# Material transport and diffusion around Sagami Bay and Suruga Bay using a particle tracking model

*Takayoshi Inoue[1], Eiji Masunaga[1], Taichi Kosako[2], Yusuke Uchiyama[3]

1. Ibaraki University, 2. Port and Airport Research Institute, 3. Kobe University

In this study, material transport and diffusion processes in Sagami Bay and Suruga Bay were evaluated using the ROMS model with a 3-D Lagrangian particle tracking model. The model was run for the summer season performed with long term averaged climatological reanalyzed data. We also investigated effects of horizontal diffusion by a random walk model.

Particles that flowed out from Sagami Bay were mainly transported to the east (70%) caused by the Kuroshio Current. For Suruga Bay, particles were mainly outflowed on the west side of the bay mouth (75%). Most of the model cases showed that the particle outflow from the inner part of the bays was lower than the bay mouths. The Kuroshio current directly influences particle transport in Sagami Bay, which results in a small difference in the particle flow rate from the bay mouth and inner part of the bay. The semi-closed shape of Suruga Bay suppressed the particle outflow rate. Particle transport between the inner part of Suruga Bay and bay mouth requires more than six days. Particles in Suruga Bay mouth tended to move toward the inner part of the bay as the horizontal diffusion increased, and the particle outflow rate decreased. Except for Suruga Bay mouth case, the particle outflow rate from the bays to the open ocean increased with increasing in the horizontal diffusion. Particles that flowed out from Sagami Bay (Suruga Bay) increased by 12 % (15 %) caused by the random walk when the horizontal diffusion was set at $10^{-1}$ ~ $10^{1}$ $m^2$ /s.

Keywords: ROMS model, Particle tracking model, Sagami Bay, Suruga Bay, Diffusion, Random walk

 