

# Modelling and early warning for healthcare climate adaptation in mountain regions



XIII Giornata della Modellistica in ARIA(NET)

Emilie LAUNAY - 25/03/2026



# Agenda



**Introduction**



**MOUNTADAPT Project Objective**



**AirAdvanced® Sentinel within MOUNTADAPT**



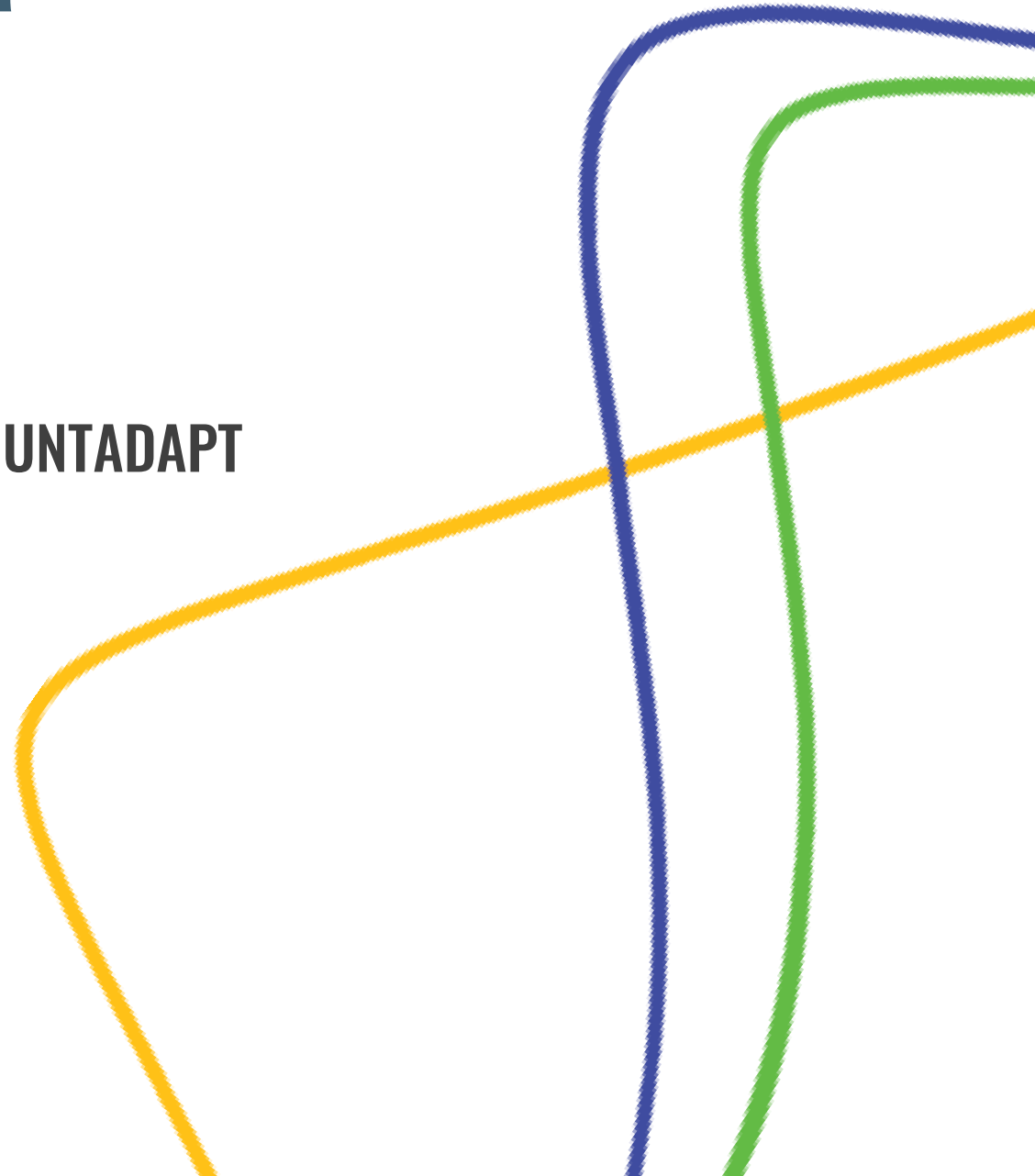
**Alba Iulia Demo Site**



**Grenoble Demo Site**



**Next steps & conclusion**



# MOUNTADAPT's objectives



→ Horizon Europe project aiming to boost the community-driven resilience of the health system in European mountain areas, mitigating the impact of climate change on public health.






 27 partners

 4 pilot sites

 3 replication sites

 11 resilience solutions

Its **main objectives** are:

-  Improving the ability to **predict how climate change will affect people's health**
-  Enhancing health systems' ability to **respond quickly and effectively to climate change**
-  **Equipping health professionals** to better prevent and respond to climate-related health threats, and **increasing the population's awareness** and preparedness
-  **Developing and testing innovative solutions** for monitoring, early warning, response, and emergency management
-  **Expanding successful climate adaptation strategies** from pilot areas to other regions and institutions, within and beyond mountain areas.

# AirAdvanced® Sentinel : an integration platform

Addressing the growing challenges of air quality monitoring

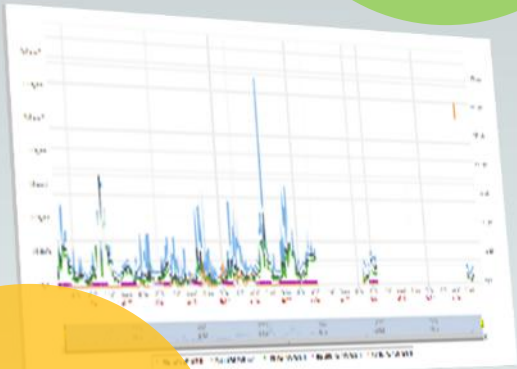


Advanced atmospheric modeling and virtual sensors



Make environmental data accessible industrial operators, local authorities or citizens

Data collection via physical sensors



→ adapted to the local context, based on the expression of needs

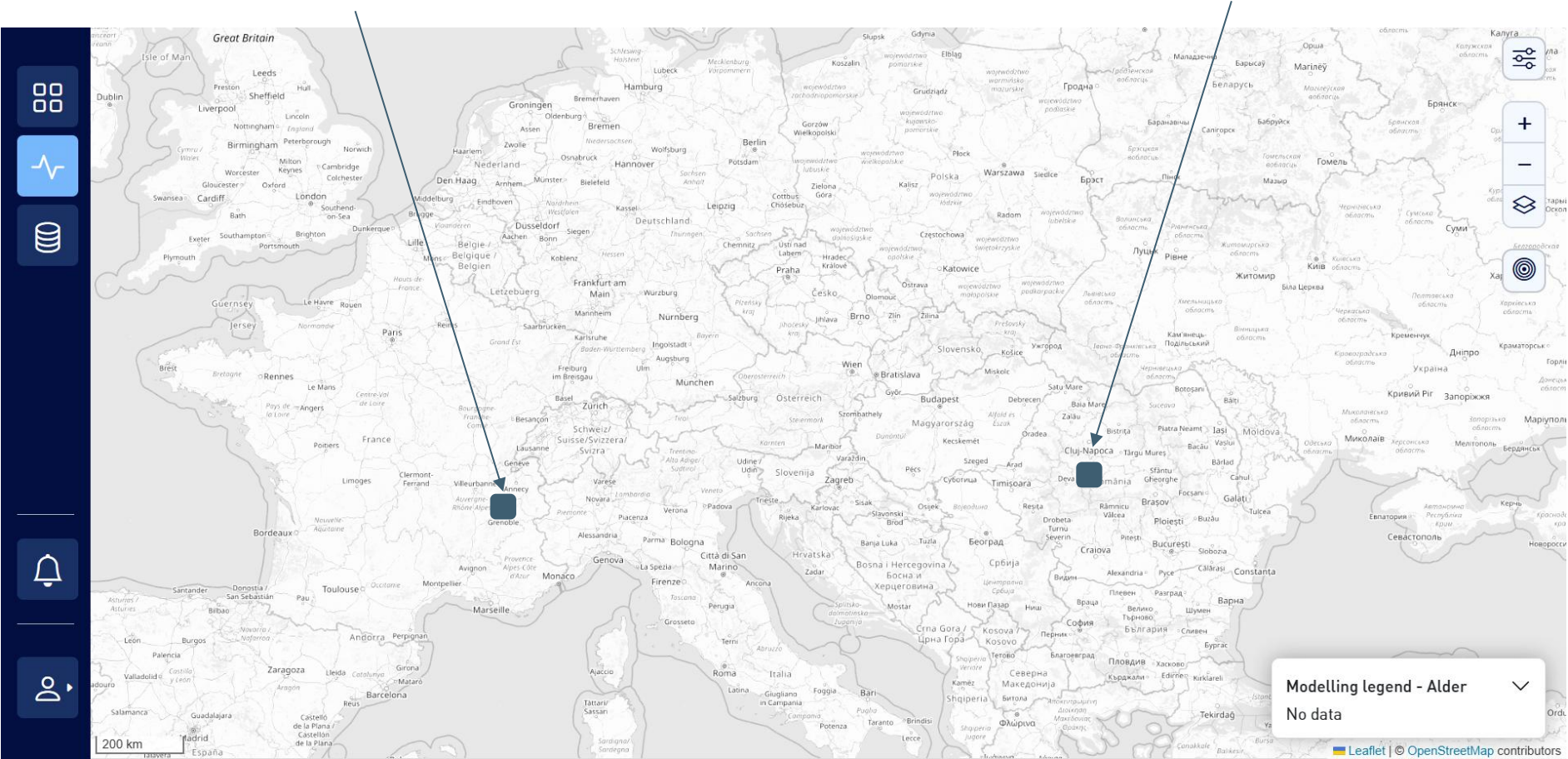


# AirAdvanced® Sentinel : applications

2 Cities : 2 Challenges

Grenoble (France)

Alba Iulia (Romania)



# Application: Alba Iulia demonstrator

→ Context: no air quality monitoring besides CAMS



## Sentinel enhances existing air quality monitoring by:

- Modelling at city scale to refine existing modelling, for AQ and pollen



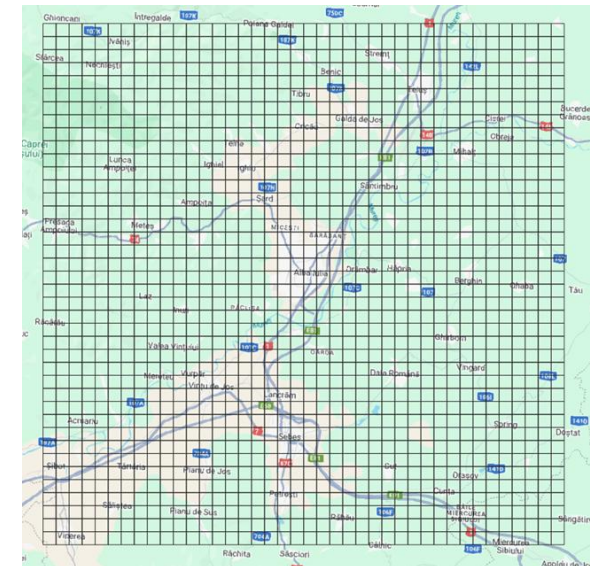
## Data centralisation:

- Sensors: AQ sensor from Urad system (Magnasci), Vectrack from IRIDEON (mosquitos),
- Modelling: forecast using FARM model fed by GFS (with WRF) model from NCEP, and uses site characteristics (topography, landuse) and the most detailed emissions inventory possible (EMEP from Europe rebased on proxies)

WRF domains



FARM grid



# Application: Alba Iulia demonstrator



## Scientific objectives:

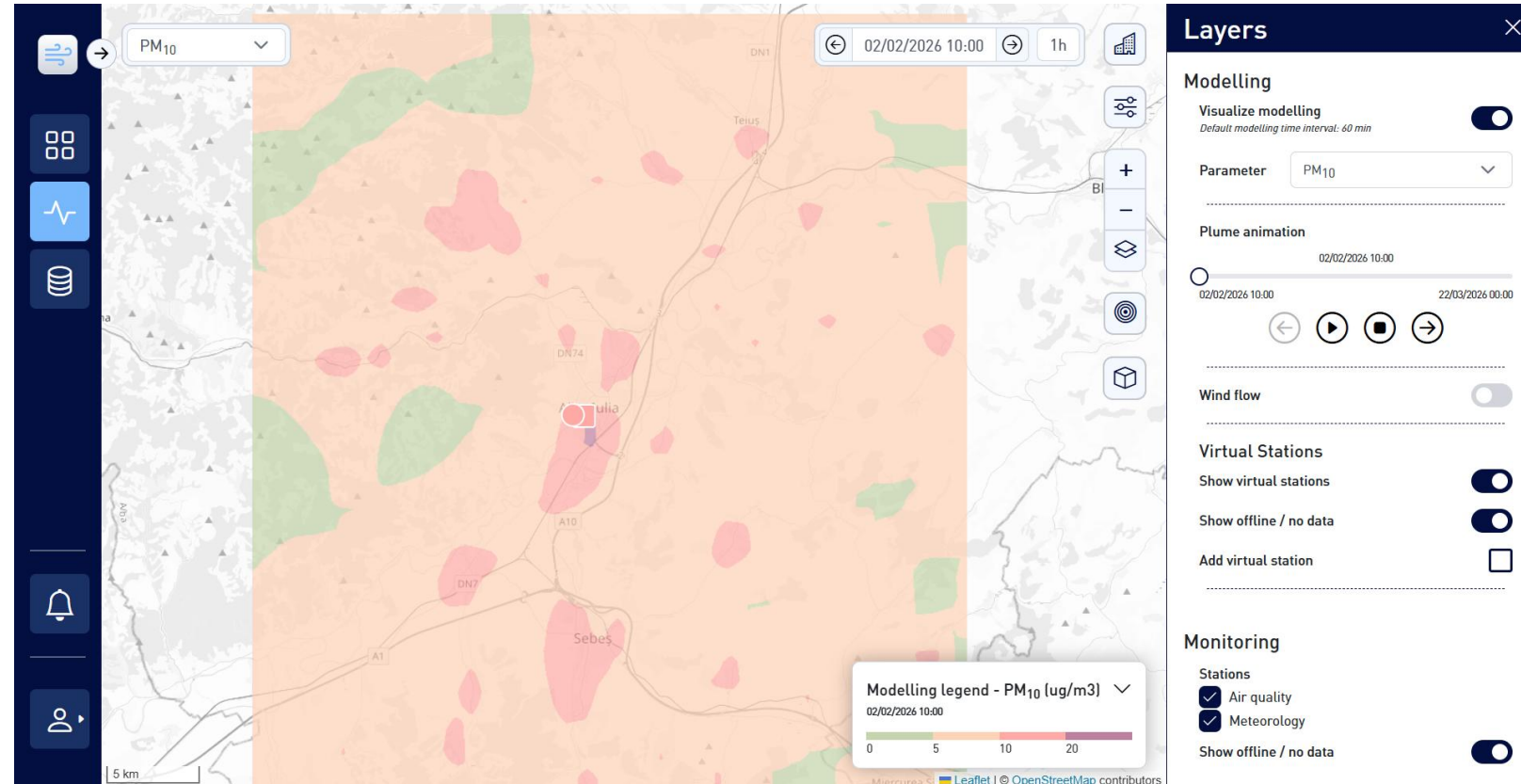
- Analyse outdoor pollution and pollen patterns via virtual sensors located at healthcare sites (care homes)



## Health-related interest:

- Inform staff and residents about protective behaviours during peak events, such as staying indoors, limiting ventilation, or adjusting outdoor activities.

AirAdvanced® Sentinel [<https://sentinel.suez.com/>]



FARM model : PM10 concentrations modelled on 02/02/2026 16:00

(other species modeled : Alder, Birch, Grass, Mugwort, Olive, Ragweed, PM2.5, NO2, O3, SO2)

# Application: Grenoble demonstrator

→ Context: high air quality monitoring by local institution



## Sentinel enhances existing air quality monitoring by:

- Deploying air quality (AQ) KUNAK sensors around the hospital (CHU)
- 3D modelling at micro-scale for high-resolution analysis around the CHU
- Collaborating with Oberon to monitor ragweed pollen levels in the Grenoble basin using Aerotape sensors



KUNAK



Measurements strategy for AQ



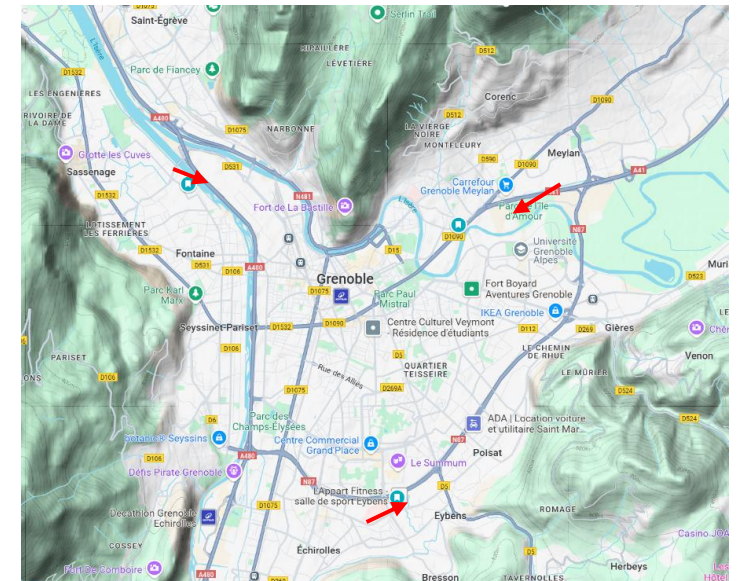
## Data centralization:

- Connectors: KUNAK sensors (AQ), Aerotape sensor (pollen), Vectrack from IRIDEON (mosquitos), Atmo Aura stations (AQ)
- Modelling: forecast using Parallel Micro-Swift and Spray (PMSS) fed by AROME model from Météo-France, and uses site characteristics (topography, landuse) and the most detailed emissions inventory possible



AEROTAPE

Measurements strategy for ragweed pollen



# Application: Grenoble demonstrator



## Scientific objectives:

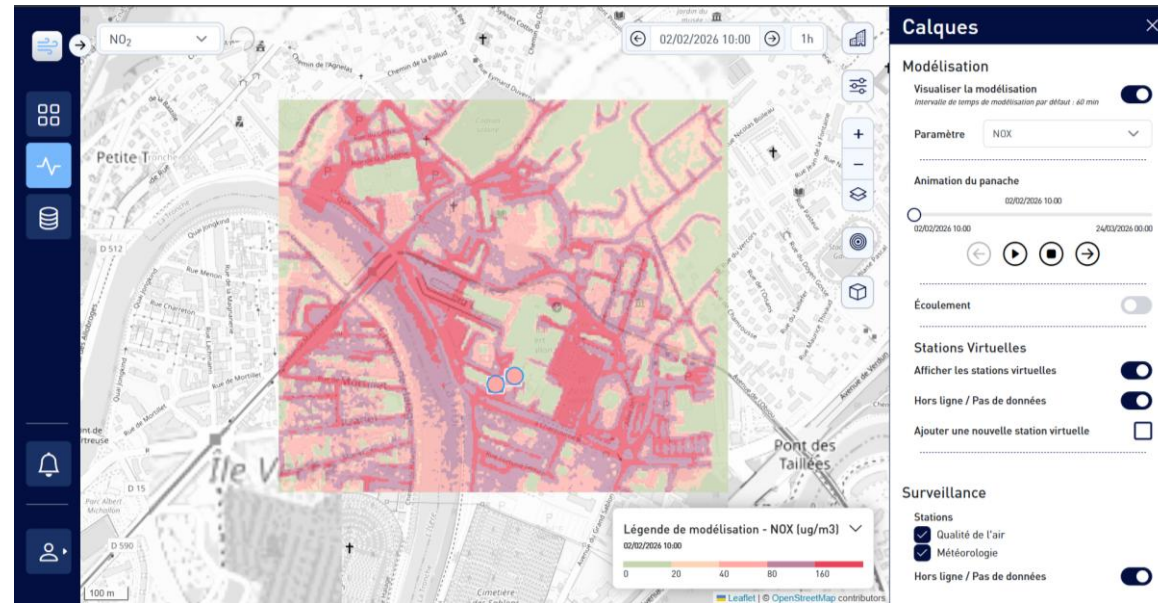
- Analyse outdoor (horizontal and vertical) pollution patterns around the CHU
- Identify zones of meteorological discomfort around the CHU
- Detect high-emission ragweed plants responsible for pollen peaks in the Grenoble basin



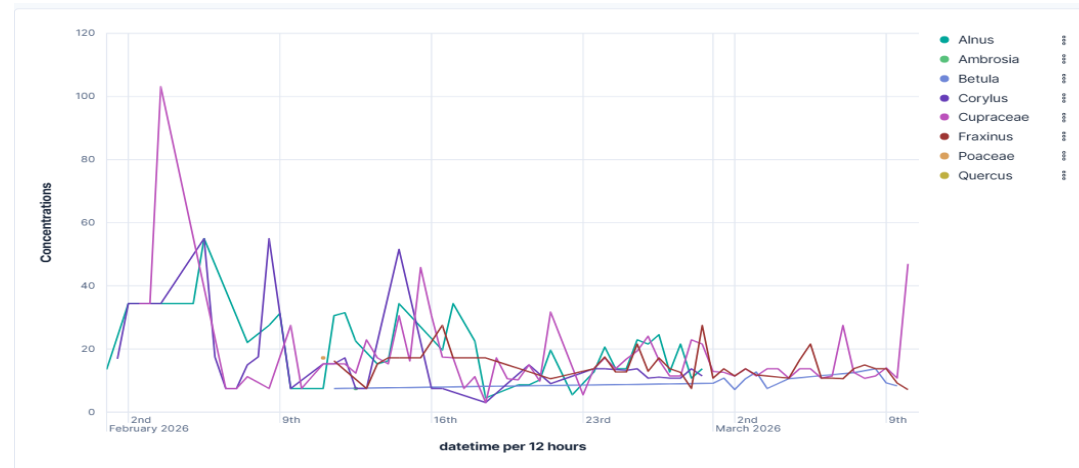
## Health-related interest:

- Hospital service reorganisation in response to pollution or meteorological discomfort
- Targeted eradication campaigns for ragweed hotspots
- Cross-referencing with health data to establish correlations (heat/cold waves, AQ, pollen, etc.)

AirAdvanced® Sentinel [<https://sentinel.suez.com/>]



PMSS model :  
NOX  
concentrations  
modelled on  
02/02/2026  
16:00  
(other species  
modeled : PM)



New results : first 2026 pollen measurements campaign at the CHU campus (North-East point)

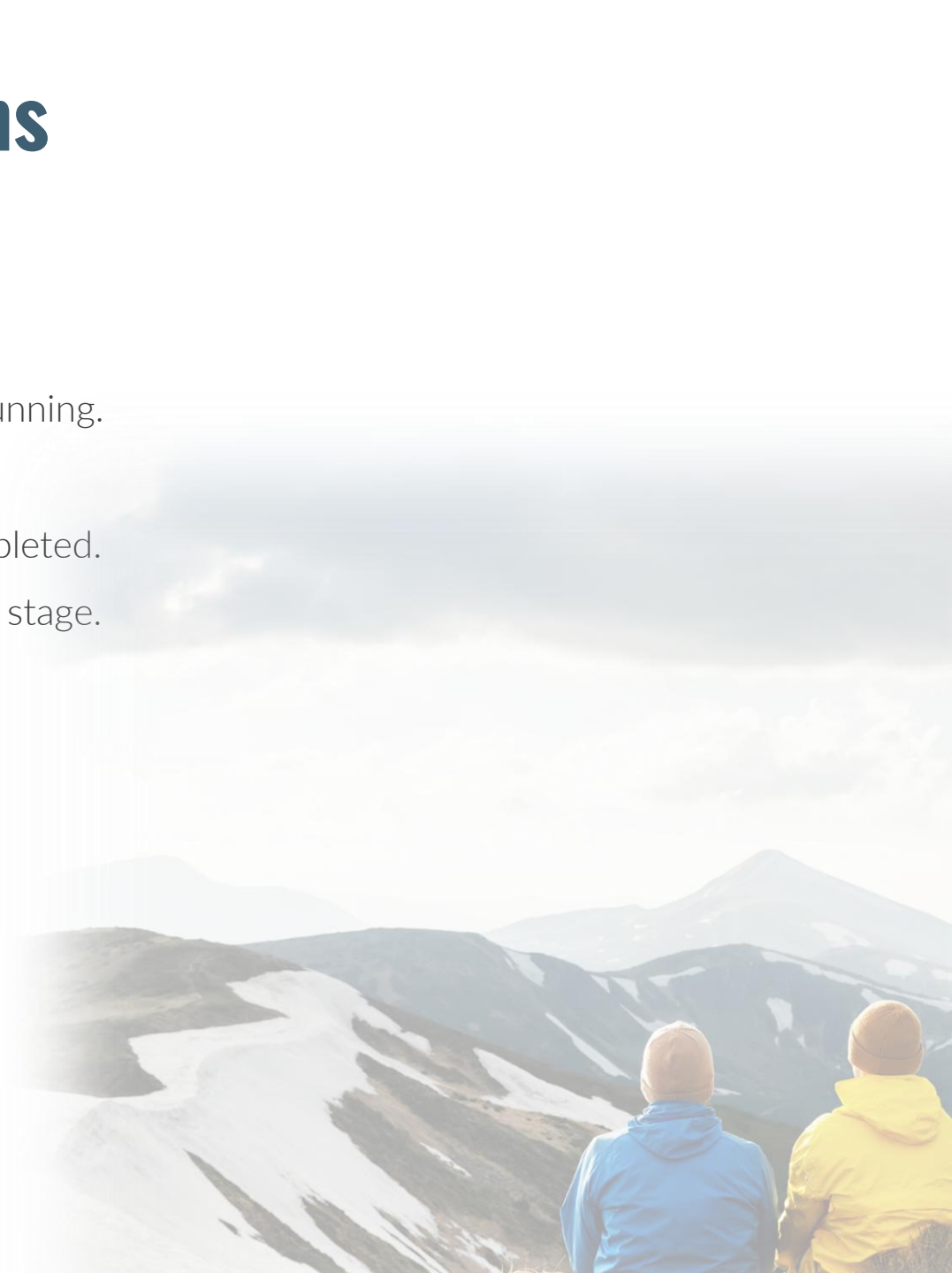
# Conclusions

## Where we stand now :

- Sentinel is fully deployed at both MountAdapt demonstrator sites.
- Modelling chains are operational and the monitoring components are running.
- Continuous data streams now feed the platform (sensors, partners,..).
- Month 22/36: first implementation and on-site monitoring phases completed.
- Both configurations are now stable enough to enter a deeper analytical stage.

## Over the past year, the project has moved:

- from design → deployment
- from deployment → monitoring
- and is now entering the joint environmental-health analysis phase.



# Next Steps

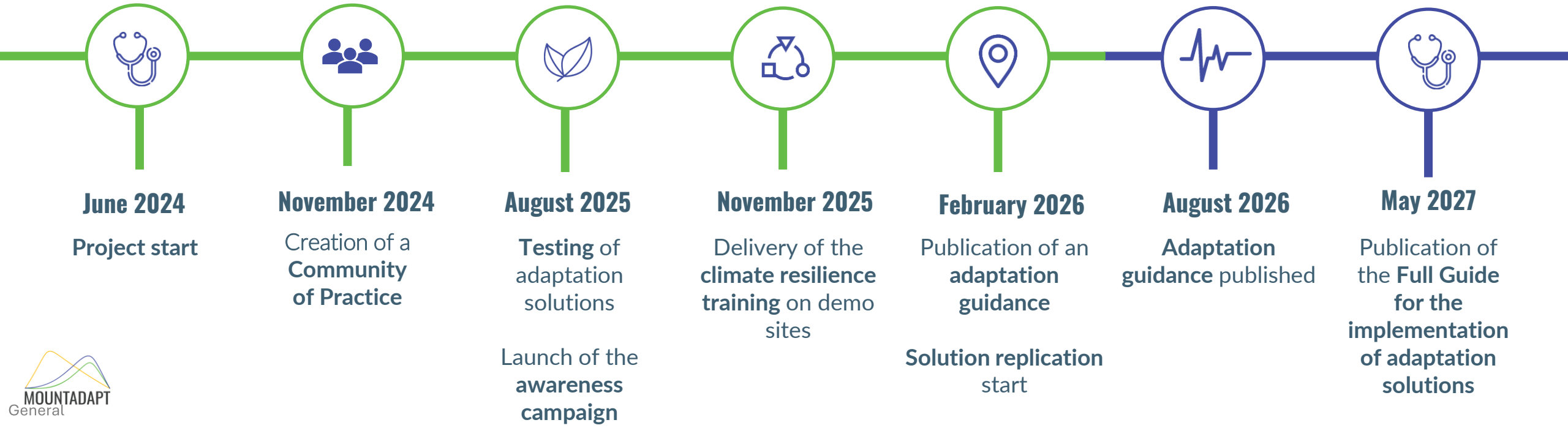
What's Next ?

## Launch of data exploration:

- initial statistical checks
- early trend analysis
- cross-comparisons between environmental signals and local contexts

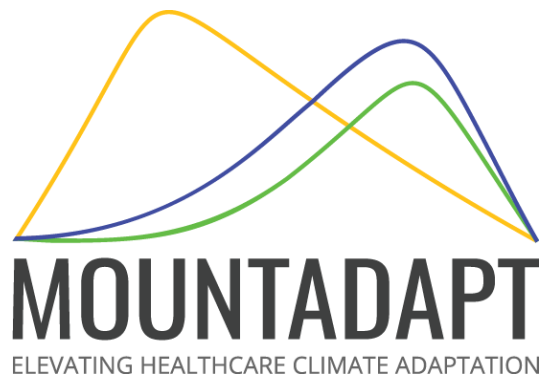
## Focus of the next months:

- refining indicators
- analysing multi-month patterns
- integrating user feedback from the field



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