

## UA Atmospheric Scientists Forecast Eight Atlantic Hurricanes for the 2016 Hurricane Season

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For the 2016 hurricane season (1 June to 30 November), the University of Arizona (UA) forecasting model developed by Kyle Davis, Xubin Zeng and Elizabeth Ritchie (Davis et al. 2015) predicts eight hurricanes in the North Atlantic, including the Gulf of Mexico and Caribbean Sea. Six is the historical average for Atlantic hurricanes since 1950. Hurricanes are tropical cyclones with wind speeds in excess of 73 mph. We estimate the range of this year's hurricane numbers at 6 to 11 by adding/subtracting one standard deviation of forecast errors. Calculated this way, the range captured 84% of the actual hurricane counts from 1950-2013 (Davis et al. 2015) and 88% from 1950-2015.

Our group's prediction can be compared with other centers or research groups. The NOAA Climate Prediction Center projects a 70% chance of between 4 and 8 hurricanes, Colorado State University forecasts 6, Tropical Storm Risk foresees 9, and the United Kingdom Met Office predicts 8 with a 70% chance that the number will be in the range 6 to 10.

The March/April/May averaged tropical Atlantic sea surface temperature is above the historical average (since 1950), favoring hurricane activities. Our model also includes the force of the wind on the ocean. Strong winds reduce sea surface temperatures because they mix the ocean layers, thereby bringing cooler, deeper water to the surface. The May averaged zonal pseudo-wind stress (i.e., zonal wind velocity times total wind speed) in the North Atlantic to the  $3/2$  power is slightly below the historical average in magnitude, likely contributing to a small increase in hurricane activities. We also use the state of a longer-term climate cycle called the Atlantic Multidecadal Oscillation (AMO) to judge how much influence El Niño has in a particular year. The Pacific sea surface temperature (ENSO) index in April and May was highly positive, but forecasters believe we will fall into a more ENSO neutral stage or even a weak La Niña in the coming months. Because AMO was also positive in May, the El Niño effect was not considered in our model as we believe ENSO will have little if any effect on this year's activity.

The UA model made a bold prediction of six for the 2015 hurricane season, higher than the other groups. The actual number of hurricanes proved to be four, producing an absolute error of two for the year but it is still within the predicted range (four to eight).

While our hindcast skill from 2001-2013 (Davis et al. 2015) does not necessarily translate to future forecast skill, the past two years have shown that the model so far has produced similar results in its predictions as its hindcasts, as the absolute error in 2014 was 1, and 2015, 2.

Reference: Kyle Davis, Xubin Zeng, and Elizabeth A. Ritchie, 2015: A New Statistical Model for Predicting Seasonal North Atlantic Hurricane Activity. *Wea. Forecasting*, 30, 730–741, doi: 10.1175/WAF-D-14-00156.1

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