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"The representation of the North Atlantic eddy-driven jet variability and its sensitivity to model resolution."

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ABSTRACT

The North Atlantic eddy-driven jet stream is directly associated to the dynamics of mid-latitude blocking and storm track variability as well as to extratropical teleconnections, such as the North Atlantic Oscillation and the Eastern Atlantic Pattern. Moreover, its climatological position and its variability are strongly linked to the air-sea interaction in the respective basin. Therefore, its realistic representation is of fundamental importance for climate models. Yet, various dynamical processes related to the eddy-driven jet (such as air-sea fluxes and baroclinic eddy fluxes) are expected to be sensitive to the model resolution, and thus so does the eddy-driven jet itself.

This study aims to diagnose differences in the representation of the North Atlantic eddy-driven jet that can be attributed, directly or indirectly, to changes in the model resolution. To isolate the role of coupled processes, both coupled and atmosphere-only models are analyzed. For comparison against observations, only historical simulations are used focusing on the period 1980–2010. The diagnostics include the latitudinal position of the low-level zonal wind (jet latitude distribution) together with the associated variance and teleconnectivity fields. Furthermore, the relation between the modeled air-sea fluxes (sensible and latent heat) and baroclinic eddy fluxes (E-vector components) to the representation of the jet is examined.

This work, currently in progress, uses existing model simulations but will be expanded assessing also state-of-the-art, multi-model ensemble simulations conducted in the framework of the EU Horizon 2020 PRIMAVERA project.