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Variability and Uncertainty in the Air-Sea Interaction over the Greater Agulhas Current

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The Greater Agulhas Current (GAC) is the most intense of the Southern Hemisphere's western boundary currents and as such, it plays an important role in local weather as well as the global climate system. It is a narrow current characterized by complex mesoscale variability and there are concerns that the air-sea interaction associated with it may be under-represented in the current generation of reanalyses, air-sea interaction datasets and climate models. Here we use a sequence of atmospheric analyses with a common lineage but with horizontal resolutions ranging from ∼75km to ∼9km to characterize the variability as well as the uncertainty in the GAC's air-sea interaction. We find that all datasets are able to capture this variability with an ∼15% increase in the turbulent heat flux between the lowest and highest resolution datasets. This increase is proposed to be the result of the higher resolution datasets improved ability to represent the oceanic and atmospheric gradients in the vicinity of the GAC. The variability in the turbulent heat flux, arising from uncertainty in the SST and model physics, is of a similar magnitude.