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General aspects on generating long time series of Earth orientation parameters

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Since the space-geodetic techniques GPS and VLBI now have a long history of data, the time series of Earth orientation parameters (EOP) that can be estimated covers more than a decade. Although computing a solution for the entire time span including the terrestrial reference frame (TRF) and all EOP in only one step yields the most consistent parameters, it may be very time consuming. Therefore, the question arises how large the differences are compared to the full solution, if the time series of EOP is generated from sub-intervals of data, e.g., one day, one week, one year etc. For these studies we have at hand datum-free normal equation systems derived from homogeneously reprocessed VLBI and GPS data. Thus, the question whether the individual single-technique solutions behave differently from the combined solution can be answered as well. Furthermore, as we consider all five EOP in our analysis, differences in the behavior of polar motion, UT/LOD and nutation can be detected. Concerning the nutation angles, the processing of longer intervals of data allows to parameterize the nutation with a lower temporal resolution than one day. The impact of the interval length for the nutation angles on the estimation of the free core nutation amplitude and the correlation between polar motion and nutation will be studied. The combined UT/LOD time series mark a special case: Using only the 24-h VLBI sessions in the combination, there would be many epochs in the time series without any contribution from VLBI and, thus, suffer from the systematic drift that is induced by integrating

GPS-derived LOD over longer time spans. In order to fill the gaps between the 24-h VLBI sessions, the intensive sessions play a very important role, although they are very weak due the very small amount of data. The benefit resulting for the combined UT/LOD time series by including the intensive sessions will be quantified.