Geophysical Research Abstracts,
Vol. 11, EGU2009-10023, 2009
EGU General Assembly 2009

A mid-Pleistocene deformation transition in the Hula basin: Implications for the tectonic evolution of the Dead Sea Fault plate boundary

U. Schattner (1) and R. Weinberger (2)

(1) Department of Marine Geosciences, Charney School for Marine Sciences, University of Haifa, Department of Marine GeoSciences, Charney School for Marine Sciences, Haifa, Israel (schattner@sci.haifa.ac.il, +972-4-8288267), (2) Geological Survey of Israel, 30 Malkhe Israel Street, Jerusalem 95501, Israel

The Dead Sea fault (DSF) plate boundary has accommodated relative sinistral motion between the Sinai and Arabian plates since the Neogene. Geologically based models point to a long-term (5–0 ma) N-trending relative motion roughly parallel to the central sector of the DSF. GPS-based calculations of present-day relative motion between the Sinai and Arabian plates indicate a northward increasing convergent component across the DSF, suggesting a kinematic change over the Plio-Pleistocene period. We study the evolving deformation of the Hula rhomb-shaped graben situated along the central sector of the DSF in order to examine the possible kinematic change. The Hula graben is widely accepted as a pull-apart basin, part of a series of basins extending southward. We use a 3-D approach, combining mapped surface structures with subsurface seismic reflection profiles (∼173 km) and borehole data (38 boreholes), gathered here into a single geographic information systems database. Results indicate that during the mid-Pleistocene a major tectonic transition modified the structure of the basin fill. A subvertical NNW-trending left-lateral throughgoing strike-slip fault developed diagonally across the basin. Consequently, the basin entered a new geodynamic phase where subsidence was controlled by both the basin bordering faults and the diagonal fault, while the vertical displacement across the transverse faults is minor. Synchronous structural changes recorded in additional localities along the DSF attests to a mid-Pleistocene (∼1 ma) regional tectonic transition that was associated with a northward increasing convergent component across the central and northern sectors of the DSF.