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Influence of an increased sea surface temperature on North Atlantic Cyclones

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In this study the influence of an increased sea surface temperature (SST) on the frequency and intensity of cyclones is investigated using two 16 year simulations with the Rossby Centre regional climate model RCA2 on a model domain including Ireland, the United Kingdom and large parts of the North Atlantic. The RCA2 model is driven by reanalysis data from the European Centre for Medium-Range Weather Forecasts (ECMWF) at the lateral and lower boundaries once using the original SST (standard experiment) and once using an SST increased by 1 K (sensitivity experiment), which is a typical increase as predicted from global climate simulations over the next 100 years for the North Atlantic region according to the SRES-B2 emission scenario. Using this kind of sensitivity study rather than driving RCA2 by the output of a global climate model for present day and for future climate ensures that we can separate the influence of the SST on the development of cyclones from other influences. Even if the total number of lows is quite similar in both simulations, there is a strong increase in the intensity of cyclones. In the 16 year period three hurricanes with pressure gradients of up to 50 hPa per 100 km, wind speeds of up to 150 km/h and massive amounts of rain of up to 50 mm/h appear in northern latitudes of 30 to 35 degrees in the sensitivity experiment, which do not appear at all in the standard experiment.