Future evolution of an eddy rich ocean leads to enhanced east Atlantic storminess in a coupled model projection

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Improved representation of air-sea fluxes afforded by eddy-rich oceans in high-resolution coupled ocean-atmosphere models may modify the tracks and intensity of storms as well as their response to climate change. Here we examine changes in winter surface ocean conditions and storminess associated with moving from an eddy-permitting (1/4º) to an eddy-rich (1/12º) ocean in control and climate change (SSP585) simulations of the HadGEM3-GC3.1 model in which the atmosphere resolution is kept constant at 25km. Differences in North Atlantic climate in the control runs stem from a revised location of the Gulf Stream in the eddy-rich model. The high ocean resolution future projection reveals a pronounced increase in storminess near the eastern edge of the Atlantic with changes six times greater than in the eddy-permitting model. This increase is associated with the distinctive long-term evolution of the North Atlantic warming hole and the Gulf Stream separation in the eddy-resolving model.