



Salt tectonic and associated mud volcanism at the eastern Cyprus Arc

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The Cyprus Arc is considered to represent the plate boundary between the African and the Aegean-Anatolian plates, which is clearly expressed in the deformation pattern along the arc. The northward subduction of the African plate started in the early Miocene. In the middle to upper Miocene the continued convergence led to the evolution of fold-thrust belts north of the Cyprus Arc, e.g., the Larnaca Ridge and Misis Kyrenia Zone. At the end of the Miocene, the compressional regime changed into a sinistral strike-slip dominated regime as a consequence of the westward escape of the Aegean-Anatolian microplate. The eastward prolongation of the Cyprus Arc is assumed to run towards the Iskenderun Bay and further towards the junction of the East Anatolian Fault. The submarine topography of the eastern Cyprus Arc is dominated by three main morphological basins separated by two scarps: the Levantine basin to the south, the Larnaca-Latakia basin to the north and, in between, the Central basin. The sedimentary cover is characterized by well stratified seismic facies overlying a strong reflection, at about 500 m below the sea-floor in the Levantine basin, but subjected to wide variations across highs or within the basins. This reflection is interpreted as the 'M' reflection which marks the top of the Messinian and recognized elsewhere in the Mediterranean. The overlying sequences consist of Plio-Quaternary sediments. The 'M' reflection may be conformable with the underlying seismically transparent sequences, interpreted as the Messinian salt-bearing series, or locally corresponds to an erosional unconformity above either the evaporites or the pre-Messinian series. Several elongated ridges and graben are present at the foot and the shoulder of the internal deformation front that separates the Central from the Larnaca-Latakia domain. Seismic data give evidence that the Messinian evaporites creep downslope the deformation front resulting in compressional folds at the front end of the creep. In the upslope and

extensional Larnaca-Latakia domain, the ridges correspond to elongated mud intrusion. Fluids escaped from the subsalt where the evaporites were thinned or withdrawn due to thin-skinned extension. Circular mud volcanoes are also fed by sub-salt and intra-salinar fluids. Fluids from within or beneath the salt dissolve the salt and form apparent calderas. Some mud volcanoes were active prior to the Messinian salinity crisis and pierced later on the Messinian salts. Mud volcano growth bended the buried Messinian salt upwards. Individual salt blocks were broken off and slid sideways, which caused compressional folds and extensional graben on the seafloor around the mud volcano.