

## Lithostratigraphic unit and its thermal maturity at Site C0009 in Kumano basin using cuttings and core samples

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Expedition 319 is the first IODP expedition using riser drilling methods in the framework of Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE). Innovative studies of cuttings samples during the expedition allowed to define 3 lithostratigraphic units at Site C0009 and constitute a valuable material for post-cruise investigations. Here, we present onboard procedure of cuttings description used to define lithologic units and discuss possible use and limitation of cuttings samples for IODP expeditions and post-cruise studies. We also present new results on cuttings samples, which allow to constrain the thermal maturity of sediments in the Kumano Forearc Basin and provide an insight into in-situ thermal conditions of drilled sequences. Cuttings were collected from with an interval of every 5 m from 703.9 to 1604 m and cores were recovered from 1509.7 m to 1593.9 m below sea floor (mbsf). Due to poor consolidation of drilled sediments, cuttings samples typically consist of sand and silt floating in a matrix of mixed sedimentary and drilling muds, and hard rock chips were not retrieved above 802.7 mbsf. Visual description of washed cuttings (i.e. grains without mud) were made throughout the hole, which were complemented on-board by XRD and XRF analyses from 802.7 m to 1603.7 mbsf. Visual description of washed cuttings were based on macroscopic observations, examination of smear slides and thin sections, which allowed to make some indexes. The bulk lithology, clay content, degree of rock chips induration, wood content, grain angularity and grain sorting of cuttings samples were useful for Site C0009.

Four Units were defined at site C0009 based on compositional and textural variations of cuttings samples, which are believed to closely reflect lithologic changes of drilled sequences, and show good consistency with logging data. Each lithologic unit are as follows: Unit I by mud with cyclical sand-rich layer; Unit II by mud with infrequent sand and silt interbeds; Unit III by silty mud and mudstone with rare silty-sand interbeds; and Unit IV by silty mudstone with minor silt interbeds. Due to possible mixing during retrieval of cuttings samples, depths of unit boundaries were best defined by logging data. Comparison of cuttings and cores at similar depth indicate compositional and textural differences between the cuttings and cores, which could reflect: (1) mixing of cuttings in drill hole; (2) contamination of cuttings by drill mud; and/or (3), effects of different drill bits used for hole opening and coring. Additional comparative studies between the cuttings samples and the cores are needed to better understand the significance of these effects. During our post-cruise research, we aim at determining thermal diagenesis of drilled sediments based on measurements of vitrinite reflectance in cuttings and cores samples. We selected samples from Unit II to IV with around 20 m interval. Vitrinite is common in all units and will allow to estimate peak temperature of samples. We report and discuss here our preliminary results on the thermal maturity of sediments beneath the Kumano Forearc Basin.

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