



GOES-R Proxy Data Management System

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Abstract

For the development of operational-certified GOES-R product algorithms and processing systems, the GOES-R Algorithm Working Group (AWG) program requests a high quality of proxy data for algorithm developments, testing and assessments. The requested proxy data will be initially integrated from the AWG funded projects to the NOAA cooperative institutes and other government laboratories, processed and managed through a high performance data management system operated at the Office of Research and Applications. The central tasks in the proxy data management system will be the delivery of simulation and observation-based GOES-R Level 1B data, the development of visualization tools for various formats of proxy data, and the design of a GOES-R Observing System Simulation Experiment (OSSE) framework for demonstrating the potential impacts of GOES-R data on NWP forecasts. Recently, the project has integrated: 15-min SEVIRI data; MODIS daily land surface temperature and emissivity data; AERONET and MODIS matchup data; MM5 model simulated GOES-R data for mesoscale weather events, such as hurricanes; GOES-08/10 matchup with 8 SURFRAD sites observations.

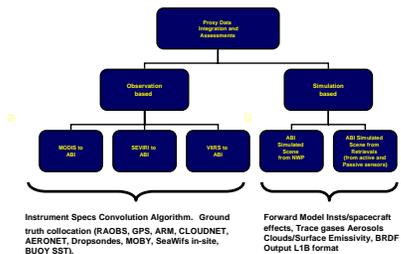
Vision

GOES-R AWG application teams will be empowered with a high-quality of GOES-R proxy data sets matched with in-situ measurements for algorithm assessment, developments and validation.

GOES-R Proxy Data Users are:



Centralized Proxy Data Concept



STAR GOES-R Proxy Datasets

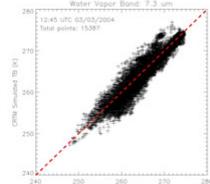
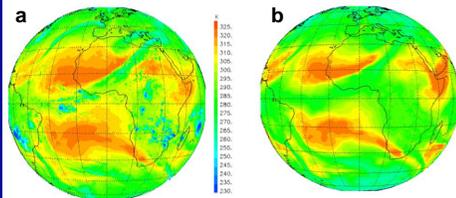
- ❖MSG SEVIRI data,
- ❖ABI simulated from SEVIRI,
- ❖GOES-08/10 matchup with SURFRAD,
- ❖MODIS land surface emissivity daily,
- ❖AERONET and MODIS matchup data,
- ❖Cloudsat data matched with ECMWF and MONDIS.
- ❖Mesoscale model simulation MM5

Proxy Data I – Observation Based

MSG SEVIRI data

SEVIRI MSG Level 1.5 15 minutes high resolution data: Image shows VIS 0.6 μm full disk observation. Full Disk Simulation of GOES-R ABI Bands: CRTM model simulated Tb at the same time.

GOES-R Radiance Simulation Verification: (a) SEVIRI MSG WV7.3 μm Brightness Temperature (Tb) at 12:45 UTC 03/03/2004, (b) CRTM model simulated Tb at the same time.



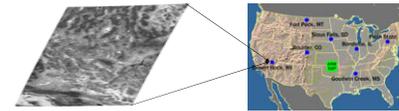
Comparison of MSG observed Tb at WV7.3 μm with CRTM simulated Tb at ABI 7.3 μm water vapor band. Total 15387 MSG observation points are selected under clear sky condition (based on MSG VIS 0.6 μm).

Comparison of observation from Ch 4 (10.7 μm) of GOES-12 with Band 13 (10.35 μm) of GOES-R ABI: 10/02/2002 Hurricane Lili

GOES-08/10 and SURFRAD Dataset

*Archive GOES-08/10 dataset for the year 2001, with 15 min resolution, 5 bands in McIDAS format.
 *Extract GOES-08 hourly data for the whole year over a selected east coast region as requested by Land Team.
 *The measurements from 8 SURFRAD sites for January and February 2001 were matched with GOES-08 data:

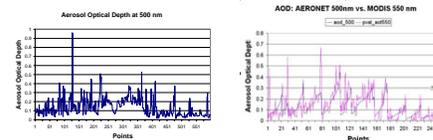
site01: PSU, PA, 40.72 N, 77.93 W
 site02: Bondville, IL, 40.05 N, 88.37 W
 site03: Goodwin Creek, MS, 34.25 N, 89.87 W
 site04: Sioux Falls, SD, 43.73 N, 96.62 W
 site05: Lamont, Oklahoma (ARM SGP CF1), 36.605 N, 97.485 W
 site06: Fort Peck, MT, 48.31 N, 105.10 W
 site07: Boulder, CO, 40.13 N, 105.24 W
 site08: Desert Rock, NV, 36.63 N, 116.02 W



GOES-10 Visible band at 1800 UTC, September 6, 2001 over Desert Rock, NV (SURFRAD site)

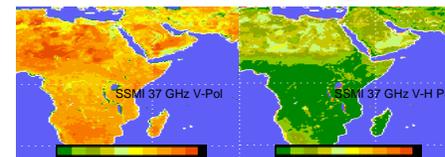
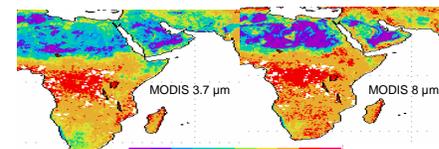
AERONET/MODIS Matchup Data

- Archive and analysis matched data of AERONET AOD, MODIS AOD and reflectance, TSI cloud cover over the ARM central facility. The dataset contains 599 matched up observation points in the year 2000 for parameters of: interpolated TSI sky cover; AERONET aerosol optical depth (AOD) at 440 nm, 500 nm and 670 nm; MODIS AOD at 550 nm; and MODIS reflectance at 0.47 μm , 0.66 μm .
- This dataset will be used for the study of aerosol/air quality produces.

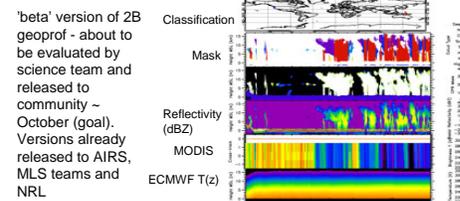


MODIS and SSM/I Emissivity Data Base

MODIS L3 global 1 km data for January 01 – 09, 2005



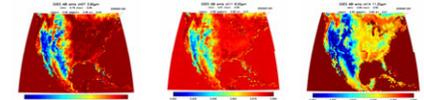
Cloudsat Data



'beta' version of 2B geoprof - about to be evaluated by science team and released to community ~ October (goal). Versions already released to AIRS, MLS teams and NRL

High resolution NDVI Data

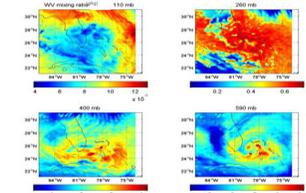
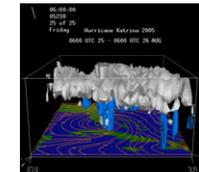
GOES-R ABI emissivity (channels 7, 11, and 14) are derived from NDVI data.



Proxy Data II – Model Simulated

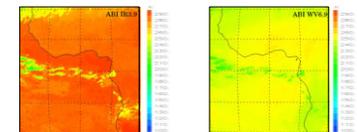
MM5 Simulation of Hurricane Katrina

48-hr simulation of Hurricane Katrina with initial time at 0600 UTC August 25, 2005. Model output time interval 1-hr for model domain-1/2, **10-min for domain-3 between 12-15 hr**. Domain-1 size: 2079 x 1971 km² (27 km resolution) Domain-2 size: 1386 x 1305 km² (9 km resolution) Domain-3 size: 678 x 587 km² (3 km resolution)



ABI Simulation by CRTM

ABI bands are simulated from SEVIRI measurements based on the relationships between two different channels derived from CRTM calculated Tbs.



Major Milestones

The major milestones will be:

- Year 1:** Integration of GOES-R proxy data and visualization tools
- Year 2:** Observing System Simulation Experiment (OSSE) Framework
- Year 3:** Documentation of GOES-R proxy data and Level 1B user guide