

XXXVIII IAH Congress

Groundwater Quality Sustainability
Krakow, 12–17 September 2010

Extended Abstracts

Editors:
Andrzej Zuber
Jarosław Kania
Ewa Kmiecik



University
of Silesia
Press 2010



abstract id: **540**

topic: **0**
Keynote lectures

title: **Groundwater dependent ecosystems: hydrology,
conceptual models and vulnerability**

author(s): **Björn Klöve**
(1) Bioforsk — Norwegian Institute for Agricultural and Environmental Research,
Soil and Environment Division,
(2) Water Resources and Environmental Engineering Laboratory, Department of
Process and Environmental Engineering, University of Oulu, Finland,
bjorn.klove@oulu.fi

keywords: groundwater dependent ecosystems, conceptual models, GENESIS project

INTRODUCTION TO GROUNDWATER DEPENDENT ECOSYSTEMS

Groundwater dependent ecosystem (GDEs) are a vital yet poorly understood component of the natural environment. Groundwater sustains different surface and terrestrial ecosystems such as wetlands, peatlands, streams and lakes. In many cases groundwater form an important but so far quite unknown contribution to these ecosystems. Some systems such as springs are completely fed by groundwater and would not exist without. This is reflected in fauna and flora too, by species adapted to the special conditions. Others systems depend partially on groundwater. In general, the role of groundwater can be to provide water, nutrients, cooling, and buoyancy but these effects are not always known.

Most fresh water on earth is in groundwater and this is a main storage in the cycling of freshwater within the hydrological cycle. Groundwater (GW) provides base flow and water release from land to surface water also during droughts. More information should be provided on how ecosystems depend on groundwater and in which way. The identification of water sources is a key component in such an evaluation of whether the system is dependent on groundwater. However, the source and contribution of GW can not be the sole classification as some systems might be indirectly dependent on groundwater. This can occur if GW provide buoyancy, but the surface vegetation shows low nutrient status and relies on precipitation. The overall role of groundwater must be better understood for both aquatic and terrestrial systems. This includes the role of groundwater in the hydrological cycle and the role of groundwater in specific ecosystems such as rivers, lakes and wetlands. This knowledge is needed to protect and manage the several functions that groundwater provide to ecosystems and society.

The role of GDE is specified in the Water Framework Directive (WFD, 2000/60/EC) and the Groundwater directive (GWD). This paper puts together past knowledge and new observations on ecosystems and discusses the role of groundwater in them. Especially, the different case studies of ecosystems involved in a European project 7th framework project GENESIS will be reviewed. The objective is to focus on hydrological and ecological properties of ecosystems connected to groundwater and on vulnerability of these systems. The presentation outlines the conditions needed for protecting these systems and for management of groundwater in a more integrated way. Also uncertain issues related to protection of GW ecosystems will be highlighted.

HYDROLOGY AND CONCEPTUAL MODELS

The presentation will review different case study sites in the GENESIS project and also previous knowledge held by the GENESIS conortia. The hydrology of different systems will be presented along with conceptual models on the role of groundwater. The sites to be presented include different type of wetlands such as mires and lagoons, small lakes, rivers and springs.

ACKNOWLEDGEMENTS

The paper was prepared with contribution from participants from work package WP4 "Groundwater dependent ecosystems" of the GENESIS project www.thegenesisproject.eu funded by EU 7th framework project (contract 226536).



International Association of Hydrogeologists



AGH University of Science and Technology

2-vol. set + CD
ISSN 0208-6336
ISBN 978-83-226-1979-0