



Analysis of coordinates change of the SHAZ GPS permanent station

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Effective study of geodynamic processes on the territory of Europe became possible due to increase of GPS permanent stations number and accretion of time series duration. This is extremely important inasmuch as it allows to use the ITRF solutions in an on-line mode for the solving of different tasks in co-ordination territories by the GNSS (Global Navigation Systems) including the development of the national reference coordinate systems. The SHAZ GPS permanent station was established according to CERGOP-2 Project and the station begun to function from the 158th day of 2004 (the 1274th GPS week). The data processing of this station is realized by the Ukrainian analysis center of the Main Astronomic Observatory (MAO, Kyiv). The center processes the data from 20 GPS permanent stations of the Eastern and Central Europe.

A change nature of the station coordinates definite in an accepted reference system is an important characteristic. The paper considers a principle and results of coordinates change determination of the SHAZ station for the annual period of permanent GPS observations.

The method of ascertainment of coordinates change with a time for the SHAZ station was the following:

- the weekly local solutions of MAO were selected from 1274th to 1292nd GPS weeks;
- an estimation of the time series was carried out between the coordinates X_i, Y_i, Z_i given on the running point of time t and coordinates X_0, Y_0, Z_0 known on some initial time t_0 (1274th GPS week).
- with the object of the withdrawal systematical influences the Helmert's coordinates

transformation parameters were determined between t and t_0 moments by data of the permanent stations located around the SHAZ station, namely: BOR1 (Poland), VLNS (Lithuania), SULP, GLSV, UZHL (Ukraine);

- the running coordinates of the SHAZ station were calculated on the initial moment t_0 by the means of the obtained transformation parameters;

- differences $\Delta X_i = X_{0i} - X_0$, $\Delta Y_i = Y_{0i} - Y_0$, $\Delta Z_i = Z_{0i} - Z_0$ were as a basis for the receiving of estimations of the station coordinates changes;

- the weekly differences of the spatial grid coordinates were transformed in the topocentric ones (N, E, U) relatively of its initial coordinates;

- the resulting coordinates of a time series show the coordinates change of the station.

The averaged changes of the spatial topocentric coordinates of the SHAZ station do not exceed usually 2 mm for the annual period. That indicates on a high stability of the comparative position of the permanent station.