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The stability and accuracy of the satellite orbit through time is essential to altimeter data analysis. Studies have shown the previously applied simple POD modeling of time variable gravity (TVG) has become increasingly less adequate since about 2005, and have suggested the recent increase in ice melt as one of the causes. Several new TVG models have emerged showing progressive improvement over the simple model as indicated by the Jason-1/2 and Envisat SLR and Crossover residuals. The new models include GRACE-derived 50x50 gravity coefficient 10-day snapshots, SLR+DORIS 4x4 7-day snapshots, and the application of the reduced-dynamic technique. Regardless of the improvement in SLR and Crossover residuals, the models differ considerably in their orbit projections affecting regional estimates of mean sea level and changes in mean sea level. Such differences can also impact tide gauge calibration analysis. This study compares the Jason-2 SLR/Crossover residuals and projected Jason-2 orbit difference trends considering the GDRD, JPL Rlse11a, and several new orbits from GSFC. The new GSFC orbits include SLR+DORIS reduced-dynamic processing using the GRACE-derived 50x50 and SLR+DORIS 4x4 snapshot TVG models. The study examines the sensitivity of the reduced-dynamic SLR+DORIS orbits to TVG, potential impact on tide gauge calibration using the various TVG models, and the question of identifying the best TVG model.
OSTS session
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Meeting name
Ocean Surface Topography Science Team (OSTST) Meeting
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