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Investigation into the Underlying Mechanisms behind the Latitudinal Shifts in the Low-Level North Atlantic Jet Stream

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The low-level North Atlantic jet stream is an important component of the European climate and weather, and understanding the variability of its magnitude and extent is crucial for accurate weather forecasting. The jet is driven by baroclinic eddies that mainly originate in the region of high baroclinicity over the Gulf Stream, though a positive feedback effect of the low-level jet on this region (and thus on the eddies) has also been observed. Recent research has shown that the low-level jet has three preferred latitudinal regimes, though the reason for such variability is currently poorly understood. This investigation examines how these regimes are linked to the properties of eddy activity, in order to gain a deeper insight into the dynamics and energetics that cause them. This study has identified significant changes in the strength of heat fluxes upstream of the storm track during these three regimes, and linked these changes to the variability of the static stability parameter and the maximum Eady growth rate.