Motivation

- Soil moisture (SM), through its direct limiting effect on surface evapotranspiration (ET), modulates feedbacks between the land surface and the lower atmosphere. For regions with a strong causal relationship between SM and ET, this coupling can significantly affect terrestrial water, energy, and biochemical cycles in a changing climate.

Materials

- Remote Sensing-based Evapotranspiration Products
- Remote Sensing-based Soil Moisture Products

Methodology

- Triple Collocation-based Coupling Strength Metric

Results and Discussion

- Global Land Data Assimilation System Land Surface Models
- Remote Sensing-based $R^2[SM_{LSM}, ET_{LSM}]$
- Our Triple Collocation-based $R^2[SM_{TC}, ET_{TC}]$

Conclusions

- Quasi-global maps of unbiased SM/LH coupling strength estimates are obtained via integrating multi-platform satellite data through triple collocation.
- RS-based coupling strength estimates are prone to large negative biases and thus insufficient for directly benchmarking the true SM/LH coupling relationship.
- Regions with strong SM/LH coupling are found over western North America, the Sahel, Central Asia and Australia.

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