A weakening of the thermohaline circulation: what impacts are to be expected?

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This talks focuses on the effects of a weakened thermohaline circulation (THC) on various ecosystems in and around the North Atlantic as well as on economy and society. Seen in conjunction with global warming, the THC in most coupled climate models weakens in the 21st century. There is however no consensus among the models whether this leads to regional cooling. If this occurs, then the Nordic Seas region might experience a cooling of up to 6 K. The sea level at the North Atlantic shores could rise by 50 cm and more, on top of the thermal effect. This is potentially the heaviest impact of THC changes, requiring costly coastal protection measures. Our results further suggest a strong impact on the whole marine food web in the Northern North Atlantic, from algae to plankton, shrimp, and fish. Norwegian fishery would suffer strongest. While regional socio-economic impacts might be large, damages will be probably small in relation to the respective gross domestic product. On the global scale, a slow-down of the thermohaline circulation has the potential to trigger far-reaching effects in the tropics - causing a shift in rainfall belts associated with the intertropical convergence zone - and in the Southern Hemisphere - warming -, with adverse effects e.g. in India and northeastern Brazil. The uncertainty about THC risks is still high - this is seen in model analyses as well as in the experts' views that we elicited. A growing awareness among stakeholders and experts indicates that the THC risks may well be perceived as "dangerous" (Art. 2 UNFCCC), thus calling for action to avoid them in spite of the uncertainties. The overview of results presented here is the outcome of the Integrated Assessment project INTEGRATION.