



## **Impact of the atmospheric depositions estimated by the different models to the $^{137}\text{Cs}$ and $^{134}\text{Cs}$ activity in the North Pacific Ocean by eddy-resolving ROMS**

Takaki Tsubono (1), Kazuhiro Misumi (1), Daisuke Tsumune (1), and Michio Aoyama (2)

(1) Central Research Institute of Electric Power Industry, Abiko, Japan (tsubono@criepi.denken.or.jp), (2) Fukushima University

We conducted the two ensemble simulations of  $^{134}\text{Cs}$  and  $^{137}\text{Cs}$  activity in the North Pacific Ocean (NPO) water after the Fukushima Dai-ichi Nuclear Power Plant (1F NPP) using the two atmospheric deposition fluxes estimated by a global aerosol transport model (Aoyama et al, 2015), Model of Aerosol Species IN the Global Atmosphere (MASINGAR MK-II), and a regional scale offline coupled meteorology-aerosol chemical transport model (Kajino et al, 2012), Meteorological Research Institute. Passive-tracers Model for radionuclides (MRI-PM/r) in addition to the direct discharge (Tsumune et al., 2013) from the power plant. The difference between both model is the total deposition amount into the NPO water in March and April 2011; 6.4 PBq for MASINGAR, 5.0 PBq for MPI-PM/r. In addition, The MASINGAR estimated larger (smaller) total deposition in north (south) of Kuroshio Extension than MPI-PM/r. Since the Pre-calculations represented the  $^{134}\text{Cs}$  inputs of both models were not enough, we calculated the magnifications for the input by the regression analysis between the observed and calculated  $^{134}\text{Cs}$ . The magnifications provided the increased total amounts of  $^{134}\text{Cs}$  and  $^{137}\text{Cs}$  activity in NPO water after accident, which is  $16 \pm 1.5$  PBq for MASINGAR,  $21 \pm 2$  PBq for MPI-PM/r. We conducted simulations  $^{137}\text{Cs}$  activity in the NPO using the magnified deposition fluxes and compared the results with the observations. The comparison represented that the correlation coefficient and the root mean square error were 0.86 and  $5.7 \text{ Bq/ m}^{-3}$  for MASINGAR, 0.75 and  $7.3 \text{ Bq/ m}^{-3}$  for MPI-PM/r. The vertical distributions of  $^{134}\text{Cs}$  for the model with MPI-PM/r represented relatively larger activity in the Subtropical Mode Water in  $165^\circ\text{E}$  in 2012 than that for the model with MASINGAR. The model with MPI-PM/r represented that the  $^{134}\text{Cs}$  activity was detected west of Okinawa Islands by 2014, while MASINGAR by 2012. These difference were expected to be depended on the amount of input south of the Kuroshio Extension.