VELOCITY ESTIMATION FROM GPS MEASUREMENTS TO ANALYSE CRUSTAL MOTIONS IN THE EASTERN CARPATHIANS (VRANCEA)

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Within the framework of the Collaborative Research Center (CRC)461 "Strong Earthquakes: A Challenge for Geosciences and Civil Engineering", funded by the Deutsche Forschungsgemeinschaft (German Research Foundation), this paper presents some new developments and results from the geodetic subproject B1 called "Threedimensional Plate Kinematics in Romania".

The Vrancea region is part of an old subduction zone around the carpathian arc in Romania. While the biggest part of this subduction-system is not active anymore, the tectonic situation in the Vrancea region is still under discussion. Getting a closer look inside the condition of the Vrancea slab, the question of whether the Vrancea slab is still attached to the upper lithosphere, or already detached, or in the process of being detached, is of great importance. An answer to this question is the key for developing a meaningful geodynamic model for the Vrancea region and therefore an important task of the CRC461.

During the last six years a monitoring network was installed stepwise by different projects resp. institutes (CERGOP, CRC461 and Delft Institute of Earth-Oriented Space Research (DEOS)), and to date it consists of 49 stations with 5 permanent stations. Several GPS campaigns have been carried out, but most times only parts of the complete network were observed. The network part belonging to the CRC461 project was
completely measured in 1997, ’98, ’00 by the CRC461 and in 2002 mainly by DEOS.

This presentation gives brief information about GPS raw data analysis done with Bernese-GPS-Software, the achieved results and accuracies. Primarily the approach for deformation analysis, that means the conjunction of the daily coordinate solutions, will be demonstrated under special consideration of station excentricities, geodetic datum effects as well as controllability of the measurements and statistical significance of the results.