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Measuring a major salt water inflow in realtime

For the second time this year, the deep water of the Baltic Sea is ventilated by North Sea water rich in oxygen. According to the Warnemünde oceanographers, the on-site findings let hope for record breaking dimensions.

Major saltwater inflows are very rare phenomena in the course of which huge amounts of oxygen-rich saltwater from the North Sea are flowing into the Baltic Sea. To supply the deep water of the central Baltic´s basin with oxygen these inflows are indispensable. Together with an excess nutrient input to the Baltic Sea, their absence causes the development of so called “dead zones” in the deep water.

Since December 15, 2014, the research vessel ELISABETH MANN BORGESE was on its way through the Western Baltic Sea and the Arkona Sea off the Island of Rugen carrying out oceanographic measurements. Prewarned by a low sea level – which is one of the prerequisites for major inflows – the scientific crew was well-prepared for a potential saltwater inflow. But the observations from December 15 to 18, excited the scientists: “On December 17, we observed dense, heavy saltwater flowing along the seafloor into the Arkona Basin. To see the water masses which passed the Darss Sill being layered on top of those which took the way through the Øresund was fascinating.” Dr. Michael Naumann and his colleagues were pursuing the event by day and night. “The passage through the Øresund is much shorter than that over the Darss Sill. Therefore, less of the Baltic Sea´s brackish water can get mixed in. Thus, the Øresund water is saltier and heavier than that coming through the Great Belt.” Beside the huge amount of saltwater coming in, their oxygen content is of high importance: On December 18, the whole water body in the Arkona Basin was well supplied with oxygen. And the inflow is still going on.
“We are talking about a major saltwater inflow, if at the Darss Sill a salt content of 17 g/kg can be measured for more than five days. Today is already the seventh day of such a high salinity. According to first estimates, we presume that up to now 150 km³ of saltwater have entered the Baltic Sea. And the weather forecasts promise even more favourable wind conditions for the next days.”

The Warnemünde oceanographers expect that the current salt water inflow will proceed into the Gotland Basin where it might improve the living conditions of the bottom life.

In order to pursue the development in an appropriate way and to check the changes in shorter intervals, the IOW adjusted the schedule of r/v ELISABETH MANN BORGESE.

During the 1960ies to 1980ies, salt water inflows occurred on a regular basis every 1 to 2 years and ventilated the deep water of the Baltic Proper. From 1984 on these events suddenly became very, very rare. Single inflows in 1993 and 2003 could enhance the environmental conditions at the bottom of the basins only for short-term. The resulting oxygen depletion which is always followed by the formation of toxic hydrogen sulfide, is one of the biggest environmental problems of the Baltic Sea.

The IOW is running a regular oceanographic observation programme within the German waters of the Baltic Sea on behalf of the Federal Maritime and Hydrographic Agency (BSH).

Contact:
Dr. Michael Naumann, Department Physical Oceanography, Leibniz Institute for Baltic Sea Research Warnemünde, phone: +49 381 5197 267
Dr. Günther Nausch, Department Marine Chemistry, Leibniz Institute for Baltic Sea Research Warnemünde, phone: +49 381 5197 332
Dr. Barbara Hentzsch, Public Relation Unit, Leibniz Institute for Baltic Sea Research Warnemünde, phone: +49 381 5197 102

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