

## Monitoring groundwater–surface water interactions in the Upper Nile Basin of Uganda

M. OWOR<sup>1,2</sup>, R. TAYLOR<sup>2</sup>, J. THOMPSON<sup>2</sup>, C. MUKWAYA<sup>2</sup> & C. TINDIMUGAYA<sup>3</sup>

<sup>1</sup> *Department of Geology, Makerere University, Kampala, Uganda*  
[mowor@sci.mak.ac.ug](mailto:mowor@sci.mak.ac.ug)

<sup>2</sup> *Department of Geography, University College London, London, UK*

<sup>3</sup> *Directorate of Water Resources Management, Entebbe, Uganda*

**Abstract** The role of groundwater in maintaining surface water levels during periods of low or absent rainfall on low relief surfaces of the Great Lakes Region of Africa has received little attention and remains very poorly understood. Neither a clear conceptual nor a numerical representation of the interaction between surface water and groundwater in this terrain exists. In the Upper Nile Basin of Uganda, interactions between groundwater and surface waters (lakes, wetlands) are commonly ignored and groundwater is excluded from estimations of the lake-water balance. Current research seeks: (1) to characterise the interface and hence pathways between groundwater and surface water, and (2) to assess the contribution of groundwater to surface waters under variable climatic conditions. Preliminary findings show that regionally, precipitation variations and changes affect shallow groundwater storage, which is also supported by large-scale monitoring of terrestrial water storage under the Gravity Anomaly and Recovery Experiment (GRACE). The lithological interface and dynamic hydrological gradients between groundwater and surface water are currently being examined at two sites on Lake Victoria (Jinja, Entebbe) and one site on Lake Kyoga (Bugondo). Groundwater discharges to surface water primarily via saprolite underlying a relatively thin (<5 m) lacustrine sand. Preliminary observations of the hydraulic gradient between groundwater and surface water indicate that the groundwater primarily discharges to the lake. The magnitude and direction of this flux is strongly influenced by variations in precipitation and dam-controlled levels of Lake Victoria.

**Key words** groundwater–surface water interactions; rainfall; lithologic interface

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