BeZero Carbon

New insights on global fire extremes from object-based fire inventories

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Global Fire Atlas products

Global Fire Atlas

- MCD64A1 burned area
- Expanded time-series from 2003-2023

Amazon Dashboard

- Combines VNP14IMGML active fire detections
- Ongoing updates (2019-Now)

Sense4Fire

- VIIRS based fire tracking for new regions

https://amzfire.servirglobal.net/

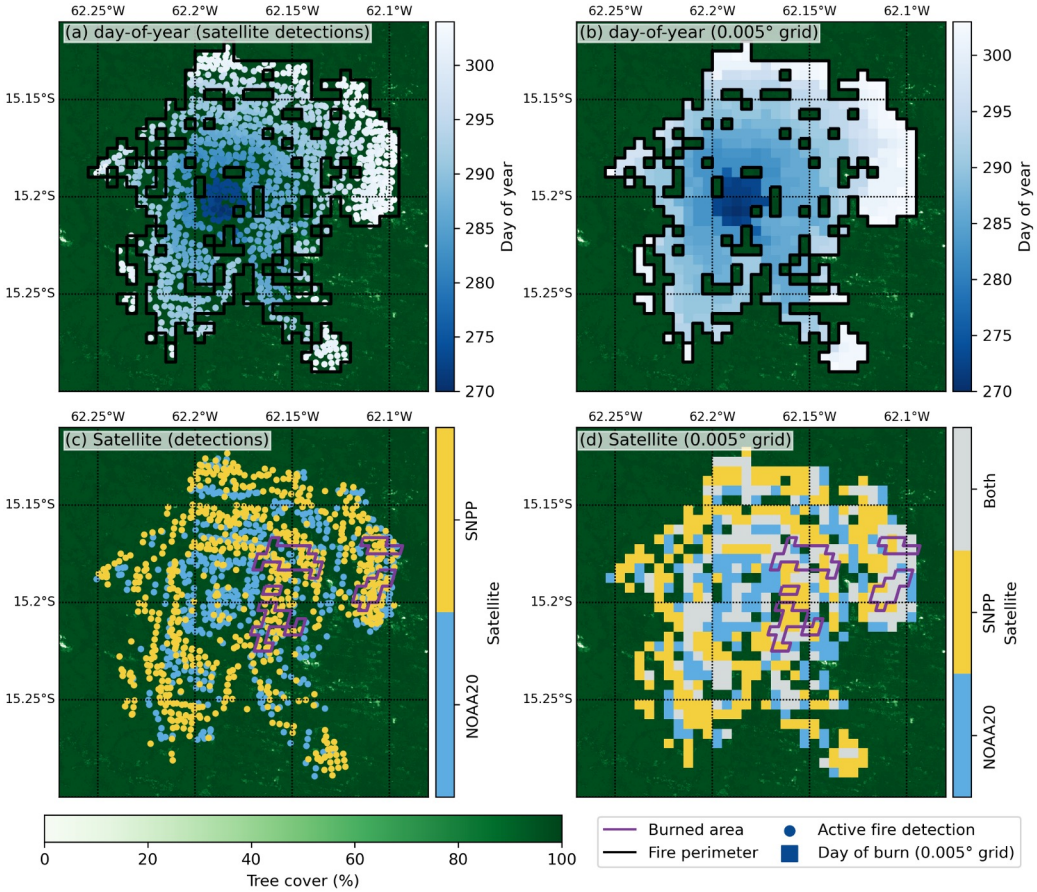
Methods

Global Fire Atlas

- Clustering using 4 - 10 day persistence threshold
- Filter to reduce inconsistencies in burn dates
- Relabel edge pixels

VIIRS active fire-based approach

- Translate active fire detections to grid
- Better detection of understory fires but fragmented for grassland fires
- Cleaner tracking of forest fire events from more precise burn dates



Global Fire Atlas

Updates

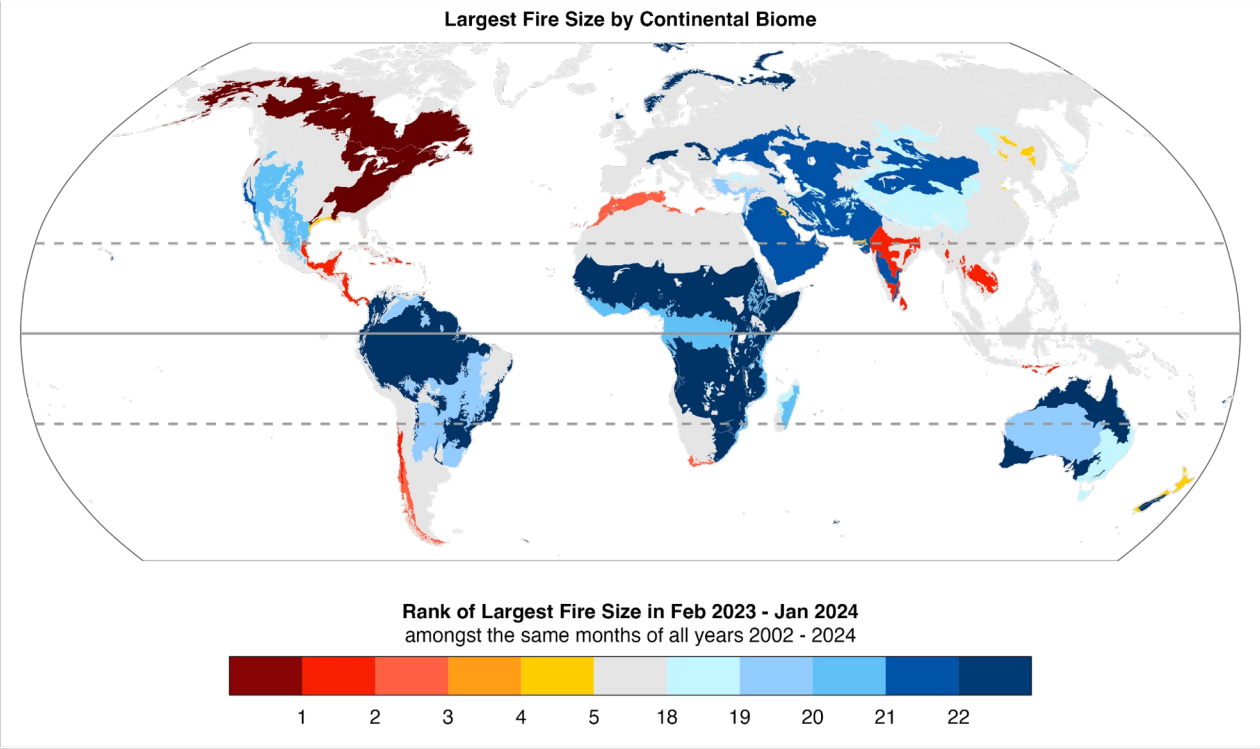
- Annual updates through “State of Wildfires” led by Matt Jones
- Now available 2003-2023

“Extreme fires” align with

- Drought extremes, e.g. El Nino
- Long-term land use and climate trends

What makes a large fire?

- Growth increases non-linearly with time
- May also move faster

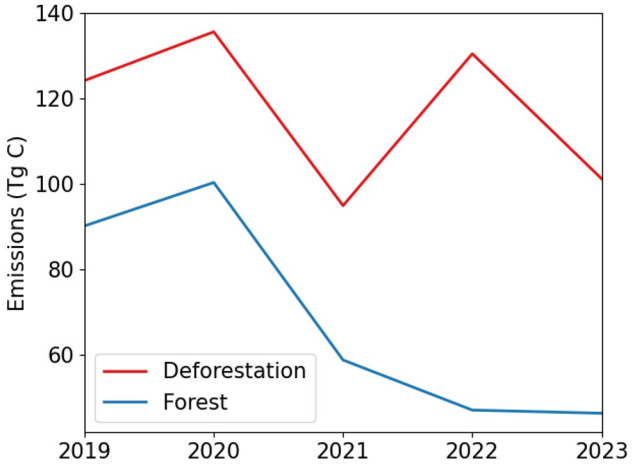


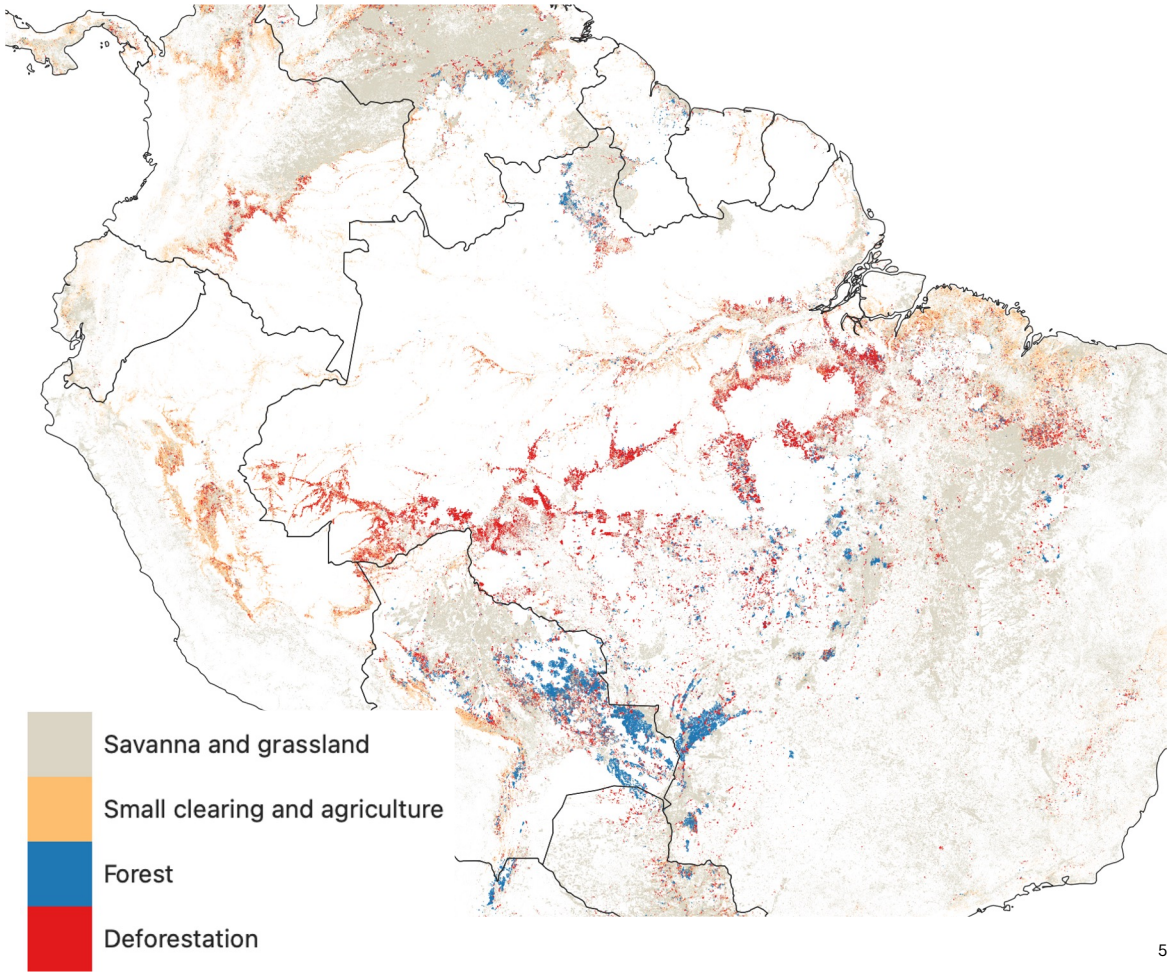
Jones et al., in prep.

Amazon Dashboard

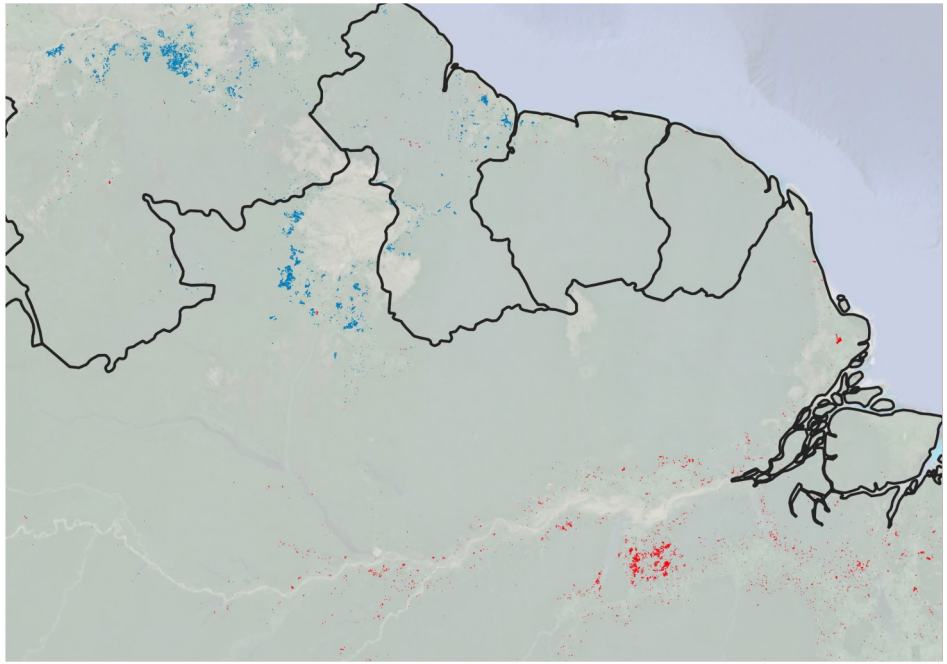
Object based approaches

- The value is in the attributes
- 2019 - now time series
- Forest vs deforestation fires
- Separating human from climatic trends

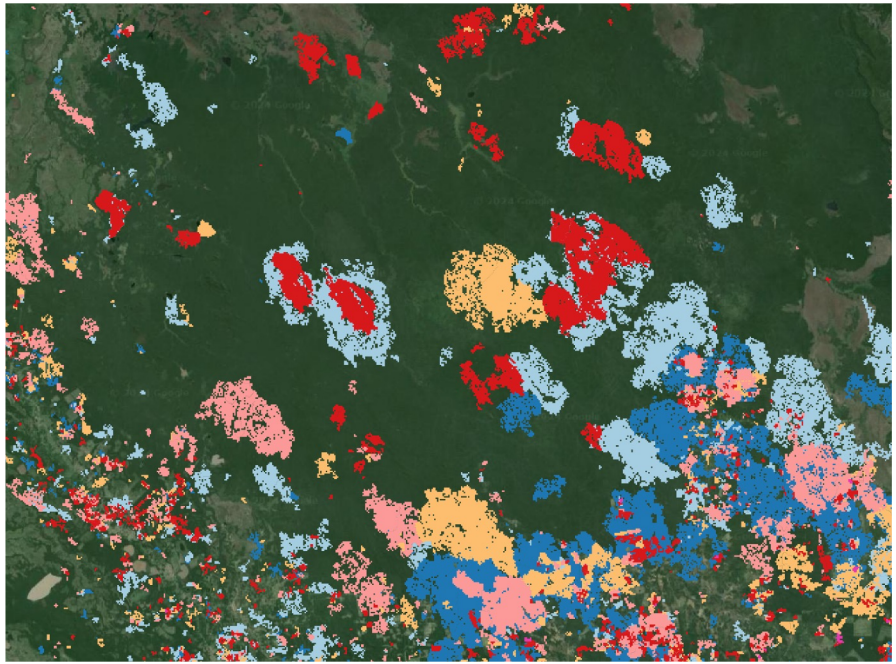




2023 El Nino



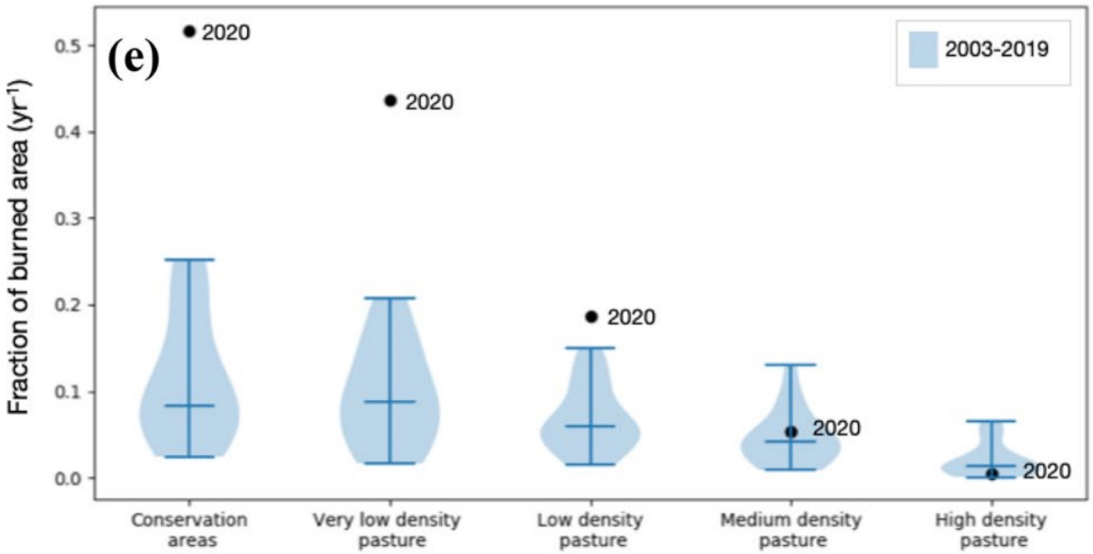
Bolivia



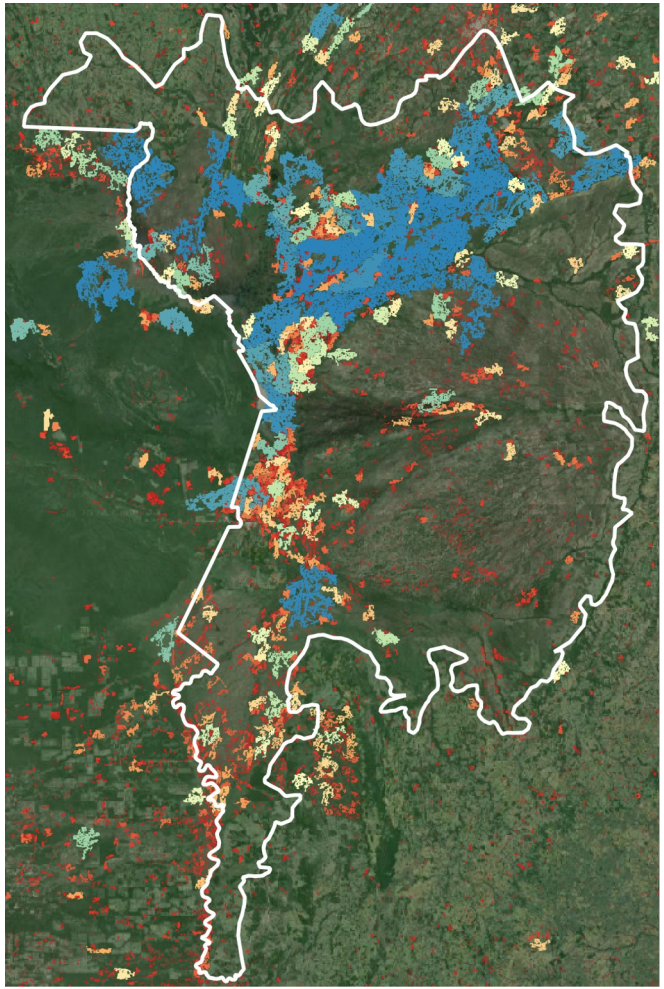
- Within season fire anomalies driven by drought extremes
- Multi-year extremes may indicate ecosystem transitions

2020 Pantanal fires

- 63 (±1% of) fires larger than 100 km2 responsible for 60% of burned area
- Natural landscapes are at highest risk of extreme fires



Kumar et al., 2022

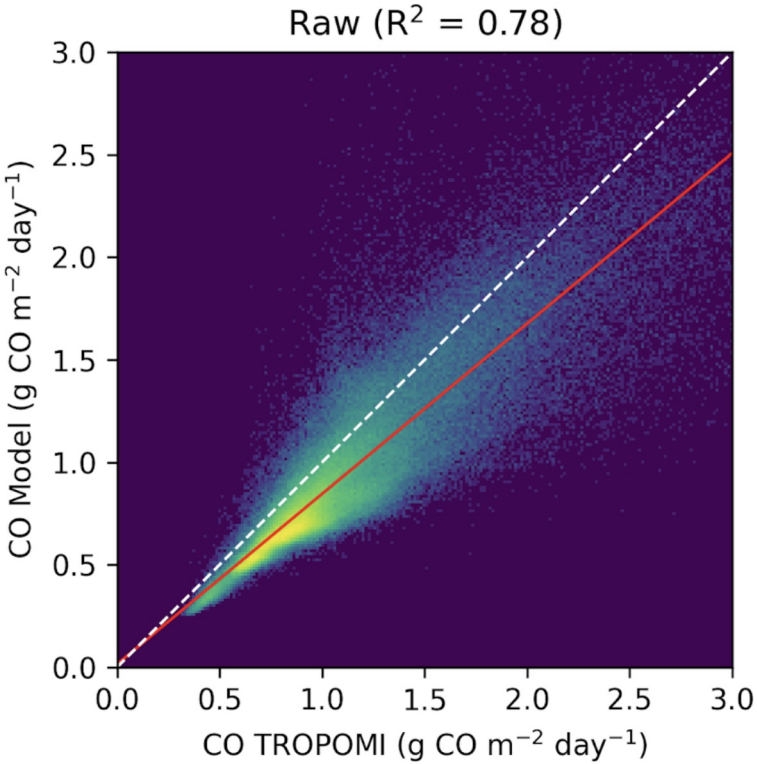


Validation

- Validation against Tropomi CO observations

New regions

- Europe, Southern hemisphere Africa, and boreal Asia
- Near real-time trial
- Opportunity to link emissions to individual plumes



van Wees et al., in prep

Conclusions

Products

- Expanded Global Fire Atlas time-series
- Amazon Dashboard, 2019 - now
- New developments as part of Sense4Fire

Insights

- Discover mechanisms of non-linearity
- Novel attributes: understanding climate sensitivity of specific fire types
- Natural landscapes are at disproportionate risk of from large fires during drought extremes

We are hiring a remote sensing (forestry) scientist!