

Compound-specific radiocarbon analysis of marine sediment core in the Kuril trench.

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This study aims to improve the dating accuracy of submarine landslide occurrences over the past 10,000 years in the Kuril Trench by analyzing marine sediment cores containing turbidites. Marine sediment cores from the North Pacific generally lack foraminifera (due to limited surface habitation and a shallow carbonate compensation depth), making it challenging to establish a chronology for these cores. While it is possible to analyze bulk organic carbon (Bulk-TOC) for radiocarbon dating, the results are typically 1,000–2,000 years older than the actual date. By chemically purifying bulk organic matter and conducting radiocarbon dating on specific organic compounds synthesized by surface-dwelling organisms, more accurate dating can be achieved. This study focuses on chlorophyll-a, produced by phytoplankton in the surface layer of the ocean. We found that the radiocarbon age of chlorophyll-a is 200–300 years older than the dissolved inorganic carbon in the surface ocean. This result suggests that some fraction of chlorophyll-a is laterally transported and redeposited by bottom water currents and other processes. However, given that the radiocarbon date of Bulk-TOC is several thousand years older, chlorophyll-a remains a promising tool for dating marine sediments in the Kuril Trench.

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