

Hazard Studies in Sub-Saharan Africa Using Integrated Techniques

Tuesday, 20 June 2023 10:49 (1 minute)

Seismic hazard assessments (SHA) have not been conducted in large parts of Sub-Saharan Africa (SSA) due to incomplete earthquake catalogues, sparse seismic networks, etc. raising concerns on needed information for planning and disaster risk management. The aim of this study is to bridge the research gap using modern techniques for across the board SHA. Updated catalogue from local networks, CTBTO's National Data Centres, International Seismological Centre and publications spanning 1615-2022 with threshold and maximum moment magnitudes (M_w) of 4.0 and 6.8 formed the dataset. The catalogue, which was declustered and harmonized to M_w , was used with available geological data to delineate area source zones and computation of earthquake recurrence parameters. Four ground motion prediction equations for tectonically similar regions to SSA were implemented using logic tree formalism in the calculation, with all equations weighted equally. With a 1-1000 year period considered, the computed Gutenberg-Richter b-value, activity rates, and regional maximum possible magnitudes ranged from 0.69 to 1.0, 1.6 to 2.1, and 5.2 to 7.2 respectively. Peak ground accelerations ranged from 0.02g to 0.2g for a 10% chance of exceedance in 50 years and seismic hazard maps for 0.1s, 0.2s, 0.3s, 0.5s, and 0.15s periods were produced. Results are expected to make significant contribution to planning in the vast region.

Promotional text

CTBT promotes wide civil and scientific applications. This has contributed a great revolution to seismic hazard assessments study for the first time in Sub-Saharan Africa, in knowledge, idea and data exchange. Promotion of healthy collaboration with larger scientific communities.

E-mail

umakad@yahoo.com

Oral preference format

in-person

Primary author: AFEGBUA KADIRI, Umar (Centre for Geodesy and Geodynamics, National Space Research and Development Agency, Ministry of Science and Technology)

Co-authors: Prof. KIJKO, Andrzej (University of Pretoria); Prof. EZOMO, Friday (University of Benin, Nigeria); Ms SITALI, Mako (Ministry of Mines and Energy, Geological Survey of Namibia); Prof. AMPONSAH, Paulina Ekua (School of Nuclear and Allied Sciences, Ghana Atomic Energy Commission); Dr MIDZI, Vunganai (Council for Geoscience)

Presenter: AFEGBUA KADIRI, Umar (Centre for Geodesy and Geodynamics, National Space Research and Development Agency, Ministry of Science and Technology)

Session Classification: Lightning talks: P1.2-1, P3.1, P3.4, P4.5

Track Classification: Theme 1. The Earth as a Complex System: T1.2 The Solid Earth and its Structure