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Mapping the continent-ocean transition in the Eastern Black Sea Basin

Tim Minshull¹, Vanessa Monteleone¹, Hector Marin Moreno², and Donna Shillington³

¹School of Ocean and Earth Science, University of Southampton, Southampton, UK (tmin@noc.soton.ac.uk)

²National Oceanography Centre, Southampton, UK (hector.marin.moreno@noc.ac.uk)

³School of Earth and Sustainability, Northern Arizona University, Flagstaff, Arizona, USA (donna.shillington@nau.edu)

The transition from continental to oceanic crust at rifted margins is characterised by changes in a variety of parameters including crustal thickness, basement morphology and magnetisation. Rifted margins also vary significantly in the degree of magmatism that is associated with breakup. The Eastern Black Sea Basin formed by backarc extension in late Cretaceous to early Cenozoic times, by the rotation of Shatsky Ridge relative to the Mid Black Sea High. Wide-angle seismic data show that anomalously thick oceanic crust is present in the southeast of the basin, while further to the northwest the crust is thinner in the centre of the basin. This thinner crust has seismic velocities that are anomalously low for oceanic crust, but is significantly magnetised and has a similar basement morphology to the thicker crust to the southeast. We synthesise constraints from wide-angle seismic data, magnetic anomaly data and new long-offset seismic reflection data into an integrated interpretation of the location and nature of the continent-ocean transition within the basin. Northwest to southeast along the axis of the basin, we infer a series of transitions from mildly stretched continental crust at the Mid Black Sea High to hyper-thinned continental crust, then to thin oceanic crust, and finally to anomalously thick oceanic crust. We explore the geodynamic processes that may have led to this configuration.