

SUBDUCTION ZONE MEGATHRUSTS: WHY STRATIGRAPHY AND SEDIMENTOLOGY MATTER

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Plate-boundary faults in subduction zones produce some of the world's most devastating earthquakes and tsunamis. A fundamental goal of the Ocean Drilling Program has been to identify and evaluate parameters that govern structural partitioning between an overriding accretionary prism and the domain of underthrust sedimentary rock and igneous crust. Another long-term goal is to pinpoint the factors that control up-dip limits of seismogenic activity along specific plate-boundary faults. One possible influence on fault-zone properties is clay mineralogy, especially the primary content and subsequent diagenetic alteration of smectite group minerals. Dr. Underwood sailed as a sedimentologist during ODP Legs 131 (Nankai Trough), 156 (Barbados), 168 (Cascadia Basin), and 190 (Nankai Trough). Drawing from these case studies, he demonstrates why variations in lithostratigraphy and clay mineralogy need to be assessed in three dimensions before their effects can be linked to the location and dynamic behavior of any subduction zone décollement.