

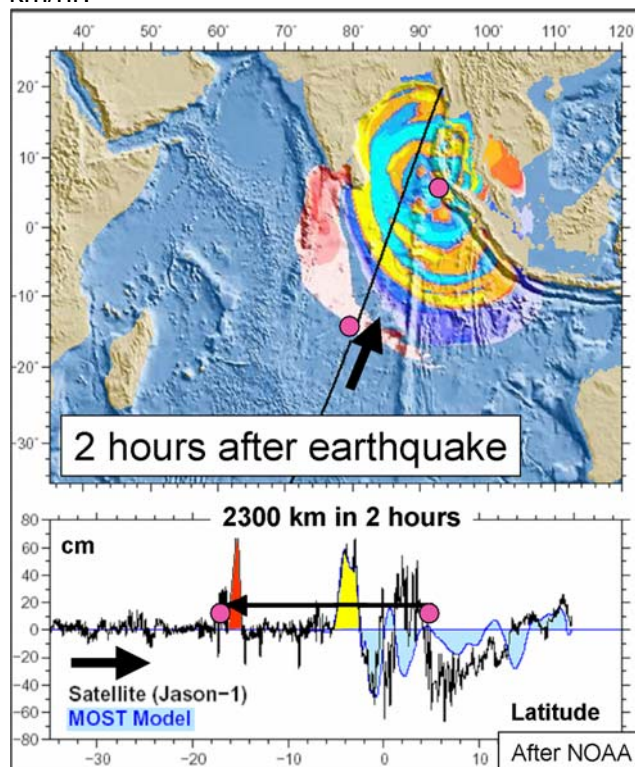


ABSTRACT

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Indian Ocean Tsunami: Will a warning system work?

Satellite altimetry data besides providing important exploration information on the marine geoid and gravity field, recently witnessed the devastating Tsunami resulting from one of the world's most powerful earthquakes (magnitude ~9.3), that occurred on 26 December 2004 off the NW coast of Sumatra. The Jason satellite (Figure) was one of 4 satellites to measure the Tsunami effects as its energy radiated out across the Indian Ocean. Jason was well placed to provide an accurate cross section of the sea surface two hours after the earthquake struck, just as the second energy pulse (yellow) struck Sri Lanka. The Figure shows the NOAA's initial spatial model of the Tsunami and the cross section of the Indian Ocean surface (solid black trace). Sea surface heights varied by +/- 60 cm over distances from 200km to 1300 km! The speed of propagation is the most spectacular feature with the initial energy pulse (red) travelling at near 'supersonic' speed (~1000 km/hr) and the secondary pulse travelling at ~700 km/hr.



The high horizontal transmission speed of the Tsunami energy (where the water particle motion basically remains static and moves in an ellipsoidal motion) and the relative distances from active subduction zones within the Indian Ocean makes any effective warning system difficult to impossible to manage. It took just 2 hours before the major energy phase (yellow) struck Sri Lanka. When this is coupled to the likely long repeat time of such disastrous earthquakes, a warning system would possibly not be triggered for decades or more and any warning would be unlikely to reach the vast expanse of coastline of eastern India within a time frame to prevent major loss of life. If this analysis is correct, then such a warning system could give people a false sense of security. *Further information can be found on the Tsunami on <www.noaa.gov>*