Status of Precise Orbit Determination for Jason-2 using GPS, SLR, DORIS data at NASA/GSFC

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The JASON-2 satellite, launched in June 2008, is the latest follow-on to the successful TOPEX/Poseidon (T/P) and JASON-1 altimetry missions. JASON-2 is equipped with a TRSR BlackJack GPS dual-frequency receiver, a laser retroreflector array, and a DORIS receiver for precise orbit determination (POD).

The most recent time series of orbits computed at NASA GSFC, based on SLR/DORIS data have been completed using both ITRF2005 and ITRF2008. These orbits have been shown to agree radially at 1 cm RMS for dynamic vs SLR/DORIS reduced-dynamic orbits and in comparison with orbits produced by other analysis centers (Lemoine et al., 2010; Zelensky et al., 2010; Cerri et al., 2010). We have recently upgraded the GEODYN software to implement model improvements for GPS processing. We describe the implementation of IGS standards to the Jason2 GEODYN GPS processing, and other dynamical and measurement model improvements.

Our GPS-only JASON-2 orbit accuracy is assessed using a number of tests including analysis of independent SLR and altimeter crossover residuals, orbit overlap differences, and direct comparison to orbits generated at GSFC using SLR and DORIS tracking, and to orbits generated externally at other centers. Tests based on SLR and the altimeter crossover residuals provide the best performance indicator for independent validation of the NASA/GSFC GPS-only reduced dynamic orbits. For the ITRF2005 and ITRF2008 implementation of our GPS-only obits we are using the IGS05 and IGS08 standards. Reduced dynamic versus dynamic orbit differences are used to characterize the remaining force model error and TRF instability. We evaluate the GPS vs SLR & DORIS orbits produced using the GEODYN software and assess in particular their consistency radially and the stability of the altimeter satellite reference frame in the Z direction for both ITRF2005 and ITRF2008 as a proxy to assess the consistency of the reference frame for altimeter satellite POD.