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Seismic ground motion and hazard assessment of the Greater Accra Metropolitan Area, Southeastern Ghana

Amponsah, P.E.¹, Banoeng –Yakubo, B.K.², Vaccari, F.³ and Panza, G.F.⁴

¹Ghana Atomic Energy Commission, P.O.Box LG 80, Accra, Ghana, pekua2@yahoo.com

²Geology Department, University of Ghana, Legon, Ghana

³Department of Earth Sciences, University of Trieste, Italy

⁴Department of Earth Sciences, University of Trieste, Italy

The seismic ground motion of the Greater Accra Metropolitan area has been computed and the hazard zones assessed using a deterministic hybrid approach based on the modal summation and finite difference methods. The seismic ground motion along four profiles located in the Greater Accra Metropolitan Area has been modelled using the 1939 earthquake of magnitude 6.5(M_L) as the scenario earthquake. Synthetic seismic waveforms from which parameters for engineering design such as peak ground acceleration, velocity and spectral amplifications have been produced along the geological cross sections. From the seismograms computed, the seismic hazard of the metropolis, expressed in terms of peak ground acceleration and peak ground velocity have been estimated. The peak ground acceleration estimated in the study ranges from 0.14 - 0.57g and the peak ground velocity from 9.2 - 37.1 cms^{-1} . The presence of low velocity sediments gave rise to high peak values and amplifications. The maximum peak ground accelerations estimated are located in areas with low velocity formations such as colluvium, continental and marine deposits. Areas in the metropolis underlain by unconsolidated sediments have been classified as the maximum damage potential zone and those underlain by highly consolidated geological materials are classified as low damage potential zone. The results of the numerical simulation have been extended to all areas in the metropolis with similar geological formation.

