

Predicting Local and Regional Phase Amplitudes

In the late 90s, using waveforms from IMS seismic stations, we showed that cross-validated, empirical amplitude corrections reduce scatter in the high frequency P/S ratios used for event discrimination. Since then, we have explored ways to model local and regional phase amplitudes, and codas, using tomography methods that solve for attenuation, source and site terms. Such models will be important for event magnitude and screening, and should aid in detection and association procedures. Current models are global in extent, but provide greater coverage of continental regions. We find that great circle paths in a 2-D Q grid along with frequency and phase dependent site terms fit Pg, Sn, and Lg amplitudes well (log10 amplitude misfit 0.1). Pn amplitudes fit less well (misfit 0.3) and likely show effects of upper mantle focusing, and perhaps source radiation effects. To raise the models to absolute levels we constrain source terms for a subset of events for which moments have been derived independently, and for a smaller subset for which corner frequencies are available from coda spectral ratio studies. This procedure provides direct constraint across all bands, opportunities for model validation, and reduces tradeoffs between attenuation and event corner frequency.

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