Geophysical Research Abstracts, Vol. 9, 07836, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-07836

A 48-kyr-long slip rate history for the Jordan Valley segment of the Dead Sea Fault

M. Ferry (1), M. Meghraoui (1), N. Abou Karaki (2), M. Al-Taj (3)

(1) Institut de Physique du Globe de Strasbourg, France, (2) University of Jordan, Jordan, (3) The Hashemite University, Jordan (matthieu.ferry@eost.u-strasbg.fr / Phone: +33-390-24-01-20)

The 110-km-long fault rupture of the Jordan Valley section of the Dead Sea Fault exhibits a significant late Quaternary active deformation. We document systematically offset drainage over three regions along the active fault trace. The mostly dendritic drainage is formed by gully incisions and river streams carving into the soft Lisan lacustrine sediments and may be arranged into six distinct generations, as a function of their incision depth. Considering incisions underwent similar erosion/deposition processes, depth reflects age and incisions may consequently be sorted chronologically. Besides, from the history of past lake-level fluctuations and intense rainfall episodes, we identify six climatic events likely to have triggered the onset of gully incisions. In addition, we measured lateral offsets affecting the drainage from the analysis of aerial photographs and field control points. Combined observations yield an accurate dating for the onset of incisions and thus, for the maximum age of cumulative displacements they recorded. The deduced slip rate displays strong variations over short time spans with a threefold increase from 3.5 mm/yr to 11 mm/yr during a 2000-yr-long period. This original behavior is interpreted as a result from alternating periods of quiescence and increased seismic activity.

Considering the last large earthquake in the Jordan Valley occurred in A.D. 1033, the fault may have accumulated 3.5 m to 5 m of slip. This pleads for a Mw 7.4+ earthquake yet to be released along the Jordan Valley fault segment.