Geophysical Research Abstracts
Vol. 13, EGU2011-10845, 2011
EGU General Assembly 2011

Evolving deformation along a transform plate boundary: example from the Dead Sea Fault in northern Israel

Ram Weinberger, Micahel Gross, Amihai Sneh, and Uri Schattner
Geological Survey of Israel, Jerusalem, Israel (rami.weinberger@gsi.gov.il)

We analyzed geologic structures and combined geophysical observations adjacent to the Dead Sea Fault (DSF) along the margins of the Sinai and Arabian plates in northern Israel in order to investigate the style and sequence of deformation associated with a transform plate boundary. The field area, located between the Hula basin in northern Israel and the Lebanese restraining bend in southern Lebanon, is divided into distinct structural blocks by a series of distributed faults that comprise this ∼N-S trending section of the DSF. Cretaceous and Tertiary rocks within and adjacent to the structural blocks are folded into broad anticlines and synclines, with more intense localized shortening manifested by tight folds and thrust duplexes. Kinematic analyses of folds, faults and veins provide evidence for two directions of regional shortening: NW-SE shortening responsible for the formation of NE-SW trending fold axes and left-lateral strike-slip motion along N-S trending faults, and E-W shortening as indicated by N-S trending fold axes, N-S striking thrust faults and extensional calcite-filled veins that strike E-W. Cross-cutting relations and U-Th ages of the vein material suggest the E-W phase of transform-normal shortening represents the most recent and presently active phase of deformation. The structural analysis provides evidence for the transition from an early (Miocene- Lower Pliocene) phase of pure strike-slip motion to a late (Upper Pliocene to Recent) phase of convergent strike slip. The latter phase is characterized by strain partitioning, which is manifested by discrete left-lateral strike-slip motion across weak N-S faults and the development of a fold-thrust belt in response to transform-normal shortening. Many of the faults investigated in this study displace Pleistocene basalts and the overlying sediments and should thus be considered as potential active faults for seismic hazard assessments.