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# Evaluation of Radioactive sediment transport in Tokyo Bay released from TMR

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Radioactive contaminants released from the TEPCO Fukushima nuclear power plant on 21-22 March 2011 into the Tokyo Metropolitan Region (TMR) are accumulated via hydrological cycle and released into the shallow estuary of Tokyo Bay.Major streams (such as the Edo, Ara, and Tama rivers) carry radionuclides via suspended material; some of them may stay in the riverbed and finally be transported into the river outlets. Using the Hydro3D model (a catchment-estuary integrated model), the study estimated the concentration of Cs-137, Cs-134 and I-131 (three major radionuclides) based on the initial radioactive distribution recomposed from aerial radioactive monitoring done by Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT).

The transport of radionuclides into the TMR were calculated using both the Euler Surface Dissolved/Non-Dissolved Transport and the Lagrangian Form Sediment-Marker Transport models. Effects of particle coagulation at the river outlets were calculated according to the salinity and diameter of suspended particulate material.According to the numerical simulation, the radioactive sediment concentration composed with Fission Products in Tokyo Bay may increase due to increase of hydrological transport within three years (mainly induced by the Cs-137/134) and then last more than 10 years (mainly by Cs-137). The average concentration at Edo and Ara river mouths estimated around 300 Bq/kg however occasionally higher concentration more than 4,000 Bq/kg has been estimated at those points. Bottom-sediment contamination near the Obitsu River outlet is predicted by the numerical simulation with around 150-300 Bq/kg, in addition to the above hotspots predicted at outlets of Edo and Ara rivers.

Keywords: Tokyo Bay, Radiocesium, Bottom sediment, contamination, River inflow