Is the world burning less?

Disentangling decadal trends, inter-annual fire variability and product uncertainties, through harmonization of the NASA MODIS and VIIRS fire product record
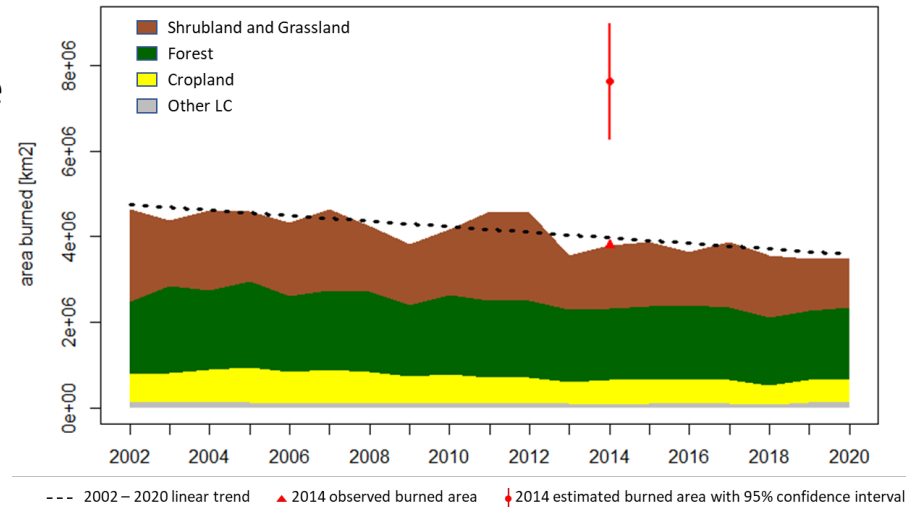
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Rationale

The combined MODIS / VIIRS burned area time series will provide the first ever global fire record covering the 30 years conventionally required for climate analysis.

Validation with Landsat shows a large bias due to missing small burns. The bias can affect the usefulness of the time series.

Legend: Shrubland and Grassland; Forest; Cropland; Other LC
--- 2002 – 2020 linear trend   ▲ 2014 observed burned area   ⏐ 2014 estimated burned area with 95% confidence interval

Project Objectives and Tasks

- Quantify the discrepancy between active fire counts and burned area detections in the MODIS and VIIRS product record.

- Generate reference L8 / S2 burned area time series at representative locations.

- Derive an unbiased 25-year 0.25° harmonized MODIS/VIIRS time series, with uncertainties, calibrated using the L8/ S2 reference burned area

- Detect burned area trends and interannual variability, identify if observed trends are significant relative to inter-annual fire variability and to the uncertainties.

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Proposed milestones (deliverables)

Year 1: Intercomparison of MODIS/VIIRS
burned area and active fire products.
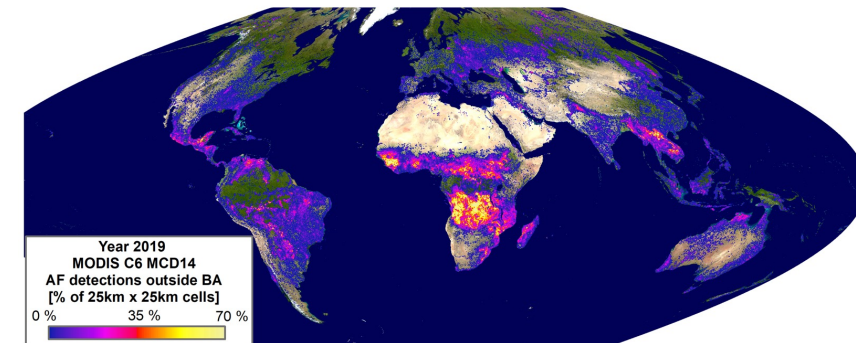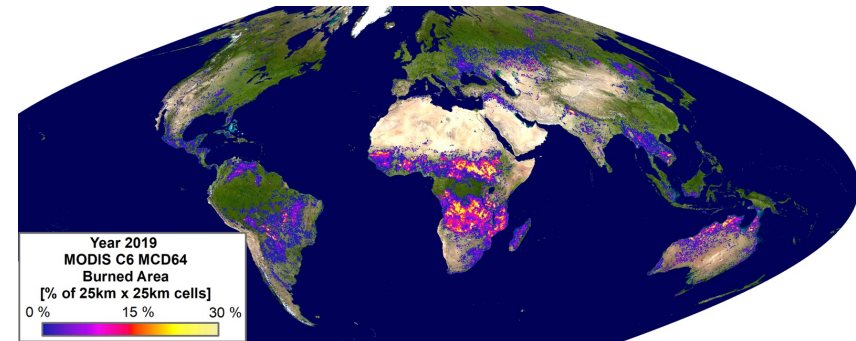Selection of locations for L8/S2
reference data.

Year 2: Generation of the L8/S2 reference
dataset
Define the approach for the AF/BA
fusion
Define the approach for the calibration
of the 0.25° harmonized product

Year 3: Generation of the calibrated 0.25°
MODIS/VIIRS burned area product
(2012-2024) and contingency VIIRS
only product (2002-2024)
Documentation and distribution

Year 2019
MODIS C6 MCD64
Burned Area
[% of 25km x 25km cells]
0 %   15 %   30 %

Year 2019
MODIS C6 MCD14
AF detections outside BA
[% of 25km x 25km cells]
0 %   35 %   70 %

Critical concern: delay in the release of the VIIRS burned area product
(L8/S2 reference dataset ideally informed by MODIS and VIIRS)