

## **KARSYS, KarstALEA and KarstFlowSIM: applied and innovative methods for the management of karst environment**

**Date:** July, 5-6 2018 (2 days)

**Minimum and maximum number of participants:** 10/20

***All attendees should bring their own laptop computer***

This 2-days workshop is dedicated to the learning of the KARSYS approach through an application on the Swiss Jura Mountains. The first day, participants will be guided through a field trip in the Val-de-Travers (Switzerland, 1.5h from Besançon). The second day, participants will apply the approach by themselves, using data and experience they acquired on the test site.

**KARSYS** is developed for hydrogeologists working in karst regions, in order to address hydrogeological questions in a very pragmatic and concrete way. KARSYS makes it possible to build an explicit conceptual model (3D image) of the karst aquifers and of the associated flow systems. The approach is based on a 3D model of the carbonate aquifer synthesizing all standard geological and hydrological data, and coupled to a series of simple hydraulic principles. This provides, within a limited effort, a consistent hydrogeological conceptual model of karst flow systems within any investigation area. The course is designed for hydrogeologists with basic knowledge on karst, hydrogeology and 3D modelling. Any professional interested in groundwater management, engineering, renewable energies in karst environments will gain a good understanding of karst hydrogeology and a pragmatic way to assess karst hydrogeological systems. Participants will apply KARSYS by themselves on a case study. For that, they will be initiated to the functioning of the Visual KARSYS tool, which is still under development, but already support users to apply KARSYS.

The course will be extended further with an introduction to KarstALEA method, which has been developed for predicting the position and characteristics of karst occurrences within a massif. KarstALEA was initially designed for tunneling, but can be applied to any kind of underground construction in karst areas. At last, an outlook to flows simulation procedures based on KARSYS (KarstFlowSIM) will be presented.

KarstALEA and KarstFlowSIM are both extensions of KARSYS, providing *de facto* a consistent and continuous workflow in karst to address pragmatic issues.

**Key-words:** Karst hydrogeology, Conceptual model, 3D, Water management, KARSYS, KarstALEA, Visual KARSYS, KarstMOD