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## Global Hawk UAS Study of Climate Changing Stratospheric Water Vapor & Ozone

### [Global Monitoring Division](#) - [ESRL-GMD](#)

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The first science flights of the NASA Global Hawk UAS in the winter portion of the Airborne Tropical Tropopause Experiment (ATTREX) are set to begin the week of 28 January 2013. Six science flights from Edwards Air Force Base, California are scheduled.

The UAS experimental payload includes two NOAA/ESRL instruments measuring water vapor, two measuring ozone and one measuring methane, nitrous oxide, hydrogen, and sulfur hexafluoride. Five NOAA/ESRL and six CIRES scientists are at the NASA Dryden facility supporting the missions.

The single jet engine Global Hawk is capable of almost 30-hr flight duration, a maximum distance of about 11000 nautical miles (20,000 km), and altitudes as high as 19.8 km.

#### Background:

Increasing greenhouse gas concentrations are leading to the production of additional high clouds. This in turn is allowing for increased stratospheric ozone destruction mediated by the clouds. As such, understanding how water vapor circulates between the lower, moister portion of the atmosphere (troposphere) and the higher, drier portion (stratosphere) is important for understanding climate change.

It is difficult for traditional aircraft to study the tropical tropopause region because of its high altitude (13-18 km), long distance from the US, and extremely cold temperatures of 190 K (-115o F). The unmanned Global Hawk though is an ideal platform for such studies.

The ultimate goal of ATTREX is to provide unique data to evaluate atmospheric models to improve predictions of climate change.

#### Significance:

The study of ozone, water vapor, and greenhouse gases falls under one of NOAA's four goals: climate. The US Clean Air Act of 1990 directs both NOAA and NASA to report to Congress on the status of stratospheric ozone depletion every three years.

NOAA is making a sizeable commitment of resources to the NASA Global Hawk built and supported by Northrop Grumman Inc. In addition to instrumentation and researcher's time, NOAA's Aircraft Operations Center, Tampa, Florida, is contributing two pilots and two ground crew members for the operation of Global Hawk during ATTREX, and will do

so in future hurricane studies using the Global Hawk.

**More information:** <http://www.espo.nasa.gov/attrex/>

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