

Development of the every-day automated analyzing system of all GEONET network site (Part II)

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On the development of the every-day automated analyzing system of all GEONET network site, we present at the fall meeting of the Geodetic Society of Japan in 2008 (Shimada et al., 2008). After the presentation, several cases are occurred to fail the automated analysis, and after examinations, we have revised the system programs and parameters. In this presentation, we introduce these problems.

In the system GAMIT/GLOBK program is adopted for the GPS analysis. The major problems are the diversion of the least-square solution in the SOLVE module of the GAMIT program. The cases are more frequent in winter rather than in summer when the system started, although the system is running only about seven months long. Because the GEONET site coordinates constraint is 1m loose, the cause of the diversion may not be caused by the GEONET site coordinates, and the tight IGS fiducial site coordinates constraint must cause the diversion. Actually when we omit the wettest IGS fiducial site, GUAM, among six IGS fiducial sites, then the solution is converge in most cases. Thus we have gradually loosen the constraint value of the GUAM site from horizontal 3mm/vertical 10mm to horizontal 12mm/vertical 30mm. The recent constraint of the GUAM site is several times looser than the other five fiducial sites. By the way, according to the coordinates solutions of the series of the analysis of the system, the coordinates of the GUAM sites are systematically about 26 mm differ from the initial ITRF 2005 coordinates in the vertical direction. Thus in the reference frame of the analyzing scheme of this system, the a priori coordinates of the GUAM site may have significant systematic deviation, especially in the vertical component. Now in the system we adopt the a priori coordinates of the GUAM site fitting from the solutions for the beginning one month in the system. After we will obtain for one year solutions in the system, we will re-evaluate the a priori coordinates and coordinates constraint values for the fiducial IGS sites including the annual variations of the coordinates and their scatter.

On the other hand, in the GAMIT solution, at first we obtain the prefit SOLVE solution using 1/10 decimation of the epoch of the GPS tracking data, then we obtain the postfit SOLVE solution using all tracking data. In some cases that SOLVE diverged, we use all tracking data also in the prefit SOLVE solution, then the postfit SOLVE solution converges. We need more cases to re-evaluate the decimation factor of the prefit SOLVE solution.

For the GAMIT solution, we divide all GEONET sites into 39 groups and obtain the least-square solutions, then we obtain the final unique solution adopting Kalman filtering in the GLOBK solution. In some cases the GLOBK solutions are diverged. In examinations, we find that the solution diverges in the initial order of the Kalman filtering from group 01st to 39th, but the solution converges in the reverse order from group 39th to 01st. After we obtain more cases, we may re-examine the order of groups in the Kalman filter solution.

In the system we use the quad-core CPU computer, and we run four automated analyzing program, sh_gamit, simultaneously in the GAMIT solution for the same user ID and the independent directories. Sometime sh_gamit programs are solving different groups in the synchronized timing, then both sh_gamit programs fail. We will debug the program in near future.