Geophysical Research Abstracts, Vol. 8, 07319, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07319

Structure of the eastern Black Sea Basin inferred from wide-angle seismic data.

C. Scott (1), D. Shillington (1), T. Minshull (1), R. Edwards (1), N. White (2)

(1) National Oceanography Centre, University of Southampton, SO14 3ZH, UK, (2) Bullard Laboratories, University of Cambridge, CB3 0EZ, UK, (cls203@noc.soton.ac.uk)

Although the Black Sea consists of one large depositional structure today, geophysical studies have revealed that the basin can be divided into two sub-basins, which have different tectonic histories. To provide constraints on the uncertainties surrounding the tectonic history of the eastern Black Sea Basin, a wide-angle seismic reflection/refraction survey was carried out in early 2005. We will present initial results from the data collected.

To delineate basin structure, seismic tomography methods have been used to create 2D velocity models through the crust. A thick sedimentary package (8-10 km) is observed on all profiles. A low-velocity zone occurs near the base of the sedimentary section and is fairly continuous throughout the basin. This zone is most likely caused by overpressurized sediments, with anomalous velocities of 2.6-3.0 km/s and 3.4-3.6 km/s above and below. Seismic velocity can be related to the effective stress. The ratio of excess pore pressure to lithostatic pressure (λ) can be estimated and our models have a value of $\lambda \simeq 0.8$ in the low velocity zone.

One profile extends across the basin from offshore Rize to the Mid Black Sea High, along the line the crust thins slowly from $\sim$28 km at the eastern margin to 7-8 km in the centre. This thickness indicates a stretching factor of 4.7 $\pm$0.3 (assuming an initial thickness of 35 km). A second profile extends from the Turkish margin, across Sinop trough and Archangelsky Ridge, into the centre of the basin. A maximum thickness of $\sim$32 km is detected beneath Archangelsky Ridge. Some crustal thinning is observed beneath Sinop trough; this thinning appears to be slightly offset from the deepest part of the overlying sedimentary basin. The crust thins abruptly from Archangelsky Ridge to 8 km in the centre of the basin over a lateral distance of only $\sim$30 km.