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Impact of network de-densification on GPS-estimated polar motion and LOD: a simulation study.

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The world-wide network of GNSS receivers is quite dense: the International GNSS Service alone provides data from nearly 400 stations, and smaller regional networks provide additional localized density. This gives GNSS-based estimation of polar motion and LOD a statistical advantage over lower-network-density geodetic estimation techniques such as VLBI ($\sim$ 30 stations world-wide).

Best practice is to incorporate data from as many GNSS receivers as possible when estimating polar motion and LOD. However, it is useful to know how the estimates would be affected should data from a subset of receivers be unavailable. The goal of the work to be presented is to begin to answer that question.

Data will be simulated for a world-wide set of stations using a given set of orbits and Earth-orientation parameters (EOPs). The complete set of data will then be processed in network mode (i.e. simultaneously, rather than station-by-station as in PPP) to check how accurately the input EOPs are reproduced. Once this check is complete, the network solution will be repeated using subsets of the simulated data set to see how the polar-motion and LOD computations are affected. If possible, a simulation subset emulating the VLBI network will be among those studied. Bernese 5.0 GPS Software will be used to perform the computations.

The primary goal of this work is to understand the relationship of network density to polar motion and LOD estimate quality. However, it would also be interesting to investigate how the network-density-impacted EOPs and orbits subsequently affect site-specific results obtained using PPP. If time permits, we will investigate this as well by performing PPP analysis on the stations deleted in the network-orbit/EOP computation.