



**Performing observations and delivering
services from academic sector to public and
private entities**

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Research Director
National Observatory of Athens



MISSION: High-impact meteorological and wildfire **research** & development and provision of **tools, services** and policies to the community and stakeholders in Greece and abroad.

RESEARCH FOCUS: Develop new **scientific knowledge** on **Severe & Extreme Weather and Fire Weather events and their Impacts**

SCIENTIFIC DIRECTIONS:

- Improve the scientific understanding, monitoring & forecasting
- Develop early warning systems
- Contribute to knowledge dissemination & education

<https://www.meteo.gr/meteogroup/>



**Weather
monitoring**

**Weather
nowcasting**

**High impact
weather
forecasting**

**Societal analysis of
severe weather
events impacts**

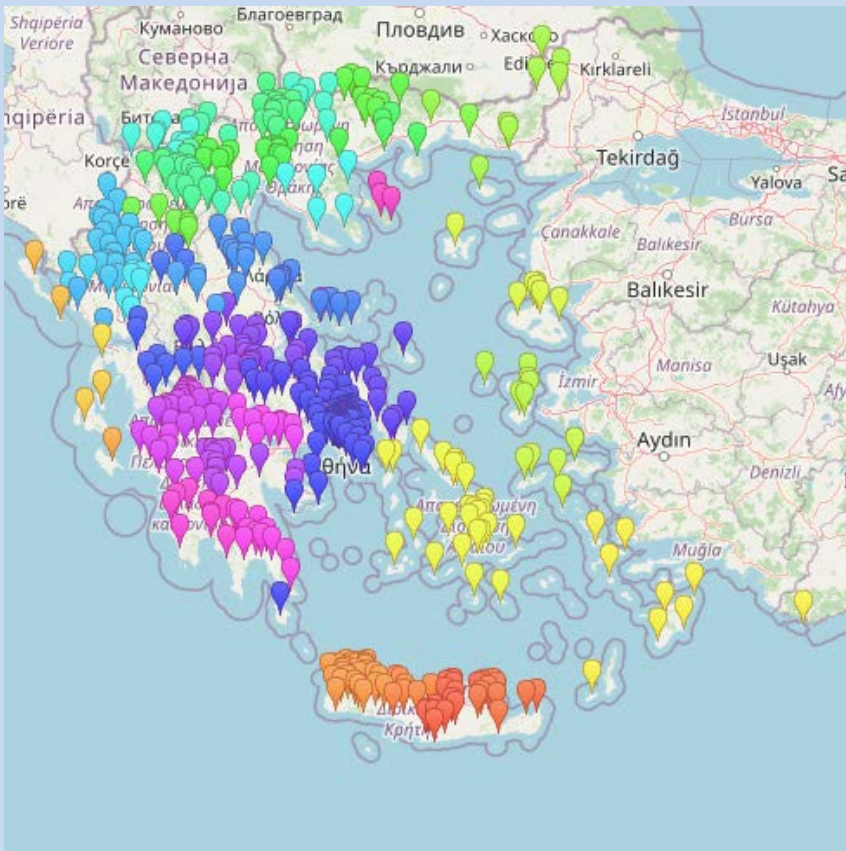
**Early warning systems
tailored to the needs of
the society**

WEATHER MONITORING

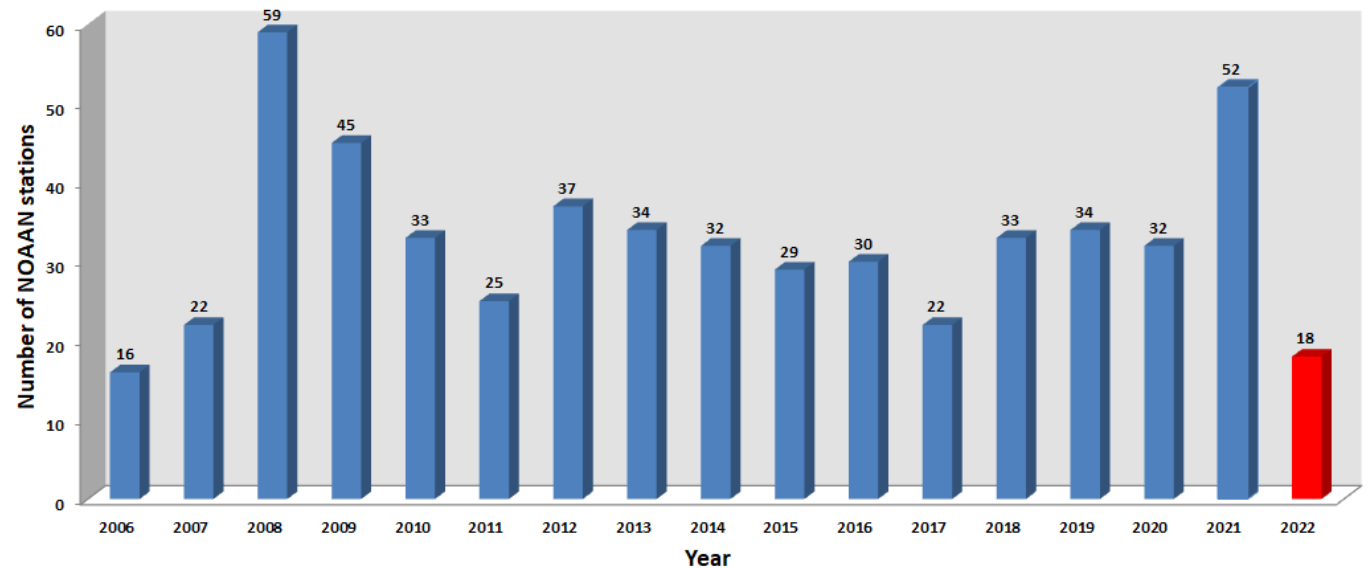


<http://stratus.meteo.noa.gr/front>

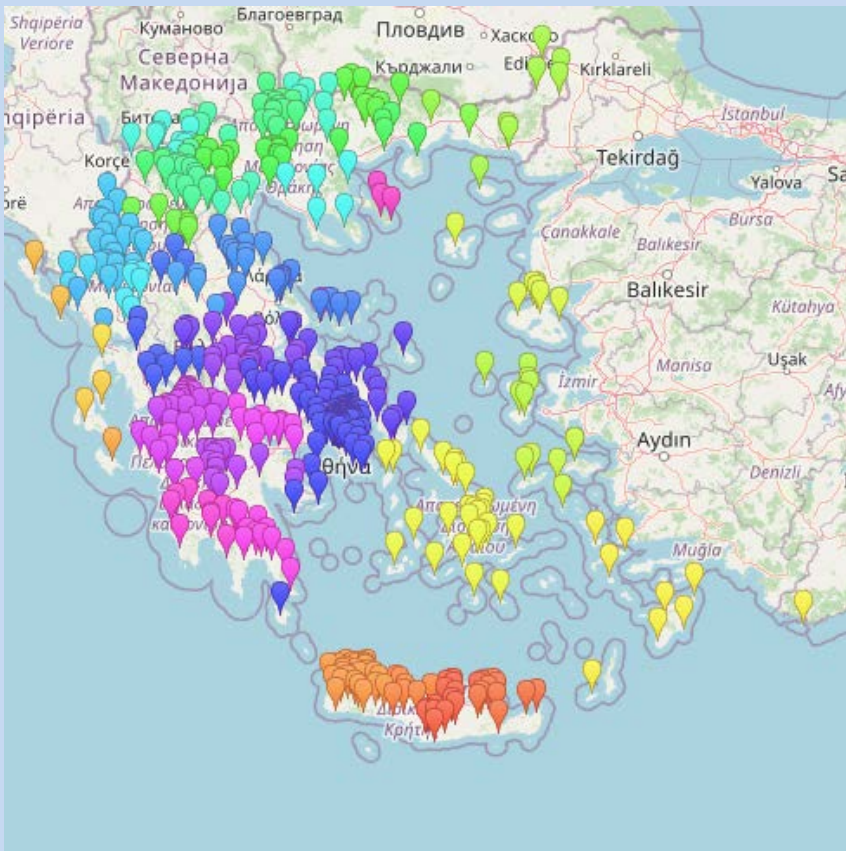
511 surface weather stations,
the densest network in Greece



Annual integrations/installations of meteorological stations
at National Observatory of Athens Automated Network



511 surface weather stations,
the densest network in Greece



Input to national & international databases

2019: Operational Feed to the Hellenic National Meteorological Service

2020: Operational Feed to Hellenic Fire Corps operating system

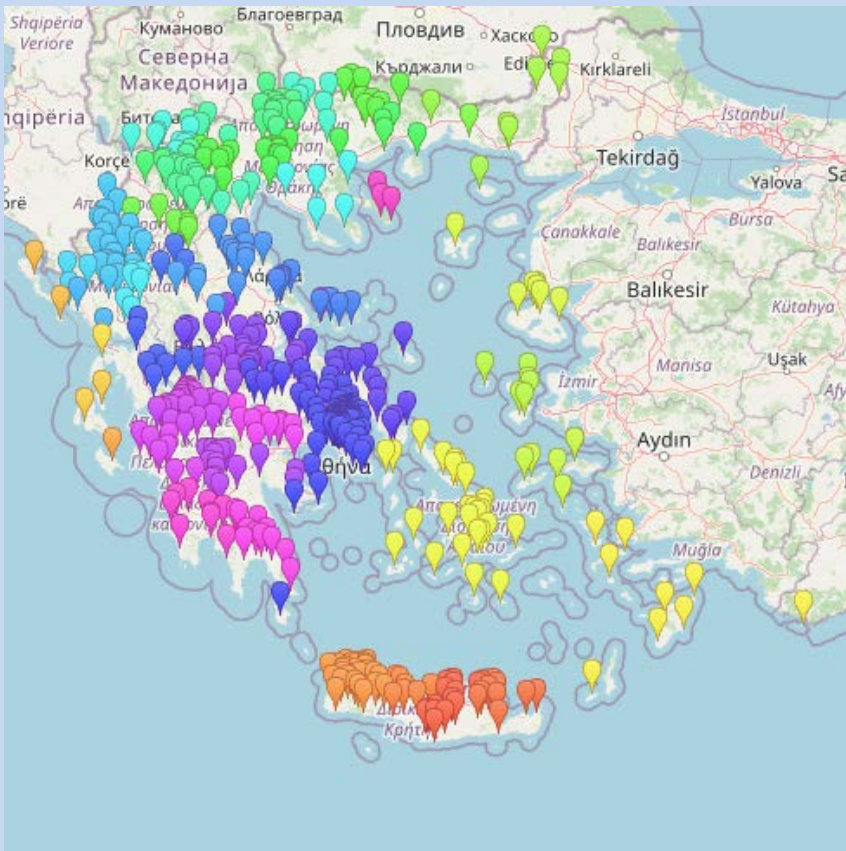
2021: Included in the Observing Systems Capability Analysis and Review Tool (OSCAR) of WMO



2022: Feed to ECMWF to test the impact of their assimilation on forecast



511 surface weather stations,
the densest network in Greece



**Support research & needs
of various sectors**

680 requests for data provision
during the last 10 years (90 in 2022)

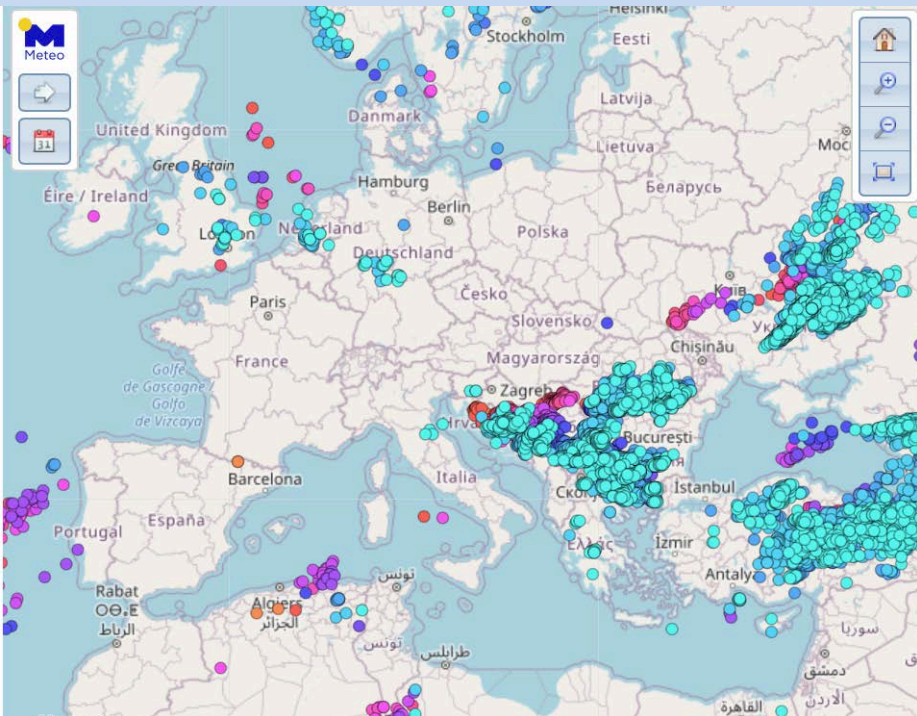
4400 station years

- ✓ Universities
- ✓ Research Centers
- ✓ Private Sector (constructions, agriculture, ...)

2 snow
meters in
Crete, the
southernmost
European
snow
observatory



ZEUS VLF lightning detection network



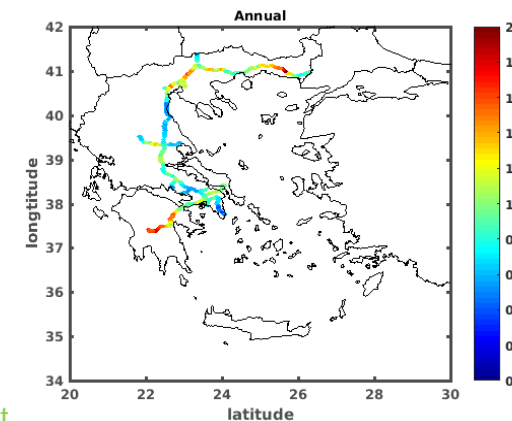
Network Details

- 6 sensors
- operational since 2005



Contribution to scientific knowledge & service development

- Contribution to European Experiments (HYMEX)
- 30 publications on lightning related subjects
- Risk analyses related to lightning :
 - ✓ agriculture (World Bank) and
 - ✓ energy distribution networks

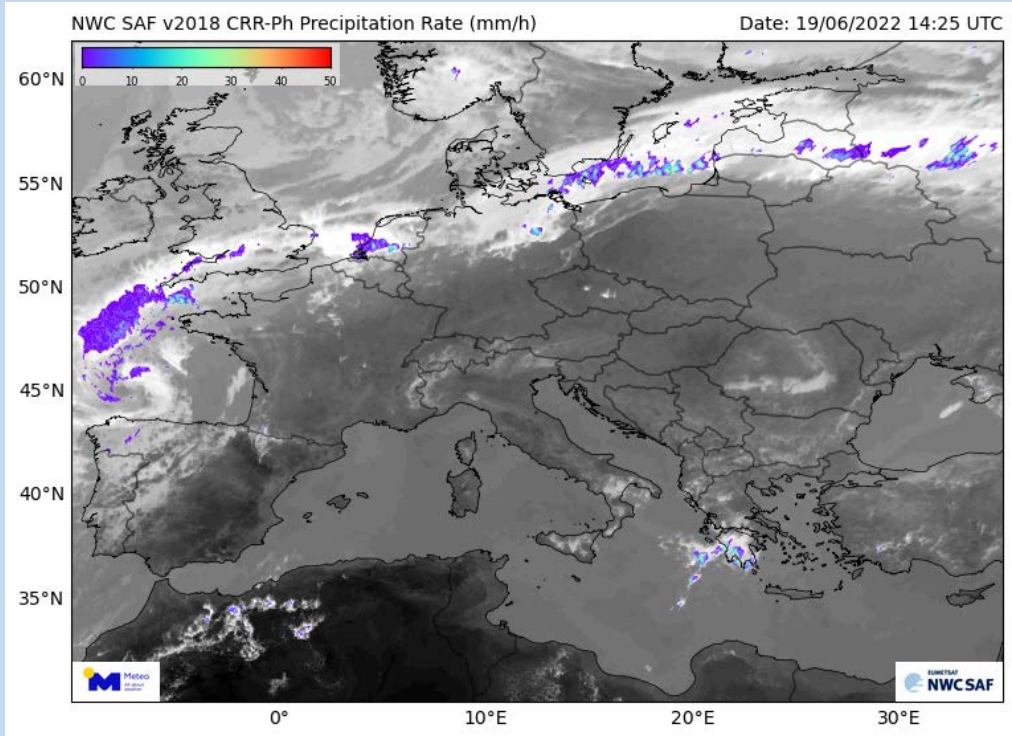


<https://www.meteo.gr/talos/en/>

SATELLITE BASED MONITORING & NOWCASTING



METEOSAT data receiving antenna :



Nowcasting & monitoring tools & services

NWC-SAF products

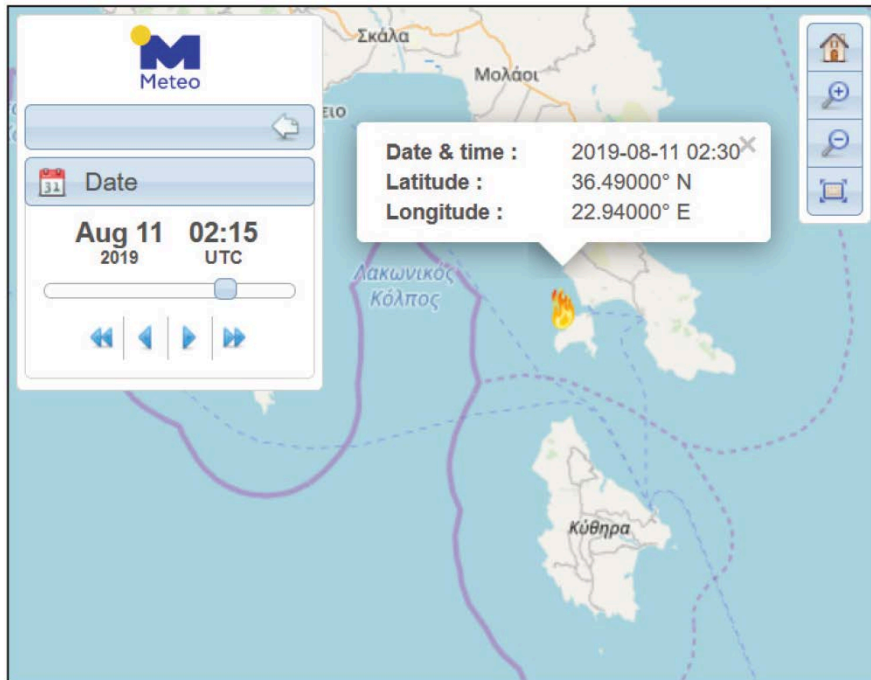
The screenshot shows a web interface for NWC-SAF products. At the top, there are navigation tabs: SATELLITES, BULLETINS, and GLOBAL MODELS. The 'SATELLITES' tab is active, showing a dropdown menu with 'Satellites Europe' and 'Satellites Greece'. Below the menu are navigation arrows. On the right, a list of products is displayed:

- Convective rainfall
- Total convective rainfall from the start of the day, version 1
- Total convective rainfall from the start of the day, version 2
- Cloud top height
- Precipitation Probability Level
- Tropopause penetrating clouds
- Cloud tops & lightning
- Cloud tops and stations recording precipitation

At the bottom of the interface, there is a map showing cloud top height over the same region as the precipitation map. The map uses a color scale from 0.0 to 35.0 km. The map includes latitude and longitude markers and logos for Meteo and NWCSAF.

LAND-SAF Products

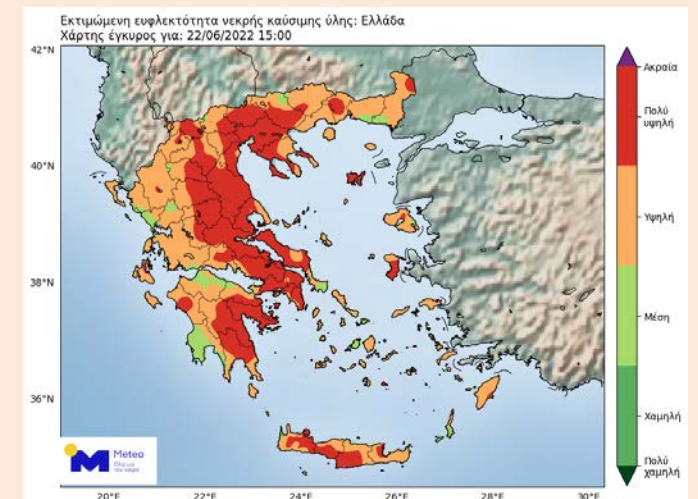
Fire detection & monitoring



Wildfires

Fire Weather Monitoring

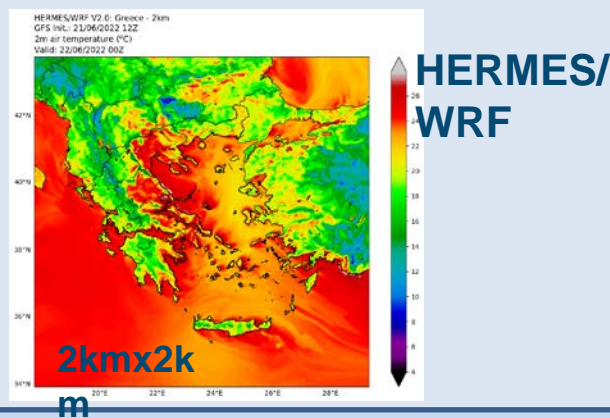
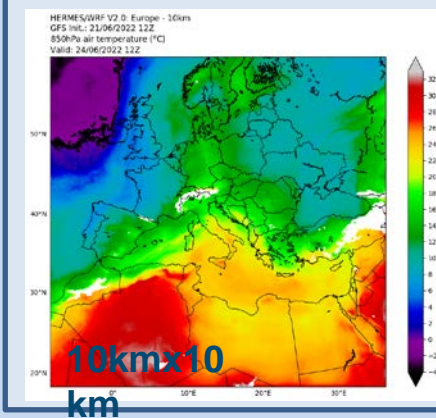
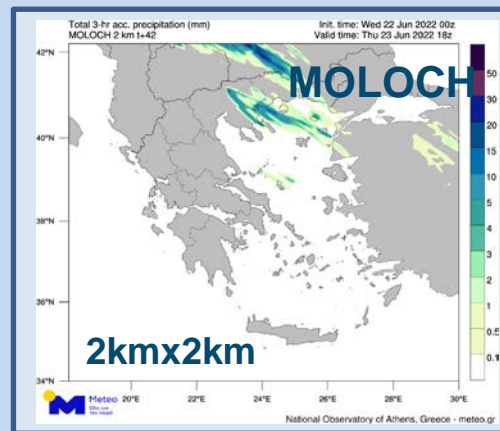
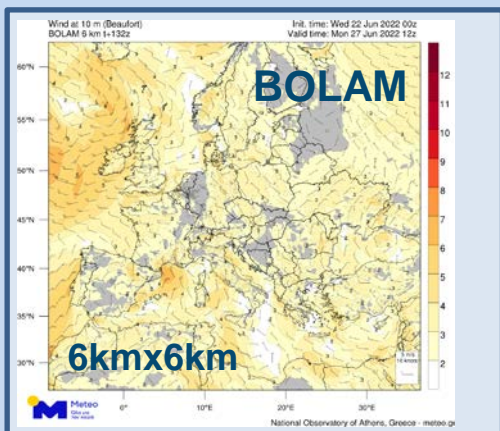
- 511 **surface weather** stations (provided also to the Hellenic Fire Service)
- ZEUS **lightning** detection network
- Daily estimate of the **degree of flammability of dead fuel moisture**



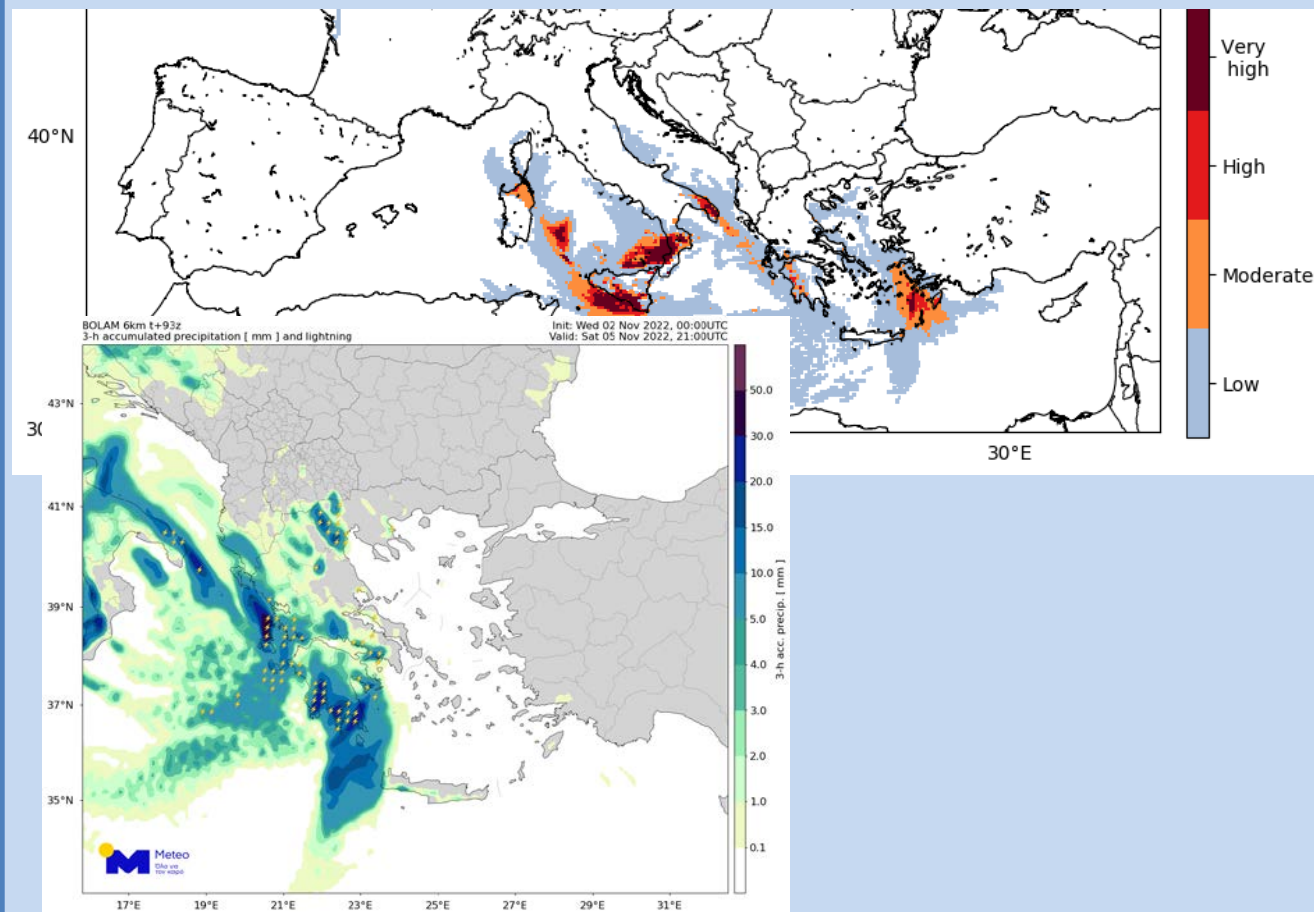
HIGH IMPACT WEATHER FORECASTING



Numerical Weather Prediction Multi-model, 2 cycles/day



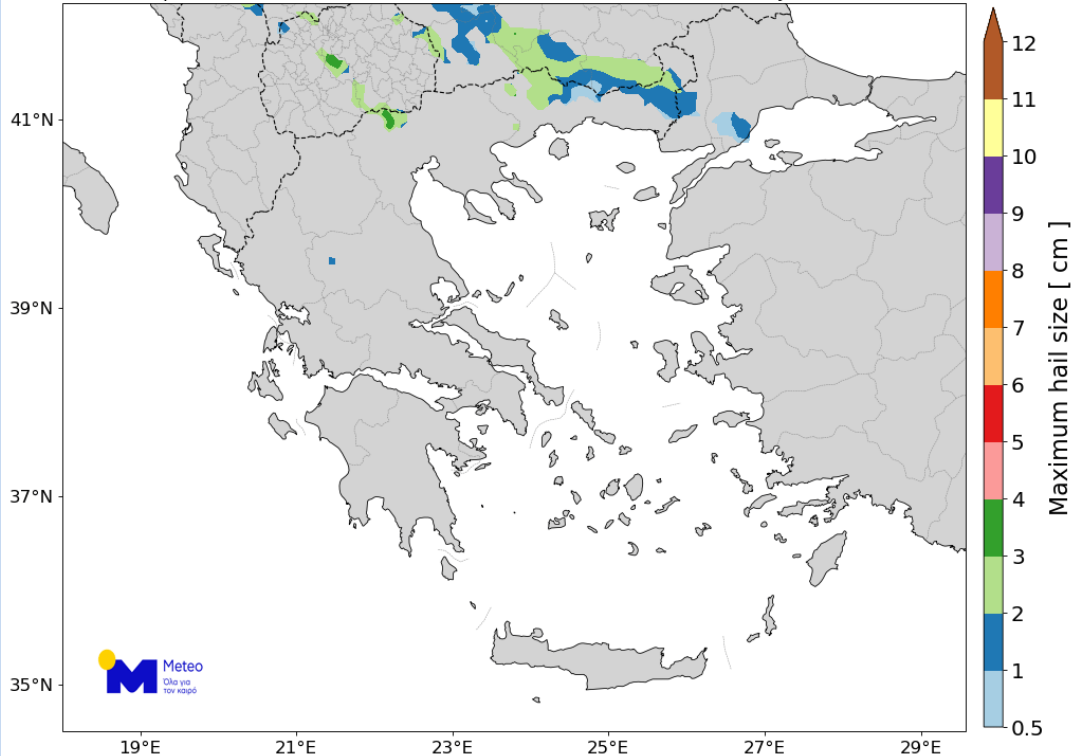
Tailor made forecasts: Lightning activity



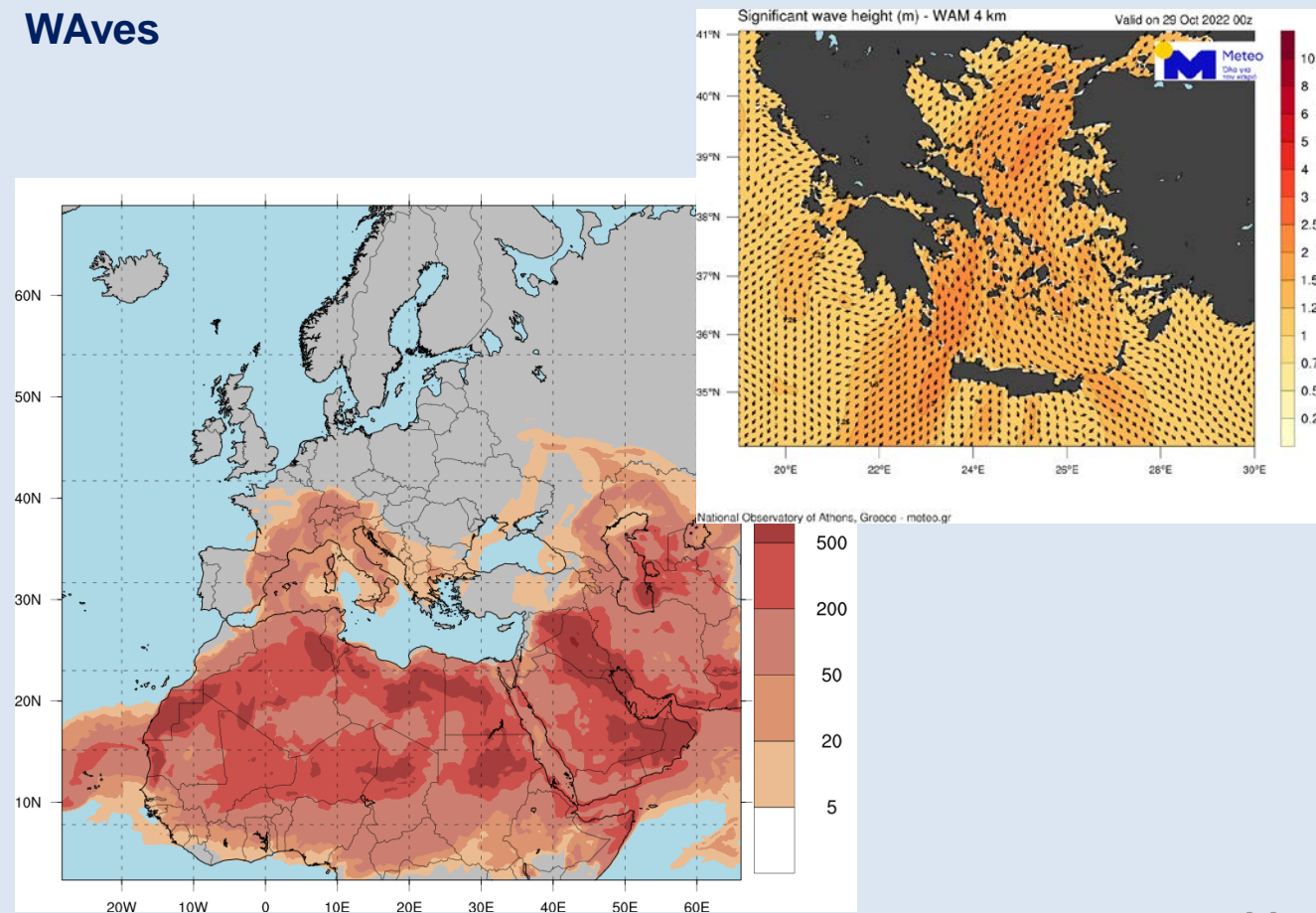
Tailor made forecasts: Hail

BOLAM 6km
HAIL SIZE INDEX (experimental)
maximum possible hail diameter = 3.7cm

Init. time: Wed 22 Jun 2022, 00:00UTC
Valid time: Wed 22 Jun 2022, 15:00UTC



Tailor made forecasts: Dust (contribution to WMO/ SDS-WAS) WAVes



Fire Weather & Fire Spread Forecasting

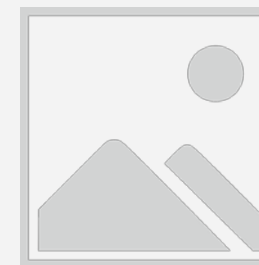
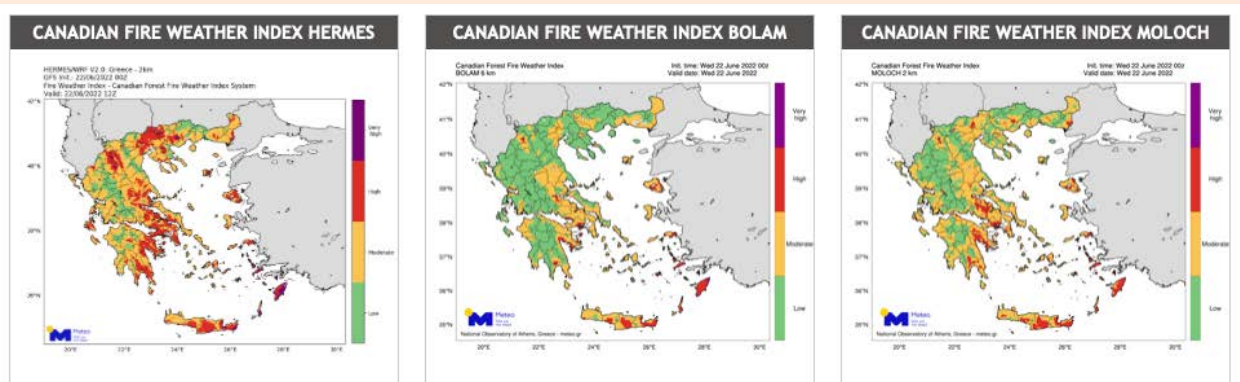
Multi-model approach (BOLAM, HERMES/WRF, MOLOCH)

Multi-indices approach

- Canadian Fire Weather Index (CFWI)
- Nesterov Index (and the modified Nesterov index),
- Fosberg Fire Weather Index (FFWI)

IRIS : On-demand, operational deployment of a rapid-response **fire spread forecasting system**

- **coupled fire-atmosphere** modeling system (WRF-Fire 4.3.3) adapted for the pyric environment of Greece.
- **fully operational** since 2019, has been called to provide fire spread forecasts for >40 wildfire events

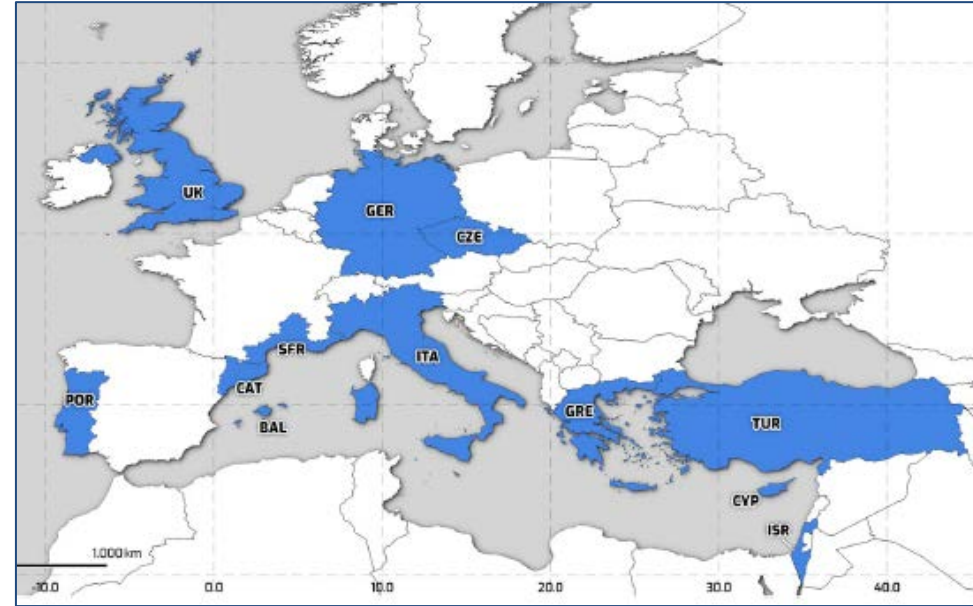
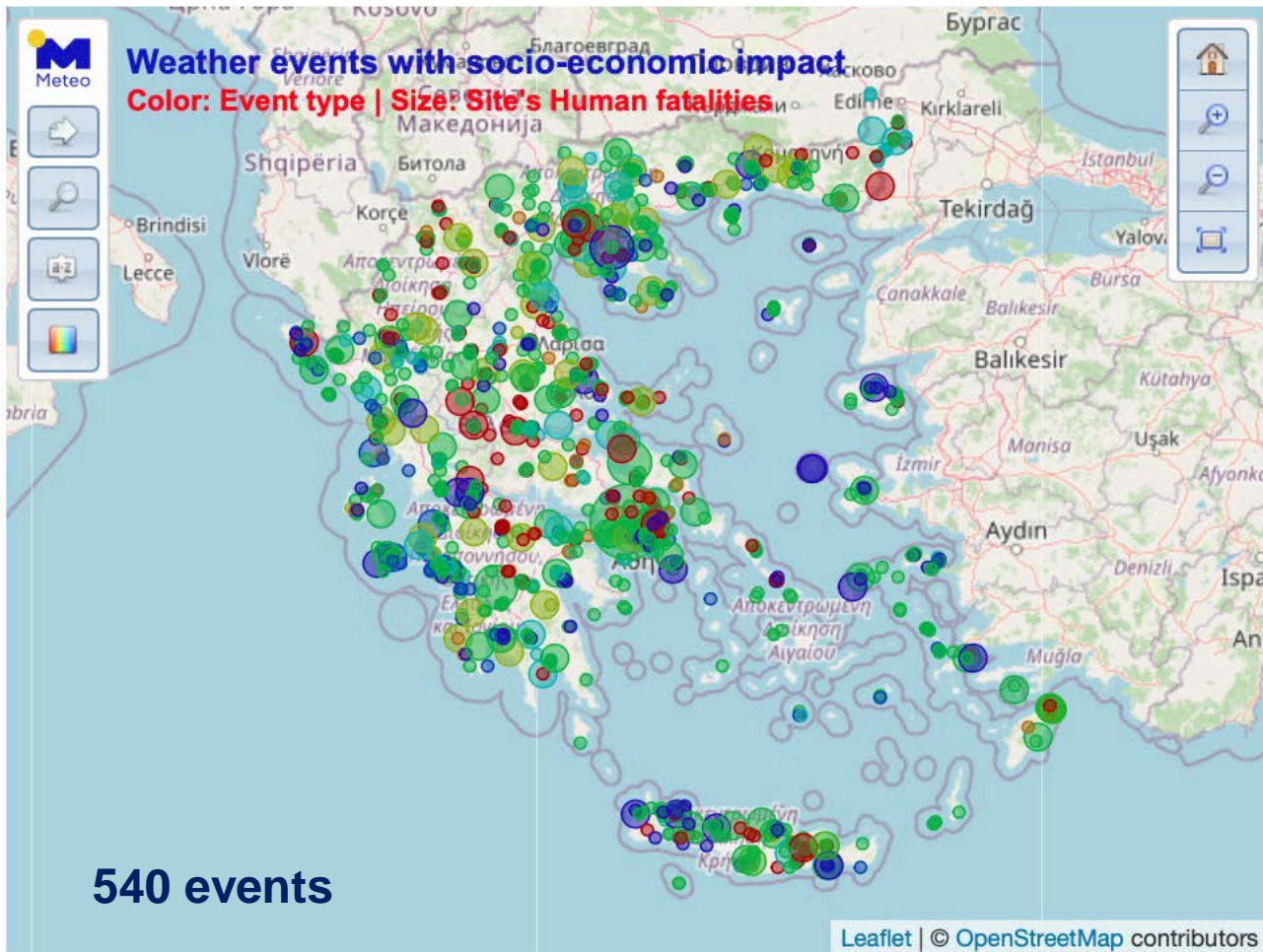


SOCIO-ECONOMIC ANALYSIS OF HIGH IMPACT WEATHER EVENTS



Data base of HIWE in Greece (2000–now)

Flood Fatalities 1980-2020



Perform **behavioural surveys** on the weather-related hazards and risk perceptions, preparedness, adaptability, and emergency response

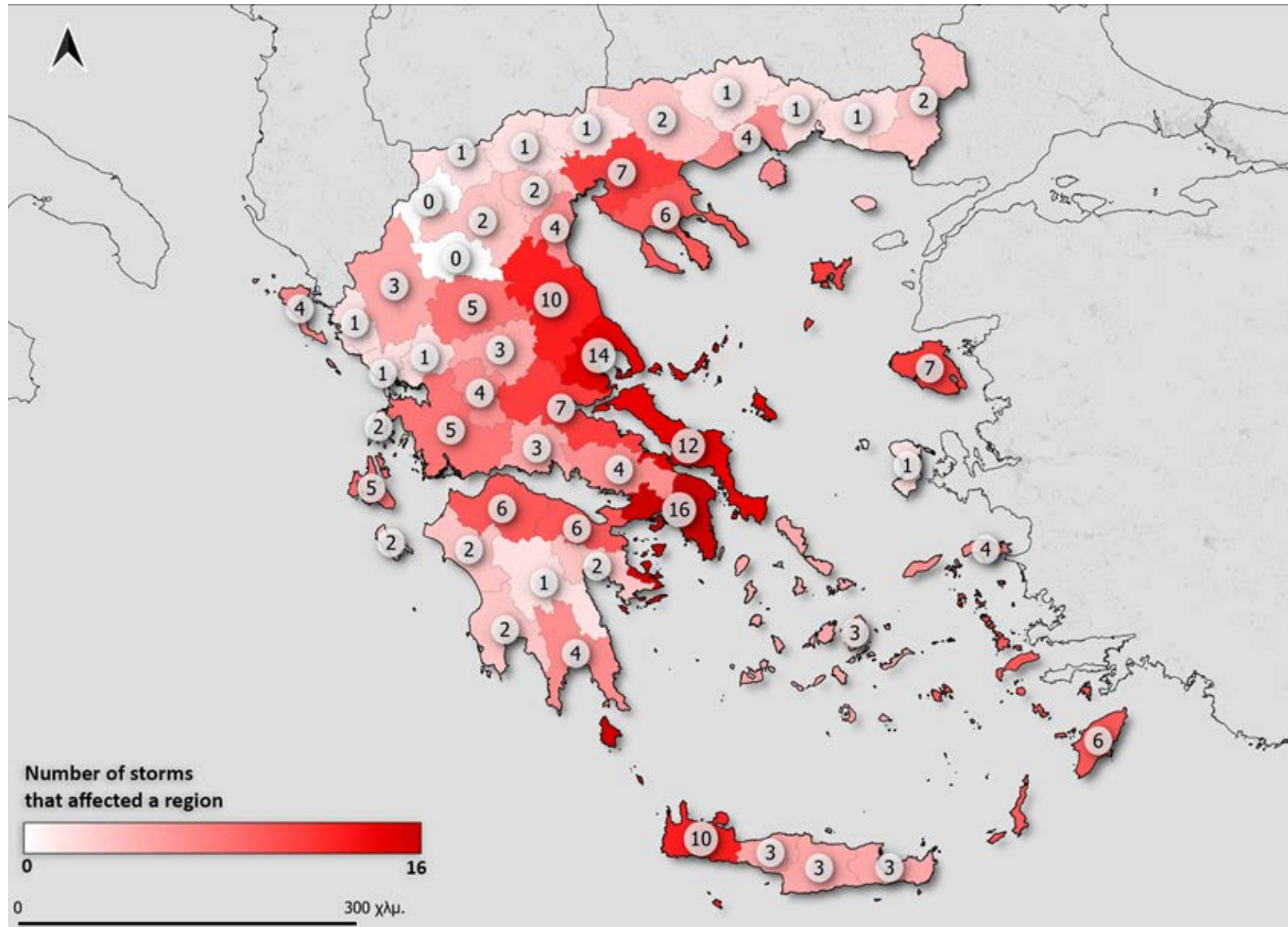
EARLY WARNING SYSTEM FOCUSED ON HIGH IMPACT EVENTS



Storm naming in Greece

Jan 2017 - Sep 2021
named 35 storms

Sep 21: embraced as an initiative by the National Meteorological Services of Greece, Cyprus and Israel.

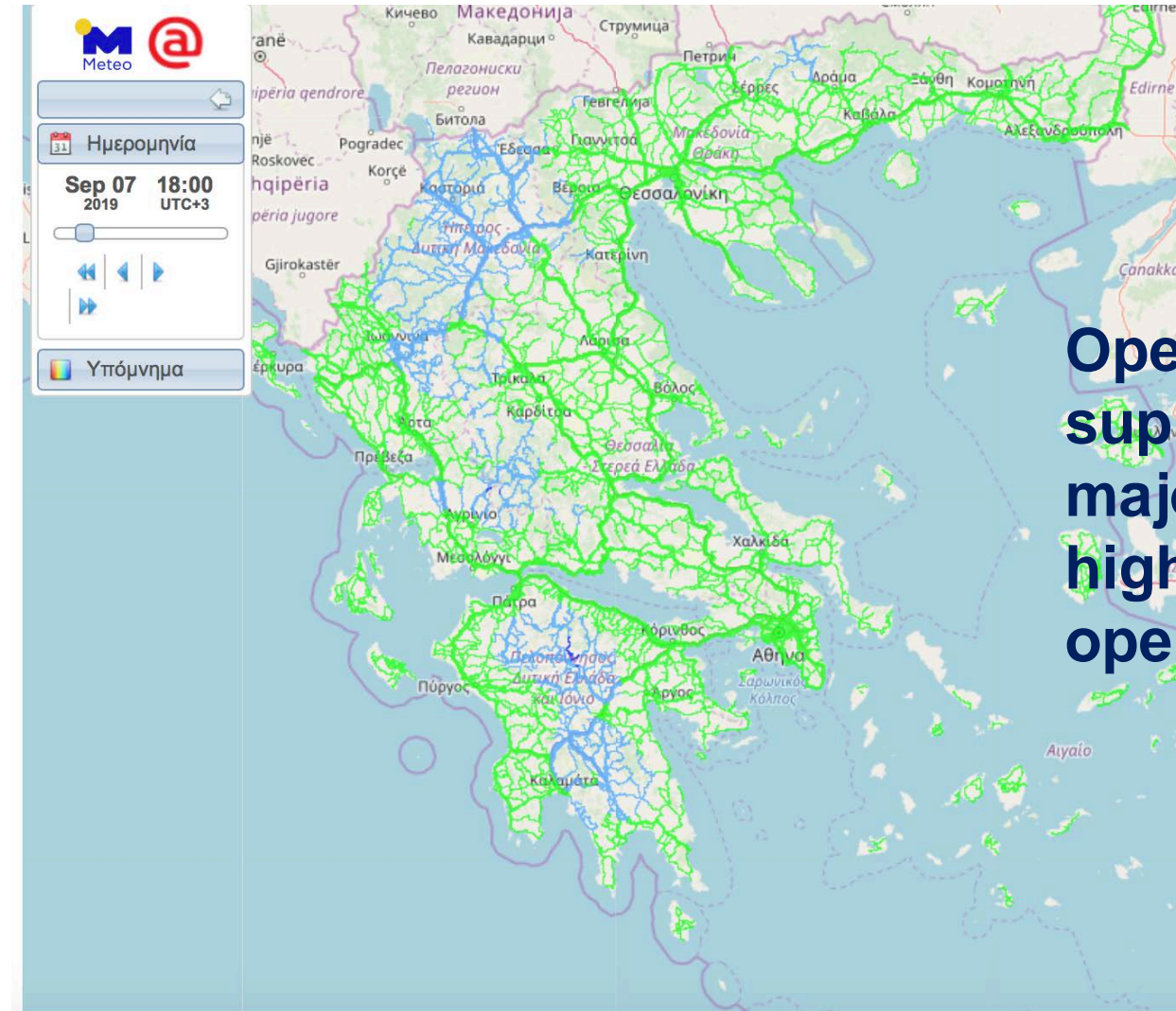


EARLY WARNING SYSTEM FOCUSED ON HIGH IMPACT EVENTS



Smart Warnings

- Road conditions



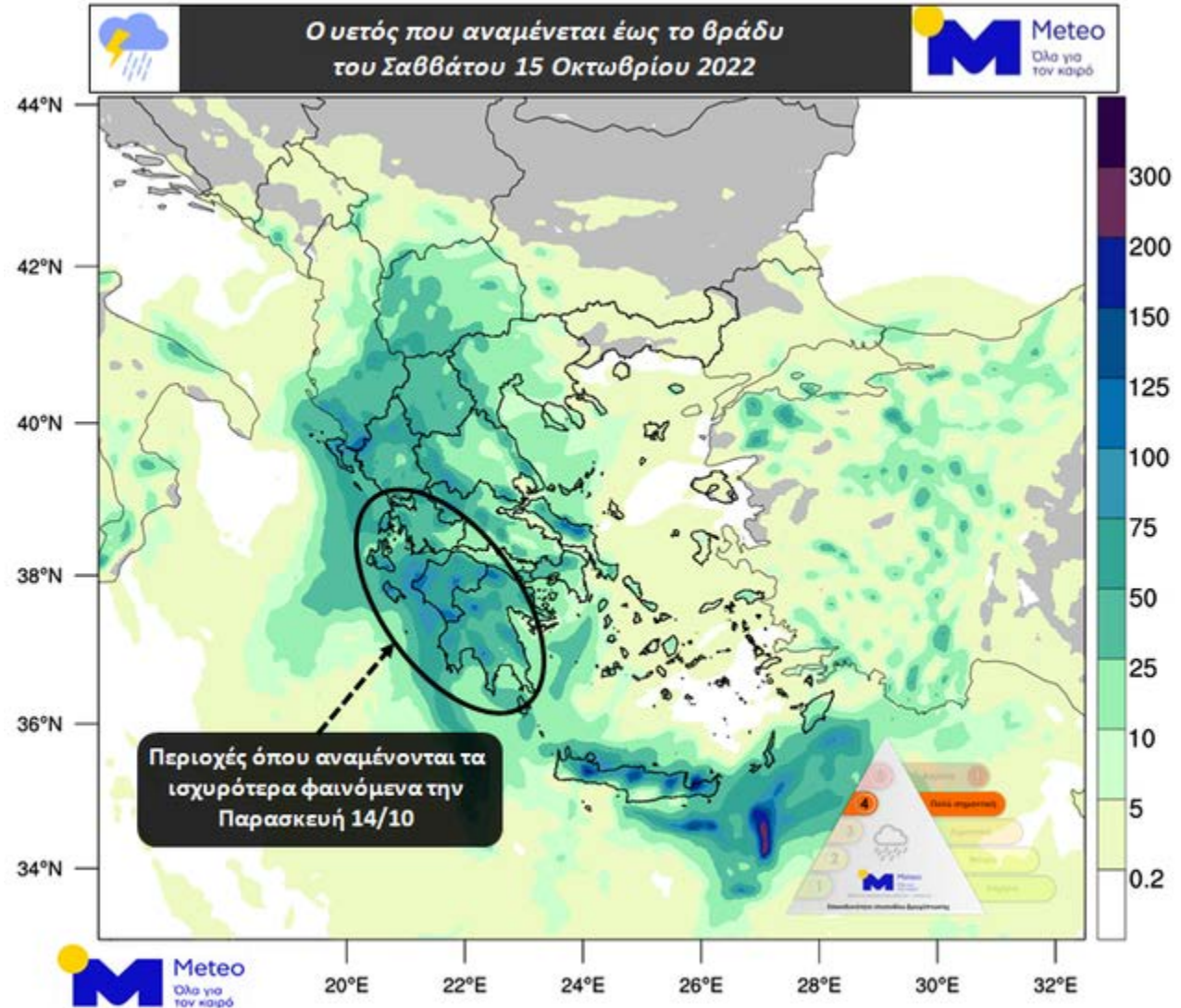
Operational support of 2 major highway operators

HIGH IMPACT WEATHER MONITORING & FORECASTING



Smart Warnings

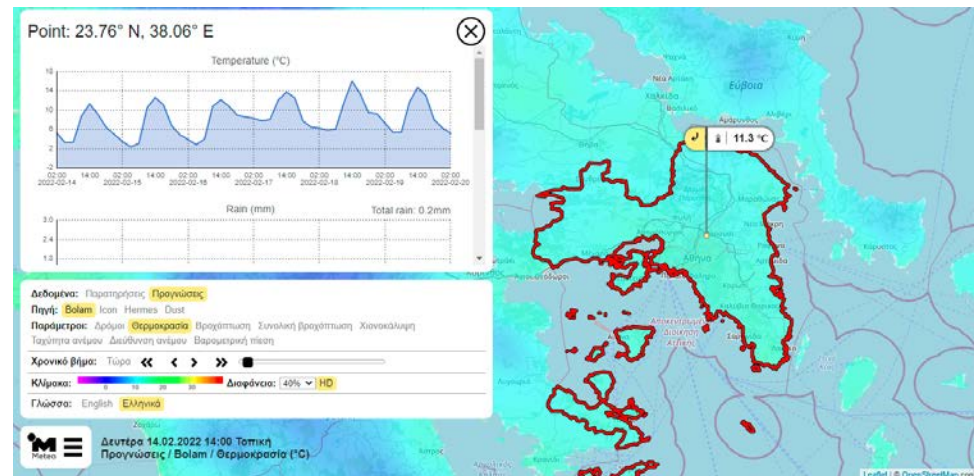
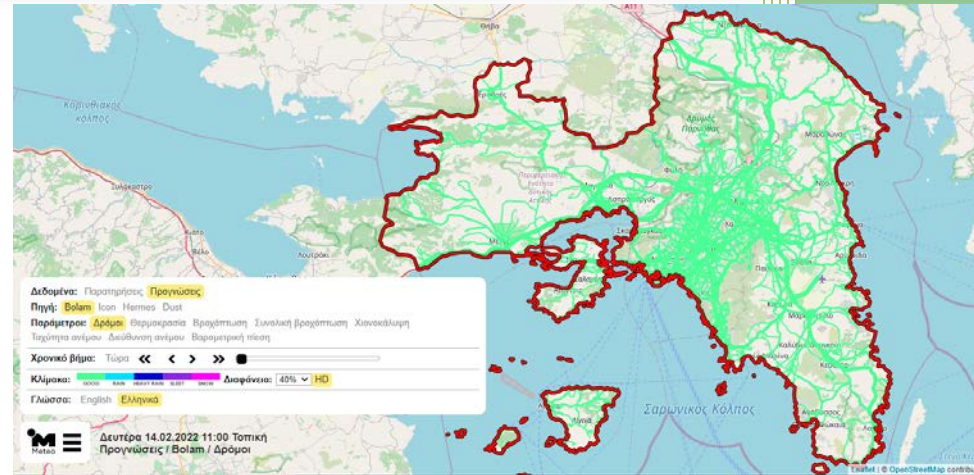
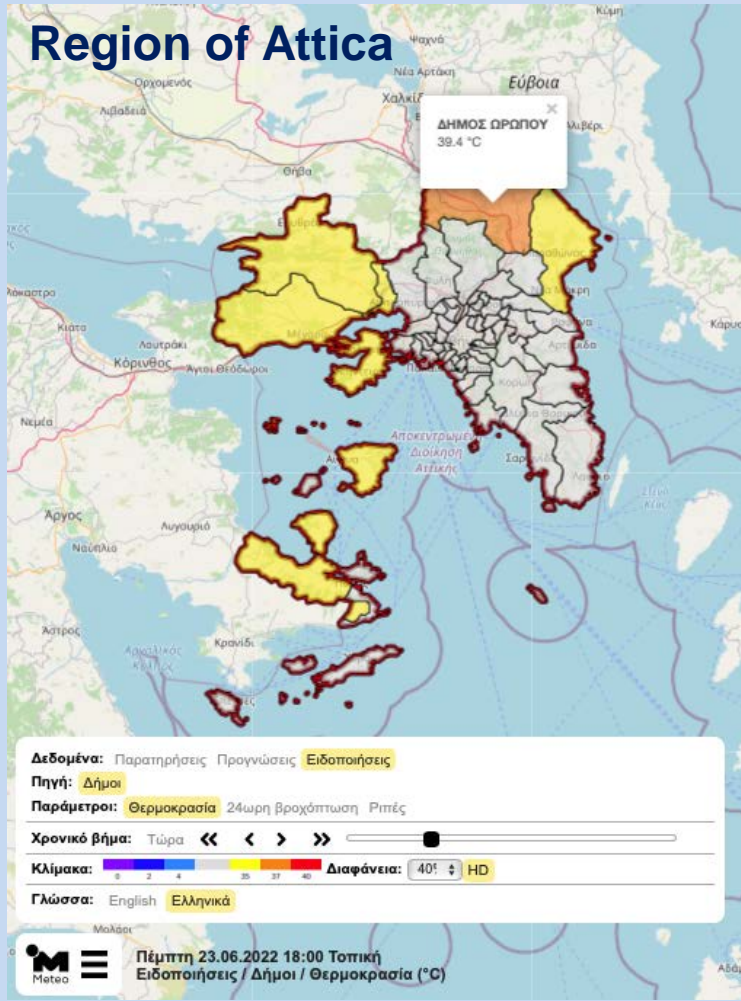
- Road conditions
- Regional Precipitation Index (RPI, since Jan22)



National Observatory of Athens, Greece - meteo.gr

Early Warning Systems

Region of Attica





Operation of www.meteo.gr

- **350.000** daily visitors & **>750.000** in case of severe weather events
- **2nd** website among public organisations
10 most visited sites in Greece
- **>125.000** facebook follows
- **>200.000** subscribers in viber
- **Major source** for weather related information & events analysis & forecasts for the Greek Media



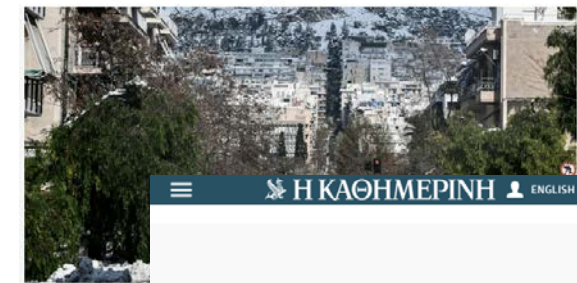
ΕΛΛΑΔΑ | ΑΤΤΙΚΗ | ΘΕΣΣΑΛΟΝΙΚΗ | ΚΑΤΗΓΟΡΙΕΣ | ΘΑΛΑΣΣΕΣ | ΚΑΙΡΟΣ ΤΩΡΑ

ΑΘΗΝΑ - ΚΕΝΤΡΟ

ΑΝΑΚΟΙΝΩΣΗ

ΠΡΟΓΝΩΣΗ	ΓΥΡΗ	ΣΚΟΝΗ	ΡΥΠΟΙ	ΓΡΑΦΗΜΑΤΑ	ΣΤΑΘΜΟΙ [4]	ΕΙΚΟΝΙΔΙΑ
ΤΕΤΑΡΤΗ 22 ΙΟΥΝΙΟΥ Ανατολή: 06:02 - Δύση 20:51						
18:00	34°C	29% υγρ.	2 Μπφ Ν 9 Km/h	↑	ΚΑΘΑΡΟΣ	☀
21:00	30°C	38% υγρ.	ΑΠΝΟΙΑ	☀	ΚΑΘΑΡΟΣ	🌙
00:00	29°C	43% υγρ.	2 Μπφ ΒΔ 9 Km/h	↓	ΚΑΘΑΡΟΣ	🌙
ΠΕΜΠΤΗ 23 ΙΟΥΝΙΟΥ Ανατολή: 06:02 - Δύση 20:51						
03:00	29°C	43% υγρ.	2 Μπφ Β 9 Km/h	↓	ΚΑΘΑΡΟΣ	🌙
06:00	29°C	39% υγρ.	3 Μπφ Β 16 Km/h	↓	ΚΑΘΑΡΟΣ	🌙
09:00	32°C	34% υγρ.	2 Μπφ Β 9 Km/h	↓	ΚΑΘΑΡΟΣ	☀
12:00	37°C	28% υγρ.	1 Μπφ Ν 3 Km/h	↑	ΑΡΑΙΗ ΣΥΝΝΕΦΙΑ	☁
15:00	37°C	27% υγρ.	3 Μπφ Ν 16 Km/h	↑	ΚΑΘΑΡΟΣ	☀
18:00	34°C	33% υγρ.	2 Μπφ Ν 9 Km/h	↑	ΚΑΘΑΡΟΣ	☀
21:00	31°C	44% υγρ.	2 Μπφ ΝΔ 9 Km/h	↗	ΑΡΑΙΗ ΣΥΝΝΕΦΙΑ	☁

Μετο: Υποχωρεί σταδιακά η κακοκαιρία «Ελπίδα» - Πού θα συνεχίσει το χιόνι



Κοινωνία
Κακοκαιρία Ελπίδα – Μετο: Από το 2008 είχε να πέσει τόσο χιόνι στην Αθήνα



Ελλάδα

Κάσωνας: Heat Alert SMS από τον Δήμο Αθηναίων μέσω του meteo

Heat Alert μέσω SMS από τον Δήμο Αθηναίων για προειδοποίηση κα



BREAKING NEWS:ΑΑ 2022: Τι απαντά το κανάλι για το

Ελλάδα | 09.08.2021 19:45

Newsroom
Οι καμμένες εκτάσεις της ξεπερνούν τα 900.000 στρέμματα, ενώ η αύξηση ξεπερνά τα 336%
Φωτιές – meteo: Τρίτη χώρα με τα περισσότερα καμμένα σε Νοτιοανατολική Ευρώπη η Ελλάδα



Educational Activities



“About Winds ..” Educational Program
2016-2022: >**10.000** students



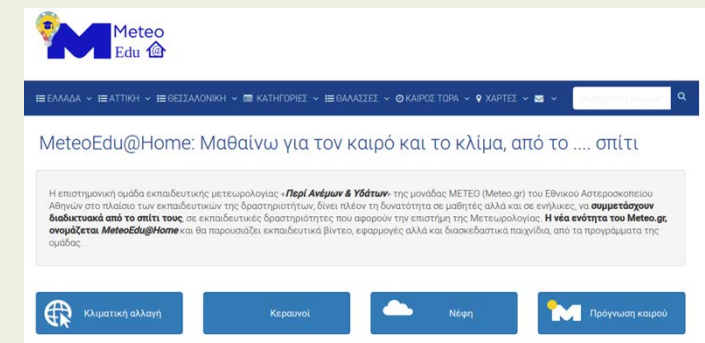
Educational Programs at Stavros Niarchos
Cultural Centre
2016-2022: > **5.700** students



Interactive Meteo-Expo:
“The weather secrets”
2018-2020: >**20.000** students



Digital Platform for pupils :
MeteoEdu@Home
(<https://meteo.gr/meteoedu/>)



Meteopedia
(<https://wiki.meteo.gr>)





FINAL REMARKS

Good practice of Research & Academia Sector :

- ✓ the exploitation of research funds can support the **development & sustainable operation of monitoring networks**
- ✓ the added-value of the use of research results for the **development of innovative tools and services** for the public & private sector
- ✓ can contribute /develop **early warning systems** that meet the needs of civil protection at local & regional level.
- ✓ can **support the increasing and diverse needs of the stakeholders** leveraging the more flexible & innovative character of the research & academia.

Research & Academia Sector can also contribute to initiatives such as SEE-MHEWS-A



FINAL REMARKS

Proposals & Prospects:

- ✓ data collection & processing and earth system forecasts can be improved with the contribution of **multiple-sector partners**
- ✓ NMS's, Research Institutions and Academia should collaborate & merge resources.
- ✓ National, European & International Organizations (e.g. WMO, EUMETNET, ECMWF) should endorse collaboration of Research Institutions and Academia with NMS's in domains that were initially only addressed by NMS's **through inclusive initiatives**.

WE CANNOT AFFORD not to use all available data/tools/services that contribute to the **safety of the society**.