Enerhodar - impact across Europe and other examples of use of EWAS

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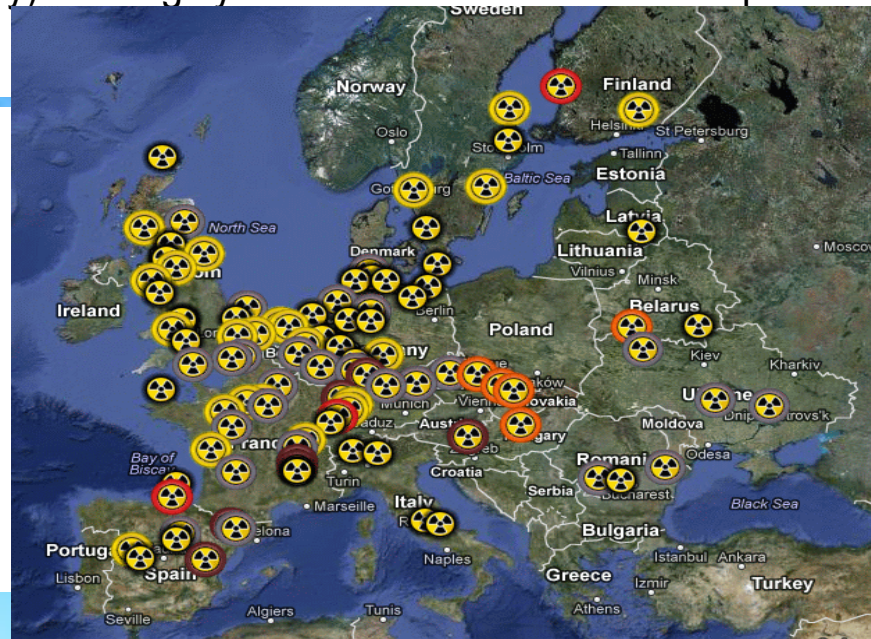
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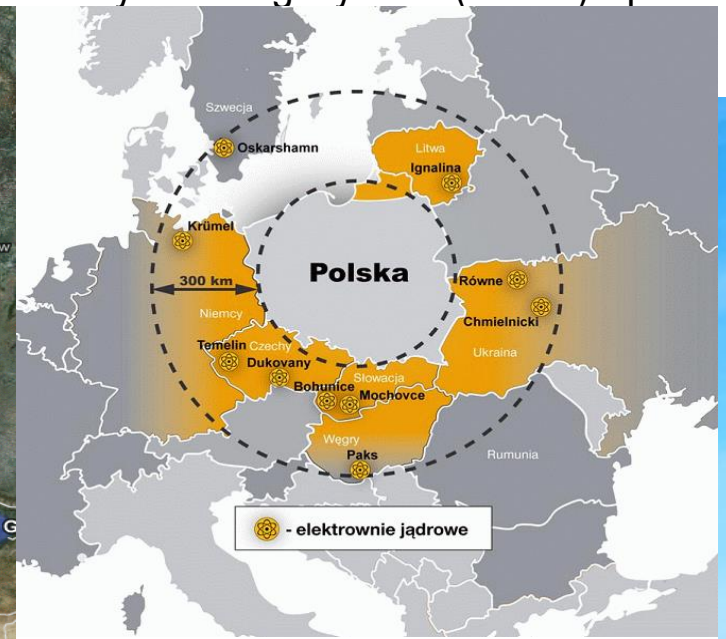Potential danger to Poland (not only!), related to at least two types of threats:

1. anthropogenic threats, resulting mainly from incidents in nuclear power plants (NPPs) in neighboring countries (war in Ukraine! at least 4 NPPs exposed to warfare), as well as other disasters or accidents of the nature of emission incidents, causing contamination of the environment with toxic (more generally: dangerous) substances;

2. natural threats, such as volcanic eruptions or forest fires, and their impact on broadly understood safety, including e.g. the safety of air transport.

The world has a situation in Ukraine – not only direct combat operations, but also constant threat of releasing radioactive substances.

For all neighbouring countries (but not only) it is highly recommended to have an up-to-date Early Warning System (EWaS) operating continuously.

Red – the type used in Fukushima;
Orange – inadequate security;
Yellow – older than 30 years;
Brown – seismically active region.
Other:
Gray – under construction;
Black – turned off.
(Status – end of 2015 yr.)

High-risk reactors in Europe

NPP within 300 km from Poland

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CONCEPT, GOALS AND RESULTS

In terms of safety, the key issue is information – including forecasts – if/how the territory of Poland may be endangered as a result of a hypothetical accident in selected NPP(s) or of a release of another contamination.
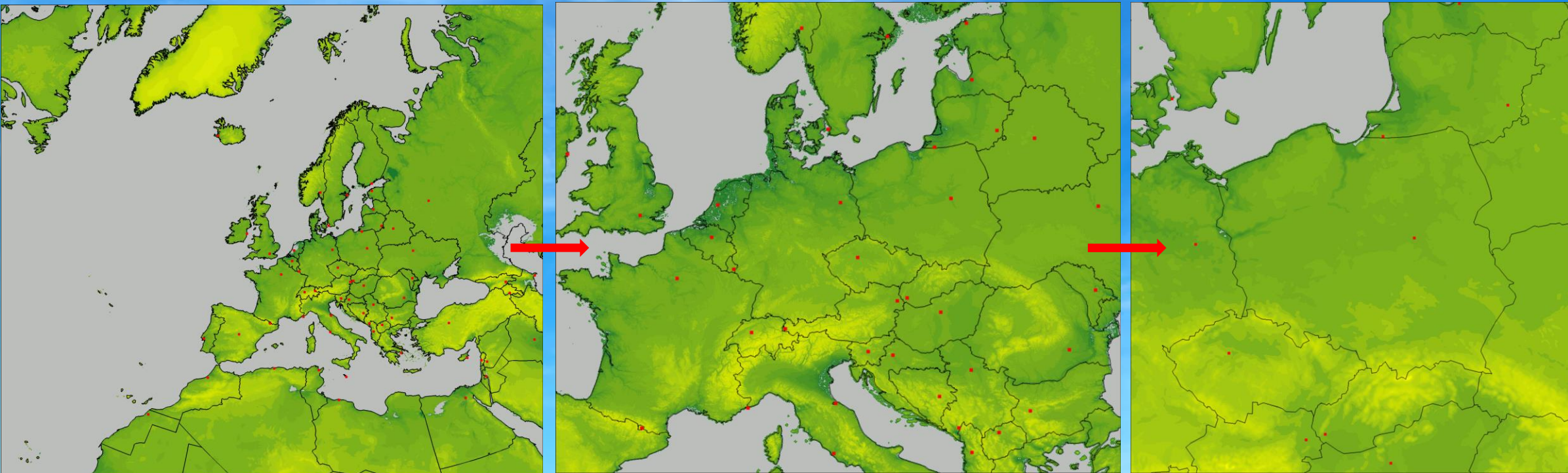
At IMWM-NRI a system for forecasting – in operational mode – the dispersion of pollutants from locations in the COSMO model domain has been prepared.

Two models (Lagrangian – trajectory and Eulerian – field) are used in the system, giving complementary information.
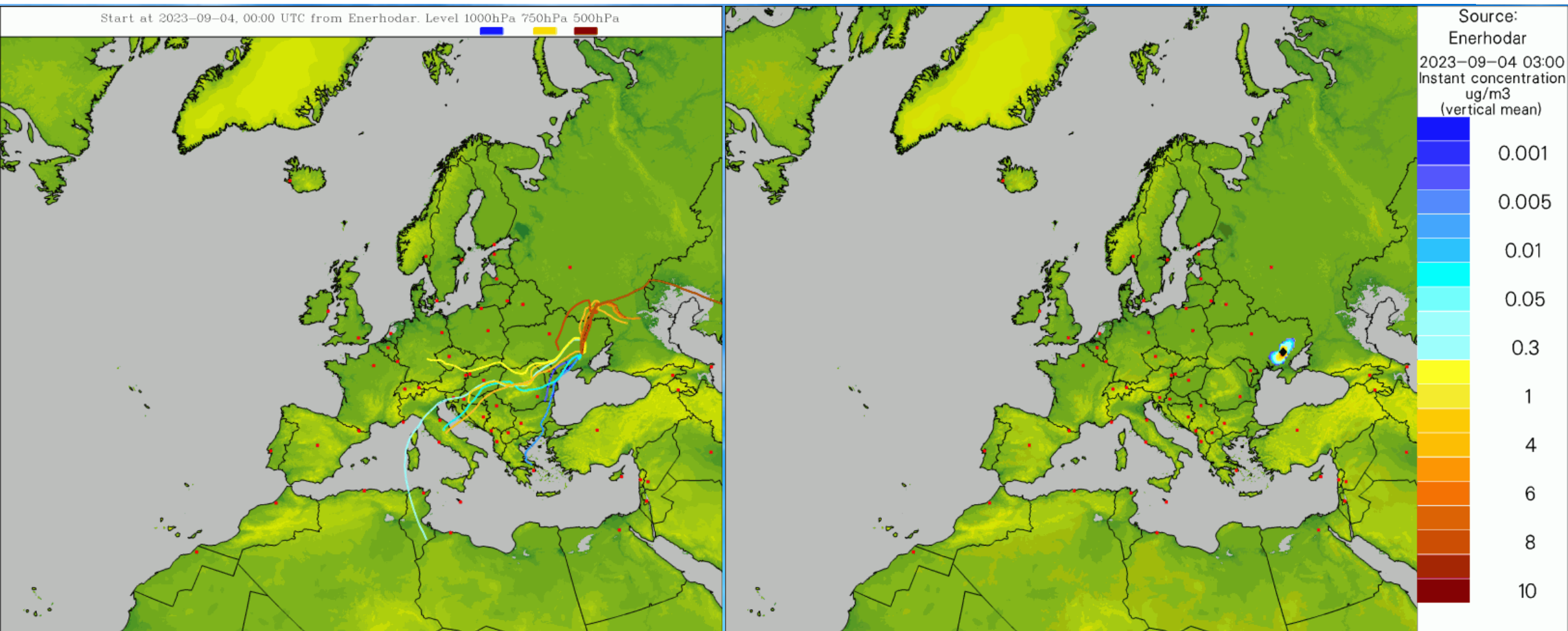
If the point of release is located outside the COSMO domain, an appropriate data set from GFS/ICON-EU is used. Twice a day, the results of a hypothetical release from selected Ukrainian NPPs are prepared. The results are sent to the relevant authorities.

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CONCEPT, GOALS AND RESULTS

The system operating at IMGW can generate warnings based on forecasts prepared on the basis of the results of meteorological models in three resolutions – from 25 to 2.8 km, in the appropriate computational domains.
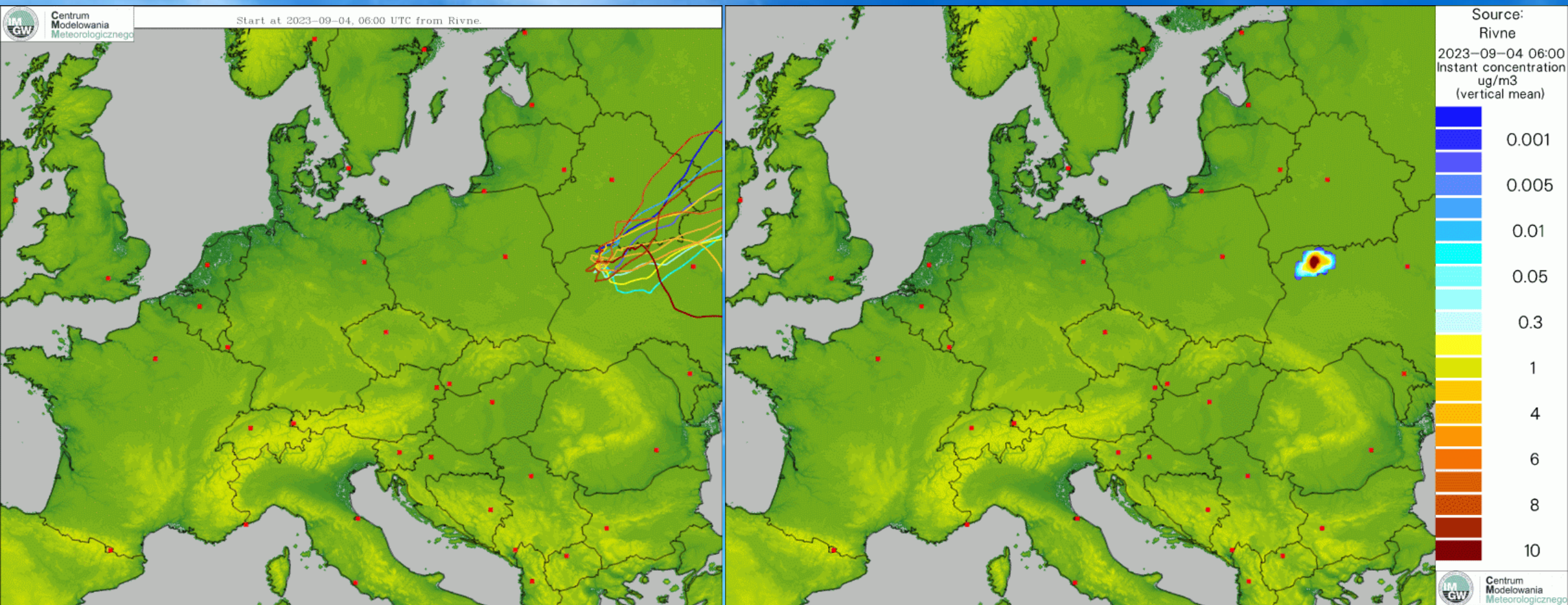
FORECASTS FOR HYPOTHETICAL FAILURES AT SELECTED NPPs

Start at 2023-09-04, 00:00 UTC from Enerhodar. Level 1000hPa 750hPa 500hPa

Source: Enerhodar 2023-09-04 03:00 Instant concentration ug/m3 (vertical mean)

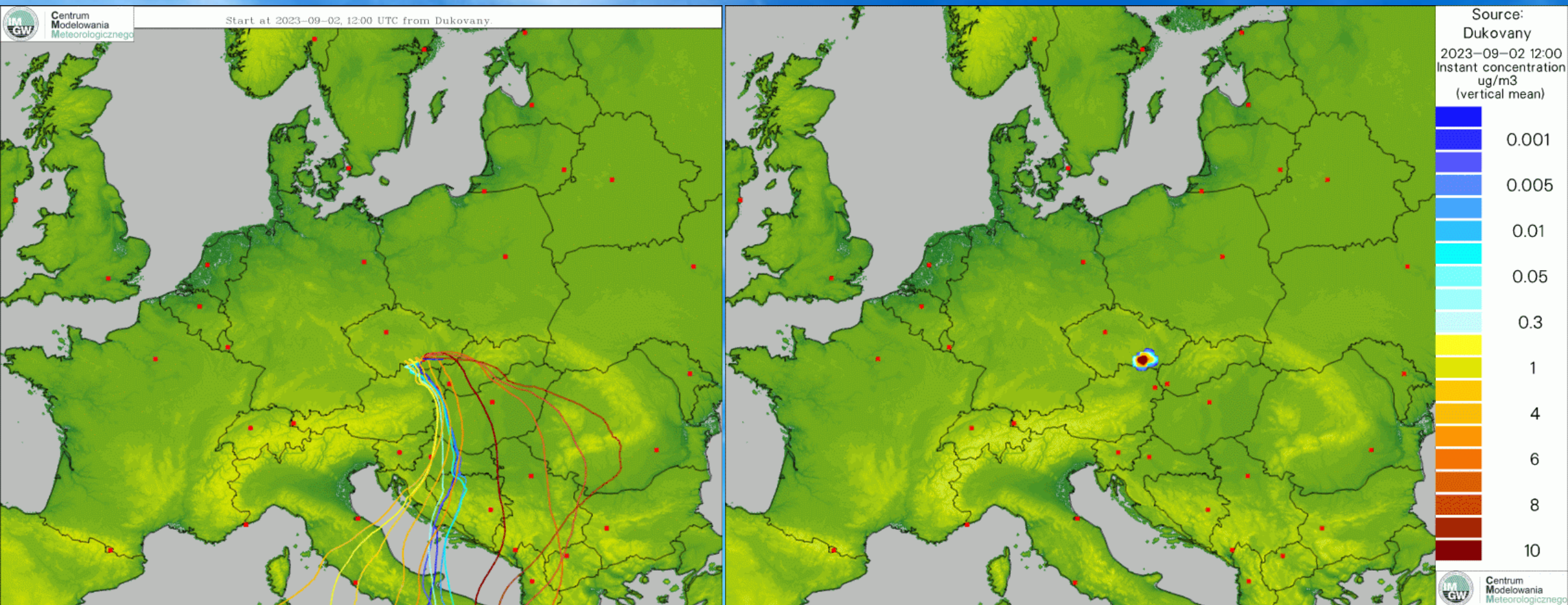**Forecasts of dispersion for hypothetical accidents in selected NPPs. Special case – Enerhodar**

FORECASTS FOR HYPOTHETICAL FAILURES AT SELECTED NPPs

Forecasts of dispersion for hypothetical accidents in selected NPPs. Special case – Rivne

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FORECASTS FOR HYPOTHETICAL FAILURES AT SELECTED NPPs

Forecasts of dispersion for hypothetical accidents in selected NPPs. Special case – Dukovany

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OTHER SOURCES

The systems covers other potential and real sources of contamination, not only NPPs, but also volcanoes, forest fires etc.

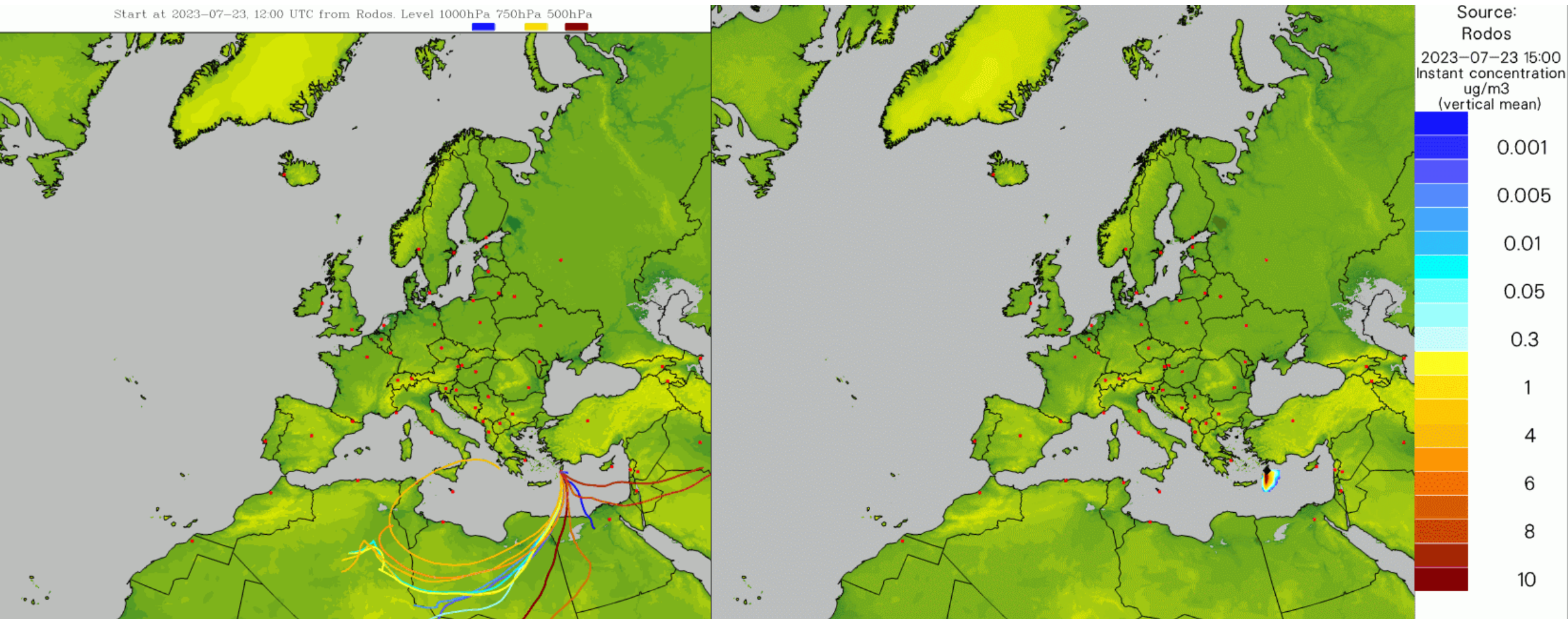Forest fires broke out on the Greek island of Rhodes in July and August.

On August 14, Mount Etna in Sicily erupted with the strongest intensity in three decades.

On August 18, forest fires broke out near Tenerife, Canary Island.

On August 20, very violent forest fires broke out near the Greek city of Alexandroupolis.

All these events, through the emission of dust, gases and other contaminants, affected the situation throughout Europe (similarly to the forest fires in Canada)

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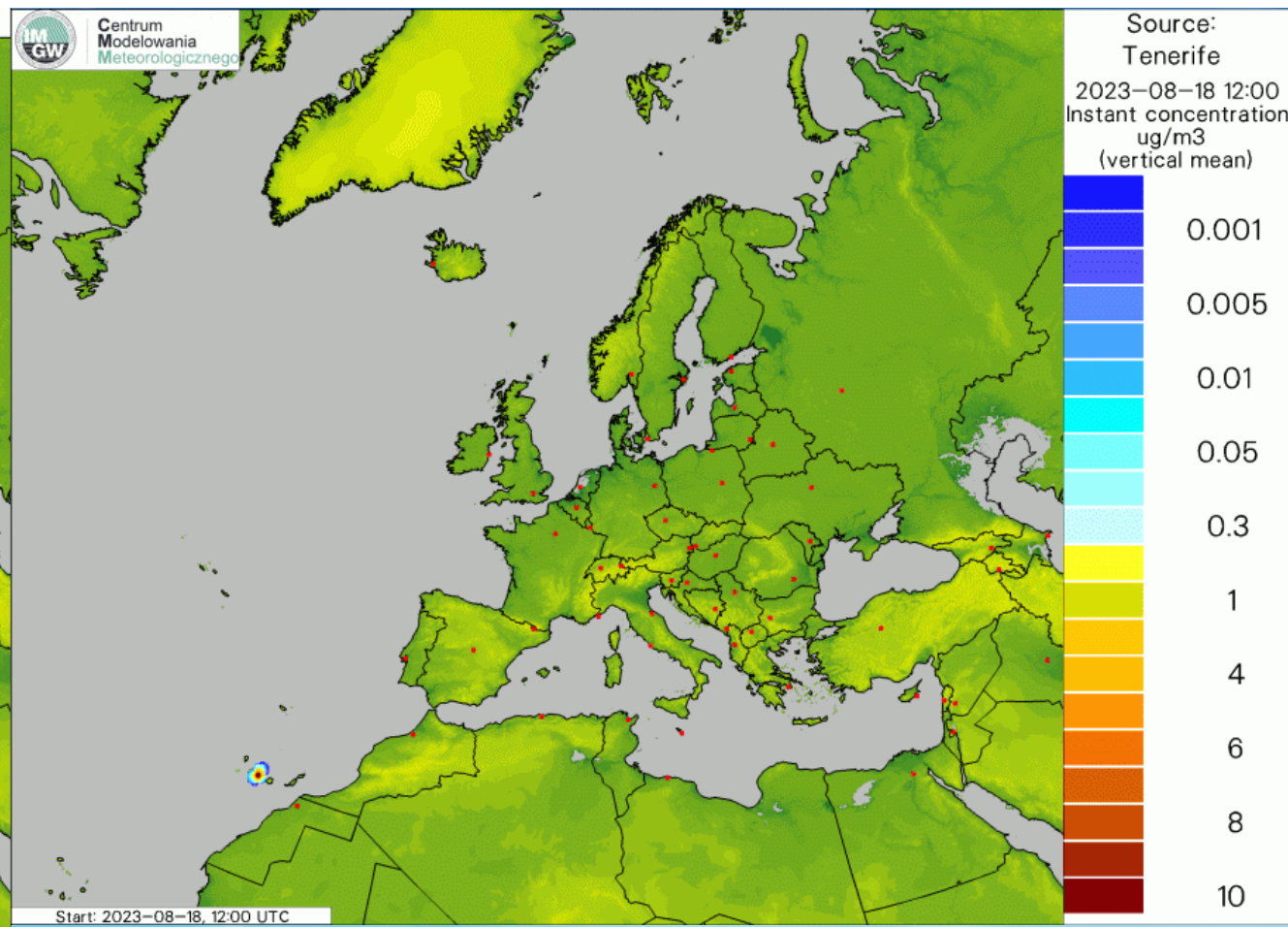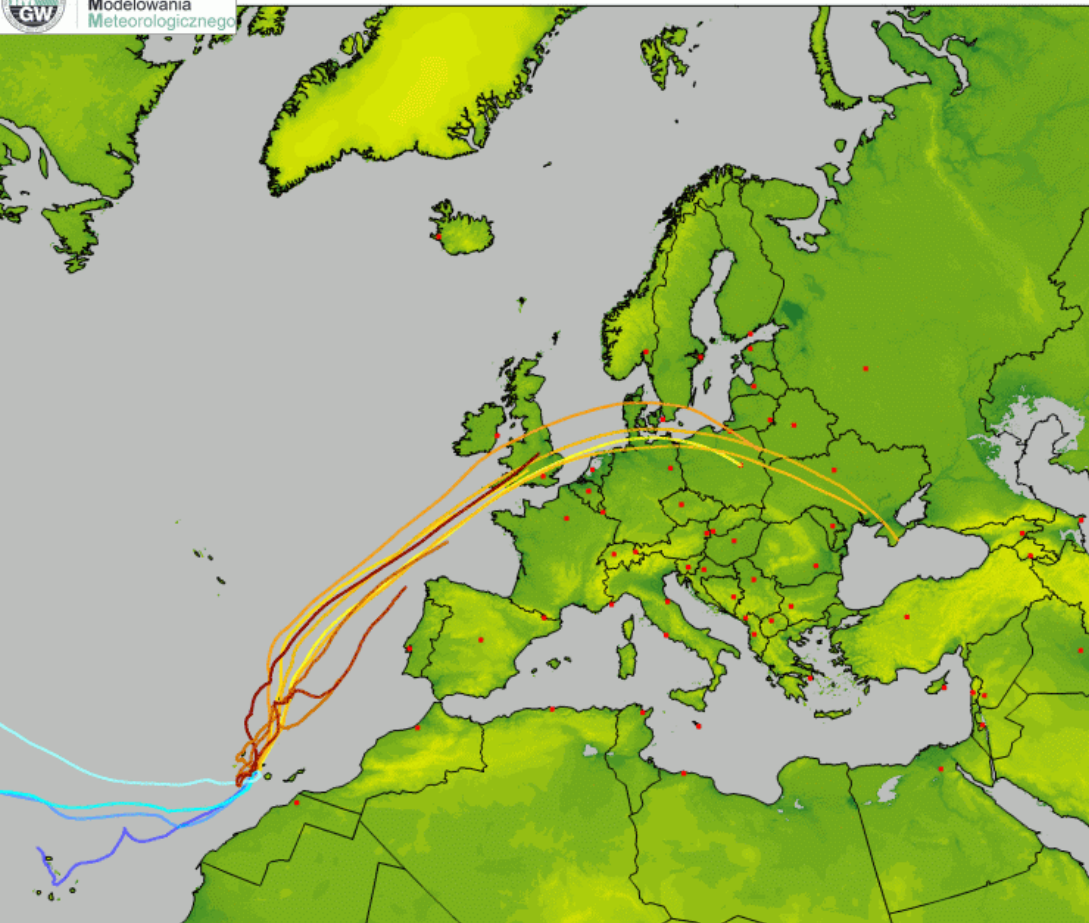and other examples of use of EWAS
OTHER SOURCES

Start at 2023-07-23, 12:00 UTC from Rodos. Level 1000hPa 750hPa 500hPa

Source:
Rodos
2023-07-23 15:00
Instant concentration
ug/m3
(vertical mean)

Forecasts of dispersion of pollutants from forest fires. Island of Rhodes

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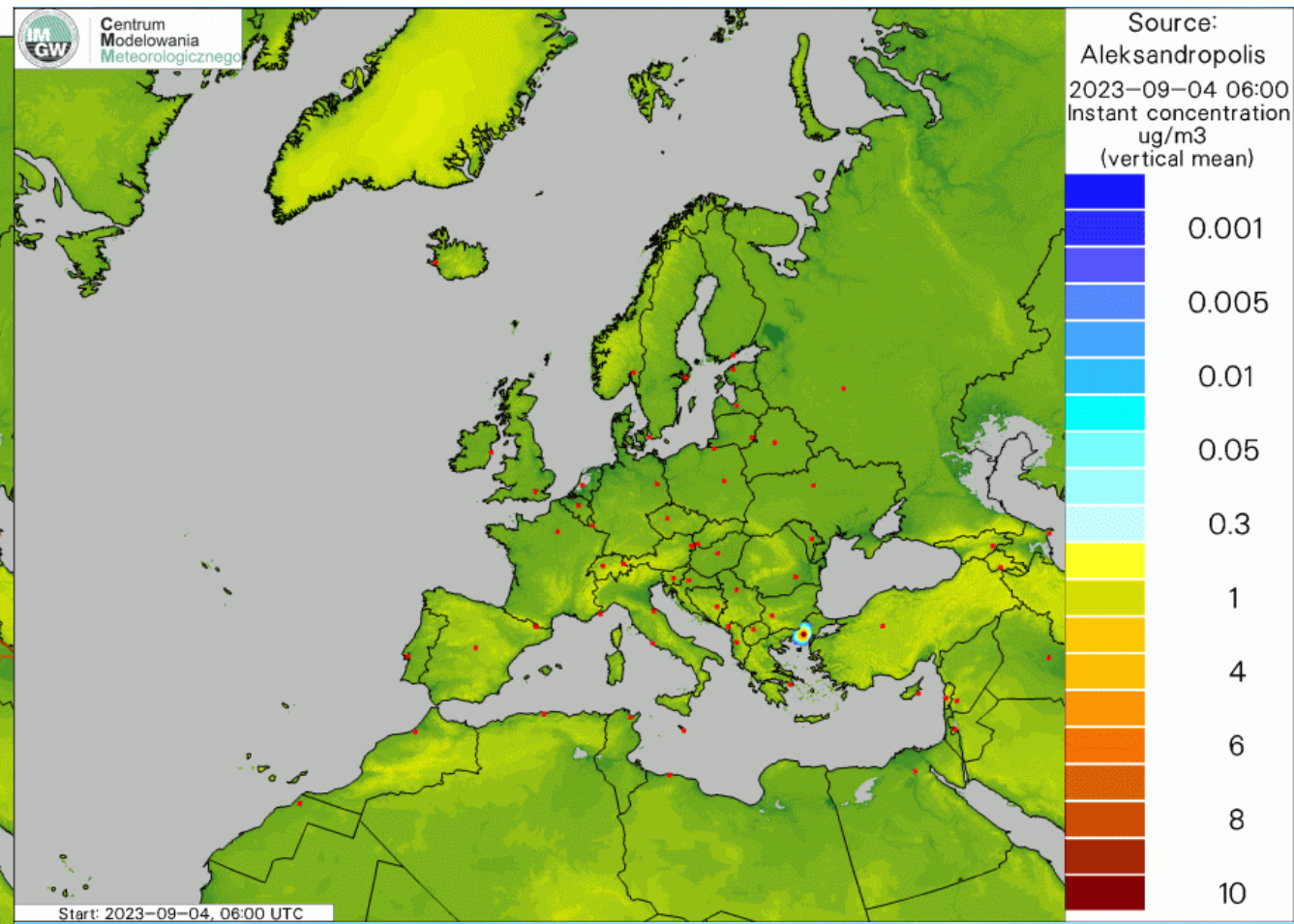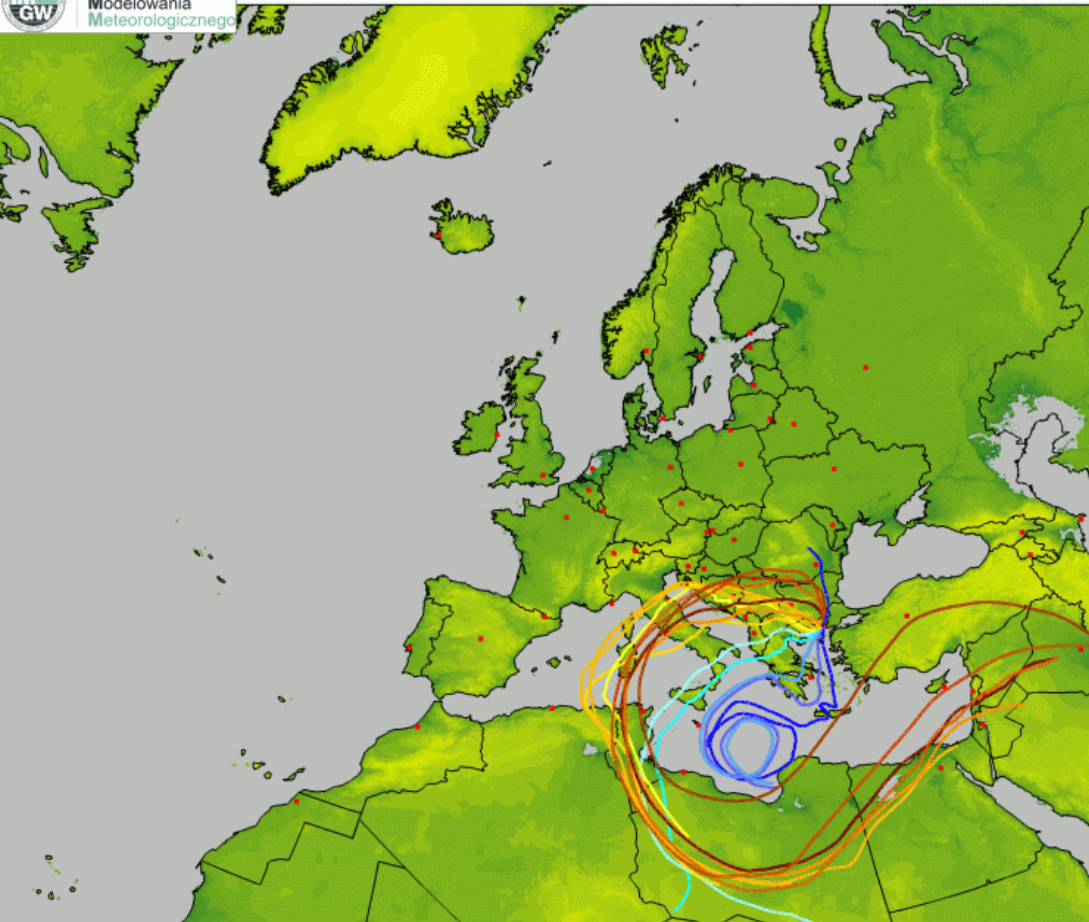and other examples of use of EWAS
OTHER SOURCES

Forecasts of dispersion of pollutants from forest fires. Tenerife, Canary Islands.

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OTHER SOURCES

Forecasts of dispersion of pollutants from forest fires. Aleksandropolis (25).
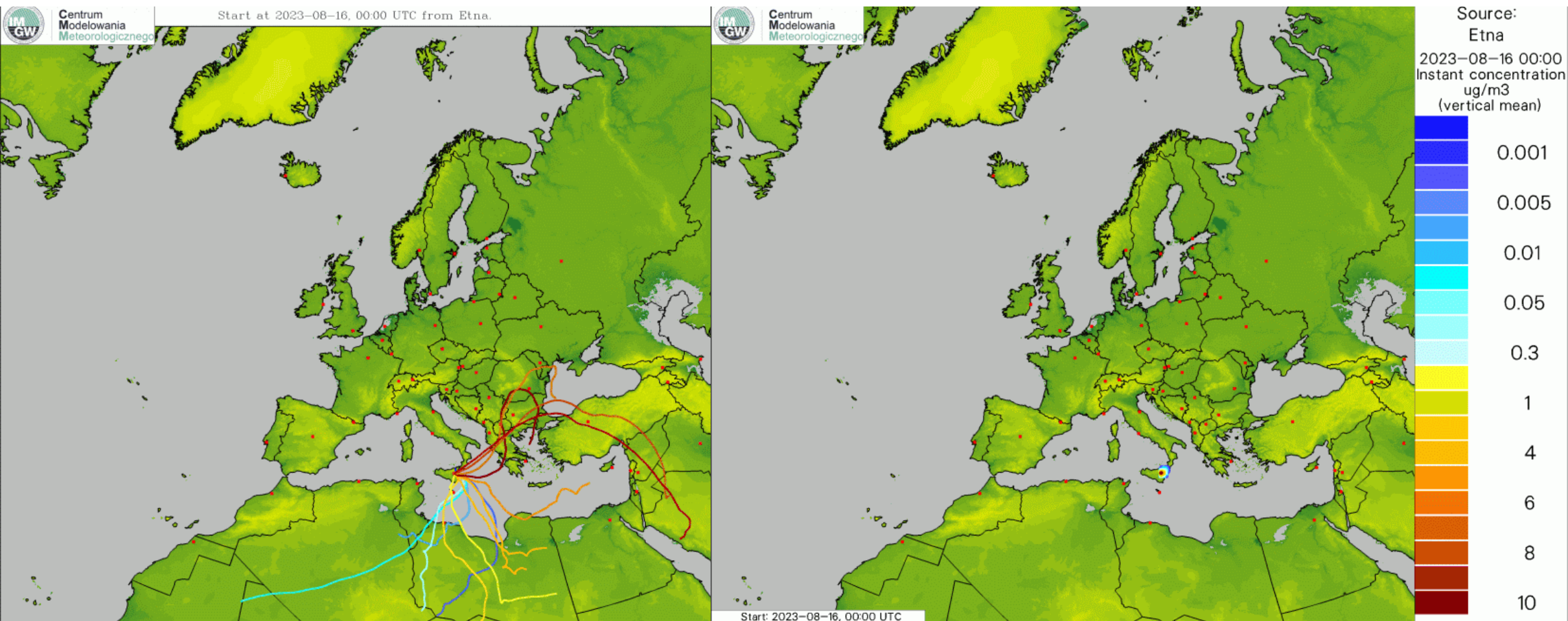
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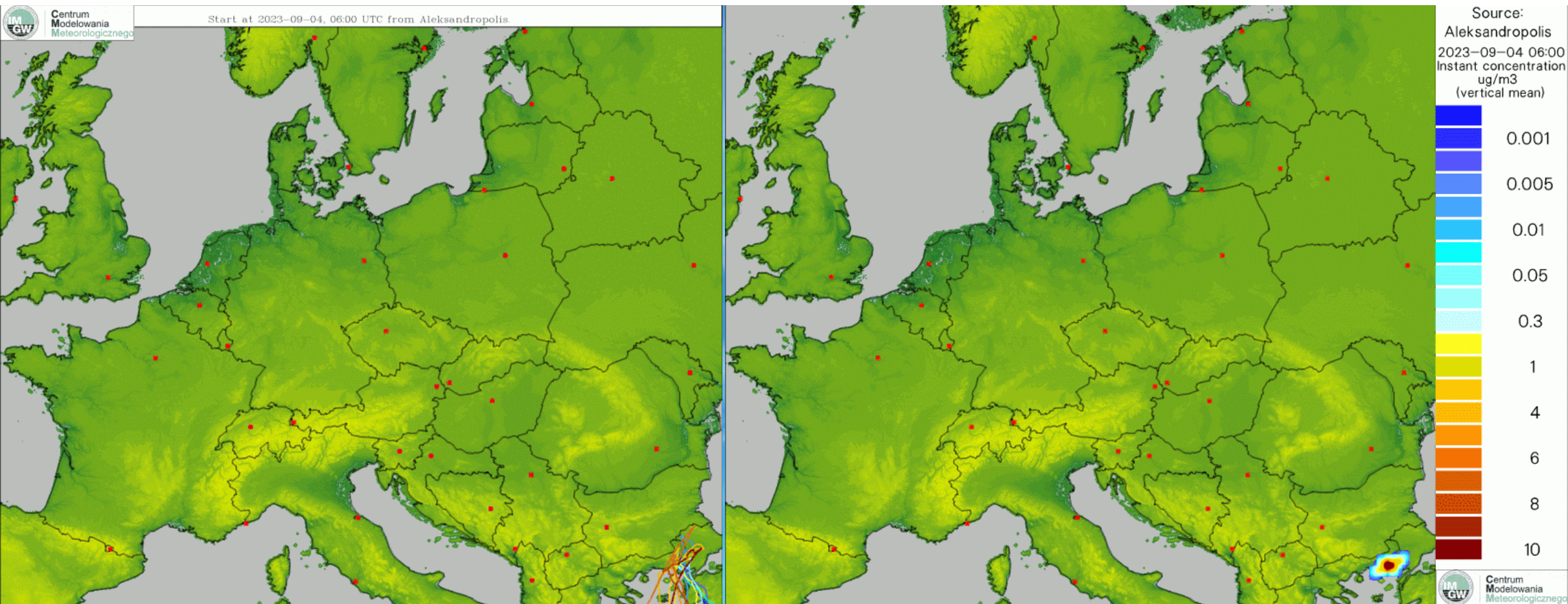
Forecasts of dispersion of pollutants from forest fires. Aleksandropolis (7).

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Forecasts of dispersion of pollutants from volcano eruption. Etna, Sicily

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SUMMARY

➢ Need for efficient systems that would respond to a crisis situation – a threat to the natural environment or human activity.

➢ It is important to prepare tools that allow to react and/or minimize the negative effects of possible accidents/releases…

➢ … or, at least, to warn the public/authorities that could potentially be at risk of contamination.

➢ **Such systems are to provide support – an information on the further development of events, the forecasted state of the environment and the negative impact of various factors on human society within the range of such impact.**

➢ Similar systems, running in Romania (NMA), Germany (DWD) and Switzerland (MCH), were introduced during the meeting on April 26 this year. There is a need for exchange experiences between partners, related to possible improvements of existing systems, as well as the introduction of new ones.

➢ **"Si vis pacem, para bellum!"**

#StandWithUkraine