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## Impacts of wildfires on the 2020 floods in southeast Australia: A vegetation data-assimilation case study using the NASA coupled LIS/WRF-Hydro system

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In late 2019 widespread wildfires impacted much of the New South Wales province in south east Australia, and this loss of vegetation contributed to increased surface runoff and consequently major flooding caused by extreme rainfall by early 2020. The recently developed NASA LIS/WRF-Hydro system enables the data assimilation (DA) capabilities of the NASA Land Information System (LIS) and the surface hydrological modeling capabilities of the WRF-Hydro model to be combined in a single model architecture. Combining the DA capabilities of the LIS system with WRF-Hydro, which has been used for both research and operational hydrologic simulations, we investigate the impacts of vegetation DA on the simulated floods in several basins across New South Wales, with varying degrees of burn severity from the 2019 fires. We also consider the impacts of the wildfires, as realized through vegetation DA on water partitioning and the surface energy budget, which both have implications for L-A interactions. For DA, we utilize the leaf area index retrievals from MODIS and vegetation optical depth from SMAP. For the present study, we will quantify the impact of the changes to the landscape brought about by the wildfires on hydrologic response, including flood severity, which would not be possible without the DA capabilities of the LIS/WRF-Hydro system.