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Precise orbit and reference frame determination using multiple altimetry satellite missions with DORIS technique

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Abstract. The German Research Centre for Geosciences (GFZ) is one of the Associate Analysis Centers (AAC) of the International Doppler Orbitography and Radiopositioning Integrated by Satellite (DORIS) Service (IDS). As part of the future contribution to the DORIS part of the International Terrestrial Reference Frame a repertoire of well-known DORIS equipped satellite missions, in particular Topex, Envisat, Jason-1/2/3, Sentinel-3A/B, Sentinel-6A Michael Freilich, has been processed. Precise Orbit Determination (POD) is performed for these missions based on DORIS and Satellite Laser Raging (SLR) observations, either in a combined approach or DORIS stand-alone. To ensure the orbit quality, orbit comparisons with external orbit solutions are performed. For the Sentinel missions the combined orbit solutions of the Copernicus POD quality working group are used for this purpose and conduce as reference for the comparison. Combined orbit solutions are assumed to have superior absolute accuracy and minimal residual systematic errors. Eventually, starting from the DORIS-only solutions weekly local terrestrial reference frames (TRF) are computed for each of the satellites as well as a combined solution for the time span starting in the early 1990's. The so generated TRF solutions are evaluated in terms of the reference frame defining parameters, i.e. origin, scale, and orientation, in comparison to the apiori TRF.