



Joint Inversion of Receiver Functions, Surface Wave Dispersion and Ambient Noise Data: The Australian Crust

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We present the results from the joint inversion of radial receiver functions and group velocities of Rayleigh type surface waves for the Australian crust. The receiver functions are calculated from teleseismic earthquakes recorded at 24 broad-band stations of the TASMAL experiment, which ran between 2003 and 2005 in central and eastern Australia with the aim of delineating the transition from Precambrian crust to Phanerozoic crust. The group velocities are extracted from continent wide tomographic images produced by the inversion of ambient noise Green's functions (shorter periods 5-12.5 s) and the inversion of waveforms from teleseismic earthquakes (longer periods 50-80 s). The joint inversion scheme employed in our analyses is a multi step procedure involving an initial grid search based inversion for estimating the simple crustal model and then an iterative inversion for constraining the finer structure. The combination of two different datasets offers a better constraint on the estimates of the crustal structure. Receiver functions are sensitive to the gradients in elastic properties, surface wave propagation is sensitive to the absolute velocity structure. The estimated crustal thicknesses indicate the presence of the major geological blocks in the study area, e.g., Mt. Isa Block, Gawler Craton. One of the goals of this study is to resolve if variations in crustal thickness mark a consistent transition from Precambrian to Phanerozoic Australian crust.