Level 2 product: GOCE Precise Science Orbits

Sub-products of the SST_PSO

- SST_PRD: reduced-dynamic orbit, 10 s sampling, sp3-format
- SST_PKI: kinematic orbit, 1 s sampling
- SST_PCV: covariance matrix of kinematic orbit, covariances over +/- 4 epochs
- SST_PRM: quaternions for the rotation from Earth fixed to Inertial reference frame
- SST_PRP: quality report (pdf-format)

ESA's first Earth Explorer Core Mission GOCE is equipped with a 12-channel, dual-frequency GPS receiver (SSTI - satellite-to-satellite tracking instrument) for precise orbit determination, instrument time-tagging, and the determination of the long wavelength part of the Earth's gravity field. A precise science orbit (PSO) product with 2-cm accuracy is provided by the GOCE High-Level Processing Facility (HLF) with a latency of one week for final analyses. Orbit validation results for the reduced-dynamic PSO obtained from almost two years of operations are presented. Characteristics of the GOCE GPS data are briefly discussed and the sub-products of the PSO are described.

Switch to B computer

iepo = 1
icomp = 1 => X
index = 4*(iepo-1)+icomp

iepo = 10 => 2010-12-01 00:00:00
icomp = 1 => X

SST_PCV file has to be interpreted as 'nominal epochs'. These 'nominal epochs' are obtained by adding back the clock correction to the estimated SSTI measurement epoch.

The epochs in the SST_PCV file have, therefore, fractional offsets (shown at the midnight epochs). These fractional offsets stayed constant for about 25-27h and were then jumped by 20ms. This behaviour changed after the switch to the redundant onboard computer B mid of Feb 2010. The time interval for a constant fractional offset is extended to 5-6 days.

The receiver clock (shown at the midnight epochs) varies between -10ms and +10ms. The variations from one day to the next have been larger at the beginning of the mission. The switch to SSTI-B from 6 Jan to 9 Feb, 2011 is clearly visible.

The internal clock is not steered to integer seconds and the observation epochs have, therefore, fractional offsets (shown at the midnight epochs). These fractional offsets stayed constant for about 25-27h and then jumped by 20ms. This behaviour changed after the switch to the redundant onboard computer B mid of Feb 2010. The time interval for a constant fractional offset is extended to 5-6 days.

The epochs given in the SST_PKI file are the true SSTI measurement epochs.

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The receiver clock (shown at the midnight epochs) varies between -10ms and +10ms. The variations from one day to the next have been larger at the beginning of the mission. The switch to SSTI-B from 6 Jan to 9 Feb, 2011 is clearly visible.

More details on orbit results and validation can be found at the poster "Orbit validation for GOCE" by Heinze et al. (2011)