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Long-term evaluation of estimated solar radiation pressure coefficients from Copernicus Sentinel-1, -2, -3 satellites

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The Copernicus POD (Precise Orbit Determination) Service is responsible for the generation of precise orbital products of the Copernicus Sentinel-1, -2, and -3 missions. In the near future, the processing setup of the Copernicus POD Service will be updated to state-of-the-art background models (geopotential, ocean tides and atmospheric gravity) and the use of single-receiver ambiguity fixing using CODE (Center for Orbit Determination in Europe) products.

In the current orbit parametrization of the six satellites, a solar radiation pressure coefficient is estimated for each daily arc. To provide long-term stability, in particular for the time series of the altimeter Sentinel-3 satellites, it would be preferable to use a constant solar radiation pressure coefficient in the processing. A reprocessing based on the updated models and set-up will be used to compute daily estimates of the solar radiation pressure coefficient for all satellites. The analysis may reveal satellite model deficiencies and might help to improve the satellite macro-models.

Mean values of the solar radiation pressure coefficients from the long-term series can be used on future operational processing. At the same time a refinement of the selection of the estimated orbit parameters might also be done if necessary, in particular the empirical accelerations. Impact on the orbit determination results and on the quality of the orbits is presented for all six satellites.