

## README: Fire INventory from NCAR (FINN) version v2.5

### February 2022

Please send any feedback, comments, or questions to Christine Wiedinmyer (christine.wiedinmyer@colorado.edu).

Fire data were downloaded from the NASA Fire Information for Resource Management System (FIRMS, <https://firms.modaps.eosdis.nasa.gov/download/>). MODIS data are available from 2002-2020 and VIIRS data from 2012-2020. Date ranges for each year started on December 30 of the previous year to January 1 of the following year, to account for time zone differences.

The emissions of non-methane organic compounds (NMOC) have been speciated either to the MOZART- T1 chemical mechanism (Emmons et al., *JAMES*, <https://doi.org/10.1029/2019MS001882>), the SAPRC99 chemical mechanism (Carter et al., 2000), and the GEOS-CHEM mechanism (Bey et al., 2001; <http://www.geos-chem.org/>). The mapping of the NMOCs to the SAPRC99 and GEOS-CHEM mechanisms has not changed from FINNv1 and is described by Wiedinmyer et al., *GMD*, 2011 (See factors in Tables 4 and 5 of that publication). The NMOC mapping to the MOZART-T1 mechanism is new and will be described in the FINNv2 paper (*in preparation*).

The files available for download here are comma-delimited ASCII files, compressed with gzip. All files contain daily fire emission estimates for the globe for the year specified at a resolution of  $\sim 1\text{km}^2$ .

Each fire point identified by satellites are assigned a POLYID. Each POLYID is assigned to a FIREID. If multiple fire points are located together as part of a big fire, they are assigned to the same FIREID.

The categories for GENVEG are:

- 1 = grasslands and savanna
- 2 = woody savanna/shrublands
- 3 = tropical forest
- 4 = temperate forest
- 5 = boreal forest
- 6 = temperate evergreen forest 9 = croplands
- 0 = no vegetation

Emissions corresponding to 3 different chemical mechanisms are available:

- MOZART-T1 speciation (version 2.0)
- SAPRC99 speciation (version 1.0)
- GEOS-CHEM speciation (version 1.0)

\*\*\* NOTE: The output for all contains different fields than FINNv1 \*\*\*\*

The first line in each file includes the headers of each field.

All files contain:

DAY	Julian Day (day of year)
POLYID	ID associated with each fire point
FIREID	FIRE ID for which each POLYID is assigned
GENVEG	Generic Vegetation type where fire occurred (See list above)
LATI	Latitude (decimal degrees)
LONGI	Longitude (decimal degrees)
AREA	Area burned (m <sup>2</sup> ) for fire point (NOTE: for larger fires, sum area for each FIREID to get total area burned)
BMASS	Biomass burned per area burned (kg/m <sup>2</sup> )

All **gas**-phase species emissions are provided as **mole(species)/day**.

All **aerosol** emissions (OC, BC, PM25, PM10) are provided as **kg(species)/day**.

For MOZART speciation, NMOC is in kg-NMOC/day.

*The reference for the FINNv1 estimates is:*

Wiedinmyer, C., Akagi, S. K., Yokelson, R. J., Emmons, L. K., Al-Saadi, J. A., Orlando, J. J., and Soja, A. J.: The Fire INventory from NCAR (FINN): a high resolution global model to estimate the emissions from open burning, *Geosci. Model Dev.*, **4**, 625–641, <https://doi.org/10.5194/gmd-4-625-2011>, 2011.

*The reference for FINNv2 emissions is in progress. The reference will be updated when available:*

Wiedinmyer, C., Kimura, Y., McDonald-Buller, E., Seto, K., Emmons, L., Tang, W., Buchholz, R., Orlando, J. The Fire INventory from NCAR version 2 (FINNv2): updates to a high resolution global fire emissions model. In preparation for submission to the *Journal of Advances in Modeling Earth Systems*.