

INTRODUCTION

Smoke particles can strongly affect the climate system, by absorbing solar radiation and by influencing the evolution of clouds.

Studying their optical properties is essential for understanding their role in the climate system and improving weather and climate models.

→ **This study** emphasizes on the intense activity of **wildfires** in Turkey's Mediterranean Region in **July and August 2021**.

METHODS & TOOLS

Identifying Atmospheric Particle Layers:

Temporal evolution of attenuated backscatter coefficient (1064 nm) | Volume depolarization ratio (532 nm)

Key Indicators: High backscatter coefficient → **aerosol loading** | Low depolarization ratio → **smoke signature** (tropospheric layers)



CARO STATION

ERATOSTHENES - Cyprus Atmospheric Remote Sensing Observatory

✓ ACTRIS AEROSOL REMOTE SENSING OBSERVATIONAL PLATFORM

- Polly^{XT} Raman LIDAR
- Wind Doppler lidar (Streamline-XR)
- Ceilometer

✓ ACTRIS CLOUD REMOTE SENSING OBSERVATIONAL PLATFORM

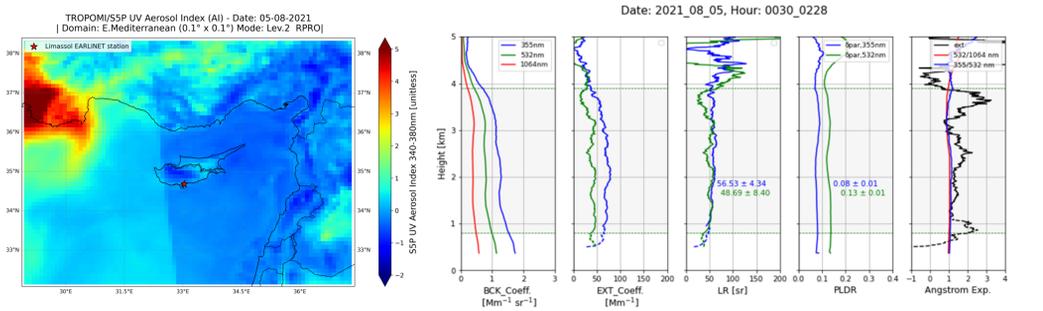
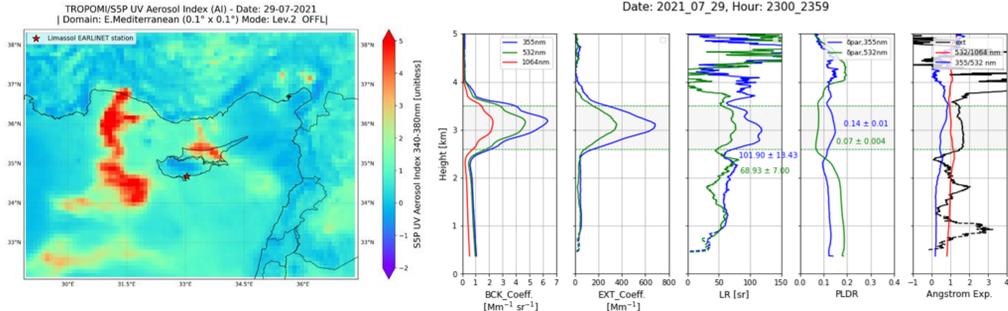
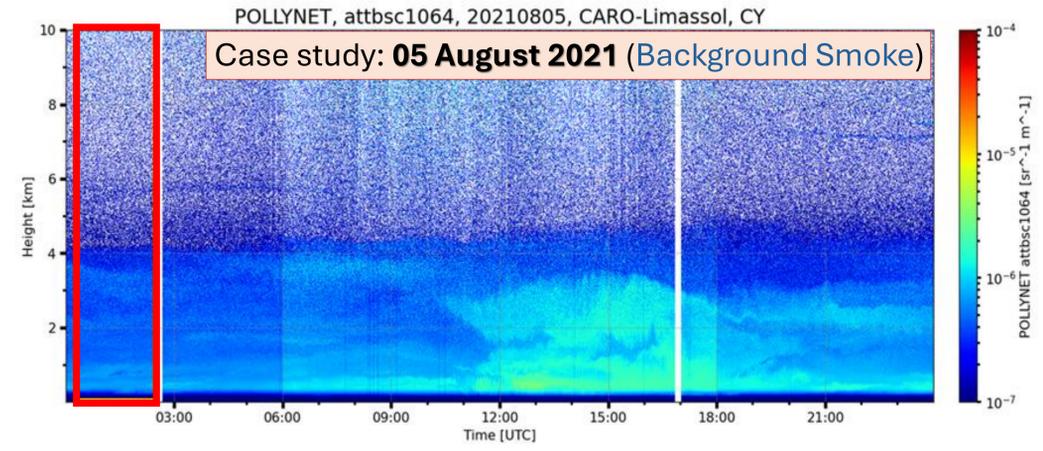
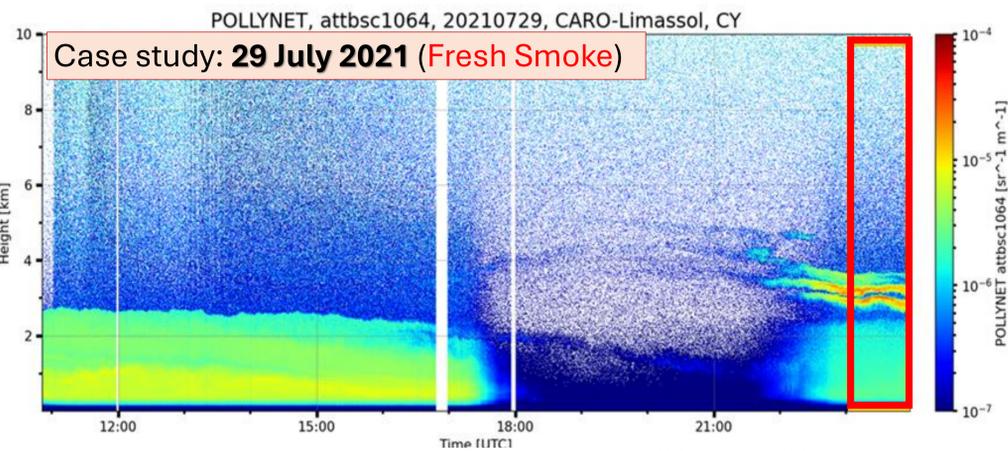
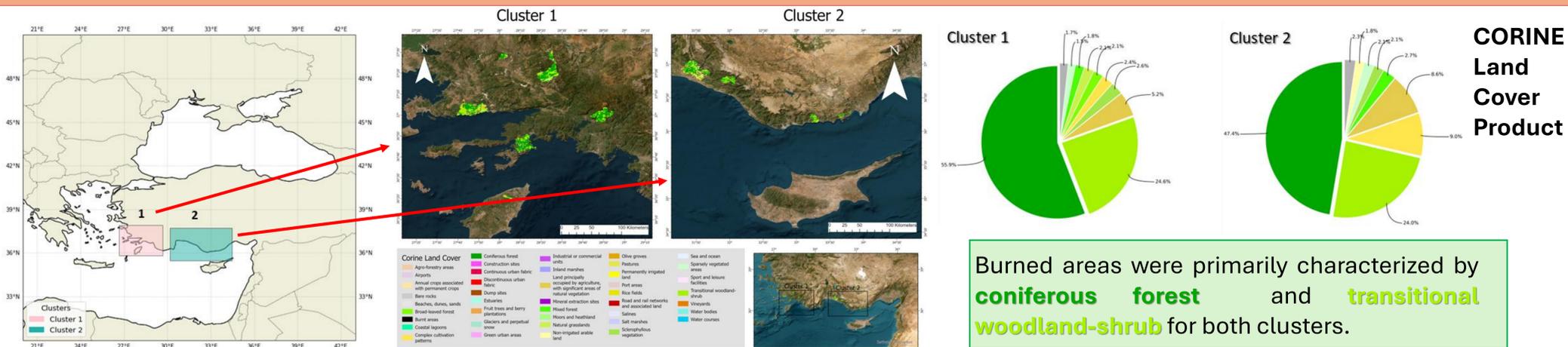
- Microwave radiometer
- Optical precipitation disdrometer
- 35 GHz MiRA cloud radar

✓ SOLAR STATION

- Sky Camera
- AERONET Sun/sky-photometer
- Pyranometers
- Spectrophotometer



RESULTS



CONCLUSIONS

Analysis of 14 smoke cases

Mean Values	LR355 [sr]	LR532 [sr]	δ355 %	δ532 %	BAE 532/1064	BAE 355/532	EAE	CRLR
Cluster 1	72 ± 12	59 ± 9	7 ± 1	8 ± 3	0.8 ± 0.2	0.9 ± 0.1	1.5 ± 0.2	0.8 ± 0.05
Cluster 2	75 ± 21	62 ± 16	10 ± 3	12 ± 4	0.9 ± 0.2	0.8 ± 0.2	1.3 ± 0.4	0.9 ± 0.2
Fresh Smoke	86 ± 17	69 ± 13	10 ± 4	9 ± 3	0.9 ± 0.2	0.8 ± 0.2	1.3 ± 0.5	0.8 ± 0.2
Background-fresh Smoke	58 ± 4	50 ± 6	8 ± 2	13 ± 3	0.7 ± 0.2	0.9 ± 0.2	1.3 ± 0.2	0.9 ± 0.1

- Burned areas **west coast vs south coast**:
 - Mainly coniferous forest and woodland-shrub, for both clusters
 - **LR**: no major differences
 - **PLDR**: higher at both wavelengths when smoke came from Cluster 2 – south coast fires (dust injection, dispersion)
- **Fresh smoke vs background-fresh smoke**:
 - Differences depending on layer intensity and geometrical characteristics
 - **LR**: higher values for fresh smoke at both wavelengths
 - **PLDR**: higher values for fresh smoke at 355nm, while lower values at 532nm
 - In both cases LR532/LR355 < 1, indicating the presence of fresh smoke