

Tracking the pumice rafts from the Fukutoku-Okanoba submarine volcano with Satellites and a Lagrangian Particles trajectory model

Young-Gyu Park

Korea Institute of Ocean Science and Technology, Busan, Republic of Korea

(e-mail: ypark@kiost.ac.kr)

On August 13th, 2021, the Fukutoku-Okanoba, a submarine volcano in the Northwest Pacific Ocean, erupted. Satellites detected various pumice rafts that had drifted westward to reach southern Japan over two months. To cope with the potential danger from pumice rafts, predicting their trajectories is crucial. Using a Lagrangian particle tracking model, the trajectories of the rafts were investigated. The model results showed strong sensitivity to the windage coefficient of pumice rafts, which is uncertain and could cause significant errors. An optimal windage coefficient was estimated by comparing the model results with satellite images using a skill score based on the distance between simulated particles and the nearest observed rafts divided by the travel distance of the particles. The optimal windage coefficients ranged between 2 and 3 % and produced pathways comparable to the observations from satellites. The simulation results showed that the pumice rafts moved from Fukutoku-Okanoba toward the Ryukyu Islands for approximately two months prior to being pushed by the north-easterly wind toward Taiwan against the Kuroshio. The methods presented here may become a valuable tool in managing coastal hazards due to diverse marine debris.