Automated GNSS-based motion monitoring at Black Forest Observatory (BFO) in near real-time

X. Luo, M. Mayer and B. Heck

Geodetic Institute, University of Karlsruhe (TH), Germany (luo@gik.uni-karlsruhe.de / Phone: +49 721-6082309)

The highest precision of positions determined using observations of global navigation satellite systems (GNSS) is required for solving problems in geoscience assignments such as identification of the relation between regional ground uplifts and gravity variations. Besides this precision criterion, the efficiency of GNSS data processing as well as the temporal restriction on the availability of the analysis results must be particularly considered in order to ensure the real-time comparability between the positions resulting from the GNSS data processing and the measures delivered by geophysical sensors.

In preparation for the planned geophysical research work at Black Forest Observatory (BFO) in Schiltach (Germany) this paper presents an automated GNSS-based approach to monitor the permanent GNSS site located at BFO in near real-time. The GNSS data are processed network-based using the Bernese GPS software version 5.0. The automation concentrates not only on the data processing itself but also on the subsequent procedures for quality control and visualisation of the results. Although the observing conditions are not ideal due to the strong afforestation in the Black Forest, the estimated daily solutions of the site coordinates hold a precision within several millimetres. Through the provision of high-quality data services like International GNSS Services (IGS), the results are available online with a delay of approximately 10 hours. Additionally, the presented software approach to automate the GNSS data processing in near real-time can be assigned easily to similar applications.