

Crust-Upper Mantle Structure and Seismic Hazards Studies for National Planning and Development in Nigeria

This work is aimed at assessing critical issues on sites response and earthquakes prediction, improve earthquakes location and better seismic hazards assessment for planning in Nigeria. Firstly, sediment depths in the Lower Benue Trough were collected; resonance frequency (F_0) and shear-wave velocities (V_s) were then computed. Secondly, average velocities were estimated from cross-correlation along stations' paths in Nigeria. Thirdly, the Moho depths beneath Ife, Kaduna and Nsukka stations were estimated, and V_p/V_s ratio beneath Ife station. Finally, Statistical and Probabilistic Seismic Hazard Assessment (PSHA) were used to compute seismic hazard parameters for Nigeria and environs. The results showed Moho depths of 39km, 38km and 28km beneath the stations, and average V_p , V_s and V_p/V_s beneath Ife station to be 5.8, 3.8 and 1.7 respectively. V_s beneath the stations were found to be 288m/s, 1019m/s, 940.6m/s and 255.02m/s respectively. Results from PSHA indicated high probability of yearly occurrence of magnitudes 2.0-3.5 in Nigeria, but low for magnitudes 4.0-6.0. The expected maximum magnitude would likely not exceed 6.5 within the 1-1000 years covered. The computed Peak Ground Accelerations ranged from 0.01-0.08g, and would be useful for engineering design and as baseline parameters for the establishment of seismic building codes for Nigeria.

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