

13-2 Radiocesium in the Environment

— Radiation Situation in Tokai Two Years after the 1F Accident —

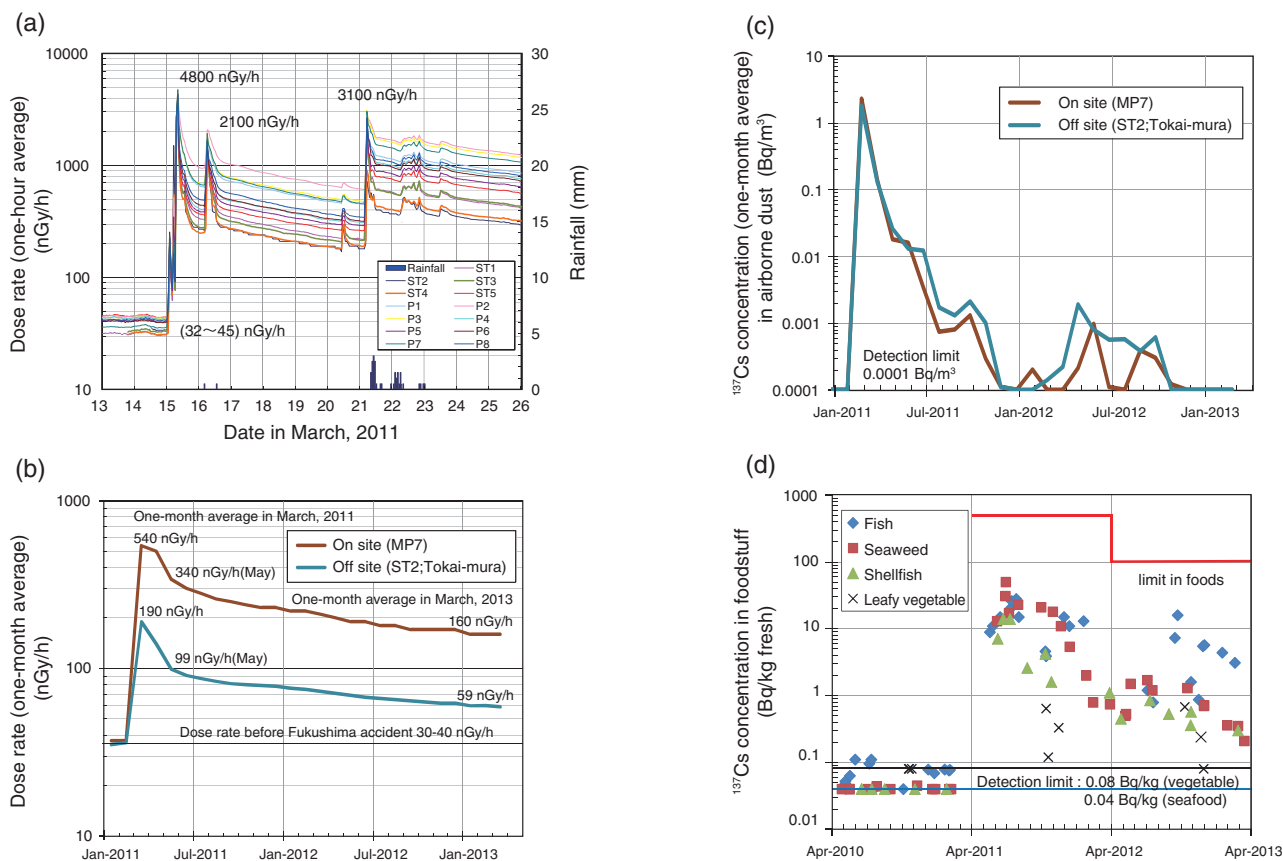


Fig.13-3 Chronological change in dose rate and ^{137}Cs concentration observed in Tokai for two years around 1F accident

Because of the release of radioactive materials during the accident at the TEPCO's Fukushima Daiichi NPS (1F), an increase in the dose rate and radiocesium concentration were observed in the Nuclear Fuel Cycle Engineering Laboratories (Tokai, Ibaraki Prefecture), which is located about 115 km from 1F, after March 15, 2011. This was reported by the Japan Atomic Energy Agency (JAEA-Review 2011-035). The dose rates (1-h averages) just after the 1F accident are presented in Fig.13-3(a). We report the chronological change in the radiation in Tokai for two years after the 1F accident.

The dose rates (one-month averages) are presented in Fig.13-3(b) for monitoring post-7 (MP7; on site) and monitoring station-2 (ST2; off site) as representative locations. Because of the differences in the environments (e.g., the presence or absence of trees), the observed dose rates varied by a factor of two or three. Because the half-lives of cesium-134 (^{134}Cs) and cesium-137 (^{137}Cs) are about 2 and 30 years, respectively, they contributed most of the dose rate. From May 2011, when the contribution from short-life nuclides almost disappeared, to March 2013, the dose rate decreased by around 60%. Thus, 25% of the ^{134}Cs and

^{137}Cs were transported elsewhere or shielded by immersion, in addition to the decrease by radiological decay (at a rate of 35% in 22 months).

The ^{137}Cs concentrations in airborne dust (one-month averages) also tended to decline (Fig.13-3(c)). The concentration off site is likely to be slightly higher than that on site. The origin of recent ^{137}Cs in airborne dust is believed to be not 1F itself but soil on which ^{137}Cs was deposited two years ago. Outside of the Laboratories, strong winds could resuspend and transport soil particles from cultivated fields.

The ^{137}Cs concentrations in foodstuffs are presented in Fig.13-3(d). Taking into account ^{134}Cs , the concentration of ^{134}Cs plus ^{137}Cs was less than half of the limit in foods (100 Bq/kg fresh for ^{134}Cs plus ^{137}Cs , 500 Bq/kg fresh before April 2012). The ^{137}Cs concentration generally decreased, but the concentration in demersal fish, which could be influenced by ^{137}Cs in seabed sediment, did not decrease as much. Because the transfer of Cs from the soil to vegetables is smaller than that from sea water to seafood, the ^{137}Cs concentration in vegetables was less than 1 Bq/kg fresh.

Reference

Fujita, H. et al., Special Environmental Monitoring around Tokai-Mura after the Accident of the Fukushima Dai-Ichi Nuclear Power Station, Proceedings of the 13th International Congress of the International Radiation Protection Association (IRPA-13), Glasgow, Scotland, U.K., 2012, P12.31, 7p.