Impact of the Fukushima accident on marine life, five years later

October 18 2016

Five years ago, the largest single release of human-made radioactive discharge to the marine environment resulted from an accident at the Fukushima Daiichi Nuclear Power Plant in Japan. Approximately 80 percent of the fallout happened over the Pacific Ocean. Jordi Vives i Batlle of the Belgian Nuclear Research Centre explores the environmental consequences in the marine environment of the accident in an article published in the October issue of *Integrated Environmental Assessment and Management*.

He outlines the status of current research about the impact of the fallout on plant and animal life and what remains to be done as the radioactivity continues to spread. His article is part of a series of invited commentaries from international experts on "Lessons Learned and Consequences of the Fukushima Daiichi Nuclear Power Plant Accident, 5 Years Later."

Overall, the radioactivity levels in the marine biota near Fukushima were lower than predicted by some early studies immediately following the accident, and exposures were too low for acute effects at the population level to be observed in marine organisms ranging from microalgae to mollusks to fish. One study cited in the article concluded that the quick radioactive decay of the iodine-131 (one of the main isotopes, initially) and the confinement of the fallout to only some species and areas close to the power station were contributing factors to the low threshold exposure. However, more recent studies have shown variable levels in individual fish, though they too confirm that population-level effects

have not been observed.

The variability in fish has numerous confounding factors—the fishes' position in the food chain, where they live in the water column and their migratory patterns, to name a few. Additionally, there is a hypothesis that sediments have delayed the dispersal of the radioactive substances. Benthic fish, those at the bottom of the ocean, are more exposed to contaminated sediments and receive higher dose rates than pelagic fish living in the higher levels of the water column.

Vives i Batlle concludes that additional research is still required to fully understand the long-term effects that the fallout has had and that there is a need to continue studying the few "hotspots" very near the power station. The long-term fate of the contamination is still unknown, and information about how much radiation is stored in sediments and how much is still leaking from delayed sources, such as groundwater, has yet to be quantified. The research available so far on the risk to the marine environment is encouraging, but key research questions remain unanswered, signaling the direction for future investigations.

More information: Jordi Vives i Batlle, Impact of the Fukushima accident on marine biota, five years later, *Integrated Environmental Assessment and Management* (2016). DOI: 10.1002/ieam.1825

Provided by Society of Environmental Toxicology and Chemistry