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生物地球化学サイクル指標としての化合物レベル放射性炭素年代 Compound-specific radiocarbon dating as a tool for biogeochemical processes

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I review the radiocarbon dating of individual organic compounds as a tool for investigating biogeochemical processes. Combination of source-specific organic molecules (biomarker) and radiocarbon dating provides a powerful tool for potentially resolving the various problems related to biogeochemical processes both in the ocean and on land. Development of small-scale radiocarbon dating during the late 1990s expands the utility of this method to less abundant samples. Furthermore, recent advances in high-performance liquid chromatography (HPLC) provide a tool for fast, easy purification of individual organic compounds from complex mixtures of organic matters in the sediment and soil. Since the establishment of this technique in the mid-1990s, many applications have been conducted to various compounds. For example, transport of sedimentary molecules like alkenones can be used for tracking the horizontal movement of organic matter produced by the phytoplankton in the water column. In this presentation, I overview the merit and limitation of this method for the future use in biogeochemical study.