NOAA Satellite Science Week

NOAT - NWS Operational Advisory Team

Carven A Scott
NOAT Lead

Chief, ESSD Alaska Region Headquarters
Acting MIC WFO Anchorage

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NWS Operational Advisory Team

NOAT – Provide guidance for the (SDEB) Science and Demonstration Executive Board to ensure science development, and Proving Ground (PG) and GOES-R Risk Reduction (R-3) are aligned with NWS operational priorities.

Membership

- Bernard Meisner (Southern Region)
- Pete Browning (Central Region)
- Ken Johnson (Eastern Region)
- Andy Edman (Western Region)
- Carven Scott (Alaska Region)
- Bill Ward (Pacific Region)
- Jim Yoe (NCEP)

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Outline

* Weather Ready Nation (WRN)
* NOAT Vision
* NOAT Priorities
* Conclusion

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Weather-Ready Nation (WRN)

- *The NWS published the Strategic Plan: Building a Weather-Ready Nation in 2011.*
- *The agency must implement this plan through 2020 (and likely beyond).*
- *The plan was built on 6 goals:*
  - **Goal 1:** Improve weather decision services for events that threaten lives and livelihood
  - **Goal 2:** Deliver a broad suite of improved water forecasting services to support management of the Nation's water supply
  - **Goal 3:** Enhance climate services to help communities, businesses, and governments understand and adapt to climate-related risks
  - **Goal 4:** Improve sector-relevant information in support of economic productivity
  - **Goal 5:** Enable integrated environmental forecast services supporting healthy communities and Ecosystems
  - **Goal 6:** Sustain a highly skilled, professional workforce equipped with the training, tools, and infrastructure to meet our mission

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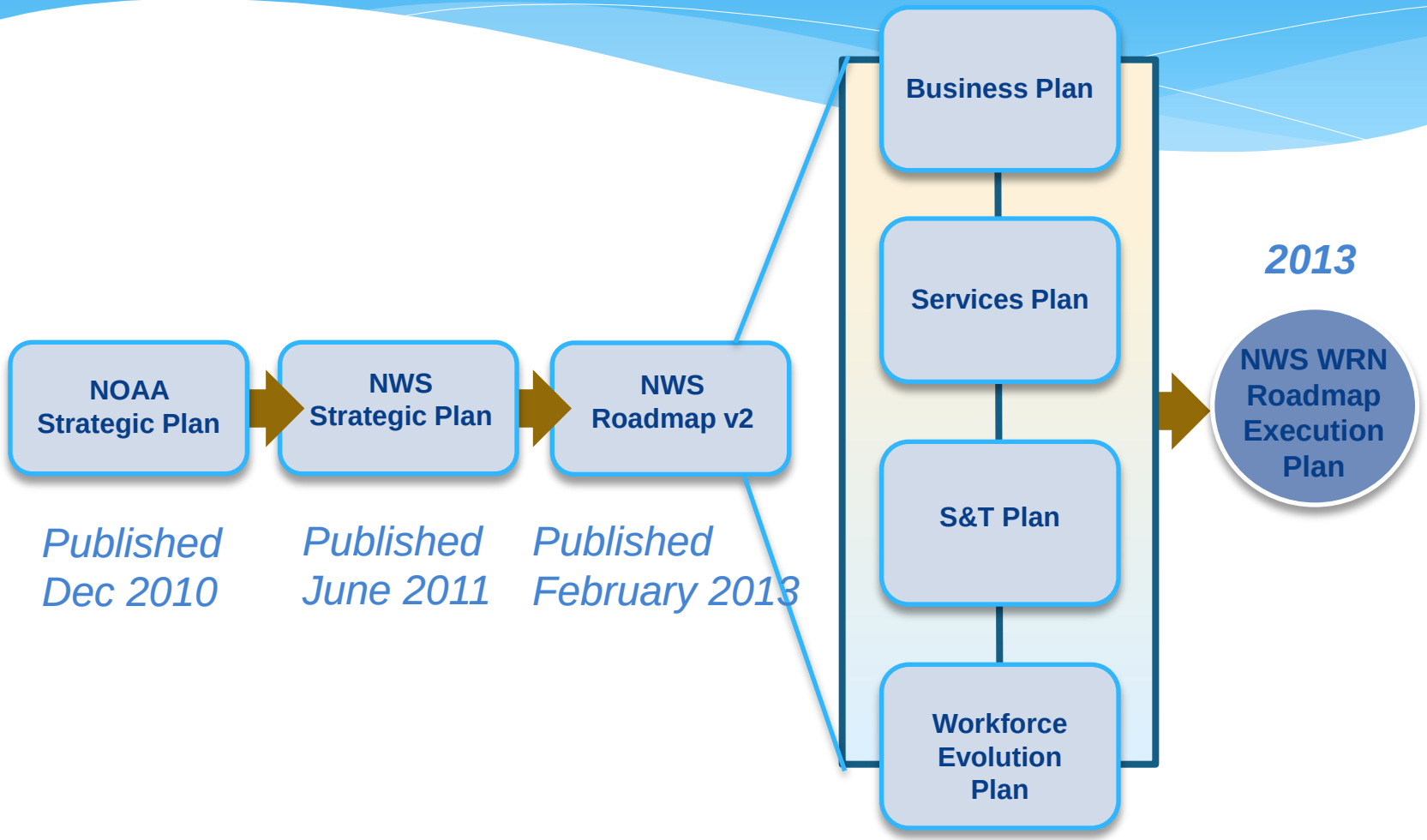
Weather-Ready Nation (WRN)



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WRN Roadmap

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WRN: What Does it REALLY Mean?

* WRN is a part of a broader NOAA vision to develop resilient ecosystems, communities, and economies.
* Emergency managers, first responders, government officials, businesses, and the public will then be empowered to make faster, smarter decisions to save lives and protect livelihoods.
* **The result: A WRN… where society is prepared for and responds to weather-dependent events.**

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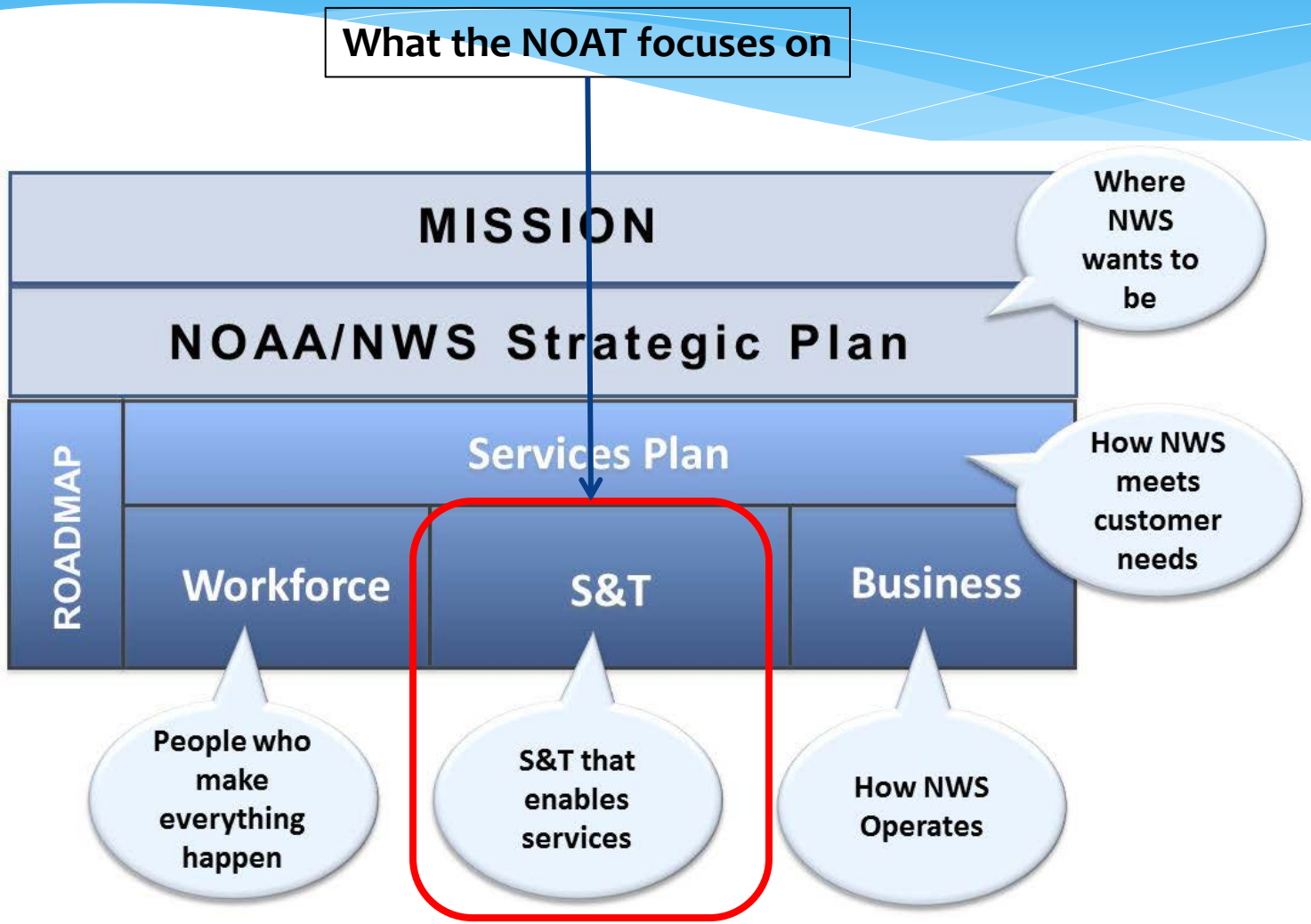
WRN - Science and Technology Concepts



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WRN - Science and Technology Concepts

- **The SSD Chief (NOAT) Science Vision (Key Themes) come from the Science and Technology (S&T) CAPSTONE document.**
- **Tied to Underlying S&T Concepts in WRN Roadmap:**
  - Best State of the Atmosphere (comprehensive situational knowledge)
  - Forecaster Decision Support Environment (FDSE)
  - Next-generation forecast system
  - Reliable forecast confidence and uncertainty
  - Agile, scalable, cost-effective data processing, management and dissemination
  - Research to Operations (R2O) and Operations to Research (O2R) (Risk Reduction, testbeds, and dynamic training as a core function)

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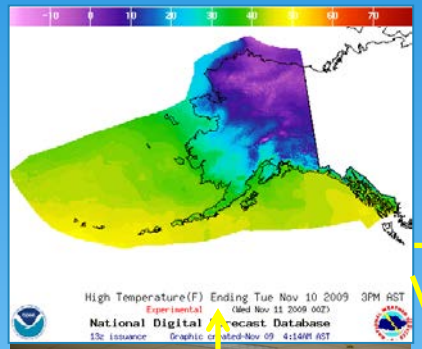
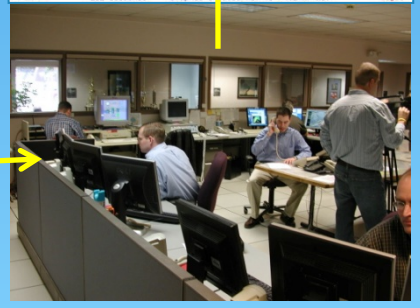
WRN – End to End Process

How we view the world





Services/Products

Satellite – Only one piece of the puzzle

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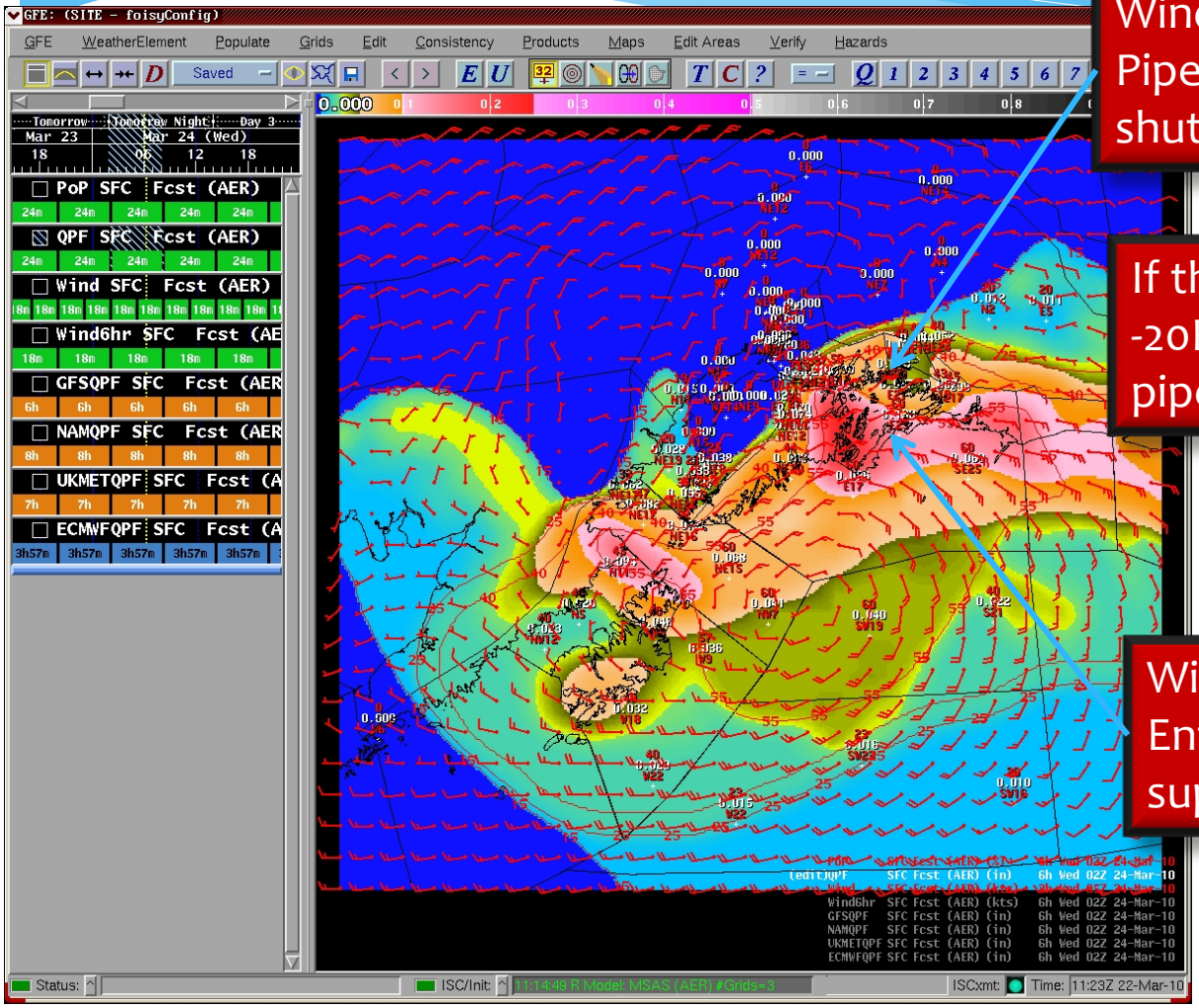
Weather-Ready Nation (WRN)



Winds > 55 mph at the Trans Alaska Pipeline Terminal in Valdez could shut down operations.

If the temperatures are colder than -20F, prolonged shutdown of the pipeline could “freeze” the oil.

Winds > 45kts at Hinchinbrook Entrance slows or shuts down supertanker operations.

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WRN - Science and Technology Concepts

Themes:

- Best state of the atmosphere
- Forecaster Decision Support Environment (FDSE)
- Next Generation Forecast System
- Forecast Confidence
- Data management and delivery
- Risk Reduction, testbeds, and dynamic training as a core function

Challenges:

- Observational Gaps
- Initiation/explicit handling of convection
- Managing the forecast process
- Warn-on-Forecast (WoF)

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WRN - Science and Technology Concepts

Impacts and Issues:

- Initial zero hour of the forecast database and **data assimilation**
- Initial conditions to next generation modeling systems
- Forecaster assist in monitoring /QCing the forecast database
- Forecaster situational awareness
- Verification
- Better boundary layer depiction, especially low level distribution of moisture
- Enable concept of "Warn on Forecast"
- Improved QPE/QPF
- Development of general convection anticipated
- Improved boundary layer forecasts of cloud, fog and visibility
- Improved architecture for IDSS
- Input into advanced DS systems (Avn NextGen, fire wx, environmental/ecosystems)

How do you fit?

Smoke and dust
Moisture/clouds
Derived winds
Fire hot spots
QPE
SST
TPW
Snow/ice cover
Sea ice
Volcanic ash
Low clouds/fog
Visibility
CI
Overshooting Tops
Enhanced V
Lightning Jump
Stability Indices
Hurricane Intensity
Moisture profile
Nearcast, etc

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WRN - Science and Technology Concepts

So… Do you just throw a product at one of these problems/challenges/issues?

Some questions you need to ponder:

- How does your proposed project deal with a path to operations (R2O)?
  - Current and future NWS operations
  - AWIPS II and/or evolving prototypes of future systems
  - Testbed, PG, operational (NWS) personnel?
  - Integrate into current/evolving operational modeling and data assimilation systems
- Is your project satellite-centric?
  - Okay **if** it makes sense
  - Fusion
    - Multisensor (more than just other sat sensors)
    - NOAA/NWS Integrated observation system and operational NWP
    - Don't forget potential end-user/stakeholder info (e.g., aviation routes, traffic)

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WRN - Science and Technology Concepts

More thoughts:

1. Leverage the concept of the "enterprise/framework" satellite system
   - Use the consistent upstream algorithms (when feasible)
2. Think strategically
   - Realize some of these ideas involve a "moving target" (e.g., next generation forecast and warning system/s, integrated obs system, etc.)
   - Try to "hit the target" vice development focused on current operations
3. Take time to understand how the forecaster does his job
   - Understand their job/challenges
   - See how they use the information in an operational setting (does it provide SA, or is it a DS tool?)
4. Embrace emerging requirements
   - Wind and solar energy
   - Ecosystems
5. Decision Support
   - Does it help the forecaster make decisions?
   - Does it help the customer make decisions?

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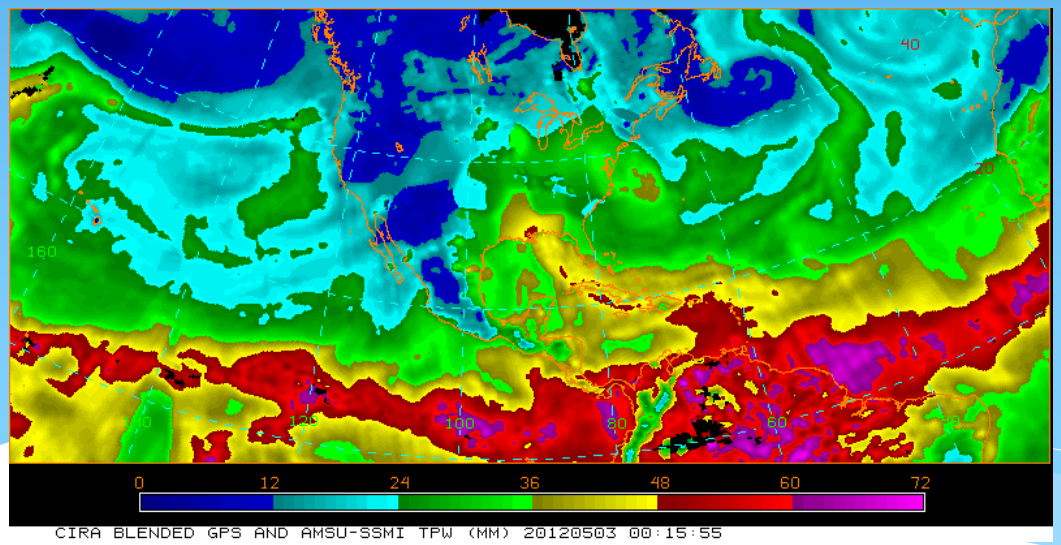
WRN - Science and Technology Concepts

An Operational Example: Blended TPW

Multisensor (GPS, AMSU-SSMI) product well used by forecasters because it dealt with a significant issue: moisture distribution



Why we need this?

Atmospheric Rivers
Heavy rain/snow
Flood/Blizzard
Drought
Convective Storms

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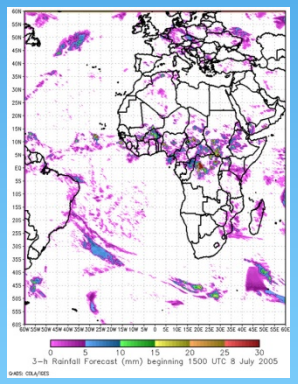
WRN - Science and Technology Concepts

A Potential Data Fusion Example: QPE

Can we do a Blended TPW-like QPE?

GOES R



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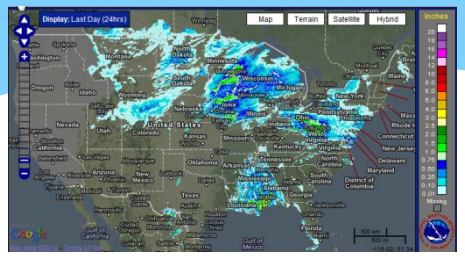

Radar/sfc obs

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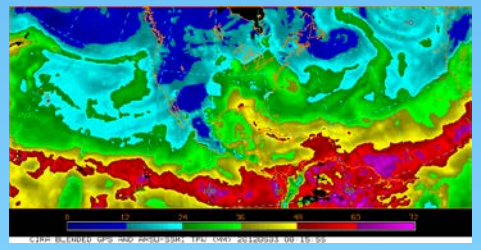
Global Precipitation



Why we need this?

Flood/flash flood
Transportation
Drought

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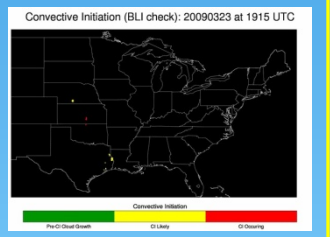
WRN - Science and Technology Concepts

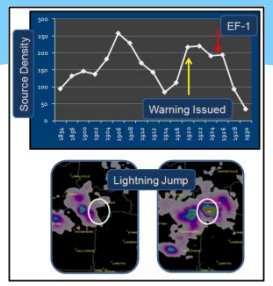
A Potential Operational Example: Convective Initiation/Severe Weather
Can we integrate the information in future tools?

CI

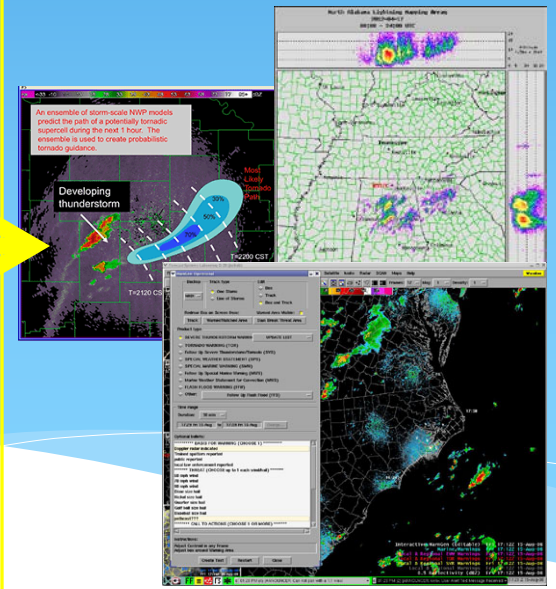


Over-shooting tops

Lightning Jumps



Next Generation Warning System



Why we need this?

Situational Awareness
Convective warning confidence
Decision Support (venues)

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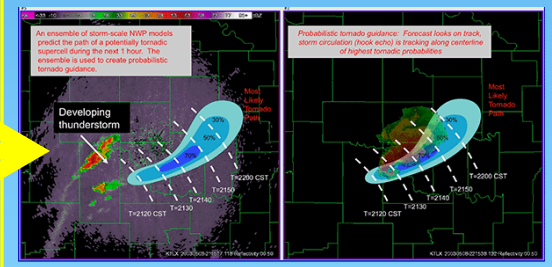
WRN - Science and Technology Concepts

A Potential Modeling Example: Convective Initiation/Severe Weather
Does it make more sense to assimilate the information into convective resolving NWP models?

JPSS /GOES-R radiances or other satellite data (CriS/ATMS)

Warn on Forecast (WoF) System



Why we need this?

Situational Awareness
Convective warning confidence
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NCEP Considerations

- **Central Guidance (EMC/NCO)**
- **Improved analysis and NWP forecasts a big target for operational use of observations**
  - Aim for future operational modeling/data assimilation systems
  - Coordinate via Joint Center for Satellite Data Assimilation
- **Service Centers (AWC, TPC, OPC, SWPC, SPC, and WPC)**
  - Centers appreciate new sensors, science and products
  - Discriminator for successful RR and PG products will depend on effective collaboration via respective Testbeds

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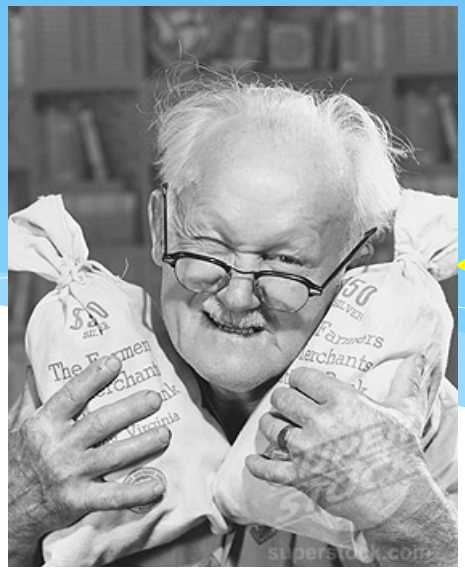
A Final Point of Clarification

The NOAT does not fund the future projects nor do we determine what is funded. We are an advisory group to the SDEB.



Andy Edman

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In Conclusion

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Questions?