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Abstract

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NASA SPoRT Initialization Datasets for Local Model Runs in the Environmental Modeling System

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The NASA Short-term Prediction Research and Transition (SPoRT) Center has developed several products for its National Weather Service (NWS) partners that can be used to initialize local model runs within the Weather Research and Forecasting (WRF) Environmental Modeling System (EMS). These real-time datasets consist of surface-based information updated at least once per day, and produced in a composite or gridded product that is easily incorporated into the WRF EMS. The primary goal for making these NASA datasets available to the WRF EMS community is to provide timely and high-quality information at a spatial resolution comparable to that used in the local model configurations (i.e., convection-allowing scales). The current suite of SPoRT products supported in the WRF EMS include a Sea Surface Temperature (SST) composite, a Great Lakes sea-ice extent, a Greenness Vegetation Fraction (GVF) composite, and Land Information System (LIS) gridded output.

The SPoRT SST composite is a blend of primarily the Moderate Resolution Imaging Spectroradiometer (MODIS) infrared and Advanced Microwave Scanning Radiometer for Earth Observing System data for non-precipitation coverage over the oceans at 2-km resolution. The composite includes a special lake surface temperature analysis over the Great Lakes using contributions from the Remote Sensing Systems temperature data. The Great Lakes Environmental Research Laboratory Ice Percentage product is used to create a sea-ice mask in the SPoRT SST composite. The sea-ice mask is produced daily (in-season) at 1.8-km resolution and identifies ice percentage from 0–100% in 10% increments, with values above 90% flagged as ice.

Over land, the SPoRT GVF grids are calculated from Normalized Difference Vegetation Index (NDVI) composites produced using real-time MODIS swath and cloud-mask data obtained from the University of Wisconsin. The compositing technique is similar to the SPoRT SST algorithm in that the most recent 20 days of data from Aqua and Terra MODIS are used for input. NDVI composites are produced once per day at 1-km resolution for a Continental U.S. (CONUS) domain. The daily GVF grids are then calculated from the NDVI composites using the technique outlined in Miller et al. (2006, *Geophysical Research Letters*). Finally, the SPoRT/LIS runs the operational Noah land surface model (LSM) in real time over much of the eastern half of the CONUS. The Noah LSM is continually cycled in real time, uncoupled to any model, and driven

by operational atmospheric analyses over a long-term, multi-year integration. The LIS-Noah thus provides the WRF EMS with high-resolution (3-km) LSM initialization data that are in an equilibrium state with the operational analyses. The SPoRT LIS began including the daily MODIS GVFs into the cycled runs as of early April 2011.

Several NWS offices are using some combination of these datasets to initialize their local WRF EMS model runs including the Huntsville, AL; Houston, TX; Mobile, AL; Melbourne, FL; and Miami, FL. This presentation highlights the SPoRT datasets available to the WRF EMS, provides basic instructions on how to specify the datasets for incorporation into the WRF EMS, and provides some sensitivity examples of forecasts using the datasets.