**Metadata for Mali Fire Studies**

**This document contains notes for three Excel files:**

1. Mali fire data 2016-2018-Laris.1
2. Mali 2015-2018 final merge all gases by plot
3. Cannister\_data-with EF and MCE complete final

**1.Notes for Mali fire data 2016-2018-Laris.1**

This file contains data for 97 fires at two mesic savanna study sites in Mali. These data were used to in the publications, which should be consulted for details on the study site locations etc:

Laris, P., Jacobs, R., Koné, M. *et al.* Determinants of fire intensity in working landscapes of an African savanna. *Fire Ecology* 16,27. <https://doi.org/10.1186/s42408-020-00085-x>, 2020.

**Laris, P**., Kone, M., Dembele, Yang, L., Jacobs, R., F. & Camara, F. 2020. Methane gas emissions from savanna fires: What analysis of local burning regimes in a working West African landscape tell us**.** Biogeosciences, 18, 6229–6244, 2021. https://doi.org/10.5194/bg-18-6229-2021

**Data explanation**

These data include values from the field experiments, such as biomass weight and ambient air conditions as well as calculated values for a variety of factors including fuel moisture Byram’s fire intensity, combustion completeness etc. See article for description.

Note that only columns with Green headings were used in the published analysis

1. ID# Specific plot ID from Tabou or Faradiele Village (locations available by request)
2. CBI calculated for early middle and late season means (EML)
3. True CBI from data calculations by date
4. Season 1-early, 2-mid, 3-late
5. Dummy
6. Dummy
7. Biomass per plot
8. Mean wind speed per plot
9. Percent of grass in biomass (not leaf litter)
10. NA
11. Humidity
12. Mean ambient temp
13. NA
14. Viney moisture content (see Viney reference)
15. NA
16. NA
17. NA
18. NA
19. NA
20. NA
21. NA
22. Type of vegetation (See code below)
23. NA
24. Majority Annual or Perennial grasses
25. “”
26. “”
27. Biomass Load (t/ha) per plot

AB. Biomass in Kg/m per plot

AC. Scorch Height (m)

AD. Wind direction (1=head, 2=backfire)

AE. “”

AF. “”

AG. Visual efficiency of burned area (out of 100)

AH. Biomass consumed w/o Viney adjustment for moisture

AI. NA

AJ. NA

AK. Time to burn 10 meters in seconds

AL. Speed of flaming front in m/s

AM. H=18000 kj/kg (net low heat of combustion)

AN. H=20000 kj/kg (net low heat of combustion)\*

AO-BH. NA

BI. Total dry biomass adj for Viney

BJ. Total dry biomass consumed adj. Viney and Cure moisture

BK. NA

BL. NA

BM. Bryam Intensity with H=20000, corrected for moisture

BN. Bryam Intensity with H=18000, corrected for moisture

BO. Total fuel moisture % for Viney and Cure

BP. Cure % moisture

BQ. Biomass dry weight (adj with Viney and Cure)

BR. True combustion completeness (CC) in % adj for moisture

BS. Methane Emission Density (g/m2)

BT. EF Methane Mean for E or M season

BU. NA

BV. Methane EF mean for head or back fire (H=4.89; B=2.56)

\*We used the value of 20 000 kJ kg−1 following Williams et al. (1998: 230), who noted: “Given the range and lack of consistency

between studies in the value of H, and, in the view of the authors, the misleading precision implied by values rounded to the nearest

1. kg−1, 20,000 kJ kg−1 is within the range of reported vales, and is easy and convenient to apply.”

**Vegetation Code**

|  |
| --- |
| Savane arbustive (shrub savanna) = 1 |
| Savane arboree (Tree savanna) = 2 |
| Jachere de 5 a 6 ans (short fallow of 5-6 years) = 3 |
| Zone de culture; Ancien site d’occupation du village; (ancient farmed site) = 4 |
| Savane boisee a arboree (wooded savanna) = 5 |
| Savane herbeuse jamais cultivé (Grass savanna, uncultivated in flood plain) = 6 |

**2. Cannister\_data-with EF and MCE complete final**

**Data description**

This file contains data from 44 canisters collected in Mali. 36 contain emissions (smoke) samples from flaming fires another 4 from smoldering fires and 4 are background ambient air for the research sites. The file contains the raw data from the field and lab as well as calculated values for gas ER and EF as well as MCE (see also file number 1). The data used

Note that columns with Blue headings were used in the published analysis. Smoldering fires were not used and their rows are in red while air samples are in yellow.

This data was used in the following publications:

**Laris, P**., Kone, M., Dembele, Yang, L., Jacobs, R., F. & Camara, F. 2020. Methane gas emissions from savanna fires: What analysis of local burning regimes in a working West African landscape tell us**.** *Biogeoscience.*

*Data description*

1. Code number for plot
2. Fire season, 1=early; 2=mid
3. Date
4. Time of fire start
5. Coordinate of fire
6. Coordinate of fire
7. Location name
8. ID (links to file #1)
9. Fire type head or back
10. Wind direction/fire type; 1=head; 2=back
11. CH4 in ppm
12. CH4 True (less background)
13. CO in ppm
14. CO True (less background)
15. CO2 ppm
16. CO2 True (less background)
17. MCE Raw (not for use)
18. ER emission ratio for CH4
19. ER for CO
20. ER for CO2

S-CL. Gas concentrations

CM. MCE TRUE

CN. ER CH4 True

CO. EF CH4 unajusted

CP. Season; 1=early

CQ. Wind speed m/s

CR. Grass biomass %

CS. Humidity

CT. Ambient Temp

CU. Veg type

CV. Grass by height

CW. Grass type. 1=annual; 2=perennial; 3 =mix

CX. Biomass t/ha

CY. Scorch Height

CZ. Fire direction: 1=head; 2=back

DA. Visual efficiency (burn efficiency) %

DB. Biomass consumed %

DC. NA

DD. NA

DE. Burn time (seconds)

DF. Speed of front

DH. H or heat of combustion kj/kg

DI. Dry biomass Viney adj.

DJ. Flame or smolder or air

DK. EF\_CH4 (use)

DL. EF\_CO (use)

DM. EF\_CO2

DN. Wet grass moisture %

DO. Methane density

DP. Total Moisture (Viney + field)%

DQ. Viney Moisture %

DR. Byrams intensity

DS. Ash

DT. Combustion Completeness True

**Mali 2015-2018 final merge all gases by plot**

**Data description**

This file contains data from 40 canisters collected in Mali. 36 contain emissions (smoke) samples from fires and 4 are background ambient air for the research sites.

This data was used in the following publications:

Kone, M., Dembele, F. **Laris, P**. 2019. Inventaire, typologie et estimation quantitative des gaz émis par les feux de brousse en savane soudanaise dans le sud Mali. *Revue de Géographie Tropicale et d’Environnement* 2: 26-39.

Note that only columns with Blue headings were used in the analysis

*Data description*

1. Code number for plot
2. Fire season, 1=early; 2=mid
3. Date
4. Time of fire start
5. Location name
6. ID (links to file #1)

G-CA. Gas concentrations