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Remote impact of North Atlantic sea surface temperature errors in sub-seasonal forecasts

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The ECMWF sub-seasonal forecast model includes dynamic representations of the atmosphere, ocean, sea-ice, and ocean-waves. Coupling to a dynamic ocean model allows more a realistic representation of air-sea interaction, but also introduces the potential for systematic errors in sea surface temperatures (SST). Here, we show that North Atlantic SST biases associated with errors in the position of the Gulf Stream have a significant impact on initialized forecasts at the sub-seasonal time range. Correcting these errors with an online SST bias-correction scheme improves the mean state of the North Atlantic region and has a significant positive impact on forecasts of atmospheric circulation anomalies. Improvements to forecast skill extend beyond the North Atlantic into Europe and along the northern hemisphere subtropical waveguide. These impacts provide important evidence for the potential benefits to initialized coupled forecast systems of higher-resolution ocean models that can better resolve the position of the Gulf Stream.

Reference: Roberts, C. D., Vitart, F., & Balmaseda, M. A. Hemispheric impact of North Atlantic SSTs in sub-seasonal forecasts. *Geophysical Research Letters*, e2020GL091446.