



LONG-TERM BURNED AREA RECONSTRUCTION THROUGH DEEP LEARNING

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INTRODUCTION

WILDFIRE OVERVIEW

- Vegetation:

- Type
- Density



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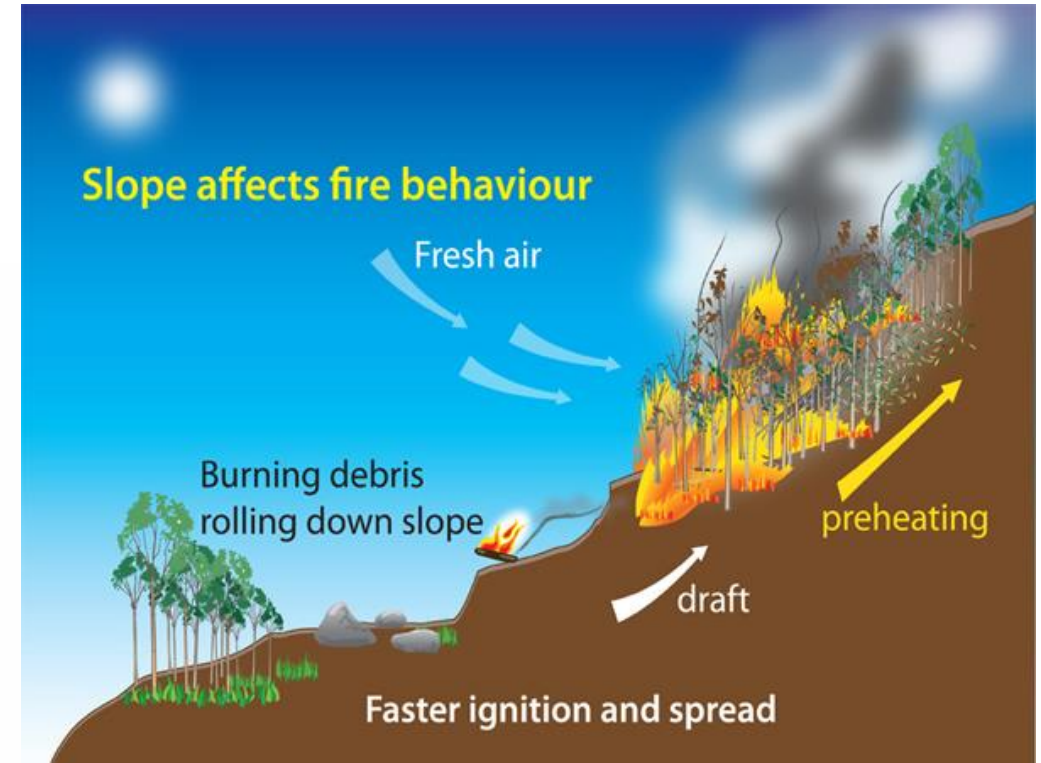
- Vegetation:
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- Weather: Preceding months
 - precipitation
 - lightning
 - wind



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- Topography
- Socio-economic development:
 - Population density
 - GDP



INTRODUCTION

PROBLEM STATEMENT

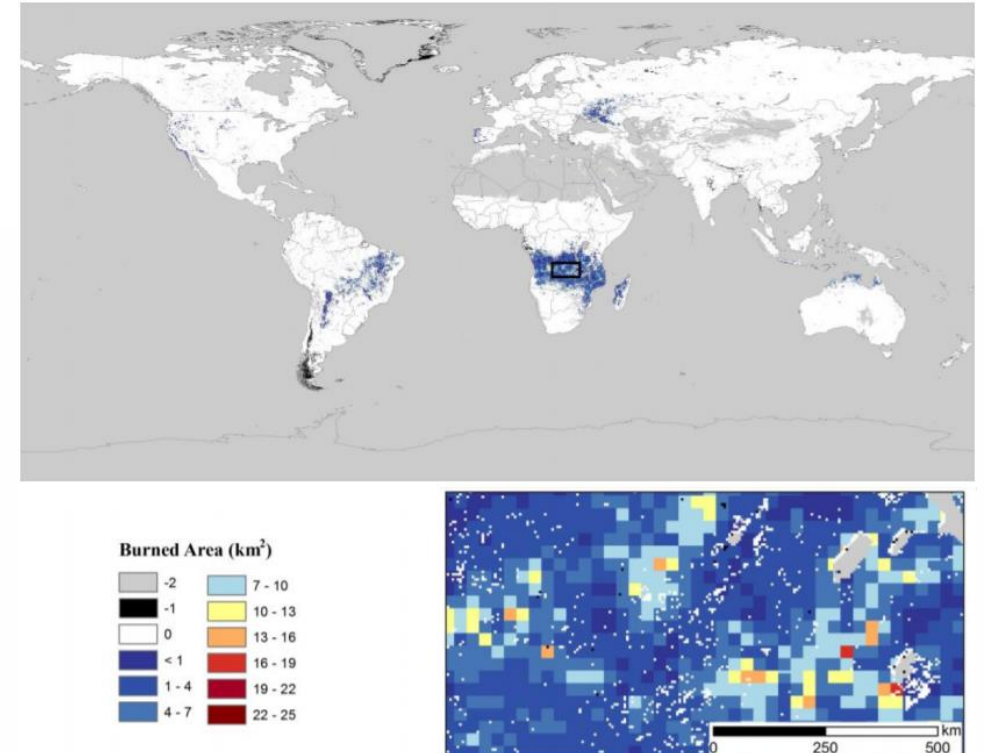
Two main ways of studying wildfire activity:

- Fire Weather Index (FWI): meteorological
- Burned Area (BA): impact

Investigating the total impact of anthropogenic activities requires BA

Longest BA dataset: FireCCILT11: monthly, 36 years

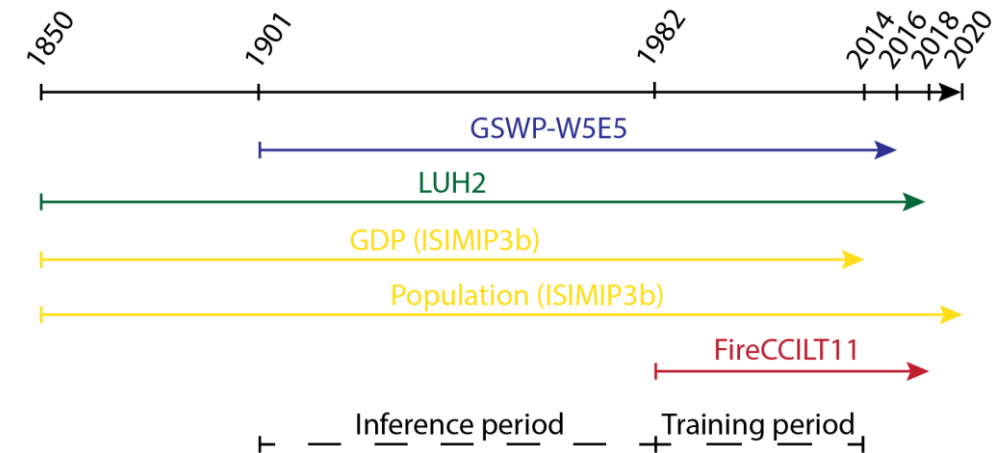
- Insufficient to analyse long-term effect of anthropogenic activities on wildfire impacts



WORK PLAN

BACK-EXTEND FIRECCILT11 DATASET

- GSWP-W5E5: 1901-2016 daily weather reanalysis at 0.5° scale with 10 parameters for each day e.g., precipitation, surface wind speed, temperature
- LUH2: 1850-2018 yearly vegetational data at 0.5° scale
- ISIMIP3b: 1850-2014 yearly per country GDP & 1850-2020 yearly population density at 0.5° scale
- DL model with LUH2 (vegetation), GSWP-W5E5 (weather) and ISIMIP3b (socio-economic) parameters as input and FireCCILT11 as prediction label for 1982-2014



WORK PLAN

CONSIDERATIONS

By including spatially explicit information such as vegetation and socio-economic factors, each pixel can be regarded as a separate data sample

- $32 \text{ years} * 12 \text{ months/year} * (720 * 360) \text{ pixels/month} * \frac{1}{3} \text{ (land pixels)} \approx 8 * 10^6 \text{ data samples}$

Include the preceding 3 months of GSWP-W5E5 weather data instead of simply 1 month

Reduce the amount of GSWP-W5E5 parameters via manual selection, temporal upscaling or PCA



RESULT

WHAT WILL HOPEFULLY BE ACHIEVED?

A monthly 1901-2014 global burned area dataset on 0.5° by 0.5° scale

This will allow to investigate the long-term trends in global wildfire activity

It will be the basis for further detection and attribution studies

It could reduce the uncertainties in future wildfire activity predictions

THANK YOU FOR YOUR ATTENTION!

QUESTIONS?



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