Variation of Seismic Coda Attenuation Characteristics in the Gauribidanur Seismic Array (GBA) Region of Southern India

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Seismic coda wave attenuation (Q_c^{-1}) characteristics in Gauribidanur seismic array (GBA) region of southern India. is studied using vertical component seismic observations from local events of hypocentral distance less than 250 km and magnitude range 0.3 to 3.7 Coda-wave attenuation (Q_c^{-1}) is estimated using single isotropic scattering method at central frequencies 1.5, 3, 5, and 8 Hz at different lapse times (*LT*) (coda window start time from S-wave on set) and coda window lengths (*WL*), from 10 to 60 seconds at an interval of 10 seconds. The results show that the Q_c^{-1} values are frequency dependent in the considered frequency range, and fit the power law $Q_c^{-1}(f) = Q_0^{-1} f^{-n}$ using least square. The Q_0 (Q_c at 1 Hz) value ranges from about 50 ($Q_0^{-1} = 20.143 \times 10^{-3}$) for lapse time of 10 sec and window length 20 sec combination to about 361 ($Q_0^{-1} = 2.769 \times 10^{-3}$) for lapse time (LT) of 60 sec and window length (WL) 60 sec combination. The exponent of the frequency dependence law, *n* ranges from 1.45 to 0.92, however, it is greater than 1.0 in general, indicating that the region is seismically and tectonically active with high heterogeneities. The attenuation in this region is less as compared to other tectonic and seismic active regions of the world, however, comparable to other regions of India. The variation of coda attenuation has been estimated for different lapse time and window length combinations to observe the effect with depth and it indicates that the upper lithosphere is more active seismically as compared to the lower lithosphere and the heterogeneity decreases with increasing depth.