DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Modern Global Navigation Satellite Systems (GNSSs) like GPS, GLONASS or Galileo play very important role in investigation of many dynamic effects taking place in the Earth's interior, hydrosphere and atmosphere. Those processes are caused by the continuous relocation of the masses, especially driven by the temperature convection in the mantle occurring as the plate tectonics causing movement of the parts of the lithosphere with a velocity of a couple of centimeters per year. Nowadays, GNSSs play extremely important role in the investigation of this effects due to their availability and global coverage of the continuously observing stations. Additional advantage is the ability to determine position in the uniform mathematic reference frame. The coordinated determined on the epoch-to-epoch basis constitute the time series with many information on environmental processed stored within. They can be divided into their deterministic and stochastic parts. Reliable determination of the velocities of the lithosphere as well as their uncertainties is based on the proper consideration of both parts. The main objective of the proposed research is to perform a complex analysis of spatially- and temporally-correlated signals present in geodetic time series in a form of Common Seasonal Signals (CSS) and Common Mode Errors (CME). The implementation of this idea will contribute to deepen a knowledge, we have now, about the nature of CSSs and CMEs in the regional GNSS networks, will allow to elaborate and apply newly proposed analysis methods and, as a consequence, to estimate new uncertainties of lithosphere's velocity field computed from Global Positioning System (GPS) position time series. The authors will take an effort to prove the hypothesis as: "spatially and temporally correlated signals need to be removed from GPS position time series before the reliability of permanent station's velocity, required for creation of reference frame, is achieved" by merging two modifications of Empirical Orthogonal Functions (EOF) into one analysis of GPS position time.