# SMAP Identifies a Key Source of Error in Streamflow Forecasts from Land Surface Models

**Problem:** Land surface models (LSMs) are commonly used for important weather and hydrologic forecasting applications. However, they often fail to accurately represent even basic hydrologic processes. This limits their ability to contribute value to forecasts.

Fig. 1

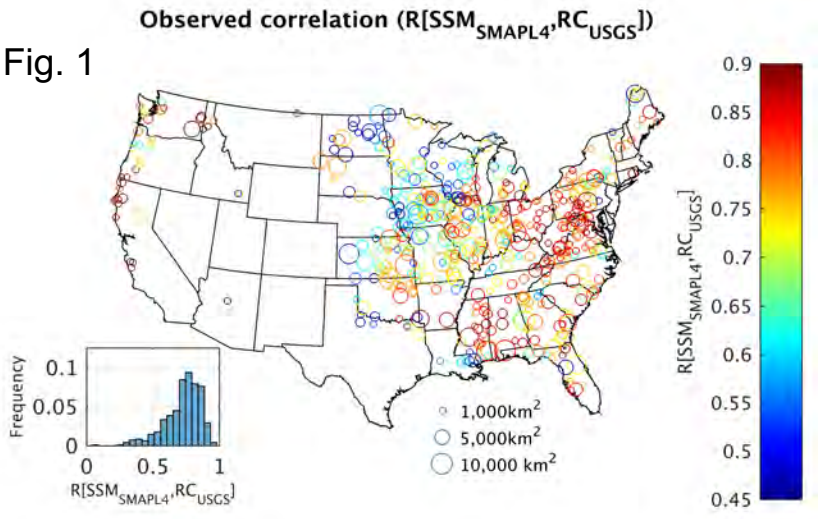
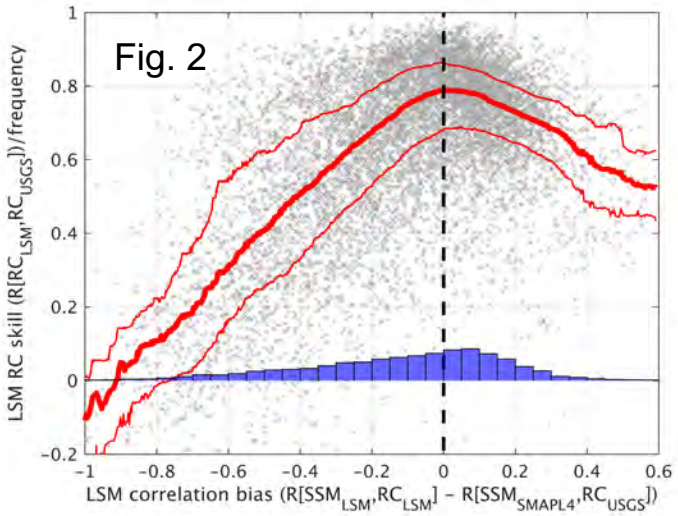



Fig. 2




**Finding:** SMAP provides a new way to evaluate LSMs. For the first time, we can reliably measure the correlation between pre-storm surface soil moisture (SSM) and within-storm runoff correlation (RC, defined as streamflow/rainfall for a storm event) [Fig. 1].

**Impact:** LSM's that correctly estimate SSM-RC correlation tend to also produce the best streamflow estimates [Fig. 2]. In contrast, poor forecasts are generally associated with an unrealistic level of SSM-RC coupling. Therefore, SMAP SSM identifies the source of critical LSM errors that degrade operational streamflow forecasts.

Crow, Chen, Reichle, Xia, 2019: Diagnosing bias in modeled soil moisture/runoff coefficient correlation using the SMAP Level 4 soil moisture product, *Water Resources Research*.