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Is Precise Point Postioning able to characterize the deformation of the Rhine Graben ?

Eric Henrion, Frédéric Masson, and Patrice Ulrich

Institut de Physique du Globe de Strasbourg ; UMR 7516, Université de Strasbourg/EOST, CNRS, Strasbourg, France (erichenrion67400@gmail.com)

During the last years, an increasing number of GNSS studies have been done processing the data using Precise Point Positioning (PPP) methods instead of differential methods. PPP methods are generally simple to implement even compared to double differences methods. The decrease of accuracy generated by the use of PPP methods instead of differential methods is generally considered as small, not damageable for the quality of the tectonic interpretation of the results.
The aim of our study is to evaluate this decrease for a GNSS study performed in a very low deformation zone, the Upper Rhine Graben (URG). We want to put forward the pros and cons of PPP method.
The URG is the central part of the 1000 kilometers long Cenozoic rift system, which extends from the North Sea to the Mediterranean Sea. The URG takes place from Basel to Frankfurt. It is 300 kilometers long and 40 kilometers wide, orientated North-Northeast/South-Southwest graben. The Vosges and the Black Forest represent the graben shoulders. The URG is one of the most active seismic areas in north-western Europe, as demonstrated by the Basel earthquake of 1356. In this area the data of a network of more than 70 stations, the GNSS Upper Rhine Graben Network (GURN), recording during more than 5 years (including several stations recording about 15 years) are available.
Velocities were evaluated using a PPP software (CSRS-PPP) and GAMIT/GLOBK as differential software reference. With very long time series, we can provide strong conclusions. After some corrections (outliers and jumps) and comparing the 2 methods, the PPP is a really fast processing but seems to be less accurate than differential method. The consistency of neighbour stations is clearly better using GAMIT/GLOBK than PPP. The mean difference between the 2 methods is of the order 0.7mm/yr for an average time series of 9 years (5 years to 12 years).
The PPP method is not suited for the Rhine Graben context with too small crustal displacements. The measurement noise absorbs the real displacement, it would be more efficient in an area with strong displacements. This method also can be used as a preliminary study before a high accuracy analysis.