FIELD SURVEY OF TSUNAMI DEPOSITS, EROSION AND FLOW DURING THE 26 DECEMBER 2004 TSUNAMI IN INDONESIA

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ABSTRACT

The 26 December 2004 Indian Ocean Tsunami caused widespread devastation and loss of life throughout the Indian Ocean basin. Fatalities in Indonesia alone totaled more than 125,000 with over 35,000 missing and 500,000 displaced. From March 30 to April 26, 2005, a team of 17 U.S. and Indonesian scientists conducted a tsunami field survey to collect data to improve the ability to mitigate tsunami hazard in Indonesia and worldwide. Study sites spanned 800 km of coast from Breuh Island north of Banda Aceh to the Batu Islands, and included 22 sites in Aceh Province in Sumatra and on Simeulue Island, Nias Island, and the Banyak Islands. Tsunami runup, elevation, flow depth, inundation distance, erosion, sedimentary characteristics of deposits, nearshore bathymetry, and vertical land movement (subsidence, uplift) were studied. Maximum tsunami elevations and flow depths were greater than 16 m and 13 m, respectively, along a 135 km stretch of coast in northwestern Sumatra. Tsunami flow depths were 10 m at 1500 m inland. Extensive tsunami deposits, primarily composed of sand and typically 5 to 20 cm thick, were observed in northwestern Sumatra.

These data are being used to improve the understanding of tsunamis and will be used to improve tsunami inundation and sedimentation models. For example, models that utilize the observed relations between tsunami characteristics and sediment deposits are being developed to increase the ability to interpret paleotsunami deposits, which will aid in determining tsunami risk, evacuation planning, and help mitigate loss of life and property in future tsunami.