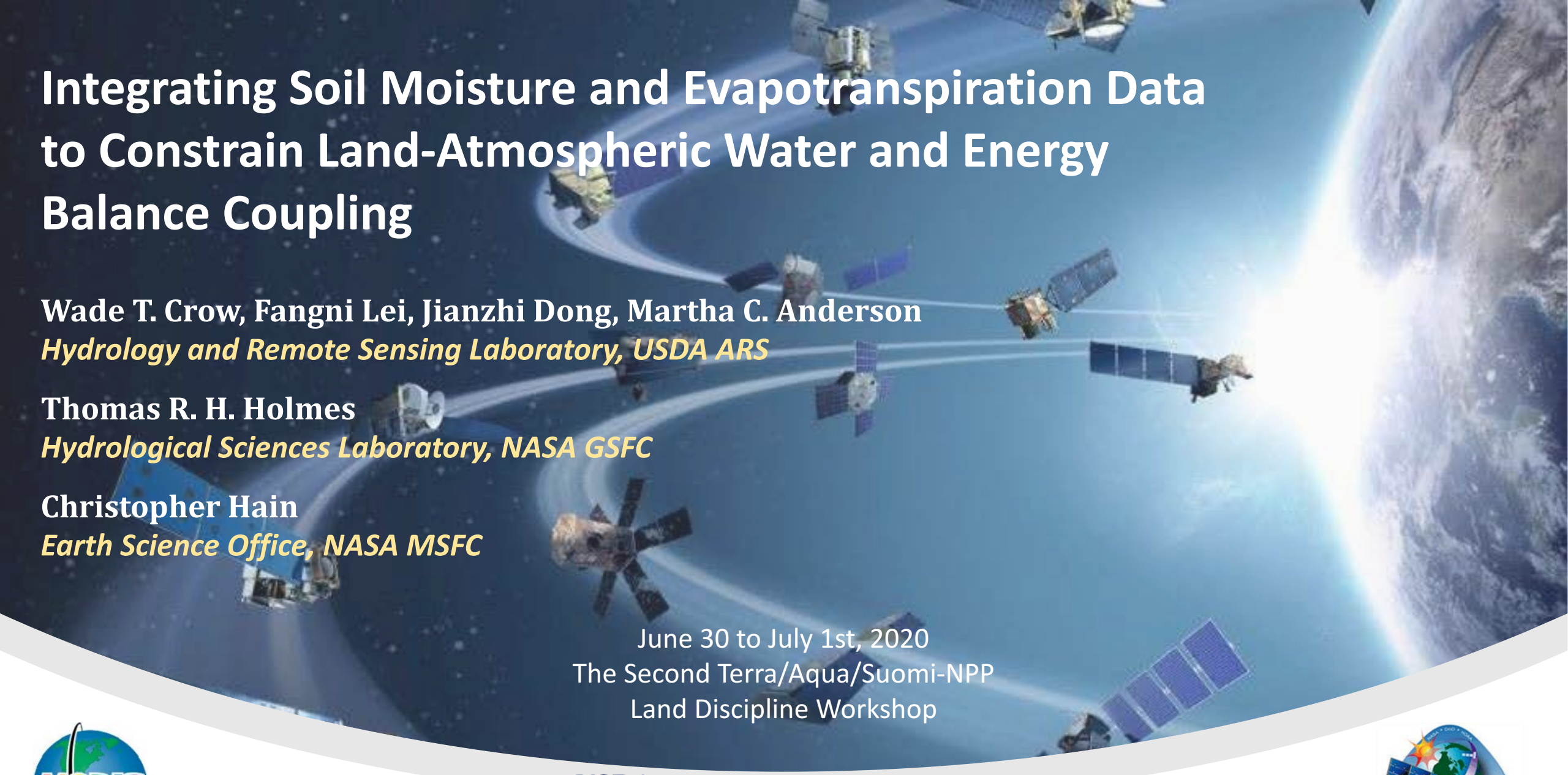


Integrating Soil Moisture and Evapotranspiration Data to Constrain Land-Atmospheric Water and Energy Balance Coupling

Wade T. Crow, Fangni Lei, Jianzhi Dong, Martha C. Anderson
Hydrology and Remote Sensing Laboratory, USDA ARS

Thomas R. H. Holmes
Hydrological Sciences Laboratory, NASA GSFC

Christopher Hain
Earth Science Office, NASA MSFC

June 30 to July 1st, 2020
The Second Terra/Aqua/Suomi-NPP
Land Discipline Workshop

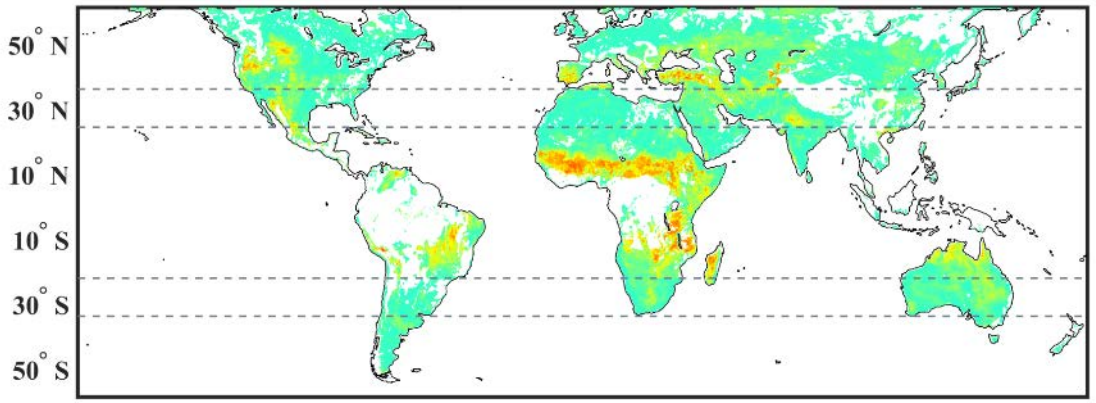
MODIS NASA/GSFC SBRC

USDA United States Department of Agriculture
Agricultural Research Service

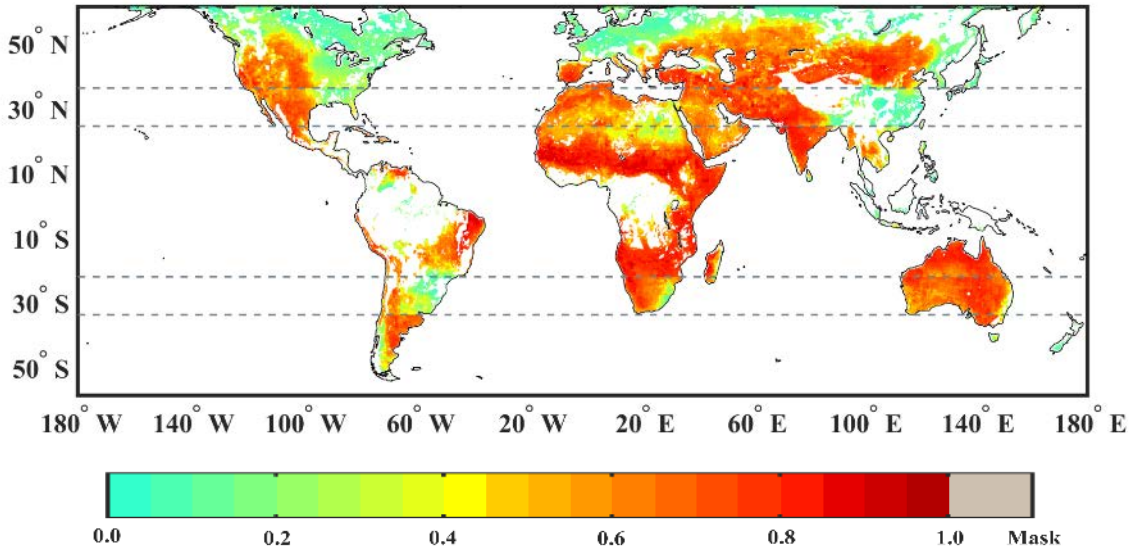
S-NPP SUOMI NATIONAL POLAR-ORBITING PARTNERSHIP

Estimating SECS Bias

Remote Sensing $R^2[SM_{RS}ET_{RS}]$



GLDAS LSMs $R^2[SM_{LSM}ET_{LSM}]$

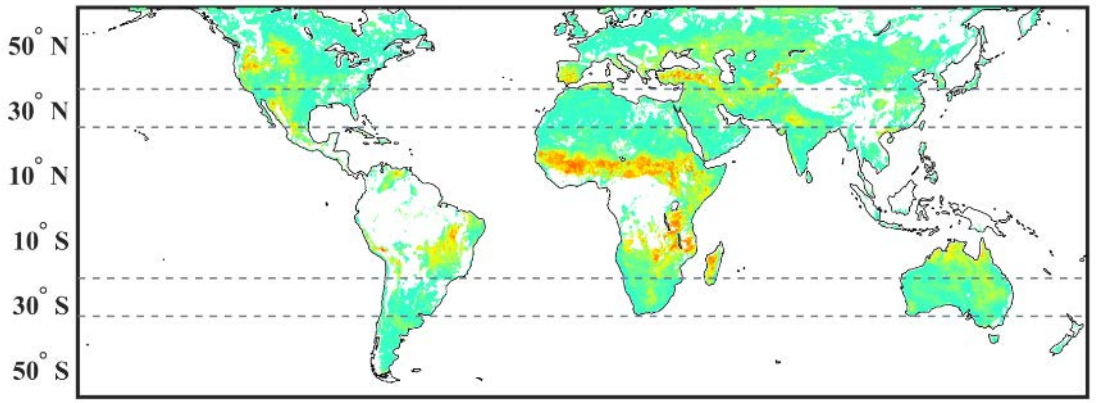


Soil Moisture-Evapotranspiration Coupling Strength (SECS)

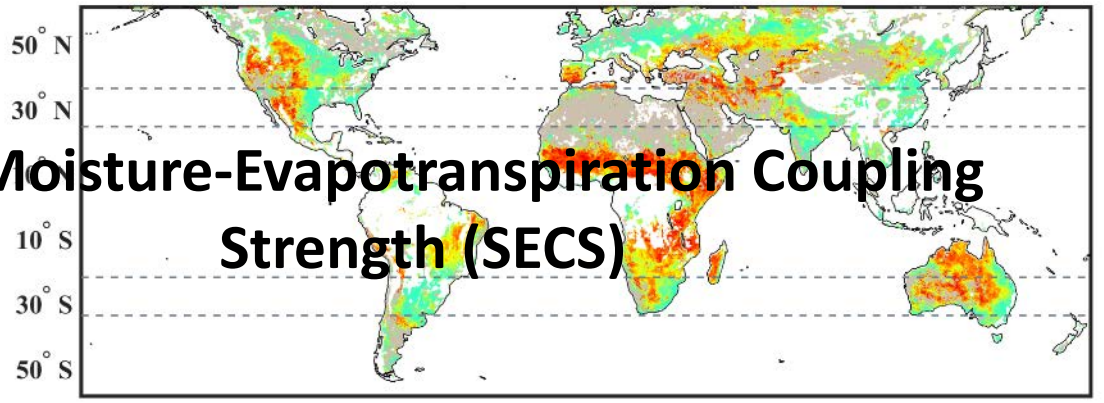
Are models over coupled or are remote-sensing coupling estimates biased low due to random retrieval errors?

Estimating SECS Bias

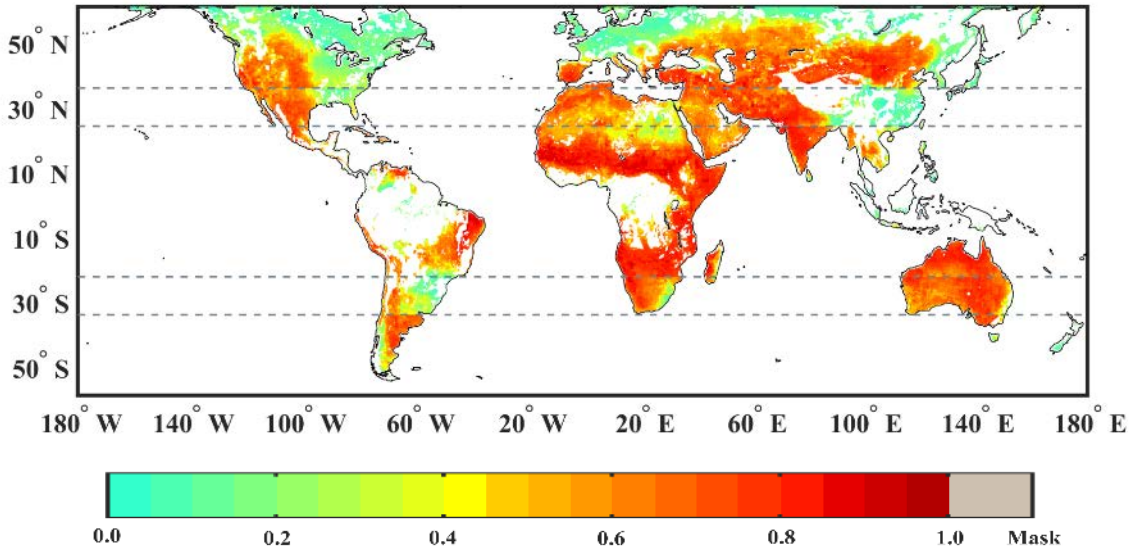
Remote Sensing $R^2[SM_{RS}ET_{RS}]$



Triple Collocation $R^2[SM_{TC}ET_{TC}]$



GLDAS LSMs $R^2[SM_{LSM}ET_{LSM}]$



Soil Moisture-Evapotranspiration Coupling Strength (SECS)

SM-ET Coupling Strength (SECS) Bias

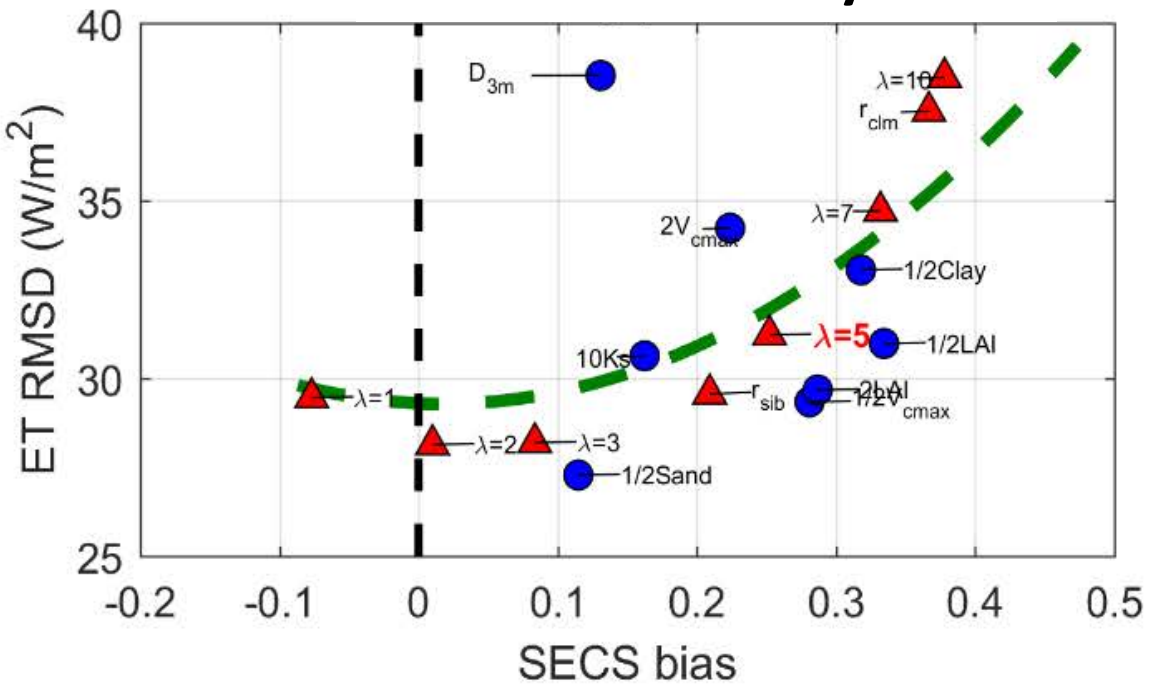
Are models over coupled or are remote-sensing coupling estimates biased low due to random retrieval errors?

What is the consequence of SECS bias on land model ET estimates?

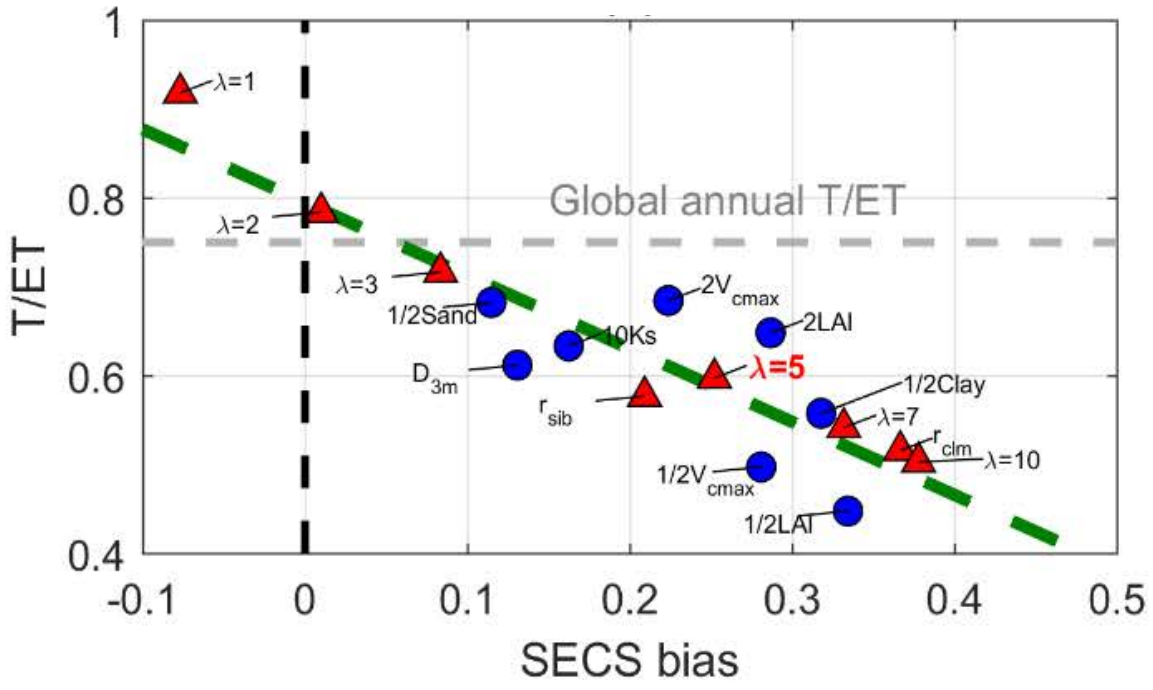
Optimizing Noah-MP over Sites

Ensemble of Central US NOAH-MP runs applying a range of ET and SM parameterizations

ET RMSD Accuracy



Transpiration/Evaporation Partitioning



Dong et al., Bare soil evaporation stress determines soil moisture - evapotranspiration coupling strength bias in land surface modeling. In submission. *Scientific Reports*. 2020.