Journal of African Earth Sciences 110 (2015) 188–226

Contents lists available at ScienceDirect

Journal of African Earth Sciences

journal homepage: www.elsevier.com/locate/jafrearsci

Invited review

Urban geology of African megacities

T.C. Davies

Faculty of Natural Sciences, Mangosuthu University of Technology, 511 Mangosuthu Highway, 4031 Umlazi, KwaZulu Natal Province, South Africa

ARTICLE INFO

Article history:
Received 26 September 2014
Received in revised form 12 June 2015
Accepted 14 June 2015
Available online 25 June 2015

Keywords:
Geoenvironmental databases
Urban planning and sustainability
Cairo
Lagos
Kinshasa
Addressing issues

ABSTRACT

Severe geoenvironmental, economic and social problems are recognised in many urban areas, worldwide. In Africa, these problems are acute, especially in the rapidly expanding megacities, and they impact on public health, poverty alleviation and sustainable development. Many cities have become densely overpopulated as a result of migration due to civil wars and the search for a better life. Cities are seen as offering more hope of jobs, better health care and educational opportunities. But these are also home to an overwhelming percentage of a country's wealth. The rapid expansion of megacities is likely to be a drain on Africa's dwindling resources, as well as a major call on international aid, while contributing substantially to environmental degradation. African megacities are at risk of geological disasters and pose huge problems for waste management, supply of raw materials, water use, air quality and climate change. Research and practice of urban geology in Africa have seen the development of new outputs to aid urban development, regeneration and conservation. Another key advance has been the realisation that, in the urban environment, knowledge and understanding of the geology need to be integrated with those of other environmental disciplines such as biodiversity and, increasingly, with the research of social scientists, economists and others. At the same time, however, it is recognised that municipal authorities need greater access to extensive databases of geoinformation that are maintained in the long-term, and renewed regularly. We need to demonstrate convincingly to all stakeholders how the geosciences can contribute to sustainable development. This discourse examines the dynamics of geoenvironmental phenomena and processes in Africa's largest urban settings (Cairo, Lagos and Kinshasa), and uses case studies and city overviews (descriptions and geodata analyses) to show how the application of geology to urban construction and development in Africa should be effectively done. The completeness of urban geotechnical databases is highlighted and their application to environmental construction and related geological problems illustrated. The three megacities provide contrasting geological settings but similar urban architecture. The fact that engineering construction problems are closely controlled by the local or site geological setting, gives for the three cities, a range of scenarios; and proposed solutions or interventions in one area can be usefully applied to tackle problems in another area with similar geology.

Contents

E-mail address: theo.clavellpr3@gmail.com

http://dx.doi.org/10.1016/j.jafrearsci.2015.06.012
1464-343X/