

Trace of the Fukushima-derived Cs in the North Pacific

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After the Fukushima accident in 2011, water samples at various locations have been collected by a number of different research groups to determine the breadth and timing of horizontal propagation and the depth of the vertical penetration of radionuclides into the North Pacific Ocean. Here, we introduce the water samples recently collected from 2015 P16N 152°W expedition along with samples collected last few years. Along 30°N, the ¹³⁴Cs radio- isotope, which carries a footprint unique to the Fukushima nuclear power plant accident, had reached a depth of 600 m west of dateline with distinct zonal extent. The easternmost edge of ¹³⁴Cs was observed to extend along the 30°N transect to 174.3°W in 2012 and farther east to 160.6°W in 2013, suggesting an eastward propagation speed of ~15° of longitude a year (~5 cm/s). In 2014, ¹³⁴Cs was observed along a transect between Dutch Harbor and Eureka crossing the Alaskan gyre. The appearance of Fukushima Cs at this location agrees well with numerical model and drifter-based predictions and is consistent with the results reported by other studies. Along 152°W, ¹³⁴Cs was observed to reach down to subsurface with vertically uniform structure in upper 300 m between 30°N and 50°N. The concentration was 3-6 Bq/m³, and the existence of ¹³⁴Cs at 30°N and northern extension toward the Gulf of Alaska indicates two years Cs progression by ocean current and mixing since it was not observed in 2013 30°N expedition.

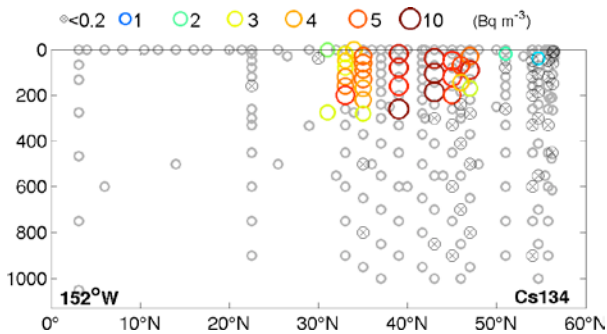


Figure 1: Colored circles represent 2015 152°W ¹³⁴Cs concentration in Bq/m³. Circles with crosses indicate the concentrations below the detection limit. Thick gray circles show sampling locations where samples are being processed.