3D scanning atmospheric - marine LIDAR

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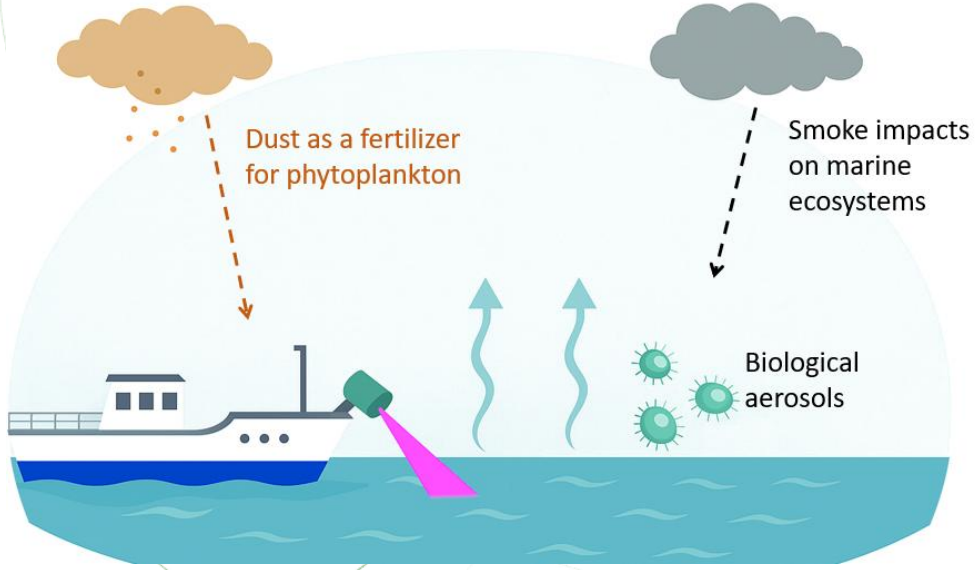
3D scanning atmospheric - marine LIDAR

- LIDAR technique is a valuable tool to investigate air-sea processes and innovative interaction studies.
- First Raman Depolarization Fluorescence LIDAR combining atmospheric and ocean measurements.
- Active remote sensing of marine aerosols and processes at the air-sea interface.
- Comprehensive understanding of environmental processes as part of the integration and harmonisation of National RIs.
- Compliant with ACTRIS requirements for High Power Lidar standard quality assurance procedures.



3D scanning atmospheric - marine LIDAR: L2 products

Atmospheric

- aerosol extinction
- aerosol backscatter
- aerosol depolarization-ratio
- aerosol fluorescence
- water vapor mixing ratio

Marine

- ocean waters depolarization-ratio
- diffuse attenuation coefficient of downwelling irradiance
- particulate backscattering coefficient
- absorption by colored dissolved organic matter

3D scanning atmospheric - marine LIDAR: Cross-domain ECVs

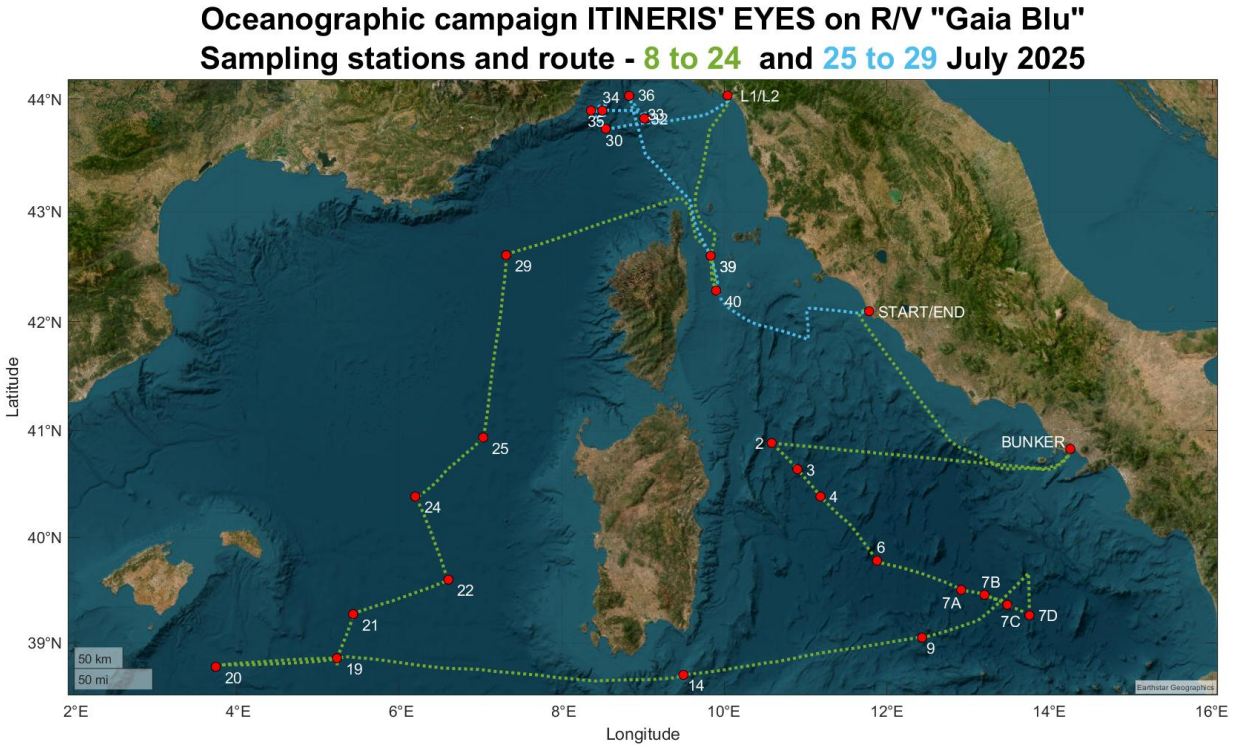
- Essential Climate Variables (ECVs), as specified by the Global Climate Observing System (GCOS), are physical, chemical, or biological variable or a group of linked variables that critically contributes to the characterization of Earth's climate.

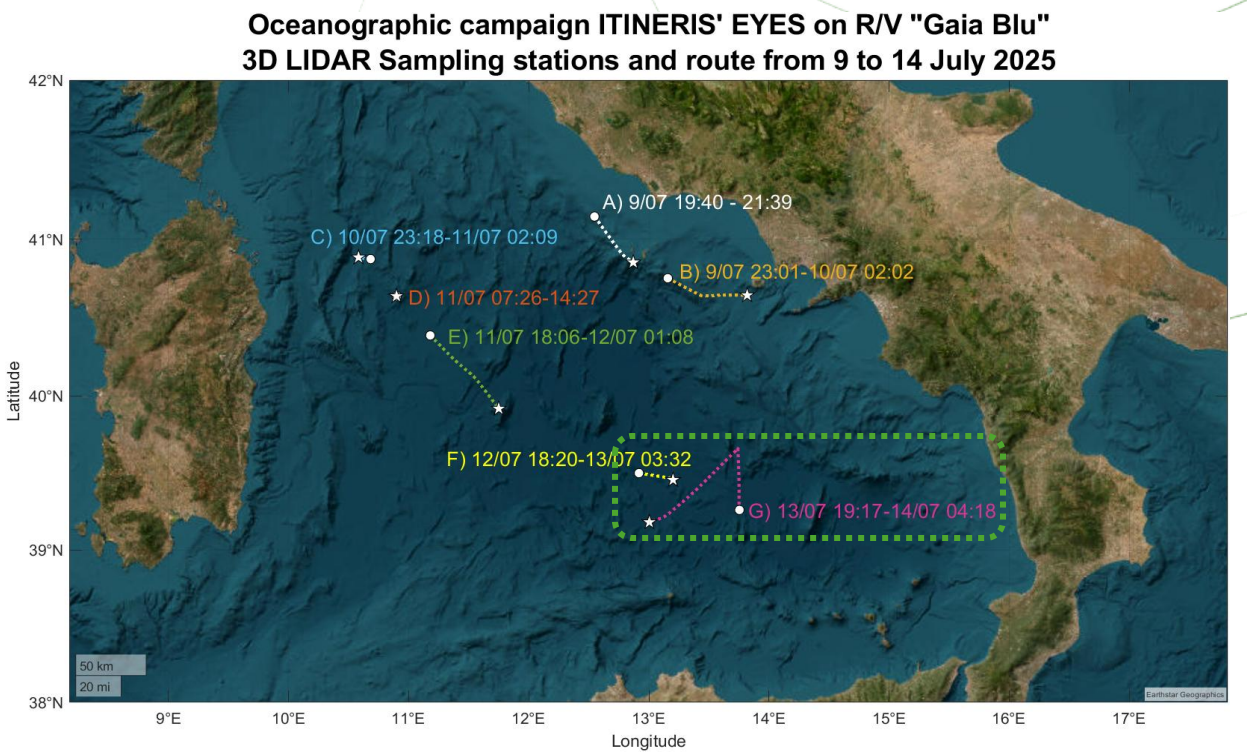
- The ECVs retrieved with the Raman Depolarization Fluorescence LIDAR are:

ECV	Domain	Subdomain	Scientific Area	Product
Aerosols	Atmosphere	Atmospheric Composition	Physical Properties	Aerosol Light Extinction Vertical Profile
Upper-air Water Vapour	Atmosphere	Upper Atmosphere	Hydrosphere	Water Vapour Mixing Ratio
Ocean Colour	Ocean	Biogeochemical	Biosphere	Chlorophyll-a Concentration

ITINERIS' EYES on R/V «Gaia Blu»

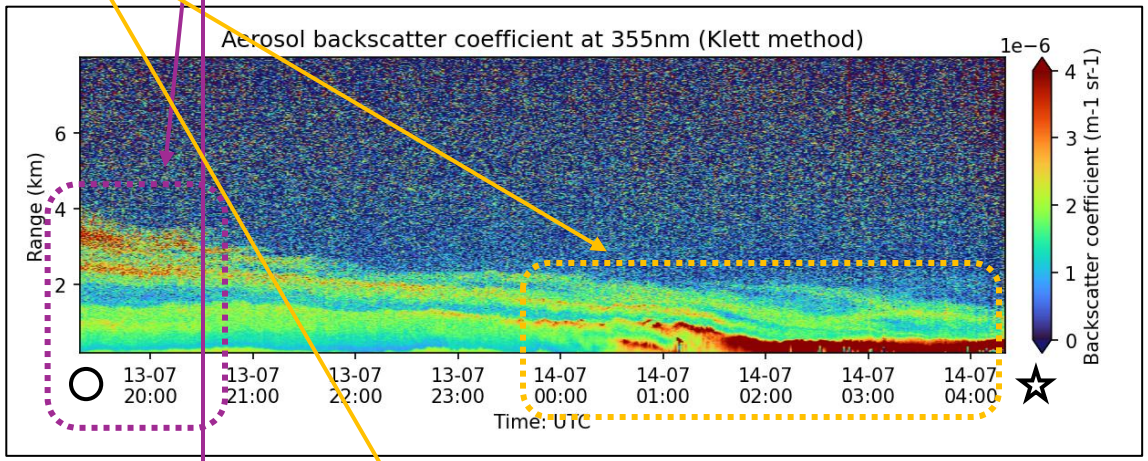
- Investigation of how climate change affects plankton biodiversity and the related impacts on the food chain and carbon cycle in Mediterranean waters with multi-platform experiments acquiring several Essential Variables (EVs).
- During the oceanographic campaign, 7 LIDAR sessions acquired for a total of 42 hrs.
- Presentation on ITINERIS' EYES at 17:25 by Emanuele Organelli.

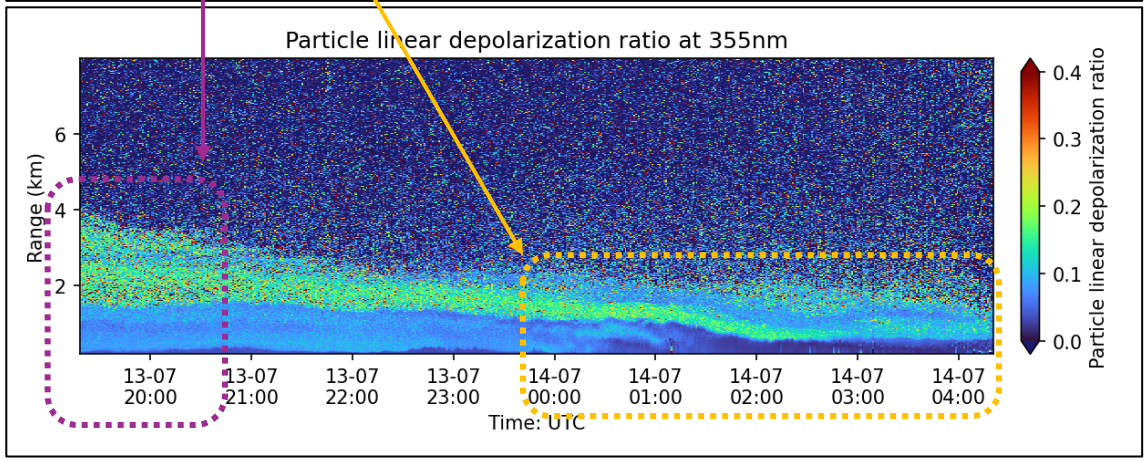


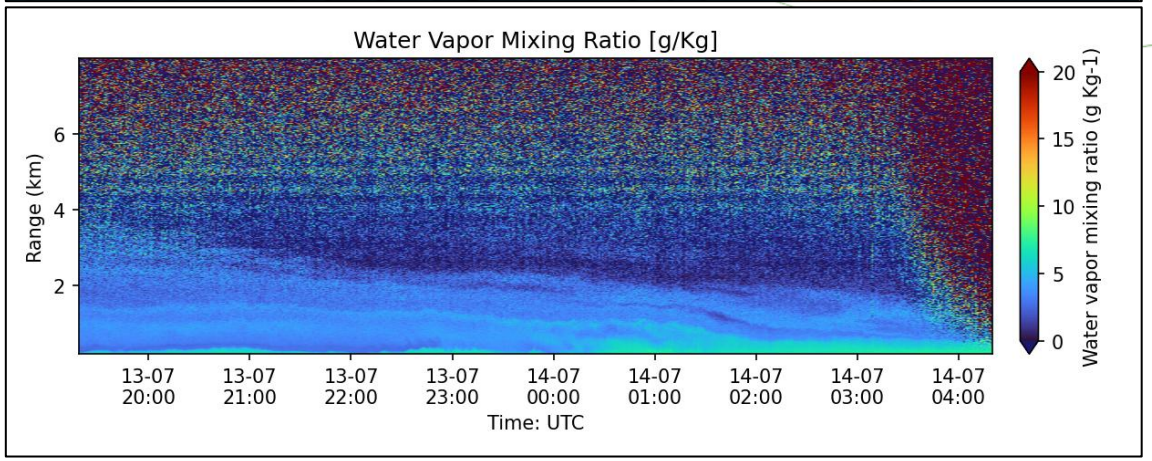


Preliminary NRT results – Distinct aerosol layers

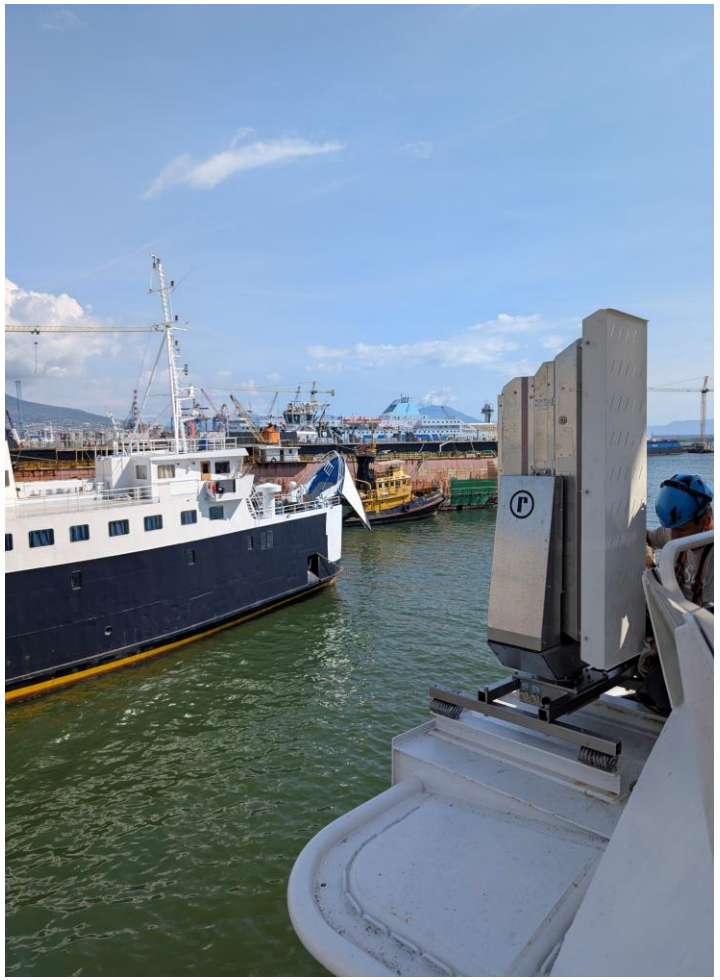
- At the beginning, two layers with different LPDR values: a low degree of non-sphericity up to 1.7 km indicating the presence of marine aerosols and between 1.7 and 3 km a different type of aerosol with a higher degree of non-sphericity.
- Later, a rapid lowering of the two aerosol layers is observed, with an increase in the aerosol backscatter coefficient and a lowering of the LPDR due to the probable formation of a thin layer of clouds just above the surface.

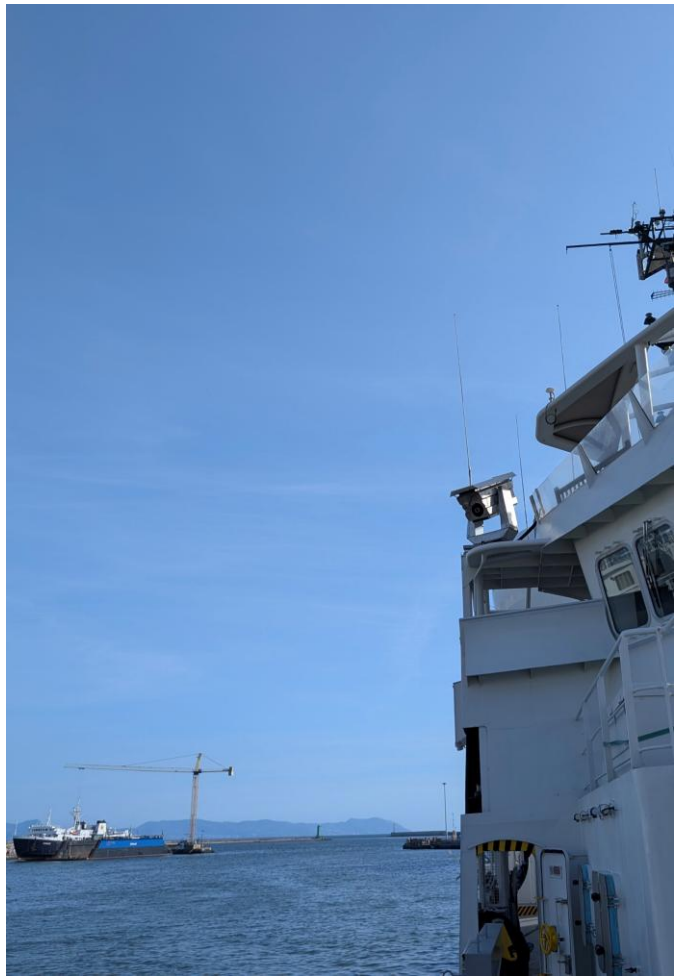




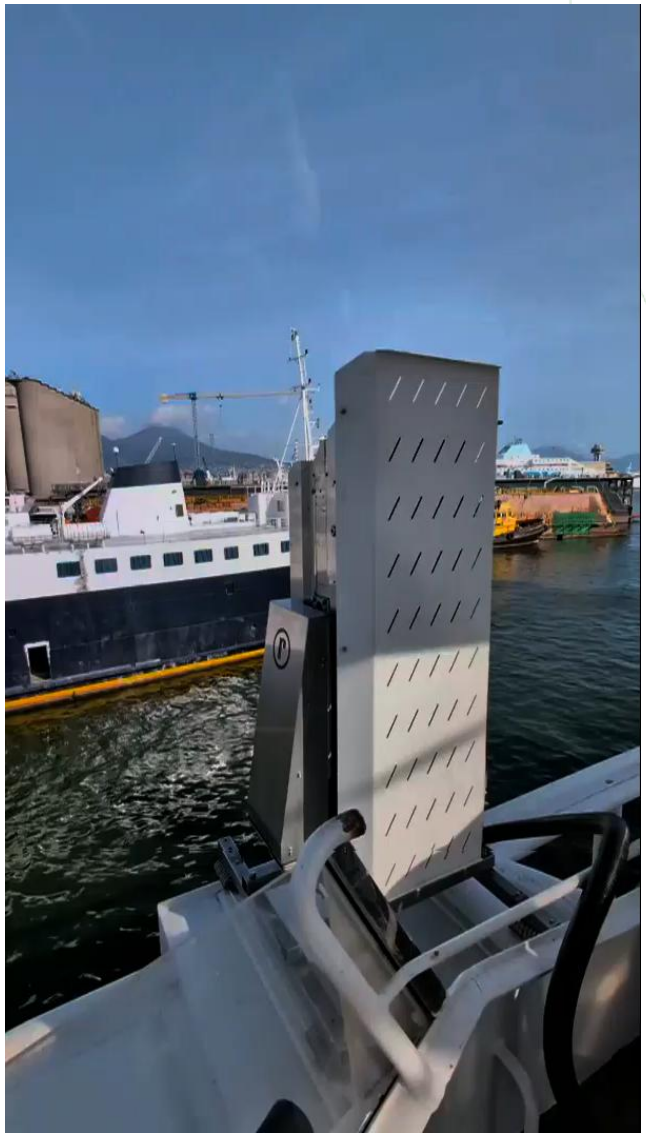


18/09/2025 - Final installation (photos)





18/09/2025 - Final installation (Zenith)



18/09/2025 - Final installation (Zenith + Azimuth)

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ITINERIS' EYES

THANKS!

photo by Alessandro Lastella

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