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# Imaging the LAB and other major lithospheric discontinuities beneath South Africa

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Investigation of the thickness of continental roots, which migrate coherently with plates belongs to the most systematic keys in order to understand the continental evolution. South Africa's lithosphere preserves a nearly uninterrupted geological history of more than 3.5 billion years. It was formed during the break-up of the supercontinent Gondwana over a period of 80 million years and therefore is the longest, best-preserved geological record of the planet Earth. To estimate the LAB and other major lithospheric discontinuities beneath South Africa, we used the novel technique of S receiver function, which employs S-to-P conversions and appears promising for detecting the LAB. This technique has already proven its power for mapping the LAB in the tectonically different regions. Although the South African craton has been extensively studied in recent years, especially by SRFs, the depth extent of the lithosphere and its nature varies somewhat between studies. It seems that several differences in methodology and data selection criteria leading to variations in the SRFs obtained. Some authors observed S-to-P conversions at 25-30 s (∼250-300 km) and interpreted them as being from the LAB. In contrast, some other authors found these conversions at shallower depths (∼150 km). We calculated SRFs for the data of more than 120 stations within South Africa. Such a huge amount of data has not been yet applied for SRF studies in South Africa. Our results clearly shows 3 different LVZs at about 100 (∼10s), 150-220 (15-22 s) km and 300-330 km (30-33 s), which were not seen in any of the previous studies. Based on our preliminary results, the deep and sharp LAB phase at 300-330 km is significantly imaged beneath the cratons (Kaapvaal and Zimbabwe cratons; > 2.7 Ga) and the oldest belt (Limpopo belt ∼ 2.7 Ga). This phase may not be visible northward and southward beneath the much younger mobile belts (Mozambique and Namaqua-Natal belt; ∼ 1.1 Ga). Instead, a shallower and less sharper boundary at 150-220 km depth can be identified across the whole region. This boundary may show an intralithospheric discontinuity beneath cratons and may reveal the LAB beneath the younger belts. In addition, a 100 km LVZ can be also observed, which may confirm the so-called "8 degree discontinuity" seen in dense, long-range seismic profiles.