

Testing frontal air-sea interaction dynamics using spectral transfer functions

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We test a linear model for the response of the atmospheric boundary layer to variations the sea surface temperature associate with the ocean mesoscale. The model includes the impact of sea surface temperature fronts on vertical mixing and on pressure gradients, and includes advection by a background Ekman spiral. Model dynamics are governed by transfer function in wave-number space between sea surface temperature, and frontally boundary layer variables. Using output from the atmospheric general circulation model AFES, we evaluate the spectral transfer functions for frontally induced wind speed and direction. For the Southern Ocean results show encouraging agreements and suggest that the linear model captures the underlying physics. In contrast, the Kuroshio region is more challenging.

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