Lg ATTENUATION OF THE CENTRAL AND EASTERN UNITED STATES

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Lg wavetrains recorded by EarthScope's Transportable Array (TA) are used to study Lg attenuation in the central and eastern United States (CEUS). The study area extends from the Rocky Mountains to the East Coast. Attenuation is calculated based on Lg spectral amplitudes filtered at a narrow frequency band. Several bands are used in order to study the frequency dependence of Q. It is found that Q values increase with increasing central frequency. The two-station and reverse two-station techniques are used to calculate Q values. 47 crustal events occurring from 2010 to 2014 and ranging from magnitude 3 to magnitude 6 are used in this study. The geometrical spreading value has been assumed to be a constant in previous studies on Lg attenuation. In order to test this assumption we determine the geometrical spreading value by plotting the logarithm of the amplitude ratio versus the logarithm of the absolute distance ratio and fitting the trend. The value of the resulting slope is considered our geometrical spreading value and used throughout our calculations. Finally, we investigate anisotropy occurring along the Appalachians.

Areas of high attenuation can be seen along the Gulf Coast, Southern Oklahoma Aulacogen, Reelfoot Rift, the Nebraska-South Dakota border, the upper part of Florida, and the Minnesota-Wisconsin region. Areas of low attenuation include a northeast trending area ranging from Kansas to Michigan, the Appalachians, and the South Carolina-Georgia region. These details can be seen in Figure 1.

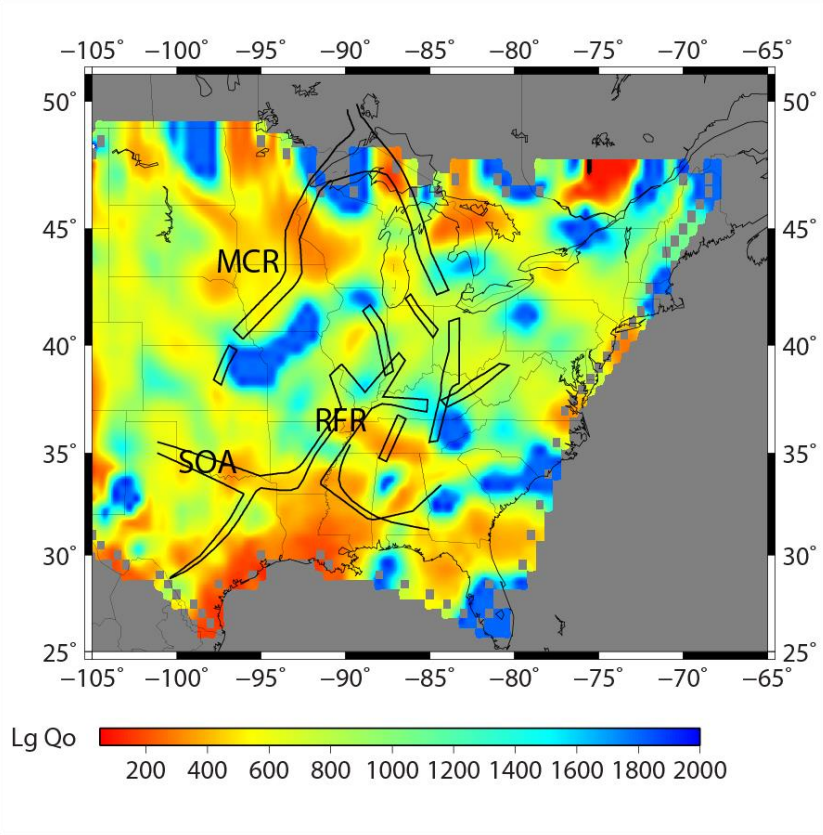

Figure 1. Attenuation map of the central and eastern United States at a central frequency of 1 Hz. Low Q_o represents high attenuation and high Q_o represents low attenuation.

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These new models use a greater amount of data and attain more coverage than previous studies and better constrain attenuation. The calculation of the geometrical spreading value and the study of frequency dependence have further improved our attenuation estimates. This increase in detail and refining of technique can improve high frequency ground motion predictions of future large earthquakes for more accurate hazard assessment and improve overall understanding of the structure and assemblage of the CEUS.

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