P162  Expansion of the Real-Time SPORT-Land Information System for NOAA/National Weather Service Situational Awareness and Local Modeling Applications

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Background
SPORT runs the NASA Land Information System (LIS) in real-time to support local modeling and diagnostic analysis at NOAA/National Weather Service (NWS) weather forecast offices (WFOs).

- Current domain covers the Southeastern half of the Continental U.S.
- LIS/GRIB output files uploaded to ftp server in real-time
- Senior forecasts over U.S. can be initialized with LIS LSM fields in place of coarser-resolution, large-scale model fields

Situational Awareness
- Drought Monitoring
- Assessing flood potential
- LIS data ingested and displayed in AWIPS II at NWS Huntsville, AL
- Refer to training examples below

Modeling System and Capabilities
NASA Land Information System (LIS)
- High-performance land surface modeling & data assimilation framework
- Can run a variety of LSMs ( Noah, SiM, Catchment, etc.)
- Supports several static databases for land use and soil classification
- Able to run up to global domains at 1-km grid spacing
- Land surface data assimilation
  - Ensemble Kalman Filter (EnKF) or Direct Insertion (DI)
  - Soil moisture, soil temperature, snow fraction/depth/ETH
- Optimization and Uncertainty Estimation (Liu et al. 2013, J. Hydromet)

LIS modes of operation

Development of LIS Training Module for Situational Awareness Applications

- SPORT-LIS for Drought Monitoring
- SPORT-LIS for Assessing Flood Potential

Example from 17 September 2013 over southwestern U.S.
- Heavy rainfall and flooding occurred in New Mexico during mid-September
- Drought monitoring of integrated soil moisture, soil fatigue revealed in drought classification

Current Applications of SPORT-LIS

Initializing LSM fields in local modeling applications (i.e., WRF model)
- Supported options in the WSO Weather Sciences Training Resource Center’s Environmental Modeling System (EMS; http://dml.geom.ucar.edu/software/ewsensc)
- LIS/GRIB output files uploaded to ftp server in real-time
- EMEs users over U.S. can initialize with LIS LSM fields in place of coarser-resolution, large-scale model fields

Sample Results / Comparison between SE U.S. LIS and CONUS LIS

- LIS/GRIB output files uploaded to ftp server in real-time
- EMEs users over U.S. can initialize with LIS LSM fields in place of coarser-resolution, large-scale model fields

Issues Documented with MRMS Precipitation Dataset

- Beam blockage due to terrain / physical impediments
  - Not just concerns in Rocky Mountains
  - Columbus, MS radar: Rapidly growing trees blocked beams over time at certain azimuths
  - Pattern particularly discernable in integrated soil moisture fields
- LIS is a good tool to identify problems in QPE data through long term integrations

Future Direction

- Upgrade to LIS7 and utilize LIS Validation Toolkit
- Validate LIS against soil moisture observations and field campaign data
- Assemble satellite-based soil moisture from SMOS and SNAP