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Crustal structure of the NE Gulf of Aden continental margin from wide-angle seismic data

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The Encens survey wide-angle data (Leroy et al., Feb. March 2006, including MCS and gravity) allow us to determine the deep structure of the northeastern Gulf of Aden magma-poor divergent margin.
Gulf of Aden is a young oceanic basin, its accretion began at least 17.6 Ma ago (Leroy et al., 2004 ; d'Acremont et al., 2006). The first order segmentation separates the Gulf in three parts: western, central and eastern Gulf of Aden. Northeastern Gulf of Aden margin, between Alula-Fartak (in the West) and Socotra-Hadbeen (in the East) fracture zones, is divided in three second order segments. Our study focus on the westernmost one: the Ashawq-Salalah segment.
The studied velocity models show (1) a continental thinning (15-20 km on 50-80 km distance) accommodated by one or two tilted blocks and clearly observed on wide-angle data, (2) a narrow transition from continental to oceanic domain (OCT) showing 5.5 km/s upper-crust velocities comparable to oceanic ones and more than 6.5 km/s lower-crust velocities comparable to continental ones, (3) a diminution of oceanic crust thicknesses from 10 km in the centre of the Ashawq-Salalah segment to 5.5 km near to the second order segmentation discontinuity, probably linked to a diminution of magma supply eastward the discontinuity of paleo-spreading ridge axis, and (4) a 5 km thick intermediate velocity/density body at the crust-mantle interface, with P-wave velocities ranging from 7.6 to 7.8 km/s and densities of 2.9 to 3, and interpreted as post-rift underplated material that may be linked to the presence of a volcano evidenced by heat flow measurement (Lucazeau et al., subm) and multichannel seismic reflection (Autin et al., subm). Furthermore, a persistent thermal activity has been evidenced in the adjoining eastern Mirbat segment (Lucazeau et al., 2008).
These results show an abrupt thinning of the continental crust, a narrow OCT and a post-rift volcanism inducing magmatic underplating affecting this magma-poor margin. This study ask some questions about the nature of the OCT during its formation and its post-rift evolution.