Study on Estimation of Original Location of Water Sampled through Inlet Set on Volunteer Observing Ship

Munehiko HINATSU* Yoshiaki TSUKADA* Hiroshi TOMITA*
Akira HARASHIMA**

Abstract

In this paper, we deal with the hydrodynamic properties of VOS (volunteer observing ship) to lend itself for direct monitoring of seawater. The original depth of seawater sampled at the stern at mid draft of the ship of opportunity for monitoring was estimated by model ship in an experimental basin. We inject dye from the upstream of the model ship and pick the water up from the inlet (sea chest), and then the density occupation rate of dye in the water taken from the fixed inlet is analyzed by use of a spectrophotometer. By iterating the same sort of measurements changing the location of the dye injection point, we obtained a contour map of the occupation rate of dye. Furthermore, CFD (computational fluid dynamics) was employed to confirm the model experiment. The experiment in regular waves was conducted to make above method extend to be applicable in real ocean condition. In addition, full size numerical computation was performed to validate the new method in its practical use. Results showed that the sampled water comes from near the water surface. In the scale of ferry being used for monitoring, it was predicted that water at -0.7m is drawn into the inlet at -4 to -5m in depth.