



## **Water exchange between partly enclosed coastal bay (Pakri Bay) and open sea (the Gulf of Finland).**

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Significant part of suspended particulate matter and nutrients in the Gulf of Finland are of coastal origin. The Gulf of Finland has rather complicated coastline and bottom topography. The bending coastline with many small islands divides the coastal area into a number of small, partly enclosed bays. Therefore the discharge of the nutrients and suspended particulate matter occurs to the semi-enclosed bays, to the bays with relatively opened throughflow and to the open coastal sea. Physical processes that contribute to the coastal and open sea exchange differ from one coastal area to another. This case study aims on identification of physical processes at the transition zone of partly enclosed Pakri Bay and the Gulf of Finland. Pakri Bay is a small coastal bay (surface area about 50 km<sup>2</sup>) in the southern Gulf of Finland. It has relatively wide (3 km) and deep (30 m) connection to the gulf in the north. In the west, the connection is also wide (3 km) but shallow (sill depth is 1 m). Northern and western connections are separated by islands.

Repeated hydrographic surveys that extended from inner bay to the open gulf in the north were performed during one and half month period in summer 1995 and 1996. The hydrographic measurements were accompanied with current meter measurements at the northern entrance to the bay. The analyses show that the outflow of inner bay water is the most intensive during strong inflow of the open gulf deep water. Landward penetration of deep water at some distance from the coast and surfacing of the pycnocline is restricted by inflow to the bay through the shallow strait in the west. The pycnocline is brought close to the surface and the stratification nearly doubles during intensive two layer flow. Following retreat of deep water from the bay excites anticyclonic eddy at the open gulf side of the entrance.