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Seismicity Analysis for Pamir-Hindukush Considering Shallow and Intermediate Depth Earthquakes

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Abstract The present study reveals the variations of frequency-magnitude distribution of shallow and intermediate depth earthquakes of high seismicity in the region of Pamir-Hindukush. The region is characterized by occurrence of large earthquakes in small zone of intense activity. The present data suggest that the space-time variation of seismicity is well correlated with the geological processes of the investigated region. In general, the shallow earthquakes are more common than intermediate depth earthquake, but our model suggests the opposite. Seismicity increases due to intermediate depth earthquakes compared to shallow earthquakes. Homogenized earthquake data have been used for analysis. Histogram analysis of earthquake dataset clearly demonstrates that the time period of 1964-2007 (the first modern WWSSN time) is appropriate to undertake the analysis of the seismicity of Pamir-Hindukush. The values of b and z are calculated for shallow and intermediate depth earthquakes. The b -value for shallow earthquake is 1.32 ± 0.07 while that for intermediate is 1.07 ± 0.03 . The z -value maps show that the earthquake with magnitude of 7.0 and above can be seen only in intermediate depth earthquake maps while no such earthquakes existed in the shallow seismicity results. Moreover, z -value maps show that rate of seismicity increases in Hindukush and decreases in Pamir in case of intermediate depth results and vice versa.

