

## **A GIS-based assessment of Earthquakes in Pakistan from 2009-2019**

Muhammad Nawaz\*, Muhammad Muslim, Waqar Ahmad

*National Centre of Excellence in Geology, University of Peshawar, Pakistan*  
*\*[muhammadnawaz441@gmail.com](mailto:muhammadnawaz441@gmail.com)*

Pakistan is seismically most dynamic and active zone of Central Asia and has experienced many devastating earthquakes. In this study an updated and unified earthquake catalogue has been developed for Pakistan having latitude (24-37°N) and longitude (61-75.5°E). This catalogue covers a period from 2009 to 2019. Data from United State Geological Survey (USGS) was used for the compilation of this catalogue. The new catalogue is homogenized to moment magnitude (M<sub>w</sub>), because a homogenized and uniform earthquake catalogue is an essential tool in any seismic hazard analysis. For the homogenization of the catalogue in term of moment magnitude Scordilis global relations 2006 formula was used. This formula was used for conversion of Body wave magnitude, and Local magnitude to Moment magnitude and Gutenberg and Richter (1956) relation for the local magnitude. After the homogenization the earthquake data was plotted on maps to observe the occurrence of earthquakes on the basis of magnitude and focal depth. From these maps it is identified that Main Boundary Thrust (MBT), Jehlum fault, Balakot-bagh fault, Raikot fault and Ornach-nal fault are active seismically and producing smaller to moderate magnitude earthquakes. Similarly mostly shallow earthquakes (depth<70 Kilometers) were observed all over Pakistan while in North-west of Pakistan moderate level earthquakes were noticed.

**Keywords:** Earthquake assessment; Moment magnitude; Scordilis equation, Pakistan