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# Impact of Oceanic Front on the Northern Hemispheric Coupled Stratosphere/Troposphere-System

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The impact of southern hemisphere oceanic fronts on the large-scale tropospheric circulation and its variability in aquaplanet configurations has widely been studied. For the Northern hemisphere, however, the dynamical and climatic impact of oceanic fronts and their signature in the stratosphere/troposphere coupled system are still poorly understood.
Using a set of semi-idealized experiments with a stratosphere-resolving AGCM, it is shown that the extratropical northern hemisphere oceanic fronts play a fundamental role in shaping the large-scale atmospheric circulation and transferring the stratospheric circulation changes into the troposphere. The impact of Northern hemispheric extratropical oceanic fronts on the stratosphere is shown to be dominated by the Kuroshio-Oyashio front and it is similar to the simultaneous impact of land/sea contrast and orography. It is associated with a strong adiabatic stratospheric warming, vortex weakening and a strengthening of the Brower-Dobson circulation, which are all caused mainly by resolved and partially by unresolved wave forcing. The stratospheric signature of oceanic fronts is shown to be important for understanding the very weak ozone destruction seen in the northern hemisphere. Regarding the stratosphere/troposphere coupling it is shown that the northern hemisphere oceanic fronts play a crucial role in transferring the stationary wave-induced stratospheric perturbations into the troposphere and dictating the latitudinal position of the stratosphere/troposphere coupling. The implications of our results for the mechanisms of the stratosphere/troposphere coupling are discussed.