

The characteristics of turbidites beds of southwestern Ryukyu Trench floor: A new approach from the X-ray fluorescence core scanning analysis

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The southwestern Ryukyu Trench terminates on the eastern margin of the indenting northern Gagua Ridge and is characterized by a curved fan-shaped trench floor. This study area is an ideal place to study the sediment transport of oceanic trenches in terms of source-to-sink. Therefore, the characteristics and related geochemical characterization of trench turbidites were analyzed. We collected one piston core and related pilot core from the cruise KR1518 in 2015. Two pushed cores also were collected by SHINKAI6500 from the cruise YK1611 in 2016. These sites are deeper than 6,000 m water depth of the southwestern Ryukyu Trench floor. The sedimentary succession of Ryukyu Trench cores is dominated by gray silt interbedded with numerous silt-fine sand. These silt-fine sand layers can be considered as turbidite beds. Most of the turbidite beds show very thin lamination less than 2 cm thick. Based on visual core descriptions and XRF results, the elemental ratios of XRF can help determine the contact between turbidite and hemipelagic sediments, particularly for the thin turbidite beds. The depths of turbidite beds were highly correlated with the intensities of several elements. The intensities of calcium and iron are considered the most sensitive geochemical indicators. The elemental ratios Zr/Rb and Ca/Fe of most turbidite beds correspond to fining-upward sequences that were used to identify each thin turbidite. Based on the results of magnetic measurements, the presence of pyrrhotite signatures indicates that the Taiwan-sourced turbidites are interbedded with hemipelagic sediments. Radiocarbon dating and organic geochemical measurements from some specific layers were also conducted. To sum up, these results can increase the insight of turbidites in distal and deep-water environments.

Keywords: deep-sea turbidite, X-ray fluorescence, Pyrrhotite, Ryukyu Trench