



GNSS strain rate patterns and their application to investigate geodynamical credibility of the GNSS velocities

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The potential that lies in the use of GNSS measurements for crustal deformation studies have already noticed in the beginning of the first of such a system (GPS). Today thanks to the development of satellite positioning techniques it is possible to detect displacement on the Earth surface with an accuracy less than 1 cm. With long-term observations we can determine the velocities even more accurately. Growing demand in the last years for GNSS applications, both for scientific and civil use, meant that new networks of the reference stations were created. Such a dense GNSS networks allow to conduct research in the field of crust deformation at a higher spatial resolution than before. In Europe most of the research focuses on Mediterranean regions, where we can monitor events resulting from the tectonic plates collision. But even in Central Europe we can see effect of Africa push. In our research we focused on Polish territory, where in the past 5 years a nearly 300 reference stations were established. With minimal movements that have been observed in Poland, a key issue in this type of research is to determine the geodynamic reliability of the estimated stations velocities. While the long-term observations enable us to determine the very accurate velocities, it hard to indicate how reliably they reflect actual tectonic movements is. In this paper we proposed a method for testing the reliability of stations velocities based on the strain rate field analysis. The method is based on the analysis of the distribution of the rate of deformation tensor components obtained for triangular elements built on the basis of assessed station. The paper presents the results of numerical simulations and initial use of the method for the Polish network of reference stations: ASG-EUPOS