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Comparison of seismic and electrical parameters for the lithosphere of Southern Africa

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Modelling and inversion of continental and regional (Southern African Seismic Experiment, SASE) seismic data yield a variety of compressional and shear velocity models for southern Africa. These models differ in the data used, either surface waves or body waves, and in the techniques applied. The MT data from SAMTEX (Southern African Magnetotelluric Experiment) yields models and images of electrical conductivity of the lithospheric mantle of Southern Africa. Although generally seismic velocity is primarily a function of bulk properties of the media, and electrical conductivity is usually primarily a function of the properties of a minor phase in the rock (low order partial melt, presence of conducting irons, oxides, etc.), a comparison of the seismic models and the electrical images reveal intriguing correlations that indicate that there may be a functional relationship between the two in some regions. If this is the case, then the two seismic velocities can be coupled with electrical conductivity to try to determine temperature, physical state, magnesium number, and composition.