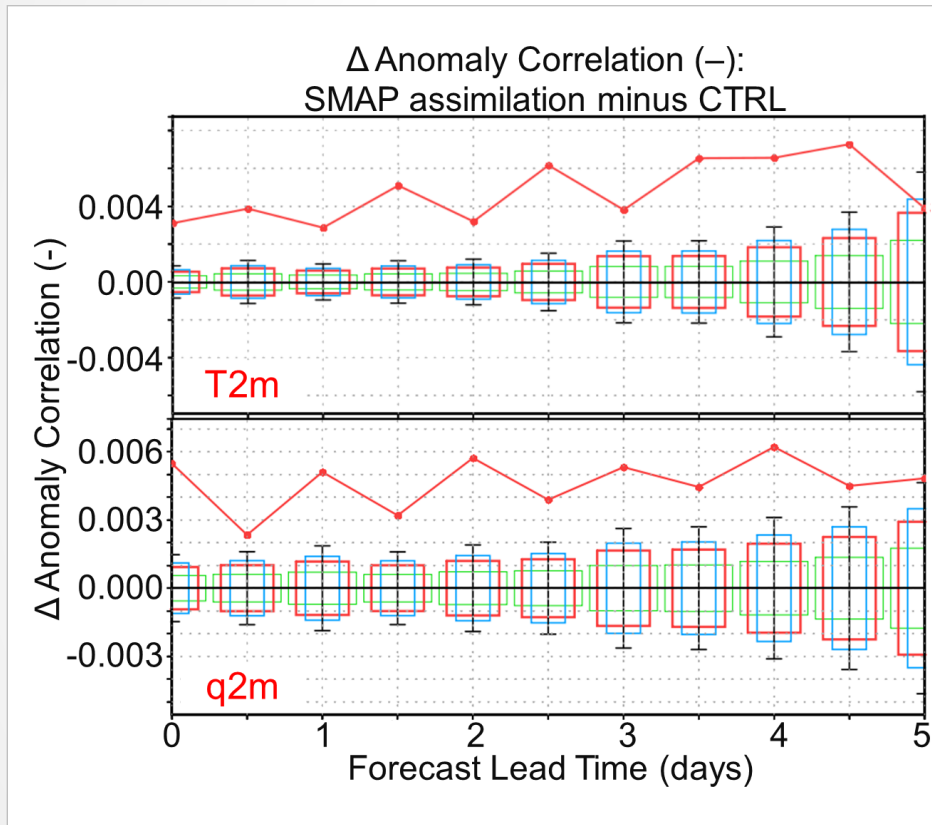


SMAP Radiance Assimilation Over Land Improves GEOS Medium-Range Forecasts of Near-Surface Air Temperature and Humidity



The Soil Moisture Active Passive (SMAP) mission is designed to measure soil moisture from space.

Assimilating SMAP observations into the Goddard Earth Observing System (GEOS) weather model significantly improves forecasts of 2-meter air temperature (T2m) and specific humidity (q2m) at lead times out to 5 days, compared to a control (CTRL) experiment without SMAP assimilation.

The results demonstrate the potential of SMAP observations for improving global operational weather analysis and forecasting systems.

The red lines in the figure at the left show the forecast skill difference with and without SMAP assimilation as a function of lead time; skill differences are shown for T2m (top) and q2m (bottom), averaged over global land for Jun-Aug 2017. Skill is measured by the anomaly correlation vs. the ECMWF operational analysis.

SMAP assimilation provides statistically significant improvements where values exceed the confidence levels indicated by the boxes (green: 68%, red: 90%, blue: 95%) and error bars (black: 99%).