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## **Carbon cycle in the polar oceans based on $^{14}\text{C}$ perspectives ( $^{14}\text{C}$ in the polar oceans)**

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The development of  $^{14}\text{C}$  measurement techniques and icebreaking research vessels especially encourage and support polar research using  $^{14}\text{C}$ . Research examining  $^{14}\text{C}$  in polar oceans in the context of climate change has led to considerable insight into the marine carbon cycle. The Amundsen Sea, in West Antarctica, is experiencing rapid ice melting because of a warming climate. As found in previous studies conducted in these seasonally ice-free areas, nutrients released from melting ice sheets and upwelled by buoyant melt water stimulate surface primary production, which in return increases the surface uptake of  $\text{CO}_2$  in these regions. To address this carbon discharge, we conducted radiocarbon analysis of dissolved organic carbon in water samples collected near the melting ice shelf in the Amundsen Sea. Our finding indicates the deep water in the regions is going through a biological process under the influence of meltwater input. Further sampling will be needed for the investigation of the role of meltwater in downstream ecosystems. The impact of warming induced melting sea ice and glaciers on marine biogeochemical cycles, future environmental challenges and research directions have also been summarized. The limitations of existing  $^{14}\text{C}$  research in polar regions can be addressed through well-designed and continuous investigation, data and sample sharing, and the development of state-of-the-art  $^{14}\text{C}$  measurement techniques.

### **Student Submission**

No

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