Theory and practice of artificial tracer experiments in groundwater

Date: 24th September 2017
Schedules: 9:30 – 17:00
Minimum and maximum number of participants: 15/45
Price: 80 EUR (includes lunches and refreshments during brakes)
Instructors: Piotr Maloszewski, AGH University of Science and Technology, Krakow, Poland; and Kristijan Posavec, University of Zagreb, Croatia
All attendees should bring their own laptop computer

During 1-day workshop we will explain and discuss in detail tracer experiments in porous, fissured and karst aquifers. Attendees will learn how to plan and prepare experiments, mathematically describe governing processes and how to estimate rock and transport parameters. The topics will include lectures on tracer experiments perform in 1) homogeneous porous media; 2) fissured aquifers; 3) karst aquifers as well as 4) Planning of an artificial tracer experiment in unconfined heterogeneous alluvial aquifer with highly transient flow conditions. No previous knowledge of tracer experiments is required, but solid foundation in hydrogeology is highly recommended.

Workshop agenda:

Day 1 Sunday morning (09:30 – 13:00)

Tracer experiments in homogeneous porous media

a. Governing processes, dispersion theory (3D, 2D, 1D)
b. Preparation of experiment (mass of tracer to be injected, sampling campaign)
c. Parameter estimation
d. Examples

15 minutes break

Tracer experiments in fissured aquifers

a. Governing processes, mathematical description
b. Models and its parameters
c. Estimation of parameters with examples

Lunch break (13:00 – 14:00)

Day 1 Sunday afternoon (14:00 – 17:00)

Tracer experiments in karst aquifers

a. Possibilities of mathematical description, mathematical models
b. Main parameters and its' estimation
c. Examples

15 minutes break

Planning of an artificial tracer experiment in unconfined heterogeneous alluvial aquifer with highly transient flow conditions

a. Experiment description
b. Calculation of sampling duration and frequencies

About Instructors:

Prof. Dr. Ing. Piotr Maloszewski is professor at the AGH-University of Science and Technology in Kraków, Poland, and the President of the International Commission on Tracers (ICT) by the International Association of Hydrological Sciences (IAHS) and member of the IAH. He has more than 43 years' experience in applying tracer methods in hydrogeology and in mathematical modelling of mass transport in groundwater in different media. He has been working 33 years in the Institute of Groundwater Ecology (former Institute of Hydrology) at the Helmholtz Center Munich and till 2016 was professor at the University of Freiburg in Germany. He is author and co-author of 200 papers and the handbook "Tracers in Hydrology".

Dr. Kristijan Posavec is associate professor at University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering. He has over 15 years of experience in hydrogeology and groundwater modelling. He co-authored Guidelines on flowpath characterization, dynamics and GW renewal, a deliverable of the GENESIS project (Groundwater and dependent Ecosistems: NEw Scientific basIS on climate change and land-use impacts for the update of the EU Groundwater Directive) of the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013) within which he designed and conducted artificial tracer experiment in unconfined heterogeneous alluvial aquifer with highly transient flow conditions.