# Monte-Carlo joint inversion of crustal architecture: incorporating local amplifications

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Rayleigh wave local amplification is a measurement of Rayleigh wave amplitude that is sensitive to local structure. Compared with surface wave dispersion, local amplification is more sensitive to P wave velocity and density structures. In addition, its sensitivities to P-wave and S-wave velocity structures have opposite signs at shallow depths thus it can be potentially used to constrain the Vp/Vs ratio. Despite the important and complementary constraints offered by local amplification, it has been rare that this data is used to construct a seismic model of the crust and upper mantle at continent scales. In this presentation, we made an improvement upon Shen's 2016 model, one of the Vs models that are constrained jointly by multiple datasets (i.e., Rayleigh wave dispersion, H/V ratio, and Receiver Function data). By incorporating the Rayleigh wave local amplification into inversion, we added extra constraints to the sub-surface structures. Moreover, we also allowed the bulk crustal Vp/Vs ratio to vary during the inversion and obtained a bulk crustal Vp/Vs map of the U.S. continent. The new Vs model shows sharper high-velocity anomalies in the upper and lower crust than the previous one, and the new Vp/Vs map also presents tectonics-related features across the U.S. continent, showing a lower Vp/Vs in the tectonically active West US, and a higher value for the stable, cratonic central and eastern US.

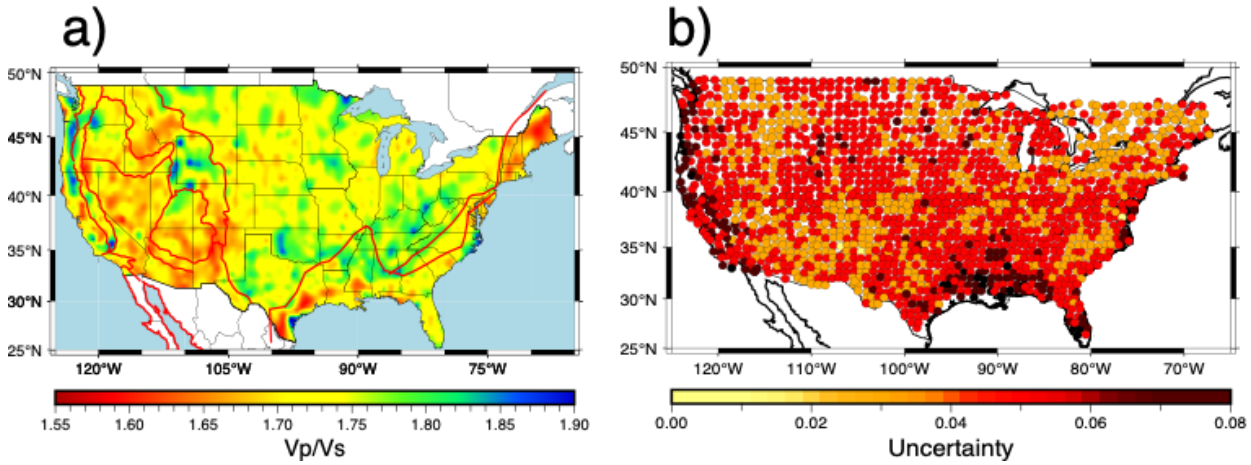


Figure 1. a) bulk Vp/Vs ratio of crystalline crust. b) the standard deviation of the Vp/Vs ratio.