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Effect of Receiver Choosing on Point Positions Determination in Network RTK

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Nowadays, the developments in GNSS technique allow to determinate point positioning in real time. Initially, point positioning was determined by RTK (Real Time Kinematic) based on a reference station. But, to avoid systematic errors in this method, distance between the reference points and rover receiver must be shorter than10 km. To overcome this restriction in RTK method, the idea of setting more than one reference point had been suggested and, CORS (Continuously Operations Reference Systems) was put into practice. Today, countries like ABD, Germany, Japan etc. have set CORS network. CORS-TR network which has 146 reference points has also been established in 2009 in Turkey. In CORS-TR network, active CORS approach was adopted. In Turkey, CORS-TR reference stations covering whole country are interconnected and, the positions of these stations and atmospheric corrections are continuously calculated.

In this study, in a selected point, RTK measurements based on CORS-TR, were made with different receivers (JAVAD TRIUMPH-1, TOPCON Hiper V, MAGELLAN PRoMark 500, PENTAX SMT888-3G, SATLAB SL-600) and with different correction techniques (VRS, FKP, MAC). In the measurements, epoch interval was taken as 5 seconds and measurement time as 1 hour. According to each receiver and each correction technique, means and differences between maximum and minimum values of measured coordinates, root mean squares in the directions of coordinate axis and 2D and 3D positioning precisions were calculated, the results were evaluated by statistical methods and the obtained graphics were interpreted.

After evaluation of the measurements and calculations, for each receiver and each correction technique; the coordinate differences between maximum and minimum values were measured to be less than 8 cm, root mean squares in coordinate axis directions less than $\pm$1.5 cm, 2D point positioning precisions less than $\pm$1.5 cm and 3D point positioning precisions less than $\pm$1.5 cm. In the measurement point, it has been concluded that VRS correction technique is generally better than other corrections techniques.