A satellite is shown in space, with the Earth's blue and white atmosphere visible in the background. The satellite has a complex structure with various instruments and panels.

Validation of ADM-Aeolus L2 aerosol and cloud product employing advanced ground-based lidar measurements (VADAM)

V. Amiridis, National Observatory of Athens, Greece

U. Wandinger, TROPOS-Leibniz Institute for Tropospheric Research, Leipzig, Germany

V. Freudenthaler, LMU-Meteorological Institute of the Ludwig-Maximilians-Universität, Munich, Germany

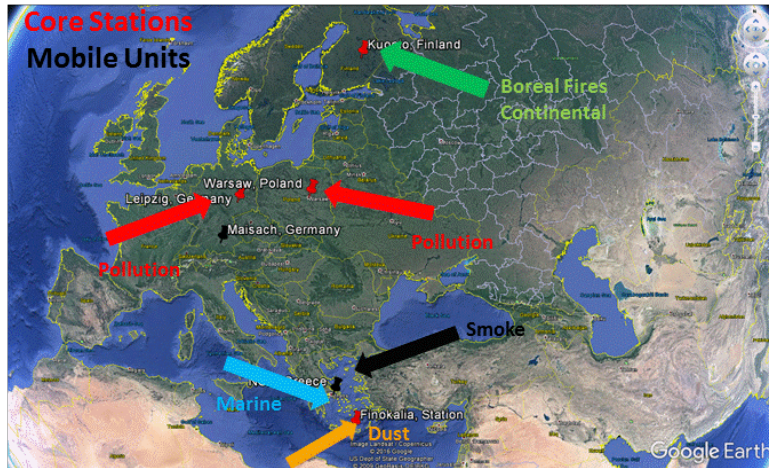
M. Komppula, FMI-Finnish Meteorological Institute, Kuopio, Finland

I. Stachlewska, UoW-University of Warsaw, Faculty of Physics, Institute of Geophysics, Warsaw, Poland

Proposal objectives

- validation of ADM-Aeolus aerosol and cloud optical properties (Level 2a product) employing advanced ground-based lidar techniques
- assessment of the accuracy, resolution and performance of ALADIN under different cloud and aerosol conditions
- assessment of the ALADIN aerosol and cloud retrieval algorithms

Description of CAL/VAL techniques applied



Collocated ground-based PollyXT lidar stations will provide aerosol and wind lidar measurements for cal/val of ALADIN cloud and aerosol products at different locations covering a great variety regarding:

- meteorological conditions (wind speed, cloud type)
- aerosol load and aerosol types

Mobile lidar units (POLIS & EMORAL) will be at selected crossing points of ADM's ground track (distance < 10 km).

The instrumentation will be coupled by sunphotometric measurements employing CIMEL instruments on the selected sites, members of the AERONET network.

Description of CAL/VAL techniques applied

Polly^{XT} @ Finokalia



Polly^{XT} @ Kuopio

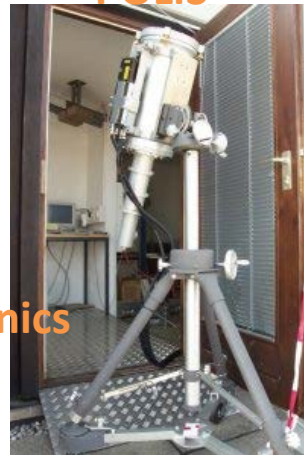


Polly^{XT} and WiLi @ Leipzig



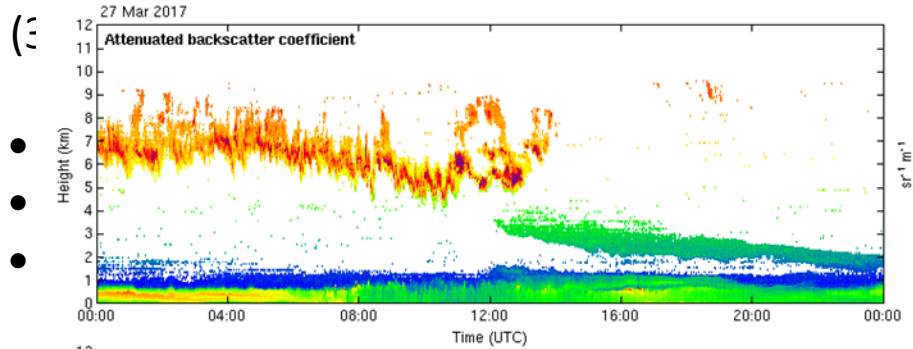
HALO Photonics Stream Line

POLIS

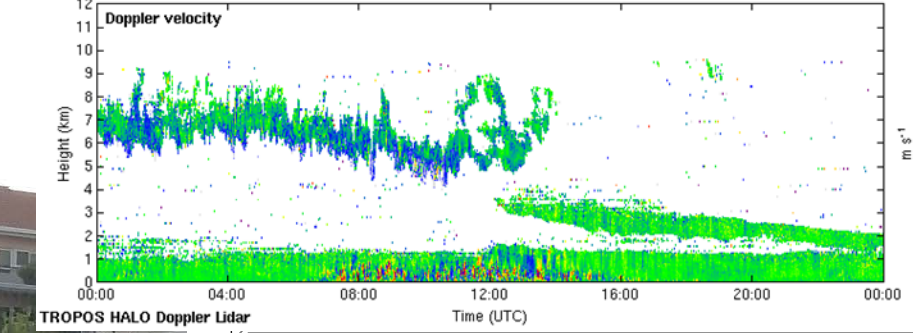


EMORAL

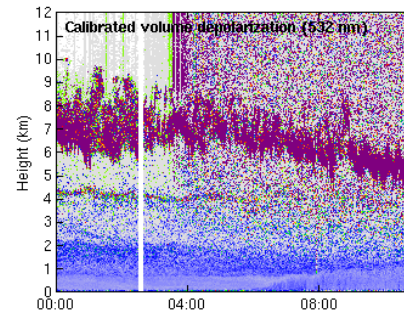
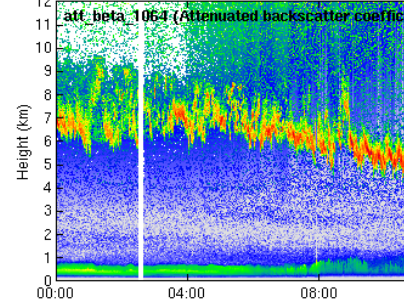




(T, Doppler lidar, passive sounders)
 (MALVE)
 campaigns
 observations for >1 year from end of 2018

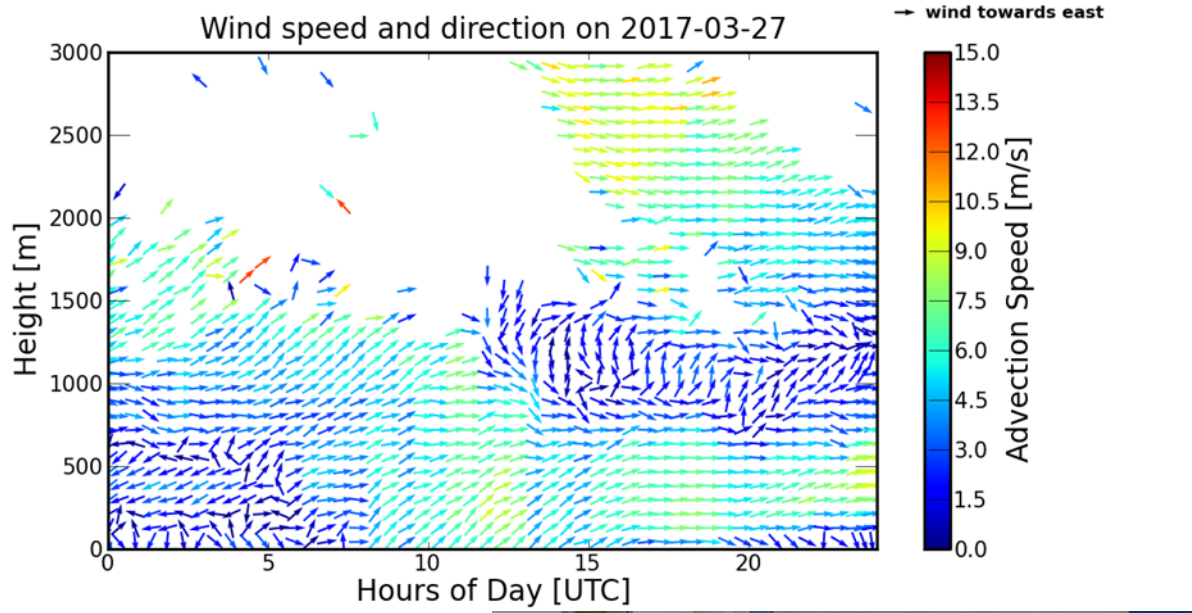


TROPOS HALO Doppler Lidar



TROPOS Polly-Xt LACROS

Time (UTC)



Contribution to Aeolus CAL/VAL requirements

Station	Instrument	Product	Distance (expected)	Time
Finokalia (NOA)	PollyXT	$3\beta+2\alpha+2\delta$	< 100 km	24h/7d
Leipzig (TROPOS)	PollyXT & Halo	$3\beta+2\alpha+2\delta$	< 100 km	24h/7d
Kuopio (FMI)	PollyXT & Halo	$3\beta+2\alpha+2\delta$	< 100 km	24h/7d
Warsaw (UoW)	PollyXT	$3\beta+2\alpha+2\delta$	< 100 km	24h/7d
Mobile Units	Instrument	Product	Distance (expected)	Time
Munich (LMU)	POLIS	$2\beta+2\delta$	< 10 km	± 2 h
Athens (NOA)	EMORAL (ESA property)	$2\beta+1\alpha+2\delta$	< 10 km	± 2 h

Mobile lidars (POLIS & EMORAL) will operate at selected crossing points of ADM's ground track (distance < 10 km).

The instrumentation will be coupled by sunphotometric measurements from AERONET.



Contribution to Aeolus CAL/VAL requirements

	Height Range	ADM-Aeolus	VADAM
Vertical Resolution	0 - 2 km	500 m	7.5 m
	2 - ~20 km	1000 m	7.5 m
	Stratosphere	2000 m	-

The **raw vertical resolution** for VADAM will be **7.5 m**. This resolution will be sustained in the Level 1 product (**range-corrected signals**) and in the Level 2 **backscatter** and **depolarization** retrievals.

For **extinction**, an **effective vertical resolution** between **100-500 m** is anticipated. The effective resolution will depend on the aerosol load, layer thickness and system's SNR among other parameters.

Status of manpower, tools and funding

The team consists of experienced researchers from:

1. The National Observatory of Athens (**NOA**),
2. The Leibniz Institute for Tropospheric Research Leipzig (**TROPOS**),
3. The Kuopio Unit of the Finish Meteorological Institute (**FMI**),
4. The Meteorological Institute of the “Ludwig-Maximilians-Universität (**LMU**)”
5. The Institute of Geophysics of the University of Warsaw (**UoW**)

All stations are members of the ACTRIS European Research Infrastructure (www.actris.eu) and EARLINET lidar network (<http://www.earlinet.org/>), with high experience in lidar techniques and Cal/Val activities (ESA-CALIPSO).

Status of manpower, tools and funding



NOA will run a new **ERC** project (**D-TECT**, starting on September 2017) which is related to dust research employing EARLINET lidars. The ERC experiment includes 3 intensive campaigns in Finokalia atmospheric observatory of ACTRIS in Crete.

This project will contribute in personnel and capacities in order to gather more data for ADM VADAM cal/val purposes.

Next steps

- Use current campaigns in Eastern Mediterranean, e.g. PRE-TECT, CyCARE and A-LIFE, and current missions (e.g. CALIPSO and CATS) to test cal/val approaches
- Focus on the development of WALL-E ERC lidar, which will detect various states of polarization, including linear and circular
- There is no poster presentation (Vassilis is in Finokalia to run the PRE-TECT campaign, more info: <http://pre-tect.space.noa.gr/>)