# Fukushima Dai-ichi and the Ocean: 10 years of study and insight Abstract Submission Form : Entry # 29


**Name**

Jian Zheng

**Title**

Senior Principal Researcher

**Affiliation**

National Institutes for Quantum and Radiological Science and Technology

**Email**

zheng.jian@qst.go.jp

**Country**

Japan

**Additional Authors (names only)**

Tatsuo Aono, Keiko Tagami


**Session**

Consequences for the ocean

**Abstract Title (English, limited to 300 characters)**

Release of Pu isotopes from Fukushima accident to the marine environment was negligible

**Abstract (English)**


Pu isotopes attracted great public attention after the Fukushima Daiichi Nuclear Power Plant (FDNPP) accident because they present a high risk for internal radiation exposure via ingestion of contaminated agricultural crops and seafood. Tiny amount of Pu has been detected in soils and aerosols, indicating atmospheric deposition of Pu released from FDNPP accident in the terrestrial environment. In the marine environment, besides the possible atmospheric deposition, contaminated water was directly discharged into the offshore of the FDNPP site, which is another possible pathway of Pu to enter the marine environment after the accident.

To better understand the Pu contamination in the marine environment after the accident, starting from May 2011, we made a 4-years continuous investigation on the distribution of Pu isotopes in seawater and marine sediments. We determined Pu isotopes in seawater collected from the near coastal area to the open ocean 900 km away from the FDNPP site. The 239+240Pu activities were 4.16-5.52 mBq/m3 and the 240Pu/239Pu atom ratios varied from 0.216 to 0.308. These values were compared with the baseline data for Pu distribution in the western North Pacific and its marginal seas before the FDNPP accident. The results suggested that there is no significant Pu contamination in seawater from the accident. We also collected marine sediment core samples within the 30 km zone around the FDNPP site in the western North Pacific about two years after the accident. Pu isotopes (239Pu, 240Pu, and 241Pu) and radiocesium isotopes (134Cs and 137Cs) in the samples were determined. The high activities of radiocesium and the 134Cs/137Cs activity ratios with values around 1 (decay corrected to 15 March 2011) suggested that these samples were contaminated by the FDNPP accident-released radionuclides. However, the activities of 239+240Pu and 241Pu were comparable with the background level before the FDNPP accident. The Pu atom ratios (240Pu/239Pu and 241Pu/239Pu) suggested that global fallout and the Pacific Proving Ground (PPG) close-in fallout

were the main sources for Pu contamination in the marine sediments. As Pu isotopes are particle-reactive and they can be easily incorporated with the marine sediments, we concluded that the release of Pu isotopes from the FDNPP accident to the marine environment was negligible.