Investigation of Web-Based Online GNSS Services Performances for Monitoring Crustal Deformations

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In this study, to measure usability and accuracy performances of web-based online GNSS processing services in crustal deformation studies is aimed. In this scope, for the determination of co-seismic and early post-seismic deformations of Van earthquake, October 23th, 2011, the observation data of 12 GNSS stations which belong to TUSAGA-Active network in the earthquake zone were analyzed with AUSPOS, OPUS, and CSRS-PPP from web-based online processing services. In order to examine the accuracy performances of web-based online processing services, the data of the same stations were processed using GAMIT/GLOBK software and the horizontal co-seismic and early post-seismic deformations were determined and the results were compared.
When the difference between horizontal deformations required from GAMIT/GLOBK software and the online processing services were examined. The results showed that the differences are statistically insignificant and the displacement vector sizes and directions are compatible. In addition, two-dimensional strain analysis was performed by using horizontal deformations obtained by both solutions. As a result of the strain analysis, it was seen that the main strain parameters obtained from the solutions were generally compatible and the differences between the principal strain parameters were below the value of 0.04 μstrain. According to the results obtained, it was found that the coordinate solutions of the continuous stations obtained by the web-based online evaluation services, were highly accurate to be used in crustal deformation studies.

Keywords: Web Based Online GNSS Processing Service, October 23th 2011 Van earthquake, Co-seismic and Post-seismic Deformation, Strain Analysis, GAMIT/GLOBK