Characteristics of surface sediments collected from Sagami bay, plate triple junction in Japan Trench, Izu-Bonin trench and the Pacific abyssal plain

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Introduction: Marine microplastic particles deposited to sea floor are moved and buried into sediments. The distribution and burial of microplastic particles are ruled as initial concentration in overlying water and depositional events such as bottom current, event deposition or bioturbation. As a part of a study on microplastic distribution into sediments, we investigated sedimentary structures in the cores collected from hemipelagic to hadal (755 m to 9232 m) environments.

Methods: During R/V Yokosuka YK19-11 and R/V Kaimei KM19-07 cruises, we collected total 11 undisturbed sediment cores from plate triple junction in Japan Trench off Boso (2 cores; from 9218 m and 9232 m), Izu-Ogasawara Trench (3 cores; from 8201 m to 9202 m), abyssal plain in the Pacific (3 cores; from 5707 m to 5813 m) and Sagami bay (3 cores; from 755 m to 1387 m), respectively. The devices used for the sampling were multiple core sampler, push core sampler with manipulation by HOV Shinkai 6500 or core sampler mounted on a free-fall camera system.

Results: Several high density layers formed in parallel with the sediment surface, probably formed by turbidity currents were found in the two cores from the plate triple junction. Similar layers were also seen in the cores from Izu-Ogasawara trench. Especially, the core collected from 8202 m had a sharp sandy layer containing planktonic foraminiferal tests in 26-27 cm. Abyssal sediments exhibited lower water content, and many burrows were seen. The cores from Sagami bay showed homogenous and consisted of coarser sediment particles. The core from the bay central showed thin high density layer on the top part. These results suggest that the burial of sediment particles including microplastics are different in the respective settings.

Keywords: Marine sediment, microplastic particles, trench, abyssal plain, Sagami bay