A preliminary assessment of the water and energy budgets in the NARR

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with contributions of the NARR Team(2)

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Objectives

“To understand the regional differences in the water and energy budgets and how they relate to soil moisture memory”

“To improve our understanding of the regional nature of land surface-atmosphere feedbacks, and their role in the variability and predictability of the hydrologic cycle of North American basins”
Motivation (1): Evolution of the SWB in the Op Eta

From Luo et al, 2005, JHM (in review)
Motivation (2): Land-atmosphere interactions in Op Eta Mississippi River Basin

From Berbery et al. (2003)
Diverse climate regimes:

1. **Mississippi basin**: summer precipitation associated with LLJ

2. **Western US basins**: complex topography and significant cold season snowfall and with a much larger runoff fraction

3. **Monsoon prevalent regions**: strong summer hydrologic cycle associated with North American Monsoon
Precipitation differences

Operational Eta – Obs

Regional Reanalysis - Obs
Seasonal variability of precipitation

- $P_{RR}$
- $P_{CPC}$
- $P_{UW}$
- $P_{RR} - P_{CPC}$
- $P_{RR} - P_{UW}$
NARR

The surface energy budget
SEB
Seasonal variability

Net Rad
SHF
LHF
GHF
Res
SEB
Multi-year time series

Net Rad
SHF
LHF
GHF
Res

(a) Mississippi basin
(b) Arkansas/Red basin
(c) Missouri basin
(d) Upper Mississippi basin
(e) Ohio basin
(f) Columbia basin
(g) Colorado basin
(h) Core Monsoon Region
SWB
Seasonal variability

(a) Precipitation (mm/day)
(b) Evaporation (mm/day)
(c) Runoff (mm/day)
(d) Change in soil water (mm/day)

P E N dW/dt Res
Annual mean Residual Field

Annual mean Residual Field

(a) Residual of the surface water balance
SWB
Multi-year time series

P
E
N
dW/dt
Res
The interannual variability of the summer diurnal cycle of precipitation
LS-A interactions results:

19\textsuperscript{th} Conference on Hydrology
Session 4: Land Atmosphere Interactions II

Tomorrow, 2 pm, Room 6D

4.5 Regional Aspects of the North American Land Surface-Atmosphere Interactions: Analysis of NCEP Regional Reanalysis Data

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