Fukushima Dai-ichi and the Ocean: 10 years of study and insight Abstract Submission Form : Entry # 31

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Session

Consequences for the ocean

Abstract Title (English, limited to 300 characters)

Following the Trail of Fukushima Tracers: Cross-basin Footprints Embedded in North Pacific Waters

Abstract (English)

In the Northwest Pacific, intense atmospheric cooling in late winter creates cold dense surface waters called mode-waters. Mode-waters sink, then spread and diffuse into the larger Pacific Ocean, carrying particular property characteristics (e.g., temperature, salinity) that slowly mix with surrounding waters. Their evolution, exact pathways and processes by which spreading and mixing into the greater North Pacific occur, is not entirely understood. The unintentional radioactive discharge in spring 2011, during mode-water formation, has provided the opportunity to uniquely trace these mode-waters. Observing radionuclides, we examined their pathways and timing as they follow the ocean circulation. We traced Fukushima-tagged waters in the eastward-flowing Kuroshio system away from Japan and in the Northeast Pacific four years later. Mode-waters stayed mainly to the north of the subtropics in the west and southward spreading occurred as the current strength decreased eastward. The bulk of eastward movement occurred subsurface and reached depths of 650m, but we also observed mode-waters where they rose toward the surface in the Northeast Pacific, near the US west coast, and in the Gulf of Alaska. We continue, seeking improved understanding of the spatial transformation and temporal evolution of mode-waters carrying these unique tracers on time scales of almost a decade.