Annual Report 2015
of the IAHS-ICT activities

Prepared by Piotr Maloszewski

International Commission on Tracers - members:

Piotr Maloszewski	Germany	President, 2011-2017
Przemyslaw Wachniew	Poland	Secretary, 2011-2015
Josep Mas Pla	Spain	Vice President, 2011-2015
Maki Tsujimura	Japan	Vice President, 2011-2015
Zhonghe Pang	China	Vice President, 2011-2015

Period: April 2014 – May 2015

1) Commission members' individual activities

The members of the commission have organized special sessions and/or lectures related to the application and development of tracer methods in the hydrology by national geological/geophysical congresses and at the home universities. They have performed several training courses, established scientific sessions and had oral presentations on tracer methods by national and international symposia and university workshops, e.g.: Final Conference of the 7th Framework Program project GENESIS, Prague, Czech Republic; 2nd Groundwater Iberian Congress in Madrid, Spain; 19th Congress of the Asia and Pacific Division of the International Association for Hydro-environment Engineering and Research in Hanoi, Vietnam; Technical Meeting of the IAEA and UNESCO on Groundwater Contamination following the Fukushima Nuclear Accident in Vienna, Austria; Wrap-up Joint Symposium Science and Technology Research Partnership for Sustainable development (SATREPS) and JICA Base the Pyramid (BOP) Business Promotion in Gammarth, Tunisia; 41st IAH Congress in Marrakech, Morocco; EGU in Vienna, Austria; Italian National Meeting on Hydrogeology "Flow-path 2014" in Viterbo, Italy. The ICT officers were also active by local workshops in Poland (UAM-University Poznan, IAH-Polish Section, and AGH-University Krakow) and Germany (University of Freiburg). They supervised several PhD students and published several papers about application and modelling of tracer data (e.g.: in App. Radiation and Isotopes, Biodegradation, Environmental Earth Sciences, Environmental Geochemistry and Health, Geological Quarterly, Hydrogeology J., HSJ, HESS, J. Arid Land Studies, J. Environmental Radioactivity, J. Electrochemical Society, J. Hydrology, Radiocarbon, Sciences in Cold and Arid Regions, Sciences of the Total Environment). Simultaneously the ICT officers have organized programs and projects such e.g.: Monitoring of Radionuclides with Hydrological Processes in Fukushima and Mapping of Residence Time and Water Storage using CFCs and SF_6 in Headwater Catchments of Japan (both - Japan Society for the Promotion of Science); UNESCO-Chair Program on Sustainable Groundwater Management in Mongolia; SATREPS-JST-JICA-Investigation on Groundwater and Surface Water Continuum using Multi-tracer Approach in Semi-arid and Semi-tropical Regions, Tunisia and Vietnam; EU-Water JPI program PERSIST(Persistence and Fate of Emerging Contaminants and Multi-resistant Bacteria in a Continuum of Surface Water - Groundwater from the Laboratory Scale to the Regional Scale); REMEDIATION (Spanish National Program on Water Resources). Our Secretary (P.W.) was the editor of the special issue by HESS (Groundwater resources and their ecosystem services: new methods and management practice).

2) Workshop on tracer methods during 26th IUGG General Assembly in Prague, Czech Republic

The ICT commission has established the session: "Tracer methods for understanding the response of hydrological systems to transient contamination" (Hw15) by 26th IUGG General Assembly to be held in Prague, in June 2015. The proper prediction of the groundwater vulnerability to the pollution requires the considering of time-lags that characterize responses of the hydrological systems to both commencement and cessation of the anthropogenic disturbances such as diffuse

pollution or climate and land use change. Scales of these time-lags are often underestimated and the decision makers and water resources managers tend to overlook their significance when assessing water quality trends in catchments. Even in the relatively shallow aquifers a significant fraction of groundwater flow-paths can be characterized by transit times of the order of tens of years. Knowledge of the distribution of water and solute travel times is fundamental for assessing temporal aspects water quality and can only be found by applying tracer methods. Tracer methods combined with mathematical and numerical modelling can provide information on the transit time distribution as they integrate functioning of hydrological systems over a wide range of temporal and spatial scales. With two oral and one poster sessions this workshop will aimed at presenting application of the environmental and artificial tracers in addressing response of hydrological systems at different scales.

3) Join workshop of the IAH and the ICT-IAHS by 42nd IAH Congress in Rom, Italy

The commission has establish the workshop "Tracer and isotope hydrology" (S8.4) by 42nd IAH Congress, to be held in Rome, Italy in September 2015. During oral and poster presentations, the application of tracers to characterize groundwater flow-paths, estimate system parameters and/or for understanding and quantifying of groundwater bioremediation will be discussed. This workshop is focused on two topics: (i) estimation of water origin, water flow-paths and groundwater dynamics in heterogeneous groundwater systems by use of tracers and mathematical modelling; and (ii) understanding and estimating of pollutant transport and bioremediation processes using isotope methods. For that workshop already 44 abstracts were submitted and reviewed.