

Determination of slope failure sediments using organic matter composition, an example from Nankai Trough, Japan

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Deep-sea turbidite has been useful tool for long-term paleoseismicity analysis. Sedimentological analyses using turbidites have been revealed the recurrence interval of sea earthquakes around subduction zones. However we have to determine the origin of turbidite, when we use deep-sea turbidites for paleoseismicity. Because turbidity currents occur with not only slope failure by earthquake (seismo-turbidites) but also flood and storm. The purpose of this study is to examine the origin of deep-sea sediments (turbidites) using sedimentary organic matter composition and estimate these recurrence intervals.

We chose two forearc basins of Nankai Trough. One is Kanasunose Trough situated at southern of Omaezaki Spur. Kanasunose Trough does not have canyon, which is connected to shelf or river, on the slope. The active fault is existed along Kanasunose Trough. Another is Kumano Trough situated at southeastern of Kii Peninsula. Kumano Trough is characterized by widely basin floor at 2,000 m depth, steep slope and narrow shelf. Submarine canyons cut off the slope.

Holocene sediment from Kanasunose Trough is mainly composed of dark olive silt and clay layers with 22 turbidite layers. Organic matter in the sediments is mainly composed of amorphous organic matter with a small amount of terrigenous organic matter, such as vitrinite and cutinite. Organic matter composition and geographic feature of this basin suggests that turbidites were deposited from slope failure. The recurrence intervals of turbidites were estimated between 50 and 450 years.

Sediment from Kumano Trough is also mainly composed of olive black silt and thin sand layers. Organic matter compositions of Kumano Trough Holocene sediments are similar to those of Kanasunose Trough. Therefore, the Holocene turbidites in Kumano Trough are interpreted as slope failure deposits. The recurrence intervals of turbidites were estimated between 50 and 160 years.