



## **Application of TEX<sub>86</sub>-paleothermometry in the Baltic Sea: Temperature reconstruction of the past 1000 years**

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The Baltic Sea is a brackish, marginal sea which is located in the center of northern Europe. The densely populated catchment area causes strong anthropogenic impacts on the Baltic Sea ecosystem. However, the health of the Baltic Sea is in reverse crucial for the human welfare of the region. Today eutrophication, cyanobacterial blooms and anoxic bottom water masses are major problems of the Baltic Sea. To answer the question to which degree these are caused by human activities sound data about the functioning of the Baltic system and its natural elasticity is needed. The BONUS project INFLOW aims to provide such data for the past 6000 years using multi proxy analysis on sediment cores and a modeling approach to evaluate the obtained results. In this context the reconstruction of surface water temperature, as a driving factor for primary production, is of major importance.

Due to the fact that the Baltic is a brackish sea the biodiversity is reduced and usual methods for temperature reconstruction like  $\delta^{18}\text{O}$  and  $\text{U}_{37}^k$  do not work caused by a lack of specific organisms. Therefore we use the molecular temperature proxy TEX<sub>86</sub>. This temperature proxy is based on temperature-induced changes in the distribution of membrane lipids of crenarchaeota which are found in high abundances in the Baltic Sea. To provide a local calibration for the Baltic Sea a set of 25 sediment core-tops as well as sediment trap samples covering one seasonal cycle of the years 2007/08 were analyzed and compared with instrumental data. The local calibration was subsequently applied on short cores covering the past 1000 years. Our reconstructions indicate that for the Medieval Warm Period temperatures were similar to recent conditions, whereas a cooling of 3- 4°C can be observed during the Little Ice Age.