



Data User Guide

GPM Ground Validation CXSI Radar Imagery OLYMPEX

Introduction

The GPM Ground Validation CXSI Radar Imagery OLYMPEX dataset contains radar reflectivity and precipitation rate images obtained from Environment and Climate Change Canada (ECCC)'s weather radar network during the GPM Ground Validation Olympic Mountain Experiment (OLYMPEX), which was conducted to validate rain and snow measurements in mid latitude frontal systems as they move from ocean to coast to mountains and to determine how remotely sensed measurements of precipitation by GPM can be applied to a range of hydrologic, weather forecasting, and climate data. These data are available as GIF images for November 19, 2015 through December 31, 2015.

Citation

Environment and Climate Change Canada. 2018. GPM Ground Validation CXSI Radar Imagery OLYMPEX [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/OLYMPEX/CXSI/DATA101>

Keywords:

ECCC, GHRC, GPM, OLYMPEX, Washington, CXSI, radar, precipitation rate, radar reflectivity

Campaign

The Global Precipitation Measurement (GPM) mission Ground Validation 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). 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 GPM GV. More information about the GPM mission is available at <https://pmm.nasa.gov/GPM/>.

One of the GPM Ground Validation field campaigns was the Olympic Mountains Experiment (OLYMPEX) which was held in the Pacific Northwest. The goal of OLYMPEX was to validate rain and snow measurements in mid-latitude frontal systems as they move from ocean to coast to mountains and to determine how remotely sensed measurements of precipitation by GPM can be applied to a range of hydrologic, weather forecasting, and climate data. The campaign consisted of a wide variety of ground instrumentation, radars, and airborne instrumentation monitoring oceanic storm systems as they approached and traversed the Peninsula and the Olympic Mountains. The OLYMPEX campaign was part of the development, evaluation, and improvement of GPM remote sensing precipitation algorithms. More information is available from the NASA GPM Ground Validation web site <https://pmm.nasa.gov/olympex>, and the University of Washington OLYMPEX web site <http://olympex.atmos.washington.edu/>.



Figure 1: OLYMPEX Domain
(Image Source: <https://pmm.nasa.gov/OLYMPEX>)

Instrument Description

Environment and Climate Change Canada (ECCC)'s weather radar network consists of 31 sites concentrated in the most populated parts of Canada, providing radar coverage to more than 95% of Canadians. This network helps with early detection of developing thunderstorms and high impact weather, as well as tracking precipitation. These WSR-98A weather radars have a detection range of about 250 km around each site location and a Doppler range of 120 km. Generally, a parabolic antenna is used to focus a pulsed radio-frequency beam out into the atmosphere. This narrow beam sweeps the sky for 360 degrees around the radar site pointing at different elevation angles each time it sweeps around. When the energy emitted by the radar antenna strikes particles of precipitation, a

portion of that energy is reflected back to the radar. The intensity of this energy is related to the number, size, and type of precipitation particles.

This dataset consists of weather radar reflectivity and precipitation data from the station referred to as CXSI located at the Mount Sicker/Victoria Radar Site, near Duncan, British Columbia, Canada. The specific latitude and longitude of the radar is 48.861, -123.757. The radar is placed at an altitude of approximately 725 meters, just a few meters below Mount Sicker's summit. More information about the ECCC's weather radars can be found on the [ECCC's About Radars webpage](#).

Investigators

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Data Characteristics

The GPM Ground Validation CXSI Radar Imagery OLYMPEX dataset files are browse only GIF images showing radar reflectivity and precipitation rate. These data are Level 1A processing level, and more information about the NASA data processing levels are available on the [EOSDIS Data Processing Levels](#) webpage. Table 1 shows the characteristics of each browse file.

Table 1: Data Characteristics

Characteristic	Description
Platform	Ground station
Instrument	Doppler weather radar
Spatial Coverage	N: 49.318, S:48.412, E: -123.118, W: -124.476 (Duncan, British Columbia, Canada)
Spatial Resolution	250 km
Temporal Coverage	November 19, 2015 - December 31, 2015
Temporal Resolution	10 minutes
Sampling Frequency	10 minutes
Parameter	Radar reflectivity, precipitation rate
Version	1
Processing Level	2

File Naming Convention

The GPM Ground Validation CXSI Radar Imagery OLYMPEX dataset are browse only GIF imagery. The data has the file naming convention shown below.

Browse files: olympex_CXSI_YYYYMMDD_hhmm.gif

Table 2: File naming convention variables

Variable	Description
YYYY	Four-digit year
MM	Two-digit month
DD	Two-digit day
hh	Two-digit hour in UTC
mm	Two-digit minute in UTC
.gif	Graphics Interchange Format

Data Format and Parameters

These data files are available in GIF format and contain radar reflectivity (dBZ) and precipitation rate (mm/hr) images gathered during the OLYMPEX field campaign.

Quality Assessment

These data had additional quality control tests performed. If Doppler filters reject moderate ground echoes in a particular area making weak meteorological echoes non-detectable, a missing data flag was implemented. The Doppler technology allows for better resolution of the precipitation echoes, as well as provides the ability to detect the movement of precipitation in relation to the radar.

Software

These data are available as GIF images; therefore, no software is required to view these data.

Known Issues or Missing Data

There are no known issues or missing data for this dataset; however, sometimes common interpretation errors may occur, including blocking beam, beam attenuation, overshooting beam, virga, Anomalous Propagation (AP), ground clutter, or electromagnetic interference. More information about these errors are available on the [ECCC's About Radars webpage](#).

References

Asong, Z. E., S. Razavi, H. S. Wheeler, and J. S. Wong (2017). Evaluation of Integrated Multisatellite Retrievals for GPM (IMERG) over Southern Canada against Ground Precipitation Observations: A Preliminary Assessment, *Journal of Hydrometeorology*, 18, 1033-1050. doi: <https://doi.org/10.1175/JHM-D-16-0187.1>

Barros, A. P. (2014). NASA GPM-Ground Validation: Integrated Precipitation and Hydrology Experiment 2014 Science Plan. doi: <http://dx.doi.org/10.7924/G8CC0XMR>

Related Data

All other data collected during the OLYMPEX field campaign are considered related datasets. Other OLYMPEX data can be located using the [GHRC HyDRO 2.0 search tool](#) with the search term 'OLYMPEX'.

More recent CXSI data can be obtained online at https://weather.gc.ca/radar/index_e.html?id=XSI

Contact Information

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

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Created: October 18, 2018