

## Transport processes around the Izu-chain islands investigated with a Lagrangian particle tracking model

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This study investigated mass transport and dispersion around Izu-chain islands off the Japan mainland using with 3-D Lagrangian particle tracking simulations modeled in a high-resolution regional ocean modeling system (ROMS). The Kuroshio and eddies, tides largely influence physical processes in the study area. Details of transport processes involving the Kuroshio, eddies and tides have not been understood well. However, these processes are important for understanding oceanic environments and ecosystems in the North Pacific Ocean. Particles were released from three regions: around the Izu-chain islands (north of the Kuroshio), in the Kuroshio, south of the Kuroshio. Model results show that the particle trajectory is different depends on the initial location of particles. Approximately 60% particles released from the Izu-chain islands were transported outside the model domain in 30 days. On the other hands, more than 90% particles released from the Kuroshio and south of the Kuroshio flew out from the domain in 30 days. The vorticity is enhanced by the tidal forcing in the whole study area. The tidal forcing enhances the horizontal diffusion of particles within 2 days scale. By contrast, in the longer time scale longer than 5 days, the dispersion of particles is suppressed by the tidal forcing, because large scale motions are suppressed by tides. The frequency spectrum of the particle velocity shows semi-diurnal peaks and high frequency (low frequency) is enhanced (decreased) by the tidal forcing.

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