HIAPER Cloud Radar (HCR) data (time series), Version 1.0

Overview

This dataset contains HIAPER Cloud Radar (HCR) data collected aboard the NSF/NCAR GV HIAPER (Gulfstream-V High-performance Instrumented Airborne Platform for Environmental Research, HIAPER) (N677F) during the NOR'EASTER field campaign. The data were collected during 1 research flight which took place February 2nd, 2015, along the US East Coast. For more information on NOR'EASTER, see https://www.eol.ucar.edu/field_projects/noreaster.

Flight	Start date	Start time UTC	End date	End time UTC
RF01	20150202	12:40	20150701	20:25

Instrument description

HCR is an airborne, polarimetric, millimeter-wavelength (W-band) radar that serves the atmospheric science community by providing cloud remote sensing capabilities to the NSF/NCAR G-V (HIAPER) aircraft. HCR detects drizzle, and ice and liquid clouds, and collects Doppler radial velocity measurements, which at vertical incident include the vertical wind speed and particle fall speed.

In a pod-based design, a single lens antenna is used for both transmit and receive. The transceiver uses a two-stage up and down conversion superheterodyne design. The transmit waveform, from a waveform generator, passes through the two-stage up-conversion to the transmit frequency of 94.40 GHz. It is then amplified by an extended interaction klystron amplifier (EIKA) to 1.6 kW peak power. System performance on transmit and receive paths are closely monitored using a coupler and a noise source. Raw in-phase and quadrature information are archived in HCR. For more information, see www.eol.ucar.edu/instruments/hiaper-cloud-radar-hcr

HIAPER Cloud Radar Specifications	
Parameter	**Specification**
Antenna	0.30 m, lens
Antenna gain	46.21 dB
Antenna 3 dB beam width	0.73°
Transmit Polarization	Linear (V)
Transmit frequency	94.40 GHz
Transmitter	Klystron
Peak transmit power	1.6 kW
Pulse width	0.2 – 1.0 μs

PRF	up to 10 kHz
System noise power	-101 dBm
Receiver noise figure	8.9 dB
Receiver Bandwidth	20 MHz
Receiver Dynamic Range	76 dB
First IF	156.25 MHz
Second IF	1406.25 MHz
Range resolution	20 - 180 m
Unambiguous range	15 km
Typical reflectivity uncertainty	0.4 dB
Sensitivity	-35.0 dBZ at 1 km and 256 ns pulse
Unambiguous velocity	±7.75 m/s
Typical radial velocity uncertainty	0.2 m/s at W=2 m/s
Dwell time	100 ms

Data description

Time series data is available at https://doi.org/10.26023/D8DG-ZK5R-7V0P. If you do not know what radar time series data is, you probably want the cfRadial 10Hz moments data available at https://doi.org/10.5065/D6QF8R1H.

Data processing and quality control

Time series data is the raw collected field data. It is not quality controlled and will remain unchanged.

Citation

NCAR/EOL HCR Team. 2024. NOREASTER: NCAR HCR radar time series data. Version 1.0. UCAR/NCAR - Earth Observing Laboratory. https://doi.org/10.26023/D8DG-ZK5R-7V0P. Accessed 02 Oct 2024. <insert data download date>.

Contact

EOL Data Support: eol-datahelp@ucar.edu
UCAR/NCAR - Earth Observing Laboratory
Remote Sensing Facility
HIAPER Cloud Radar
http://doi.org/10.5065/D6BP00TP