Surface Deformation Along the Carmel-Gilboa Fault System by Means of Extended Free Network Adjustment Constraints

Gilad Even-Tzur (Israel)

Key words: Deformation measurement; GNSS/GPS

SUMMARY

The Carmel-Gilboa Fault System is one of the major geological structures of northern Israel. It is a northwestern branch of the Dead Sea Fault. Tectonic activity and crustal deformation occurs along the Carmel Gilboa Fault System. The fault system region is covered by a monitoring geodetic network consisting of 24 sites. In this paper we analyze GPS data which were measured eight times between 1999 and 2016 and derive regional velocities for the network sites. The site velocities were estimated with respect to a local datum by means of extended free network adjustment constraints.

In this study the GPS vectors from each campaign are stripped from their datum content using the extended free network adjustment constraints. The datumless measurements are used to define the datum by preliminary coordinates and linear constraints, which remain constant for all monitoring campaigns, as well as to define the position of the network points and their velocities. The use of extended S-transformation enables transition from one datum to another and calculates the velocities in relation to the chosen datum.

We use principles from continuum mechanics to extract the horizontal site velocities field into surface deformation parameters. The results show deformations of about 1 mm/yr sinister along the Carmel Gilboa Fault System accompanied with extensions and shear strain.

Surface Deformation Along the Carmel-Gilboa Fault System by Means of Extended Free Network Adjustment Constraints (9976)
Gilad Even-Tzur (Israel)

FIG Working Week 2019
Geospatial information for a smarter life and environmental resilience
Hanoi, Vietnam, April 22–26, 2019