Ocean Sci. Discuss., 6, C687–C688, 2009
www.ocean-sci-discuss.net/6/C687/2009/

Ocean Science Discussions

Interactive comment on "The relative importance of selected factors controlling the oxygen dynamics in the water column of the Baltic Sea" *by* S. Miladinova and A. Stips

Anonymous Referee #1

Received and published: 23 October 2009

In the comment that I posted yesterday, I suggested that the observed seasonal variations in the oxygen concentration at the bottom of the Baltic Sea (in particular the stations BY0 and BY1 that are closest to the North Sea) may be caused by seasonal pulses of oxygenated water from the North Sea. If this is the case, then one would expect the bottom temperature and salinity to vary more or less in phase with the oxygen concentration: when oxygen is high, temperature must be low and salinity must be high. Now, an alternative explanation just came to my mind: maybe, there is a constant transport of oxygen into the deep Baltic, maybe vertical from the sea surface, or more likely, lateral from the North Sea, but there are pulses of biological oxygen consumption during which there is a net decrease of oxygen. During other periods, the

transport 'wins' and there is a net increase of oxygen. This explanation is consistent with the timing of the seasonal decreases in oxygen: they roughly occur from February until September which is during and right after the spring bloom when a lot of organic material rains to the bottom which will inevitably lead to higher biological oxygen consumption. If this is what is going on, then one expects temperature and salinity to stay rather constant throughout the year. Yet another hypothesis is that there is a seasonal deepening of the mixed layer all the way down to the sea floor during autumn and winter at Stations BY0 and BY1 which leads to oxygenation of the bottom water. If this is the case, then one expects a seasonal salinity variation, but one that is different from the one expected from the 'North-Sea-pulse'-hypothesis: in winter, when bottom oxygen is high, bottom salinity should be low. Hence, in any case, plots of observations of the temperature and salinity as a function of time at the bottom of Stations BY0 and BY1 would be extremely helpful!

Interactive comment on Ocean Sci. Discuss., 6, 2115, 2009.