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GPS-based estimation of polar motion parameters at sub-hourly frequency

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We present results from a reanalysis of one year of data from a global GPS network specifically targeting the recovery of polar motion parameters at high resolution. In this reanalysis, various strategies have been considered to determine the coordinates of the Celestial Intermediate Pole at sub-hourly resolution while computing the orbit and clock solutions of the GPS constellation. The trade-space between the precision of the determination of the GPS satellite orbits and clocks and the recovery of the Earth's pole coordinates at sufficient accuracy for geodetic purposes has been investigated. In particular, the effects of the orbital arc length and the pole coordinates estimation interval on the precision of the estimates have been studied. The quality of the pole coordinate estimates has been assessed in two main ways. The GPS-derived time series have been compared to simulated time series generated based on the sub-daily model accounting for the impact of ocean tides on polar motion variations recommended by the IERS Conventions 2003. Residual time series have also been converted into geodetic excitation and compared to effective oceanic and atmospheric angular momentum function data (EAMF) provided by the GFZ and ECMWF. Preliminary results show that the correlation coefficients between the sub-daily ocean tide model and the estimates reach 0.89 and 0.87 for the prograde and retrograde components respectively. In addition, for periods ranging from 2 to 20 days, the geodetic excitation and geophysical EAMF are correlated at up to 79% (prograde) and 65% (retrograde).