Poster #41

Detection and Attribution of the Terrestrial Runoff in the Conterminous United States

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Detection is the process of demonstrating that change has occurred in a defined statistical sense, while attribution is the process of establishing the most likely cause for the detected change with some defined level of statistical confidence. Though the statistical methods of Detection and Attribution (D&A) have been widely used in studies of physical climate variables (e.g., temperature, precipitation and extreme events), their applications on terrestrial ecosystem (e.g., vegetation dynamics, carbon fluxes, and hydrologic cycles) are limited, mainly owing to the lack of long-term observational records and credible model simulations. With the recent availability of long-term runoff observations (1950-2013) and multiple factorial model simulations in continental U.S., we are in a unique position to detect and attribute the multi-year changes of terrestrial runoff from local to continental scales. To disentangle the natural and anthropogenic drivers (e.g., climate change, elevated CO_2 concentration, and land use/land cover change) underlying spatiotemporal changes in runoff, we'll carry out formal and modified D&A analysis using single-factor simulations from fully-coupled Earth system models and offline land surface models, including the latest ACME land model. We hypothesize that in addition to climate change effects, particularly the precipitation, observed runoff trends can also be attributed to individual and combined human effects. The importance of each natural and human drivers, however, is regionally and seasonally dependent.