Geophysical Research Abstracts
Vol. 13, EGU2011-5324-1, 2011
EGU General Assembly 2011


# Sea surface cooling in the wake of Tropical Cyclones: atmospheric and oceanic controls

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Strong winds associated to Tropical Cyclones (TCs) act to cool the sea surface temperature (SST) along the cyclones tracks. Understanding the mechanisms controlling such cooling is critical because it feeds back on TC intensity.
In this study, a global oceanic 1/2° resolution simulation that includes the TC wind forcing reconstructed using observed cyclone database over the last 30 years allows for the first time to realistically sample the ocean response to more than 3,000 historical TCs. Validation to satellite microwave SST and sea level show that the model is able to accurately simulate the ocean response along the cyclone track. This modeling framework enables us to estimate the respective contributions of the various processes involved in the TC-induced cooling.
Our results demonstrate that the relative role of surface heat fluxes and vertical oceanic processes varies both with cyclone intensity and distance to the cyclone track (with vertical oceanic processes becoming increasingly dominant close to the cyclone track and for intense cyclones). While asymmetry in SST response is largely due to vertical processes for moderate intensity cyclones, lateral advection largely contributed to this asymmetry for strong cyclones.