

MICROSTRATIGRAPHY AND IRON AND MANGANESE AUTHIGENESIS IN THE LANDSORT DEEP, BALTIC SEA

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The abundance of authigenic Fe and Mn sulfides and carbonates in the Landsort Deep is unique for a sedimentary setting, and as such it provides an endmember reference for geochemical models proposed for basins with less extreme conditions. To consider the supply and depletion of reactants, we have tried to characterize this geochemical archive with sub-mm detail. Using thin sections of impregnated sapropels from the deepest portion of the Landsort Deep, we have defined microfacies based upon the mineralogy and textural features of these finely laminated sapropels. The sequential associations between facies are statistically evaluated using Markov chain analysis. Both seasonal and non-seasonal influences are interpreted to have changed the supply of clastic sediments, organic matter, and the basin circulation. Additional geochemical data can be further interpreted within the framework of the lamina models. On a longer time scale, the stratigraphy reflects variation in the extent of anoxia in the basins of the Baltic Sea. Sapropel formation apparently corresponds to periods of low sediment accumulation rates, largely controlled by the supply of terrigenous material. The high pH and low Eh conditions necessary within the anoxic basin are believed to be dependent also upon organic degradation and sulfate reduction processes enhanced by the concentration of organic matter during these lulls in clastic sedimentation.