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Ambient noise tomography (Passive Seismic) to image the Cape-Karoo transition near Jansenville, Eastern Cape.

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Abstract content
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Between August and September 2015, a seismic network consisting of 17 stations was installed in the south-eastern Cape-Karoo, near Jansenville. Ambient seismic signals were continuously monitored for a 6 week period. In this paper we present the retrieval and coherency analysis of Rayleigh waves extracted from the ambient noise. Green's empirical function between receiver pairs are extracted from cross correlation of the vertical component records. We average the measured group velocity dispersion curves of the Rayleigh waves in the period range from 2.5 to 5.5 seconds (approximately 2-5 km depth). The arrival times of the Rayleigh waves are picked at various periods and then inverted to compute 2-D group velocity maps at different periods. This resulted in a velocity model at depths down to 5 km. The results reveal two contrasting velocity regions, corresponding broadly to the Cape Fold Belt and the flanking Karoo Basin, where the higher group velocity anomalies most likely represent the Permian-Triassic basin depot centers (3 to 5 km in thickness). A lowermost velocity region in the south-eastern study area could correspond to the Jurassic-Cretaceous depot center of the Algoa Basin overlying the Cape Fold Belt.

Keywords: Ambient noise, group velocity maps, tomography, Karoo depot center, Algoa Basin

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PhD

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