Fukushima Dai-ichi and the Ocean: 10 years of study and insight Abstract Submission Form : Entry # 60

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Session

Biological uptake of radionuclides

Abstract Title (English, limited to 300 characters)

The determining factors of radio-cesium levels in fish off Fukushima derived from dynamic biological transfer model simulation

Abstract (English)

Radio-cesium released from the Fukushima Dai-ichi Nuclear Power Plant (1FNPP) contaminated coastal fish after the accident in March 2011. After 2016, the radio-nuclides concentrations in coastal biota off Fukushima were almost below the regulatory levels for seafood safety, whereas the factors determining the radio-cesium depuration in fish off Fukushima were not well clarified. We studied the radio-cesium kinetics in commercially important species olive flounder by dynamic model simulation. We verified the simulated results by the measured 137Cs concentrations in seawater, food species, muscle and stomach contents of olive flounder. With respect to other demersal fish, rock fish fish was reported to be significantly high content of radio-cesium and were found as slow depuration even the seawater level was decreased. Since the radio-cesium metabolism in the rock fish was suggested to be slow because of its longer lifespan than other fish, we examined the relation of the fish age and the temporal radio-cesium concentrations in the rock fish collected from south of the 1FNPP. The greenling was also reported as specifically high radio-cesium content in the individual from the 1FNPP port. The dynamic model simulation was applied to understand why the radio-cesium in this species were comparatively higher than olive flounder from the port. In addition, the radio-cesium levels in some demersal fishes of active sediment feeder were examined by modelling approach, because that the radio-cesium in sediment was suggested to be a source for benthic biota and demersal fish. In the modelling study, the contribution of so called "bio-available" radio-cesium fraction in sediment was implemented and the simulated results were evaluated by the low back ground measurement. As results, overall determining factors of radio-cesium levels in coastal fish off Fukushima were organized as being by i) habitat sedentary, ii) food preference, iii) species specific metabolism, iv) age composition in population.