Topic 1 – 2 σ Lightning Jump Field Test
(GOES-R, NSSL, NWS collaboration)

- NWS OS&T Director Don Berchoff requested an assessment of the Schultz et al. 2009 algorithm
- Run an automated version of this algorithm daily and determine if predicted reduction in FAR is validated
- Determine ground rules for a fair test
- Need someone on the research development side and operational liaison for each LMA testbed (NALMA, DCLMA, OKLMA, WTLMA, Langmuir/White Sands, KSC, Houston)

Outstanding Questions/Issues

- Select tracking algorithm (Lak-Trak, TITAN, SCIT) and field to track (lightning and/or radar)
- Determine flash identification algorithm
- Determine means of verification
  - Storm reports, radar algorithms, SHAVE, MADIS
  - Consult with WMO working group (WG-FVR)
- How to best compliment existing GOES-R3 funded projects (UAH and OU/CIMMS)
- Project communication (standing meeting?)

Data Management Issues

- Decimated vs. real-time LMA data
- Archived datasets (WSR-88D, MRMS, environmental data)
- Availability/access to processing/storage systems
- Transmission of data for processing
- How to disseminate the real-time products (i.e., for forecaster evaluation)

Experiment Design

- End result needs to stand up to external review
- Phase 1 – Identify and assemble project components
- Phase 2 – Stress test for automated algorithm implementation
- Phase 3 – Real-time implementation
- Phase 4 – End user (forecaster) evaluation

Additional Comments

1. First verification effort should use the same data that the algorithm was trained on
2. If the weather service is looking for nationwide implementation, we also should evaluate the algorithm performance using WTLN data (must first evaluate WTLN system performance)
3. Must exercise the verification problem during the stress test

Topic 2 – Training

- NWS is moving away from radar only training on severe weather to more of an integrated approach (radar, satellite, lightning)
- Must explain how to use total lightning information, and also where it is misleading or does not provide operational utility
- Ensure that it is not provided as a black box
- Make best use of demonstration opportunities (e.g., HWT) to get forecaster buy-in
- Consider training to understand system performance (e.g., LMA DE vs. range)

SPoRT Modules

- SPoRT is developing total lightning training modules
  - Goal is to show operational demonstrations and also to explain the physical basis
  - Modules have been implemented in the NWS LMS
  - Feedback has been positive – modules are quick, short, and to the point, also like the physical reasoning
  - Second module has been developed for the HWT
  - Developing a three piece GOES-R GLM module
    - 45 minute module broken into 15 min sections

TTU COMET Project

- Identified a gap between the origin of the data, products, and conceptual models that forecasters are familiar with
- Explain when, where, and how much lightning they should expect as well as its storm relative location (link radar to flash density products)
- Start with basic cloud physics
- Explain the LMA system
- Provide real world examples
- Must explain to forecasters that this is an additional tool
- Evolve coordination between TTU and SPoRT
- Examine how to validate use in forecast decision making using other data (e.g., NLDN, radar)

CICS-Sterling WFO Project

- Develop WES cases to train forecasters and evaluate the utility of total lightning products
  - Incorporate training into the WES cases
  - Demonstrate the operational utility of the products in marginally severe cases
  - Gather forecaster feedback during the WES simulations
- Package for use at additional WFOs (both AWIPS-I and AWIPS-II)
- Evolve coordination between TTU/SPoRT/CICS

Topic 3 – NWS Data Fusion

- Develop blended/fused applications using total lightning (methods for combining information)
- Forecaster will get lots more data = need for data fusion, with tools that are easy to use
- Not only do you provide a new product, but also need to provide a tool that allows them to understand the information
- Two examples from recent GOES-R3 solicitation
  - Volcanic plumes/lightning (ABI+GLM)
  - Enhanced precipitation estimate (ABI+GLM+GPM)

NWS Data Fusion cont.

- Must be aware of end user requirements, be cautious of data overload
- Different users = different capabilities
- What data are important for forecast or warning, focus on issue at hand
- NWS serves as a filter of information, distills information for various customers
- Flexibility is required, many users are requesting data in a GIS format

NWS Data Fusion cont.

- NASA real-time mission monitor is a good example, lets the user define their own parameters
- Must consider the degree of automation, as well as the degree of processed data, must be provided in an open, simple, and standard format
- Full data vs. simple products
  - Increased use of GIS tools
  - Must be able to drill down to base data

Data Fusion Examples

- John Mecikalski/UAH working towards a comprehensive GOES-R convective tool…
  - 1) environment, 2) CI – satcast, 3) LI – 1 hr forecast, 4) lightning activity level
- Aviation Applications
  - Determine needs and requirements
    - CG lightning stop
    - International sigmets GLM+ABI convective turbulence
  - Need for lightning probability 1-3 hour range
  - Consider Next-Gen (4-D data cube) data integration