Data User Guide

GPM Ground Validation Iowa Flood Center (IFC) Stream Flow IFloodS

Introduction
The GPM Ground Validation Iowa Flood Center (IFC) Stream Flow IFloodS dataset was obtained from the IFC during the Iowa Flood Studies (IFloodS) field campaign that extended from March 31, 2013 through June 30, 2013. The main goal of IFloodS was to evaluate how well the GPM satellite rainfall data can be used for flood forecasting. The IFC monitors stage levels using sensors attached to the side of bridges throughout Iowa. The sensor data are downloaded from the Iowa Flood Information System (IFIS) as support data for the IFloodS campaign. The IFC Stream Flow data were collected in real-time and provide measurements at 15 minute intervals. These IFC Stream Flow IFloodS data are available in XML format.

Notice:
The IFC Stream Flow data were downloaded during the IFloodS field campaign to support efforts in real time. Visit the [Iowa Flood Information System](#) for historical or quality checked data.

Citation
Krajewski, Witold F. 2018. GPM Ground Validation Iowa Flood Center (IFC) Stream Flow IFloodS [indicate subset used]. Dataset available online 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/GAUGES/DATA201

Keywords:
NASA, GHRC, GPM, IFloodS, IFC, Iowa Flood Center, Iowa, stream flow, stream gauge, floods, stream level, gauge height, discharge

Campaign

The Global Precipitation Measurement mission Ground Validation (GPM GV) campaign used a variety of methods for validation of GPM satellite constellation measurements prior to and after launch of the GPM Core Satellite, which launched on February 27, 2014. The instrument 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, and disdrometers). These field campaigns accounted for the majority of the effort and resources expended by GPM GV. More information about the GPM mission is at https://pmm.nasa.gov/GPM/.

The Iowa Flood Studies (IFloodS) was a ground measurement campaign that took place throughout Iowa from May 1 to June 15, 2013. The main goal of IFloodS was to evaluate how well the GPM satellite rainfall data can be used for flood forecasting. Specifically, this meant collecting detailed measurements of precipitation at the Earth's surface using ground instruments and advanced weather radars and simultaneously collecting data from satellites passing overhead. The ground instruments characterize 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 GPM mission's Core Observatory satellite, which launched in 2014. More information about IFloodS is available at https://ghrc.nsstc.nasa.gov/home/field-campaigns/ifloods.
Additional information about the Iowa Flood Center is available at http://iowafloodcenter.org/.

Instrument Description

The IFC streamflow dataset for the IFloodS field campaign consists of data collected at 126 gauge locations in the Iowa area by sensors that operated in real-time, typically recording data at 15 minute intervals.

An IFC stream gauge measures the stage, or height, of a river by sending out a sonar signal that determines the distance from the water surface to the sensor. Sensors are placed on bridges or stream overpasses. The data are directly transmitted to the Iowa Flood Information system (IFIS) thru a cell modem, where the data are made publicly available. Locations of these stream gauges were determined by consultation with watershed management authorities, the National Weather Service, state agencies, and local emergency management and engineering governments. More information about the IFC Stream Gauges is available at the Iowa Flood Center Stream Gauge Sensors and the Iowa Flood Center Sensor Development webpages.

Figure 1: IFC Stream Gauge
(Image Source: Iowa Flood Center)

Figure 2: Typical location of the IFC Stream Gauges
(Image Source: Iowa Flood Center)

Investigators

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Data Characteristics

The GPM Ground Validation Iowa Flood Center (IFC) Stream Flow IFloodS data files are available in XML format at a Level 2 data processing level. More information about the NASA data processing levels are available on the [NASA Data Processing Levels website](#).

Table 1: Data Characteristics

Characteristic	Description
Platform	Ground station
Instrument	IFC Stream Gauges
Projection	n/a
Spatial Coverage	N: 43.342, S: 40.72, E: -90.468, W: -95.705 (Iowa)
Spatial Resolution	point
Temporal Coverage	March 31, 2013 - June 30, 2013
Sampling Frequency	every 15 minutes
Parameter	river/stream height (stage level) measured in feet
Version	1
Processing Level	2

File Naming Convention

The GPM Ground Validation Iowa Flood Center (IFC) Stream Flow IFloodS dataset has the file naming convention shown below. The data files are available in XML format.

Data files: ifloods_IFC_StreamFlow_<site ID>.xml

Table 2: File naming convention variables

Variable	Description
<site ID>	Site ID for each stream gauge
.xml	Extensible Markup Language format

Data Format and Parameters

The GPM Ground Validation Iowa Flood Center (IFC) Stream Flow IFloodS dataset consists of one XML data file per station containing stream gauge measurements for the entire study period. These data are organized by the latitude, longitude, station name, and date and time of data collection in UTC followed by the stage data. Table 3 describes each parameter within these data files. Each file represents the site location of the IFC stream gauge with measurements taken every 15 minutes from March 31, 2013 to June 30, 2013.

Table 3: Data Fields

Parameter	Unit
Stage Level	ft

Software

These data files are in XML formats; therefore, no software is required to view these data. Notepad++ can be used to easily view these XML data files and Microsoft Excel or other comparable software can be used to import the data into a table.

References

Podrazik, Ken and Aubry Bhattarai (2014): National Weather Service Des Moines' Newsletter The Weather Whisper, 8 (2).
http://www.crh.noaa.gov/images/dmx/DMXNewsletter/2014NewsletterSummer-Fall.pdf

Iowa Flood Center: Sensor Development. Web page accessed for information included in this guide: http://iowafloodcenter.org/projects/stream-stage-sensor/river-stage-sensors/

Iowa Flood Center: Stream Stage Sensors. Web page accessed for information included in this guide: http://iowafloodcenter.org/projects/stream-stage-sensor/

Related Data

All data from other instruments collected during the IFloodS field campaign are related to this dataset. Other IFloodS campaign data can be located using the GHRC HyDRO 2.0 search tool.

Contact Information

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

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