REFAG 2022 THESSALONIKI - GREECE
17-20 October 2022

Comparison Analysis of Network Adjustment of 5000 Unified Control Points in South Korea using Bernese and GAMIT/GLOBK

Canying Shen (SUNGKYUNKWAN UNIVERSITY), Hong Sic Yun (SUNGKYUNKWAN UNIVERSITY), Seung Jun Lee (SUNGKYUNKWAN UNIVERSITY), Myeong Hun Lee (SUNGKYUNKWAN UNIVERSITY) and Jinzhen Han (SUNGKYUNKWAN UNIVERSITY)

Abstract. GAMIT/GLOBK and Bernese are internationally recognized GNSS processing software that supports double-difference correction on the Network adjustment data processing. This article briefly introduced GAMIT/GLOBK and Bernese. More than 16,000 observation data (from 2002 to 2020 of 437 days) of 5,000 Unified Control Points located in South Korea were applied in GAMIT/GLOBK and Bernese. This article analyzed determination of the solution strategy and compared the solution results. 17 GNSS Continuously Operating Reference Stations located in South Korea were chosen as fixed station. The absolute velocities indicated an overall displacement of the South Korea region along the south-east direction (GAMIT =3.04 cm/yr, Bernese =3.33 cm/yr). The value of RMSE solved with the GAMIT/GLOBK version 10.71 software was an average of 0.0104 m in the N direction and 0.0124 m in the E direction. The value of RMSE solved with the BERNESE version 5.2 software was an average of 0.0068 m in the N direction, in the E direction, the average was calculated as 0.0072 m. There are differences in the coordinate results of the two software programs at the millimeter levels, respectively, in the case of a consistent solution scheme. The average difference between the result of Network Adjustment using GAMIT/GLOBK and Korean Geodetic Datum 2002 was 0.0013 m in the N direction, and 0.0039 m in the E direction. The average difference between the result of Network Adjustment using Bernese and Korean Geodetic Datum 2002 was 0.0071 m in the N direction, and 0.0092 m in the E direction. GAMIT/GLOBK was slightly more accurate in solving baselines. We speculated that the millimeter difference is due to the difference in the software themselves.