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The Eratosthenes Seamount – Eastern Mediterranean

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The Eratosthenes Seamount forms a prominent landmark in the Eastern Mediterranean. It is located south of Cyprus with the Levantine Basin on its eastern side, the Herodotus Basin on its western side and the Nile Cone south of the seamount. The Eratosthenes Seamount rises up to 750 m below sea surface and is about 1200 m higher than the surrounding seafloor of the Levantine Basin and the Nile Cone sediments. The Eratosthenes Seamount is considered as a continental fragment of the former African-Nubian Plate that was rifted to its present position relative to Africa during the formation of the Tethyan Ocean.

In 2010 a detailed geophysical survey was carried out in the area of the Eratosthenes Seamount by the Federal Institute for Geosciences and Natural Resources of Germany including multichannel seismic (MCS), refraction seismics, magnetic, gravity and magnetotelluric data acquisition.

First results show a highly deformed seamount, with a plateau-like top that is impacted by west-east trending graben formation. The slopes of the seamount are eroded showing deep incised ripple patterns and recent submarine landslides. The Eratosthenes Seamount produces also a prominent magnetic and gravity anomaly, both supporting its uniqueness in the area of the Eastern Mediterranean. Velocity information by refraction seismic modeling, as well as the models of the magnetic and gravity data show evidence for a volcanic core of the seamount with carbonate layers on top of the volcanic core. The slopes of the seamount terminate against a conspicuous rim-like escarpment that forms in addition the northern and western termination of the Messinian Evaporites in the study area. The MCS and refraction seismic data show a very deep Levantine Basin with maximum acoustic basement depths of 12 to 14 km very close to the slope of the Eratosthenes Seamount. The deepest sediments resolved by the MCS data are of Lower Cretaceous to Jurassic age. The refraction seismic model shows a 14 km thick crystalline crust thinning to 7 km thickness towards the east. The basement below the Levantine Basin is probably of oceanic nature, the transition to the Eratosthenes Seamount is unclear yet. However, all above mentioned details could be explained as well (and probably easier) if the Eratosthenes Seamount is not a continental fragment but an oceanic seamount.