

## Preface

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In 2014, the Universities of Malaga (Spain), Besançon (France), and Neuchâtel (Switzerland), jointly with the Spanish Geological Survey, decided to join their resources to launch the *Eurokarst* series of conferences. The first edition was held in Neuchâtel, Switzerland, in September 2016, and involved about 200 participants from more than 20 countries from all over Europe and the World. *Eurokarst* is the largest event on this theme in Europe.

The aim of the *Eurokarst* conference series is to continue promoting advances in the field of karst and carbonate reservoirs after more than 40 years of regular meetings that were held in these three universities.

These conferences were initiated in 1970 in Besançon by Pierre Chauve and dedicated to Eugène Fournier, one of the fathers of karst hydrology in France. At that time, the conference was named the *Colloque d'Hydrologie en Pays Calcaire*, and all the conferences were given in French. The second edition was in Besançon in 1976 and included 36 communications (groundwater circulation dynamics, tracers in karst, groundwater exploitation, underground engineering in limestone, etc.). In 1982, the conference moved to Neuchâtel. It was chaired by André Burger and included 27 presentations in French from French, Swiss, Belgium, Italian, and Slovak participants from universities and private companies or administrations (Burgeap, Service de Contrôle des Eaux de la Ville de Paris, Motor-Columbus AG, etc.). During the next 20 years, the *Colloque* continued to alternate between Neuchâtel and Besançon. In Besançon, Jacky Mania followed by Jacques Mudry took over the organization. In Switzerland, François Zwahlen, Imre Müller, Pierre-Yves Jeannin, and Nico Goldscheider ensured the continuation of the conference series with an incursion in La-Chaux-de-Fonds (Switzerland) in 1997. In the 1990s, the language of the conference became a mixture of French and English. In 2011, in Besançon, the name was changed to *H2Karst*. At that time, the event had reached a much larger audience with more than 200 participants including 27 nationalities and 126

presentations on a wide range of topics, including notably a large section on karst modeling.

In parallel with the joint French and Swiss conferences, the *International Symposiums on Karst* have been organized by the University of Malaga and the Spanish Geological Survey (IGME), under the coordination of Bartolomé Andreo, Juan José Durán, Francisco Carrasco, and coworkers. The first (1999) and second (2002) editions were organized in Nerja under the auspiciousness of the Nerja Cave Foundation. In 2006, 2010, and 2014, the symposium was held in Malaga city, and both national and international partnerships were involved. Again, the event was pretty large with around 110 presentations. It is during this last conference in Spain that was announced the merge of these events to create the *Eurokarst* conference series.

Today, the *Eurokarst* conference remains a platform where professionals, consultants, researchers, and students can meet to learn about new technologies and methods but also about new practical challenges encountered in applications.

While the original themes are still relevant—understanding how groundwater flows into carbonate and karstic formations, protecting and managing this resource against pollution and overexploitation—the approaches have evolved, and new problems and tools are emerging. In particular, the development of new analytical technologies enables hydrogeologists to monitor the behavior of karst at a much higher frequency and new parameters (natural tracers as well as emerging contaminants) can now be measured continuously in the field. This poses a challenge in terms of data treatment and analysis but also opens up a wide range of new possibilities for an improved understanding of these systems. These data are also challenging the conceptual and numerical models of karst by offering new ways to constrain or invalidate theories. An important trend is also the wider availability of massive computing resources and software allowing to construct three-dimensional models which were just impossible to build 20 years ago. How to use these

models is still a topic of debate but also an important aspect to discuss during these conferences.

Among the various challenges posed for the twenty-first century, the development of renewable energy resources such as geothermics is a remarkable issue that karst hydrogeologists will have to tackle.

Last but not least, the world is facing global climate change. Understanding and forecasting the impact of this change requires on the one hand the systematic and long-term monitoring of physical and chemical parameters to record the changes and understand the processes, and on the other hand, it also requires the development of appropriate models able to describe and predict those phenomena.

To conclude, it is well known that karst aquifers are able to store abundant water resources that could become crucial under the growing pressure of global climate change and population increase in many places in the world. We are therefore convinced that continuing to conduct research on karstic systems remains critical and that events like *Eurokarst* are of prime importance.

In 2016, for its first edition, the *Eurokarst* conference included 164 communications covering a wide variety of topics in many fields related to karst. Among them, 35 are presented in this book. These articles provide an overview of recent progresses made in karst research. The articles are organized around six main topics:

- Geomorphology and geophysics;
- Geological control and speleogenesis;
- Hydrodynamics;
- Time series analysis and modeling;
- Karst aquifer management;
- Multidisciplinary regional studies.

As the organizers of the *Eurokarst* event and editors of this book, we are extremely thankful to a number of organizations and people who participated in the preparation of the event and without whom the book could not be published. First of all, we would like to thank the sponsors who contributed financially to support the conference:

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