TOPEX/POSE DON: Four Years of Synoptic Oceanography

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Exceeding all expectations of measurement precision and accuracy, the US/France TOPEX/POSEIDON satellite mission is now in its 5th year. Returning more than 98 % of the altimetric data, the measured global geocentric height of the sea surface has provided unprecedented opportunities to address a host of scientific problems ranging from the dynamics of ocean circulation to the distribution of internal tidal energy. Scientific highlights of this longest- running altimetric satellite mission include improvements in our understanding of the dynamics and thermodynamics of large-scale ocean variability, such as, the properties of planetary waves; the energetics of basin-wide gyres; the heat budget of the ocean; and the ocean's response to wind forcing. For the first time, oceanographers have quantitative descriptions of a dynamic variable of the physical state of the global oceans available in near-real- time. These data provide a unique test-bed for ocean general circulation models and have set the stage for operational ocean applications. The limit of the mission's capability has been fully utilized to resolve the mm/year rate of global mean sea level variation, a direct indicator of climate change. Through continuous and comprehensive calibration and verification efforts, it has been demonstrated that a precision altimetry system plus a network of in situ tide gauges can determine the global mean sea level variation with an estimated accuracy of 1 mm/year - the threshold of a useful monitoring system. Looking to the future, all spacecraft systems remain healthy and we are optimistic TOPEX/POSEIDON will produce many more years of these outstanding global sea level data.