

Coastal Environment Laboratory

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Theme 1 ► Monitoring coastal morphology for regional sediment management

A large number of technical hurdles remain before we can achieve a measurement method for understanding sediment transport in water areas such as rivers and coasts. In particular, long-term coastal management requires a monitoring method providing continuous and highly-frequent topographical information on shallow sea areas. This research theme concentrates on small vessels for whitebait fishing in which fishermen operate in shallow sea areas. By recording and analyzing position and water depth during the operation of these fishing vessels, we are undertaking research to develop a low-cost monitoring method that can provide highly-frequent and continuous region-wide bathymetry data. Moreover, we are also using this data to research into analytical methods to calculate bathymetric changes and volume of sediment transport, along with methods of data assimilation.



Small fishing vessels in the Enshu-Nada coast

Theme 2 ► Material transport and ecosystems in an estuarine tidal flat

Ecosystems and environment in coastal zones are heavily influenced by economic activities, such as deterioration of water quality and man-made changes to coasts. Fisheries are no exception. Because reducing the numbers of fish catches is a critical issue, water resource management and environmental conservation are thus vital in order to maintain sustainable fishing. This research theme targets abundance of juvenile littleneck clams in Rokujo tidal flat, a primarily setting site for juvenile of manila clam in Japan, seeking to make clear their generation mechanism by investigating relationship between mechanisms and material transport in the tidal flat. We are especially focused on the relationship between waves, currents and sediment transport and juvenile littleneck clams setting and movement. Unlocking the sediment transport mechanisms around estuaries and tidal flats will allow us to present the optimal sediment environment for the development of juvenile clams, intending to point the way to the recovery of clam resources.



Japanese littleneck clam juveniles on Rokujo tidal flat

Theme 3 ► Water quality variations in an estuary

Interest in water environment has increased significantly in recent years, and a variety of regulations intended to conserve water quality have served to improve water quality in rivers and estuaries. On the other hand, hypoxia has a large impact on aquatic ecosystems and water quality in estuaries, coastal waters and freshwater lakes, and its formation and movement is related to hydrology. In order to protect waters from the hypoxia and to improve methods of water quality management, therefore, there is a requirement to understand the movement of these water masses based in the hydraulic characteristics. This research theme is focused on an estuary lagoon, Hamana Lake, intending to make clear the mechanism by which the hypoxia is formed and moves, upwells, and influences the water quality of shallow water areas in the lake. In order to make clear the mechanism, we are also taking into account a variety of other elements, including weather, tides and currents.



Field measurements in Hamana Lake