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# Sensitivity study of velocity estimates in local GPS campaigns

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Local GPS campaigns are often performed to study rigid movement as well as deformation of tectonic blocks. Highest accuracy for coordinates and velocities is required for the geophysical interpretation of the results. In order to assess the reliability of a local network solution, this study focuses on two main aspects: The impact of the inconsistencies in IGS (International GNSS Service) products and the effect of different datum definition strategies on local GPS network solutions.

Processing the data of a local GPS network normally includes IGS products (e.g., satellite orbits and Earth orientation parameters) which were estimated by the IGS analysis centers in a global solution. Changes in the reference frame may result in significant discontinuities in all products of the IGS. In November 2006 the IGS switched from the relative to the absolute antenna model and the reference frame changed from ITRF2000 to ITRF2005. First results of a global reprocessing (GFZ/TU Munich/TU Dresden) have shown that geophysical interpretation may benefit from global homogeneously and consistently reprocessed products. The global reprocessing products refer to one reference frame and are thus without any discontinuities. We analyze the impact of inconsistent IGS products and the reprocessed products on local GPS network solutions and compare them.

In order to define the datum in a GPS network, one has to select sites whose positions and velocities (e.g., in ITRF2005) are assumed to be known. Normally the datum is defined by only a small amount of regionally distributed sites. A globally defined da-

tum would be in accordance with the definition of ITRF but is often not employed. We examine to which extent the datum definition influences the velocity and Euler Pole estimation by comparing these two methods. In order to achieve a globally defined datum we stack the normal equations of the global reprocessed solutions and our solutions.

Our sensitivity study is based on data of the Jordanian GPS Activity Campaign network which was observed in 2006 and 2007. This network contains 30 sites and was installed as part of the GEO-DESIRE (GEOscientific DEad Sea Integrated REsearch) Project of the German Research Association (DFG) to investigate the Dead Sea Fault area. We also include data of 18 Israeli permanent GPS sites operated by the Survey of Israel as well as 15 regionally distributed IGS sites around the studying area.