



Australian Drought and Bushfires Had Major Effects On Local Water Storage Patterns



Sujay Kumar (617)

Southeast Australia faced unprecedented drought and fires in late 2019 and early 2020, with roughly 25 million acres burning. We examined how these vegetation changes impact the way the land interacts with water (hydrology) using land surface models and remote sensing data from the Soil Moisture Active Passive satellite (SMAP) and the MODIS instrument on the Terra and Aqua satellites. We found that changes in vegetation from fires had a significant impact in reducing the presence of vegetation that led to less evaporation and more runoff, with runoff increasing by as much as 14%.

Changes in the local hydrology can have major societal impacts. For example, the increase in runoff from vegetation removal likely had an important contribution to February 2020 flooding that occurred in Southeast Australia following the fires of the preceding months. Approximately 10 million people were at risk from the post-fire flooding that ensued. Characterizing vegetation changes with remote sensing information can not only assist with hazard monitoring, but also can be important for forecasting impacts on local hydrology.

Our study shows the intimate linkages between vegetation and the water cycle. Since the effects on the landscape from fires can be broadly characterized through remote sensing, this study also highlights the critical utility of such measurements in informing societal impacts.

