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Award Abstract #0208031

Seismic Investigation of Lithospheric Strain: The Red Sea Rift

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ABSTRACT

EAR-0208031 Jeffrey J. Park In the Red Sea region, a continental shield has rifted to form an incipient ocean basin. Several stages of the continental rifting process are evident in the region, ranging from the formation of genuine oceanic crust in central Red Sea to transcurrent pull-apart motion along the Dead Sea transform. Surface features of this rifting are well mapped, but the extent and geometry of ductile shear in the underlying lower crust and mantle lithosphere are

unknown. The use of seismic anisotropy as a proxy for the deformation of the lower crust and upper mantle became widespread with the advent of broadband digital seismic data recording. However, only a small subset of data available from permanent seismic observatories in the Red Sea region has been explored with techniques that address anisotropic properties directly. The investigators will study the structure and the texture of the lower crust and the shallow mantle in the Red Sea region using seismic observables that diagnose elastic anisotropy - teleseismic shear wave splitting and receiver functions. These two techniques are largely complementary: shear-wave splitting integrates anisotropy along the path of a shear wave, while P-S converted waves are sensitive to velocity and anisotropy jumps at interfaces. Together they offer a way to constrain vertical variations in anisotropic properties, which should allow us to distinguish inherited rock textures within the Proterozoic-age lithosphere from textures associated with the ongoing continental break-up.

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