

## Thermal fluid migration in the Kumano forearc basin, Nankai Trough, estimated through vitrinite reflectance measurement

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Sediment analysis and the thermal history of the Kumano forearc basin and slope basin sediments in the Nankai Trough were studied through chemical and mineral composition analyses and the vitrinite reflectance measurement of sediments from Integrated Ocean Drilling Program Sites C0004, C0007, and C0009. The immobile component ratio ( $\text{TiO}_2/\text{P}_2\text{O}_5$ ) suggests that the depositional source of sedimentary rock underlying the Kumano forearc basin (Unit IV of Site C0009) is different from those in the Kumano forearc basin (Unit III of Site C0009). The results support that Unit IV is not a basin sediment but a part of an old accretionary prism. The source of Unit IV is similar to that of the Shikoku basin sediment currently situated in the accretionary toe and subduction input, based on mineral composition analysis. The similarity is well explained by sediment transport from the East China Sea. In the Kumano forearc basin, a paleothermal anomaly was detected at Site C0009 using vitrinite reflectance measurement. The anomaly peak is 200 m wide with a maximum temperature of 79 °C. Estimation of reflectance increase through vitrinite reaction promotion suggests that 80–100 °C thermal fluid had passed with at least 100 ky, thus causing the anomaly. The thermal fluid upwelling might relate to ancient splay fault activity near Site C0009. The thermal anomaly zone in the Kumano forearc basin at Site C0009 coincides with the currently fluid conduit zone. These results indicate that massive fluid circulation occurs spatially and temporally through a large thrust in the subduction zone.

Keywords: Nankai Trough, Vitrinite reflectance, Kumano forearc basin, Thermal fluid