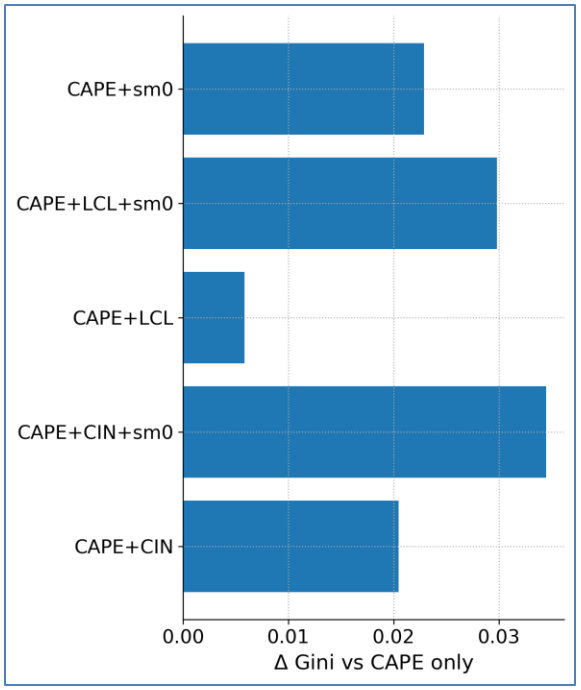
Does soil moisture from SMAP help us predict heavy precipitation?

Problem: How does soil moisture influence when and where convective storms form? We combine satellite observations of the surface (SMAP) and atmosphere (AIRS) to quantify the links.

Figure: The change in Gini score vs. CAPE only, where a high Gini score indicates that the estimator is doing a good job at predicting the outcome—precipitation. CAPE is Convective Available Potential Energy, where high values correlate with potential for severe weather. CIN is convective inhibition. sm0 is soil moisture from the pre-storm environment.



Finding:

- small improvement in precipitation prediction from soil moisture
- Soil moisture at the initial time adds more info than either LCL (cloud base height) or CIN
- mean soil moisture correlates with later occurrence of heavy precipitation

Impact: Soil moisture can be used as a predictor of heavy precipitation

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