

## Geophysical Research in a Changing Environment

Hauer C\*

Department of Water, Atmosphere and Environment, Laboratory for Sediment Research and Management, Institute of Water Management, Hydrology and Hydraulic Engineering, University of Natural Resources and Life Sciences, Vienna, Muthgasse 107, 1190 Vienna, Austria

### Editorial

The current issue includes an actual scope and worldwide perspective in both water and geophysical research and management in natural and anthropogenic disturbed environments. The presented research papers contains basic research in earth system dynamics or highlight actual problems in a technical, socioeconomic as well as ecological challenges from different African states (Egypt, Chad), Japan, China and India. The work of Mahmoud [1] addresses the socioeconomic importance of the groundwater resource in Egypt as 90% of the country is classified as desert. In their work an attempt to trace three-dimensional modelling of the Kharga Reservoir was done using magnetotelluric data (MT) was done to evaluate geophysical boundaries for future irrigation measurements. The results indicated a low resistivity layer associated with a Quaternary aquifer which extends from the surface until 75 m depth and moderate resistivity values for the deep (cretaceous) depths 500-1100 m. The second African study of this issue by Diponbe [2] was conducted in South-West Chad with the aim to investigate different lineaments of the region which are partially hidden by the sedimentary cover. In their study, various gravity data processing techniques were applied, including horizontal gradient of vertical derivative coupled with upward continuation and Euler's deconvolution. These methods revealed a number of lineaments describing gravity density discontinuities. The detections of lineaments are very useful in an economic and socioeconomic perspective for groundwater and oil exploration, but also for risk assessment. Moreover, in a primary research study, Lu [3] investigated the geological complexity of the Junggar basin (China) with the aim to document local sources and tectonical settings of the Triassic-Jurassic clastic rocks in the northwest margin including absolute dating of igneous rocks, rock geochemistry, and U-Pb detrital zircon geochronology. The results dated post-collision landforms and evolutionary aspects like the change from a single source to mix multiple sources of sediments in parts of the area as well as detailed information about the spread and magnitude of deposited sediments in the basin.

On a larger scale, Rahmann investigated earthquakes as parts of the world geophysical dynamics [4]. In Japan, in the period of a strong earthquake observed anomalous change of the height of the Earth's surface was observed. According to the geodetic data the latest vertical movements of faults were reviewed. The (i) development of observed deformation precursors, (ii) acoustic emission monitoring in dehydration process, including the speed change of massive movement depending on the remaining time till the earthquake happens, and (iii) theoretically calculated marks of a speed of displacement are shown in the article. In addition to the research on groundwater resources in Egypt the importance of well detection and management are reflecting the socioeconomic importance of the presented issue of Geology & Geophysics. In an Indian case study by Srinaiiah [5] well logging techniques comprising various parameters from five wells in Auranga coalfield Jharkhand were carried out to evaluate the possible impacts of coal mining. The authors identified logs against coal seams and non-coal litho-units from combined signatures of available physical properties as a central outcome. Moreover, the study of Ghoneimi [6] emphasise

the importance of wells in terms of managing water resources. Based on the open-hole wire-line log-data of seven wells, the petro-physical characteristics of the Late Miocene Abu Madi Formation in Abu Madi-El-Qara-Nidoco area, northern Nile Delta, Egypt were studied. In their work the vertical variation of the petro-physical characteristics was presented as litho-saturation cross-plots. Central results were parameter distribution maps, which were used to represent the lateral variation of petro-physical characteristics. In addition, cross plots of the investigated area showed that the main reservoir lithology is shaly sandstone with laminated to dispersed shale. Based on the presented studies, the current issue of Geology & Geophysics underlines the necessity of geophysical research in a changing environment, affected by global variations in geology [7], large scale tectonical dynamics [8] as well as the sensitivity of world-wide water resources managements impacted by global warming [9].

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\*Corresponding author: Hauer C, Department of Water, Atmosphere and Environment, Laboratory for Sediment Research and Management, Institute of Water Management, Hydrology and Hydraulic Engineering, University of Natural Resources and Life Sciences, Vienna, Muthgasse 107, 1190 Vienna, Austria, Tel: 0043 1 3189900 112; E-mail: [christoph.hauer@boku.ac.at](mailto:christoph.hauer@boku.ac.at)

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