

# 39TH INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS CONGRESS



## Congress Program and Abstracts

September 16-21, 2012 • Niagara Falls, Canada

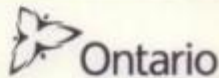
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The following people acted as “champions” for the Congress technical sessions. They proposed and helped to organize the sessions, helped promote the Congress, encouraged abstract submissions and reviewed abstracts. Many are also volunteering to help chair the sessions. Their efforts are greatly appreciated and invaluable to the success of the Congress.

### Energy and Climate

#### Groundwater and Climate Change: Linkages and Adaptation

*Richard Taylor (UK), Diana Allen (Canada), Makoto Taniguchi (Japan), Jianyao Chen (China)*

*Jason Gurdak (USA), Tim Green (USA), Bridget Scanlon (USA)*

#### Geothermal Energy

*Grant Ferguson (Canada), Han Zaisheng (China), Alper Baba (Turkey)*

#### Hydrogeological Issues Surrounding Shale Oil and Gas

*Avner Vengosh (USA), Ramon Aravena (Canada)*

#### Hydrogeological Issues Related to Oil Sands

*Steve Wallace (Canada), Jon Fennell (Canada)*

#### Carbon Sequestration

*Dan Palombi (Canada), James Brydie (Canada)*

### Karst Hydrogeology

#### Karst Aquifers, Environmental Problems and Global Change

*Derek Ford (Canada), Liu Zaihua (China)*

#### Characterization and Management of Karst Aquifers

*Nico Goldscheider (Germany), Barbara Mahler (USA), Geary Schindel (USA)*

#### Modeling Karst Aquifer Systems

*Neven Kresic (USA), Nicolas Massei (France)*

#### Topics in General Karst Hydrogeology

*Stephen Worthington (Canada), Nadine Goeppert (Germany),*

*Jiang Guanghui (China)*

#### Artificial Tracers and Environmental Isotopes to Understand and Quantify Water Flow-paths and Pollutant Transport in Karst Aquifers

*Piotr Maloszewski (Germany), Przemysław Wachniew (Poland),*

*Ralf Benischke (Austria)*

### Groundwater-Surface Water Interactions

#### Groundwater-surface Water Interactions and Ecohydrology

*Bruce Misstear (Ireland), Philippe Van Cappellen (Canada), Faouf-Marie Couture (Canada), Fereidoun Rezaeezhad (Canada), Marie Larocque (Canada), Masaki Hayashi (Canada), Allison Aldous (USA), Joseph Gurrieri (USA), Hillol Guha (USA), Andrea Bradford (Canada)*

*Vadose zone processes: Edwin Cey (Canada), James Smith (Canada)*

### Groundwater Management- Technical

#### Groundwater Recharge: Advances in understanding recharge processes, characterizing spatial/temporal variability, and techniques for managed aquifer recharge

*Peter Dillon (Australia), Victor Heilweil (USA)*

#### Hydrogeophysics

*Anthony Endres (Canada), Peete Pehme (Canada)*

#### The Role of Aquitards in Aquifer Protection

*Wendy Timms (Australia), Jim Hendry (Canada)*

#### Frontiers in Numerical Modelling

*John Molson (Canada), Rene Therrien (Canada)*

#### Transboundary Aquifer Systems of the Americas

*Alfonso Rivera (Canada)*

#### Cold Regions Hydrogeology

*Jeff McKenzie (Canada), Victor Bense (UK)*

#### Hydrogeologic Characterization of Fractured Rock Settings

*Kent Novakowski (Canada)*

#### Three-Dimensional Geologic/Hydrogeologic Mapping

*Hazen Russell (Canada), Holger Kessler (UK)*

#### Regional Groundwater Flow Systems: Theory and Application

*José Joel Carillo Rivera (Mexico), Judit Mádl-Szóryi (Hungary),*

*Joszeff Tóth (Canada)*

#### Urban Hydrogeology Issues

*Ken Howard (Canada), Dan Rogers (USA), Stephen Foster (UK)*

#### Development and Application of Conceptual Models in

#### Numerical Modelling

*Mike Wireman (USA), Denis Peach (UK)*





## 293 - Unstable regime of Dinaric karst aquifers as a major concern for their sustainable utilization

Zelimir Pekas<sup>1</sup>, Boban Jolovic<sup>2</sup> & Dragan Radojevic<sup>3</sup>

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<sup>2</sup> Geological Survey of Republic of Srpska, Zvornik, Bosnia & Herzegovina;

<sup>3</sup> Geological Survey of Montenegro, Podgorica, Montenegro;

Arben Pambuku<sup>4</sup>, Zoran Stevanovic<sup>5</sup>, Neno Kukuric<sup>6</sup> & Zeljko Zubac<sup>7</sup>

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<sup>7</sup> HET, Trebinje, Bosnia & Herzegovina

DIKTAS (Protection and Sustainable Use of the Dinaric Karst Transboundary Aquifer System) is an on-going GEF project implemented by UNDP and UNESCO's IHP aiming to bring together specialists and decision makers from the Dinaric region in SE Europe in order to improve the common utilization and protection of karst waters and related ecosystems. The three capitals get their drinking waters from the karstic aquifers (Sarajevo from the Vrelo Bosne springs, Tirana from Selita and Shemria, and Podgorica from Marezja spring). Along the Adriatic and Ionian coast almost all cities and tourist centres consume karstic groundwater discharging from large springs such as Timavo, Zvir, Jadro, Ombla among others. On average, the huge springs along the Neretva Valley and in the Kotor Bay annually discharge more than 150 m<sup>3</sup>/s directly or indirectly into the Adriatic Sea. It is assumed that 2/3 of all the groundwater resources in Albania are linked with karstic aquifer, and they provide more than roughly 60% of the water consumed in the country. Although perennial and sinking streams are regulated by several reservoirs, variable discharge is the main concern for sustainable utilization of karstic groundwater. This particularly concerns the coastal zone where salt water intrusions inland are common in the summer and autumn periods. Some of the springs are drying out or discharging as submarine flows, while their maximum could be over 100 m<sup>3</sup>/s (e.g. Sopot, Ljuta near Kotor). Some other large springs also have a large variation between maximal and minimal discharges: Oko (Trebinje water supply) 0.5-40 m<sup>3</sup>/s; Bragava (Stolac i Ljubinje water supply) 0.33-71.7 m<sup>3</sup>/s; Buna 3-123 m<sup>3</sup>/s; Bunica 0.7-207 m<sup>3</sup>/s. Based on 380 conducted tracing tests, the fictive groundwater velocities in Dinaric karst are as follows: in 70% of cases from 0 to 5 cm/s; in 20% of cases, 5 to 10 cm/s; and in 10% of cases, more than 10 cm/s (even 80 cm/s is recorded). Fluctuation of the groundwater level by 100m within 24h has been registered in several boreholes, while a difference of 312m between maximal and minimal levels (Nevesinje area) is one of the highest ever recorded worldwide. One of the main tasks towards sustainable development of the karst aquifers will be to improve monitoring systems, in terms of both the quantity and quality of the water.

## 472 - Preliminary hydrogeological characterization of karst tributaries of the San Franciscan Depression, River Corrente, Bahia, Brazil

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(3) Karlsruhe Institute of Technology (KIT), Institute of Applied Geosciences, Division of Hydrogeology, Karlsruhe, Germany

Brazilian economy has experienced substantial growth in the last decade. Balancing economic development and the associated increase of water consumption with environmental sustainability is a challenge for both society and the government. Karst aquifers are important fresh-water resources for the growing population in some regions of Brazil. The west region of the state of Bahia is known for its abundant water resources. Corrente River (basin surface: 42,732 km<sup>2</sup>), provides approximately 30% of the total water flow of the Sao Francisco River (basin surface 631,133 km<sup>2</sup>). During recent years, Bahia has undergone a marked process of economic growth driven by agricultural modernization. Important transformations in land use can be observed and water resource management is disorganized and predatory. The karst aquifers on the San Franciscan depression are located downstream of an intensively exploited region, the Urucua sandstone aquifer. Karst aquifers are characterized as being high vulnerability to contamination and low capacity of self-purification. This study aims to: (i) perform a preliminary characterization of the hydrogeological behaviour of the karst system in relation to the whole basin by characterizing water hydrochemistry, and (ii) to

