Uncertainty in Land-Atmosphere Coupling Classification Using SMAP Level 3 and Level 4 Soil Moisture Products

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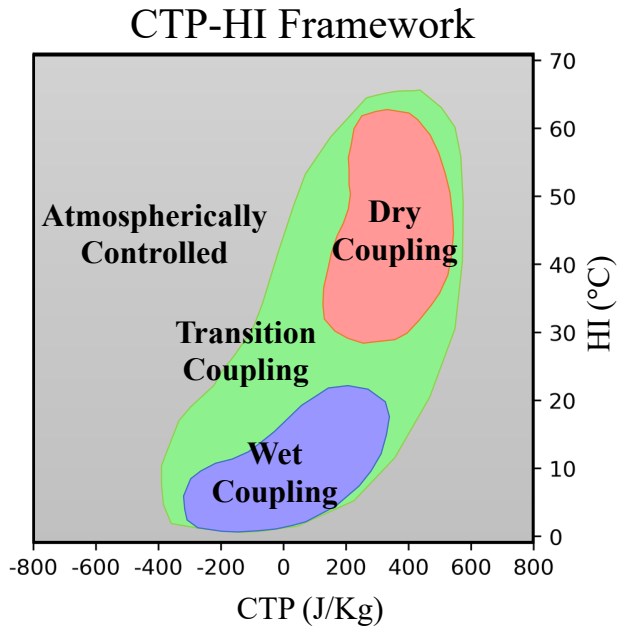
Coupling Classification Framework



CTP-HI framework was developed by Roundy et. al. (2013)

Calibration Period of CTP-HI framework: April 2015 to 2022

Simulation	Soil Moisture
SMAPL3	Soil Moisture from SMAP Level 3
SMAPL4	Soil Moisture from SMAP Level 4

Convective Triggering Potential **(CTP)**

Humidity Index **(HI)**

} **Atmosphere state**

Soil Moisture (SM) } **Land state**

Dataset for CTP and HI

MERRA2 **CFSR** **ERA5**

Merged CTP and HI Using Triple Collocation (2003 to 2022)

(Makhasana et. al. (In prep))

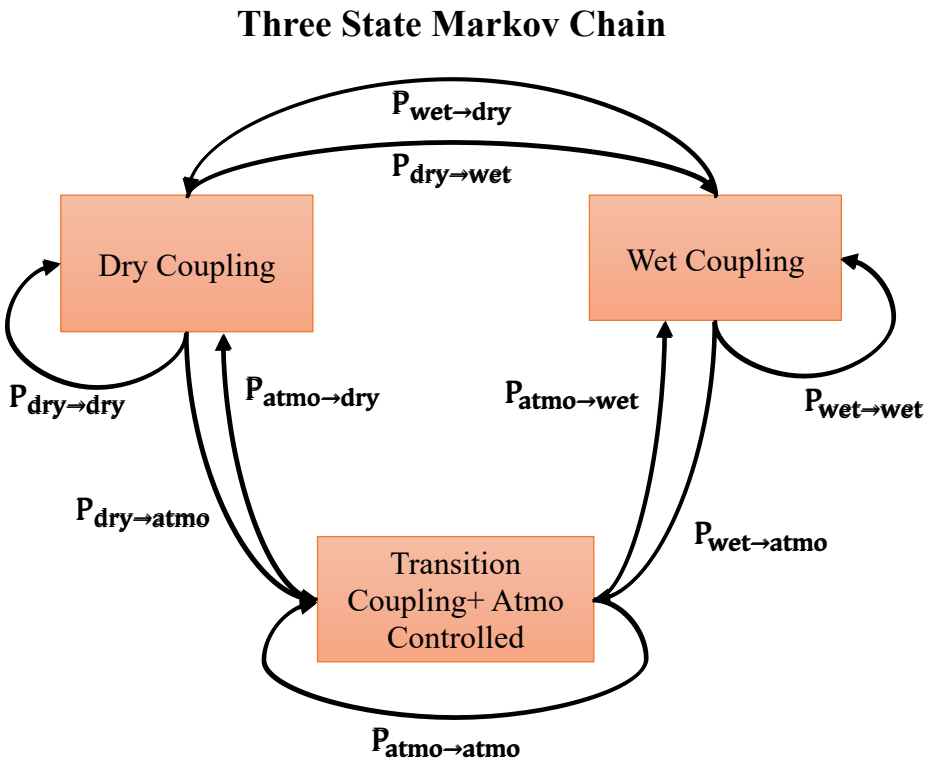
Dataset for SM

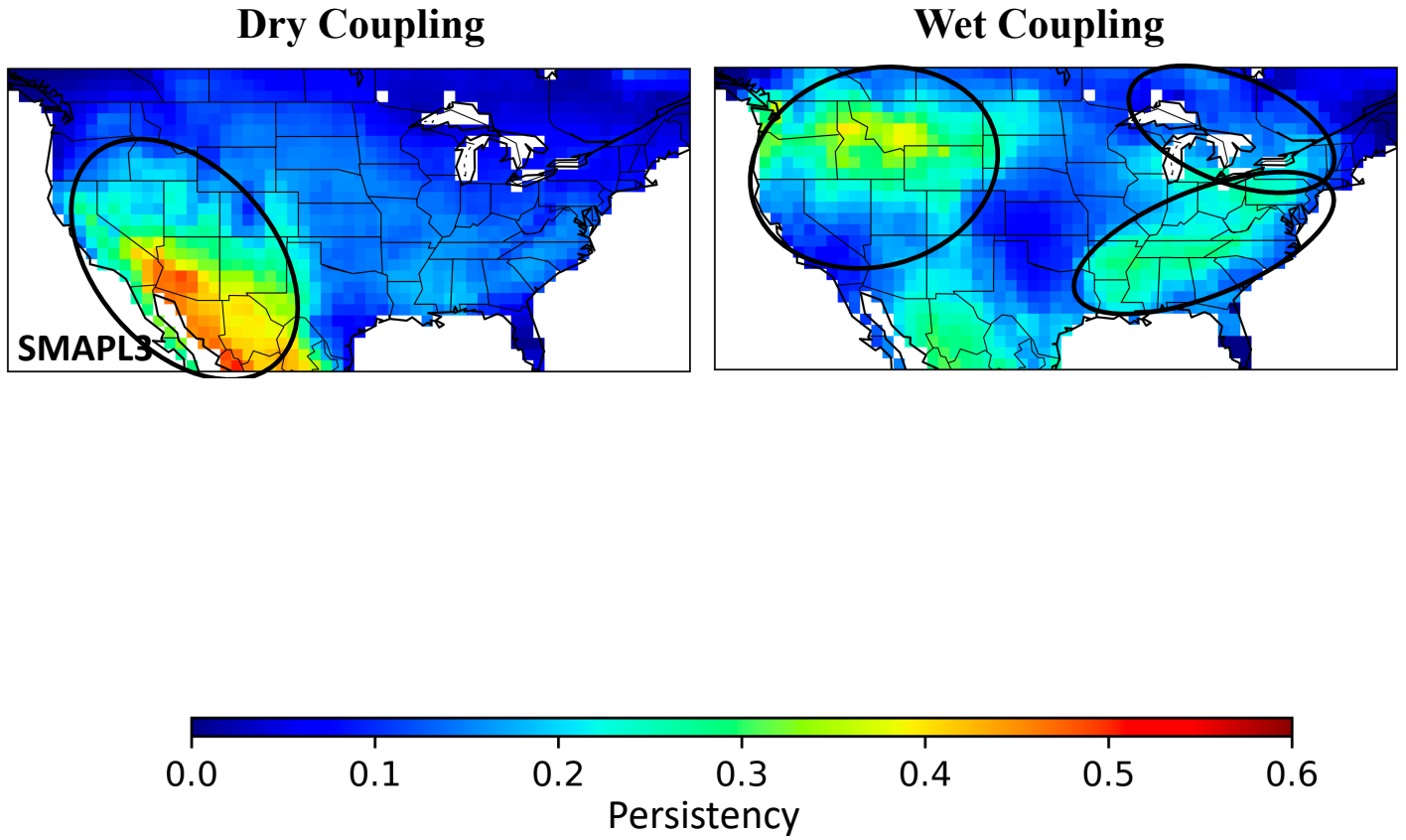
SMAP Level 3 **SMAP Level 4**

Data length: April 2015 to 2022

How different soil moisture influence the coupling classification?

Probable Persistency:





SMAPL4 have a higher persistency

Does the same pattern of persistency occur all around the world?

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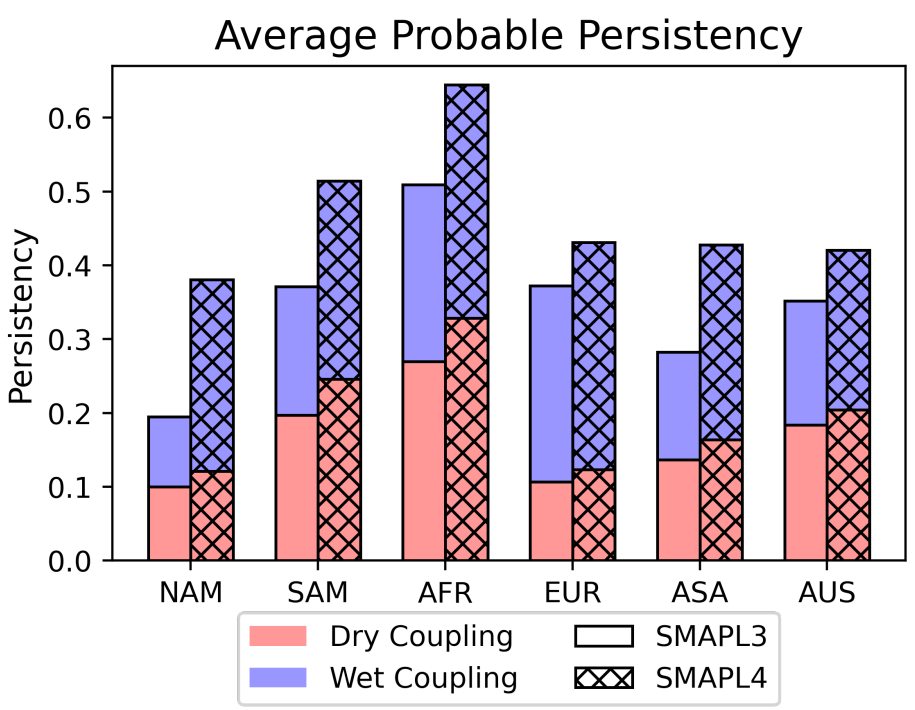
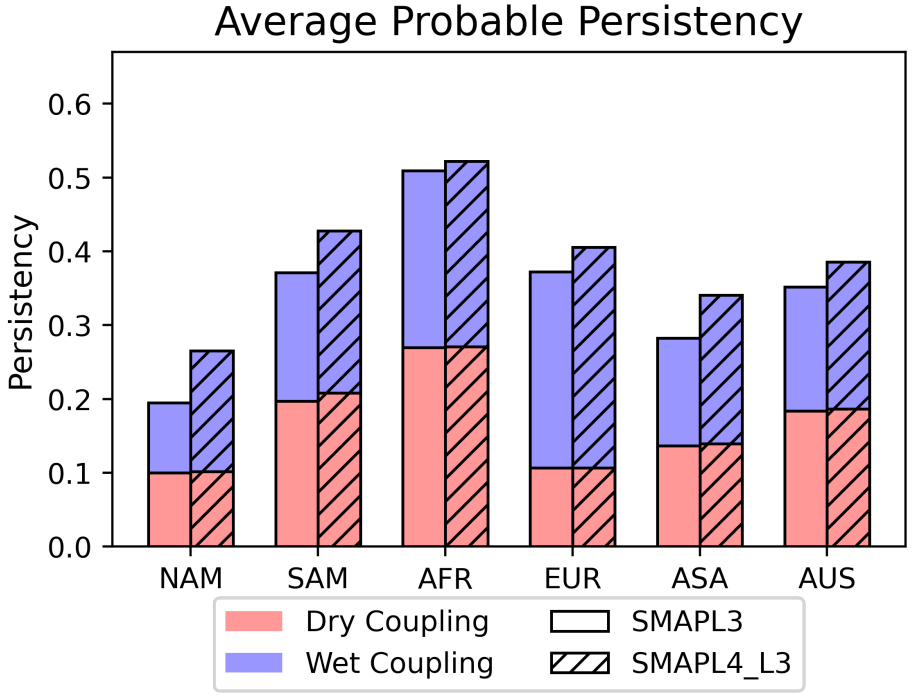


Results sensitive to Numbers of Observation



Consistent Number of Observations

Simulation	Soil Moisture
SMAPL4_L3	SMAP Level 4 soil moisture data when SMAP Level 3 data is accessible

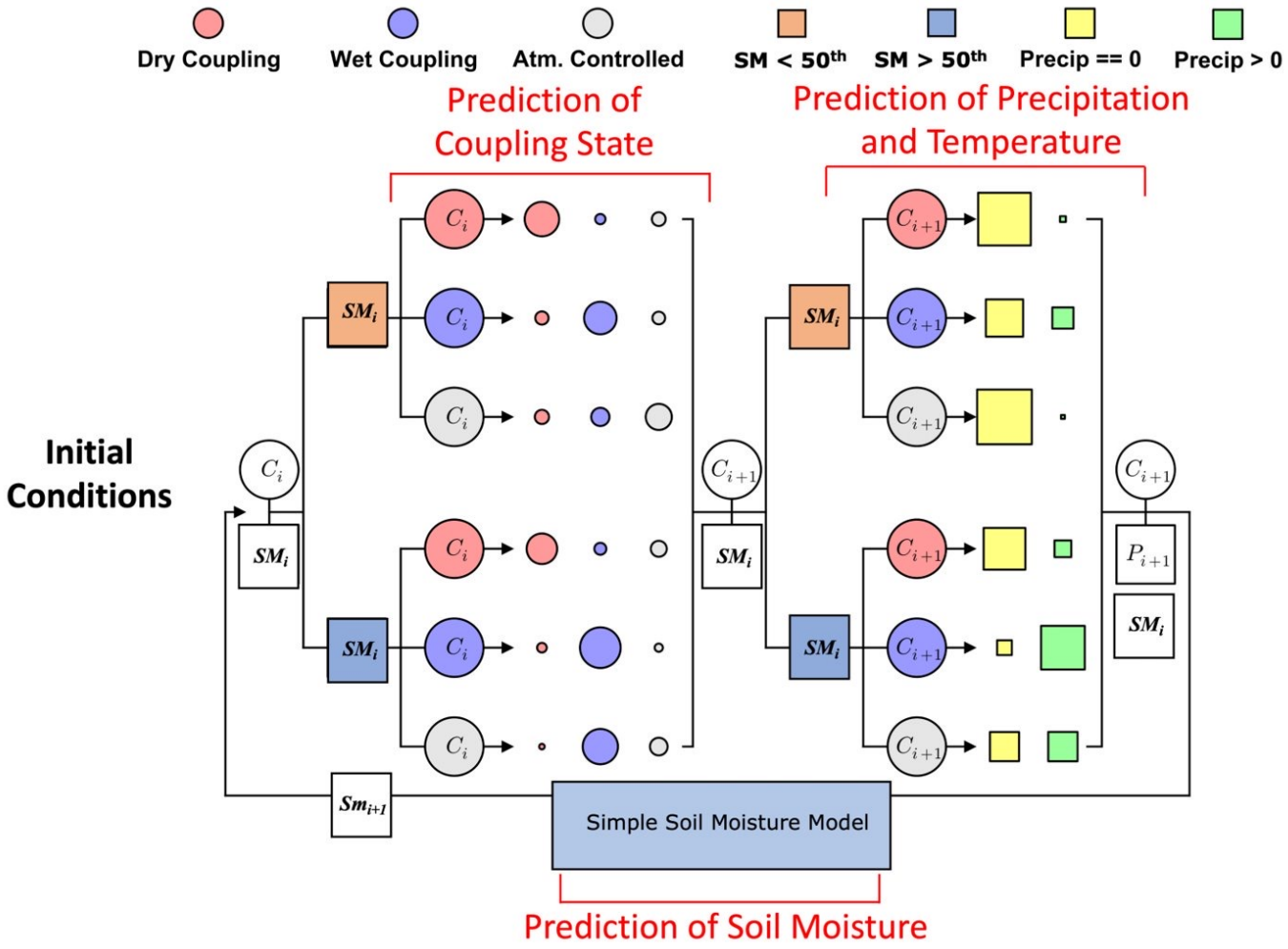
SMAPL4's higher persistency in dry regimes is sensitive to the number of observations.

SMAPL4 shows higher persistency over wet coupling regime

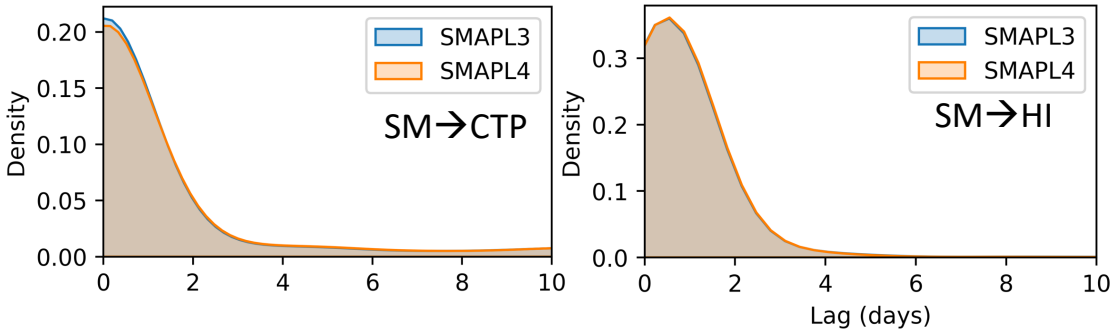
Future work:

Goal: To develop short-term drought prediction model based on the L-A interaction

Coupling Stochastic Model



Maximum Predictability



SMAPL4 exhibits persistent coupling behavior and a presence of wet bias

Future Goal: Determine whether SMAPL4 significantly enhances the precision of drought predictions relative to those derived from SMAPL3

Thank You!

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