



Tracing terrestrial organic matter along the Mackenzie Trough in the Beaufort Sea

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Recent Arctic warming accelerates the release of vast amounts of organic carbon from the terrestrial permafrost to the Arctic Ocean, having the potential to affect Arctic biogeochemical carbon cycles. The Mackenzie River is one of the largest rivers draining into the Arctic Ocean and the most important source of terrestrial freshwater and sediment input to the Beaufort Sea. In this study, we investigated surface sediments collected along the Mackenzie Trough during the ARA04C, ARA05C, and ARA08C expeditions of the Korean ice-breaker R/V ARAON in the Canadian Beaufort Sea in 2013, 2014, and 2017, respectively. We analyzed the samples for bulk (TOC, TON, C/N ratio, $\delta^{13}\text{C}_{\text{TOC}}$, and $\delta^{15}\text{N}_{\text{TON}}$) and molecular (concentrations and $\delta^{13}\text{C}$ of *n*-alkanes) parameters to trace the terrestrial organic matter input from the Mackenzie River to the Beaufort Sea. In addition, we analyzed the radiocarbon content ($\Delta^{14}\text{C}$) to calculate the petrogenic contribution of OC to the total OC pool. Our results provide information on the effect of thawing permafrost and thus the contribution of the activated old OC along the Mackenzie Trough. (Corresponding author: J.-H. Kim, jhkim123@kopri.re.kr)