



## Earth Rotation Parameter Solutions using BDS and GPS Data from MEGX Network

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**Abstract:** Earth rotation parameters (ERPs) are necessary parameters to achieve mutual transformation of the celestial reference frame and earth-fix reference frame. They are very important for satellite precise orbit determination (POD), high-precision space navigation and positioning. In this paper, the determination of ERPs including polar motion (PM), polar motion rate (PMR) and length of day (LOD) are presented using BDS and GPS data of June 2013 from MEGX network based on least square (LS) estimation with constraint condition. BDS and GPS data of 16 co-location stations from MEGX network are the first time used to estimate the ERPs. The results show that the RMSs of x and y component errors of PM and PM rate are about 0.9 mas, 1.0 mas, 0.2 mas/d and 0.3 mas/d respectively using BDS data. The RMS of LOD is about 0.03 ms/d using BDS data. The RMSs of x and y component errors of PM and PM rate are about 0.2 mas, 0.2 mas/d respectively using GPS data. The RMS of LOD is about 0.02 ms/d using GPS data. The optimal relative weight is determined by using variance component estimation when combining BDS and GPS data. The accuracy improvements of adding BDS data is between 8% to 20% for PM and PM rate. There is no obvious improvement in LOD when BDS data is involved. System biases between BDS and GPS are also resolved per station. They are very stable from day to day with the average accuracy of about 20 cm.

**Keywords:** Earth rotation parameter; International GNSS Service; polar motion; length of day; least square with constraint condition

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