

Spectral Properties of the Differences between TOPEX/Poseidon and Jason-1 Altimeter Measurements

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From mid January to mid August 2002, Jason-1 was in a calibration/validation phase in which Jason-1 and TOPEX/Poseidon flew over the same ground tracks and visited the same spot of the ocean only 72 seconds apart. Within such a short period of time, the conditions of the sea state and the overlying atmosphere column remain nearly the same. The differences between the two nearly simultaneous measurements allow the evaluation of the differences in the two altimeter measurements. Ideally, the differences should be white noise. Any “colored signals” should be evaluated as possible systematic measurement errors. Preliminary results indicate that the Jason-1 altimeter measurements have met the mission requirements with only small systematic errors: 0.1 m for significant wave height, 0.1 dB for the normalized backscatter coefficient. The differences in sea surface height measurements were dominated by orbit errors (3 cm rms) at wavelengths ~ 10000 km. At wavelengths 1000-5000 km there is significant coherence between the height difference and wave height, indicating possible systematic instrument errors with a magnitude of 1.5 cm (rms). The ionospheric delay difference also has a systematic error of 0.3 cm (rms) that is coherent with wave height at wavelengths longer than 1000 km. Adjustments of Jason-1 instrument algorithms and re-tracking of TOPEX/Poseidon data are underway to mitigate these systematic errors. Results from these ongoing efforts will be presented in the meeting.