



# Strategic Implementation Plan (SIP) for a Community-based Unified Forecast System



## Land surface Models (LSM) and Hydrology *Working Group*

*Presented by*

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*Presented at SIP Coordination Meeting*

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# LSM/Hydro WG *Membership*



- *Mike Ek (NCAR/RAL/JNT)\*\**
- *Helin Wei (NOAA/EMC) \*\**
- *Trey Flowers (NOAA/NWS/NWC)\*\**
- Jack Kain (NOAA/EMC)
- Christa Peters-Lidars (NASA/GSFC)
- Tanya Smirnova (NOAA/ESRL)
- Fei Chen (NCAR)
- Brent Lofgren (NOAA/GLERL)
- Elena Shevliakova (OAR/GFDL)
- Sergey Malyshev (OAR/GFDL)
- Chris Milly (OAR/GFDL)
- Randy Koster (NASA/GSFC)
- David Gochis (NCAR)
- David Lawrence (NCAR)
- Brian Cosgrove (NWS/OWP)
- Xubin Zeng (U. Arizona)
- *Co-Chair \*\**



# LSM/Hydro WG

## Accomplishments & Challenges



- **SIP project milestones completed/progress to date:**
  - Noah MP has been extensively tested in FV3GFS (highlight in next slide)
  - Flake was coupled and tested in FV3GFS
  - A parameterization of heat storage in canopy was developed
  - Land-atmosphere interaction scheme was improved
  - National Water Model V2.0 development completed
    - Upgrade includes first-time coverage for Hawaii and an ensemble medium-range forecast configuration.
- **SIP project issues (main challenges):**
  - NCEP/EMC land team leadership
  - Lack of funding to support some SIP projects
  - Need project to examine Noah MP for NWP->S2S



# Testing of Noah MP in FV3GFS



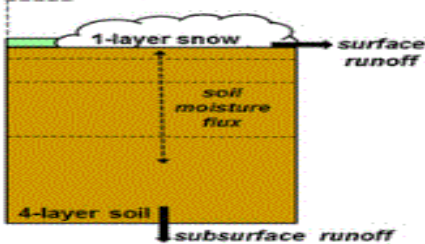
Each cell has average vegetation parameters



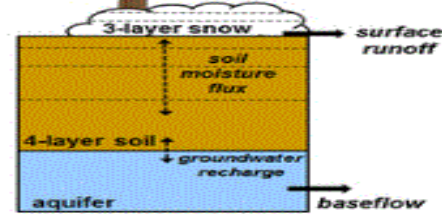
Semi-tile approach for computing longwave, latent heat, sensible heat and ground heat fluxes



Implicit vegetation



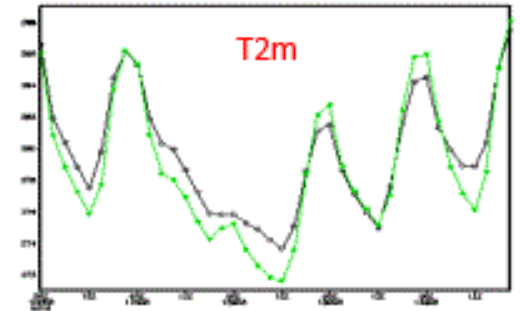
Noah-LSM



Noah-MP

Structure improvement by Noah MP  
Scheme flexibility

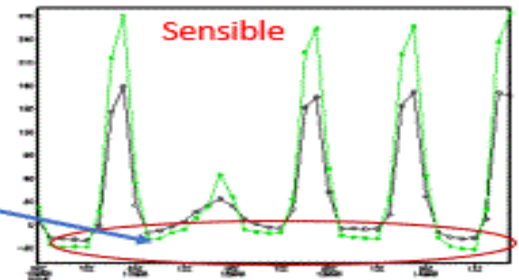
larger diurnal variations



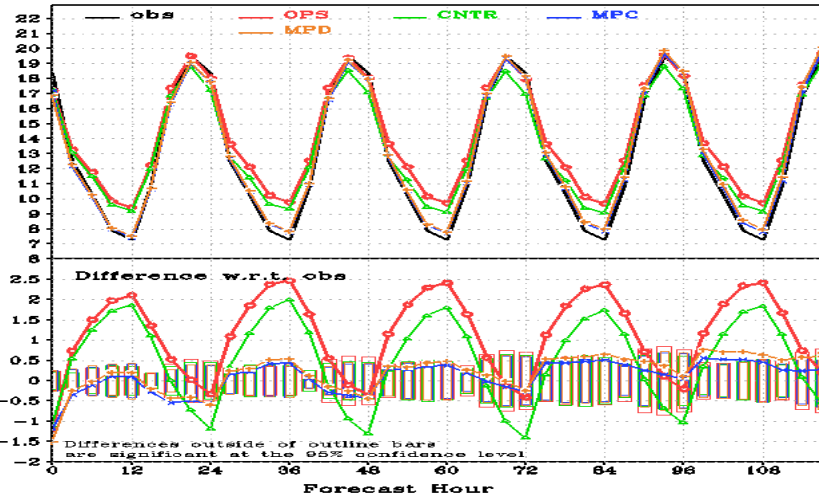
Longtime outstanding issue: nighttime warm biases over Great Plains

significantly improved

allow more energy going down to the ground during nighttime

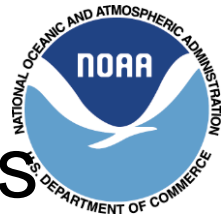


T SFC, Southern Great Plains, 00Z Cycle, 20180306-20180331 Mean





# LSM/Hydro WG



## Team Coordination and Dependencies

- Improved communication between SIP and Community Advisory Committee for Water Prediction(CAC-WP) committees will benefit overall effort with respect to governance and coordination
- Improved coordination with DA WG to expedite land DA into UFS. Future role of NLDAS/NULDAS/LIS?RUC?LM4?
- Follow up with SA WG on land-hydrology-atmosphere and land-hydrology-marine coupling strategy still needed.
- Follow up with Verification WG on land/hydro-specific verification and process-based benchmarking.
- Continue to improve land physics/land data sets, accelerate land DA efforts and test S2S time frame
- WG membership (land DA, physics: surface-atmosphere interaction)