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The tandem calibration phases for TOPEX/Poseidon and Jason-1 and for Jason-1 and Jason-2 provided crucial opportunities to compare instrument performances, geographically-correlated errors, and regional and global biases between missions. These phases have been essential for establishing a high confidence in the climate data record from the reference series of altimeter missions. When the Jason series makes the transition to a new platform of instruments with Jason-CS, the tandem calibration phase with Jason-3 will need to be of sufficient length to ensure the integrity of the climate data record.

Early in the Jason-2 mission, the residual differences in global mean sea level between Jason-1 and Jason-2 during the calibration phase were shown to have a 1 mm rms for the 10-day cycles. Differences during the Jason-1 interleaved and geodetic phases have essentially the same scatter, which we show is due to random altimeter errors, radiometer errors, and differences in sampling on different orbits. We will present sampling error bounds estimated from output of the assimilated ECCO model sampled with Jason, Envisat, and CryoSat ground tracks. These results suggest that a relatively short calibration phase can determine any intermission bias.

However, Jason-2 and Jason-1 were largely identical platforms, and common systematic errors may not be apparent. For example, errors in global mean sea level at the S2 aliasing period (59 days) largely cancel in the Jason-1/Jason-2 differences. We can construct global mean sea level from an independent mission, Cryosat, and compare with Jason-1 and Jason-2. The residuals in global mean sea level between CryoSat-2 and Jason-2 have an rms of 3.6 mm, with the two largest variations (~2 mm) at the S2 aliasing periods for each of these two satellites (59 days for Jason and 244 days for CryoSat). These results suggest that errors associated with a solar day (e.g. errors in the S2 ocean and atmosphere tides, ionosphere corrections, heating of the instruments, etc.) are present in all missions.

Two issues argue for a calibration phase of at least six months. First, geographically-

correlated errors between missions remain despite common orbit determination standards. We will show an analysis from the calibation phase that finds that at least 6 months of observations are necessary to determine the spatial pattern of the errors. Second, differences in sea state bias models between missions suggest that the length of the calibration phase should be long enough to sample the seasonal variations in wind and wave fields, in order to separate the true EM-bias from other sea state errors, such as tracker bias.

OSTS session

Quantifying Errors and Uncertainties in Altimetry Data