

Variations in the Frequency-Magnitude Distribution with Depth in Kalabsha Area, Aswan, South Egypt

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Abstract : Mapping the earthquake-size distribution in various tectonic regimes on a local to regional scale reveals statistically significant variations in the range of at least 0.4 to 2.0 for the b-value in the frequency-magnitude distribution. We map the earthquake frequency-magnitude distribution (b value) as a function of depth in the Reservoir Triggered Seismicity (RTS) region in Kalabsha region, in south Egypt. About 1680 well-located events recorded during 1981-2014 in the Kalabsha region are selected for the analysis. The earthquake data sets are separated in 5 km zones from 0 to 25 km depth. The result shows a systematic decrease in b value up to 12 km followed by an increase. The increase in b value is interpreted to be caused by the presence of fluids. We also investigate the spatial distribution of b value with depth. Significant variations in the b value are detected, with b ranging from b 0.7 to 1.19. Low b value areas at 5 km depth indicate localized high stresses which are favorable for future rupture.

Keywords : seismicity, frequency-magnitude, b-value, earthquake

Conference Title : ICESE 2016 : International Conference on Earthquake and Structural Engineering

Conference Location : Jeddah, Saudi Arabia

Conference Dates : January 26-27, 2016