Application of NASA SPoRT-Land Information System (SPoRT-LIS) Soil Moisture Data for Drought

May 17, 24, & 31, 2023

10:00-11:30 or 15:00-16:30 EDT (UTC-4)

This training will improve the user's understanding of how soil moisture is modeled within LIS in order to improve the interpretation and application of this output for drought monitoring. Conducted by experts in LIS and operational drought monitoring, the overall course will enable users to interpret SPoRT-LIS soil moisture percentile products for drought applications. Examples from operational applications as well as practice exercises (for using LIS data for drought monitoring) will be included in this course. Access to the SPoRT-LIS products via online viewer, in GIS formats, and GIS-based display tools, will also be included. Moreover, self-paced microlessons will be available to help users confirm their understanding and improve their skill via homework lessons between live sessions.

Session 1: Foundational Understanding of LIS (static, forcing, models, output)

- Introduction and Drought Background - Christopher Hain
- NASA LIS Framework and Output by Sujay Kumar (30 minutes)
    * Why LIS was created; Who's using it now; What's the future
    * LIS framework, inputs/forcing, static fields, relevant aspects impacting drought like soil type or veg type classifications, data/satellite assimilation capabilities;
    * LIS output: soil moisture, layers and other drought-relevant aspects
- SPoRT LIS-CONUS version, Derived Percentiles, Forecasts by Jonathan Case (30 minutes):
    * SPoRT LIS-CONUS version/instance; other subdomains
    * Unique aspects …. Why is the Green Vegetation Fraction (GVF) used?, MRMS/GDAS usage, NLDAS usage, and 4-5 day rerun to present
    * Creation of Percentiles for Relative Soil Moisture (RSM)
    * SPoRT-LIS CONUS Forecasts
- **Q & A Session** (30 minutes)
- Homework Lessons to be completed prior to Session 2:
    * **Self-Paced Item 1a:** Details of RSM and Other Output for Drought
        » Reminder from Live Session plus some details and examples
    * **Self-Paced Item 1b:** SPoRT-LIS Derived Percentiles Important for Drought
        » Demonstration of Percentiles, Differences, and Layer RSM – what do these really mean for my own applications?

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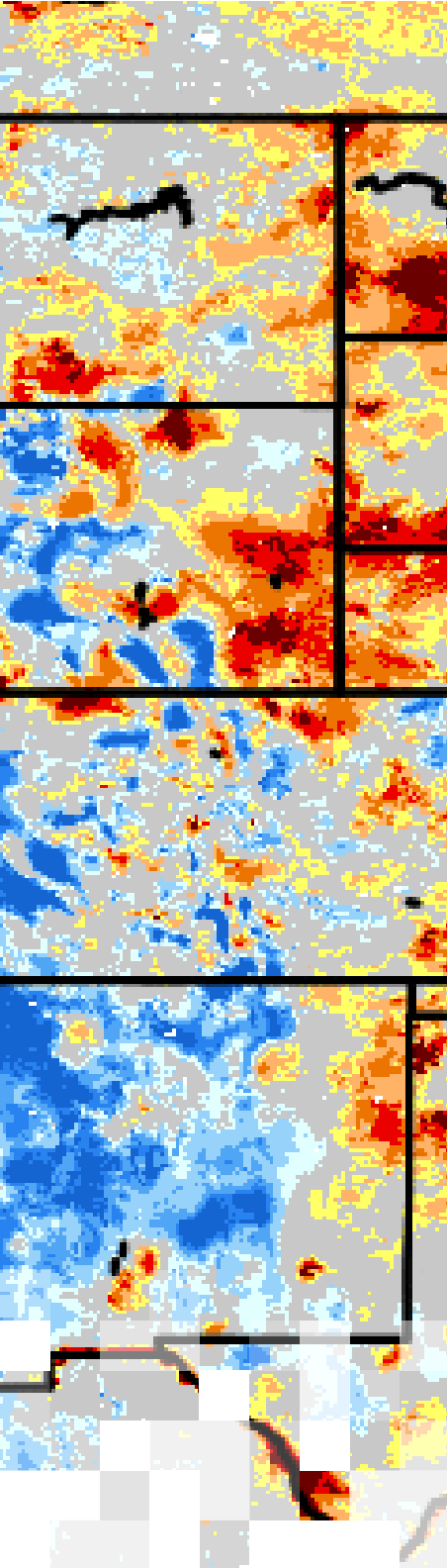
Session 2: Early and Established Applications of LIS for Drought Analysis in Operations

- SPoRT-LIS Early Use and Value in Local Operations; Application of Percentile and Differences by Kris White (25-30 minutes)
  - * Early use of LIS for drought and eventual use for USDM
  - * How to consider LIS layers and vegetation types
  - * What is the context in terms of known climatology? - Percentiles, differences (weekly, etc.) and their application
- US Drought Monitor Application of SPoRT-LIS with Existing Data and Methods by Richard Heim (15-20 minutes)
  - * Convergence of Evidence: How/Why does SPoRT LIS provide value compared to an existing dataset or as a complement?
  - * From a national view, how does SPoRT-LIS output best provide value
  - * Short-term vs Long-term drought analysis with SPoRT LIS;
- State/Regional Climate Application of SPoRT-LIS for Drought Trend Assessments by Barrett Smith and Corey Davis (15-20 minutes)
  - * Applications for decision making (flash drought, emerging from drought, state-level decisions/actions, conflicting drought indicators)
  - * Workflow Integration
  - * Examples of assessing emergence from drought and impacts from extreme events
- **Q&A Session** (20-30 minutes)
- Homework Lessons to be completed prior to Session 3:
  - * **Self-Paced Item 2a:** Drought Analysis Application in CONUS and International Domain Example
    - » Example exercise to test understanding of SME application concepts
    - » International domain example: apply lessons from live session in unknown area
  - * **Self-Paced Item 2b:** Best Practices with SPoRT-LIS
    - * Discovery of appropriate uses to applying LIS output for Drought via interactive examples and decision making

Session 3: Access Data at Organization and Individual levels

- Display of SPoRT-LIS CONUS Output via SPoRT Web Viewer by Jonathan Case
  - * Easy and quick viewing of many parameters in set domains
  - * Custom animations over time, which can be saved for local use
- Acquire and Display SPoRT-LIS CONUS GEOTIFF via QGIS by Matt Smith
  - * Where & how to obtain a file
  - * How to view via GIS and REST Service
  - * How to customize display
- Display and Differencing of SPoRT-LIS within Google Colab/Jupyter by Ryan Wade and Rob Junod
  - * Read and display of file for SPoRT-LIS Output
  - * Custom domains
  - * Differencing tailored to user needs
- Homework Lessons to be completed within a week after Session 3:
  - * **Self-Paced Item 3a:** Starter Guide for ingest/display
    - » Create Your Own Display and Difference Plots of Percentile or RSM (CONUS, International).