

Fukushima Dai-ichi and the Ocean: 10 years of study and insight Abstract Submission Form : Entry # 44

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Session

Biological uptake of radionuclides

Abstract Title (English, limited to 300 characters)

Spatiotemporal changes in radiocesium concentrations in marine products off Fukushima after the accident

Abstract (English)

This study was conducted to present spatiotemporal changes in radiocesium (^{134}Cs and ^{137}Cs) concentrations in marine products off Fukushima after the Fukushima Dai-ichi Nuclear Power Plant (FDNPP) accident from 2011 to 2020. Marine species data monitored by Fukushima Prefecture during 2011–2020 ($n = 66,222$) and those presented by the Tokyo Electric Power Company during 2012–2020 ($n = 11,480$) were compiled to evaluate the decreasing trends of radiocesium concentrations in marine products. Also, demersal fish data published in Wada et al. (2019) were presented to show the actual contamination levels in marine fish in 2016. Monitoring results showed that higher concentrations (max. 14.4 kBq/kg-wet) were observed in shallower waters south of the FDNPP, and concentrations above the Japanese regulatory limit (>100 Bq/kg-wet) have been detected frequently during 2011–2013. Declining trend was much more gradual in demersal fish species compared with other groups (pelagic fish, invertebrates, seaweeds etc.). However, from 2011 to 2015, percentages of samples below the detection limit (mean 8.3 and 7.4 Bq/kg-wet for ^{134}Cs and ^{137}Cs , respectively) increased gradually from 14% to 89%, respectively, and that finally reached 99.9% in 2020. The drastic decrease in radioactivity was supported by the spatiotemporal distribution of radiocesium concentrations in demersal fish during 2011–2015, and by the precisely measured data in 2016 (0.234–3.41 Bq/kg-wet). Although radiocesium concentrations in marine species have exceptionally been higher in the FDNPP port, the maximum concentrations have significantly decreased from 740 kBq/kg-wet in 2012 to 159 Bq/kg-wet in 2020. These results show clearly that the radiocesium contamination level of marine products off Fukushima has decreased drastically during the 10 years after the FDNPP accident, although it has not still reached an equilibrium state (e.g., higher concentration ratio values).