## Site classification of recording stations of EEW System for Garhwal region of Uttarakhand, India

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In the present study, site classification study of the 84 stations where accelerometers have been installed in the field, has been carried out. These accelerometers are instrumented in the field as part of Earthquake Early Warning System for Uttarakhand, a province of India. Horizontal to vertical spectral ratio (HVSR) of recorded strong ground motion of earthquakes of Mw 2.8 to 7.5 has been carried out to find out the natural period of the ground at the site. Four classification methods have been applied for classification. In the first method, HVSR of Fourier amplitude spectra is performed and natural period corresponding to the HVSR peak is estimated. In the second method 5% damped response spectra is used in HVSR, then the predominant period corresponding to peak of curve is estimated. The estimated time period from method one and two, is used to classify the sites in the range in with the natural period falls in the standard classification schemes (Building Seismic Safety Council, 2003; Japan Road Association, 1980). In the 3<sup>rd</sup> method, site classification is done by matching the 5% damped response spectra curve to the standard curve and the site index (SI) is estimated using the method proposed by (Zhao et al., 2006). The 4<sup>th</sup> method uses the Spearman's rank correlation coefficient as site classification index (Ghasemi et al., 2009). In method 3<sup>rd</sup> and 4<sup>th</sup>, the sites are classified in 4 classes. Out of 84 stations, method 1<sup>st</sup> categorize 44% station in class - B, 27% stations in class -C, 9% stations in class -D and 10% in class -E, method 2 categorize 36 % stations in class -B, 30% stations in class -C, and 5% stations in class- D and 16% in class -E, method 3 categorizes 75% stations in class -B, 10% stations in class -C and 1% in class -D and 3% in class -E, method 4 categorize 46% stations in class -B, 22% stations in class -C, 11% stations in class -D and 10% stations in class -E. Results from method 1<sup>st</sup> and 4<sup>th</sup> are consistent and shows the similarity to the classification. Validation of classification is done with the study of ground response analysis carried by (Pandey, 2018).

Keywords: Site classification, EEW System, HVSR, predominant period

