

Objectives

- characterize the “mixed smoke”^{1,2} measurements and thus the main burnt vegetation type from which the smoke originates.
- investigate if there is a specific relationship between biomass burning (BB) from various vegetation types and aerosol intensive parameters (IPs).

Input

- IPs from lidar measurements (2008-2017, Bucharest station).
- land cover data³ provided by MODIS for each year
- FIRMS database⁴ to extract the fires contributing to the measured smoke.

Methodology

- Use average values for land cover (11 types) over entire period.
- Extract the vegetation type for each fire contributing to smoke measurement
- For each fire, define ‘predominant vegetation type’ (PVT) as the one for which the coverage percentage was > 50 %. The other cases were labelled as mixed.
- For a smoke layer, the overall predominant vegetation (OPVT) type is taken as the most frequent value of all PVTs.

Preliminary results

- ❖ Location of the fires contributing to smoke measurements in Bucharest. (1122 fires /detected 1965 times contributed to 123 smoke layers /84-time stamps)
- ❖ PVT at fires’ location
- ❖ Vegetation type
- ❖ Histogram of IPs versus OPVT

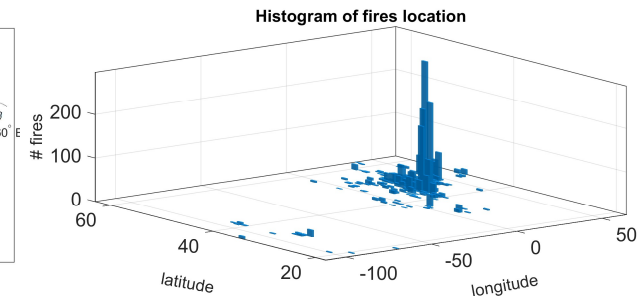
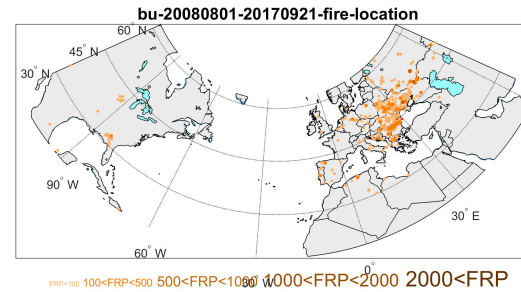


Fig. 1. Histogram of the fires’ location.

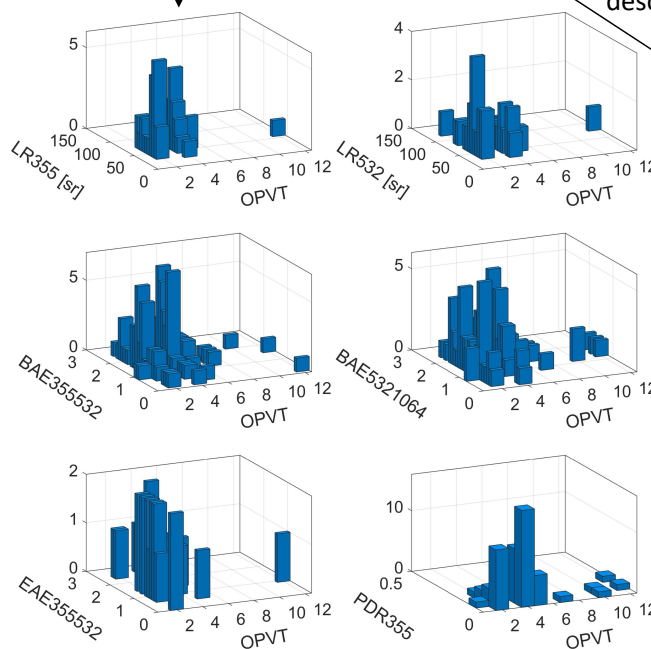


Fig. 3. 2D histogram of IPs versus overall predominant vegetation type. See Table 1 for index description.

Fig. 2. Predominant vegetation type at fires’ location. See Table 1 for index description.

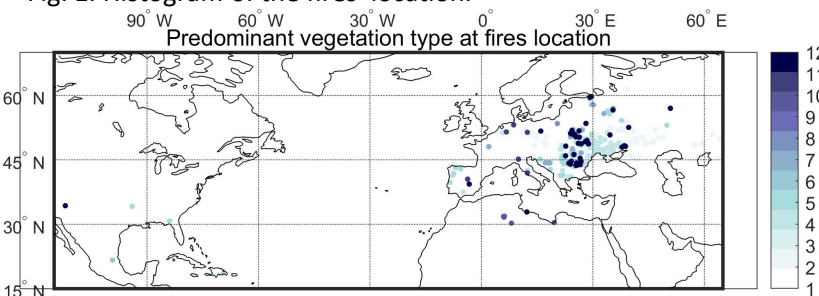


Table 1. Vegetation type (%)

1	water	0.51	7	deciduous broadleaf forest	2.2
2	grasses or cereal	42	8	evergreen needleleaf forest	0.2
3	Shrubs	0	9	deciduous needleleaf forest	0
4	broadleaf crops	41	10	unvegetated	1.6
5	savannah	6	11	urban	0.76
6	evergreen broadleaf forest	0.1	12	mixed	6.1

Current findings

- Categories contributing the most to smoke measurements: grasses or cereal (2) and broadleaf crops (4).
- In average, category 2 => aged smoke, category 4 => fresh smoke

Mean values	LR 355	LR 532	CR _{LR}	EAE	BAE 355/532	BAE 532/1064	CR _{BAE}	PDR 532
Cat. 2	48	57	1.2	0.98	1.4	1.2	0.9	6.3%
Cat. 4	53	53	1	1.82	1.3	1.3	0.97	4.5%

References

- 1) Adam et al., <https://acp.copernicus.org/preprints/acp-2020-320/>
- 2) Adam et al., <https://acp.copernicus.org/preprints/acp-2020-647/>
- 3) <https://pdaac.usgs.gov/products/mcd12c1v006/> (MCD12C1v006)
- 4) <https://firms.modaps.eosdis.nasa.gov/>

Acknowledgements: This work was supported by the Romanian National contracts 18N/08.02.2019, 19PFE/17.10.2018, PN-III-P2-2.1-PED-2019-1816 and PN-III-P2-2.1-PED-2019-3495.

Contact: mariana.adam@inoe.ro