

Interactive comment on “The relative contributions of scattering and viscoelasticity to the attenuation of S waves in Earth’s mantle” by Susini deSilva and Vernon F. Cormier

Anonymous Referee #2

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The manuscript presents synthetic seismogram analyses of ScS multiple attenuation varying the importance of intrinsic attenuation and scattering in five different model scenarios. A simple comparison with the range of ScS Q values from a few prior studies and analysis of two earthquakes in this study is used to estimate the approximate balance between scattering and intrinsic attenuation in the upper and lower mantle. The modeling aspect of the study is well-conducted and the five scenarios provide a new and instructive perspective on the tradeoffs between scattering and intrinsic attenuation. The connection of the modeling results to inferences about Earth’s mantle via comparison with observational results is much weaker on account of the choice to ignore the wealth of relevant and easily accessible seismic data in modern community

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archives. Consequently, I am cautious about the value of the interpretations regarding the balance of scattering and intrinsic attenuation in the real rather than synthetic model mantle. The observational component of the manuscript should be substantially expanded to use global data from many sources and a large number of receivers as the available data resources have advanced greatly beyond those used in most of the references. Comparing a more statistically significant set of waveform analyses to the modeling results would be a powerful approach for evaluating the relative influences of scattering and intrinsic attenuation.

Given the quality of the modeling component I would suggest focusing on that in this manuscript and refraining from insights into actual mantle properties rather than just model implications. Or, with much more observational analysis a compelling observational component could be added to this study.

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