

NOAA's Preparations for the launch of the GOES-R Series

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GOES-R Preparations - Overview



Proxy Data Generation

- Polar satellite data (e.g., MODIS) to get spectral info
- Geo tests with spare satellites, such as 1-minute from GOES-14
- Use high res model (<=4 km grid spacing) output with a radiative transfer model to simulate ABI data/imagery</p>

Algorithm Development

Use proxy data above to develop algorithms, so when the GOES-R data begins to flow, we "flip the switch" to generate products

Proving Ground

- The Proving Ground is a program in which pre-operational or experimental products are tested in an operational environment
- Allows 2-way feedback: researchers to forecasters/users, and forecasters/users to researchers
- Training Bernie can speak to what was done here



Simulated Imagery





NSSL WRF Simulated Water Vapor Loop 20 May 2013 - 00 UTC cycle 9- to 26-hour forecast Valid 0900 – 0200 UTC Observed GOES-13 Water Vapor Loop 20-21 May 2013 0915 UTC – 0215 UTC





- Satellite liaisons sitting with operational forecasters
- Simulated imagery provided to NWS in real time
- GOES-14 1-min imagery provided to NWS in real time
- Experimental products provided to NWS in real time for evaluation and feedback
- RGBs introduced to forecasters from other satellites, such as MSG





Example: Detection of Saharan Dust



Environmental RGBs – Dust/Dry air

CIRA GeoColor RGB

EUMETSAT Air Mass

EUMETSAT Dust





Saharan Air Layer

- Dust visible in GeoColor RGB
- Airmass RGB shows boundary between warm, moist tropical air (green) and drier midlatitude air (orange)
- Dust appears pink in Dust RGB



Example: Convective Storm Development



(from Hazardous Weather Testbed Spring Experiment in Norman, OK)



- "Some of this upper level moisture can also be seen on the 6.19um... However, very dry air is observed in the middle levels on the 7.34 um channel noted by the deep orange colors."
- "The use of the three water vapor channels also provides a lot of useful information in terms of identifying subtle features which were possibly not evident in previous GOES imagery."
- "... I could really get a sense of the explosive updraft development using the 1 min imagery."
- "... When we were watching storms in SD with the 1-min data, you could see towers developing and dissipating that weren't captured by the 5-min data."

Courtesy of Michael Bowlan



Example: 1-min imagery



Rapid Scan Imagery – Now Operational with GOES-16





Example: GLM



Geostationary Lightning Mapper Detection (CICS, TTU, SPoRT)



Courtesy of Scott Rudlosky and Geoffrey Stano



Example: GeoColor



GOES-16 GeoColor (CIRA)





Example: GeoColor



GOES-16 GeoColor (CIRA)





Example: Volcanic Ash



Himawari-8 Ash RGB (EUMETSAT)



Example: Volcanic Ash Himawari-8 GeoColor (CIRA) – Sinabung in Indonesia



NASA



Example: Fire and Smoke Detection



GOES-16 Fire Temperature RGB + GeoColor (CIRA)





Cloud/Snow RGB (Steve Miller, CIRA)







- Simulate data and imagery years before launch of a new satellite/sensor is tremendously useful
- Train forecasters in advance, preferably with proxy datasets if available. Most effective training is real-time evaluation of proxy data using a testbed-like approach
 - Establish collaborations with other international agencies to get access to sample data/imagery whenever possible

