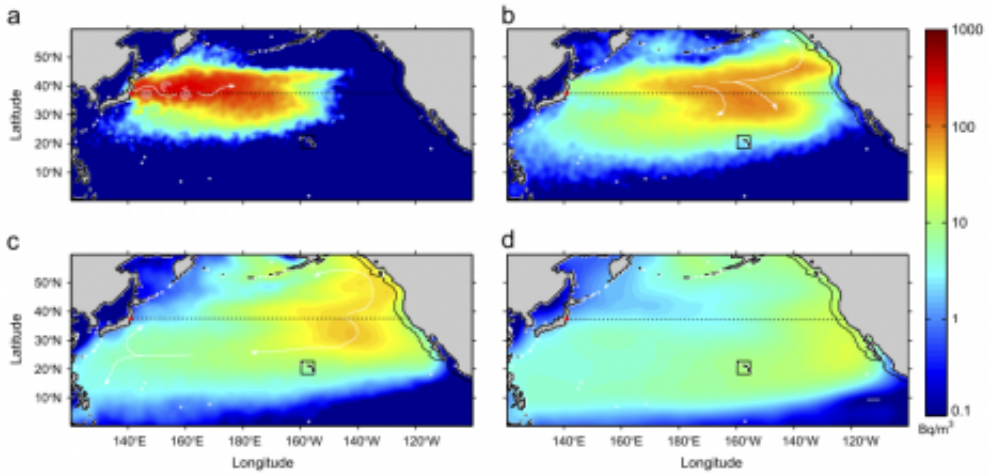
Fukushima radioactive plume to reach US in three years

August 28 2013



Surface (0–200m) of Cesium-137 concentrations (Bq/m3) by (a)April 2012, (b) April 2014 (c) April 2016 and (d) April 2021

The radioactive ocean plume from the 2011 Fukushima nuclear plant disaster will reach the shores of the US within three years from the date of the incident but is likely to be harmless according to new paper in the journal *Deep-Sea Research 1*.

While atmospheric radiation was detected on the US west coast within days of the incident, the radioactive particles in the ocean plume take considerably longer to travel the same distance.

In the paper, researchers from the Centre of Excellence for Climate

System Science and others used a range of ocean simulations to track the path of the radiation from the Fukushima incident.

The models identified where it would likely travel through the world's oceans for the next 10 years.

"Observers on the west coast of the United States will be able to see a measurable increase in radioactive material three years after the event," said one of the paper's authors, Dr Erik van Sebille.

"However, people on those coastlines should not be concerned as the concentration of radioactive material quickly drops below World Health Organisation safety levels as soon as it leaves Japanese waters."

Two energetic currents off the Japanese coast - the Kuroshio Current and the Kurushio Extension – are primarily responsible for accelerating the dilution of the radioactive material, taking it well below WHO safety levels within four months.

Eddies and giant whirlpools – some tens of kilometres wide – and other currents in the open ocean continue this dilution process and direct the radioactive particles to different areas along the US west coast.

"Although some uncertainties remain around the total amount released and the likely concentrations that would be observed, we have shown unambiguously that the contact with the north-west American coasts will not be identical everywhere," said Dr Vincent Rossi.

"Shelf waters north of 45°N will experience higher concentrations during a shorter period, when compared to the Californian coast. This late but prolonged exposure is due to the three-dimensional pathways of the plume. The plume will be forced down deeper into the ocean toward the subtropics before rising up again along the southern Californian

shelf."

Interestingly, the great majority of the radioactive material will stay in the North Pacific, with very little crossing south of the Equator in the first decade. Eventually over a number of decades, a measurable but otherwise harmless signature of the radiation will spread into other ocean basins, particularly the Indian and South Pacific oceans.

"Australia and other countries in the Southern Hemisphere will see little if any radioactive material in their coastal waters and certainly not at levels to cause concern," Dr van Sebille said.

"For those interested in tracking the path of the radiation, we have developed a website to help them.

"Using this website, members of the public can click on an area in the ocean and track the movement of the radiation or any other form of pollution on the ocean surface over the next 10 years."

More information: Multi-decadal projections of surface and interior pathways of the Fukushima Cesium-137 radioactive plume. DOI: 10.1016/j.dsr.2013.05.015

Provided by University of New South Wales

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