Global Hydrology Resource Center

Data User Guide

Hurricane and Severe Storm Sentinel (HS3) Global Hawk Advanced Vertical Atmospheric Profiling System (AVAPS) Dropsonde System

Introduction

The Global Hawk Advanced Vertical Atmospheric Profiling System (AVAPS) Dropsonde System data set measured vertical profiles of pressure, temperature, humidity, and wind during the Hurricane and Severe Storm Sentinel (HS3) campaign from 2012 to 2014. AVAPS data files are provided in netCDF and ASCII text file format with available browse imagery of plotted Skew-T diagrams.

Citation

NCAR/EOL, Terry Hock, Kate Young, and Holger Voemel. 2016. Hurricane and Severe Storm Sentinel (HS3) Global Hawk AVAPS Dropsonde System [indicate subset used]. Dataset available online [https://hs3.nsstc.nasa.gov/pub/hs3/AVAPS/] from the NASA Global Hydrology Resource Center DAAC, Huntsville, Alabama, U.S.A. doi: http://dx.doi.org/10.5067/HS3/AVAPS/DROPSONDE/DATA201

Keywords:

GHRC, HS3, NASA, Global Hawk; Atlantic Ocean, vertical profiling system, dropsonde system; pressure, temperature, humidity, winds

Campaign

The Hurricane and Severe Storm Sentinel (HS3) was a five-year NASA mission specifically targeted to investigate the processes that underlie hurricane formation and intensity change in the Atlantic Ocean basin. Goals for HS3 included: assessing

the relative roles of large-scale environment and storm-scale internal processes; and addressing the controversial role of the Saharan Air Layer (SAL) in tropical storm formation and intensification as well as the role of deep convection in the inner-core region of storms. To achieve these goals, sustained measurements over several years was needed to get a large enough sample of storms. Therefore, field measurements took place from 2012 through 2014 for one month during each hurricane season. The HS3 campaign utilized two Global Hawks, one with instruments geared toward measurement of the environment and the other with instruments suited to inner-core structure and processes. The environmental payload included the scanning High-resolution Interferometer Sounder (S-HIS) and the AVAPS dropsonde system; the over-storm payload included the HIWRAP conically scanning Doppler radar, the HIRAD multi-frequency interferometric radiometer, and the HAMSR microwave sounder. More information about the HS3 campaign can be found here http://hs3.nsstc.nasa.gov/.

Instrument Description

The Advanced Vertical Atmospheric Profiling System (AVAPS), built by the National Center for Atmospheric Research (NCAR), served as the dropsonde system for the Global Hawk aircraft during the HS3 campaign. AVAPS dropsondes provided in-situ, high-vertical resolution measurements of atmospheric variables including pressure, temperature, humidity, geographic location, and winds, providing a vertical profile of atmospheric conditions. The raw instrument measurement precision is as follows: pressure ±1.0 hPa, temperature ±0.2 °C, wind ±1 ms^{-1}, and humidity ±7%. The measured information was transmitted via Iridium or Ku-Band satellite to a ground station where the Global Telecommunications System (GTS) performed additional processing for research and operational purposes.

Investigators

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File Naming Convention

The HS3 Global Hawk AVAPS Dropsonde System data files are named using the following convention:

Data:
DYYYYMMDD_HHMMSS_P.PresCorrQC.nc
DYYYYMMDD_HHMMSS_P.QC.eol

Where,
YYYYMMDD = year, month, day of data acquisition
HHMMSS = hour, minute, second of data acquisition in UTC
.nc = netCDF file
.eol = NCAR Earth Observing Laboratory (EOL) Ascii text file

Data Format Description

Data is distributed in NetCDF and NCAR Ascii text file format containing point type information. All data has under gone a quality control process; for more information on the process and problem notices, please refer to documentation corresponding to the year of data acquisition (http://data.eol.ucar.edu/codiac/ds_proj?HS3).

Temporal Coverage:

2012
Begin date: 2012-09-07, End date: 2012-09-26
2013
Begin date: 2013-08-20, End date: 2013-09-19
2014
Begin date: 2014-08-26, End date: 2014-09-30

Spatial Coverage:

2012
Minimum latitude: 13.493430, Minimum longitude: -88.437500
Maximum latitude: 42.054820, Maximum longitude: -19.4265302013
2013
Minimum latitude: 10.030200, Minimum longitude: -97.176650
Maximum latitude: 36.489540, Maximum longitude: -28.645940
2014
Minimum latitude: 0.000000, Minimum longitude: -95.000000
Maximum latitude: 45.000000, Maximum longitude: -25.000000

Profile Resolution:

½ second

Parameters:

The table below provides an overview of the general AVAPS data parameters, their associated units, and whether they were measured or calculated collected. For more information on the data parameters, please refer to http://data.eol.ucar.edu/codiac/ds_proj?HS3.

Parameter	Units	Measured/ Calculated
Time	Seconds	n/a
UTC Hour	Hours	n/a
UTC Minute	Minutes	n/a
UTC Second	Seconds	n/a
Pressure	Millibars (hPa)	Measured
Dry-bulb Temp	Degrees C	Measured
Dewpoint Temp	Degrees C	Calculated
Relative Humidity	Percent	Measured
U Wind Component	Meters/Second	Calculated
V Wind Component	Meters/Second	Calculated
Wind Speed	Meters/Second	Measured
Wind Direction	Degrees	Measured
Descent Rate	Meters/Second	Calculated
Geopotential Altitude	Meters	Calculated
Longitude	Degrees	Measured
Latitude	Degrees	Measured
GPS Altitude	Meters	Measures

Contact Information

To order these data or for further information, please contact:

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