Geophysical Research Abstracts
Vol. 12, EGU2010-4065, 2010
EGU General Assembly 2010

Salt karst deformations along the Dead Sea coast mapped with ALOS palsar radar images

Damien Closson (1), Najib Abou Karaki (2), Nada Milisavljevic (1), Frédéric Hallot (1), Marc Acheroy (1), and Mustapha Meghraoui (3)

(1) Royal Military Academy, Signal and Image Centre, Brussels, Belgium (damien.closson@yahoo.fr, +32 2 742 64 72), (2) University of Jordan, Environmental & Applied Geology Dept., Amman, Jordan (naja@ju.edu.jo), (3) Ecole et Observatoire des Sciences de la Terre-Institut de Physique de Globe (EOST-IPAS), 5 rue René Descartes, 67084 Strasbourg, France (mustapha@eost.u-strasbg.fr)

Since the 1960s, the Dead Sea level is dropping and the lake had already lost about 30% of its original surface. The emerged new lands are characterized by their very high concentration of salt. The downward movement of the surrounding water tables and of the streams to accommodate the base level lowering lead to the development of a young coastal salt karst characterized by the proliferation of sinkholes, landslides, and subsidence. To evaluate the dynamic of the disequilibrium, interferometric processing was applied to 10 ALOS PALSAR satellite images spanning from November 2007 to December 2008 (6 ascending and 4 descending scenes). It is the first time that ALOS' L-Band (1257.5 MHz; wavelength 0.229 m) is used to extract relevant information on this environmental disaster.

The work focuses on ground deformations affecting the Southern Dead Sea area with emphasis on the dried up Lynch Strait, one of the most dynamic zones over the borderline between Jordan and Israel. An affected area of about two kilometers long displays interferometric fringes indicating 3 maxima of subsidence. The major observed displacements (Image pair April 4 – May 17, 2008) are concomitant to two small earthquake events (Ml = 3.1 and Mw = 2.3) that shacked the place on April 13, 2008.

The analysis of fringes pattern suggests that the deformations are not related to fault displacements but rather due to the dissolution of shallow salt levels along ancient tectonic lineaments. The earthquakes that have hit the Southern Dead Sea area since the lake level is dropping are not the sources of the weakness zones revealed by the alignments of sinkholes. Furthermore, the lack of accuracy in the hypocenters locations impedes the establishment of a robust correlation between karst development and seismic events. The alignment of sinkholes do not justify the alignment of the sources of ambient seismicity (M <4) and their depth. To make a possible correlation with seismic activity that would increase simply collapses, a precise location of the epicenter is needed.