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How you cannot find rain with changes in land surface temperature

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Estimating precipitation from space-born sensors is valuable source of observation in poorly-gauged regions. For example, hydrological modelling and monitoring greatly benefits from the increased near-real time data availability for improved accuracy in the simulations of water resources. As is true for all satellite product, precipitation estimated from space are far from perfect and scientist have used many techniques to improve their accuracy.

In this study, I tried to improve the space-born precipitation estimates by using remotely sensed soil moisture to observe sudden increases in soil wetness as a result of precipitation. After a month of massaging the data and applied methodology I realized that the gain was very marginal and I was drilling a dry hole. Driven by these disappointing results I tried some random other satellite products to see if they showed correlation with the precipitation signal. There I found a causality that I had not expected at the start of this study, linking land surface temperature to precipitation.

It seemed that using changes in land surface temperature strongly correlated with precipitation totals, driven by a cooling of the soil as a result of increase wetness. This link could not only be modelled, but more surprisingly it could be observed from space and used to improve the satellite precipitation estimates. The reduction in the precipitation uncertainty was far better than for any of the three soil moisture products, contrary to what one might expect.

This was far from the anticipated result but it showed me that sometimes you should think out of the box and not only use observations for their intended purpose. This experience has motivated me to not only use the obvious observation or method and try techniques and methods from other disciplines to see if we can improve our understanding of the hydrological cycle.