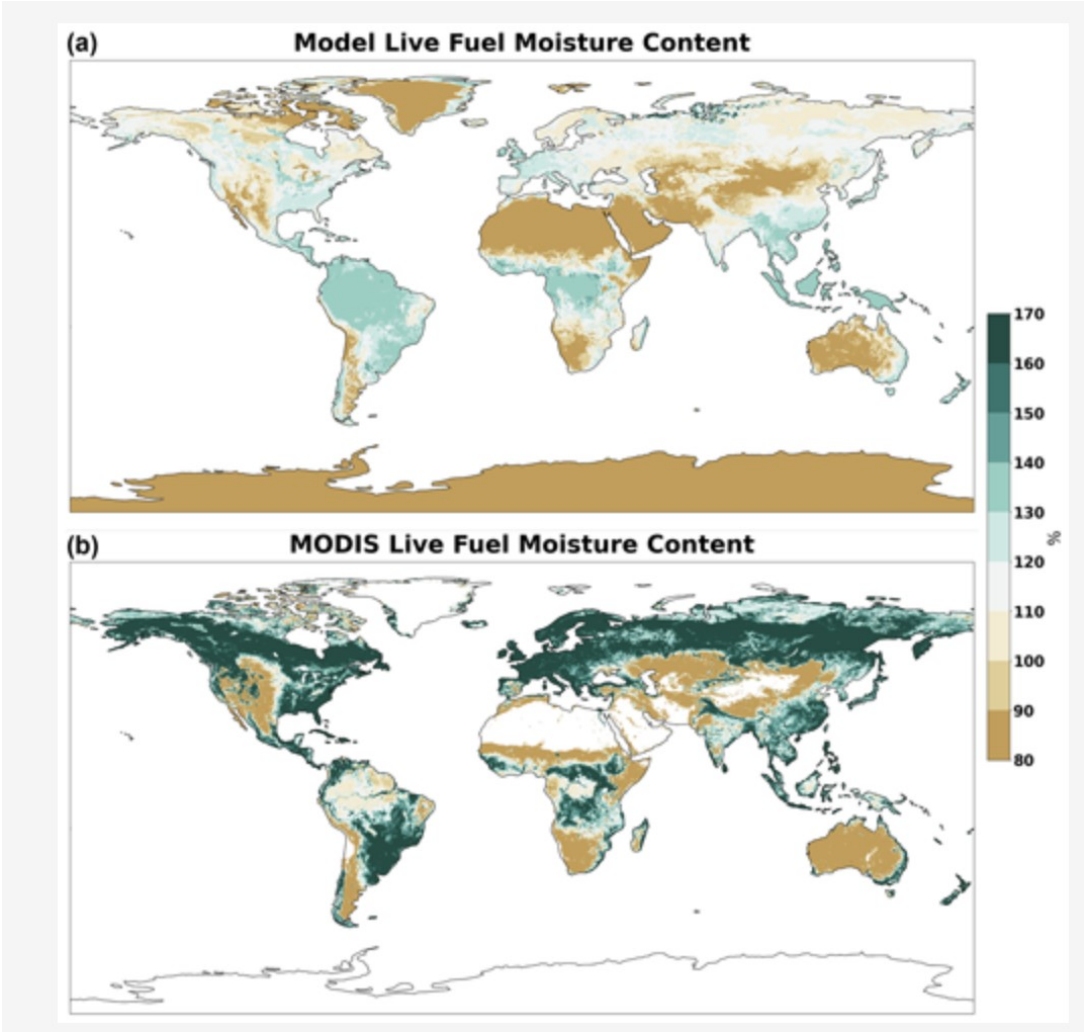


# A global fuel characteristic model and dataset for wildfire prediction

Joe R. McNorton and Francesca Di Giuseppe



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## Global data-driven prediction of fire activity

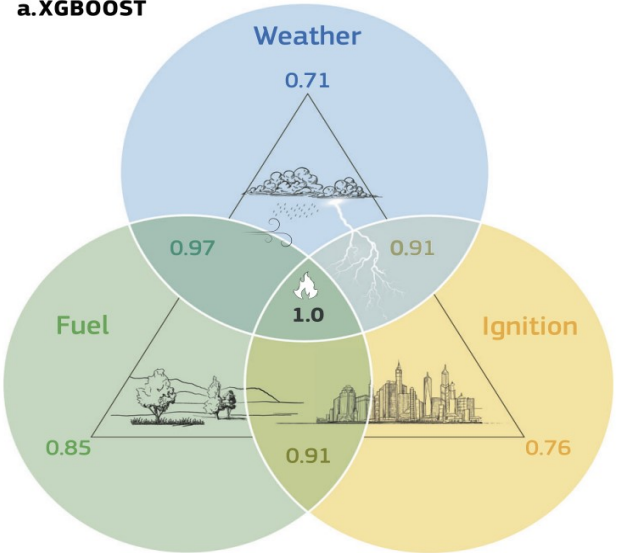
[Francesca Di Giuseppe](#), [Joe McNorton](#), [Anna Lombardi](#) & [Fredrik Wetterhall](#)

[Nature Communications](#) **16**, Article number: 2918 (2025) | [Cite this article](#)

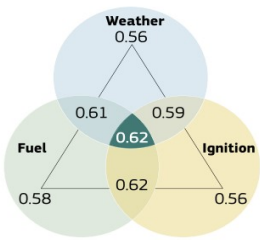
17k Accesses | 9 Citations | 90 Altmetric | [Metrics](#)

*“We find that the quality of input data is more important when improving forecasts than the complexity of the ML architecture. While the focus on ML advancements is often justified, our findings highlight the importance of investing in high-quality data and, where necessary create it through physical models.”*

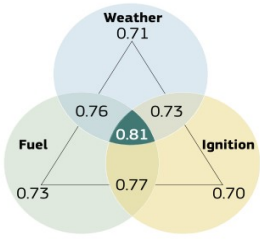
a.XGBOOST



b. Random forest



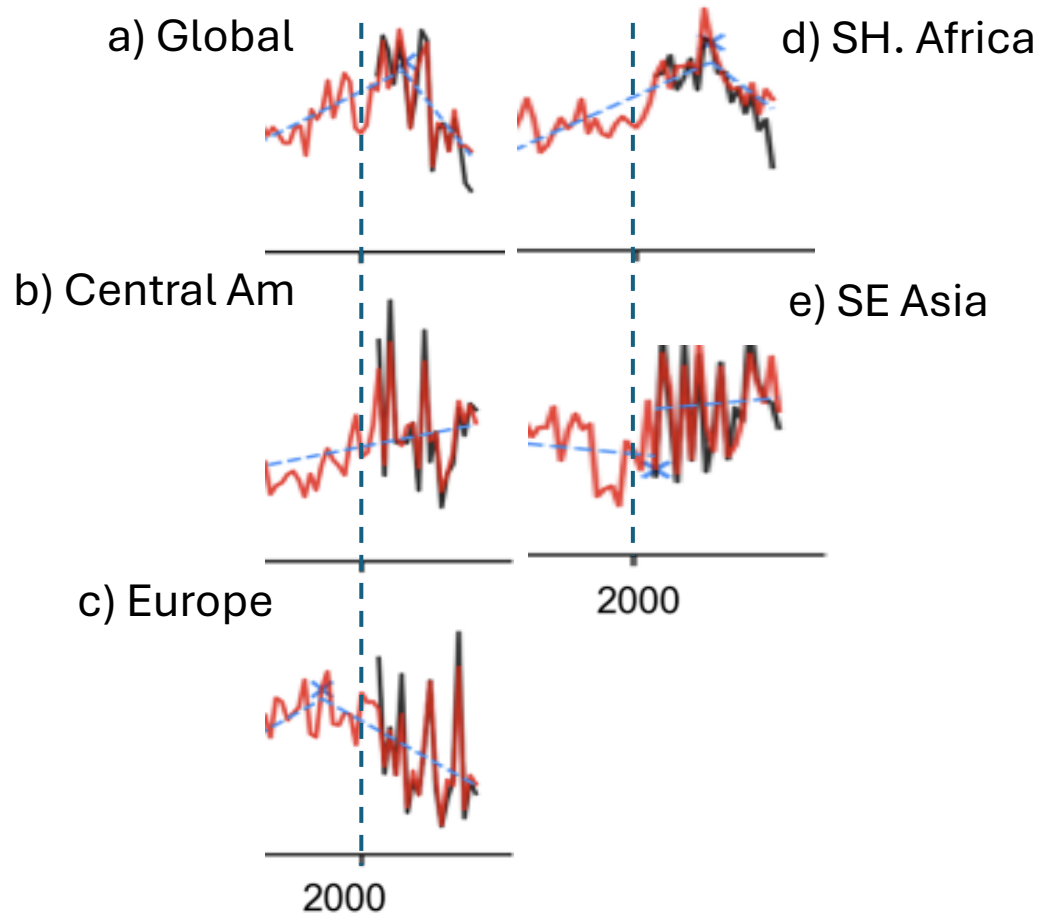
c. Neural Network



## Reconstructed global monthly burned area maps from 1901 to 2020

Zhixuan Guo<sup>1</sup>, Wei Li<sup>1</sup>, Philippe Ciais<sup>2</sup>, Stephen Sitch<sup>3</sup>, Guido R. van der Werf<sup>4</sup>, Simon P. K. Bowring<sup>2</sup>, Ana Bastos<sup>5</sup>, Florent Mouillot<sup>6</sup>, Jiaying He<sup>7</sup>, Minxuan Sun<sup>1</sup>, Lei Zhu<sup>1</sup>, Xiaomeng Du<sup>1</sup>, Nan Wang<sup>1</sup>, and Xiaomeng Huang<sup>1</sup>

- 2 models per GFED region [split at 90<sup>th</sup> percentile]
- Reproduces IAV and trend in burned area [within sample]



## BuRNN (v1.0): A Data-Driven Fire Model

Seppe Lampe [✉](#), [Lukas Gudmundsson](#), Basil Kraft, Stijn Hantson, Douglas Kelley, Vincent Humphrey, Bertrand Le Saux, Emilio Chuvieco, and Wim Thiery

- Unseen prediction by GFED region; emphasis on not overfitting
- Does **not** reproduce IAV or trend in burned area

