

Fukushima Dai-ichi and the Ocean: 10 years of study and insight Abstract Submission Form : Entry # 33

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Session

Consequences for the ocean

Abstract Title (English, limited to 300 characters)

The concentration and migration of iodine-129 in the ocean released from the accident of the Fukushima Daiichi Nuclear Power Plant

Abstract (English)

The Fukushima Daiichi Nuclear Power Plant accident occurred in March 2011 and released significant amounts of radionuclides into the ocean. Since ^{129}I is one of the fission products, some studies were carried out to evaluate the level and migration of ^{129}I in the western North Pacific Ocean. To evaluate the accident-derived ^{129}I , it is important to investigate the concentration of ^{129}I before the accident because ^{129}I have already been also released into the environment from nuclear fuel reprocessing plants.

The pre-accident concentrations of ^{129}I were observed from 2008 to 2009. The concentration of ^{129}I in surface seawater between 32°N and 44°N before the accident ranged $(1.29 - 1.78) \times 10^{10}$ atoms/ m^3 . The distribution pattern of ^{129}I showed a latitudinal gradient that was expressed as a linear function of latitude.

The post-accident concentrations of ^{129}I in surface seawater after the accident were reported by some studies. The observed concentration of ^{129}I at many stations were higher than that of ^{129}I before the accident and the highest concentration was observed 89.8×10^{10} atoms/ m^3 . The highest concentration of ^{129}I was 73 times higher than that of ^{129}I before the accident. Therefore, it was concluded that the ^{129}I was released by the accident.

Vertical distributions of ^{129}I after the accident were investigated at the Oyashio current, Kuroshio current, and transition area. The accident-derived ^{129}I was observed at surface mixing layer in Oyashio current and transition areas. At the Kuroshio current area, the accident-derived ^{129}I was not observed in surface mixing layer but ^{129}I -rich layer was formed at depth of 370 -470 m. The seawater containing ^{129}I -rich layer would be transported from the seawater in the transition area which was

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contained the accident-derived 129I, moving southward by the meander of the Kuroshio Extension current.