

Epilogue

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The first stage of a forum on the frequency dependence of seismic Q appeared in the October 2010 issue of PAGEOPH. It consisted of two papers, the first by Igor Morozov titled *On the causes of frequency-dependent apparent seismological Q* and the second by Jiakang Xie titled *Can we improve estimates of seismological Q using a new “geometrical spreading” model?*

Morozov performed inversions of data sets from several previous studies, some of which contributed to the establishment of the frequency-dependent Q concept. He concluded, in keeping with his own earlier results, that all of those data sets could be explained using a frequency-independent effective Q (Q_e) and that most of the frequency-dependent Q values obtained in the earlier studies occurred because researchers assumed an over-simplified geometrical spreading model.

Xie argued that Morozov's new inversion method lacked the physical basis that is inherent in the traditional method for inverting seismic wave attenuation data and that it is effectively only a curve-fitting procedure using a first-order Taylor series expansion (thus limiting its applicability to relatively small frequency bands).

This, the second stage of the forum, includes two comments. In the first comment Li tried to follow Morozov's preferred approach of using a phenomenological model. He chose an energy flux approach based on empirical results indicating that wave energy is spatially uniform within a crustal volume. He found situations in which both scattering Q and intrinsic Q , as opposed to Morozov's results, vary with frequency. In the second comment Li and Lu, like Xie, raise questions about whether or not Morozov's factor $\exp(\gamma t)$ is a good approximation for the residual geometrical spreading and about the physical interpretation of his model.

The papers by Xie and the two thoughtful comments by Li and by Li and Lu take issue with some of Morozov's results. But differences of opinion on the topic will undoubtedly continue until seismologists achieve a better understanding of seismic wave attenuation in the crust and mantle. One thing that most seismologists agree upon is that Q measurements are inherently difficult. If nothing else this forum will, I hope, remind many seismologists about those difficulties.

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