Altimeter (calibration and Geophysical Monitoring from Collocated Measurements at the Harvest Oil Platform

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Prior to the launch of TOPEX/POSEIDON in August, 1992, NASA established its primary in situ verification site on the Harvest oil platform located in the Pacific Ocean off tile coast of central California. 1)ata from a suite of geodetic and oceanographic instruments attached to the platform have been combined to yield a precise record of absolute sea level since the beginning of the mission. Critical to the computation of this geocentric sea lewd record is the precise determination of the platform geodetic height and vertical velocity in the global terrestri ial reference frame. We compare estimates of the platform height and vertical velo city from global posi tioning system (GI 'S) data alone and from a combinat ion of GI 'S and sat ellite laser ranging (S1 .R) information. Current estimates suggest the platform is subsiding at a rate of about 8 mm/yr. This height information is combined with in situ tide gauge measurements of sea level relative to a platform reference mark in order to produce a continuous record of the local geocentric sea height.

'J 'he TOPEX/POSEIDON satellite! has passed directly over the platform (within ±1 km cross track) once every 10 days in its repeating orbit. At this writing, over 125 overflights have been made.] Direct comparisons of the sea lewd measurements derived independently from the space-based sensors (altimeter) and in situ instruments at the overflight times have been used to yield estimates of bias and drift in the altimeter measurement systems. The repeatability of the individual altimeter bias determinations is 2-3 cm (RMS). This figure includes errors in both the altimeter and in situ measurement systems, and reflects a level of performance which is significantly better than prelaunch expectations. The results suggest that the NASA Al .T continues to measure snort (bias of - 125 ± 20 mm), while the CNES solid-state altimeter (SSAI ,'J') remains relatively unbiased (+28 ± 20 mm). Neither altimeter measurement system shows evidence of unmodeled drift at a lewd which can be presently detected, i.e. 3-6 mm/yr. A longer time series and c1osc control of systematic errors can reduce the error in the estimated drift rate, lending further credibility to the continually updated measurements of eustatic change from the TOPEX/POSEIDON mission.

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