

NOAA Operational Land DA: status and plans

Clara Draper (NOAA ESRL/PSD)

with input from Daryl Kleist (NOAA NCEP),

Greg Fall (NOAA NOHRCS)

Stan Benjamin and Tanja Smirnova (NOAA ESRL/GSD)

ISWG Meeting, July, 2019



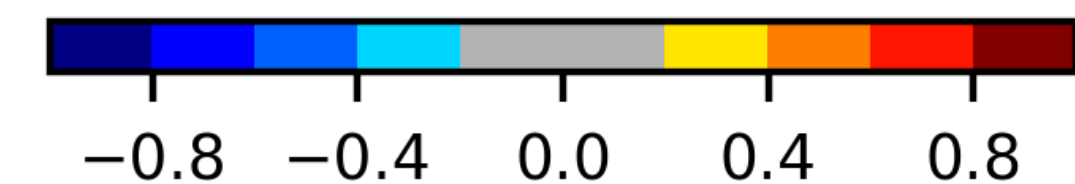
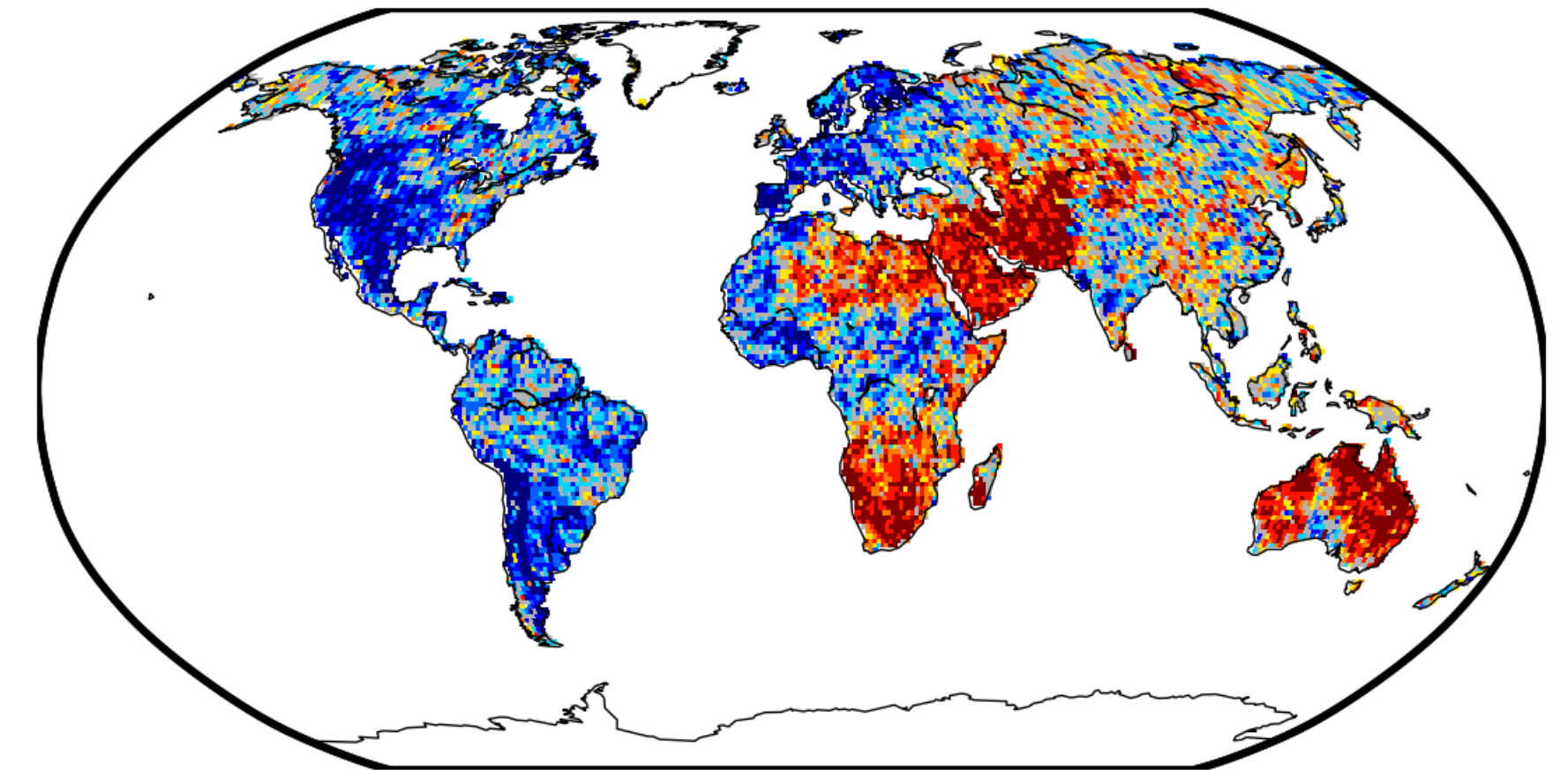
Operational land DA status at NOAA

- HRRR/RAP (regional, short-range forecasts at 3-km with hourly updating)
 - 2-m T & Td assimilated to update the atmospheric boundary layer, soil moisture, soil temperature, and snow temperature, using an OI-type scheme
 - NESDIS IMS 4-km snow data used to update snow cover area (ruled-based update)
- GFS (global, short/medium range forecasts)
 - NESDIS IMS snow cover area and AFWA snow depth are assimilated using a simple rule-based scheme
- CFS (global, seasonal)
 - Snow DA as above
 - Surface fields updated once daily with fields forced with observed precip (GLDAS).
- Hydrology systems:
 - SNODAS snow pack analysis from NOHRSC uses a subjective analysis to incorporate ground-based, air-craft, and satellite obs

Planned operational land DA at NOAA

- HRRR/RAP
 - Switching to NOAA FV3 dynamic core
 - Implement soil temperature/moisture and snow temperature/depth cycling over the HRRR domain.
 - Introduce an EnKF-based land DA scheme (from below)
- GFS
 - Updating the land model from Noah to Noah-MP
 - Introduction of an EnKF based land DA scheme
 - Weakly coupled snow DA developed using LIS
 - GSI/JEDI scheme under development for 2-m obs. (potentially strongly coupled)
 - Use observed precipitation to force the land surface

GFS Ensemble correlation sm1, T2m
[00 UTC]



GFS has unexpected night-time+ve relationship between soil moisture and temperature. Expected to be fixed in Noah-MP. May not be able to successfully assimilate 2m until land model has been updated.

Planned operational land DA at NOAA

- CFS global, seasonal
 - As above
- Hydrology systems:
 - Modernize NOAA land surface models to assimilate snow observations using JEDI, and merge the capabilities of SNODAS and the National Water Model