

**Modeling Detection Biases in Remotely Sensed and Agency Reported Fires in the U.S. 2003-2013**

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Understanding fire dynamics is vital for managing fires in an economically and ecologically responsible manner. Current perceptions of modern spatiotemporal patterns of US fires are based on fire records derived primarily from agency reports or from remotely sensed satellite images. However, estimates of total burned area vary greatly, suggesting these datasets are not detecting and reporting the same set of fire events. Here we investigate whether a fire will be detected using satellite remote sensing or detected and reported by local/state/federal agencies. We compared over 800,000 agency reported fires in the contiguous US from the Fire Program Analysis fire occurrence database to the Moderate Resolution Imaging Spectroradiometer (MODIS) burned area and active fire products to identify which fires were detected by each source. We created generalized linear models to predict fire event detections as a function of fire attributes and environmental variables for MODIS fires, and anthropogenic variables for agency fires. We modeled these separately for the eastern and western US, resulting in eight models total. Overall, we found MODIS burned area and active fire products detected about 5%, and 22% of all agency fires greater than 1 hectare, respectively. Agency reports detected 31% of burned area and 24% of all MODIS active fires. By understanding which fires are represented in each database, we can draw more accurate conclusions when using these data. This study provides insight into the potential for these fire products to be used for an ensemble approach to create a more complete picture of US wildfire activity.