Editorial

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The activities of engineering geological, geotechnical and environmental professionals in developing countries are closely linked with social issues of housing, provision of basic services, e.g. water, and infrastructure development. Due to the ever increasing population and the very tangible influence of climate change environmental geotechnical challenges are changing into social and environmental disasters. The severe droughts over the past couple of years in parts of southern Africa are leading to the city of Cape Town, with 4 million inhabitants to become the first major city in the world to run dry (Koopman and de Buys, 2017; Maxmen, 2018). Many other regions in the country are also experiencing changes in climatic patterns with unpredictable and severe rainfall events which cause traditional water supply projects to be inadequate.

The social and economic impacts of this disaster are the very visible and tangible results, but the emergency water augmentation schemes, e.g. tapping into the large sandy aquifer of the Cape Flats and extracting water from the Table Mountain Sandstone Aquifer, will have an influence on the geotechnical properties of these materials.

Changes in weather patterns in other parts of the country may also influence the geotechnical properties of foundation materials, e.g. collapsible soils on Basement Granite and behaviour of expansive clays on the Bushveld Igneous Complex. Vadose zone processes (Dippenaar and Van Rooy, 2014), changes in water recharge and subsequent changes in groundwater levels may cause unpredictable sinkhole events in urban karst areas. Current knowledge on most environmental geotechnical problems in South Africa is based on historic data and relatively stable recent environmental conditions. The incredibly long exposure of post-Gondwana breakup continents, e.g. Africa, South America, India, Australasia, to the effects of climate change (Partridge and Maud, 1987) and evidence still imprinted on the geomorphology, soils and rocks may warrant further investigation and research to unravel the influence of climate change on the geotechnical properties of these materials. Africa as the Cradle of Humankind should maybe lead us to the Cradle of Environmental Geotechnics. Current knowledge on the use of natural materials and influences of problem soils and engineering solutions abound in local literature (e.g. Brink, 1979–1985; Huisamen and Van Rooy, 2012; Brink and Van Rooy, 2015; Oosthuizen and Van Rooy, 2015; Oyelami and Van Rooy, 2016; Williams *et al.*, 1985). Changes in the environment will lead to changes in behaviour of soils and rock masses and this is really what Environmental Geotechnics is all about. In the developing countries such as South Africa we may not be at the forefront of research,

but we have enthusiastic and dedicated professionals in geology, environmental science and geotechnics, but these professions are looked upon by society and government to contribute to the mitigation of environmental disasters facing us.

Environmental Geotechnics serves as an ideal avenue to communicate research findings and case histories and will hopefully contribute to the solution of many of the problems facing the developing world.

The examples above emphasize the role of geotechnical engineering

In this issue the contribution of the geotechnical profession in mitigating negative environmental influences of anthropogenic wastes, but also finding new and safe uses of waste products is highlighted with three of the four papers presenting results on the isolation, use and evaluation of anthropogenic materials. Valter *et al.* (2018) modelled the resaturation time of a granular bentonite mixture barrier between radioactive waste and the host rock at the planned repository in Switzerland. Correlation of remoulded shear strength of highly organic soils, such as municipal sludge, with fall-cone test results are proposed by O’Kelly (2018) and the use of MIBA as a road construction material with specific reference to its leaching behaviour when bound in cement and bitumen are discussed by Lynn *et al.* (2018).

Interaction between the atmosphere and natural materials is the topic of the fourth paper. Due to the geological setting of Shanghai, China and the prevailing weather systems lightning causes serious damage and mitigation via lightning protection and grounding methods are important. Laboratory investigation on the effect of water and salinity in soils when struck by lightning is reported on by Rao *et al.* (2018).

Our living space is threatened by, not only climatological and geological hazards, but also human induced (anthropogenic) hazards, including the generation of waste. Evaluation of constructed barriers between hazardous waste and the environment are necessary to keep our living space safe. The appropriate re-use of inert waste materials also reduces the magnitude of the ‘waste problem’ to some extent. Environmental geotechnics plays an important part in the abovementioned issues. It is however important to always be sensitive towards the influence of atmospheric and geological processes and materials when seeking long-term engineering solutions to some of the problems addressed in this issue.

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