Geophysical Research Abstracts
Vol. 13, EGU2011-1125, 2011
EGU General Assembly 2011


# Dead Sea salt karst system dynamics measured with Insar PS and SBAS techniques

Damien Closson (1), Paolo Pasquali (2), Najib Abou Karaki (3), Nada Milisavljevic (1), Frédéric Hallot (1), Marc Acheroy (1), and Francesco Holecz (2)

(1) Royal Military Academy, Signal and Image Centre, Brussels, Belgium (damien.closson@yahoo.fr, +32 2 742 64 72), (2) Sarmap s.a., Cascine di Barico, 6989 Purasca - Switzerland (ppasquali@sarmap.ch, +41 91 600 93 66), (3) University of Jordan, Environmental & Applied Geology Dept., Amman-Jordan (naj@paris.com, +962 795332311),

Small Baseline Subset (SBAS) and Persistent Scatterers (PS) are interferometric stacking techniques enabling the management and the processing of tens of radar images to measure displacements of areas/points of the landscape over periods of several years.
In this study, both approaches have been successfully applied for the very first time to quantify the dynamics of the Southern Dead Sea salt karst system for the period 1992-2010 (18 years). This work contributes in the improvement of risk evaluation and mapping in the most affected coastal areas.

Comparison between both techniques led to the following results:

PS
- Independent, incorrelated motions
- Pixel wise continuous time series
- Time interval between two acquisitions limited by displacement rate
- Very accurate
- Linear displacements favoured

SBAS
- At best spatially correlated motions
- Possibility of handling time series with temporal holes
- Time interval between two acquisitions limited by temporal decorrelation
- Slightly less accurate than PS
- Larger variety of parametric models possible. Non-parametric modeling possible

The radar images dataset was composed by 40 Envisat ASAR images covering the period 2003-2010 and 50 ERS AMI-SAR images acquired from 1992.

The results have shown a drastic acceleration of the subsidence rates in the recent years by comparison with displacement values obtained in the 1990s. It is also confirmed by field observations.
The increasing rates of subsidence are interpreted as the consequence of the Dead Sea level drop acceleration. This was already reflected by the proliferation of sinkholes, the great increase in their numbers, sizes and also by the vertical erosion of the lake feeders.
The results of this study should warn land planners in charge of the development of the Dead Sea area to take into account the acceleration of environmental deterioration into their plans (e.g. Red Sea – Dead Sea canal). Interferometric stacking techniques are cost/effective solutions to get knowledge of the environmental deterioration trends.