



Operational Enhancements by Leveraging the GOES-R Proving Ground

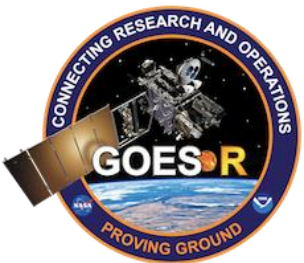


Questions posed:

- How might satellite resources be more effective in helping provide operational products/services?
- Do you have any recommendations on better use of satellite resources (including the GOES-R Lightning Mapper) in the Proving Ground exercises?
- What actions do you recommend to ensure the Proving Ground is more effective in using future satellite data for decision support?

Rusty Billingsley

NWS Southern Region



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How will satellite information best improve services?

GOES-R Products

Cloud & Moisture Imagery (CFR)	Lightning Det Events, Flashes, Griggs*	Lowest Longitude Radiance, Surface
Radiance**	Energetic Heavy Ion**	Convective Intensity
Regional Ionosphere (Including Swells & Quasi)	Magnetospheric Electrons and Protons	Enhanced UV Overheating Top Detection
Regional Optical Depth	Low Energy*	Temperature, Turbulence, Production
Midwave, Aoi, Detection & Height	Magnetospheric Electrons and Protons	Medium & High Energy*
Cloud Optical Depth	Solar and Collector Protons*	Lowest Longitude Radiance, TOA
Cloud Radiance Sp. Distribution	Geomagnetic Field*	Standard Reference Rad. Surface
Cloud Top Height	Solar Flux, EUV*	Biomedical Longitude Rad. Surface
Cloud Top Height	Solar Flux, IR-MW*	Cloud Top Height, Water
Cloud Top Height	Solar Imagery, UV*	IR Cloud*
Cloud Top Pressure	Atmospheric Ion	Sea Level, West Plains
Cloud Top Temperature	Atmospheric Thermal	Surface Albedo
Humidity Intensity	Cloud Top	Surface Emissivity
Global Rain / QPE	Open Top	Vegetation Fraction, Green
Global Vertical Moisture Profile	Moisture	Vegetation Index
Global Vertical Temperature Profile	Cloud Ice Water Path	Current, Offshore
Global Stability Index	Cloud Layers / Heights	Sea and Lake Ice: Age
Total Precipitable Water	Cloud Liquid Water	Sea and Lake Ice: Concentration
Clear Sky Visibility	NO ₂ Detection	Sea and Lake Ice: Motion
Downward Shortwave Rad., Surface	Low Cloud and Fog	Position of Storm
IR2 (200) Self Calibration	Midwave Shortwave Rad., TOA	Radar Potential
Land Surface (GLS) Temperature	Snow Cover	
Sea Surface Temperature (LST)	Downward Motion Winds	
ABI (Baseline Products)	GLM	SOVI
ABI (Derived Products)	ECB	Temperature
GOES	* Included in GSB	

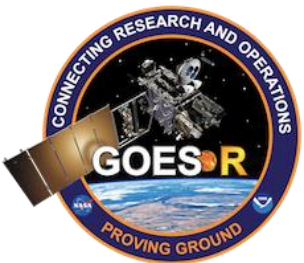
L7D11

AWG is developing the ABI and GLM Level-2 algorithms for



GOES-R Proving Ground

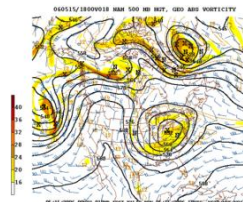
Legacy process viewed from NWS: “We (satellite folks) have new satellite products – What do you NWS guys/gals think?”



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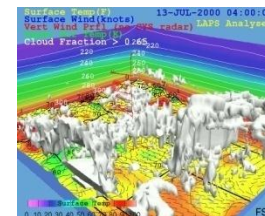


How will satellite information best improve services?

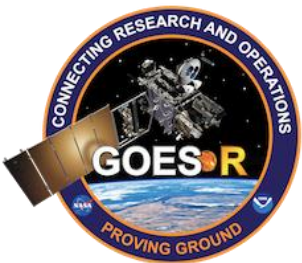


Science priorities
Forecast Issues
Opportunities

Potential solutions



How we (NWS) see things: “We have forecast issues/problems – How can satellite information contribute to solutions/opportunities?”



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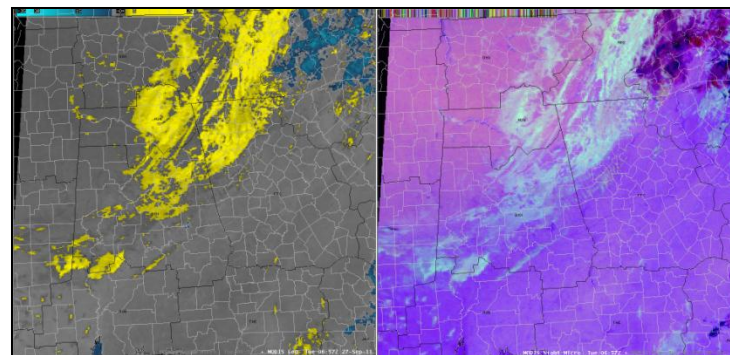
Quick Example of Problem Solving Framework

Issue: Fog and Low Clouds – forecast formation (heights/visibility), detect/observe, forecast dissipation (aviation TAFs)

Satellite brings partial answer – detection of low clouds and fog

Other opportunities – NWP, surface obs, soil moisture, antecedent rainfall, boundary layer profiles of wind, temp, moisture, etc.

Can we produce an analysis/forecast system to deal with the entire issue? Or at least ensure we can integrate/fuse data that can contribute?



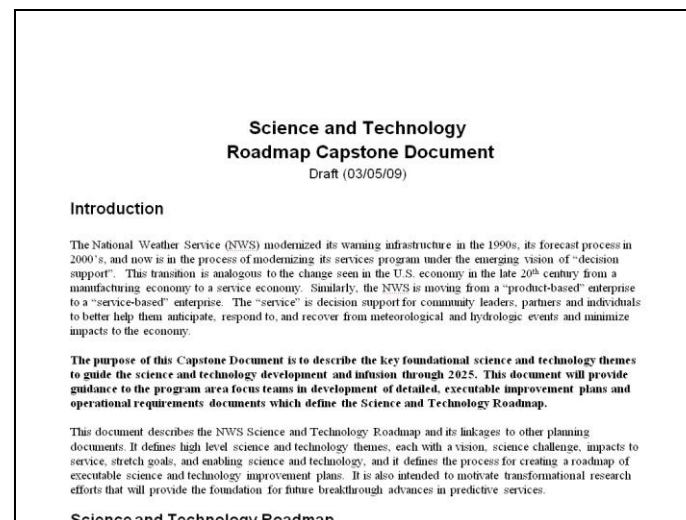


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What should be the priority near-term activities?

- Warn on Forecast for High Impact Events (and CI)
 - Improved Boundary Layer depiction of met variables
 - Other improvements to convection resolving fine scale NWP
 - Not just convection, improves QPF, boundary layer forecasts of clouds, fog, and visibility, etc.
- Develop Next Generation Forecast System
 - 4-d high spatial/temporal res gridded database
 - Better 3-d depiction of atmospheric moisture
 - 3-d analysis for monitoring/adjustment
 - Uncertainty/probabilistic
- Integrated Observing and Analysis System
 - Integrate obs from separate system
 - Again, robust 3-d environmental analysis
 - Depiction of boundary layer
 - Science approach to fill gaps
- Decision Support Services
 - All about lead time at every scale
- Social Science Integration



SSD Chief Science Vision



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What should be the priority near-term activities?

More simply:

- Integrated 3-d analysis of the environment (What's happening now?)
- Improvements in NWP (What's going to happen?)

Rain Rate (west or oceans)

Blended PWAT

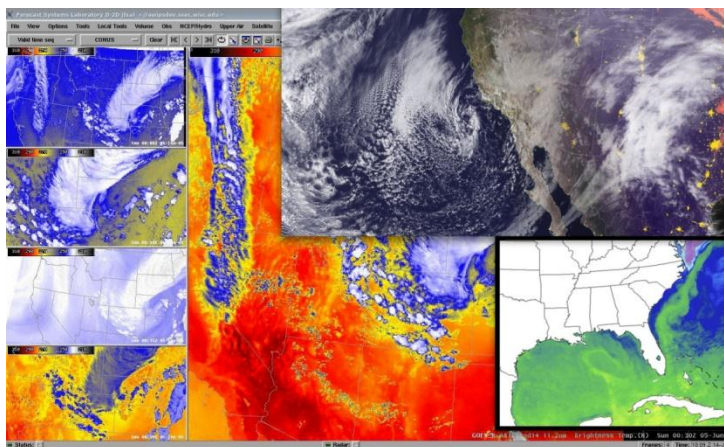
Low cloud/fog detection

SST

Fire hot spots

Cloud type

Snow cover



Any time Satellite is the
primary solution



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Strengths of the Proving Ground, i.e., *things we like!*

- The Opportunity! to participate
- Developers + Research Community + Forecasters = Great!
- Participation in the HWT and with NHC/AWC
- Integration into AWIPS/AWIPS II
- Multichannel/multispectral RGB-like applications
- Anything that improves synoptic, meso, or convective scale NWP
- Anything that moves us closer to a real 3-d analysis system
- Helping us in the data void part of the world



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Suggestions for the PG (possible improvement)

- Morph from ‘product’ mentality to ‘problem solving (or opportunity)’ framework
- The more integrated/fused with other data sources, the better
- Testbeds
- Efficient visualization – realization NWS forecasters are inundated with new data
- Lessen the confusion – PG is confusing from outside
- Collaborate with new NWS Pilot Projects