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GNSS orbit validation activities at the Astronomical Institute in Bern

The Center for Orbit Determination in Europe (CODE) is an Associate Analysis Center of the International Laser Ranging Service (ILRS). Since 2004 CODE has been computing the SLR residuals with respect to CODE's 3-day rapid orbits (i.e., GPS and GLONASS orbits) on a daily basis. The SLR stations are hence provided with a fast and rough feedback on their performance. The validation of microwave-based orbits by SLR measurements is another important task in order to identify modeling issues within the GNSS orbit determination procedure (e.g., solar radiation pressure modeling). By means of SLR residuals we will illustrate the impact of modifications in the dynamical orbit parametrization on GNSS orbits computed at CODE. Further, residuals with respect to homogeneously reprocessed series of GPS and GLONASS orbits are analyzed over a time span of almost 20 years. This long time span allows us to identify signatures in the residuals of some satellites that change significantly over time. The validation of satellite orbits being part of the Multi-GNSS Extension (MGEX) of the International GNSS Service (IGS) gives an important insight in the modeling of the satellites from the new constellations like Galileo, BeiDou, and QZSS.