



## **The impact of the Gulf Stream on the North Atlantic storm track: deterministic or stochastic?**

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Recent numerical experiments with high horizontal resolution (grid spacing of 25km or less) have suggested that the impact of the Gulf Stream on the “storm track” is mediated by the frontal circulation embedded in extra-tropical cyclones. In a series of controlled experiments with the UK Met Office Model, we were able to show that the frontal circulation can be destabilized by the Gulf Stream, with associated injection of low potential vorticity air at upper levels and a potential impact on blocking events further downstream, but we could not assess whether this effect was systematic (Sheldon et al., 2017). In this work, we address this issue by analysing an 11-member ensemble hindcast from ECMWF over the period 2007-2017 at a horizontal resolution of 16km. A large spread is found amongst ensemble members suggesting that, rather than systematically affecting the frontal circulation of cyclones, the effect of the Gulf Stream on them has to be understood within a statistical framework. The impact of the Gulf Stream on low frequency atmospheric variability further downstream is discussed within this framework.