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The Atmospheric Response to Gulf Stream Variability

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The Western boundary current regions stand out due to strong meridional SST gradients. The mean atmospheric patterns in the region of the front show conspicuousfeatures, like a concentrated band of strong precipitation, lowlevel convergence and related upward winds that extends into the deep troposphere. Thus, it is conceivable that these regions drive large-scale teleconnections via planetary Rossby waves. However, it is still unclear how temporal variability of the ocean currents is connected to the atmosphere. At inter-annual to decadal time scales, the ocean may force the atmosphere. Due to the potential predictability of the ocean, a better understanding of these interactions might lead to significant progress in mid-term climate prediction.

Here, ocean-atmosphere interaction over the Gulf Stream is investigated in NCEP reanalysis data and ECHAM5 AGCM experiments. The model can reproduce important features of the atmospheric patterns quite well. An Analysis of Variance (ANOVA) of a five member ensemble run forced by 139 years of observed time varying SST indicates that up to 70