Average attenuation of 0.7–5.0 Hz Lg waves and magnitude scale determination for the region bounding the western branch of the East African Rift

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Abstract
The investigation of L G attenuation characteristics in the region bounding the western branch of the East African rift system using digital recordings from a seismic network located along the rift between Lake Rukwa and Lake Malawi is reported. A set of 24 recordings of L G waves from 12 regional earthquakes has been used for the determination of anelastic attenuation, Q_{Lg}, and regional body-wave magnitude, $M_b{}_{Lg}$, scale. The events used have body-wave magnitudes, M_b, between 4.6 and 5.5, which have been determined teleseismically and listed in ISC bulletins. The data were time-domain displacement amplitudes measured at 10 different frequencies (0.7–5.0 Hz). Q_{Lg} and its frequency dependence, H, in the region can be represented in the form $Q_{Lg}=(186.2\pm6.5)\ F^{(0.78\pm0.05)}$. This model is in agreement with models established in other active tectonic regions. The L G-wave-based magnitude formula for the region is given by $M_b{}_{Lg}=\log A+(3.76\pm0.38)\log D-(5.72\pm1.06)$, where A is a half-peak-to-peak maximum amplitude of the 1 s L G wave amplitude in microns and Dis the epicentral distance in kilometres. Magnitude results for the 12 regional earthquakes tested are in good agreement with the ISC body-wave magnitude scale.

Keywords
Attenuation
mb magnitude
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