lez, France). A. Dausse, H. Jourde, V. Léonardi
Controlling factors of wormhole growth in karst aquifers. Y. Cabeza, J.J. Hidalgo, J. Carrera
Safeguard zones and activities permitted cartography. Application in carbonate aquifers of Southern of Spain. A. Jiménez, F. Carrasco, C. Martínez
Assessment of groundwater vulnerability in Croatian karstic aquifer in Jadro and Žrnovnica springs catchment area. J. Loborec, S. Kapelj, D. Dogančić, A. Ptiček
Assessment of Groundwater Contamination in Yucatan Peninsula (Mexico) by Geoestatistical Analysis. R. Alcaraz, E. Graniel, A. Castro, I. Vadillo

Evaluación de la recarga y funcionamiento hidrodinámico del acuífero kárstico drenado por el manantial de Fuenmayor (Prepirineo aragones). C. Oliván, L.J. Lambán, J.A. Cuchí, J.L. Villarrol
Numerical flow modeling of a karstic system using the EPA Storm Water Management Model: an application at the test site of Milandre (Jura, Switzerland). C. Vuilleumier, P.Y. Jeannin, P. Perrochet, M. Hessenauer, P.X. Meury, E. Weber
Impact of karst structures on the vulnerability of groundwater (SE Algeria). B. Hocine, F. Chemseddine, Ch. Hicham
The World Karst Aquifer Mapping Project: a better global overview of karst aquifers. Zhao Chen, N. Goldscheider and the WOKAM Team
Simulation of drainage behavior of a folded karst system in high alpine terrain using a Coupled Reservoir-Conduit Model. Zhao Chen, N. Goldscheider
Hydrogeological characterization of saline springs related to evaporitic karst aquifers: A case-study in Anzur River (Córdoba, Spain). J.M. Gil, M. Mudarra, B. Andreo
Comparison of models for calculating the resource in carbonate aquifers. Application to GWB Sierra de Líbar. Southern Spain. P. Jiménez-Gavilán, P. Jiménez-Fernández
Monitoring network and preliminary result to investigate the hydrogeological functioning of the Sierra de Jarastepar-Alto del Conio Karst Aquifer. Málaga province (South Spain). B. de la Torre, M. Mudarra, B. Andreo, P. Jiménez
Groundwater flow modeling in a karst area, Blau Valley, Germany. C. Neukum, J. Song, A. Köhler, S. Hennings, R. Azzam

15th OCTOBER

Intra-symposium Field Trips to Karst Areas of Malaga province.

Meeting point: Malaga Palacio hotel

Hours of departure (please, respect strictly hour of departure):

- 8:30 Field trip 1: Torcal de Antequera and Alta Cadena (hour of estimated arrival 19:00)
- 8:30 Field trip 2: Nerja Cave and Coastal karst area (hour of estimated arrival 19:00)
- 8:30 Field trip 3: Evaporite karst areas (Fuente de Piedra and Archidona wetlands) (hour of estimated arrival 19:00)

20:30 **Gala Dinner**

16th OCTOBER

Session 4. Methods to investigate karst aquifers

Chairmen: Brian Smith and Pierre-Yves Jeannin

9:00-9:15 Feasibility and limits of Electrical Resistivity Tomography to monitor water infiltration through karst medium during a rainy event. S. Carrière, K. Chalikakis, C. Danquigny, R. Clément, C. Emblanch

9:15-9:30 Transmissive and capacitive behavior of the unsaturated zone in Devonian limestones: Implications for the functioning of the epikarstic aquifer. A. Poulain, G. Rochez, I. Bonniver, V. Hallet

9:30-9:45 Significance of preferential infiltration areas for groundwater recharge rate estimated with APLIS in the mountain karst aquifer system of Sierra de las Nieves (southern Spain). C. Guardiola, S. Martos, J.J. Durán, E. Pardo, P. Robledo, J.A. Luque

9:45-10:00 Comparison of the APLIS and Modified-APLIS methods to estimate the recharge in fractured karst aquifer, Amazonas, Perú. K. Espinoza, M. Marina, J.H. Fortuna, F. Altamirano

10:00-10:15 Use of tracing tests to study the impact of boundary conditions on the transfer function of karstic aquifers. L. Duran, M. Fournier, N. Massei, J.P. Dupont

10:15-10:30 Standardized approach for conducting tracing tests in order to validate and refine vulnerability mapping criteria. M. Sinreich, A. Pochon

10:30-11:30 Coffee break and Poster Session

Session 5. Methods to study karst aquifers II: Analysis of Hydrodynamic Data and Hydrochemistry

Chairmen: Dave Evans and Antonio Pulido

11:30-12:00 Spatial and temporal hydrodynamic variations of flow in the karst vadose zone (Rustrel, France) in function of depth and fracturing density. A. Barbel, C. Emblanch, C. Danquigny

12:00-12:15 Contribution of hydrogeological time series statistical analysis to the study of karst unsaturated zone (Rustrel, France). C. Ollivier, C. Danquigny, N. Mazzilli, A. Barbel

12:15-12:30 Hydrologic Influences of the Blanco River on the Trinity and Edwards Aquifers, Central Texas, USA. B.A. Smith, B.B. Hunt, A.G. Andrews, J.A. Watson, M.O. Gary, D.A. Wierman, A.S. Broun

12:30-12:45 Middle term evolution of water chemistry in a karst river: Example from the Loue River (Jura Mountains, Eastern France). J. Mudry, F. Degiorgi, E. Lucot, P.M. Badot

12:45-13:00 Characterization of carbonate aquifers (Sierra de Grazalema, S Spain) by means of hydrodynamic and hydrochemical tools. D. Sánchez, B. Andreo, M. López, M.J. González, M. Mudarra

13:00-13:15 Characterization of the functionality of karstic systems based on the study of the $SiC-Pco_2$ relation. S. Minvielle, N. Peyraube, R. Lastennet, A. Denis

13:15-13:30 In Situ study of hydrochemical response of a fractured-layered carbonate regional aquifer: comparative analyses of natural infiltration and artificial leakage of a large dam lake (Voglans, Jura, France). C. Bertrand, Y. Guglielmi, S. Denimal, J. Mudry, G. Deveze

13:30-15:30 Lunch time

Session 6. Engineering and Mining in Karst Media. Karst Geomorphology. Karst Cavities

Chairmen: Peter Malik and Hervé Jourdé

15:30-16:00 **Lecture: Hydrogeology applied to Engineering and Mining activities in Karst media. Petar Milanovic (IAH Serbian Chapter)**

16:00-16:15 Impact of a tunnel on a karst aquifer – application on the Brunnmühle springs (Bernese Jura, Switzerland). A. Malard, P.Y. Jeannin, D. Rickerl

16:15-16:30 Hydrogeological Risks of Mining in Mountainous Karstic Terrain – lessons learned in the Peruvian Andes. D. Evans

16:30-16:45 Karstic hydrogeology of the Uchucchacua underground mine (Peru) and its interaction with surface waters. D. Apaza, A. Pulido, F. Sánchez

16:45-17:00 Striped karren on Snake Mountain above Kunming (Yunnan, China). M. Knez, L. Hong, T. Slabe

17:00-17:15 Influence of the rivers on speleogenesis combining KARSYS approach and cave levels. Picos de Europa, Spain. D. Ballesteros, A. Malard, P.Y. Jeannin, M. Jiménez, J. García, M. Meléndez, G. Sendra

17:15-17:30 Geodiversity of a tropical karst zone in southeast Mexico. P. Fragoso, A. Pereira, O. Frausto, F. Bautista

17:30-17:45 Terrestrial Laser Scanning for 3D cave reconstruction. Support for geomorphological analyses and geo-heritage enjoyment and use. A. Marsico, M. Infante, V. Iurilli, D. Capolongo

17:45-18:00 Caves and Mining in Brazil: The dilemma of cave preservation within a mining context. A.S. Auler, L.B. Piló

18:00-18:30 **Coffee break**

Session 7. Karst Cavities

Chairmen: James LaMoreaux and Tadej Slabe

18:30-18:45 Climate-driven changes on storage and sink of carbon dioxide in subsurface atmosphere of karst terrains. A. Fernández, S. Cuezva, E. Garcia, E., M. Álvarez, D. Benavente, J.M. Calaforra, S. Sánchez

18:45-19:00 A field analog of CO₂-closed conditions in a karstified carbonate aquifer (Nerja Cave experimental site, South Spain). J. Benavente, I. Vadillo, C. Liñán, F. Carrasco, A. Soler

19:00-19:15 A laser technique for capturing cross sections in dry and underwater caves. A. Schiller, S. Pfeiler

19:15-19:30 A transboundary monitoring network for the management of the Classical Karst aquifer. F. Cucchi, L. Zini, Ch. Calligaris, Ph. Turpaud, Fr. Treu, S. Furlani, E. Zavagno, S. Biolchi, Ch. Boccali, S. Cleva, F. F. Slejko, M. Michelini, B. Stenni, J. Urbanc, T. FerjanStanič, J. Kogovsek, M. Petric, N. Ravbar, F. Gabrovsek, E. Altran, S. Piselli, D. Sciolis, P. Sossi, M. Leban, G. Casagrande, A. Brancelj, Natasa Mori

POSTER SESSION: 16th OCTOBER, 9:00-19:00

Recharge processes of karst massifs: examples from southern Italy. F. Fiorillo, M. Pagnozzi
Comparative study of the physico-chemical response of two karst systems during contrasting flood events in the French Jura Mountains. C. Cholet, M. Steinmann, J.B. Charlier, S. Denimal
Role of the soil-epikarst-unsaturated zone in the hydrogeological functioning of karst aquifers. The case of the Sierra Gorda de Villanueva del Trabuco aquifer (Southern Spain). M. Mudarra, B. Andreo
Hydrochemical characterization, origin and mixing of groundwater in a karst aquifer system in West Greece, Aitolakarnania Province. E. Zagana, P. Tserolas, J. A. Barberá, B. Andreo
A method for automatic detection and delineation of karst depressions and hills. E. Pardo, J.J. Durán, P. Robledo, J.A. Luque, A. Pedrera, C. Guardiola, S. Martos
Synthesis of groundwater recharge of carbonate aquifers in the Betic Cordillera (Southern Spain). S. Martos, A. González, P. Jiménez, J.J. Durán, B. Andreo, E. Mancera
A computer method for separating hard to separate dye tracers. P.A. Schnegg
Hydrogeological characterization of karst tributaries of the San Franciscan Depression, River Corrente, West Bahia, Brazil. C. Bicalho, M. Berbert, E. Silva-Filho
Hydrogeochemical and isotopic characterization of the main karst aquifers of the Tez bent Mountain, Tebessa region, Northeast of Algeria. F. Chemseddine, B. Dalila, G. Marwan, L. Jens
Spatiotemporal variations of soil CO ₂ in Chenqi, Puding, SW China: the effects of weather and LUCC. Y. Rui, Z. Min, Z. Cheng, Ch. Bo, L. Zaihua
Analysis of mixed sedimentary sequences and eustatic paleolevels from speleothems of the Vallgornera Cave, Mallorca, Spain. P. A. Robledo, J.J. Durán, A. Tienda
Natural ventilation of karstic caves: new data on the Nerja Cave (Malaga, S of Spain). C. Liñán, Y. del Rosal
Environmental study of cave waters: A case-study in Las Herrerías Cave (Llanes, Spain). M. Meléndez, M. Jiménez, I. Vadillo, H. Stoll, M.J. Domínguez, D. Ballesteros, E. Martos, L. Rodríguez, J. García
Geoheritage and Geodiversity evaluation of endokarst landscapes: The Picos de Europa Global Geosite, North Spain. D. Ballesteros, M. Jiménez, M.J. Domínguez, J. García, M. Meléndez

Hydrogeochemical and Isotopic Characterization of Karstic Endorheic Estaña Lakes (Huesca, Spain). C. Pérez, L.J. Lambán, P. Martínez
Statistical spatial graphs to study the topology and geometry of large karst networks. M. Hendrick
Limestone mining and Karst Potential for Reducing CO ₂ Emissions: A case study in Gunung Kidul Yogyakarta. Y. Irawat
An overview of karst formation controlling factors in Eastern and SouthWestern Saudi Arabia. A. Amin, S. Khomsi
Carbonates Karst Features Landscapes in the Alpine Chain of Northern Africa in Tunisia: Impact of Fault Control. S. Khomsi, A. Amin, M. Bedir, H. Gabtni
How flow data analysis can characterize interactions between surface and underground draining networks? F. Raynaud, H. Mathieu, V. Borrell, S. Pistre, F. Hernández, S. Van-Exter
The Utilization of Real-Time High Resolution Monitoring Skill in Karst Carbon Sequestration: A Case of the Station in Banzhai Subterranean Stream Catchment. He Shiyi, Kang Zhiqiang, Li Qingyan
The Application of Stable Carbon Isotope to the Study of Carbon Sources in Guijiang Watershed, Guangxi. Yang Hui, Wang Hua, Zhang Chunlai
Karst morphology and hydrogeology of Karangbolong area, Indonesia. E Haryono, ST Putro, B Yulianto, F Nuchifera
Definition of microclimatic conditions in a karst cavity: Rull Cave (Alicante, Spain). C. Pla, J.J. Galiana, J. Cuevas, J.M. Andreu, J.C. Cañaveras, S. Cuezva, A. Fernández; E. García, S. Sánchez, D. Benavente
Trace elements in speleothems as indicators of past climate and karst hydrochemistry: a case study from Kaite Cave (N Spain). J.A. Cruz, J. Martín, A. Marin, M.J. Turrero, R.L. Edwards, A.I. Ortega, J.O. Cáceres
Variations in trace elements of drip waters in Kaite Cave (N Spain): significance in terms of present and past processes in the karst system. M. J. Turrero, A. Garralón, L. Sánchez, A.I. Ortega, J. Martín, P. Gómez, A. Escribano
Climate variability during the Middle-Late Pleistocene based on stalagmite from Órganos Cave (Sierra de Camorra, Southern Spain). C. Jiménez de Cisneros, E. Caballero, B. Andreo, J.J. Durán
Comparison of models for calculating the resource in carbonate aquifers. Application to GWB Sierra de Líbar. Southern Spain. P. Jiménez-Gavilán, P. Jiménez-Fernández
Field trace experiments for assessment of underground flow patterns and speleological connections in a recently discovered karst cave (Bizkaia, N Spain). J.A. Barberá, I. Vadillo, J. Moreno

17th OCTOBER

HYDROKARST Training Course