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**Contributions to Global Earth Sciences Integration. A special issue on the 3rd Young Earth Scientists Congress**

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**Preface**

The Young Earth Scientists (YES) Network is an association of early-career geoscientists who are primarily under the age of 35 years from universities, geoscience organizations and companies from across the world ([www.networkyes.org](http://www.networkyes.org)). The YES Network was formed as result of the International Year of Planet Earth in 2007 under the patronage of UNESCO. YES Congress history began in 2009, when the first event took place at the China University of Geosciences in Beijing, China. The second YES Congress was convened in 2012 in Brisbane, Australia, in conjunction with the 34th International Geological Congress (IGC).

The special issue introduced here contains some of the contributions presented at the 3rd YES Congress, held at the Mwalimu Julius Nyerere International Convention Centre in Dar es Salaam, Tanzania, from 11th to 14th August 2014 (Fig. 1). This meeting was developed in conjunction with the 25th Colloquium of African Geology (CAG25).

The YES Congress is a good platform for ventilating new and emerging topical issues in earth sciences that are pioneered and initiated by young scientists. Indeed, in this special issue, the topical issues have been very interesting and quite diverse, including but not limited to the areas of hydrogeology and groundwater resources, water resources management, renewable energy resources and related policies, regional geology and tectonics, palaeontology, land management, aspects of climate change/variability, anthropogenic impacts on environment, remote sensing and geographic information systems applications in the earth sciences, amongst others. The patronage was quite high and diverse in their approach and region of research.

The first paper, by Addai et al. (2015-this issue), takes a further step to the study of groundwater resources in the Nasia sub-basin of the White Volta basin of Ghana. Groundwater resources constitute the bedrock of the rural water delivery system in Ghana, and therefore requires prudent management which in itself depends on knowledge of recharge processes as well as the quantitative estimates of the spatial and temporal variations in groundwater recharge. It is in the light of this that this kind of research is very important in Ghana, and in other sub-Saharan African countries. As the authors pointed out, sustainable socioeconomic development in such countries appears to hinge on the maintenance of robust irrigation systems that are resilient to the impacts of climate change/variability over time. One of the main successes of this research has been the use of stable isotopes to establish and understand the mechanisms of groundwater recharge in hydrogeology and water resource assessment and management in general. The methodology is novel and will certainly appeal to the general readership including the international audience of the Journal of African Earth Sciences.

The contribution of Mei et al. (2015-this issue) investigates land cover changes in the Lampedusa Island (Italy) using Landsat TM and Oli satellite images. The Lampedusa Island presents a good case study as it displays an important socio-economic impact in relation to an intensive touristic activity that is reflected in an increase in use of electricity and waste generation. The study focused in the time interval from 1984 to 2014 in order to obtain spatial and temporal information on changes that occurred in the island. The uniqueness of this research lies in the utility of remote sensing techniques to evaluate land cover changes over time. In the current age of urban population increase and the concomitant increase in energy use, this research finds place in advocating the informed use of renewable resources. The approach and findings will certainly prove useful to the larger audience of the Journal of African Earth Sciences.

The review work of Sen et al. (2015-this issue) is a paper that deals with one of the most significant problems in the world: the use and handling of renewable energies. The paper discusses a case study on renewable energy sources and development scenarios in India, one of the biggest and most populous countries in the world. The contribution of Sen and colleagues presents a detailed report on the current energy status in that country, and the potential for developing renewable energies. In addition, it describes a summary of political, public and private actions regarding relevant international cooperation on renewable energy development scenarios and options.

Senyah et al. (2015 this issue) presents a detailed geochemical and structural study of the Palaeoproterozoic metavolcanic rocks from the Chirano Gold District, Sefwi belt, in Ghana. From a geological standpoint, this work represents a substantial advance in the current knowledge of the West African craton, with emphasis on its tectonic setting. The importance of such a study lies in the economic importance of the Chirano Gold District, in order to establish metallogenetic model. The focus of this work has been the use of petrographical analysis of the rocks and their whole rock major and trace elements contents by ICP-AES and ICP-MS methods. In addition to contributing to the understanding of the geology of the Birimian in Ghana and West Africa, the methods applied in this study will certainly be of interest to the international readership of the Journal of African Earth Sciences.

Abitty et al. (2015 this issue) elucidate on the understanding of the geology of the K-rich 'Bongo-type' granitoids in the Paleoproterozoic BoleeNangodi greenstone belt of Ghana. This paper represents another approach to assess the Paleoproterozoic rocks in the Birimian terrane of the West African craton (WAC). The unique 'Bongo-type' granitoids provide an important avenue for discussions on the tectonic regime and magmatic processes prevailing during the final stages of the Eburnean orogenic cycle. The authors presented a detailed analysis of whole rock major element composition. Analysis of the bulk rock geochemistry was carried out using ICP-AES while the minor and trace elements were measured using lithium borate fusion ICP-MS. This is an interesting paper which will appeal to the general readership of this journal.

The paper of Díaz-Martínez et al. (2016 this issue) reports the first unambiguous record of large ornithopod tracks in Gondwana in the Uppermost Cretaceous. The cogent point is that it gives the first evidence of *Hadrosauropodus* from Gondwana, expanding the geographic range of this ichnogenus. The tracks from this record are different from other possible large ornithopod tracks of South America. They are unique with bilobed heel impressions, one pad impression in the heel and one in each digit imprint, and clear blunt claw traces. Therefore, this new record may represent the most northerly evidence of hadrosaurids in Argentina.

Manzo et al. (2015 this issue) present an analysis of anthropogenic activities in the southeast of Mt. Vesuvius National Park (Naples, Italy). The authors have used an integrated remote sensing analysis for downscaling environmental change. Indeed, this methodology is very useful regarding the fact that territorial analysis requires attention in effective decision making for planning and monitoring anthropogenic activities. The study area has been affected by two main activities during the last decades: mining and consecutive municipal solid waste dumping. Landsat TM images, airborne MIVIS data and aerial orthophotos were used to study the changes that occurred in the area based on analysis of environmental indices at a wider temporal scale, between 1987 and 2011.

The paper of Arora et al., (2016 this issue) encompasses a thorough study of the relation between resistivity and soil moisture data from the unsaturated zone of a granitic terrane, in order to locate preferential pathways of recharge of an aquifer in South India. The importance of the studying of unsaturated zone processes of an aquifer lies in the fact that this zone is the gateway for water movement from the land surface to the saturated zone. The amount of recharge to an aquifer is highly dependent on the rate of percolation, which is constrained by the characteristics of the unsaturated zone. In this paper, the authors present a detailed spatio-temporal study of a watershed as was carried out through a Time Lapse Electrical Resistivity Tomography experiment (TLERT data).

Németh et al. (2016 this issue) have analysed the adsorption and chemical precipitation of lead and zinc from contaminated solutions in porous rocks of Northern Hungary. In addition, the authors discuss the possible application of this methodology in environmental protection. Such research is crucial because heavy metal pollution is one of the most hazardous problems in environmental management. Heavy metals are non-biodegradable, and they can cause acute and chronic toxicity. This paper demonstrates the adsorption capacity and mineral precipitation of lead and zinc solutions on the surface of two porous lithologies: a limestone and a rhyolite tuff. One possible application is the use of these porous rocks as permeable reactive barriers in ground water treatment, especially in their powdered form due to higher reactive surfaces.

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Caption Fig.1: Opening ceremony of 3rd Young Earth Scientists Congress and 25th Colloquium of African Geology (CAG25). At the front office bearers of YES Network, Geological Society of Africa (GSAf) and Government of Tanzania.

### **References**



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