LSM/Hydro WG
Membership

• Mike Ek (NCAR/RAL/JNT)**
• Helin Wei (NOAA/EMC) **
• Trey Flowers (NOAA/NWS/NWC)**
• Jack Kain (NOAA/EMC)
• Christa Peters-Lidard (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)

• Co-Chair **
• Randy Koster (NASA/GSFC)
• David Gochis (NCAR)
• David Lawrence (NCAR)
• Brian Cosgrove (NWS/OWP)
• Xubin Zeng (U. Arizona)
Strategic Implementation Plan (SIP) for a Community-based Unified Forecast System

Land surface Models (LSM) and Hydrology Working Group

Presented by
Helin Wei, EMC/NOAA

Presented at
Coordination Meeting for the Unified Forecast System
Strategic Implementation Plan (SIP) Annual Update
August 2, 2018; College Park, MD
SIP project accomplishments to date:
- Noah MP and Flake were in-line coupled to the FV3GFS
- LIS was externally coupled to the NEMSGFS
- NULDAS forcing strategy developed, GLDAS V2.0 dev complete
- The impact of snow DA on FV3GFS was initiated
- National Water Model V1.2 implemented into operations
- National Water Model V2.0 development completed
- OWP Analysis of Record for Calibration (forcing) completed

SIP project issues:
- Lack of high-quality land dataset for land DA
- Further clarification needed on hydro-NWM coordination
- Resource identification challenging in constrained environment
NEMS UGCS-Seasonal 0.5 was released in June 2017. This milestone includes the existing three-way coupled system (ATM, OCN, ICE), a land component (LND), and a hydrology component (HYD). This milestone is a scientifically valid one-way coupling from GSM to LIS and LIS to WRF-Hydro, the core of the NWM.

NEMS UGCS-Seasonal 0.6 was released in February 2018. This milestone includes the current three-way coupled system (ATM, OCN, ICE), a land component (LND), and a hydrology component (HYD). This milestone includes soil moisture feedback from HYD to LND and land surface state feedback from LND to ATM.

NEMS UGCS-Seasonal 0.7 is an internal release to demonstrate physically realistic atmosphere-land coupling using an external land model with field exchanges through the NEMS Mediator. This release enables surface fields from LIS to be coupled back to GSM, thereby establishing two-way atmosphere-land feedbacks.
GSM_MOM5_CICE was initialized with April 1, 2015 CFSR-based initial conditions, and the LIS component reads the April 1, 2015 initial conditions from a custom binary format. The coupled configuration was run for 48 hours, and the above figures show 12-hr forecasts.
LSM/Hydro WG
Team Coordination and Dependencies

- Follow-up with SA WG on land-hydrology-atmosphere and land-hydrology-marine coupling strategy needed. Where appropriate coordinate with coupling work underway as part of Integrated Water Prediction effort.
- Follow-up with Aerosols/Chemistry WG on BVOC/Dust emissions & deposition velocity still needed.
- Follow-up with Verification WG on land/hydro-specific verification and process-based benchmarking.
- Follow-up with DA WG on JEDI and land/hydro DA needed. Proceed with LIS-based EnKF DA for LDAS-related work.
- Follow-up with Governance on UMAC-CACWP interactions
- Internal SIP dependencies are only one challenge—how does land/hydro align and collaborate across varied modeling efforts which feature different focus and operational/research missions?