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The crustal composition of the Falkland Plateau

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The Falkland Islands are situated in the South Atlantic Ocean 500 km east of Patagonia, South America. The islands are part of the Falkland Plateau, which stretches eastward for more than 1500 km. A bathymetric high, the Maurice Ewing Bank, terminates the plateau in the east. Until Late Jurassic the Falkland Islands were part of Gondwana and were located adjacent to the east coast of South Africa.
While the Falkland Islands and Maurice Ewing Bank are proved to be of continental composition, the nature and structure of the Falkland Plateau's basement in between is debatable. The first crustal model derived from sonobuoy data contradicts an only recently published 3D-gravity model. To enhance the understanding of Gondwana break-up considering timing, geometry and amount of volcanism, further knowledge about the structure and thickness of the crust is inevitable.
During the ANT-XXIX/5 Polarstern cruise seismic refraction measurements were conducted using Ocean Bottom Seismometers (OBS) and Reftek land stations onshore of East Falkland. The OBS were deployed at 78 locations along an approximately 1500 km east-west stretching profile.
For the western transect a P-wave velocity model is calculated using 2D-raytracing techniques. The results are presented in combination with potential field data showing the extension of the Falkland Islands basement, the continent-ocean transition zone and the crustal structure of the plateau.
On the Falkland Plateau Basin sediment thickness is about 6 km with velocities ranging from 1.7 to 4.1 km/s in the upper part and about 4.7 km/s above basement. The crust is of oceanic composition with an igneous section that is considerably thicker than average oceanic crust (up to 17 km). The velocity structure in the upper crustal part is typical for layer 2 with a velocity gradient ranging from 5.4 km/s to 6.5 km/s and thicknesses between 1.5 km and 4 km. Layer 3 is about 14 km thick with a velocity gradient from 6.6 km/s to 7.6 km/s, which is remarkably higher than the velocity structure of average oceanic crust. Here, we present the first results of this experiments and preliminary interpretations.