

Fracturing in gabbros within the Costa Rica subduction zone: High-resolution study from the core-log data integration

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Costa Rica margin is an important area for studies of the seismogenic zone and subduction factory. Building on Ocean Drilling Program (ODP) Leg 170 coring and logging while drilling (LWD) at the same sites, Leg 205 drilled three sites in 2002 to determine the igneous and alteration history of the upper most part of the down going plate, to characterize the hydrological regime above and within the decollement, and to install long-term borehole observatories to monitor downhole pressure, temperature, sample fluids and gases.

Among the several highlights from the results, successful installation of CORKs, selective coring of decollement zone and its above, coring and logging of thick basement zone was significant to detail the fracture distribution and structure of basement at down going plate. Even though logging runs in the sediment section was failed due to the hole conditions, triple combination and FMS-sonic tool strings made successful measurements of the basement rocks at Site 1253.

Post-cruise research work included quality control on logging data, processing of Formation MicroScanner (FMS) and several velocity logs, and interpreting these logging data and core sample analysis results in integrated manner. Among several downhole logging results, FMS images can be used to characterize structure and fabric in the igneous units. As the hole conditions were good in most of the igneous intervals, the textural and structural variation is clear between the sections and also shows differences within the section itself. Detailed analysis of FMS and combined logs, integrated with core sample analyses enhanced the understanding of structural process of this particular region.