Low Q in the mantle transition zone beneath the Northwestern Pacific?

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We recently conducted simultaneous waveform inversion for 1-D elastic and anelastic structure in the mantle transition zone beneath the Northwestern Pacific and found low Q value of 50-100 (Fuji et al., 2010). As the inversion result is preliminary (very much methodology-oriented), we need to validate it by forward-modeling experiments. We find that the low Q agrees well with the long-period waveforms and also that such a low Q value is consistent with the initial 50s or so of the shorter-period waveforms. We find possible frequency dependence of Q and thus we will perform inversion for several passbands. We used waveforms with an epicentral distance of 35 degrees but we will use waveforms with a longer epicentral distance in order to detect structure in the lower mantle as well; for Q in the lower mantle might be higher than PREM as suggested by the forward-modeling experiment.

Using FJ model (Faul and Jackson, 2005), we will also interpret the elastic and anelastic model of the mantle transition zone beneath the Northwestern Pacific as temperature and water content.

References

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