2010 Ocean Surface Topography Science Team (IDS) Meeting

IMPROVING DORIS TROPOSPHERE MEASUREMENT MODELING FOR JASON-1 AND JASON-2

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Abstract

DORIS has been proven to be a powerful and highly accurate satellite tracking system which provides nearly complete geographic coverage and high precision Doppler measurements. It is used to determine precise orbits for the SPOT, Jason, and Envisat satellites, to contribute to the ITRF realizations, and to contribute to determination of geocenter motion. 1-cm DORIS-only radial orbit accuracy has been achieved for Jason-2, which carries the latest DORIS receiver, which can track up to seven DORIS beacons. However DORIS is highly sensitivity to tropospheric path delay error and troposphere modeling accuracy may prove to be a limiting factor in the future use of DORIS. This paper illustrates DORIS sensitivity to modeling the tropospheric path delay for Jason-1 and Jason-2, and evaluates improvements to such modeling. The evaluation includes several approaches to estimating the troposphere zenith delay scale factor, normally done with every pass of DORIS, and among which is using the combined Jason-1/Jason-2 data simultaneously received from the same ground beacons. We pay particularly close attention to the tandem flight intervals for TOPEX & Jason-1 and Jason-1 & Jason-2, and we use independent data from other tracking systems (SLR, GPS, Altimeter Crossovers).