

Dispersion of artificial caesium-134 and -137 in the western North Pacific one month after the Fukushima accident

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Abstract

In March 2011, an accident at the Fukushima Daiichi nuclear power plant (FNPP-AC) was caused by the Tohoku earthquake and tsunami. Here we show the distribution of artificial caesium-134 and -137 (^{134}Cs and ^{137}Cs) in the western North Pacific one month after the FNPP-AC. In surface seawater, ^{137}Cs concentrations were from several times to two orders of magnitude higher than before the FNPP-AC. ^{134}Cs was also detected, and in many seawater samples the $^{134}\text{Cs}/^{137}\text{Cs}$ ratio was about 1. These findings indicate that radionuclides from the FNPP dispersed quickly in the western North Pacific. ^{134}Cs and ^{137}Cs concentrations in suspended solids and zooplankton at stations K2 and S1 were also one to two orders higher than before the accident. Numerical simulation results show that the higher caesium observed in the western North Pacific one month after the FNPP-AC was transported not only by diffusion and advection of seawater but also via the atmosphere as an aerosol.