Current climate models needs improvement for near-term prediction to reliably predict temperature in offshore waters of Western Norway

The variable heat of the Gulf Stream's extension toward the Arctic influences European climate, Arctic sea ice conditions, and northern fisheries. It would accordingly be most beneficial if one could predict the state of the ocean skillfully from months to years into the future. Current climate models are accordingly now being developed for this purpose, i.e., climate prediction. Models are then being synchronized with the observed state of the ocean (specifically sea surface temperature, that is well-known from remote sensing), to forecast future ocean circulation and climate starting from a realistic initial state. This means, for instance, that an unusual warm ocean surface in the subtropics is represented at the correct time, and could then circulate polewards with the model ocean and lead to a warmer ocean offshore, e.g., Western Norway some years later.

We assessed three different climate models. Only one is able, at present, to predict the ocean surface temperatures all the way from the Northeastern Atlantic and northwards to the waters west off Svalbard at the gateway to the Arctic. These temperature changes are predicted 6-8 years beforehand, and already 4-6 years beforehand in the Northeastern Atlantic. We find that this time difference is reflecting what observations tell us: unusual warm or cold surface water travel northwards within 1-3 years from the Northeastern Atlantic to Svalbard along the extension of the North Atlantic Current. The two other climate models assessed were found to be less skillful; one is generally showing less ability of predicting temperature changes in the northern seas, whereas the other model appears less able to represent the surface waters of the Northeastern Atlantic.

Langehaug HR, Matei D, Eldevik T, Lohmann K, Gao Y, 2017. On model differences and skill in predicting sea surface temperature in the Nordic and Barents Seas. Climate Dynamics, 48: 913, doi:10.1007/s00382-016-3118-3