Airborne In-situ Measurements during JATAC/CAVA-AW 2021/2022 campaigns - First Climate-Relevant Results

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Introduction

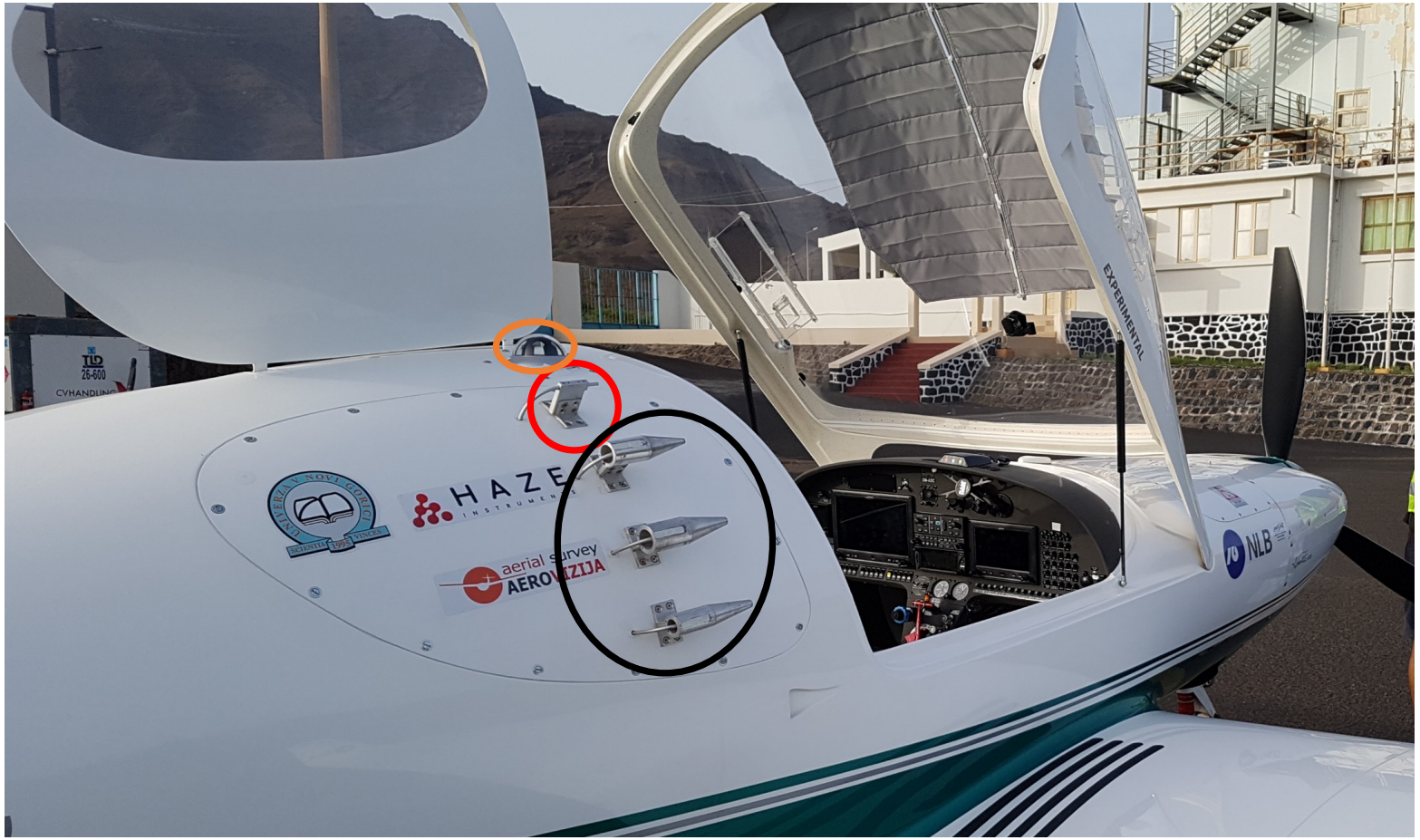
- **26 flights** during the JATAC CAVA Cal/Val 2021 & 2022 campaigns

- Measuring the **optical properties** of aerosol particles, **PSD** and the solar **irradiance**

- Main objectives:
  - Obtain **in-situ vertical profiles** of these properties, compare them with **remote** measurements
  - Analyze the **absorption properties** of mineral dust particles
  - Calculate the **heating rate** of the **SAL** mineral dust layers

Methodology

Airplane



Pyranometer

VI inlet

Isokinetic inlets

Methodology

Instrumentation

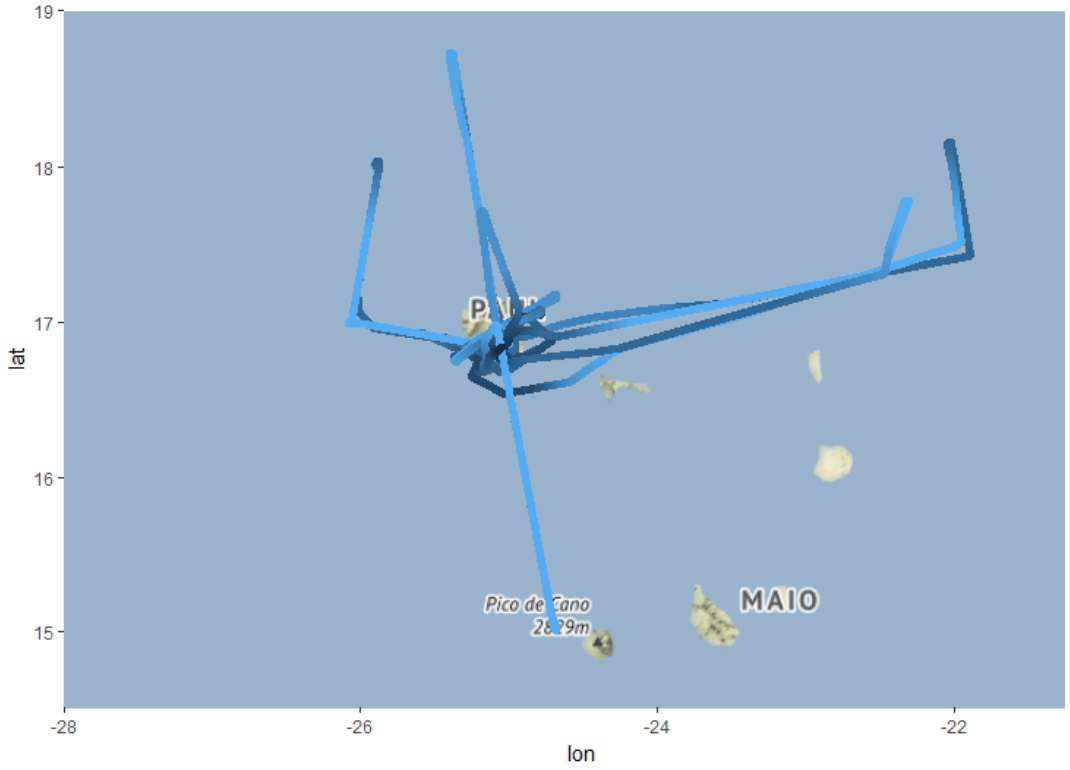
VI inlet:
- **CLAP**
- **OPC**

Isokinetic inlets
- **CLAP**
- **Nephelometer**
- **OPC**

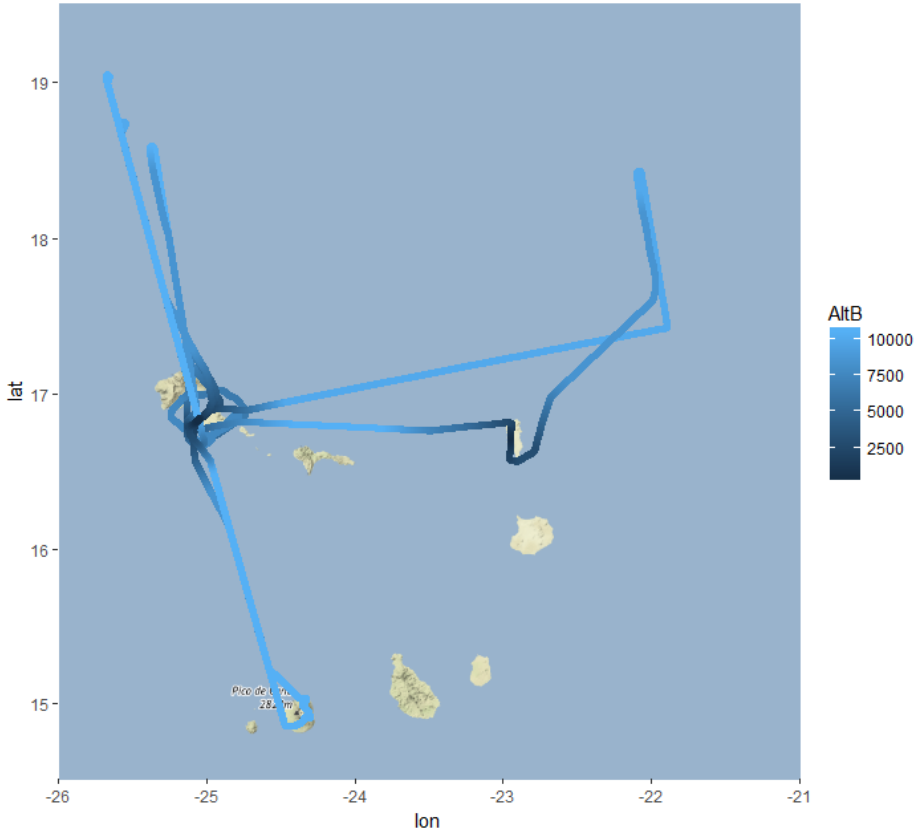
Other sensors
- **CO2 concentration**

Campaigns overview

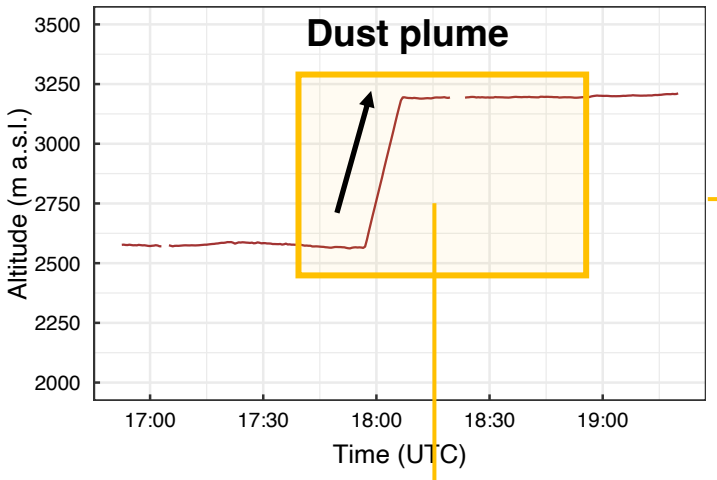
2021 – 18 flights

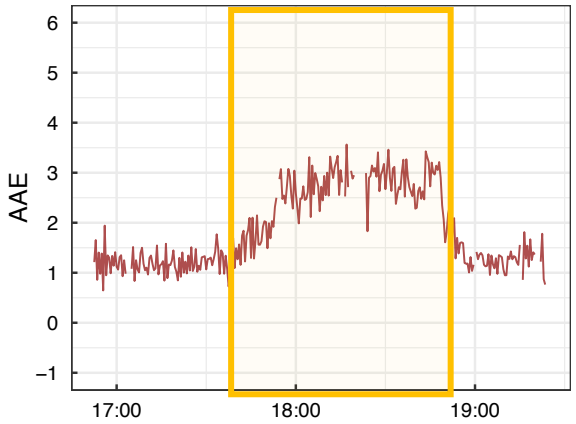


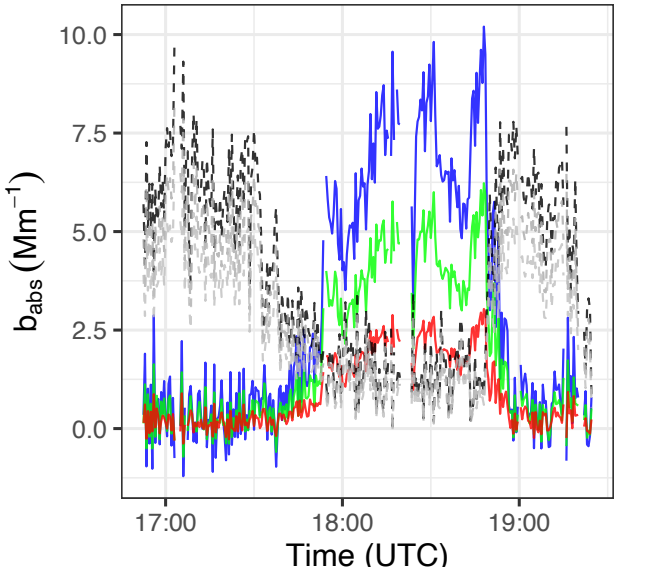
2022 – 9 flights



Case study 2021 — 17 Sep.

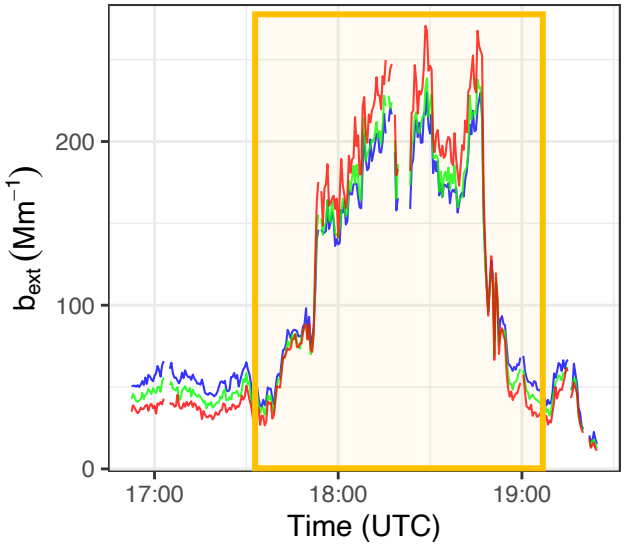






Absorption coefficients

- $b_{abs,\ 450\ nm\ –\ dust}$
- $b_{abs,\ 525\ nm\ –\ dust}$
- $b_{abs,\ 635\ nm\ –\ dust}$
- $b_{abs,\ 450\ nm\ –\ BC}$
- $b_{abs,\ 525\ nm\ –\ BC}$
- $b_{abs,\ 635\ nm\ –\ BC}$



Extinction coefficients

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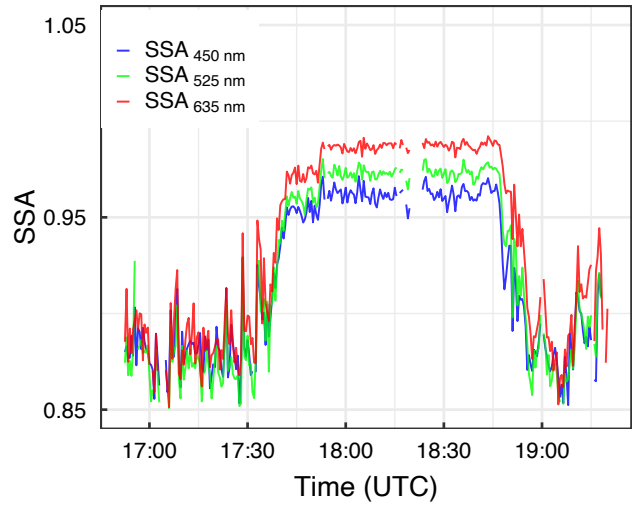
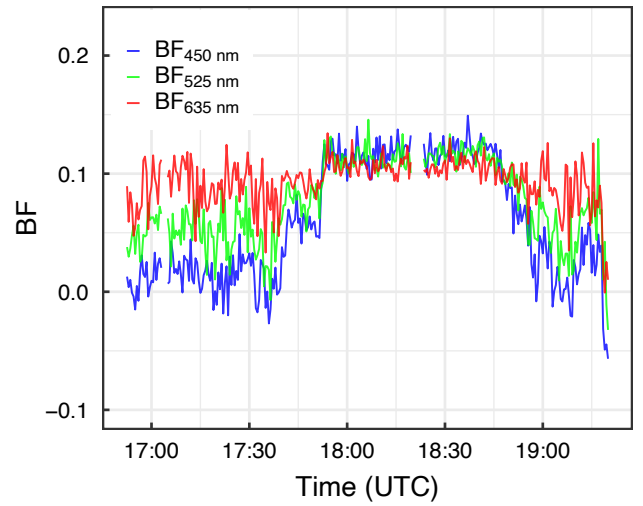
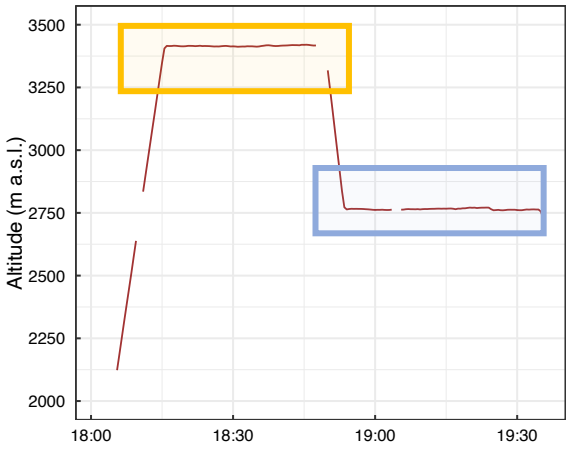
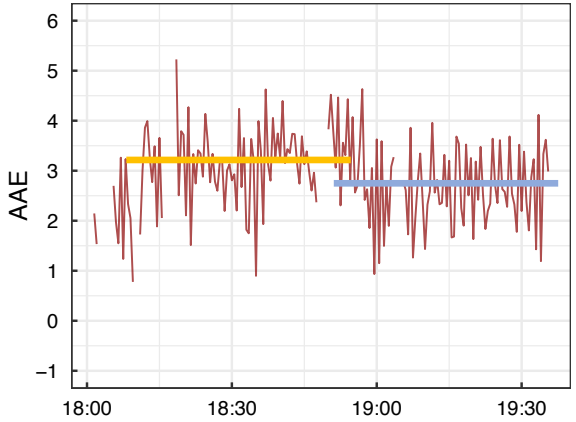
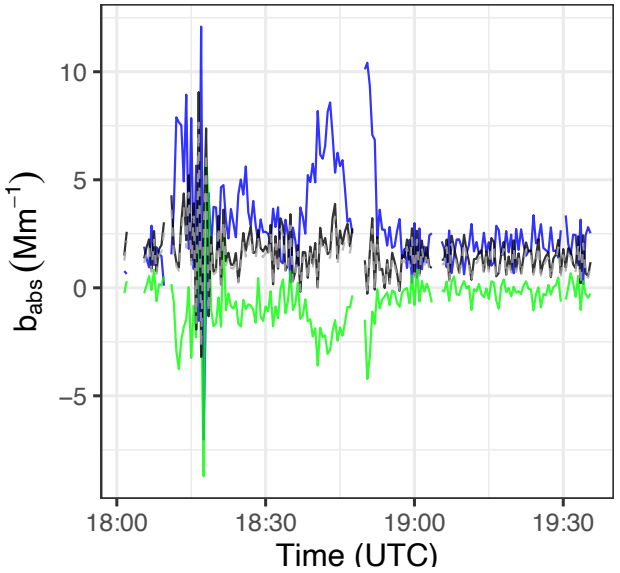




Case study 2022 — 16 Sep.







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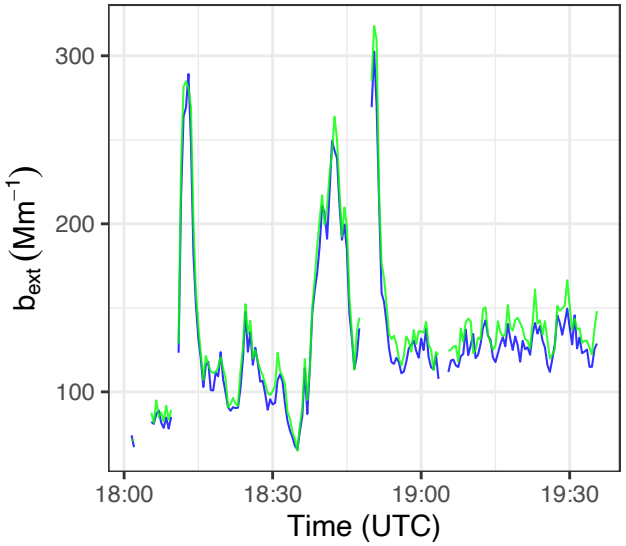

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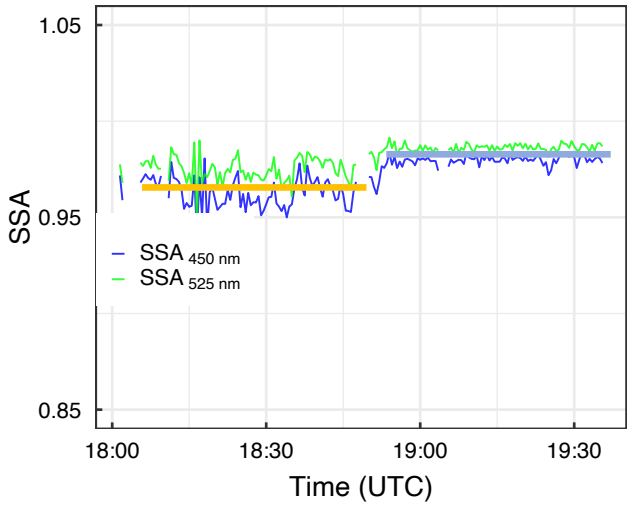

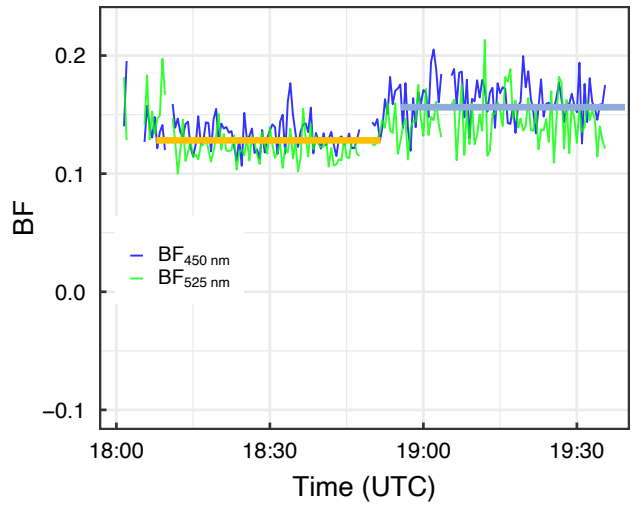

Conclusions & Future Steps

- Stark contrast between **BC** and **Dust** loaded layers
- Layers of ~ 750 m depth
- Large **absorption** by **dust**, comparable with **BC**

- **Currently working on:**
  - Obtaining **heating rate** of the **dust layers**

Credit all pictures: Griša Močnik

Thank you!

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