

PARALLEL SESSION C: IMPACTS AND APPLICATIONS
C2: REGIONAL ATMOSPHERIC AND OCEAN CIRCULATION SYSTEMS

**Estimating uncertainties in projections for the Baltic Sea region based upon
an ensemble of regional climate system models**

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Multi-model ensemble simulations for the Baltic Sea region are presented for the period 1850–2098. For the past period 1850–2006, atmospheric, hydrological and nutrient forcings were reconstructed, based on historical measurements. For the future period 1961–2098, scenario simulations were driven by regionalized global general circulation model (GCM) data using several regional climate system models (RCSMs) and forced by various future greenhouse gas emission and air- and riverborne nutrient load scenarios (ranging from a pessimistic ‘business-as-usual’ to the most optimistic case). To estimate uncertainties caused by biases of RCSMs and GCMs, natural variability and unknown forcing scenarios, different models for the various parts of the Earth System, different initial conditions and different scenarios were applied. These simulations constitute the largest ever analyzed multi-model ensemble for the Baltic Sea allowing, inter alia, the statistical analysis of the ensemble spread. Assuming the IPCC greenhouse gas emission scenarios A1B or A2, we found that water temperatures at the end of this century may be higher and salinities and oxygen concentrations may be lower than ever measured since 1850. There is also a tendency of increased hypoxia and eutrophication in the future, depending on the nutrient load scenario. Despite considerable shortcomings of state-of-the-art models, this study suggests that the future Baltic Sea ecosystem may unprecedentedly change compared to the past 150 yr. As stakeholders today pay only little attention to adaptation and mitigation strategies, more information is needed to raise public awareness of the possible impacts of climate change on marine ecosystems.

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