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Continental or oceanic crust? A new study on the crustal structure of the Levantine Basin

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The history of the Levantine Basin in the Eastern Mediterranean Sea is closely related to the history of the Neo-Tethys. It is still controversely discussed, whether the basin is underlain by continental crust or whether the oceanic crust extends this far south. To unravel the origin and nature of the underlying crust Meteor cruise M52-2 was carried out in spring 2002. Two refraction seismic profiles were recorded, one E-W-line (33.03N, 33,49E to 33,01N, 35.05E) and one NW-SE-line (31.49N,34.24E to 32.52N, 33.16E), along with a net of multichannel seismic and gravity lines. Two of the gravity and multichannel seimic lines coincide with the refraction profiles. Velocity models of these profiles show a Moho depth of 20 to 23km with a total crustal thickness of roughly 8km. The velocities of the upper crust are 6.0 to 6.3km/s, those of the lower crust 6.5 to 6.9km/s. Above lies a layer with 1 to 3km thickness and a velocity of approx. 4.5km/s, commonly interpreted as a carbonate sequence, which is covered by 5 to 7km of Jurassic to Miocene sediments with an average velocity of 3.8km/s. On top of these sediments lies the Messinian evaporite layer with a velocity of 4.3 to 4.4km/s, covered by Plio-Quaternary sediments of about 1km thickness and a water column of up to 1.5km. The associated gravity models support this structure and additionally show on the southern line a steep decrease of the Moho depth down to almost 30km near the coast, where this line can be extended to the DESERT2000-line, running across the Dead Sea Transform Fault well into Jordan. The DESERT2000-line reveals a similar velocity distribution in the basement as our lines, which supports our postulation of continental crust under the southern basin.