



Near-Real-Time Simulated ABI Imagery for User Readiness, Retrieval Algorithm Evaluation and Model Verification

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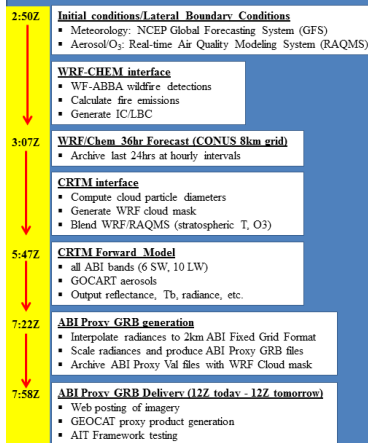
Goals

This project supports GOES-R Algorithm Working Group (AWG) Weather Research & Forecasting with Chemistry (WRF-CHEM) Advanced Baseline Imager (ABI) proxy data capabilities through generation of near-real-time data sets that include aerosols and ozone. These proxy data sets are generated on S4 using WRF-CHEM air quality simulations coupled to global chemical and aerosol analyses from the Real-time Air Quality Modeling System (RAQMS).

- Generate simulated ABI radiances using output from coupled RAQMS/WRF-CHEM ozone and aerosol simulations and the Joint Center for Satellite Data Assimilation (JCSDA) Community Radiative Transfer Model (CRTM)
- Supply data to the Algorithm Integration Team (AIT) and Proving Ground partners for testing all GOES-R algorithms over a greater range of conditions than is possible with current proxy ABI datasets
- Provide near-real-time validation capabilities based on GOES imager/sounder observations to assess the accuracy of the simulated radiances
- Support GOES-R Analysis Facility for Instrument Impacts on Requirements (GRAFIIR) by providing proxy ABI data to address government-specified waivers

Production of Simulated ABI Data

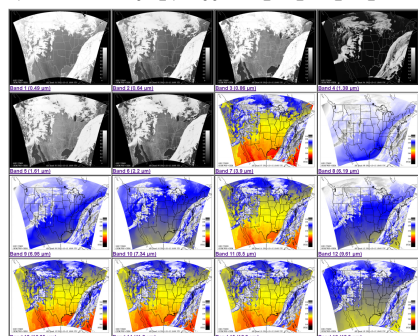
CIMSS Real-time Proxy Framework



Simulated ABI imagery and data products will allow forecasters and other users to prepare for the new information that the ABI will provide on the atmosphere, clouds and the surface and make use of the future GOES ReBroadcast (GRB) data. These data will also be used for GOES-R pre-launch activities, such as testing ABI data throughput and retrieval algorithms.

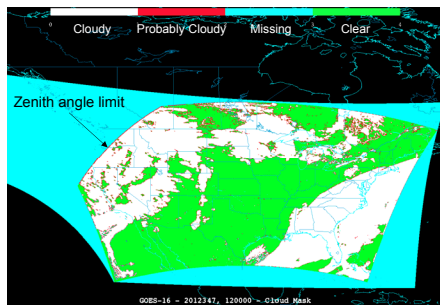
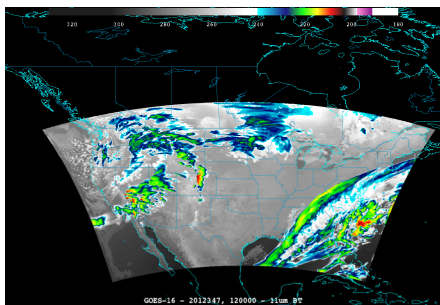
Near-Real-Time Website:

http://cimss.ssec.wisc.edu/goes_r/proving-ground/wrf_chem_abi/wrf_chem_abi.html



GOES-R Algorithm Evaluation

Proxy ABI data were supplied to the GeoStationalary Cloud Algorithm Test-bed (GEOCAT), which contains many of the baseline GOES-R product algorithms. Below is a test of the cloud mask algorithm.



A Near-Real-Time Verification System

SSEC GOES Data Archive

GOES Sounder Interface

- Extract GOES Sounder radiances from SSEC archive
- Generate GOES cloud mask

GOES Sounder GRB Generation (00Z - 24Z yesterday)

- Interpolate GOES radiances to 2km ABI Fixed Grid Format
- Scale radiances and produce GOES GRB files
- Archive GOES Val files with GOES Cloud mask

GOES-13 Sounder data (collected at SSEC) are used to verify select IR bands of the simulated ABI data (see table). Both simulated ABI data and observed sounder data are remapped to the currently accepted 2 km Fixed Grid Format (in NetCDF). These files are converted to GRB files (also in NetCDF), which contain Level 1b products with radiometric and geometric correction applied to produce parameters in physical units. Clear and cloudy data points are identified in these data files and Glance (a Python software tool developed at CIMSS) is run to monitor statistics between the simulated data and observations.

Real-time Proxy Validation

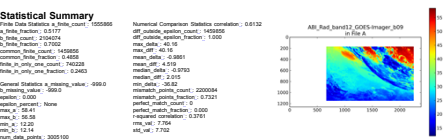
Glance Real-time validation (00Z - 24Z yesterday)

- Identify GOES/WRF Clear/Clear, Cloudy/Cloudy pixels
- Hourly statistics and graphical output for each band
- Query Glance final output for statistical time-series

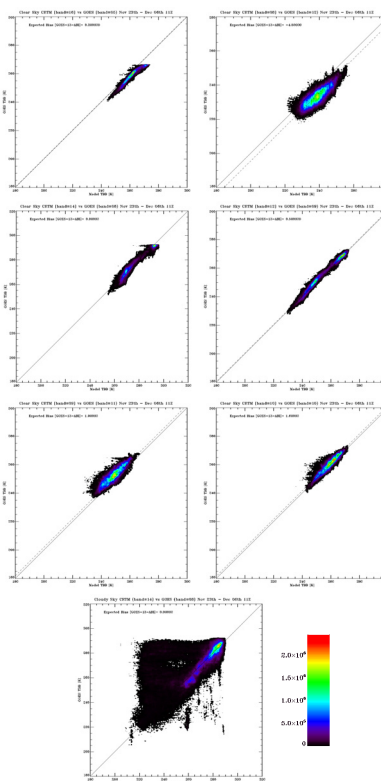
Retrospective validation (weeks to months)

- Identify GOES/WRF Clear/Clear, Cloudy/Cloudy pixels
- Long term Statistical summary output for each band

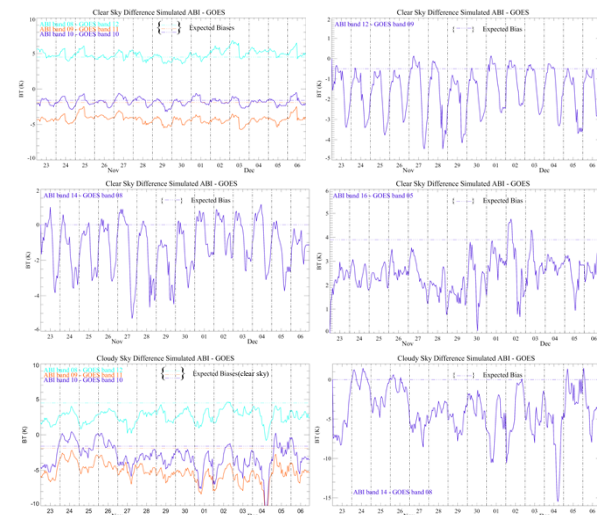
Sample Glance Output:



Scatterplots Derived from Glance Output:



Time Series Derived from Glance Output:



Summary and Plans

- CIMSS is currently producing proxy ABI data for all 16 bands in near-real-time using WRF-CHEM simulations and the CRTM (data available upon request)
- These data files are in the same format as anticipated for GRB, which will help users familiarize themselves with the new data format
- A verification system has been developed but will need further testing; we plan to explore other validation metrics as well
- Near-term plans are to provide these data in near-real-time to the AIT
- Additional plans are to make available simulated GOES-R cloud/sounding (and other) products in near-real-time

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