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Incipient Continent-Continent Collision between the Eratosthenes Seamount and Cyprus / Eastern Mediterranean

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Earth processes related to incipient continent-continent collision have been studied via the example of Cyprus and the Eratosthenes Seamount in the eastern Mediterranean. Subduction of the African plate beneath the Cyprus-Anatolian plate continued until the seamount, and perhaps a predecessor, the Hecataeus Rise, approached the Cyprus arc trench. The following transition from subduction to collision triggered a series of synchronous deformations across the collision zone between Africa-Sinai-Arabia and Eurasia-Anatolia, including the entire eastern Mediterranean region.
This fundamental Earth process has been studied during research cruise MSM14/3 with RV Maria S. Merian in spring 2010. 39 MCS-profiles of more than 2300 km entire length, more than 3000 km magnetic and sediment echosounder data, and about 4000 km of gravity data have been recorded. Four wide-angle reflection/refraction profiles across the seamount were measured with up to 34 OBS deployments along each profile. 10 ocean-bottom-magnetotelluric stations were deployed along one of these profiles that connects the seamount with the Hecataeus Rise. One 650 km long amphibian refraction profile strikes across the seamount, Cyprus and southern Turkey. Of the 250 land stations, 200 were deployed in southern Turkey and 50 in Cyprus.
A first analysis of the collected data led to the following hypothesis about the interrelation of observed processes: Continent-continent collision caused a compressional regime in the crustal lithosphere, which resulted in the flexure (of the Eratosthenes Seamount), uplift (of Cyprus and Turkey) and accordingly an increased tilt of the facing slopes. The collision reactivated Mesozoic fault lineaments in the Levantine Basin like the Baltim-Hecataeus-Line and created the Hecataeus Rise. Shortening in the non-consolidated Messinian to Holocene sediment succession between the seamount and Cyprus resulted in faulting, folding and compressional salt diapirism. The increase in pore pressure causes fluid migration and mud volcanism. Slope tilt and faulting triggered mass wasting. All of these processes are still shaping the seafloor morphology and interact with the bottom current circulation, which is reflected by sediment drift deposition, sediment remobilisation and erosion, which facilitates again mass wasting.