New marine research station for the island of Uto

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The new marine researche station is situated on a convenient location on the outer edges of the archipelago. Credit: Lauri Laakso.

The new marine research station is situated on a convenient location on the outer edges of the archipelago. Photo: Lauri Laakso. The Finnish Meteorological Institute and the Finnish Environment Institute (SYKE) press release

A unique marine research station is near completion on the island of Utö. IT will produce real time research information from under the sea, its surface, and the air year-round and around the clock. The station is

being set up as a joint project of the Meteorological Institute and the Environment Institute.

The station will have a comprehensive array of equipment, some of which will be completely new types of devices, and many of them will be permanently installed in the sea in Finland for the first time. The basic idea for Utö is for a comprehethe lower atmosphere.

"The Baltic Sea is a small and shallow peripheral sea which functions differently from the oceans. There is seasonal and regional variation in the carbon dioxide content of the Baltic. Depending on thensive approach, which gives an overall picture of the state of the sea and time and place, it can be either a sink, or source of carbon dioxide. Factors affecting the carbon balance of the Baltic Sea include the sea's biological processes, temperature, nutrients, and the ice cover. Understanding the whole requires a wide array of measurements", says Head of Group Lauri Laakso, at the Finnish Meteorological Institute.

The station will provide a very varied picture from below and above the surface, and on the interaction of the sea and the atmosphere.

"In addition to the height and direction of the waves, the surface current and the carbon dioxide content of the sea water and the gas exchange between the sea and the atmosphere, we also get information about the oxygen content, nutrients, and the layering of the sea water. The measurements come in real time all year-round", Lauri Laakso explains.

"The Utö station is a multidisciplinary flagship of Finnish marine research, which brings top-level knowledge of the key research institutes and universities to the same measuring platform", says Timo Tamminen, research professor at the Finnish Meteorological Institute, who leads the new Finnish marine research consortium FINMARI.

Half of carbon binding takes place at sea

"Detailed research on the interactions between the sea and atmosphere is necessary for the production of more precise climate change forecasts, because half of the binding of carbon takes place in the marine ecosystem", Timo Tamminen says.

Measurements are already being made at Utö of atmospheric particulates, greenhouse gas content, currents in the lower atmosphere, as well as maritime weather characteristics such as wind, temperature, and visibility, which are familiar from the radio.

"With the Utö station, the Finnish research stations of the European Integrated Carbon Observation System (ICOS) measurement network will cover the surface layer of the sea, in addition to the land and lake ecosystems. The importance of the Utö station for the study of the Baltic Sea is similar to that of the Pallas-Sodankylä GAW station of the Finnish Meteorological Institute is for Finnish Arctic research", Lauri Laakso observes.

Precise image of factors affecting blooms of algae

The SYKE Marine Research Centre has long conducted real-time measurements with Algaline equipment installed on commercial vessels in the Baltic Sea.

"Commercial vessels give us a good picture of the algae bloom situation in the large areas of the Baltic Sea, but the schedules of the shipping routes naturally limit the frequency of measurement", says Jukka Seppälä the head of the marine biology laboratory of the Finnish Environment Institute.

"Measuring devices to be set up at the Utö station and nearby areas will, for the first time, give us a precise reading of factors regulating the formation of algae blooms, because uninterrupted measurements in the same place will now be possible. In addition, we now have available completely new equipment that measures the activity of phytoplankton, with whose help the impact of the basic production of the sea on the carbon balance can be evaluated better than ever before", Jukka Seppälä says.

In addition to greenhouse gases, scientists at Utö also research wind power at sea, maritime technology, and emissions from shipping.

Exceptionally convenient location on the outer edges of the archipelago

The research station on the lighthouse island of Utö far from the mainland, is unique even on a world scale owing to its versatility, and its approach, which brings together different fields of science. It also differs from other stations at sea because of its occasional ice cover.

On the other hand, its location on an inhabited island is effortless from the point of view of transport connections. Over a longer period of time - decades - good connections and reasonable costs are of primary importance. Also of significance from the operations at Utö is the input of the permanent residents on the island in the maintenance and service of the measurement activities.

Provided by Finnish Environment Institute