



Data User Guide

GPM Ground Validation NASA Micro Rain Radar (MRR) IFloodS

Introduction

The GPM Ground Validation NASA Micro Rain Radar (MRR) IFloodS is a vertically pointing Doppler radar that obtained measurements of vertical velocity, drop size distribution, rainfall rate, attenuation, liquid water content, and reflectivity factor during the Iowa Flood Studies (IFloodS) campaign, a ground measurement campaign that took place in eastern Iowa from May 1 to June 15, 2013. The data are in ASCII format.

Citation

Petersen, W., P. Gatlin, and M. Wingo. 2015. GPM Ground Validation NASA Micro Rain Radar (MRR) IFloodS [indicate subset used]. Dataset available online [ftp://gpm.nsstc.nasa.gov/gpm_validation/ifloods/mrr_NASA/] from the NASA EOSDIS Global Hydrology Resource Center Distributed Active Archive Center, Huntsville, Alabama, U.S.A. doi: <http://dx.doi.org/10.5067/GPMGV/IFLOODS/MRR/DATA201>

Keywords:

GHRC, GPM GV, IFloodS; Iowa; radar, micro rain radar, Doppler radar; vertical velocity, drop size distribution, rainfall rate, attenuation, liquid water content, reflectivity factor;

Campaign

The Global Precipitation Measurement (GPM) mission Ground Validation (GV) campaign used a variety of methods for validation of GPM satellite constellation measurements prior to launch of the GPM Core Satellite, which launched on February 27th, 2014. The validation effort included numerous GPM-specific and joint-agency/international external field campaigns, using state of the art cloud and

precipitation observational infrastructure (polarimetric radars, profilers, rain gauges, disdrometers). Surface rainfall was measured by very dense rain gauge and disdrometer networks at various field campaign sites. These field campaigns accounted for the majority of the effort and resources expended by Global Precipitation Measurement (GPM) mission Ground Validation (GV). More information about the GPM mission is available at <http://pmm.nasa.gov/GPM>.

The Iowa Flood Studies (IFloodS) campaign was a ground measurement campaign that took place in eastern Iowa from May 1 to June 15, 2013. The goals of the campaign were to collect detailed measurements of precipitation at the Earth's surface using ground instruments and advanced weather radars and, simultaneously, collect data from satellites passing overhead. The ground instruments characterized precipitation -- the size and shape of raindrops, the physics of ice and liquid particles throughout the cloud and below as it falls, temperature, air moisture, and distribution of different size droplets -- to improve rainfall estimates from the satellites, and in particular the algorithms that interpret raw data for the Global Precipitation Measurement (GPM) mission's Core Observatory satellite, which launched in 2014. More information about IFloodS is available at <http://gpm.nsstc.nasa.gov/iffloods/>.

Instrument Description

The GPM Ground Validation NASA Micro Rain Radar (MRR) is a vertically pointing Doppler radar which provided measurements of vertical velocity, drop size distribution, rainfall rate, attenuation, liquid water content, and reflectivity factor obtained during the Iowa Flood Study (IFloodS), which took place in eastern Iowa during the spring of 2013. A total of four MRRs were deployed, each adjacent to a two-dimensional video disdrometer. Each MRR-2DVD site had one or more Autonomous Parsivel2 Unit (APU) with tipping bucket rain gauges either collocated or within 4-8 km away. The dataset covers the period of April 11, 2013 through June 16, 2013, but each MRR deployed may not contain data during the entirety of this period. More information about the MRR can be found at <http://metek.de/product/mrr-2/>.

Site # / Instrument	Site Coordinates	Latitude	Longitude	Alitude (m)
SN25, APU-01	N42°14'19.7" W92°27'49.1"	42.238806	92.463639	287
SN36, APU-03	N42°07'33.6" W92°16'54.3"	42.126	92.28175	286
SN37	N41°59'30.0" W92°04'18.6"	41.991667	92.071833	280

SN38, APU-10, TB	N41°51'37.5" W91°52'26.5"	41.860417	91.874028	253
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MRR2-2DVD co-located instruments

More detailed information about the GPM Ground Validation NASA Micro Rain Radar (MRR) IFloodS is available at ftp://gpm.nsstc.nasa.gov/gpm_validation/ifloods/mrr_NASA/doc/DataFormat_mrr_ifloods.pdf.

Investigators

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File Naming Convention

The MRR dataset files are named with the following convention:

ifloods_mrr_[site]_[date]_[latitude_longitude].tar

Where,

[site] = serial number of 2dvd at site of MRR deployment

[date] = YYYYmmDD (e.g., 20110422)

[latitude_longitude]=geographic location of instrument (e.g., N363442.07_W0972640.90 is North 36°34'42.07" and West 97°26'40.90")

Data Format Description

The GPM Ground Validation NASA Micro Rain Radar (MRR) IFloodS data are available in ASCII format. The data processing level for the raw data is 0, the processed/instantaneous Data is level 1, and the averaged data is level 2. More information about NASA data processing levels can be found at <http://science.nasa.gov/earth-science/earth-science-data/data-processing-levels-for-eosdis-data-products/>.

References

Peters, G., B. Fischer, H. Münster, M. Clemens, and A. Wagner. 2005. Profiles of Raindrop Size Distributions as Retrieved by Microrain Radars. *J. Appl. Meteor.*, 44, 1930–1949. doi: <http://dx.doi.org/10.1175/JAM2316.1>

Peters, G., B. Fischer, and M. Clemens. 2010. Rain Attenuation of Radar Echoes Considering Finite-Range Resolution and Using Drop Size Distributions. *J. Atmos. Oceanic Technol.*, 27, 829–842. doi: <http://dx.doi.org/10.1175/2009JTECHA1342.1>

Contact Information

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

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