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Sediment organic matter as an important food source for amphipods in hadal trenches

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Hadal trench (6000 to 11000 m deep) is the least explored ocean ecosystems. Our knowledge on biogeochemical characteristic of sediment organic matter (SOM) in trenches is rudimentary, let alone its influence on hadal life. Here we examined sediments and benthic amphipods collected from Mariana Trench (MT), Mussau Trench (MS) and New Britain Trench (NBT) by analyzing elementary compositions, biomarkers and isotopes (δ13C and δ15N). The Challenger Deep (MT) and the MS deep contain highly degraded and marine predominant SOM, while the NBT deep comprises the highest terrestrial and labile SOM among three trenches as well as NBT landward and oceanward slopes, suggesting a rapid transport and efficient burial of SOM along the trench axis. The positive correlation of δ13Corg between trench sediments and amphipod muscles supposes that hadal amphipods can consume SOM when the high quality food (e.g., carrion-falls) is unavailable in the extreme hadal environments, although their major food source varied from sediment detritus in the MT and MS to carrion-falls in the NBT given a large range of δ13Corg.