



Seismic structure of Precambrian terranes in Western Australia and East Antarctica: insights into building ancient cratons and supercontinents

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The seismic structures of Precambrian terranes in remote regions of Western Australia and East Antarctica, continents forming part of East Gondwana, are modelled using receiver function methods. High-fidelity broadband waveforms from distant earthquakes allow 1-D best-fit models of upper lithospheric structure to be made in a cost-effective manner across extensive regions. This allows the first determinations of structure to be made at a resolution greater than the main terrane groups within Western Australia, and the first determinations of seismic structure to be made in the vast Lamber Glacier region of the East Antarctica interior. In both continents, receiver functions are found to be characteristic of the main terrane groups. In Western Australia, this implies that the seismic structure of the upper lithosphere was fixed prior to the assembly of the ancient Yilgarn Craton. Differences between the lower crustal structures of terranes of different ages imply that older lithosphere was more thoroughly reworked before accretion and stabilisation of the continent. In East Antarctica, a major tectonic boundary, possibly the southern boundary of the pre-Gondwanan continent of Indo-Antarctica, has been found and the characteristic structures of the major terranes form a baseline for mapping tectonic structure and major boundaries beneath the ice.