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UAS with NOAA ESRL instruments flies into the Earth's coldest tropopause

Global Monitoring Division - **ESRL-GMD**
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NOAA ESRL is participating in NASA Global Hawk Unmanned Aircraft System (UAS) research flights from an airbase in Guam to study the coldest parts of the Earth's tropopause over the tropical Western Pacific. At least six flights will be based out of Guam during this series, the Airborne Tropical Tropopause Experiment-3 (ATTREX-3), that will last from January through March, 2014.

The UAS experimental payload includes two NOAA/ESRL ozone absorption photometers, two water vapor spectrometers, and two gas chromatographs to measure nitrous oxide, methane, sulfur hexafluoride, and hydrogen. Scientists and engineers from ESRL are also providing water vapor inter-comparison measurements with balloon borne instruments that rise to 85,000 ft. before being parachuted back to Earth. There are seven NOAA scientists and eleven CIRES scientists from the Global Monitoring and the Chemical Sciences Divisions, Boulder involved in the program along with two NOAA Corps pilots and two ground crew form the NOAA Aircraft Operations Center, Tampa.

The NCAR Gulfstream-V (GV) and British BAe-146 are providing lower altitude coverage (marine boundary level to 47,000 ft.) compared to the high altitude coverage (up to 65,000 ft.) of the Global Hawk.

Background: Changes in stratospheric water vapor content play a significant role in climate. The lowest water vapor concentrations at the tropopause are located over the tropical western Pacific Ocean. The air at the tropical tropopause is the coldest for all tropopause regions, and consequently the air is dehydrated significantly during ascent, leading to the lowest values observed. Most of the transport of major long-lived pollutants, like the greenhouse and ozone depleting gases, into the stratosphere also occurs in this region.

Significance: Climate, which includes research on water vapor, ozone, greenhouse and ozone depleting gases, is one of the major goals of NOAA. The results of this work will be incorporated in future scientific assessments of climate and stratospheric ozone depletion.

More information: http://www.espo.nasa.gov/attrex

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