

# Retrieve the properties of above-cloud smoke aerosols and their spectrally-resolved direct effects in SE Atlantic region from PACE observatory

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Area of interest listed on  
your proposal:

Refinement of data products

Advanced products

PACE and models

Cross product development

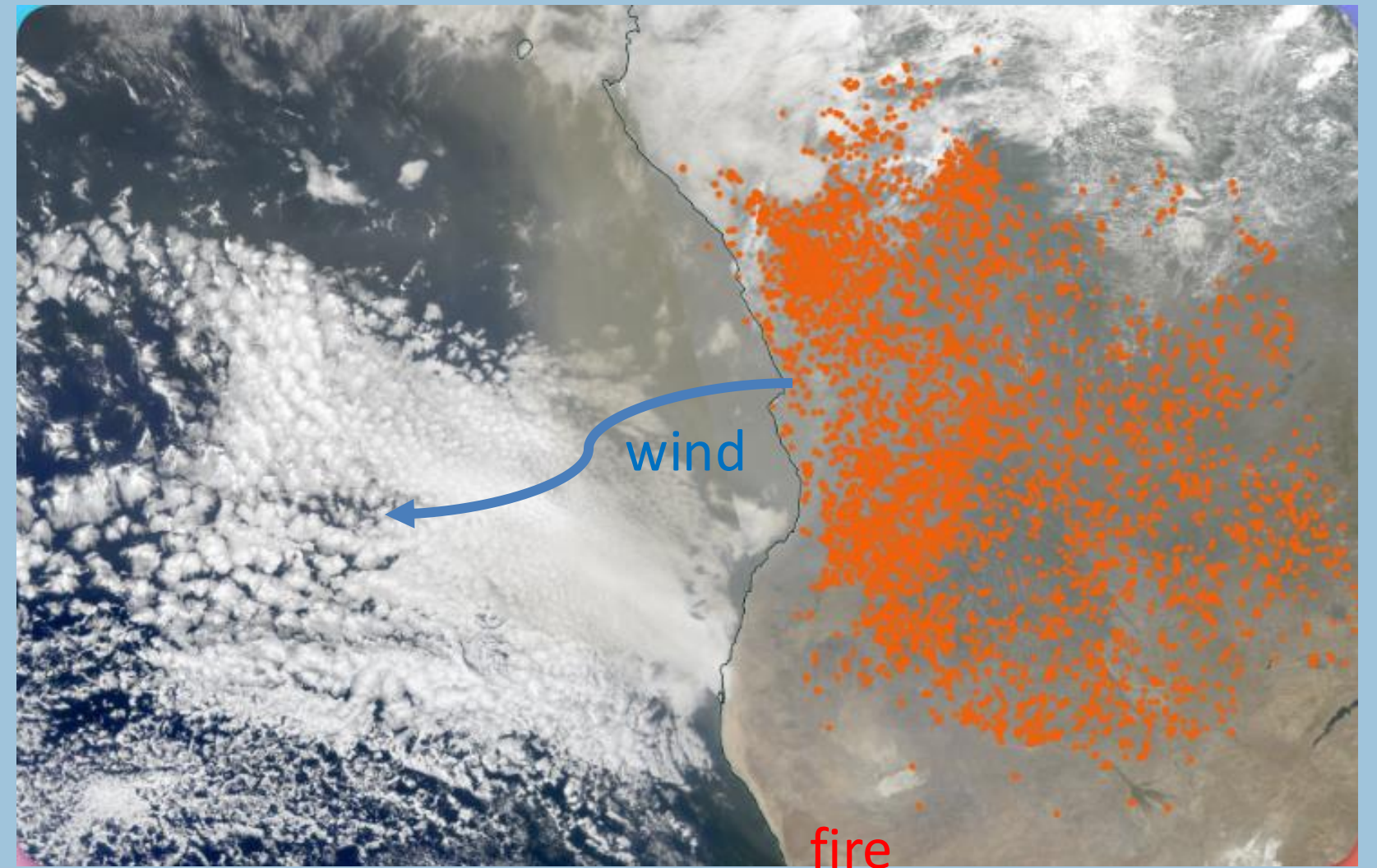
PACE applications product

# Overview

**Key deliverable:** Properties of above-cloud aerosol properties and cloud retrieval correction; spectrally-resolved smoke direct radiative effect (DRE)

**Background:** A layer of smoke from biomass burning in Central Africa is frequently observed above the stratocumulus cloud deck in the southeastern Atlantic region from July to October. This unique phenomenon plays a crucial role in influencing both regional and global climate.

**Rationale:** The existing OCI cloud retrieval algorithm does not account for above-cloud smoke, which can introduce significant errors in the COT product. Our approach aims to correct this issue. Additionally, the wide spectral coverage of OCI presents an excellent opportunity to derive assumption-free and spectrally independent DRE of smoke.



PACE OCI RGB image on July 13<sup>th</sup>, 2024

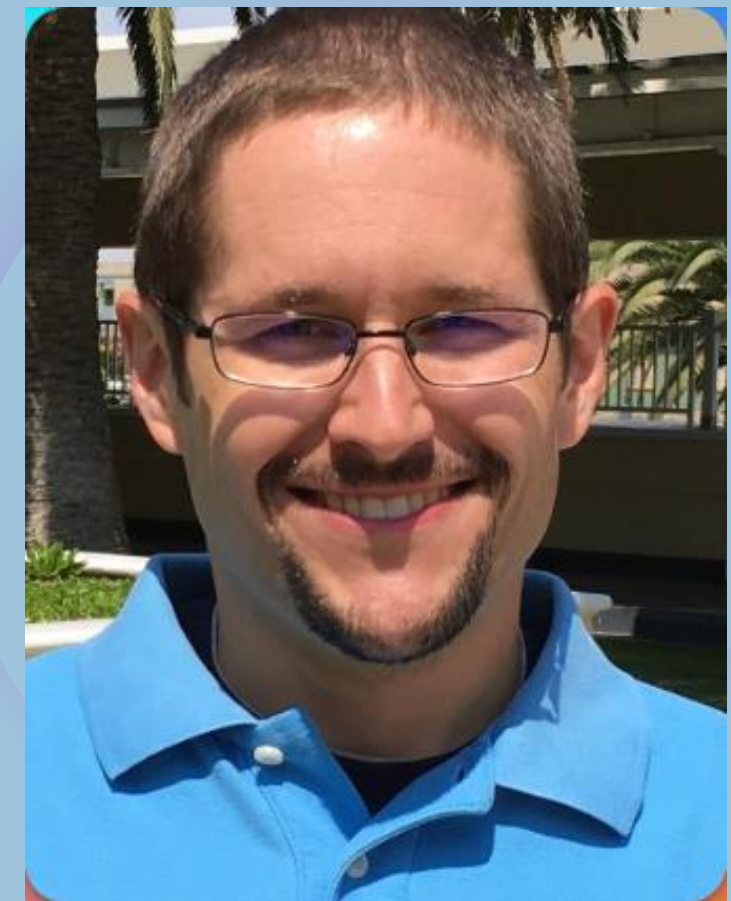
# Our Project Team



**Zhibo Zhang/UMBC**



**Daniel Miller/UMBC**

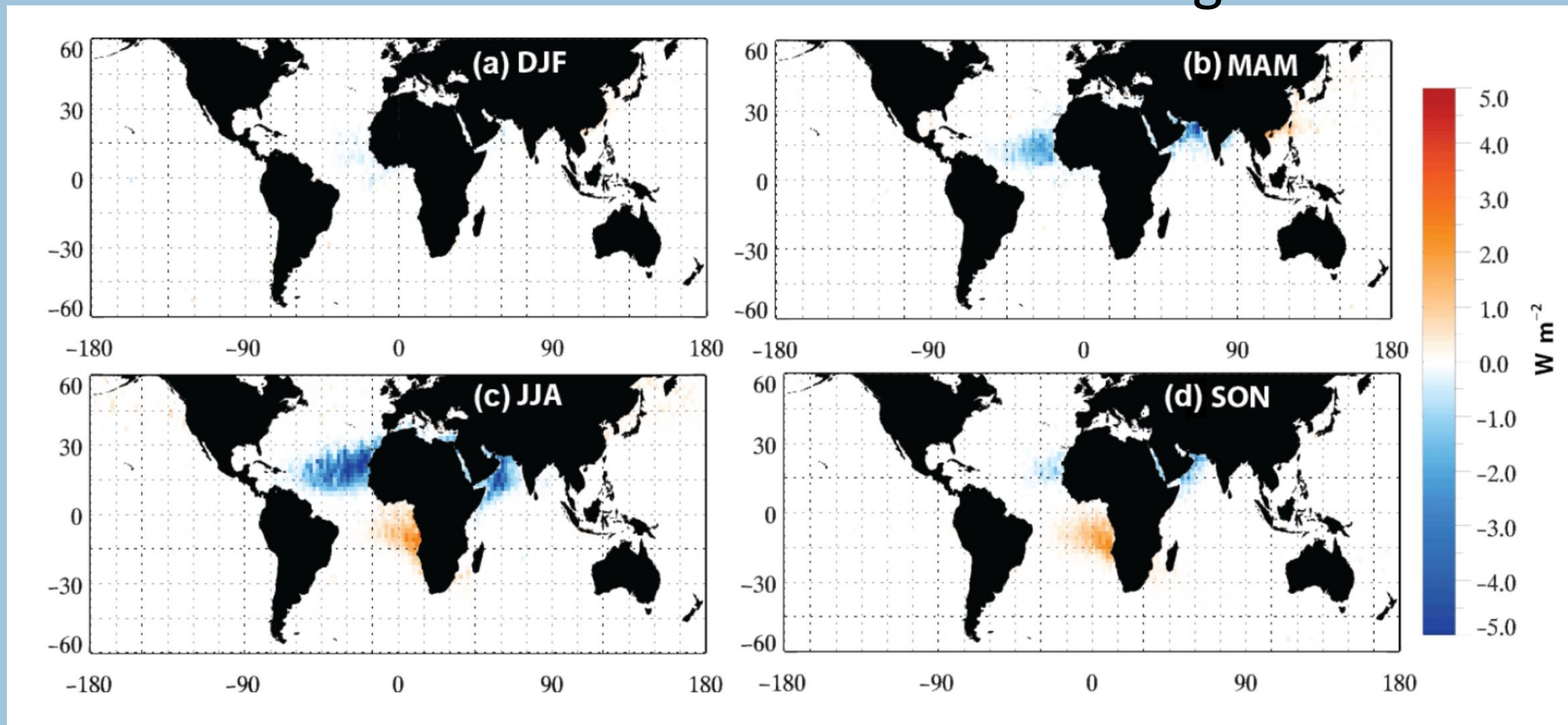


**Kerry Meyer/NASA GSFC**

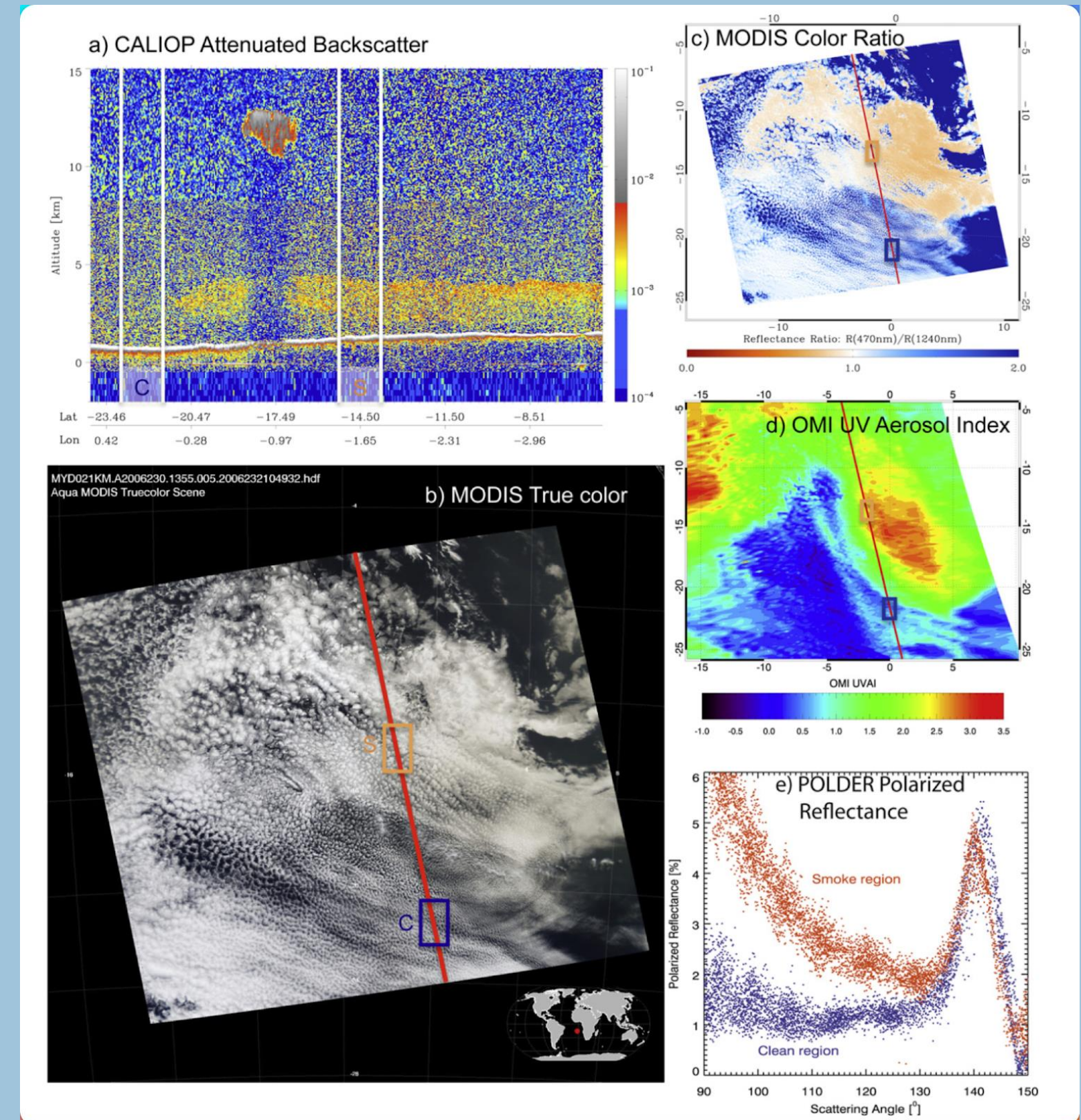
# A bit of Background...

Yu and Zhang 2013

Zhang et al. 2016

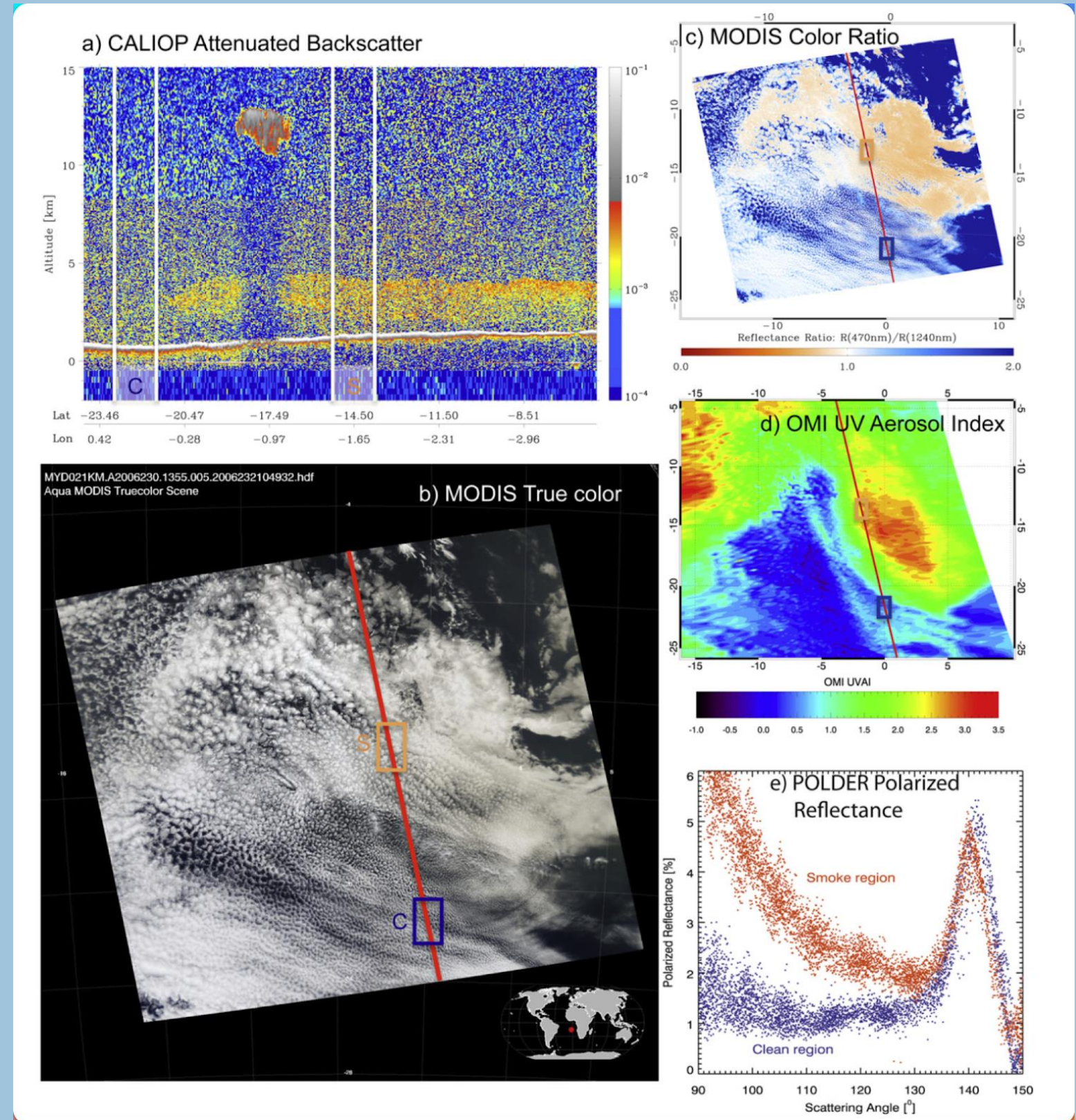
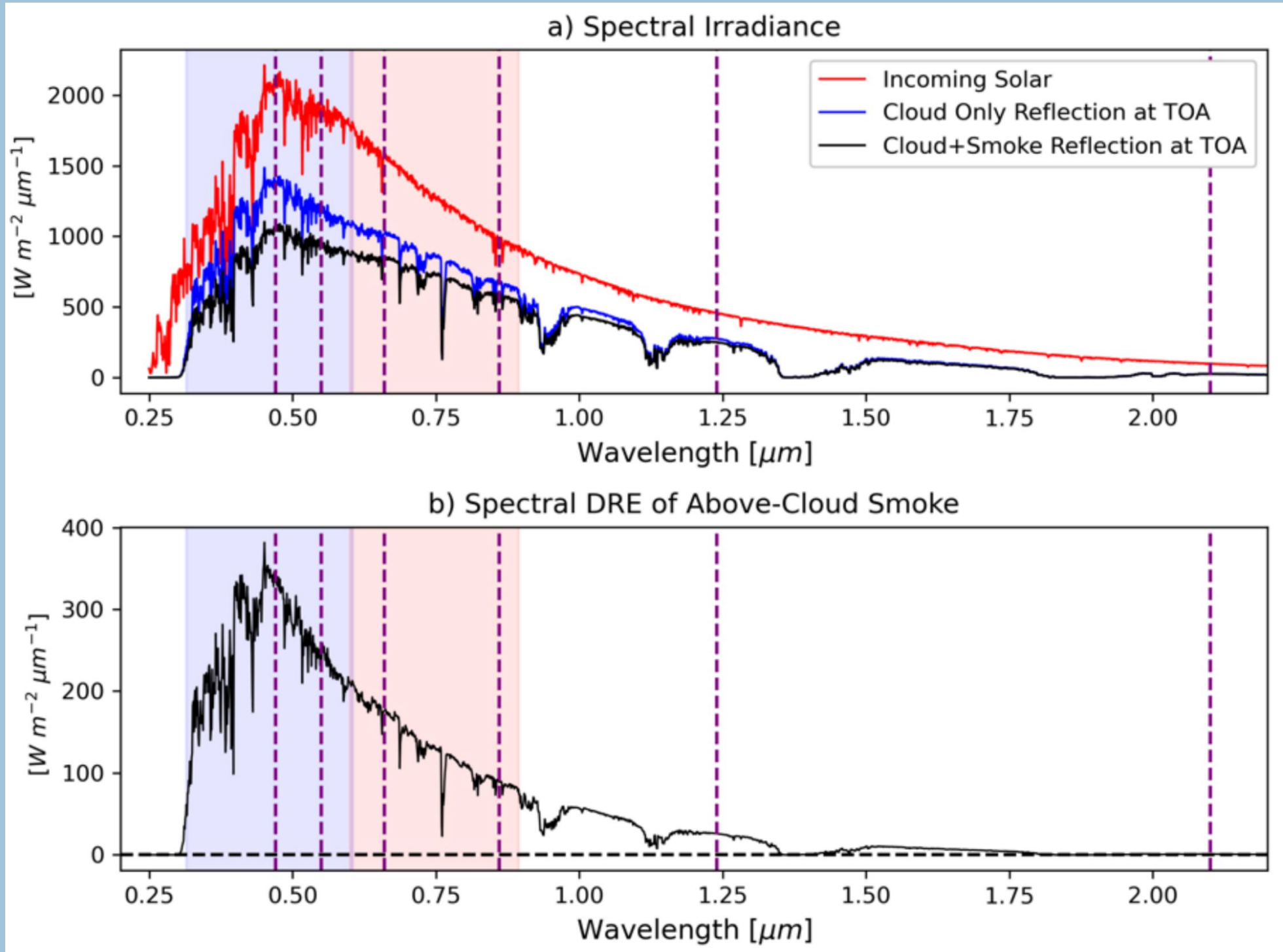


- **Direct effect:** Above-cloud can have a significant positive direct radiative effect because smoke absorption is enhanced by the underlying clouds.
- **Indirect Effect:** Entrained smoke particles can also affect the microphysical properties of the clouds underneath, thereby influencing their radiative property and lifetime.



# A bit of Background...

Yu and Zhang 2013



# Objectives and Goals



## Goal # 1

Algorithm development and integration



## Goal # 2

Uncertainty quantification and product performance verification

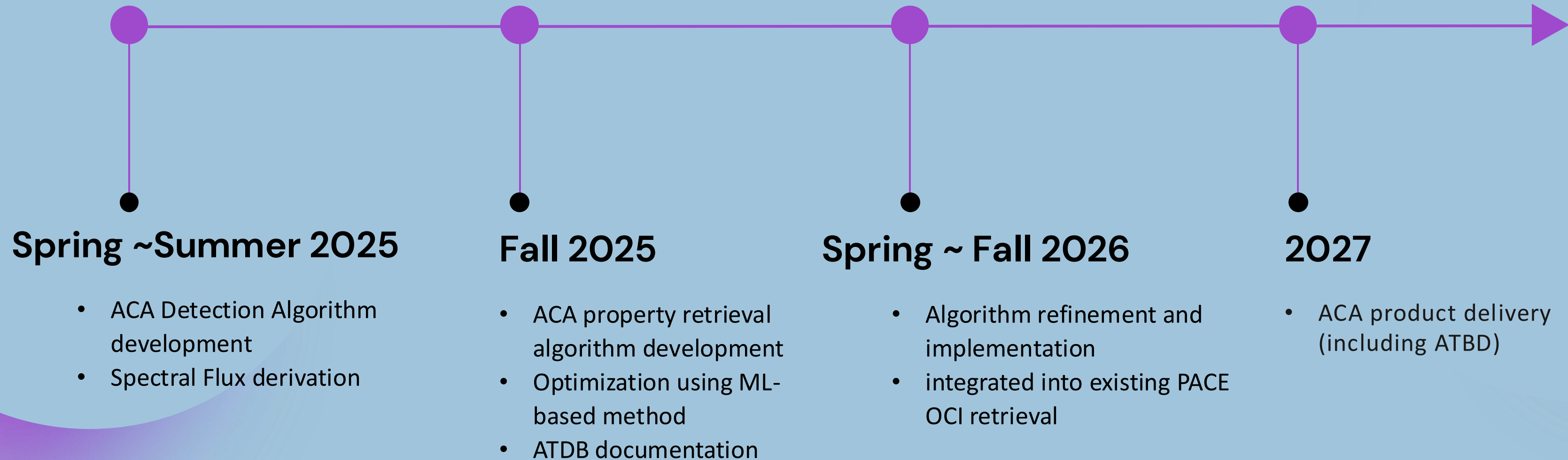


## Goal # 3

Publication of the algorithm and implementation of operational product:

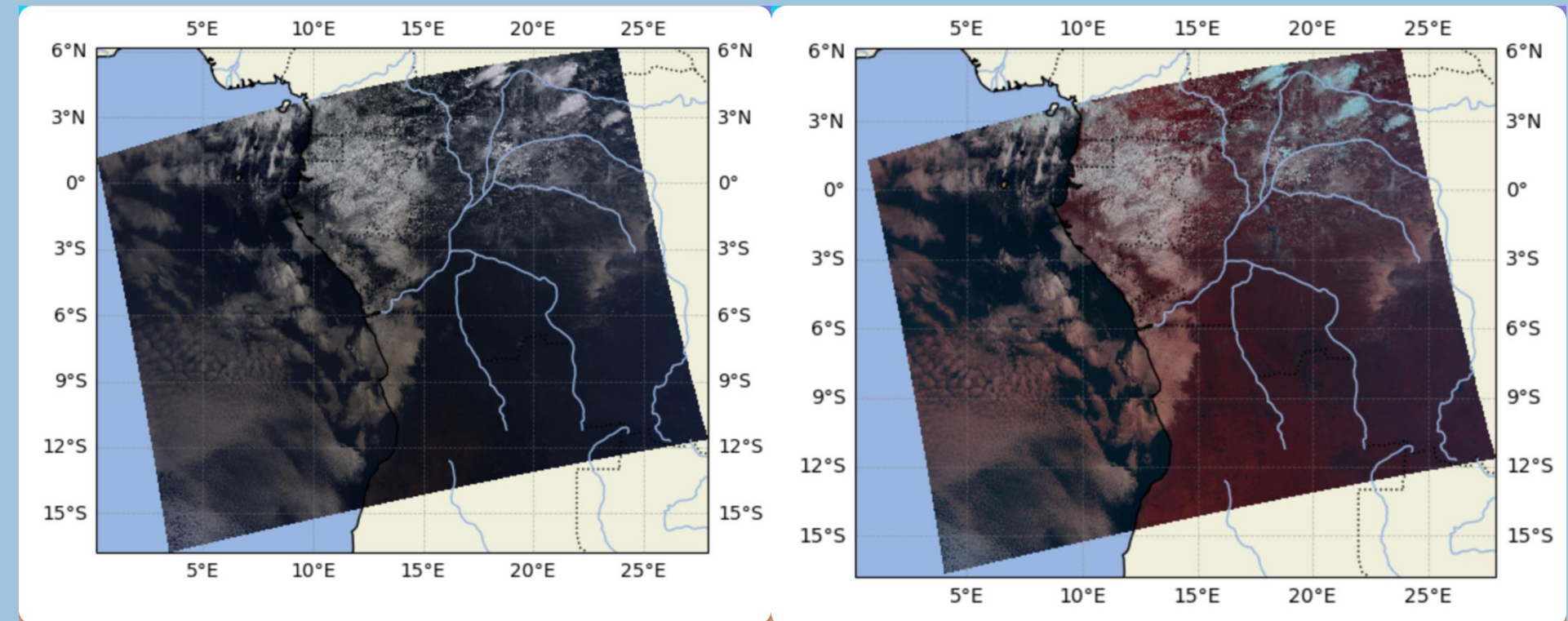
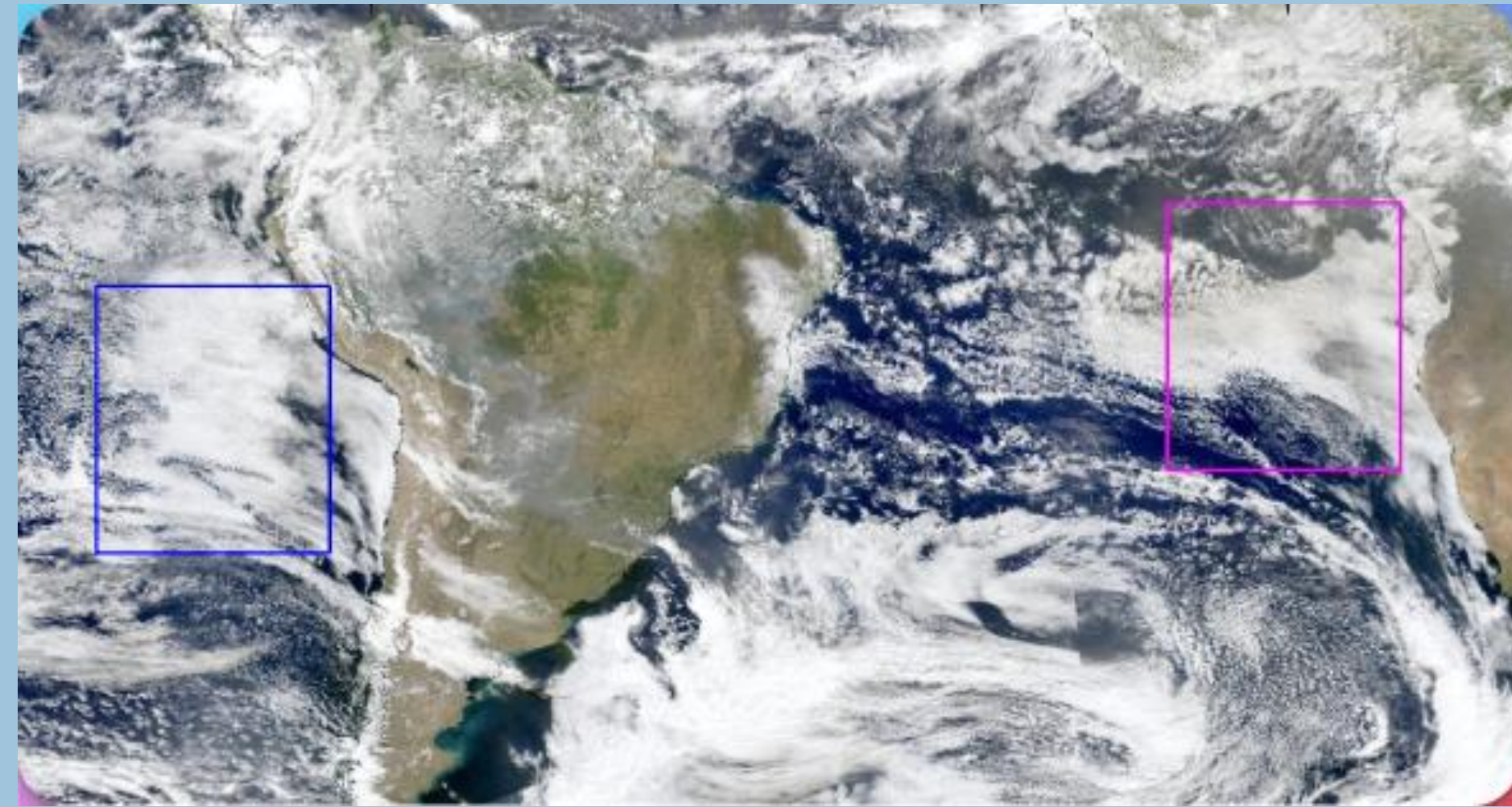
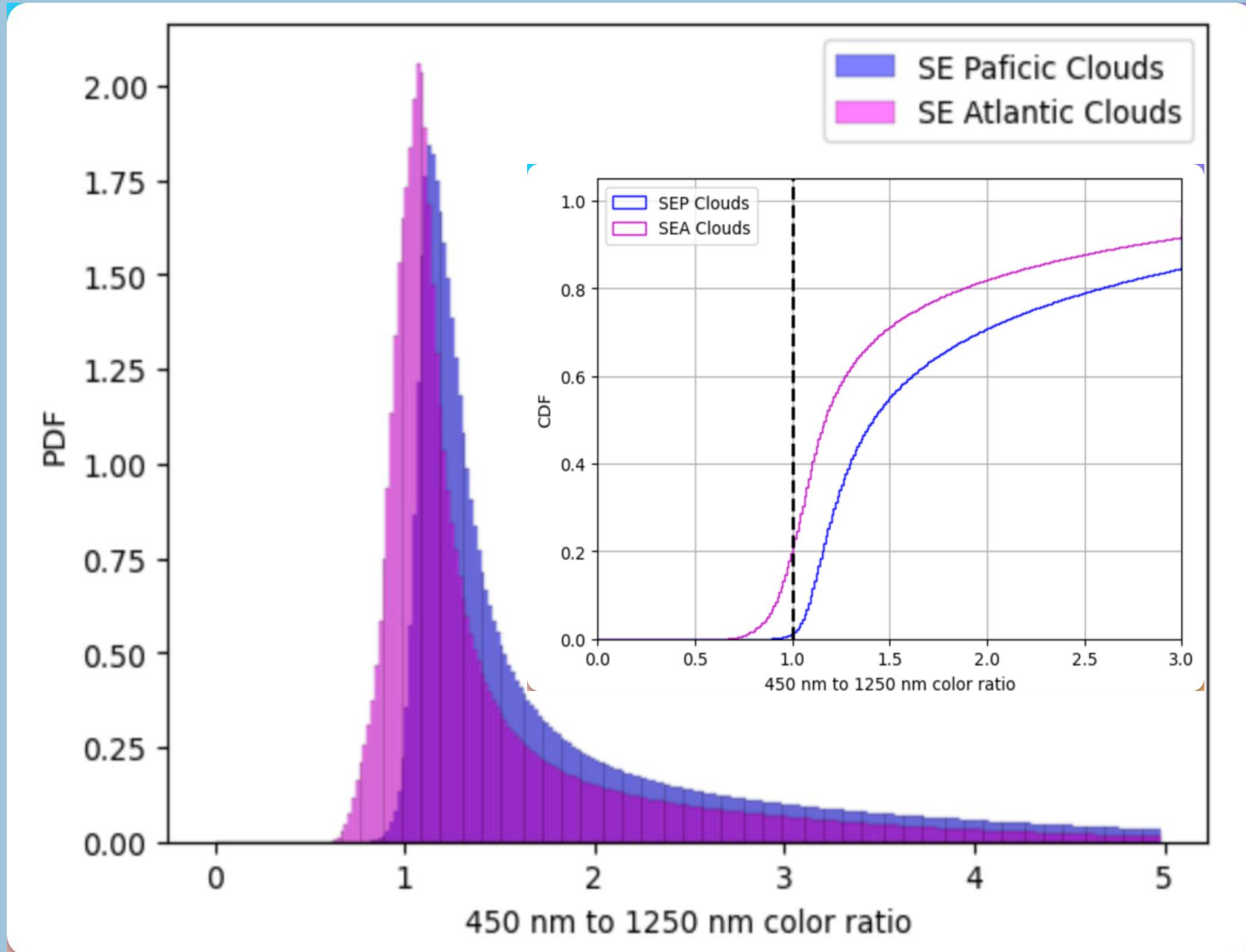
# Timeline

Briefly discuss the key dates for the project.



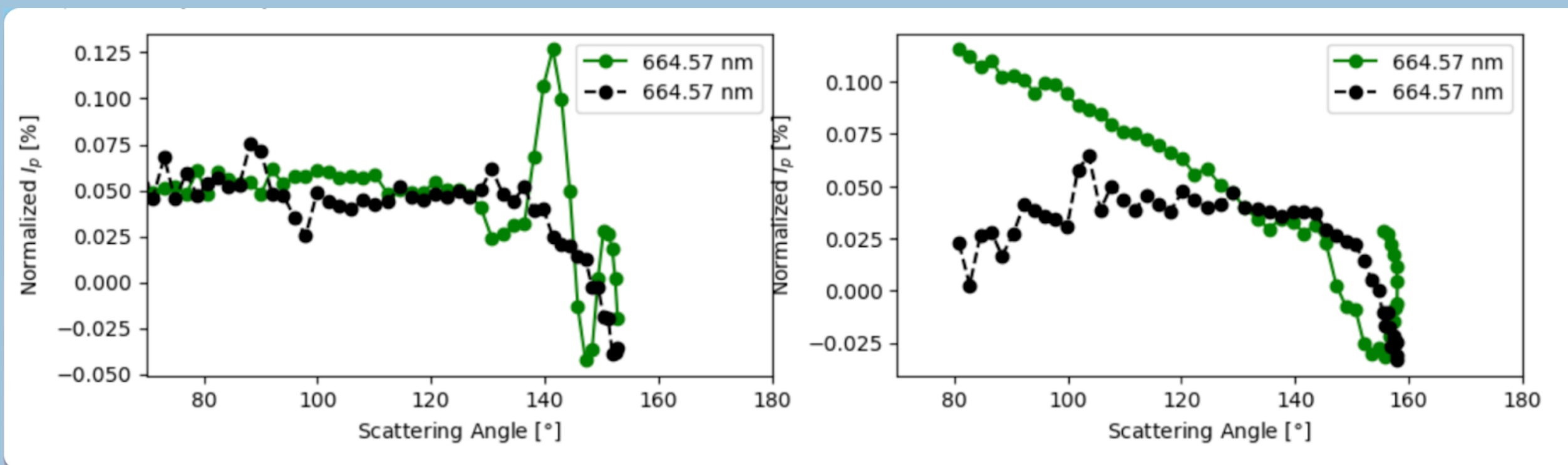
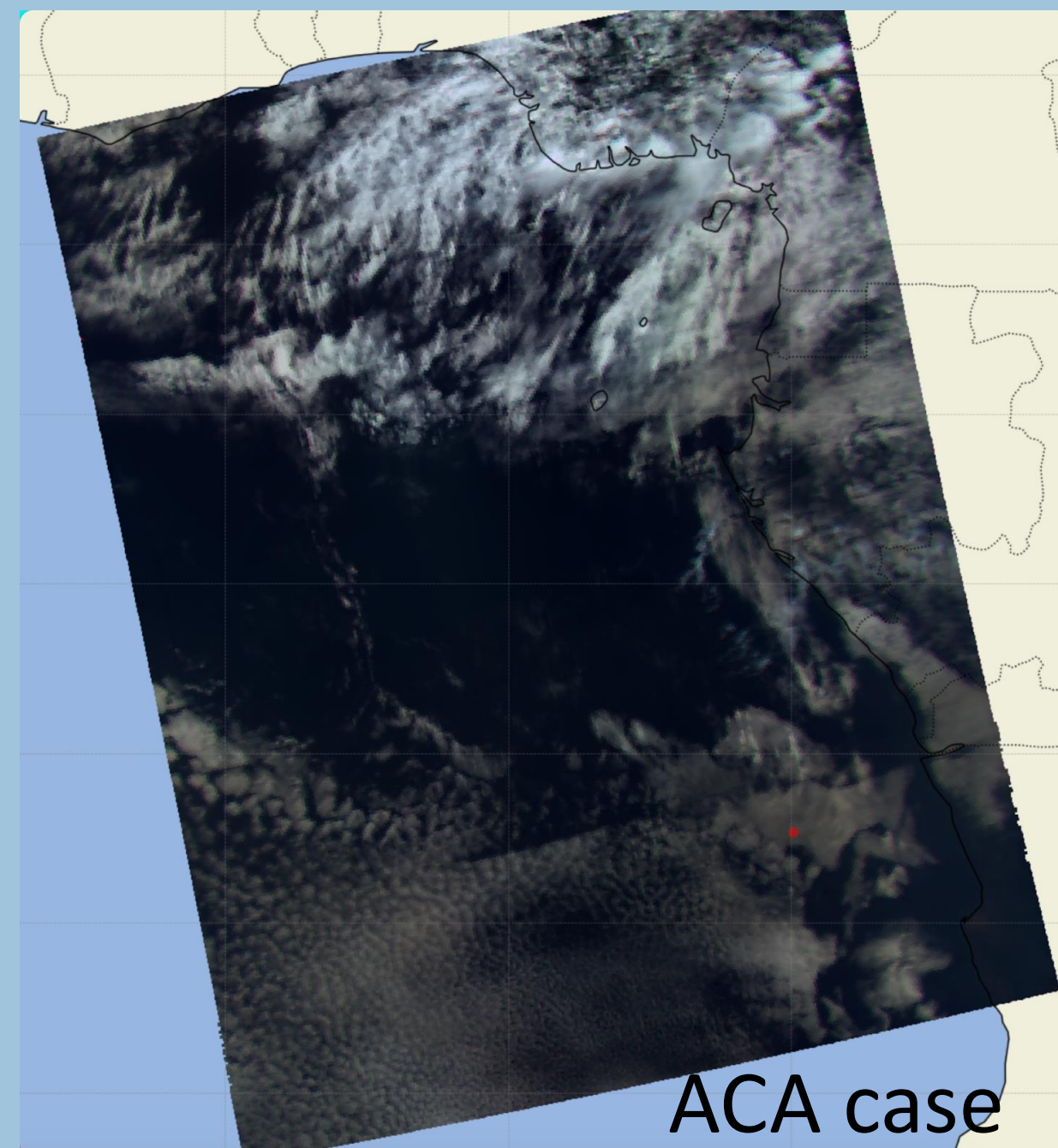
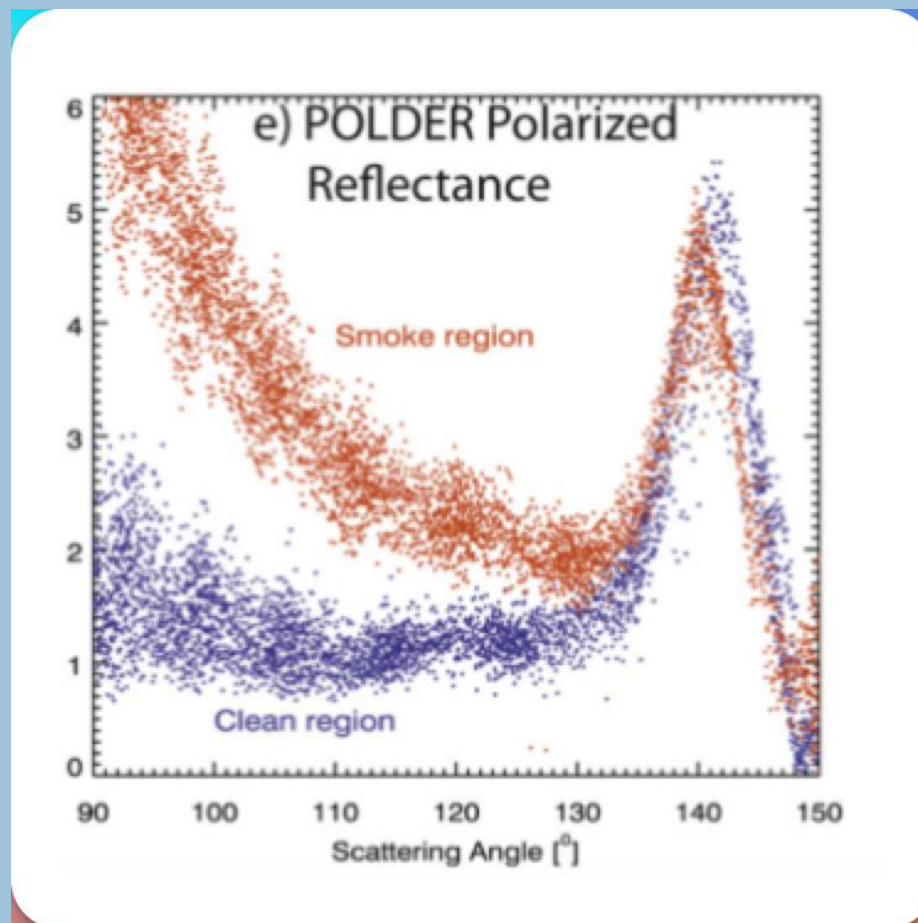
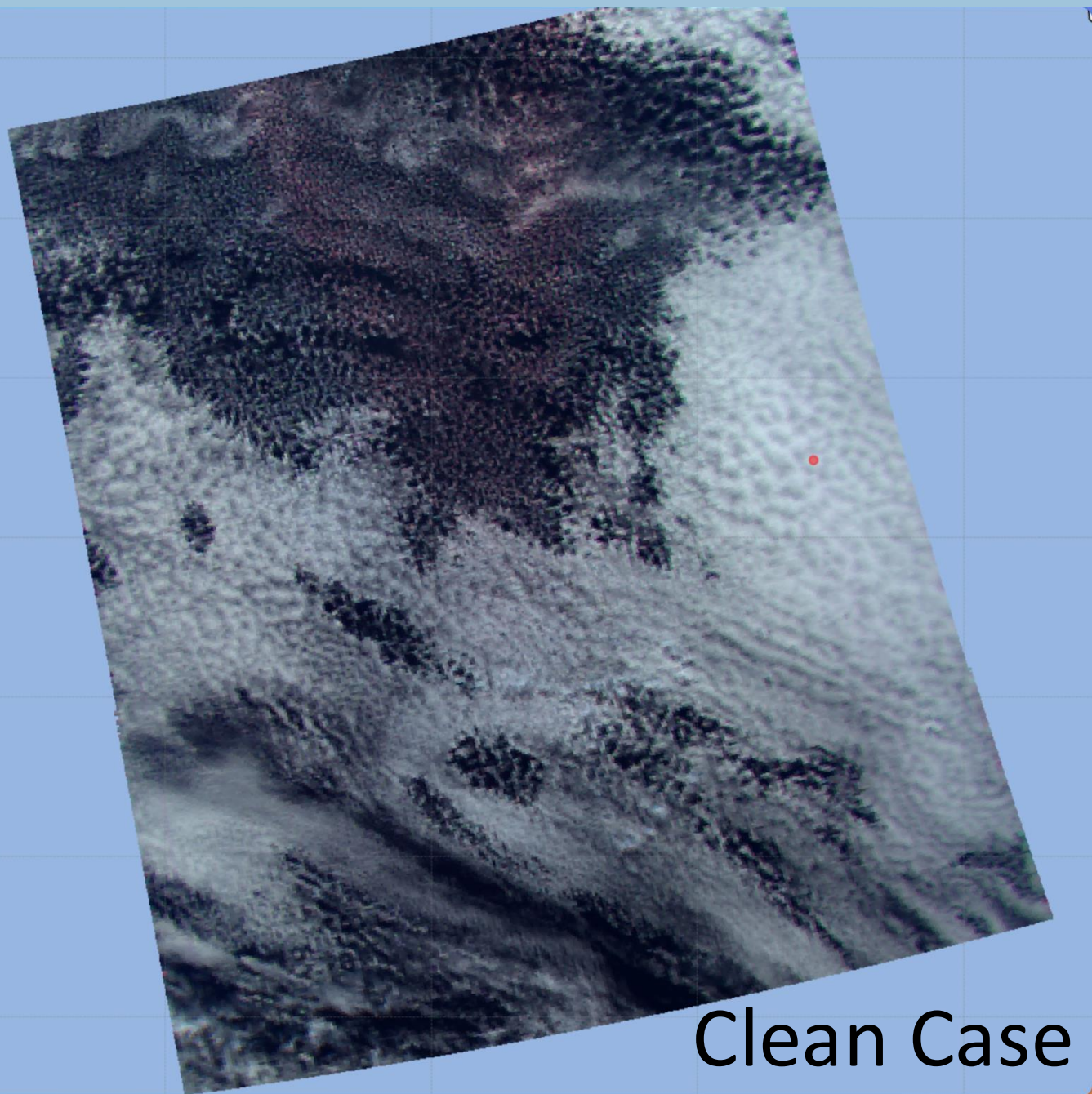
# Recent Progress

Above-cloud smoke detection using color ratio method based on OCI observations



# Recent Progress

## AC-smoke Detection using PACE HARP-2



# Stakeholders/end-users?

Who will be use this product?

- The aerosol-cloud community
- Modeling community?

**For questions,  
reach out to:**



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