Tracing water exchange and circulation in the Antarctic using ^{129}I

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Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

Abstract ID: 22
Track classification: AOG

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Due to the conservative feature of iodine in the ocean, the high releases from the human nuclear activities and long half-life, ^{129}I has been widely used as an oceanographic tracer for water circulation and exchange in many regions. But the distribution of ^{129}I in seawater in the Antarctic has not yet been reported. The surface and depth profile seawater collected from the Drake Passage, Bellingshausen, Amundsen, and Ross Seas in the Antarctic in Nov. 2010 - Jan. 2011 were analyzed for total ^{129}I and ^{127}I. The concentrations (1.15-3.27)E6 atoms/L for ^{129}I and (0.61-1.98)E-11 for $^{129}I/^{127}I$ atomic ratios are lowest compared to the other oceans. The iodine distribution patterns provide significant information about surface water transport and mixing that are vital for the better understanding of the Southern Oceans effects on the global climate change. The results indicate multiple spatial interaction between the Antarctic Circumpolar Current (ACC) and Antarctic Peninsula Coastal Current (APCC). These interactions happen in restricted circulation pathways that may partly relate to glacial melting and icebergs transport.

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