

**Assessment of site effect in Kumaon Himalaya region, India using
ambient noise and micro-earthquakes recorded on broadband
seismograms**

K. Sivaram and K.S.Prakasam

*National Geophysical Research Institute (Council of Scientific and Industrial
Research), Hyderabad-500 007, India*

email : ksramngri@yahoo.com; ph: 91-040-23434700-extn 2466

We quantify the site response parameters of Kumaon Himalaya region, India by the empirical Nakamura technique of horizontal to vertical (H/V) spectral ratio of ambient noise, and micro-earthquakes recorded on 32 broadband seismographs. The parameters are estimated over a frequency range from 0.50 Hz to 15 Hz. The spectral ratio estimated using the Nakamura technique on noise as well the micro-earthquakes show similar behaviour. Also, consistency in site-specific fundamental frequency during different periods of a year is observed, except for small variation in peak-amplitudes of the H/V spectral curves. In conformity with the SESAME project criteria the three distinct patterns have been observed: (1) well defined H/V peak curve due to sharp velocity contrast; (2) low amplitude and flat peak H/V curve associated with weak contrast; and (3) broad H/V peak due to complex lateral variability. Observance of maximum amplitude of site response (H/V) between 2-4 for sites located in Kumaon Central Himalaya, is reported which may be further validated. Apart from the fundamental site frequency and lower bound amplification factor, our analysis also indicates directivity effect of the H/V spectral ratio. Contrary to previous understanding, considerable site amplification-effect is seen in the rock locations.

Keywords: Site response, Kumaon Himalaya, H/V, Microtremor, Microearthquakes