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Possible Earthquake Generated Turbidites along the Sumatra Margin

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An international science party of 37 embarked from Phuket Thailand to collect cores from the Sumatra margin to investigate the paleoseismic record from great earthquake rupture in the Holocene. 99 piston, gravity, kasten, and multicores were collected along the length of the Sumatra margin, from the 2004 rupture zone in the north, to the southern tip of Sumatra Island. Cores were collected in the trench and in lower slope piggyback basins. The trench lithology was dominated by fine mature quartz sand, consistent with the well known Himalayan source of the accreting Bengal and Nicobar fans, and contained several tephras. Slope basins contained similar lithology, with abundant forams, and significant organic debris in those basins near the offshore islands of the Sumatran forearc. Core sites were located in places that optimized for 1) isolation from confounding factors, like terrestrial storm generated sediment input, 2) sufficient sampling for structural segment boundary determination, and 3) preservation of sediments that could permit our analytical methods. Our strategy was to densely sample both trench and basin sites to test correlations between sites to determine whether observed turbidites are earthquake generated. If so, the sampling density may allow discrimination of segment boundaries as well as event histories for margin segments. Preliminary analysis suggests that the cores contain turbidites most likely generated by the 2004 and 2005 northern Sumatra great earthquakes. These are represented by a large shallow multipulse event overlain by a smaller single pulse event at the seafloor, with no observed hemipelagic sediment between them. Ongoing ^{14}C and Pb^{210} dating with stratigraphic correlation will test the origins and connectivity of these and numerous other Holocene turbidites.

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