

Climate change, warm Gulf waters and westerly wind shear, and Hurricane Katrina

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The present year experienced several strong hurricanes intensifying in the Gulf of Mexico before making landfall and severely damaging the Gulf States, especially Hurricane Katrina. Here we show that increasing trend of sea surface temperature (SST) and decreasing vertical wind shear since 1995 over the Gulf may be attributed to climate change and provide favorable conditions for the recent increase in hurricane activity, especially the 2005 hurricanes. Higher SST anomaly at the right side of storm track induced the increase in surface heat fluxes, which corresponds to the deepening of hurricane minimum central pressure. A phase lag of about two days is found between SST increase and significant deepening of hurricane central pressure. Our results suggest that in addition to the magnitude of vertical wind shear, the effects of westerly from easterly wind shear on the intensification of hurricane may need to be separated, and westerly environmental wind shear is conducive to hurricane development. Warmer SST is found to correspond to the increase of vertical wind shear over the Gulf of Mexico.