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Drilling the Seismogenic Zone in Central America: IODP Costa Rica Seismogenesis Project CRISP

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In these days (Jan. 2010) the Integrated Ocean Drilling Program (IODP) is making available the opportunity to start the drilling operation of CRISP (Costa RIca Seismogenesis Project). CRISP aims to reach the seismogenic zone of the Central America erosional convergent margin. The shallow dip of the subduction zone off southern Costa Rica and the relatively high temperature of the subducting ocean crust bring materials and processes involved in seismogenesis to depths reachable by drilling with the riser ship Chikyu (about 5 km). CRISP is structured in non-riser (Program A) and riser (Program B) stages that systematically lead from shallow non-riser to deep riser drilling. Program A is going to be scheduled in Spring 2011. Program A drilling will use standard ODP drilling technology allowing sample upper plate basement rock. This information is necessary background for Program B which will penetrate 5 km into this still unknown material. Moreover upper plate geology can directly influence seismogenesis since the subduction channel of an erosional margin receives material eroded from the upper plate. Therefore the lithology, alteration, and fracturing that controls erosion presumably directly affects plate boundary friction. Program A also carries stand-alone objectives. The subduction of the Cocos Ridge offshore Osa Peninsula, in fact, caused the adjacent volcanic arc to shut down and uplifted the Cordillera de Talamanca. Volcanic ash deposits at the drilling sites have the potential to record the extinction of the arc activity. Finally, in scientific drilling history, investigation of 7 accretionary convergent margins unexpectedly discovered an erosional history. But the drilling was not designed to quantify erosion across a margin. CRISP Program A is the first scientific drilling program designed to characterize an erosional margin and that can quantify subduction erosion and its effects on seismogenesis.