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Numerical simulation of dispersal and on-shore transport of larvae of the ghost shrimp *Nihonotrypaea harmandi* with special reference to its tidal-flat networks in the Ariake Sound estuarine system

Ariake Sound is located at the northwest part of Kyushu Island, Japan and surrounded by four prefectures. It is approximately 200km long from north to south and 120km from east to west and has an average depth of 40m. It has the narrow and deep strait, Hayasaki Strait, at its mouth. The population of *N. harmandi* occurs on small- to medium-sized intertidal sandflats scattered in the waters ranging from the outermost one-third of Ariake Sound, via Tachibana Bay, to the coastal waters of the East China Sea. Of all local populations surveyed, the size at Tomioka Bay, located on the southwestern corner of the estuarine system, is by far the largest, comprising 70% of the total number of ghost shrimps in the region.

After released from the Tomioka Bay sandflat, larvae of *N. harmandi* grow to the decapodid stage offshore. About 0.1% of the larvae are estimated to be recruited to the Tomioka Bay population. But it was not clear what processes made their recruitment possible. It was also supposed that larvae originated from Tomioka Bay were transported to other tidal flats. Such larval transport networks will not become clear only by the sampling of larvae and adults. In this study, first, using a numerical model, physical oceanographic processes such as tidal currents, tide-induced residual currents, and residual currents that could play an important role in the dispersal from and the recruitment to the Tomioka Bay population are clarified. Furthermore, using a tracer model, the rate of larval exchange between all pairs of the local populations is calculated to present a picture on their networks in the estuarine system.