Lg AND CODA WAVE STUDIES

OF

EASTERN CANADA

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Lg wave spectral analysis of New Brunswick earthquakes was used to study source parameters and Lg wave propagation characteristics. These earthquakes, which were located at 46.6° N, 66.6° W and had body-wave magnitudes that range from 2.1 to 5.7, were recorded on digital seismographs of the Eastern Canada Telemetered Network (ECTN). The spatial attenuation of the Lg wave from seven larger earthquakes ($m_{bLg} \geq 3.5$), which were recorded by more than five stations with epicentral distances from 100 km to 1000 km, is obtained by using Butterworth narrow bandpass filtering and fitting time-domain peak amplitudes and frequency-domain amplitude spectra. Both results imply a frequency dependence for Q_{Lg} given by $Q(f) = Q_o(1Hz) f^{(0.65 \pm 0.07)}$ where $Q_o = 500.0 - 550.0$

Scattering effects of the eastern Canada area were examined by using seven earthquakes recorded by more than five stations. The m_{Lg} magnitude of the earthquakes varies from 3.7 to 5.7 and epicentral distances of the stations from 100 km to 1000 km. Aki and Chouet proposed body-wave and surface-wave single back-scattering models for filtered coda waves and Sato gave a correction term for these models as the separation of the receiver and the source is taken into account. Surface-wave models may play a very important role at low frequencies for distant records. In this study, coda wave attenuation for each station, for each event, and for the whole area was measured separately.

A new set of master curves describing filtered coda wave envelope were set up by adding narrow bandpass filters to Herrmann's master curves. Coda wave attenuation at different frequencies can be easily obtained by matching observed data to these curves. From this analysis, the coda Q is of the form of $(500 \pm 50) f^{(0.6-0.7)}$. This is a result compatible with that obtained by filtered amplitude spectral analysis.

The Lg-Q estimates differ from coda-Q estimates substantially at low frequencies, but the Lg wave is more attenuated than the coda wave at high frequencies. Therefore, Lg-Q values obtained at high frequencies are most likely indicative of coda wave attenuation. Due to this complexity, we resolve high frequency Lg attenuation by using a correction term related to scattered S waves for distant data. The result is shown to be of the form $560 f^{0.55}$ for Lg wave.