Applications of LANCE Data at SPoRT

LANCE Users Working Group
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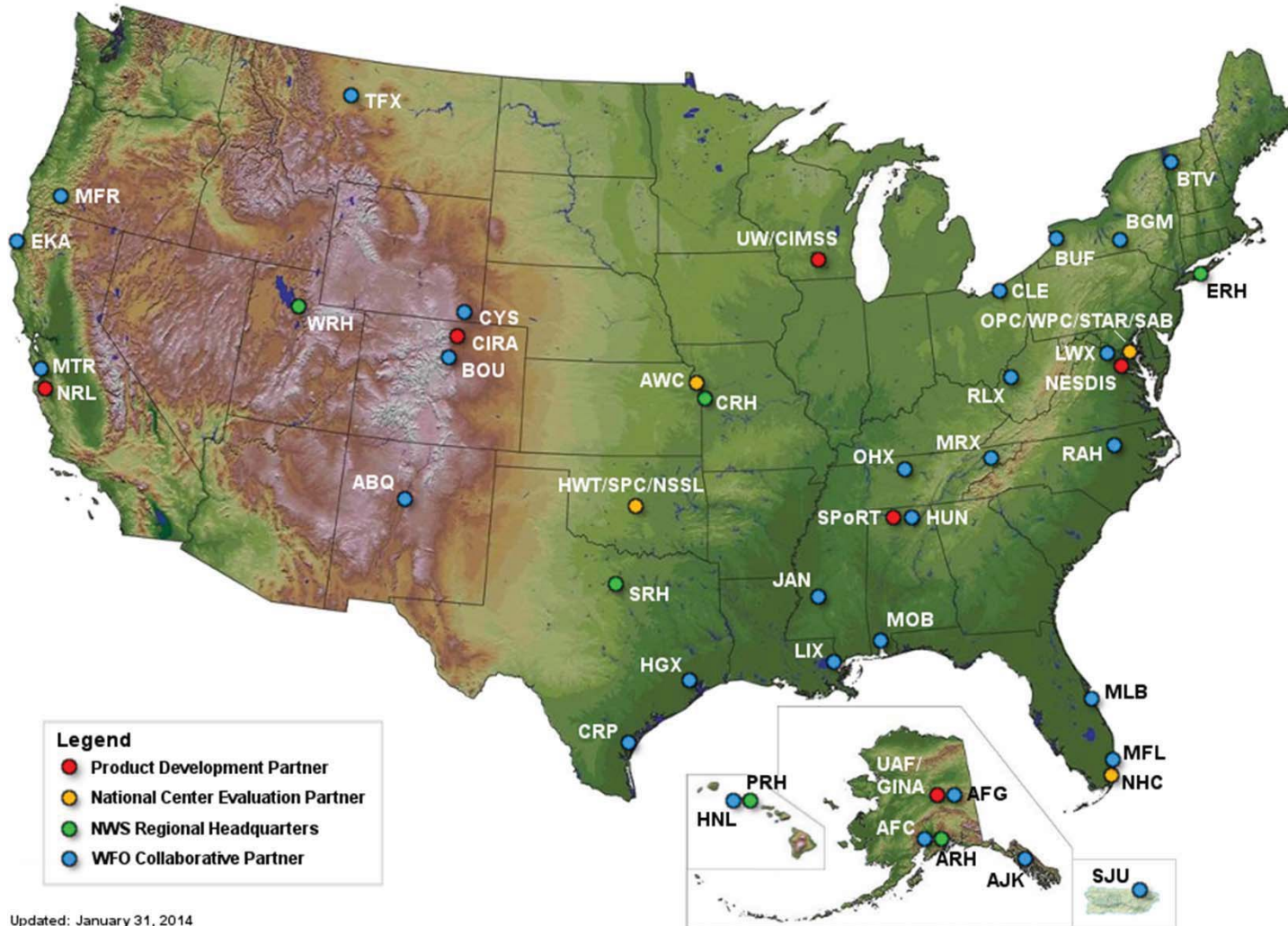andrew.molthan@nasa.gov

Background

Short-term Prediction Research and Transition (SPoRT) Center:

- Mission: Apply NASA and NOAA measurement systems and unique Earth science research to improve the accuracy of short-term weather prediction at the regional / local scale

- Goals:

  - *Evaluate and assess the utility of NASA and NOAA Earth science data and products and unique research capabilities to address operational weather forecast problems*

  - *Provide an environment which enables the development and testing of new capabilities to improve short-term weather forecasts on a regional scale*

  - *Help ensure successful transition of new capabilities to operational weather entities for the benefit of society*

Collaborative Partners

Legend
- 🔴 Product Development Partner
- 🟡 National Center Evaluation Partner
- 🟢 NWS Regional Headquarters
- 🔵 WFO Collaborative Partner

Updated: January 31, 2014

Use of LANCE Data at SPoRT

- The SPoRT team uses LANCE data to provide near real-time information for weather and disaster applications where direct broadcast data are unavailable

- Current applications of LANCE data:
  – Using LANCE API to acquire Terra and Aqua MODIS land and atmosphere data for vegetation composites
    - Current focus on CONUS to identify land surface change resulting from severe weather, with opportunities to expand for global applications in landslides, flooding, and other areas.
  – Using LANCE ftp subscriptions to fill in data gaps for outside CONUS
    - LANCE provides SPoRT team members with data subscriptions that push granules via FTP for locations such as Alaska, Hawaii, and Puerto Rico

- Data products are processed at SPoRT and disseminated via AWIPS / AWIPS II (NOAA/NWS partners) and WMS (Disasters)

Applications

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Vegetation Composites and Differencing

- The LANCE API is used to collect MODIS observations, from which NDVI and NDVI change are derived.

- Short-term NDVI change following severe weather can be used to identify hail or tornado damage scars, when corroborated with other storm information.

- Providing data to the NOAA/NWS Damage Assessment Toolkit via WMS for use in the field.

Example MODIS NDVI difference product derived from LANCE observations and shown in the NOAA/NWS Damage Assessment Toolkit

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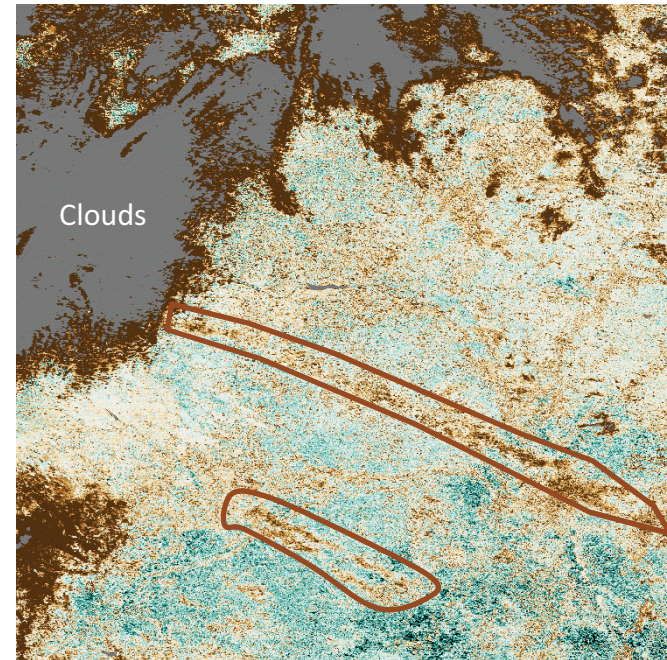

Clouds

Example hail damage scars evident across Nebraska, derived from LANCE observations. Sharp, short-term decreases in brown highlight damage in cloud-free areas.

Desired Products and Improvements

- The availability of the LANCE API for acquisition of MODIS granules makes it very easy to acquire data:
  - "I *really* like that their API allows us to only download data that meets our criteria (domain, date/time, product, satellite, etc.)"
- It would be *fantastic* to see this API capability extended for VIIRS and other key S-NPP data sets.
  - Although numerous venues exist for acquiring S-NPP data, a one-stop shop focused on minimizing latency and streamlined APIs for dissemination (e.g. LANCE) would be of great help – easily extend MODIS work to VIIRS data.
  - Easier acquisition and processing of OCONUS regions for disasters or international application partners with SERVIR
- SPoRT is also using GPM passive microwave data and rain rates for weather applications.
  - Having a LANCE-like API for data acquisition would be helpful.
- As always, any steps that can be taken to reduce latency are helpful
  - Reduced latency of products, or options for automatic delivery (e.g. FTP subscriptions) that minimize time in searching and acquiring products

VIIRS Disaster Applications at SPoRT
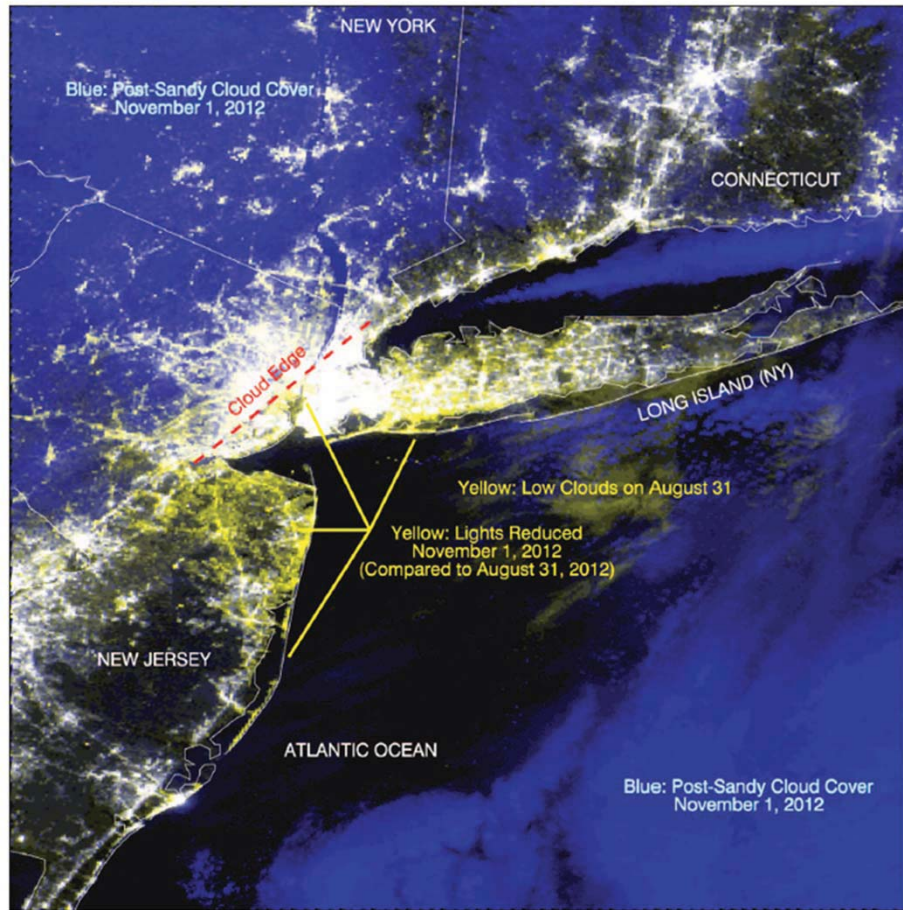
False color composite of pre- and post-storm VIIRS DNB imagery over New York and New Jersey following Superstorm Sandy (reproduced from Molthan et al. 2013)
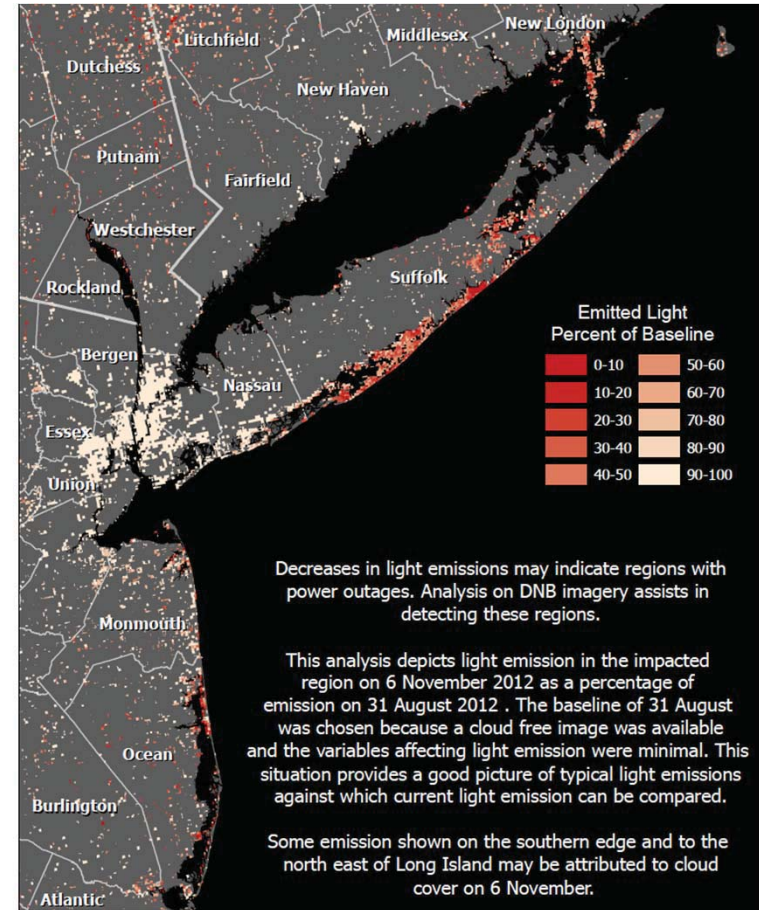
SPoRT provided U.S. Northern Command with daily VIIRS DNB and guidance on deriving "percent of baseline" light emissions used by DoD in recovery efforts.

Summary

- The SPoRT Center makes extensive use of LANCE products for weather, climate, and disaster applications.
- We highly value the streamlined APIs that allow for global search and acquisition of MODIS products
  - It would be great to see these capabilities extended to S-NPP data sets and other NASA missions such as GPM
- End users benefit from LANCE data through weather analysis and disaster applications that summarize impacts identified through MODIS products
- SPoRT applications continue to grow in S-NPP, GPM, and upcoming SMAP areas, and LANCE-like data access is beneficial.