Multi-constellation GNSS orbit combination based on MGEX products: preliminary results

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One of the aims of the International GNSS Service (IGS) is to deliver highly accurate GNSS data and products to the public. Among these products, precise orbits and clocks for GPS and GLONASS are provided based on a combination of several independent solutions that are determined by the Analysis Centers (AC). Over the past years, the IGS has been putting efforts in extending the service to several navigation satellite systems within the Multi-GNSS Experiment and Pilot Project (MGEX). As part of MGEX, a number of ACs provide solutions containing also Galileo, BeiDou and QZSS. Although there is no MGEX combination so far, many users ask for combined MGEX solution to enable their applications.

In order to achieve a MGEX combination, we started a study to develop a new combination algorithm capable to handle all the constellations consistently with their orbits, clocks and biases. The method tested can be summarized in three main steps: the alignment with the ITRF, an outlier detection and the weighting of ACs, satellites and constellations. We will present initial results and will discuss each step based on these results. The initial combined orbits solutions (GPS only) achieved so far an agreement of 2.5 cm compared with IGS final products. In addition, we discuss the agreement between the combined product and the individual ACs' orbits.