



## **Investigation on seasonal water residence time in the Madura Strait, Indonesia using Lagrangian particle tracer**

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A Lagrangian particle tracer method embedded within a 3-D finite difference hydrodynamic model is used to study the transport and exchange process in the unique semi enclosed water Madura Strait, East Java, Indonesia. The 3-D hydrodynamic model forcing functions consist of tidal elevation at north and east open boundary, river discharge of Brantas River estuaries, and monsoonal wind. The validated model successfully estimated the variability of residence time. The calculation results show that water resicence time in Madura Strait are mainly governed by the strength river discharges, whereas the direction of advection is influenced mainly by monsoon wind directions and less by the mean residual tidal current.