Geophysical Research Abstracts,
Vol. 11, EGU2009-11535-1, 2009
EGU General Assembly 2009

Distribution and nature of mass movements along the Middle America Trench

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We present a study of large-scale mass wasting processes along the continental slope of the convergent margin of the Middle America Trench from Panama to Mexico.
We have mapped about 1250 km of the continental slope landward of the Middle America Trench with high-resolution multibeam bathymetry, and compiled deep-towed side scan sonar data of selected areas on the slope after the examination of the bathymetric data.
Based on this we have made an inventory of slides and slumps (> 500 m across) along the research area, and studied the morphology of the failure areas and, where present, the mass wasting deposits. We have used these observations to infer the translational or rotational nature of the failure mechanisms. The Middle America Trench is an optimal setting to study how large-scale changes in the relief of the subducting plate, affect the tectonic and the mass wasting processes of the overriding continental margin. Along strike of the Middle America active margin we have found importenant changes in the style of mass wasting on the continental slope. Offshore Costa Rica subducting ridges and seamounts produce spectacular failures of the continental margin with pronounced high scarps. Offshore Nicaragua, the downgoing Cocos plate is decorated with smaller seamounts, and has pronounced horst-graben topography. Here mass wasting structures are numerous, but less voluminous, affecting a large part of the margin segment. Farther north offshore El Salvador and Guatemala where the horst and graben terrain is in general more subdued, mass wasting is less pronounced

Our analysis indicate that the importance of mass wasting processes and sediment dynamics in this type of margin may have been previously unrecognized. An important defining variable seems to be the topography of the downgoing plate. Our mapping of failure structures shows that 10- 20 % of the continental slope of the margin has been affected by potentially large catastrophic mass wasting events.