

コストリカ沖浸食型沈み込み帯のインプット物質組成 Incoming materials for an erosional subduction zone, offshore Osa Peninsula, Costa Rica

亀田 純^{1*}; ハリス ロバート²; 清水 麻由子³; 氏家 恒太郎⁴; 堤 昭人⁵; 池原 実⁶; 宇野 正起⁷;
山口 飛鳥⁸; 濱田 洋平⁹; 並木 由香⁵; 木村 学¹⁰
KAMEDA, Jun^{1*}; HARRIS, Robert²; SHIMIZU, Mayuko³; UJIIE, Kohtaro⁴; TSUTSUMI, Akito⁵;
IKEHARA, Minoru⁶; UNO, Masaaki⁷; YAMAGUCHI, Asuka⁸; HAMADA, Yohei⁹; NAMIKI, Yuka⁵;
KIMURA, Gaku¹⁰

¹ 北海道大学, ² オレゴン州立大学, ³ 日本原子力研究開発機構, ⁴ 筑波大学, ⁵ 京都大学, ⁶ 高知大学, ⁷ 東北大学, ⁸ 東京大学,
⁹ 海洋研究開発機構, ¹⁰ 東京大学

¹Hokkaido University, ²Oregon State University, ³Japan Atomic Energy Agency, ⁴University of Tsukuba, ⁵Kyoto University,
⁶Kochi University, ⁷Tohoku University, ⁸University of Tokyo, ⁹Japan Agency for Marine-Earth Science and Technology,
¹⁰University of Tokyo

Bulk mineral assemblages of sediments and igneous basement rocks on the incoming Cocos Plate at the Costa Rica subduction zone were examined by X-ray diffraction (XRD) analyses on core samples. These samples are from Integrated Ocean Drilling Program (IODP) Exp. 334 reference Site U1381, ~5 km seaward of the trench, cored as part of the Costa Rica Seismogenesis Project (CRISP).

Drilling recovered approximately 100 m of sediment and 70 m of igneous oceanic basement. The sediment includes two lithologic units: hemipelagic clayey mud (unit 1) and siliceous to calcareous pelagic ooze (unit 2). The hemipelagic unit is composed of clay minerals (~50 wt.%), quartz (~5 wt.%), plagioclase (~5 wt.%), calcite (~15 wt.%) and ~30 wt.% of amorphous materials, while the pelagic unit is mostly made up of biogenic amorphous silica (~50 wt.%) and calcite (~50 wt.%). The igneous basement rock is composed of plagioclase (~50-60 wt.%), clinopyroxene (>25 wt.%), and saponite (~15-40 wt.%). Saponite is more abundant in pillow basalt than in the massive section, reflecting the variable intensity of alteration. Fluid expulsion models shows that sediment compaction during shallow subduction causes the release of pore water while peak mineral dehydration occurs at temperatures of approximately ~100 °C. The subducting sediment has the potential to generate fluid overpressure at distances of between 5 and 70 km landward of the trench.

Keywords: erosional subduction zone, CRISP, XRD