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Multi-decadal increase of forest burned area in Australia linked to climate change

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Abstract

Fire activity in Australia is strongly affected by high inter-annual climate variability and extremes, and anthropogenic climate change has now the potential to alter these fire dynamics. We compile three satellite and ground-based burned area datasets 19, 32, and 90 years long, climate and weather observations, and simulated fuel loads for Australian forests. We found that burned area in Australia's forests shows a linear positive annual trend and an exponential increase during autumn and winter. The mean number of years since the last fire has decreased consecutively in each of the past four decades, while the frequency of forest megafire years (>1 Mha burned) has markedly increased since 2000. The increase in forest burned area is consistent with the observed increasingly more dangerous fire weather conditions, increased risk factors associated with pyroconvection, including fire-generated thunderstorms, and increased ignitions from dry lightning, all associated to varying degrees with anthropogenic climate change. Analysis of trends in prescribed burnings and modelled fuel production suggest that changes in fuel loads have played a small role in the observed increasing trends in forest burned area. This analysis is the first of its kind in showing both a multi-decadal increase of forest burned area across the Australian continent and the dominant role of climate change in driving the long-term observed trends (Canadell et al. 2021).

Keywords: fire frequency, climate change, fire weather, burned area,

References

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