

The fire year: definition of an optimal time interval for the analysis and reporting of global fire activity

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ABSTRACT- Inter-annual variability of fire activity is generally studied without explicit investigation of a suitable starting month for yearly calculations. Most studies use the calendar year, i.e. starting in January, while those that use a different starting month do so without explicit justification. In various scientific fields, annual periods are often not defined to start in January. For example, in hydrology the year is often considered to start with the beginning of the major precipitation season and to end in the subsequent dry season. Aggregating annual precipitation data using this definition, allows for the generation of more consistent yearly statistics as the major rainy season precipitation is aggregated together, and so there is less “carry over” among consecutive years. The same properties are desirable for inter-annual fire analysis. A “fire year” defined with similar criteria means that the analysis of fire inter-annual variability is also the analysis of the variability between fire seasons, which in turn may be more unambiguously linked to other climatological events. We initially introduced the concept of fire year based on the analysis of 37 months of global MODIS active fire detections (Boschetti and Roy, 2008). In the present paper, we revisit the fire year definition by considering the entire record (2002-2018) of the most recent MODIS Collection 6 global burned area product (Giglio et al., 2018). We examine the sensitivity of yearly fire calculations made with respect to changing the starting month of the calendar year definition, the impact of using inappropriate starting months, and suggest optimal starting months for analyses of global and select sub-continental scale fire inter-annual variability. Optimal starting months for analyses of global and sub-continental fire inter-annual variability are described. The research indicates that a fire year starting in April provides an optimal definition for annual global fire activity.

Keywords: Global fire regimes; remote sensing; MODIS; fire activity reporting

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