fire cci

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https://esa-fire-cci.org

Goal of the project:

Generation of global long-term and properly validated burned area (BA) products to serve the needs of climate modellers.

Currently available BA products:

Global

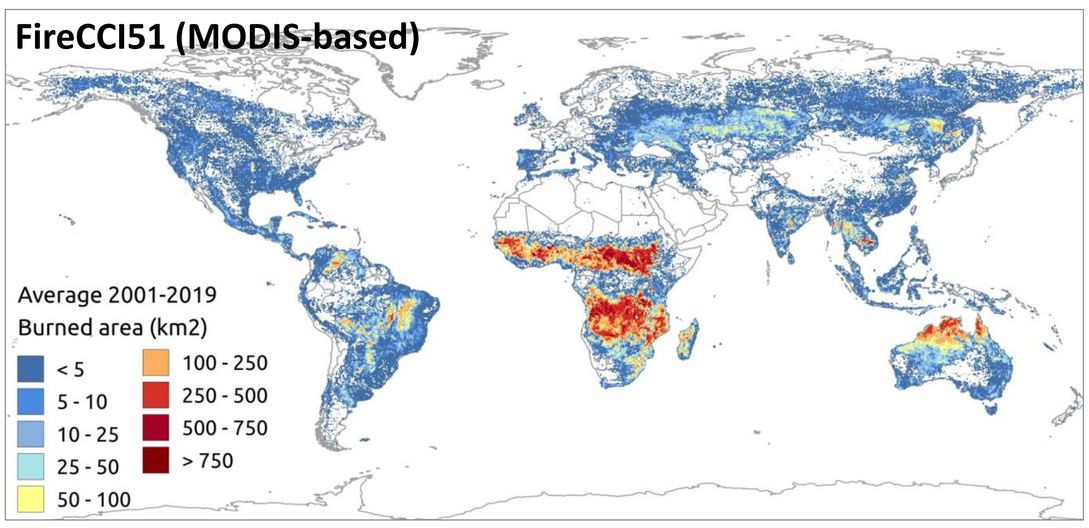
- MODIS FireCCI51: 2001-2019, 250 m & 0.25 degrees
- AVHRR FireCCILT10: 1982-2017, 0.25 degrees

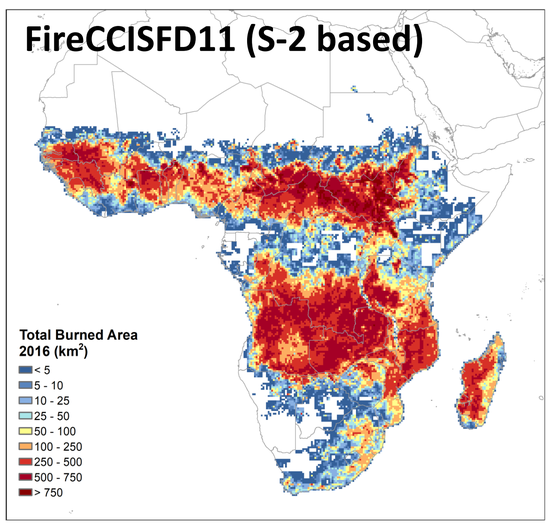
Regional

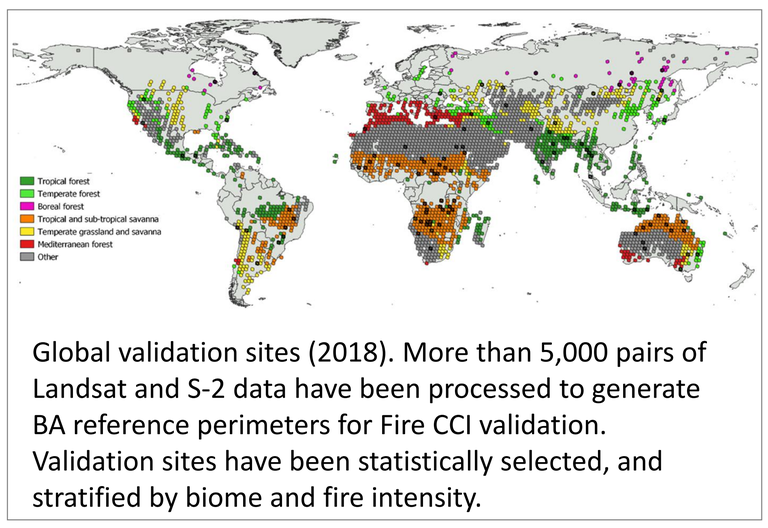
- Africa: S-2 MSI FireCCISFD11: 2016, 20m
- Africa, Amazon & Indonesia: SAR regional BA products

Highlights:

- First ever global BA product based on MERIS 300m.
- First ever global BA product based on MODIS 250m.
- First ever global BA product based on LTDR time series.
- First ever S-2 BA product covering a continent (Africa).
- First ever S-1 BA product covering a large area (Amazon).
- First ever spatio-temporal validation of BA products.
- All products adapted to the climate user needs.
- Strengthen the EO fire European community.
- European-generated BA datasets are now credible to the international community.







Global validation sites (2018). More than 5,000 pairs of Landsat and S-2 data have been processed to generate BA reference perimeters for Fire CCI validation. Validation sites have been statistically selected, and stratified by biome and fire intensity.

Fire CCI recent developments

BA Algorithm developments:

- Adaptation to S-3 sensors: SYN
- Integration of S-1 and S-2 sensors.

Validation:

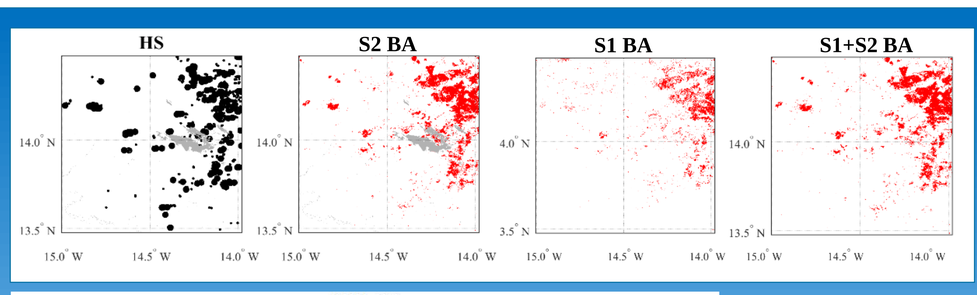
- Global sample based on Landsat OLI.
- Regional sample based on S-2 and Planet.

Product assessment:

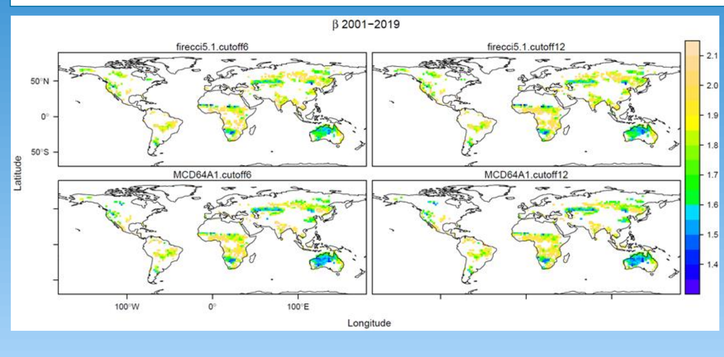
- Atmospheric emissions from chemical models and MOPITT
- Global fire size distribution analysis based on power-law fits

Product dissemination highlights:

- Fire CCI presentation at COP25 Madrid.
- FireCCI51 now available at Google Earth Engine.
- Nature paper on Australian extreme fires (2019-2020).



Integrated SAR (S1) & Optical (S2) algorithm based on Convolutional Neural Networks (CNN).



Global β parameter from the fire patch datasets for the years 2001-2019. β is the index parameter of a power-law fit on fire patch size distribution. Lower values indicate higher frequencies of large fire patches. Top-left: FireCCI51 dataset with a 6-day cut-off value for patch clustering; top-right: the same dataset with a 12-day cut-off value; bottom-left: MODIS Collection 6 dataset with a 6-day cut-off value; bottom-right: the same dataset with a 12-day cut-off value. β values higher than 2 are not shown in order to highlight regions with high frequency of large fires (i.e. low β). Our results show that the FireCCI51 burned area dataset is in good agreement with previous BA datasets in detecting large-size fire patches.

https://doi.org/10.1038/d41586-020-02306-4

Wildfires: Australia needs a national monitoring agency

David Bowman, Grant Williamson, Marta Yebra, Joshua Lizundia-Loiola, Marta Lucrecia Pettinari, Sami Shah, Ross Bradstock & Emilio Chuvieco

Comprehensive fire surveillance will strengthen resilience and adaptation to climate change.

Just before the COVID-19 pandemic, bush fires in Australia destroyed more than 3,000 homes and burnt millions of hectares of vegetation. The crisis exposed the nation's fire monitoring system as being unfit for purpose. Precise real-time information about the area burnt and the intensity of the fires was not available when it was needed.

Australia does not have a central system for gathering and storing essential information about bush fires. State and territory governments, and even agencies within states, have different approaches. This worked fine when fires were smaller. But those in the 2019-20 season crossed multiple state borders.

The blazes engulfed a huge geographic range and burnt for a duration and intensity that was beyond the experience of communities and fire managers[1]. Many Australians endured five months of smoke pollution that breached national air-quality standards. Usually, people would experience shorter bouts covering smaller areas[2].

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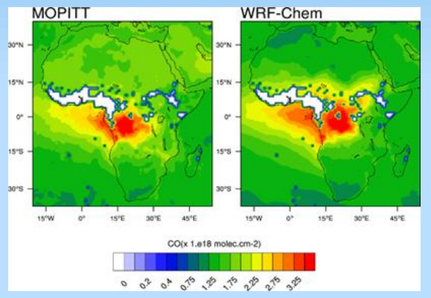
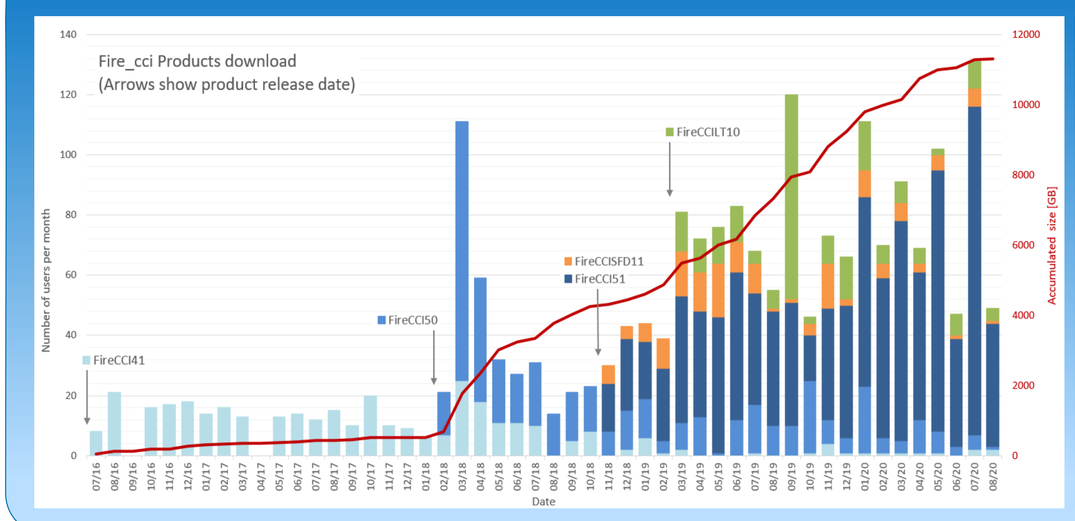
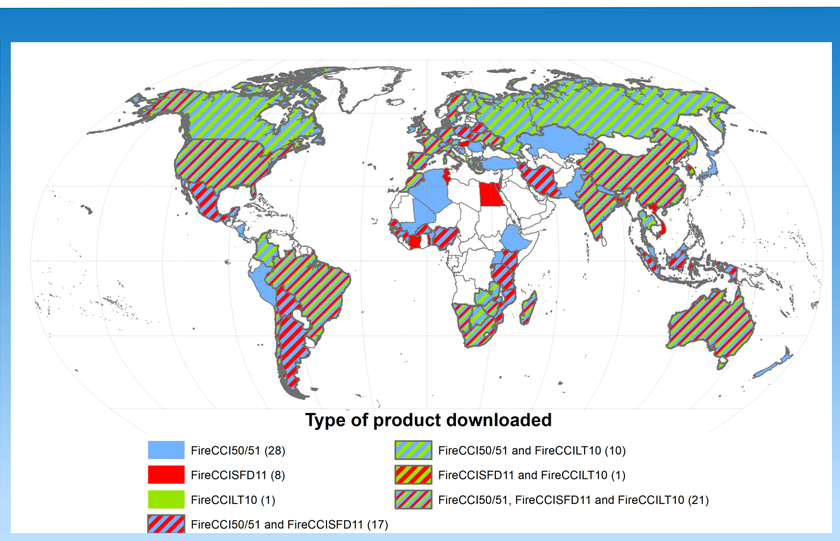
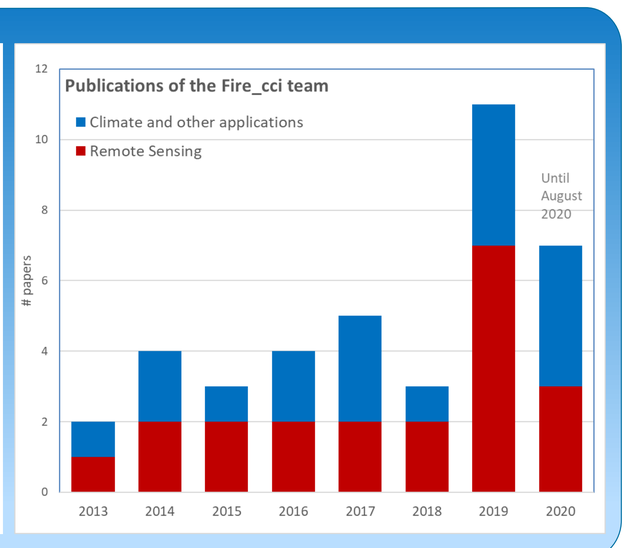
Emission inventories were fed in the atmospheric chemistry transport model WRF-Chem and simulated atmospheric concentrations were compared with satellite observations and aircraft/station measurements. Despite the FINN inventory has the lowest CO fire emissions of all fire emission inventories (shown in the right panel), simulated WRF-Chem CO concentrations over west Africa are substantially overestimated when compared to, e.g., MOPITT satellite observations.



Project Impact







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