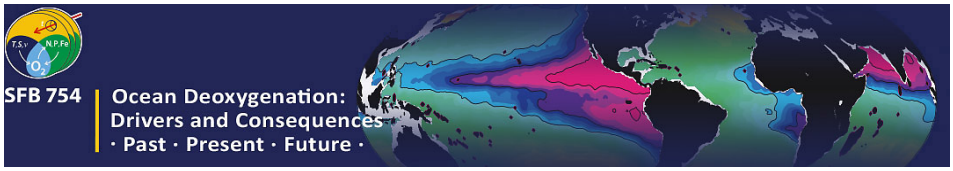

Contribution ID : **97** Type : **Oral**

Benthic foraminiferal Mn/Ca evidence for bottom water deoxygenation in the Baltic Sea over the past 7,500 years

Thursday, 6 September 2018 16:00 (15)

Deoxygenation is recognized with growing concern in the modern Baltic Sea and results in increasing areas of hypoxia ([O2]<1.4 ml/l). The Baltic Sea has been highly prone to deoxygenation during the Holocene. Our goal is to study how the extent and severity of hypoxia in the region have varied over the Holocene from 7.5 ka BP to present: to achieve this, we use high accumulation rate sediment cores retrieved during IODP Exp. 347 (Baltic Sea Paleoenvironment) spanning the past 8 ka BP. We apply benthic foraminiferal geochemistry and faunal assemblage data to reconstruct past marine conditions (e.g. oxygenation, temperature, salinity). We analyse the trace elemental composition (Mg/Ca, Mn/Ca Ba/Ca, Sr/Ca, U/Ca) and stable carbon and oxygen isotopes of the low-oxygen tolerant foraminifera species *Elphidium selseyense* and *Elphidium clavatum* from two Baltic Sea sites: the Little Belt, Danish Straits (Site M0059) and the Landsort Deep, the deepest basin of the Baltic Sea (Site M0063). For trace element analysis, we use laser ablation (LA-)ICP-MS to avoid the influence of surface diagenetic coatings on these foraminifera. In particular, Mn is a redox-sensitive element, and it has an increased concentration in bottom waters and sedimentary pore waters under hypoxic conditions which may result in increasing Mn incorporation into foraminiferal carbonate. Site M0059 Mg/Ca and Mn/Ca results show a general decrease from 7.5 ka to present. These proxies may suggest high temperature and low bottom oxygen conditions at Site M0059 ~7 ka BP and between 4.5 and 3.5 ka BP. Ba/Ca and oxygen stable isotopes have potential to be used as a multiproxy approach for salinity reconstruction, potentially indicating increasing bottom water salinity from 7.5 to 3 ka BP in the Little Belt. Initial trace element results from the Landsort Deep show that some samples have much higher Mn/Ca ratios compared to those in Site M0059, potentially indicating low oxygen conditions in this area. By combining geochemical results with foraminiferal assemblage data, we quantify and discuss the hypoxia and ecosystem changes at these two sites in the Baltic Sea over the past ~7.5 ka BP.

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Session Classification : 09 Ocean Deoxygenation - how the Past can Inform the Future

Track Classification : 09 Ocean Deoxygenation - How the Past can Inform the Future