17th Symposium on Earthquake Engineering
November 14-17, 2022
IIT Roorkee, India
Paper No. 348

Ground Motion Prediction Equation for NW Himalaya and Its Surrounding Region

Vandana[1], Harendra K Dadhich[1], Himanshu Mittal[1], O P Mishra[1]

[1]National Centre for Seismology, Ministry of Earth Sciences, New Delhi, India

Abstract

An attenuation relationship, also known as ground motion prediction equation (GMPE) has been developed for Northwest Himalaya and its neighboring region using the strong motion data recorded by National Center for Seismology Network. In the present study, we have used the 40 records of 18 earthquakes from the 2010 to 2020 having magnitudes ($5.0 < M_w < 5.6$) that occurred in the region. To develop the new attenuation relationship, we have used the maximum peak ground acceleration (PGA) of two horizontal components. Two-step stratified based regression approach is followed. The newly developed relationship is:

$$Log_{10}PGA(gal) = 0.36512 + 0.55599 * M - 0.957736 Log_{10}(HD + e^{1.27581 * M})$$

Where PGA is peak ground acceleration in gal, M is the magnitude, and HD is hypocentral distance. The standard error is of the order of 0.0093. The established GMPE is proposed to be useful for seismic hazard estimation, ground motion simulation, site specific studies, and other engineering applications.

Keywords: Attenuation relationship, Regression, GMPE, Amplitude