



Contribution ID: 54 Contribution code: **PSB-11**

Type: **Poster**

Radiocarbon dating of modern marine organisms living in hadal trench

Wednesday, 23 October 2024 17:35 (20 minutes)

Hadal trenches (6000-11000 m) constitute 45% of the ocean depths range and have the ecology of the deepest places on earth. The understanding of the life history of hadal trench organisms is limited due to the lack of a proper dating method. Though radiocarbon has the potential for dating modern organisms in trenches, the lack of a ^{14}C dating method limited the application of ^{14}C in marine organisms. Here we will show the ^{14}C dating method for modern hadal organisms by the example of amphipods. First, the radiocarbon tracing study reveals that the organic carbon of hadal amphipods mainly comes from the production in the surface water. Then a synthetic curve for the ^{14}C variation in the West Pacific Ocean (WPO) for the past 70 years was built up by the data of proxy of ^{14}C content in surface water. The apparent ages of amphipods' muscle tissues are calibrated according to the WPO curve. These results indicate greater longevity of hadal amphipods than the ones in shallow water, which is consistent with the ages estimated by the body length and growth rate. The relation between the apparent age and real age of amphipods needs further interdisciplinary studies. This method can be applied extensively to marine organisms in the deep sea, whose organic carbon source also comes from the production in surface water.

Student Submission

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Session Classification: Poster Session B

Track Classification: Applications in Oceanography