

Fukushima Dai-ichi and the Ocean: 10 years of study and insight Abstract Submission Form : Entry # 58

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Session

Consequences for the ocean

Abstract Title (English, limited to 300 characters)

Transport history of Fukushima radioactivity on Line P in the northeast Pacific Ocean: 2012-2018

Abstract (English)

The large inventory of radioactivity released during the March, 2011 Fukushima Dai-ichi nuclear reactor accident in Japan spread rapidly across the North Pacific Ocean and was first observed at the westernmost station on Line P, an oceanographic sampling line extending 1500 km westward of British Columbia (BC), Canada in June 2012. Time series measurements of ^{134}Cs and ^{137}Cs in seawater on Line P have resolved the transport history of the Fukushima radioactivity tracer plume through the northeast Pacific Ocean up to 2018. During 2013 and 2014 the Fukushima plume spread onto the Canadian continental shelf and by 2015 and early 2016 it attained ^{137}Cs values of 6-8 Bq/m³ in surface water along Line P. The maximum in the Fukushima ^{137}Cs plume spread shoreward along Line P between 2016 and 2018 as the overall signal began to decline in agreement with ocean circulation model simulations. At the same time Fukushima ^{137}Cs concentrations began to increase in the Bering Sea indicating that a component of the Fukushima plume undergoing cyclonic transport in the subpolar gyre had entered the westward flowing Alaska Stream and passed through the Aleutian Islands on route to the Bering Strait and the Arctic Ocean. The current elevated Fukushima ^{137}Cs levels in seawater in the eastern North Pacific are equivalent to fallout background levels of ^{137}Cs that prevailed during the 1970s and do not represent a radiological threat to human health or the environment.