

Neogene Sedimentary History of the Outer Cilicia Basin, Eastern Mediterranean: A Contribution to the TopoEurope VAMP Project

Tiffany Piercey,* Jeremy Hall and Ali Aksu
Memorial University, St. John's, NL
tiffany.piercey@mun.ca

and

Selin Akhun and Günay Çifçi
Institute of Marine Sciences and Technology, Dokuz Eylül University, Izmir, Turkey
gunay.cifci@deu.edu.tr

Abstract

The Vertical Anatolian Movements Project (VAMP) addresses the Neogene uplift of the Taurides and the Central Anatolian Plateau. While terrestrial studies are focused on erosion in the sediment source area, and deposition within the Turkish landmass, our marine work is intended to provide a history of deposition in one of the ultimate sinks: the eastern Mediterranean. In particular, we are mapping the distribution in space and time of sediment deposited from the Göksu River into the Cilicia Basin. In 2008 we obtained km of high-resolution marine multi-channel seismic profiles radiating out from the river delta across the basin. Many of the profiles are processed and images of the data are presented.

Interpretation of the available industry seismic reflection profiles show that during the Miocene the northeastern Mediterranean, including the Cilicia Basin, experienced regional compression, which resulted in the formation of a broad and arcuate fold-thrust belt extending from the Taurides in the north, across the Troodos ophiolite complex into the Cyprus Arc in the south. Two prominent culminations were developed: one was located along the Misis-Kyrenia Fault Zone, another developed in the Amanos-Larnaka-Troodos Fault Zone. Stratigraphic and structural relationships demonstrated that the late Pliocene-Quaternary Cilicia-Adana Basin complex evolved as an asymmetric piggyback basin on the hanging-wall of the south-verging Misis-Kyrenia thrust culmination.

Detailed mapping demonstrated that the S/SE-directed contraction culminated in the latest Miocene, and is followed in the early Pliocene by a progressive transition to partitioned contraction and extension related to the initiation of strike slip along the eastern Anatolian Transform Fault and its marine extensions. The shift in kinematics is expressed by the development of major NE-SW trending (Inner Cilicia Basin) and E-W trending (Outer Cilicia Basin) steep faults with extensional separations bounding the Pliocene-Quaternary basins. These basement-rooted faults are incompatible with the contractional regime that existed in this part of the basin complex during the Miocene, and signal the onset of a regime with partitioned stress in the region. The 2008 seismic reflection profiles showed that within the Cilicia Basin a linked extensional-contractional fault system developed, which is detached at the base of the Messinian evaporites. The extensional fault system in the Inner Cilicia Basin is characterized by imbricate fans of listric normal faults. A complementary contractional fault system is developed

in Outer Cilicia Basin and is characterized by a thinner Pliocene-Quaternary cover overlying a relatively uniform salt substrate. Here a series of salt-cored growth folds are commonly associated with thrusts of variable vergence. This specific project is meant to outline the relationship between the tectonic evolution and the sedimentary history of the Outer Cilicia Basin.