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To what extent do oceanic frontal zones affect mid-latitude weather and climate?

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This talk introduces the mechanism of "Thermal Damping and Strengthening" and discusses why understanding this process is key to determining the influence of oceanic frontal zones, such as the Gulf Stream and the Kuroshio Extension, on mid-latitude weather and climate. Specifically, we argue this mechanism is key because it is the interaction of oceanic frontal zones with individual atmospheric fronts that is primarily responsible for the local as well as basin-scale ocean-to-atmosphere feedback in the seasonal mean and longer time scale. As a result, it is suggested that the influence of these oceanic frontal zones on climate can only be properly realised in general circulation models of sufficiently high resolution (i.e. horizontal grid size of 25km or less). The current implications for both general circulation models and reanalysis datasets are also addressed.