

ID: W2811415919

TITLE: Distribution and fate of <sup>129</sup>I in the seabed sediment off Fukushima

AUTHOR: ['Shigeyoshi Ootosaka', 'Yuhi Satoh', 'Takashi Suzuki', 'Jun Kuwabara', 'Takahiro Nakanishi']

ABSTRACT:

In this study, seabed sediment was collected from 26 stations located within 160 km from the Fukushima Dai-ichi Nuclear Power Plant (FDNPP) during the 2 years which followed the FDNPP accident of March 2011 and the concentrations of <sup>129</sup>I and <sup>137</sup>Cs were measured. By comparing the distribution of these two radionuclides with respect to their different geochemical behaviors in the environment, the transport of accident-derived radionuclides near the seafloor is discussed. The concentration of <sup>129</sup>I in seabed sediment recovered from offshore Fukushima in 2011 ranged between 0.02 and 0.45 mBq kg<sup>-1</sup>, with <sup>129</sup>I/<sup>137</sup>Cs activity ratios of  $(1.9 \pm 0.5) \times 10^{-6}$  Bq Bq<sup>-1</sup>. The initial deposition of <sup>129</sup>I to the seafloor in the study area was  $0.36 \pm 0.13$  GBq, and the general distribution of sedimentary <sup>129</sup>I was established within 6 months after the accident. Although iodine is a biophilic element, the accident-derived <sup>129</sup>I negligibly affects the benthic ecosystem. Until October 2013, a slight increase in activity of <sup>129</sup>I in the surface sediment along the shelf-edge region (bottom depth: 200-400 m) was observed, despite that such a trend was not observed for <sup>137</sup>Cs. The preferential increase of the <sup>129</sup>I concentrations in the shelf-edge sediments was presumed to be affected by the re-deposition in the shelf-edge sediments of <sup>129</sup>I desorbed from the contaminated coastal sediment. The results obtained from this study indicate that <sup>129</sup>I/<sup>137</sup>Cs in marine particles is a useful indicator for tracking the secondary transport of accident-derived materials, particularly biophilic radionuclides, from the coast to offshore areas.

SOURCE: Journal of environmental radioactivity

PDF URL: None

CITED BY COUNT: 17

PUBLICATION YEAR: 2018

TYPE: article

CONCEPTS: ['Sediment', 'Seafloor spreading', 'Radionuclide', 'Benthic zone', 'Seabed', 'Environmental science', 'Oceanography', 'Deposition (geology)', 'Fukushima Nuclear Accident', 'Sedimentary rock', 'Geology', 'Submarine pipeline', 'Geochemistry', 'Geomorphology', 'Nuclear power plant', 'Physics', 'Quantum mechanics', 'Nuclear physics']