Abstract

Sub-Saharan Africa is one of the most vulnerable regions to climate variability and change because a large percentage of people depend on rainfed agriculture for their livelihoods. Although adequate water availability is obviously vital to the success of crops, characterizing the detailed relationship between water availability and crop yield has historically been challenging in this region due to limited data. Here, we analyze interdependencies amongst soil moisture, near-surface temperature and winds, and maize yields using several recently-available data streams. Soil moisture observations come from the recently-launched Soil Moisture Active Passive (SMAP) satellite, and yield is estimated using solar-induced fluorescence from the Global Ozone Monitoring Experiment-2 (GOME-2) instrument along with survey data from the USDA National Agricultural Statistics Service (NASS) and Food and Agriculture Organization (FAO). Focus is on discerning spatial variations in the present-day yield response to combinations of water availability and demand. These response functions are then integrated with future changes in soil moisture and water demand indicated by an ensemble of climate models in order to examine implications for future changes in yield.