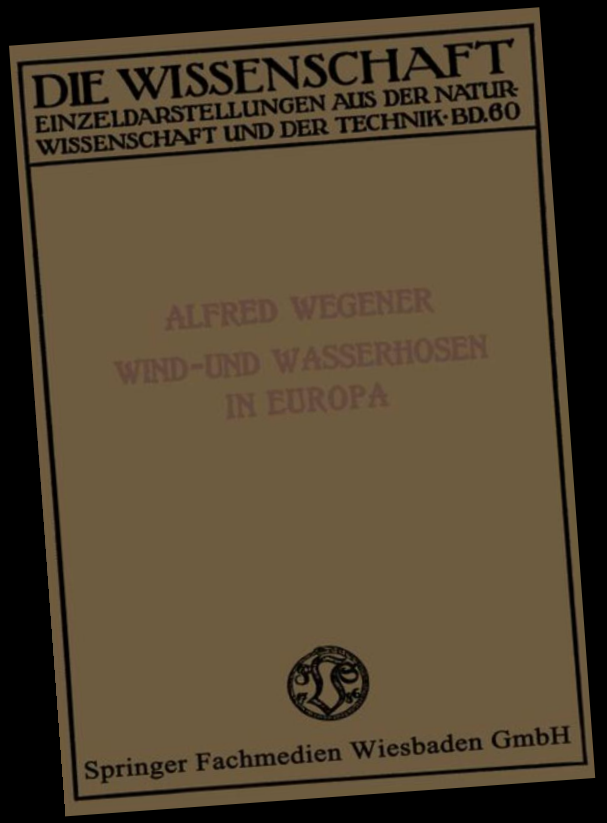
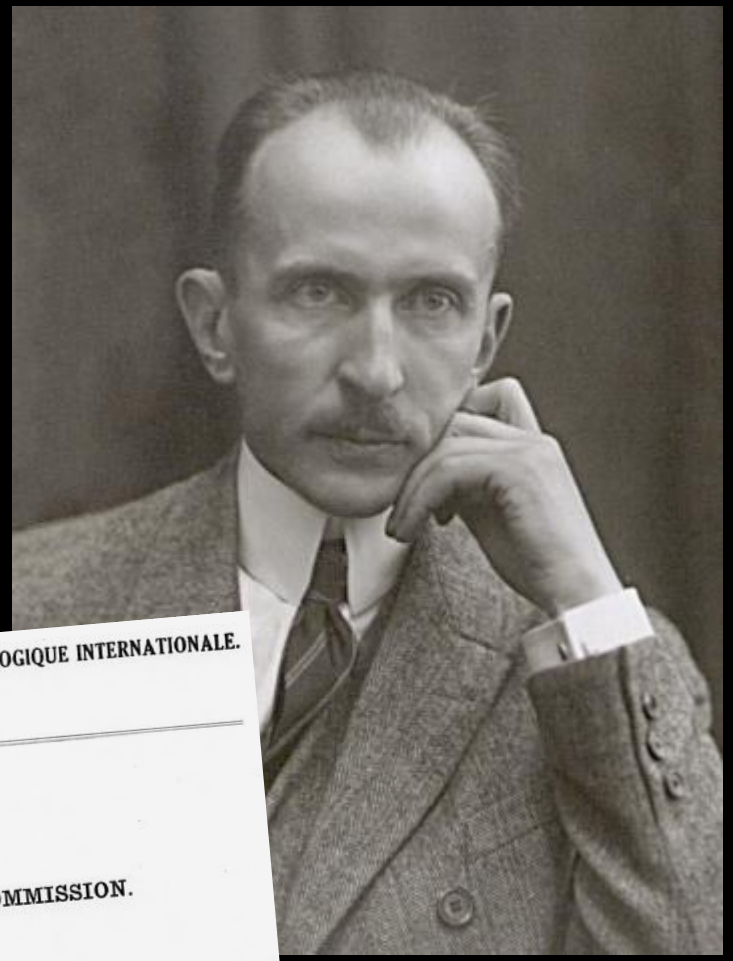
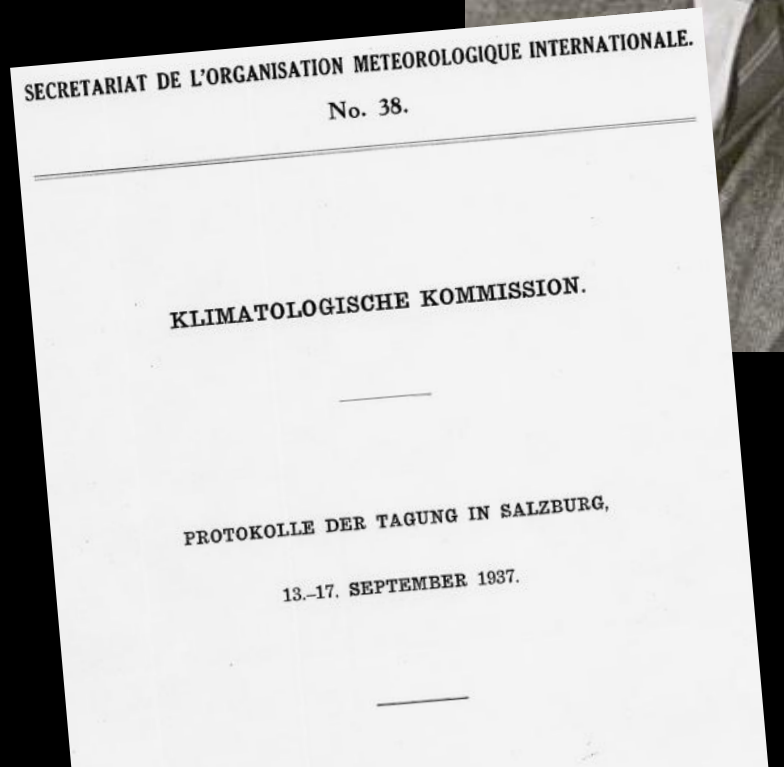
first slide is black and empty

1917

First collection of tornadoes from all over Europe






SECRETARIAT DE L'ORGANISATION METEOROLOGIQUE INTERNATIONALE.

No. 38.

KLIMATOLOGISCHE KOMMISSION.

PROTOKOLLE DER TAGUNG IN SALZBURG,

13.–17. SEPTEMBER 1937.

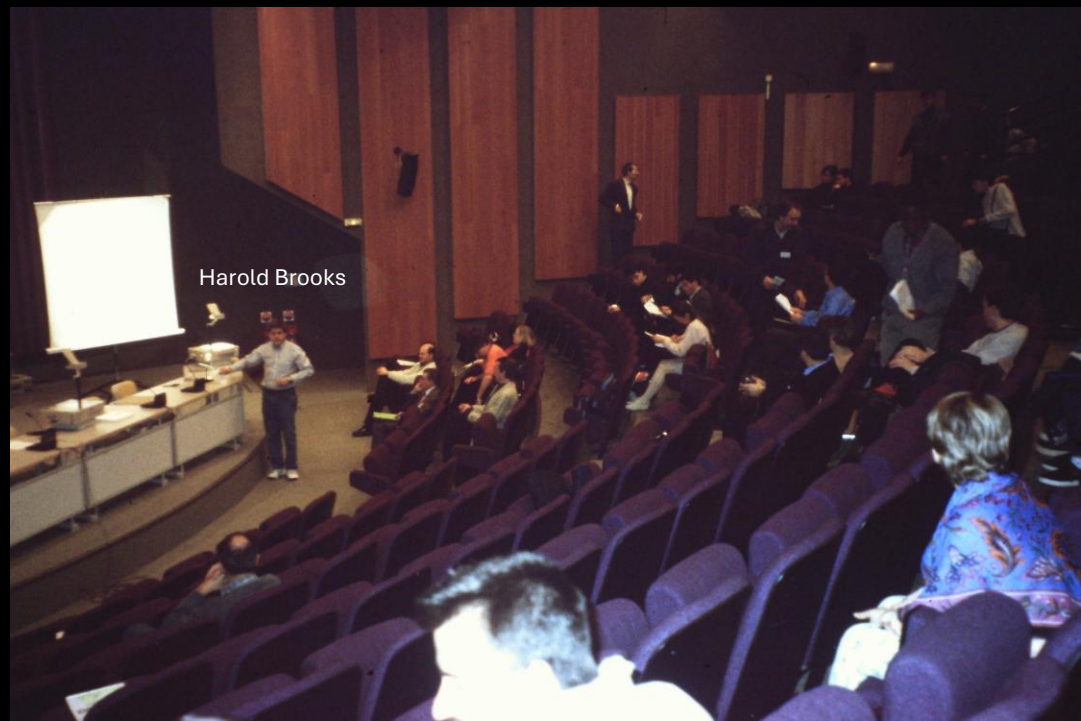
1937

- Organisation Météorologique Internationale (WMO predecessor): First international guidelines for tornado damage assessment
- First tornado collection point initiated by Johannes Letzmann at the University of Tartu, Estonia

2000

First ECSS
(European Conference on Tornadoes and Severe Storms)
at MeteoFrance HQ in Toulouse

Main initiator: Jean Dessens
Heino Tooming Lifetime Achievement Awardee 2019

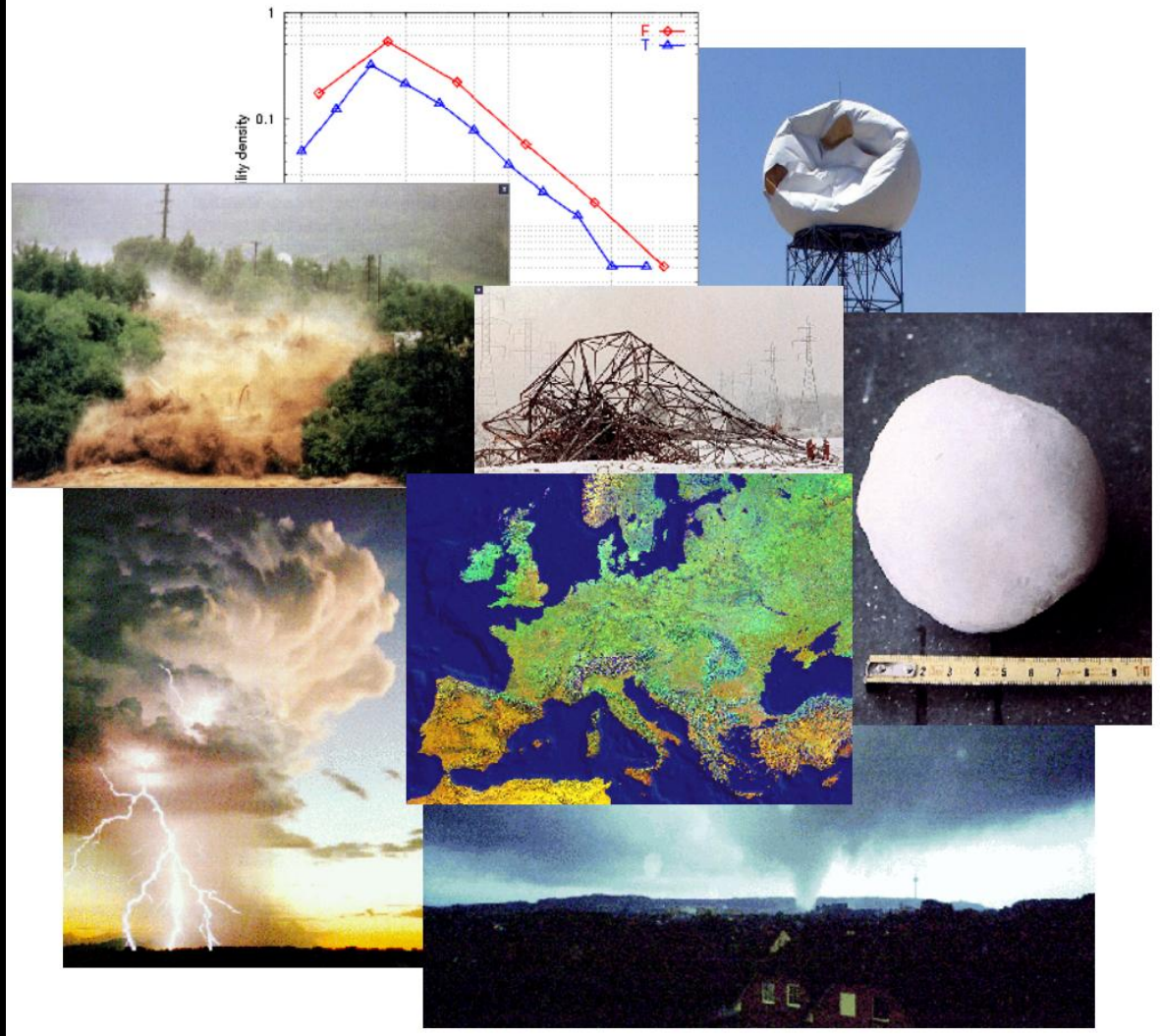


Vision of ESSL first presented by Nikolai Dotzek
at this conference

Pilot study for a European Severe Storms Laboratory

ESSL

Dr. Nikolai Dotzek,
DLR-Institut für Physik der Atmosphäre,
Deutsches Zentrum für Luft- und Raumfahrt,
Oberpfaffenhofen,
D-82234 Wessling, Germany



2002

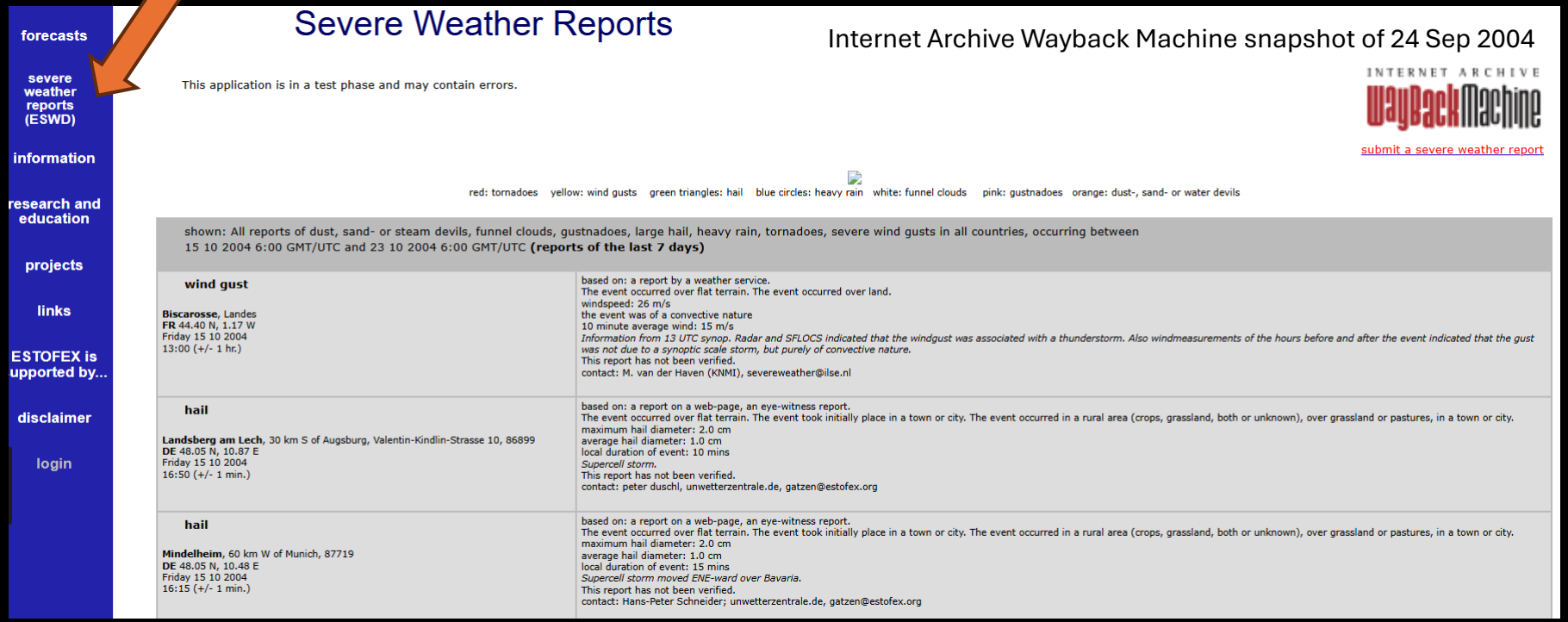
Vision of ESSL formulated in a pilot study by Nikolai Dotzek, while visiting the NSSL in Norman, Oklahoma

2004

Third ECSS conference in León:

Version 1.00 of the European Severe Weather Database adopted by the ESWD data format committee, chaired by Pieter Groenemeijer.

First version of ESWD hosted on the website of the European Storm Forecast Experiment (ESTOFEX):



forecasts
severe weather reports (ESWD)
information
research and education
projects
links
ESTOFEX is supported by...
disclaimer
login

Severe Weather Reports

Internet Archive Wayback Machine snapshot of 24 Sep 2004

This application is in a test phase and may contain errors.

submit a severe weather report

red: tornadoes yellow: wind gusts green triangles: hail blue circles: heavy rain white: funnel clouds pink: gustnadoes orange: dust-, sand- or water devils

shown: All reports of dust, sand- or steam devils, funnel clouds, gustnadoes, large hail, heavy rain, tornadoes, severe wind gusts in all countries, occurring between 15 10 2004 6:00 GMT/UTC and 23 10 2004 6:00 GMT/UTC **(reports of the last 7 days)**

wind gust **Biscarosse**, Landes **FR** 44.40 N, 1.17 W Friday 15 10 2004 13:00 (+/- 1 hr.)	based on: a report by a weather service. The event occurred over flat terrain. The event occurred over land. windspeed: 26 m/s the event was of a convective nature 10 minute average wind: 15 m/s *Information from 13 UTC synop. Radar and SFLOCS indicated that the windgust was associated with a thunderstorm. Also windmeasurements of the hours before and after the event indicated that the gust was not due to a synoptic scale storm, but purely of convective nature.* This report has not been verified. contact: M. van der Haven (KNMI), severeweather@ilse.nl
hail **Landsberg am Lech**, 30 km S of Augsburg, Valentin-Kindlin-Strasse 10, 86899 **DE** 48.05 N, 10.87 E Friday 15 10 2004 16:50 (+/- 1 min.)	based on: a report on a web-page, an eye-witness report. The event occurred over flat terrain. The event took initially place in a town or city. The event occurred in a rural area (crops, grassland, both or unknown), over grassland or pastures, in a town or city. maximum hail diameter: 2.0 cm average hail diameter: 1.0 cm local duration of event: 10 mins *Supercell storm.* This report has not been verified. contact: peter duschl, unwetterzentrale.de, gatzen@estofex.org
hail **Mindelheim**, 60 km W of Munich, 87719 **DE** 48.05 N, 10.48 E Friday 15 10 2004 16:15 (+/- 1 min.)	based on: a report on a web-page, an eye-witness report. The event occurred over flat terrain. The event took initially place in a town or city. The event occurred in a rural area (crops, grassland, both or unknown), over grassland or pastures, in a town or city. maximum hail diameter: 2.0 cm average hail diameter: 1.0 cm local duration of event: 15 mins *Supercell storm moved ENE-ward over Bavaria.* This report has not been verified. contact: Hans-Peter Schneider; unwetterzentrale.de, gatzen@estofex.org

Important ESWD predecessors:

- UIB
  (Gayà, Romero, Homar, Llasat)
- Tornado database at ARPA FVG
  (Giaiotti, Giovannoni, Pucillo, Stel)
- TorDACH
  (Dotzek, Schmid, Holzer)

2006-2007

Founding assembly

for the non-profit research association ESSL

on invitation by Nikolai Dotzek,

chaired by Alois M. Holzer on 28 September 2006

Other ESSL founding members:

Bernold Feuerstein, Pieter Groenemeijer, Dario Giaiotti, Maria-Carmen Llasat, Romualdo Romero, Martin Setvák, Fulvio Stel and Jenni Rauhala (née Teittinen).

First institutional member in 2007:

First ESSL Executive Board in 2007
Photo in front of DLR main gate in Wessling

European Severe Storms Laboratory

Advance meteorology and related sciences in the field of research on severe convective storms and extreme weather events on a European level

Operate and extend the European Severe Weather Database, ESWD

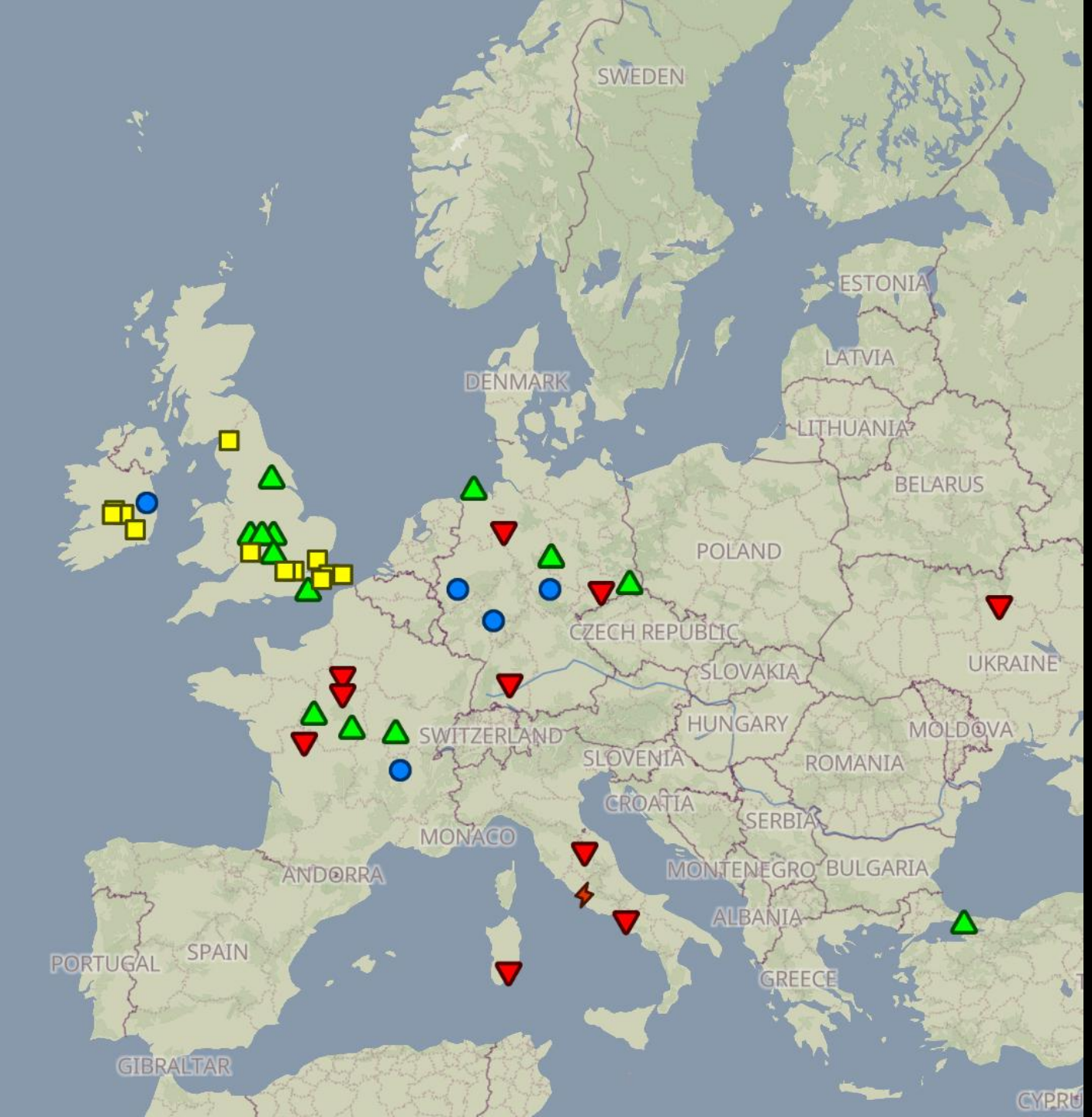
Organise the European Conferences on Severe Storms, ECSS

Strong ties with members

30 institutional full members

39 institutional supporting members

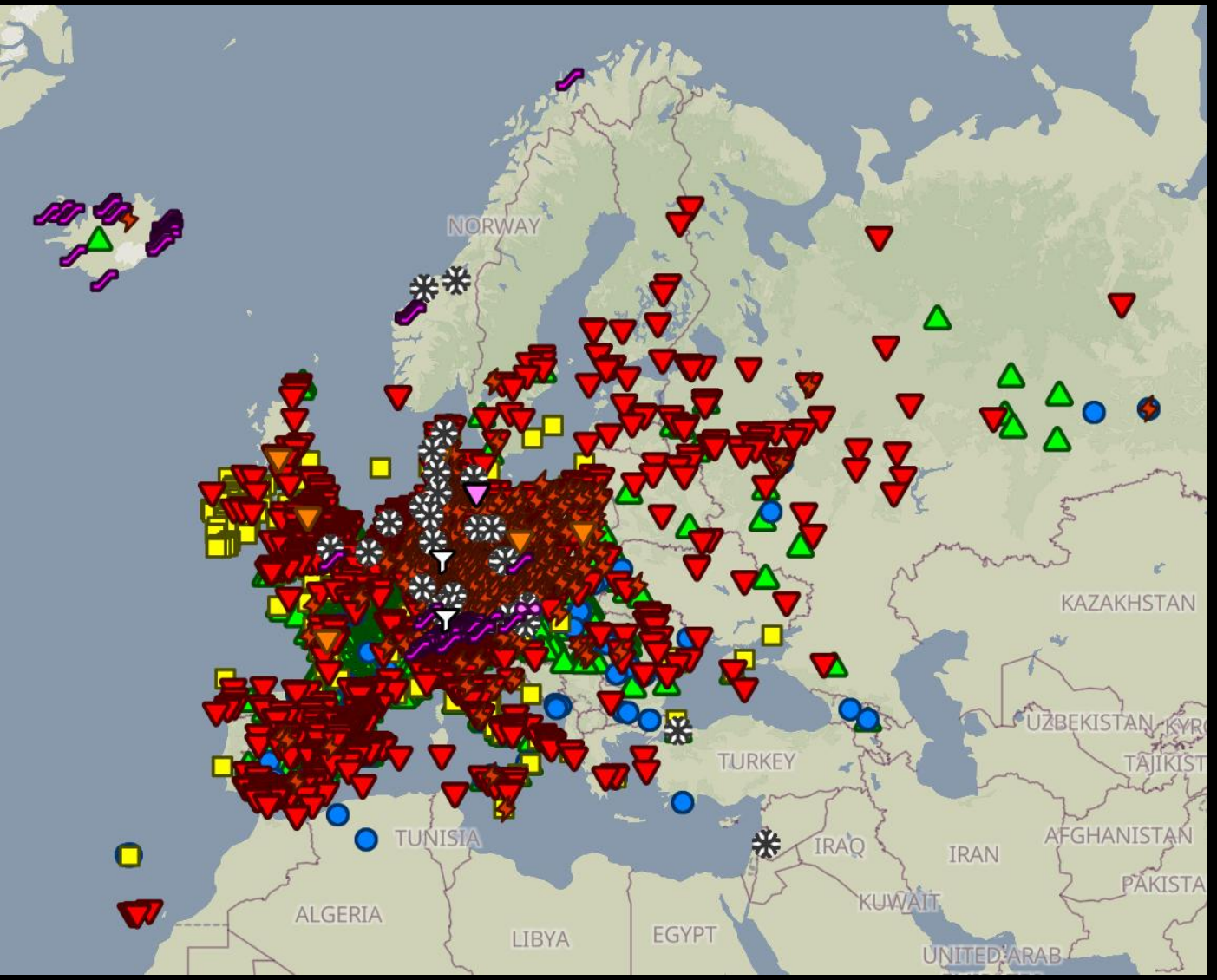
40 personal members



ESWD

starting point of research within and outside of ESSL

43 events before the year 1000

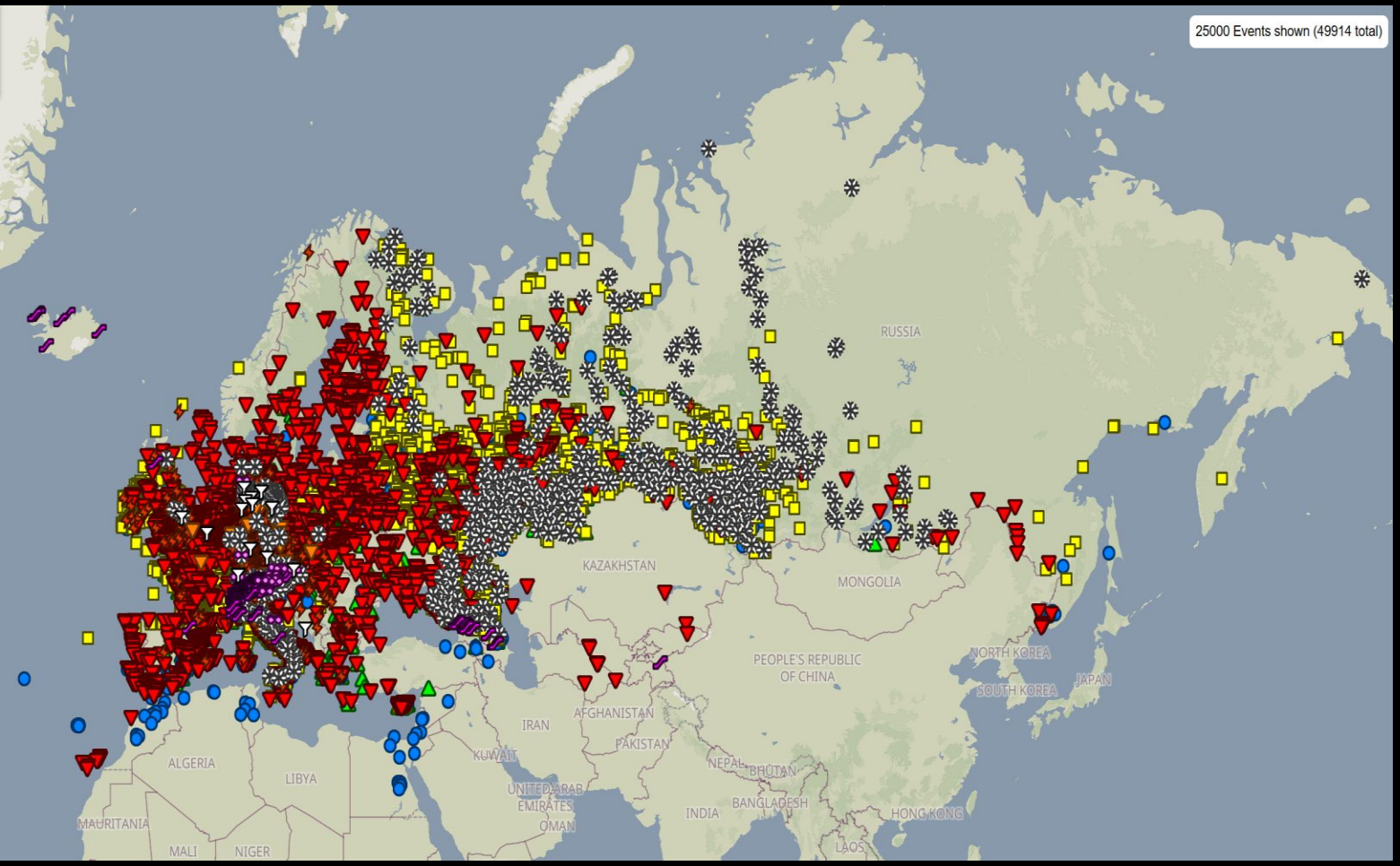


ESWD

starting point of research within and outside of ESSL

7960 events before 1900

ESWD



starting point of research within and outside of ESSL

49914 events from 1900 to 1999
82903 from 2000 to 2009
around 400 000 since 2010

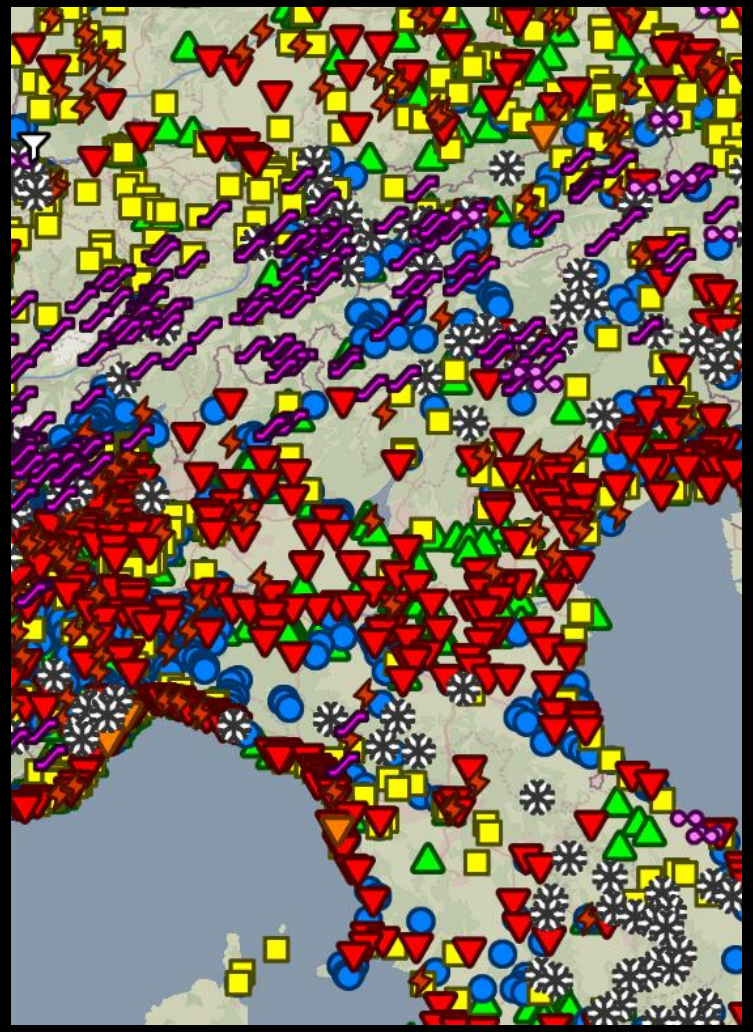
ESWD

The very first ESSL employee

1 August 2008

Thilo Kühne

„Minijob“ for 400 EUR per month



ESWD
European Severe Weather Database

Current total: 542 000 severe weather events recorded

Tornado

QC1

Rome Lazio, Italy

09/11/1925 13:30 UTC (+/- 15 minutes)

Reporter: Federico Pavan (PRETEMP)

Likely tornado in the (at the time) poor suburb of Primavalle. Furniture and tableware were found some distance from origin and people were reported lofted into the air. with one woman being injured in the landing

Coordinates

Lat.: 41.9104° Long.: 12.4149° (+/- 1 Kilometer)

Number of Injured

1

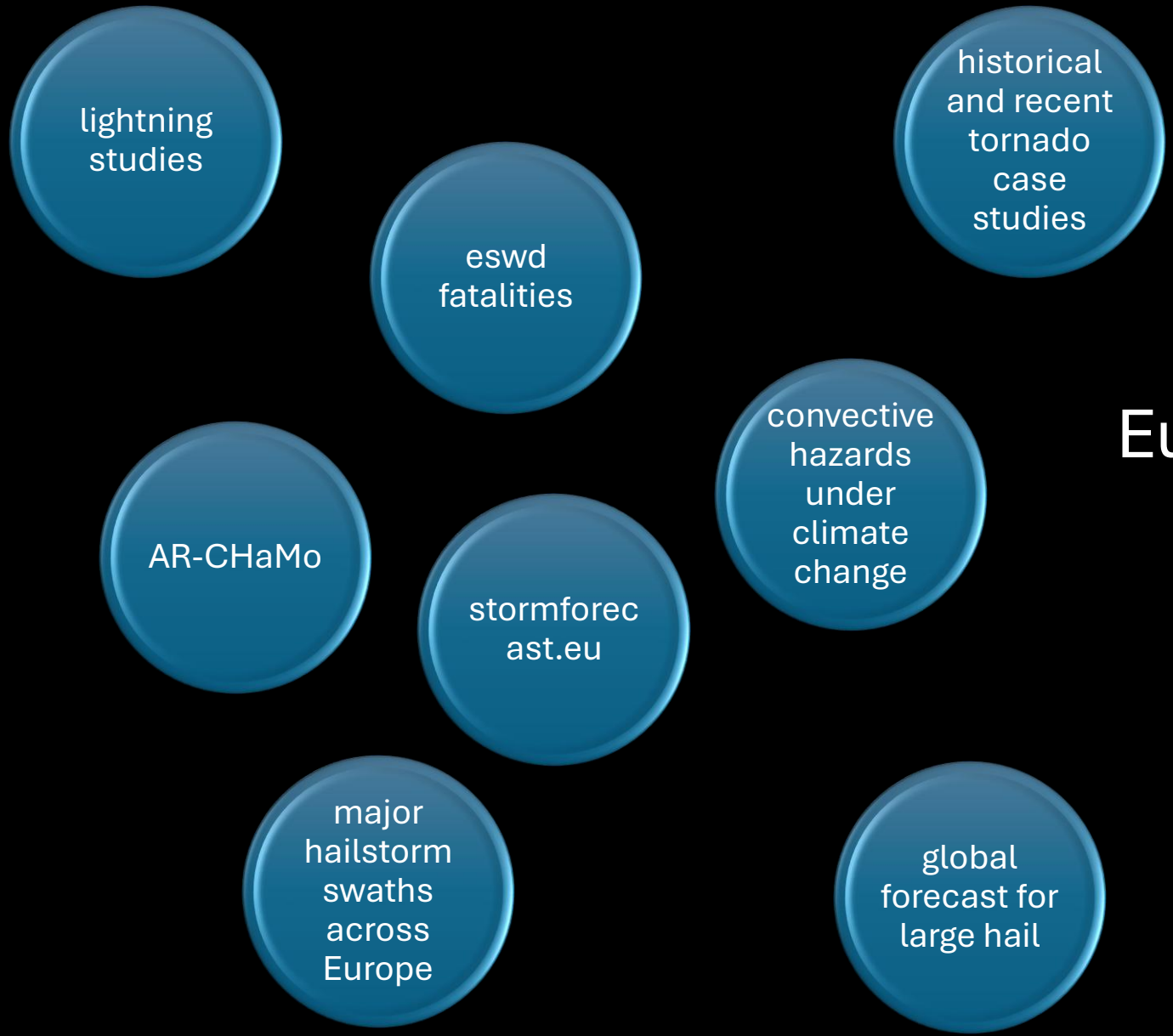
Impacts

Roofs destroyed | Walls (partially) collapsed

Information Source

Newspaper | Eye Witness | Eye Witness of Damage

VOP/N = Voluntary Observer Person/Network



ESSL Research

inspiring a growing European storm research community

lightning studies

eswd fatalities

historical and recent tornado case studies

AR-CHaMo

stormforecast.eu

convective hazards under climate change

major hailstorm swaths across Europe

global forecast for large hail

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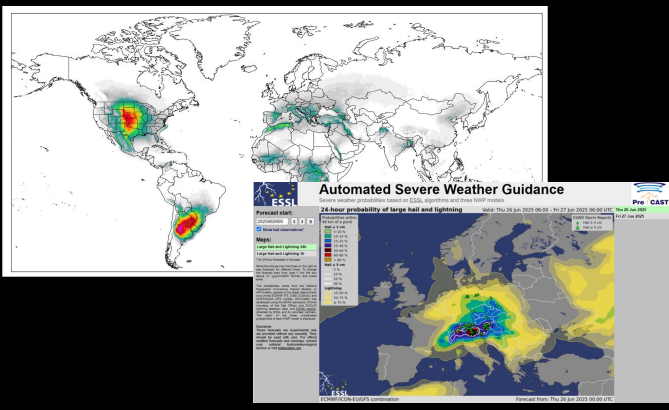

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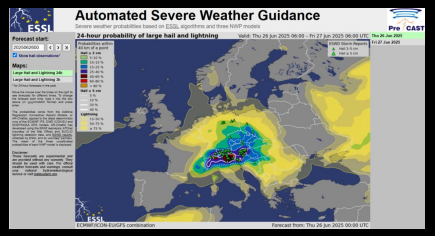
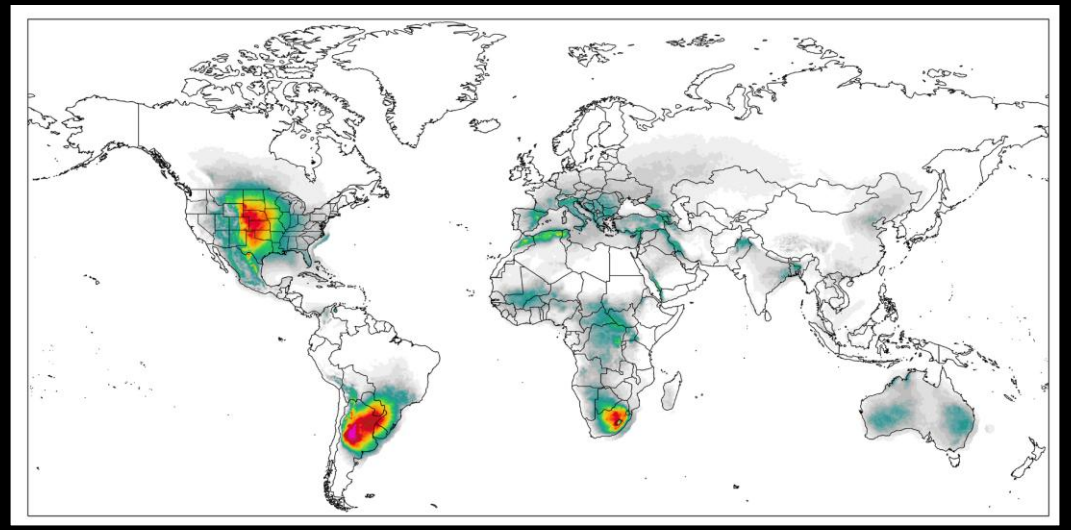


ESSL Research

inspiring a growing European storm research community



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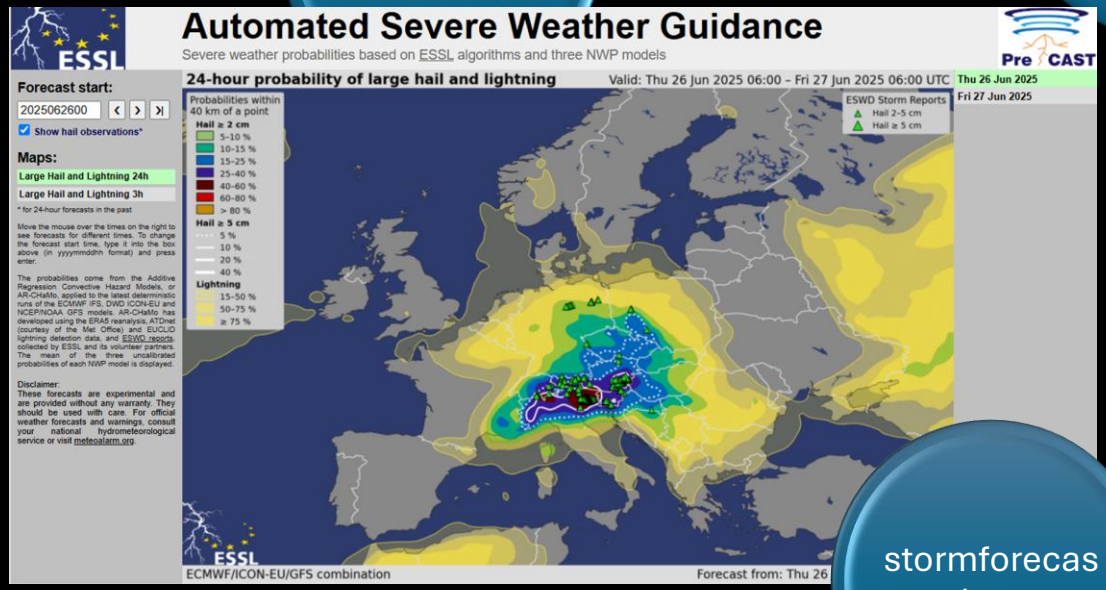
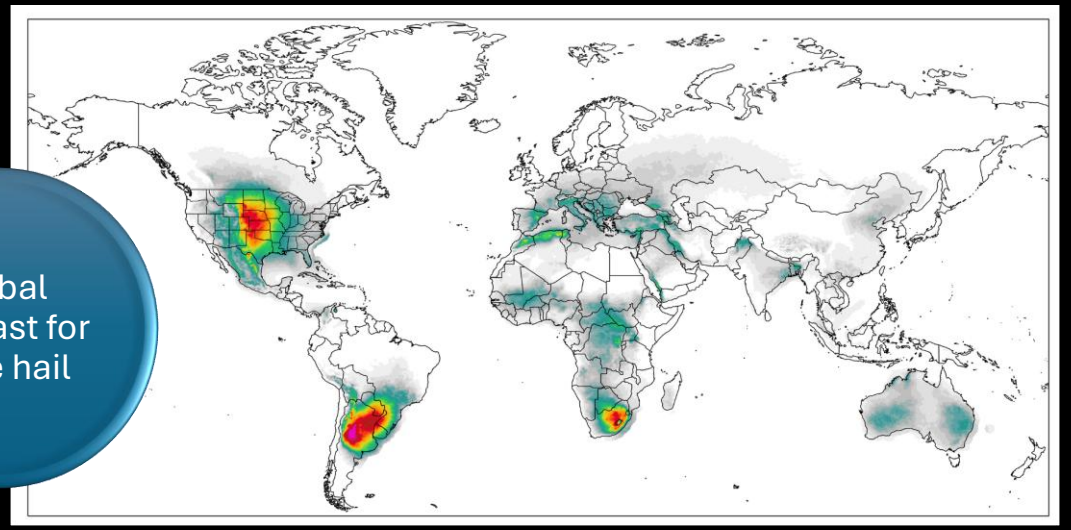


stormforecast.eu



global forecast for large hail

Most influential woman

Aurora Bell (Stan-Sion), Romania

Important role for decisions after the sudden passing away of the first ESSL Director Nikolai Dotzek in 2010

Strong supporter of the ESSL Testbed idea in 2010

Most influential non-European

Charles A. Doswell III

Strong supporter of ESSL, the ECSS,

the ESWD, the ESSL Testbed, and ESSL courses

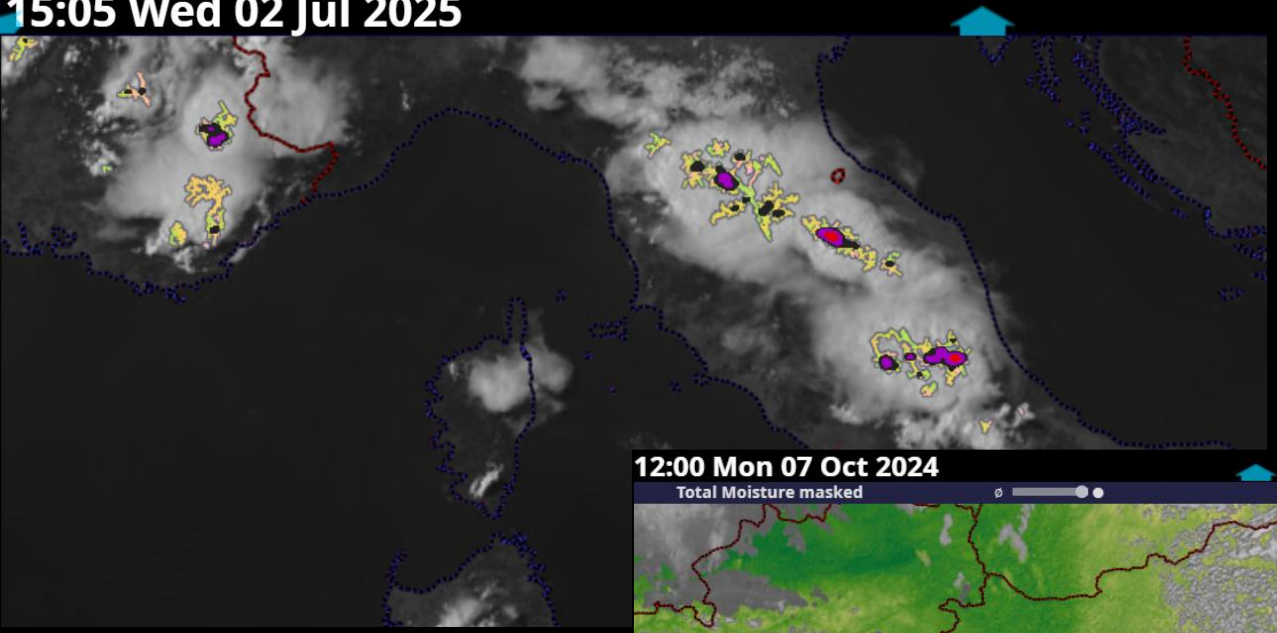
from the very beginning

2nd Nikolai Dotzek Awardee (Helsinki, 2013)

Evaluation of new forecasting tools since 2012

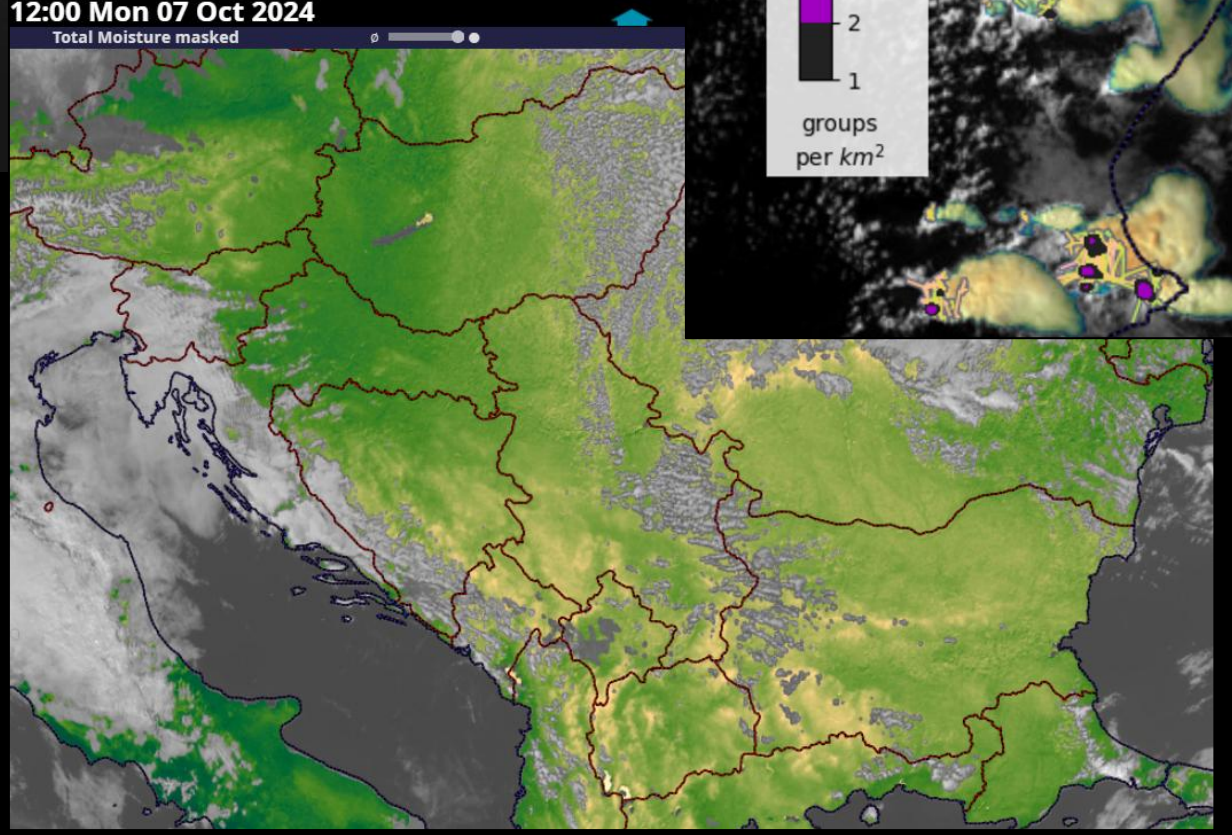
Classic „ESSL Testbeds“ and „EUMETSAT-ESSL Testbeds“

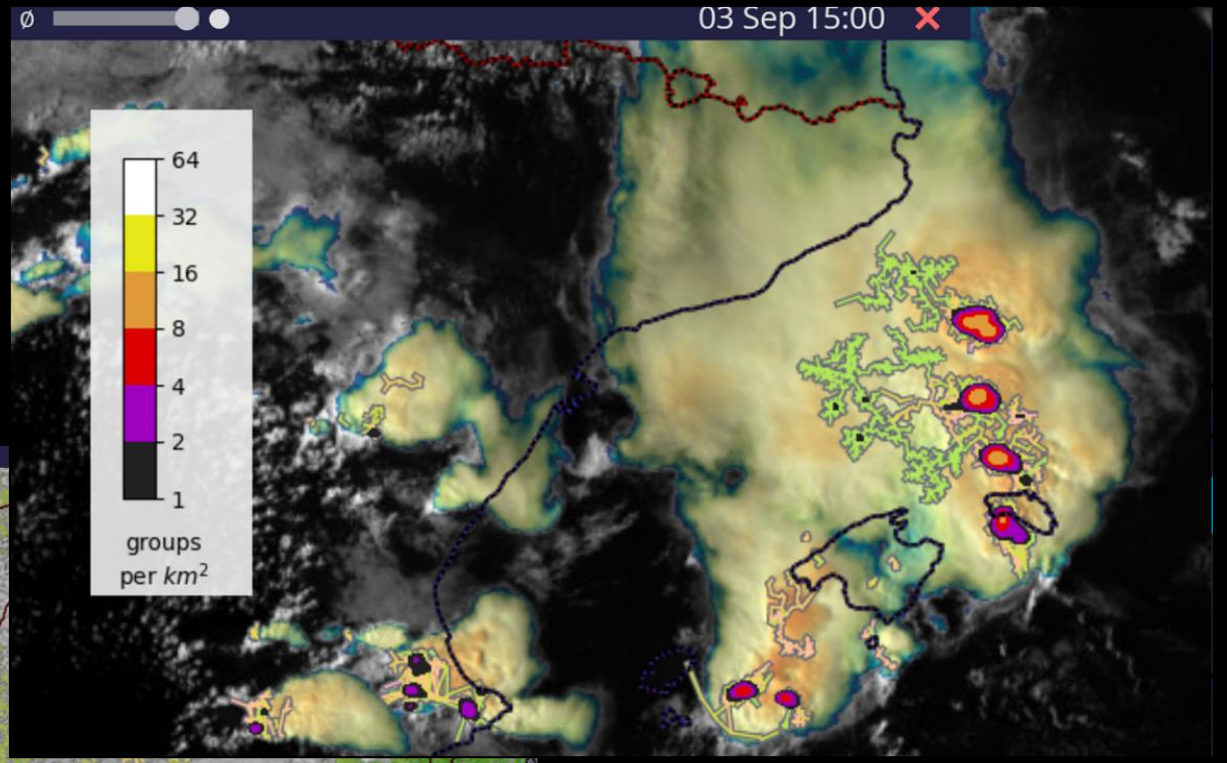
15:05 Wed 02 Jul 2025



12:00 Mon 07 Oct 2024

Total Moisture masked





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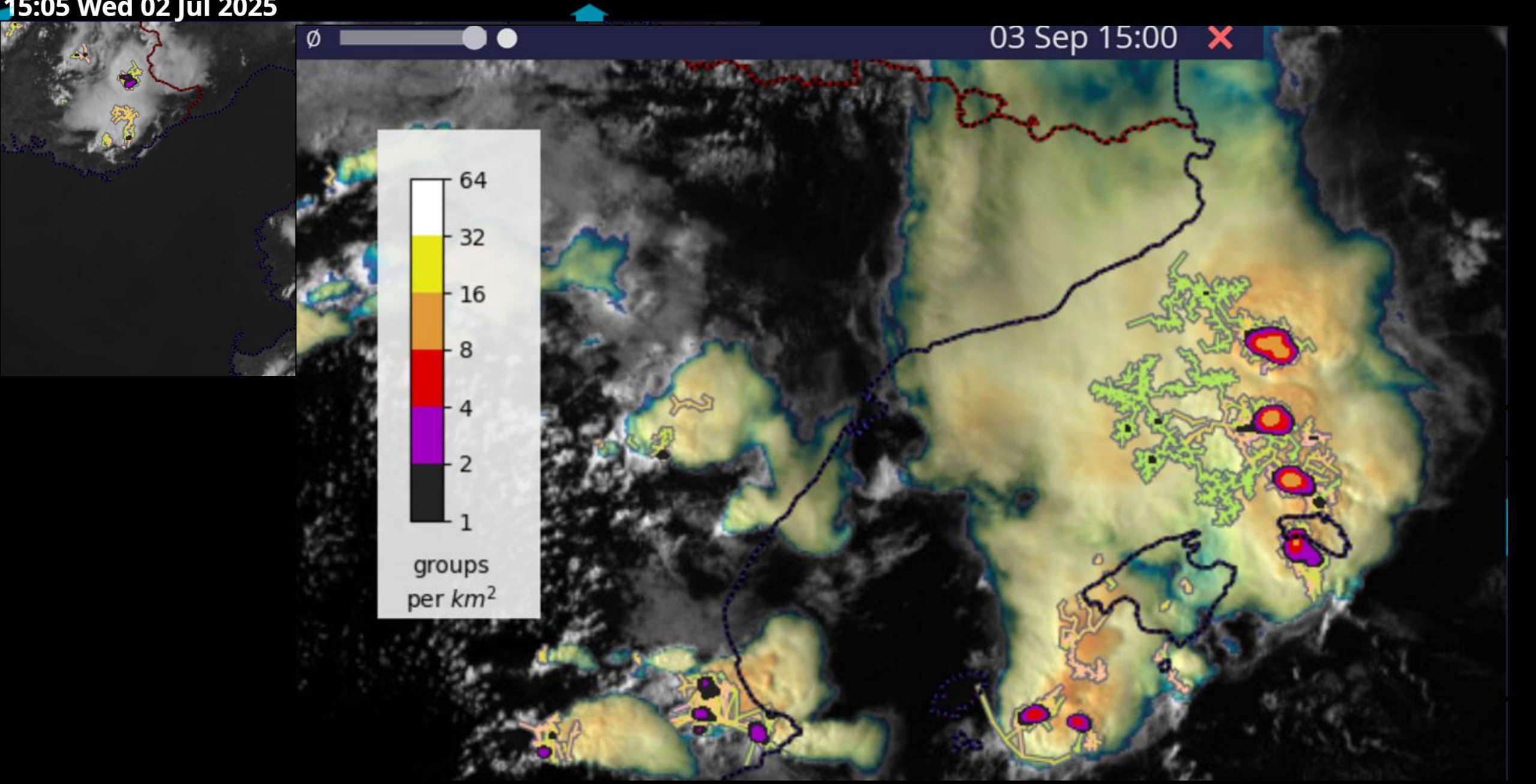

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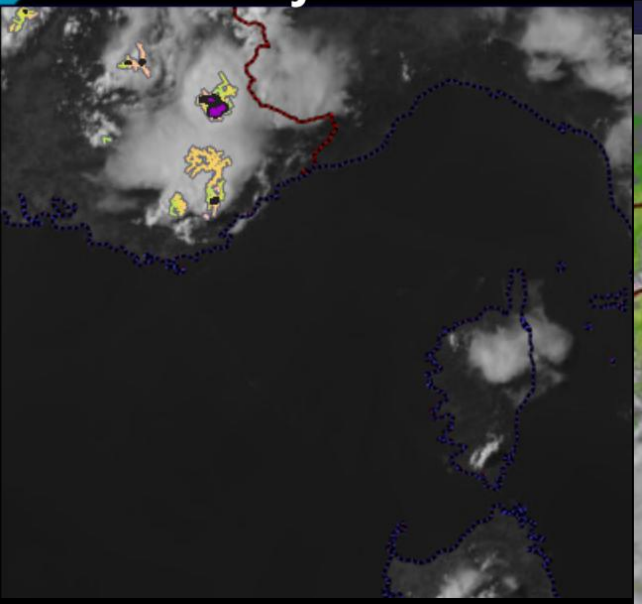
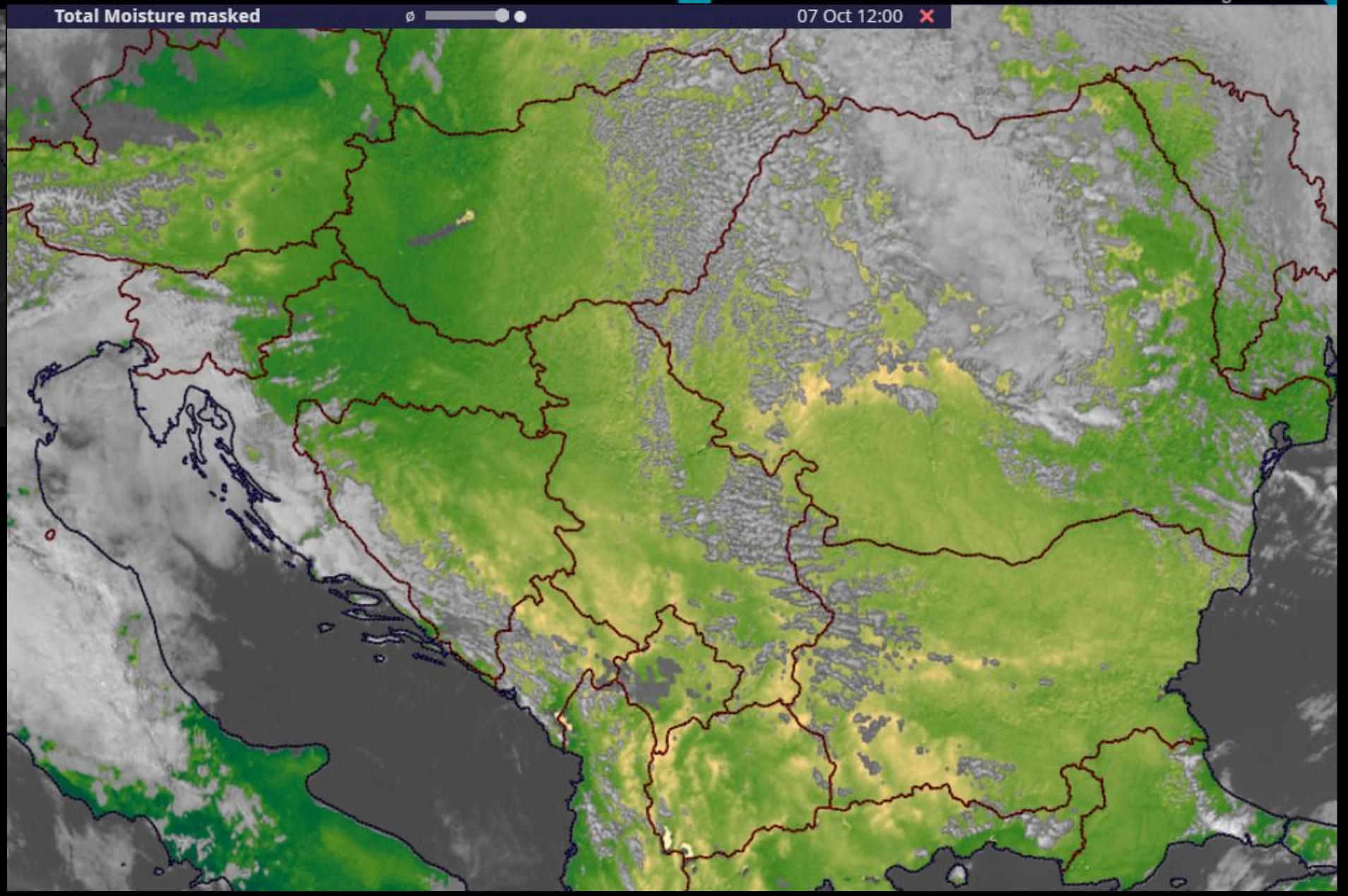
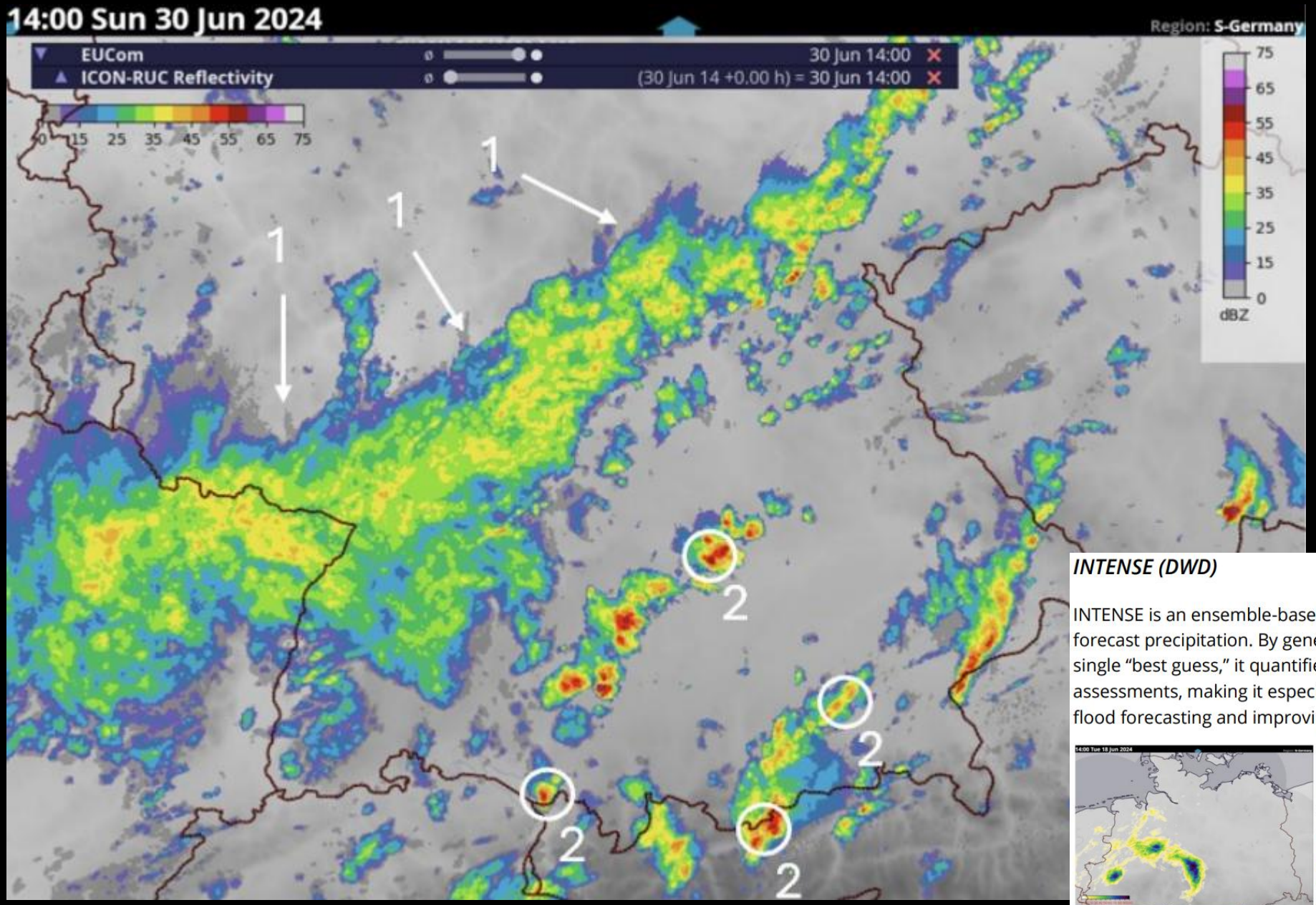


12:00 Mon 07 Oct 2024

Region: **Balkans**





INTENSE (DWD)

INTENSE is an ensemble-based nowcasting algorithm that uses radar composites to forecast precipitation. By generating multiple equally likely scenarios instead of a single "best guess," it quantifies forecast uncertainty and supports scenario-based assessments, making it especially valuable for hydrological applications like flash flood forecasting and improving warning lead times.

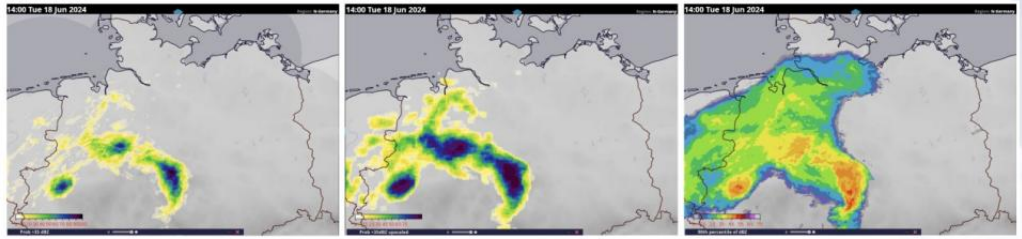
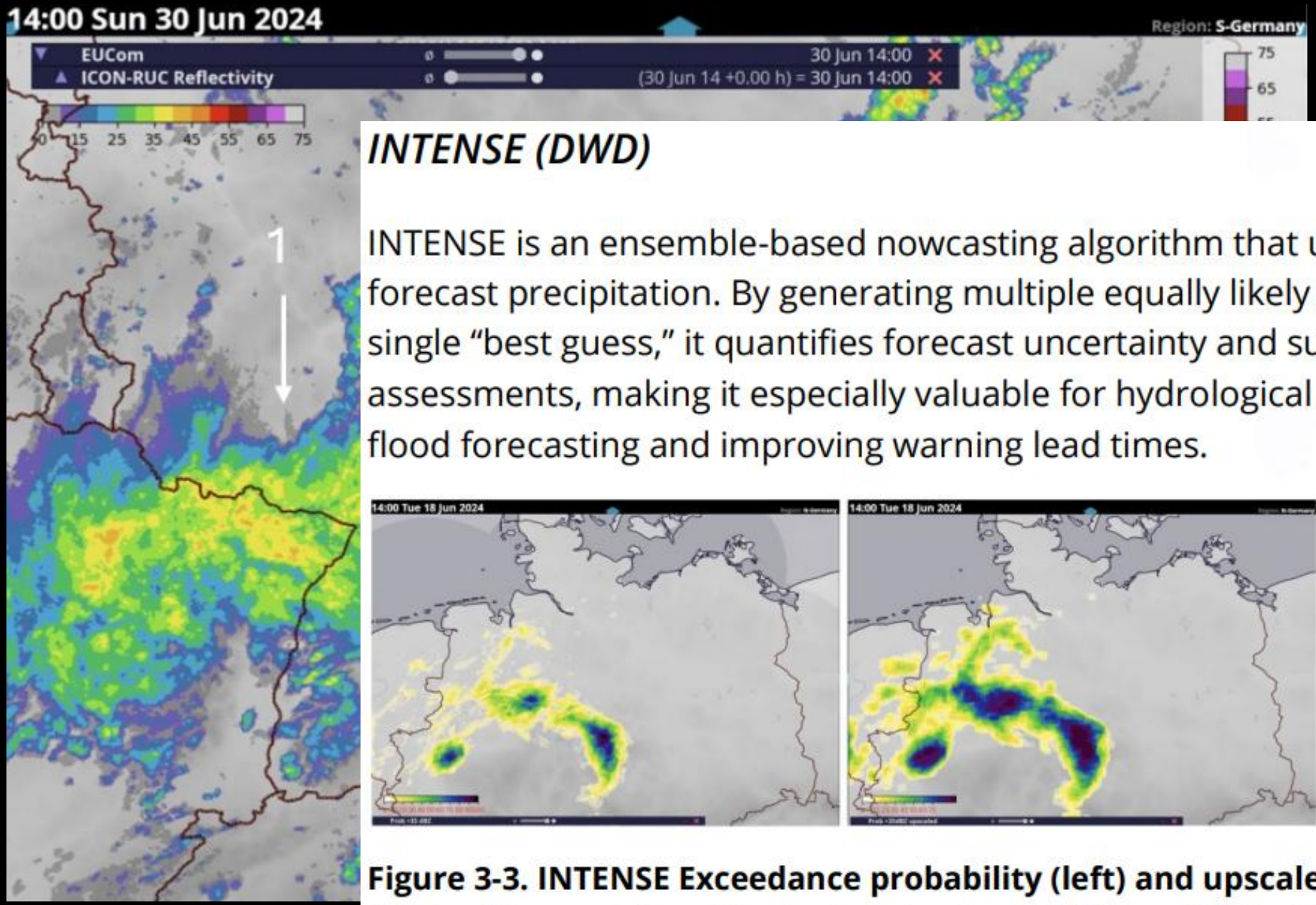


Figure 3-3. INTENSE Exceedance probability (left) and upscaled exceedance probability (centre) forecast for +60 minutes starting at 18 June 2024 at 1300 UTC for the threshold 35 dBZ. 90th percentile of dBZ for the same forecast (right).



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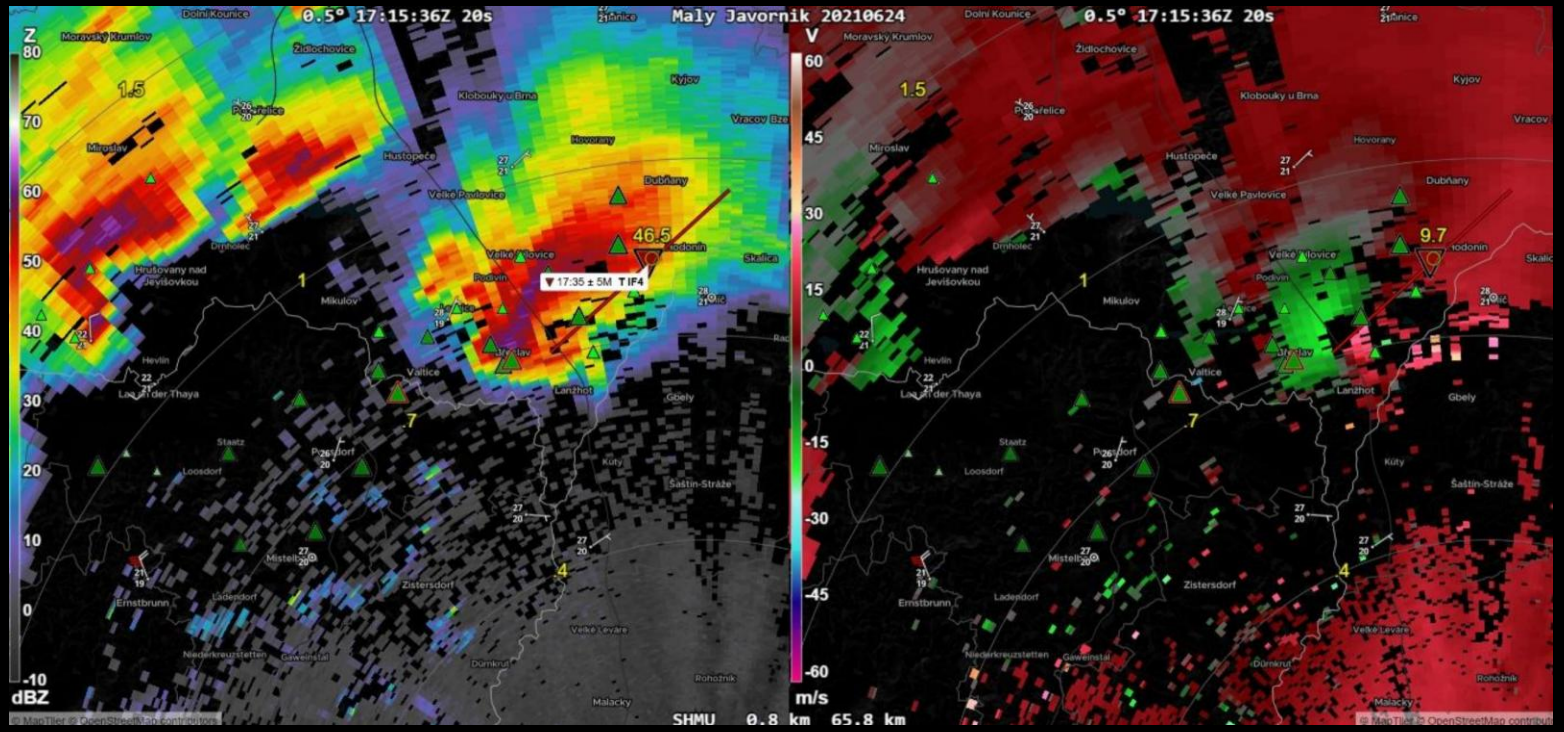
ESSL Weather Data Displayer
and Radar Displayer

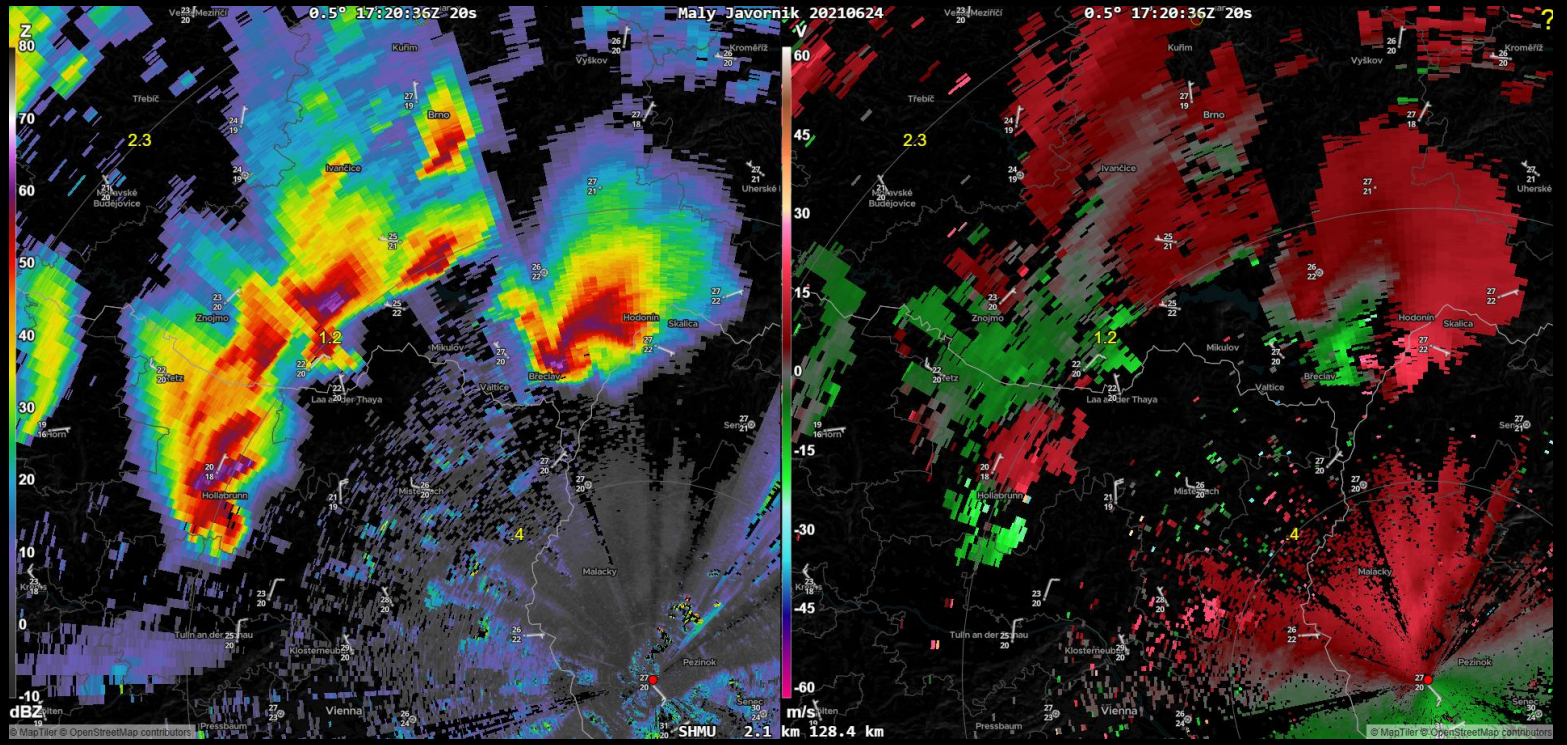
Licenced by ESSL Subsidiary



ESSL Services

ESSL Weather Data Displayer
and Radar Displayer

Licenced by ESSL Subsidiary



ESSL Services

ESSL Weather Data Displayer
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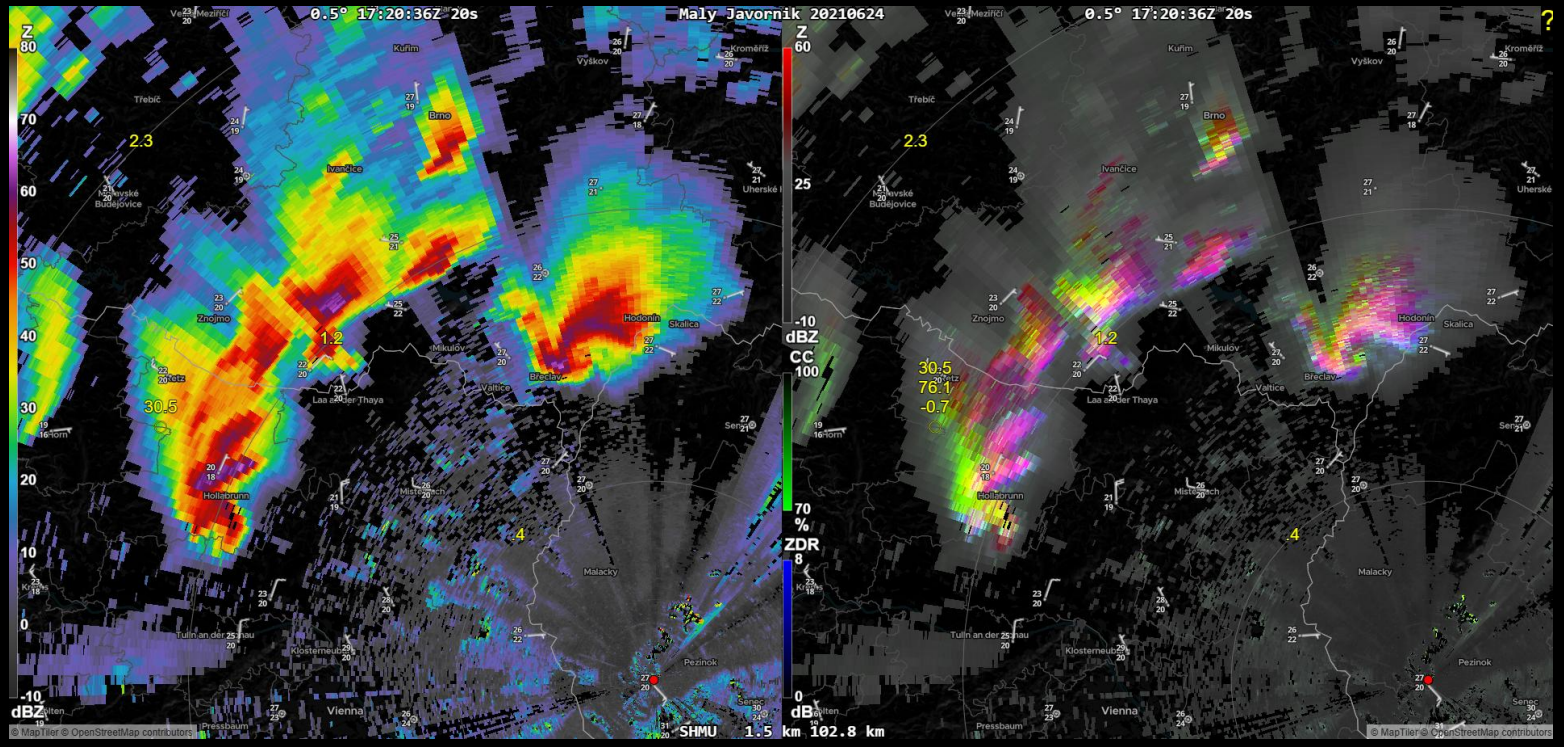

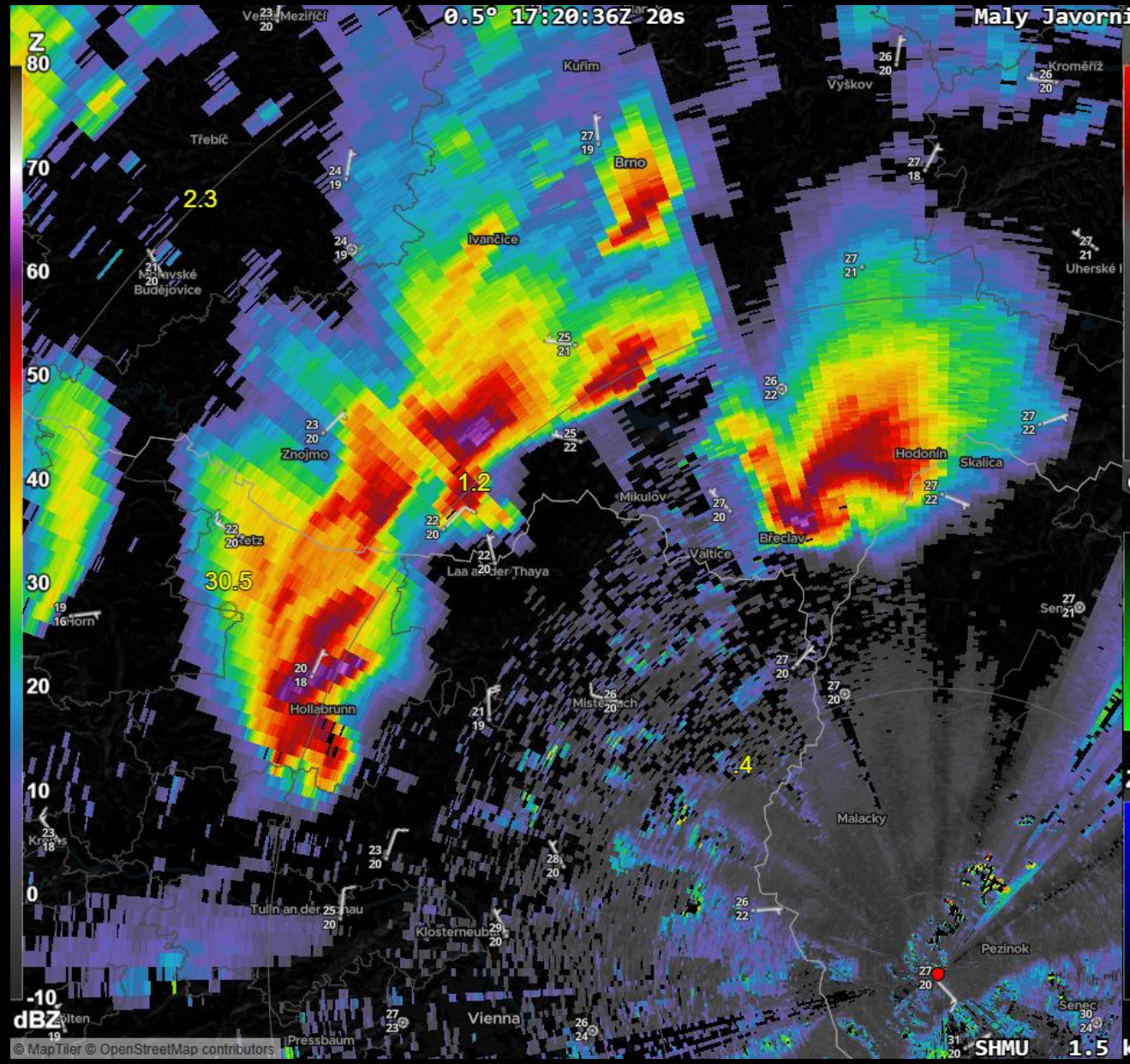
0.5° 17:20:36Z 20s
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70
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30
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-10
dBZ
2.3
1.2
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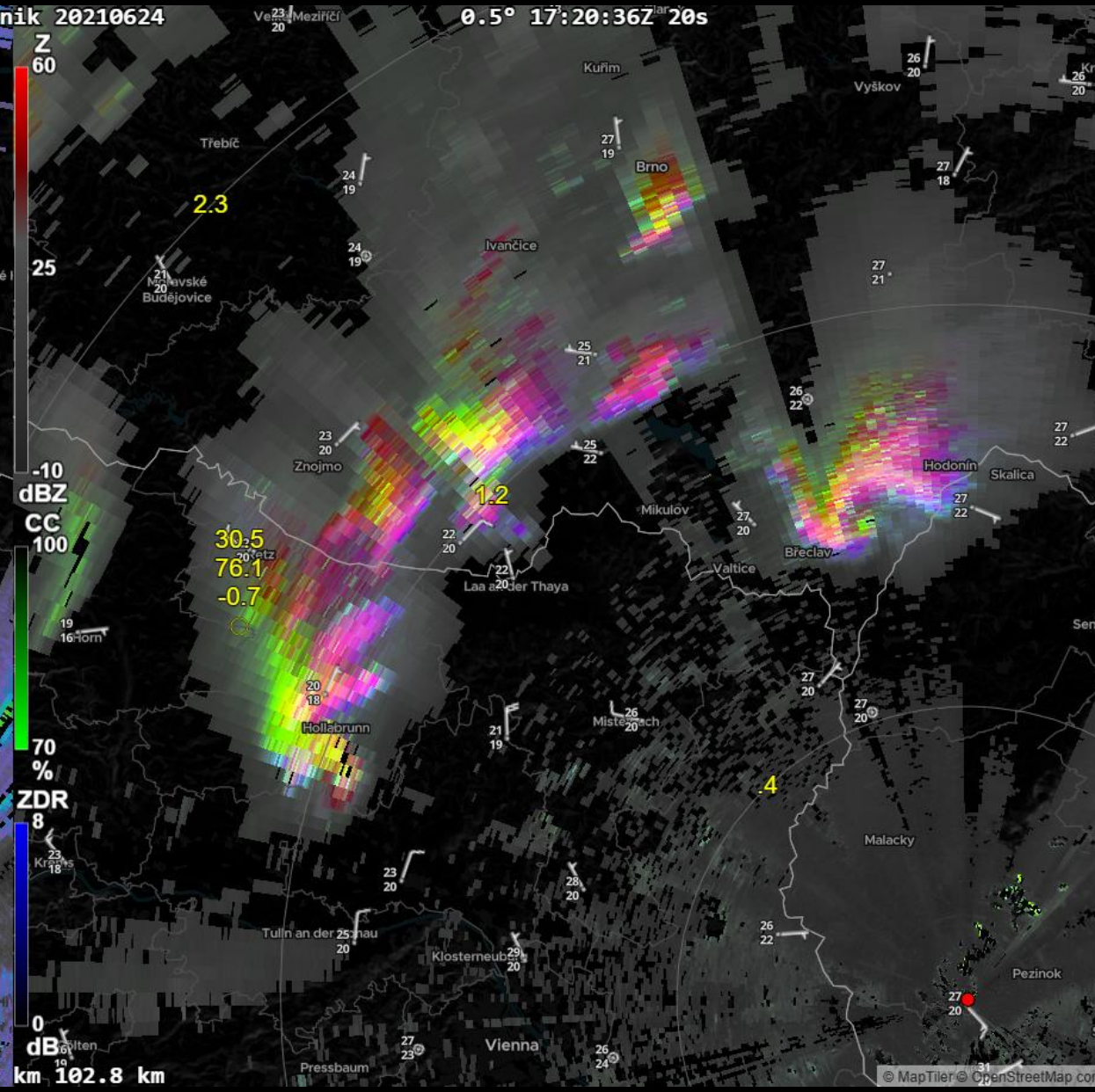
Třebíč
Kuřim
Vyškov
Kroměříž
Brno
Ivančice
Znojmo
Hodonín
Skalica
Mikulov
Břeclav
Valtice
Laa an der Thaya
Hollabrunn
Mistelbach
Malacky
Pezinok
Senec
Vienna
Pressbaum
Tulln an der Donau
Klosterneuburg
SHMU
1.5
km


Maly Javornik 20210624
Z
60
25
-10
dBZ
CC
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70
%
ZDR
8
0
dB
102.8 km

0.5° 17:20:36Z 20s
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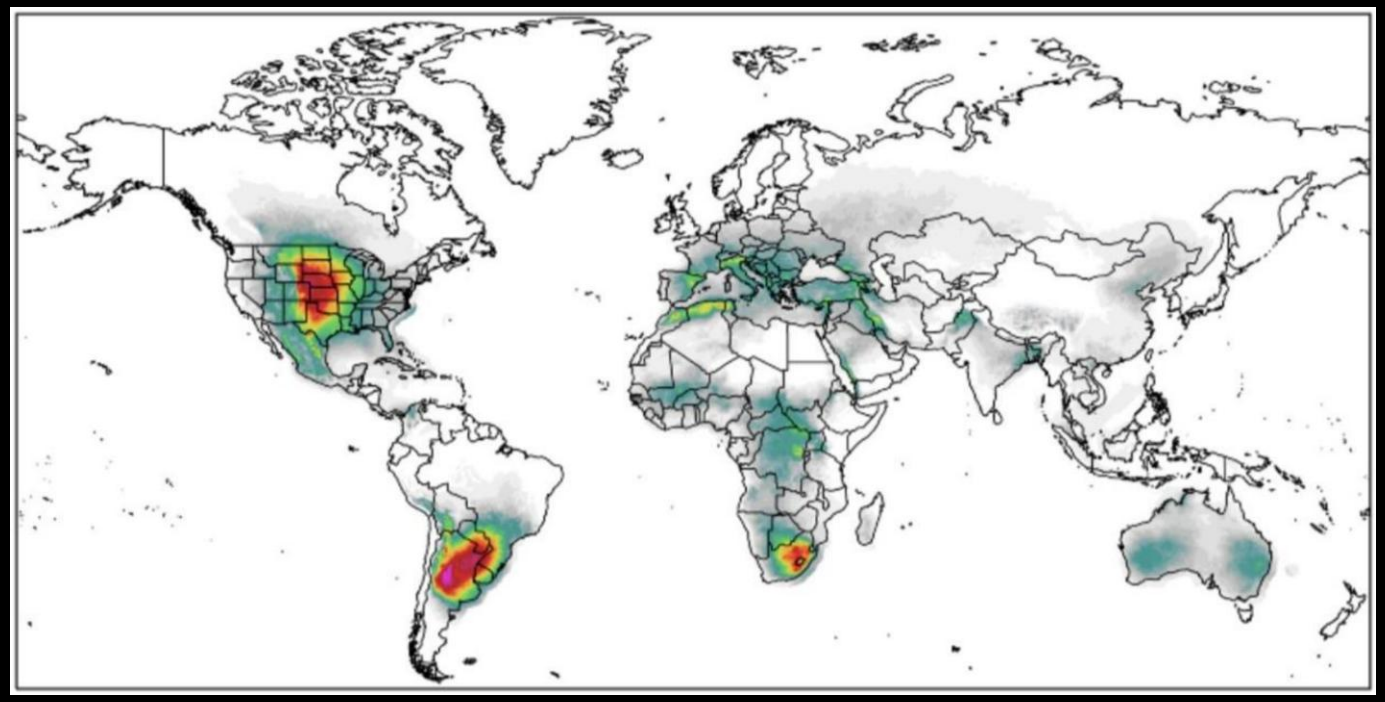
1.2
30.5
76.1
-0.7
.4
Třebíč
Kuřim
Vyškov
Brno
Ivančice
Znojmo
Hodonín
Skalica
Mikulov
Břeclav
Valtice
Laa an der Thaya
Hollabrunn
Mistelbach
Malacky
Pezinok
Vienna
Pressbaum
Tulln an der Donau
Klosterneuburg

ESSL Weather Data Displayer and Risk Modelling

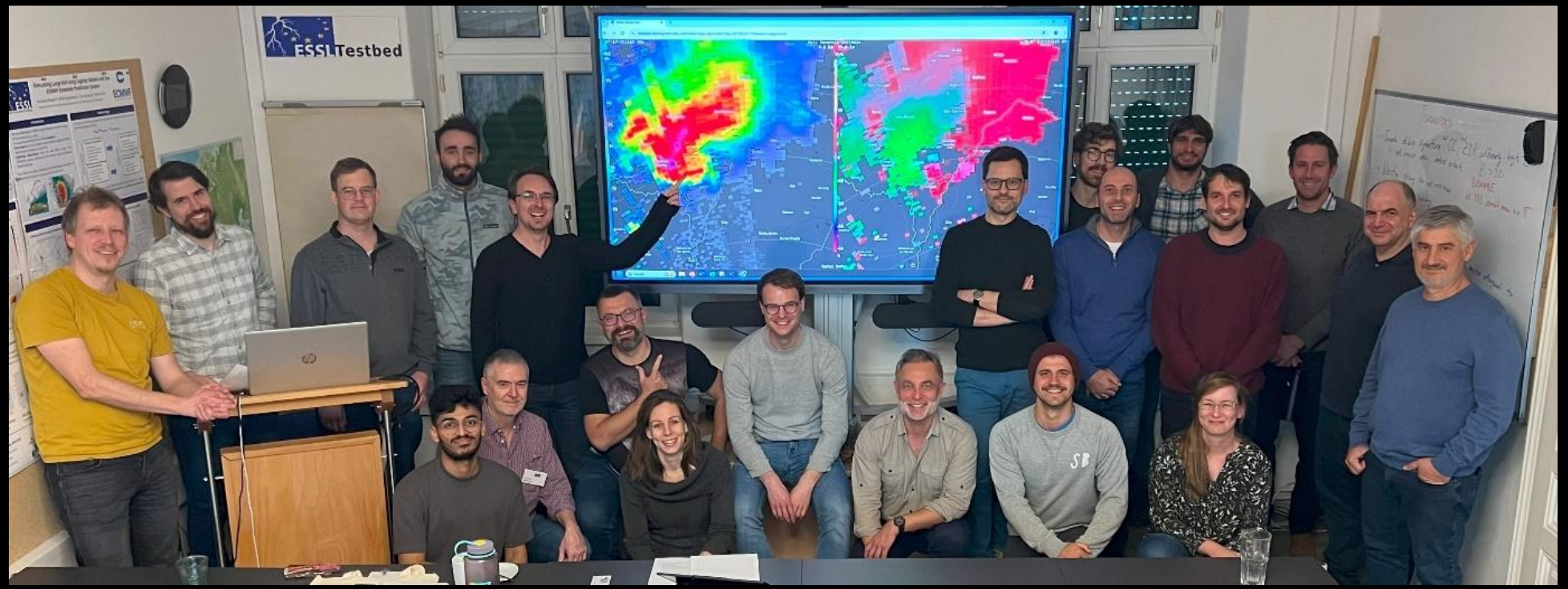
Enabled by ESSL Subsidiary



ESSL Services

Training of forecasters and various other courses

- Forecasting severe convection
- Optimal use of radar data in severe storm nowcasting
- Aviation nowcasting of severe convection
- 2-day online refreshers
- Communication of meteorological content
- Wind damage assessment
- MTG FCI and LI course



Forecasting severe convection

Optimal use of radar data in severe storm nowcasting

Aviation nowcasting of severe convection

2-day online refreshers

Communication of meteorological content

Wind damage assessment

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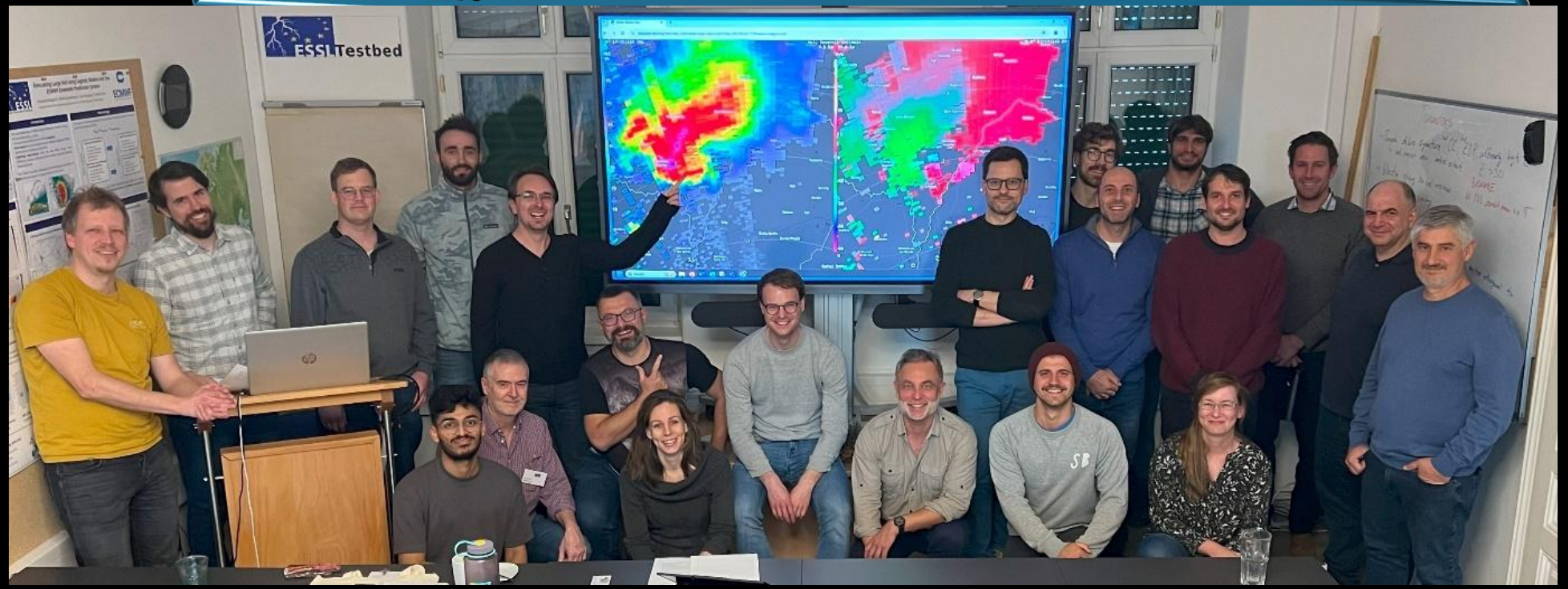

How would you grade the ESSL Testbed as a whole on a scale from 1 (terrible) to 10 (excellent)?

10+++

Do you have any other wishes / suggestions for the future?

I was very impressed how amazing the teachers were. They were professional of course but also very talented to teach and create a good atmosphere! This was the best course I have ever attended.

Very very big thank you!

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TIM
SEVERE STORMS FIELD CAMPAIGN

ARPA LOMBARDIA
Agenzia Regionale per la Protezione dell'Ambiente

ARPAL
Agenzia regionale per la protezione dell'ambiente ligure

arpav
Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto

austro CONTROL

Czech Hydrometeorological Institute

cima RESEARCH FOUNDATION

DHMZ

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

ESSL
European Severe Storms Laboratory

GeoSphere Austria
Bundesanstalt für Geologie, Geophysik, Klimatologie und Meteorologie

HungaroMet

GW

KIT
Karlsruher Institut für Technologie

METEO FRANCE

WISSENSCHAFT · FORSCHUNG NIEDERÖSTERREICH

ΕΘΝΙΚΟΝ ΑΣΤΕΡΟΣΚΟΠΕΙΟΝ ΑΘΗΝΩΝ
NATIONAL OBSERVATORY ATHENS

UNIVERZITA PAVLA JOZEFA ŠAFÁRIKA V KOŠICIACH

POLITECNICO MILANO 1863

SHMÚ

Università di Genova

universität freiburg

UNIVERSITÄT BERN

EUMETSAT

CNR ISAC

ÚSTAV FYZIKY ATMOSFÉRY AV ČR

Europe’s centre of competence on severe convective storms approaches its 20 year anniversary

Pieter Groenemeijer, Alois M. Holzer,
the ESSL employees and Executive Board

When, before its founding in 2006, the European Severe Storms Laboratory (ESSL) was conceived by its initiator, Dr. Nikolai Dotzek, he had the vision of it becoming a leading “Center of Competence” on convective storms in Europe. Since its inception, the Laboratory has gradually expanded and now employs 15 staff members, including part-time personnel.

ESSL’s main activities include the development and maintenance of the European Severe Weather Database, conducting comprehensive research on severe weather phenomena, including the assessment of new forecasting tools, organizing the European Conferences on Severe Storms, and providing training for weather forecasters. These efforts are made possible through the support of institutional and individual members, funding from international, national and regional agencies, and the valuable contributions of volunteers who report severe weather events to ESSL.

Over time, ESSL has also built strong, long-term collaborations with organizations such as ECMWF, EUMETSAT, and various national weather services. Since 2024, the two legal entities in Germany and Austria responsible for ESSL’s operations, together with its employees, have co-owned a commercial venture that facilitates the use of ESSL’s hazard models and the popular online Weather Data Displayer by members and others.

Some of ESSL’s other current developments include the organization of the field campaign on Thunderstorm Intensification from Mountains to plains (TIM) and leveraging several new avenues in research and education enabled by the classification of ever more European meteorological data as “Open data”.
In our presentation, we will reflect on ESSL’s achievements over the years, highlight key milestones and events, anticipate the celebration of its 20th anniversary in 2026, and share a forward-looking perspective on the Laboratory’s future development.