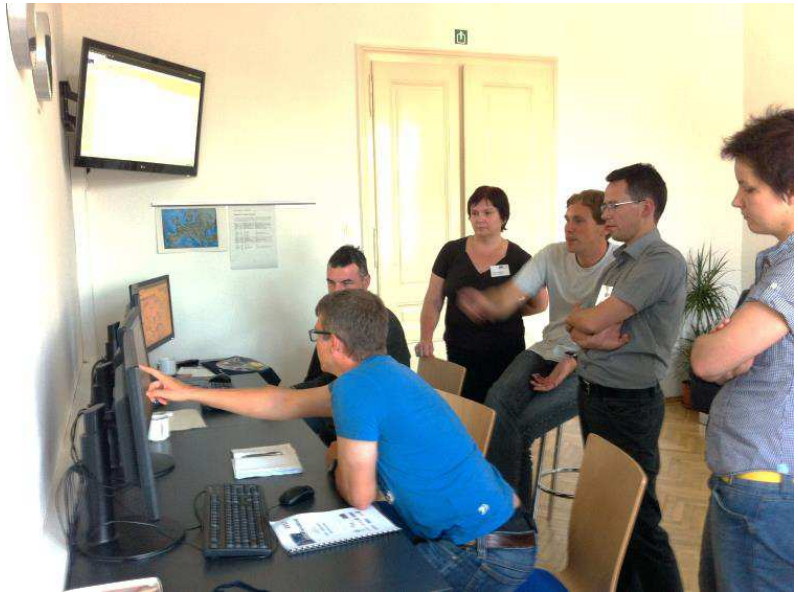
ESSL Testbed



The ESSL Testbed's role in forecaster training

Pieter Groenemeijer
Alois M. Holzer
Georg Pistotnik

organized in cooperation with:

ZAMG
ZentralAnstalt für Meteorologie und Geodynamik

Photos courtesy of Magdalena Pichler, Lucia Sokolová, Alois M. Holzer

The European Severe Storms Laboratory

- non-profit research organization
- legally, an association with members
- statutory purposes:

1. Perform and support severe weather research at a European level

2. Management and development of the European Severe Weather Database ESWD

3. Organization or support of the European Conference on Severe Storms

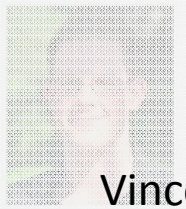
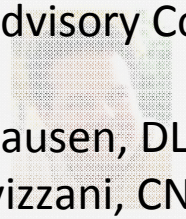
Subsidiary (non-profit) ESSL – Science and Training in Wiener Neustadt, Austria:
Forecaster Trainings, Seminars, **ESSL Testbed**.

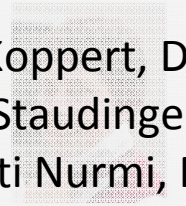
ESSL Team

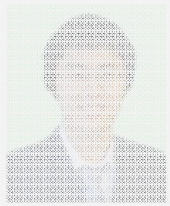
ESSL Advisory Council

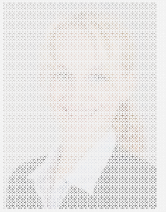
Robert Sausen, DLR, *chair*
Vincenzo Levizzani, CNR (Bologna)
David Schultz, Univ. Manchester

Hans-Joachim Koppert, DWD, *vice-chair*
Michael Staudinger, ZAMG
Pertti Nurmi, FMI





ESSL members

Individual members

- researchers
- supporting members

Institutional members

- 10 National (Hydro-) Meteorological Services / EUMETSAT
- 2 Research Institutes
- 7 Reinsurance / Risk modelling companies

Deutscher Wetterdienst (DWD)

ZAMG – ZentralAnstalt für Meteorologie und Geodynamik

EUMETSAT

austro CONTROL

National Meteorological Administration (Romania) (NMA)

FINNISH METEOROLOGICAL INSTITUTE

CZECH HYDROMETEOROLOGICAL INSTITUTE

SHMÚ – Slovak Hydrometeorological Institute

HMZCG

DHMZ

Guy Carpenter

Research Center for Environmental Changes, Taiwan

AIR worldwide

Münchener Rück Munich Re Group

Deutsche Rück

TOKIO MARINE TECHNOLOGIES

Willis

NKSJ GROUP

DLR Deutsches Zentrum für Luft- und Raumfahrt e.V. in der Helmholtz-Gemeinschaft

Financing

ESSL has these sources of income:

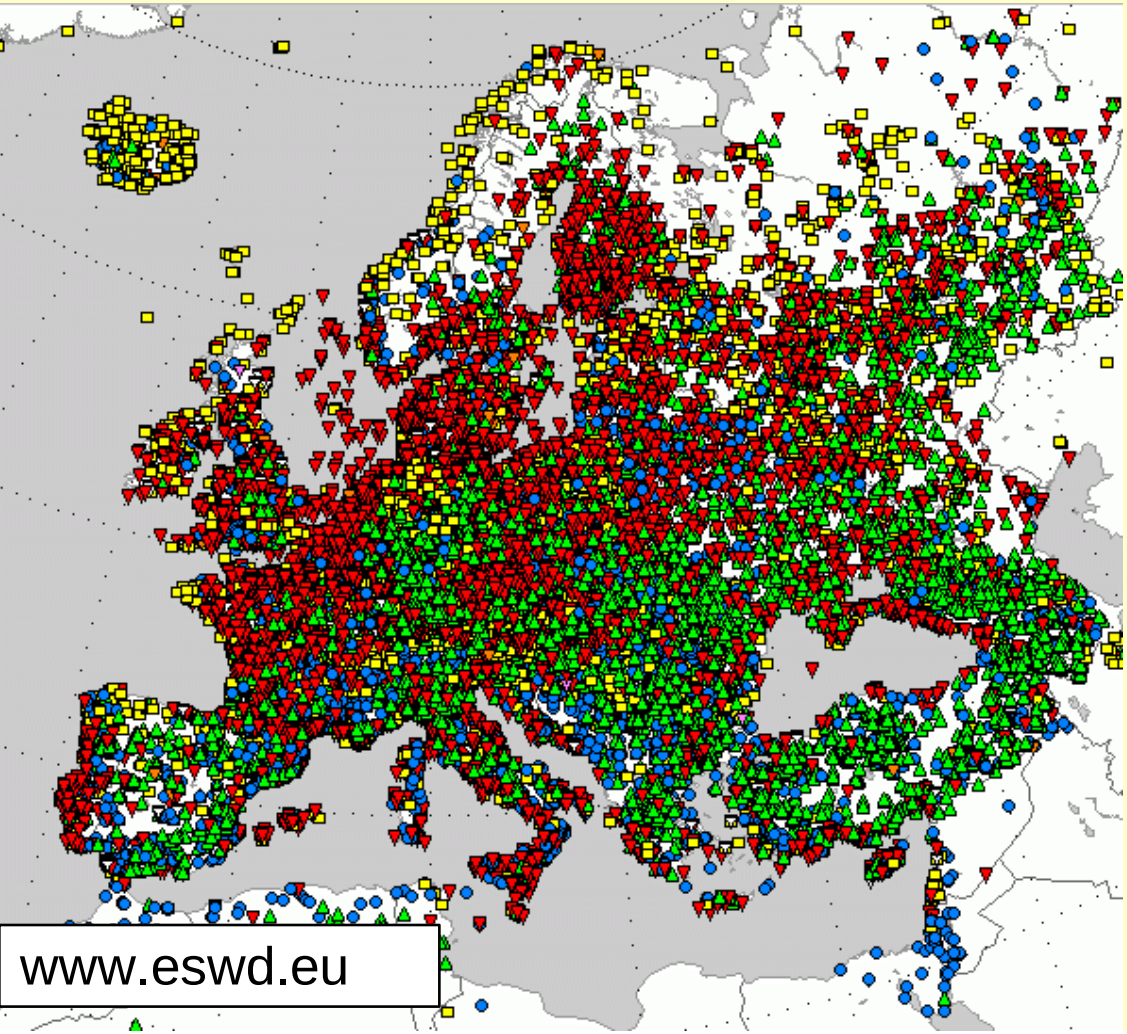
1. Membership fees

2. Third-party projects
   - European Commission
   - National and regional governments
   - Partner research organizations

3. Fees for „own projects“:
   - ECSS – European Conference on Severe Storms
   - ESSL Testbed (participants, product evaluations)
   - Trainings, Seminars, Workshops

The European Severe Weather Database

- almost 60 000 individual reports of severe weather



Tornadoes
Severe wind gusts
Large hail
Extreme rainfall

Avalanches
Heavy snowfall
Damaging Lightning
Freezing rain…

ESWD data

Tornadoes
Severe wind gusts
Large hail
Extreme rainfall

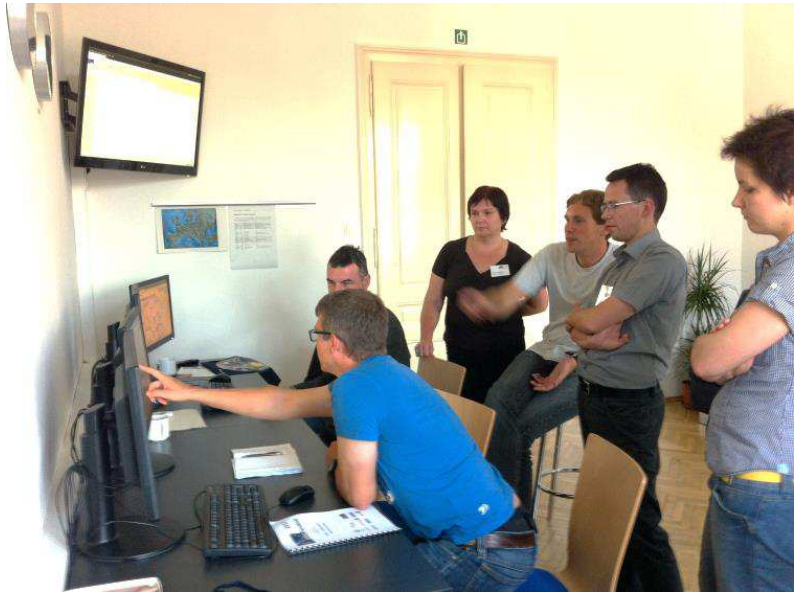
near Wiener Neustadt 3 Juni 2012
Images: Skywarn.at / ORF

Venice (I), 11 June 2012

Slovenia, 4 November 2012

ESSL Testbed

in 2012, 2013, 2014 and beyond…



Pieter Groenemeijer
Alois M. Holzer
Georg Pistotnik

organized in cooperation with:

ZAMG
ZentralAnstalt für Meteorologie und Geodynamik

supported by:

World Meteorological Organization

GOES-R

EUMETSAT

WIENER NEUSTADT

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

DWD

eumetcal

EUCLID
European Cooperation for Lightning Detection

VAISALA

NIEDERÖSTERREICH
HINEIN INS LEBEN.

EUMETNET

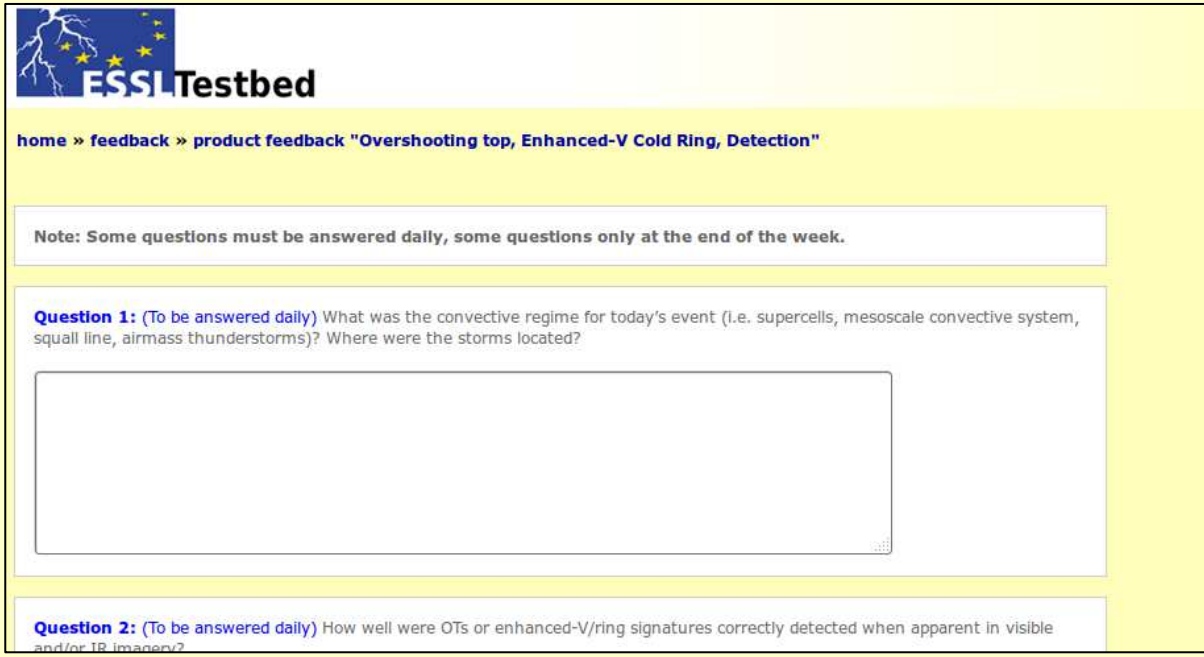
Photos courtesy of Magdalena Pichler, Lucia Sokolová, Alois M. Holzer

The Testbed concept

- loosely modelled after NOAA's HWT Spring Program
- bring **forecasters** and **researchers** together to evaluate new forecast-supporting products (satellite, radar, NWP, other...)
- ... and get trained in severe storm forecasting
- participants take part for one week **on-site** and/or join **online** sessions

The procedure

1. Participants jointly **make nowcasts and forecasts**
2. Forecasts are **verified against observations**
3. **Products are discussed**
   - Person-to-person feedback
   - Testbed Blog
   - Questionnaires, optional summary report by ESSL



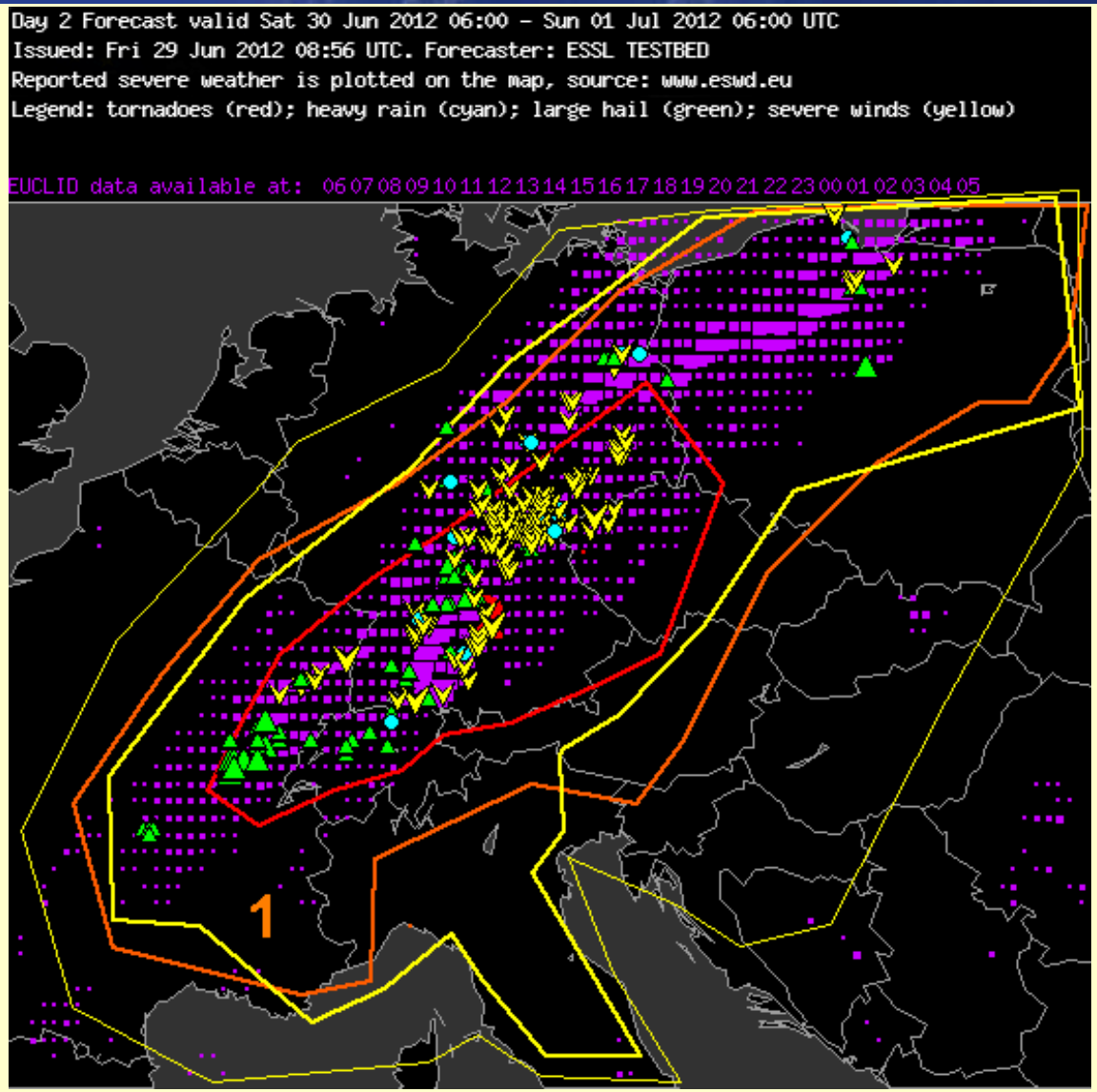
Forecast

An example with verification data

Red lines indicate where severe weather is forecast in the next 2 hours

Characters indicate the expected type of severe weather: Rain Hail, Wind, or Tornadoes.

Verification data are small coloured symbols and lightning detections in magenta.



Forecast for the **next day** (coloured lines) with verification data (symbols reflect severe weather reports, magenta = lightning).

Nowcast

Activity:

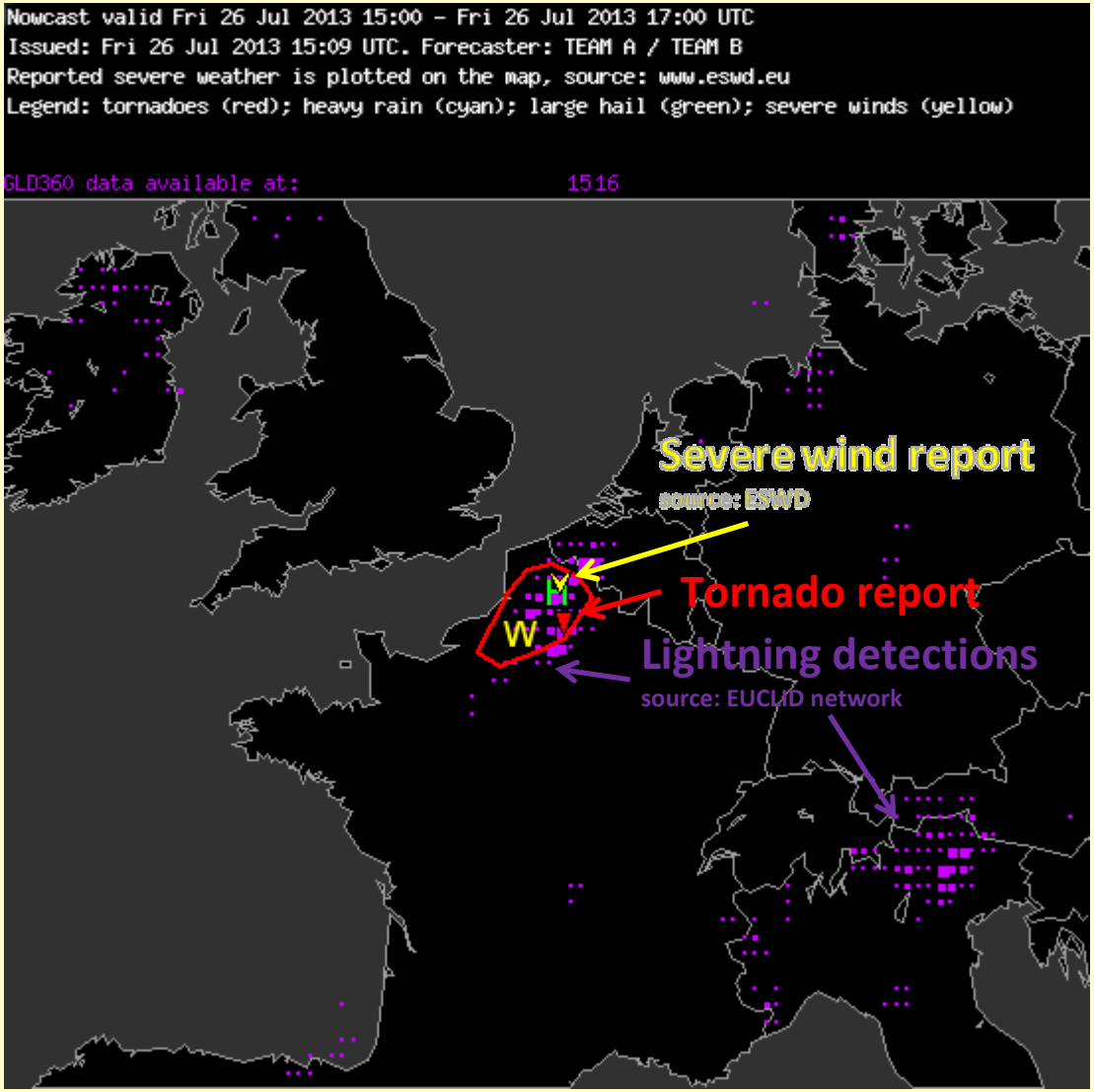
Compare forecast to the real observed severe weather.

Red lines indicate where severe weather is forecast in the next 2 hours

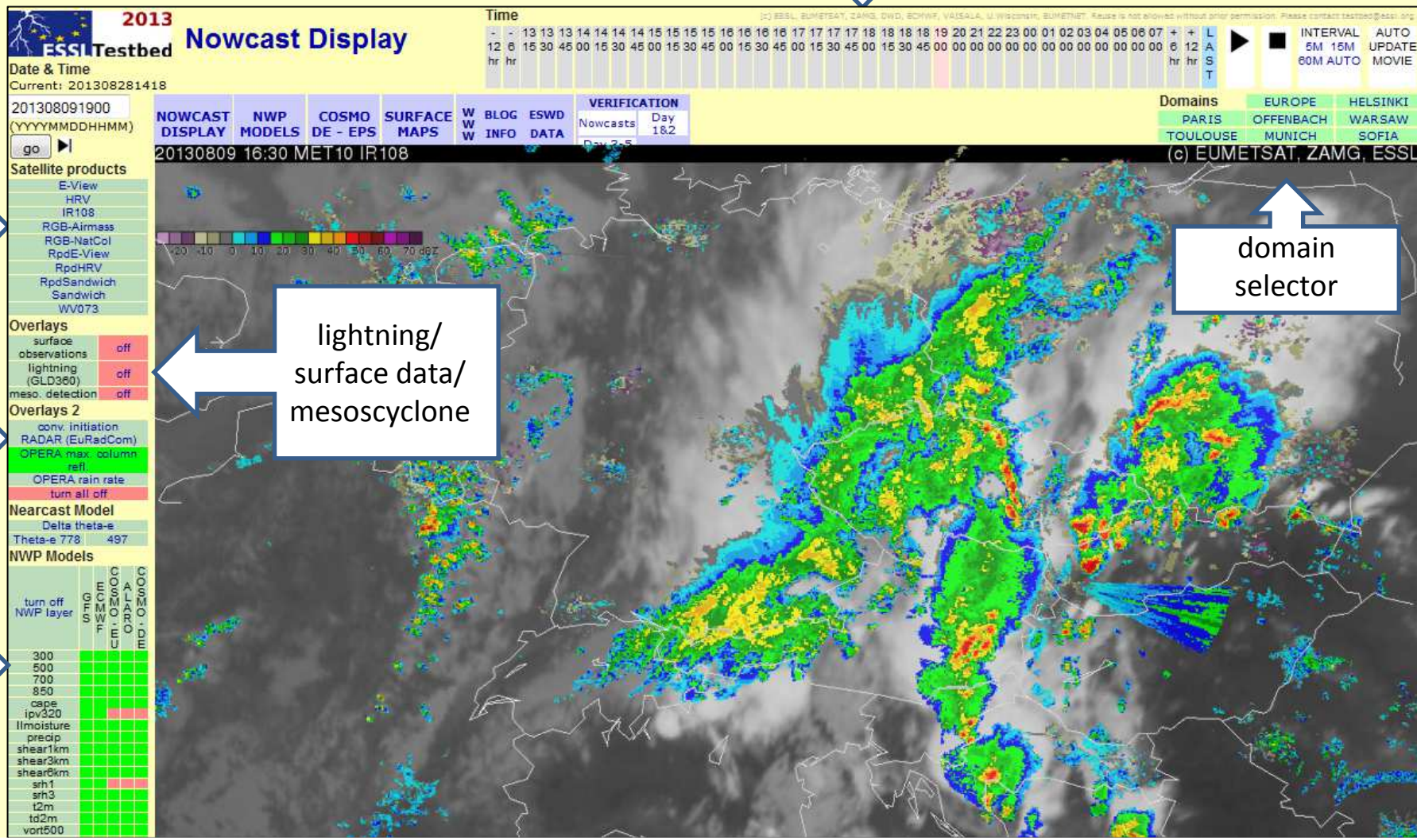
Characters indicate the expected type of severe weather: Rain Hail, Wind, or Tornadoes.

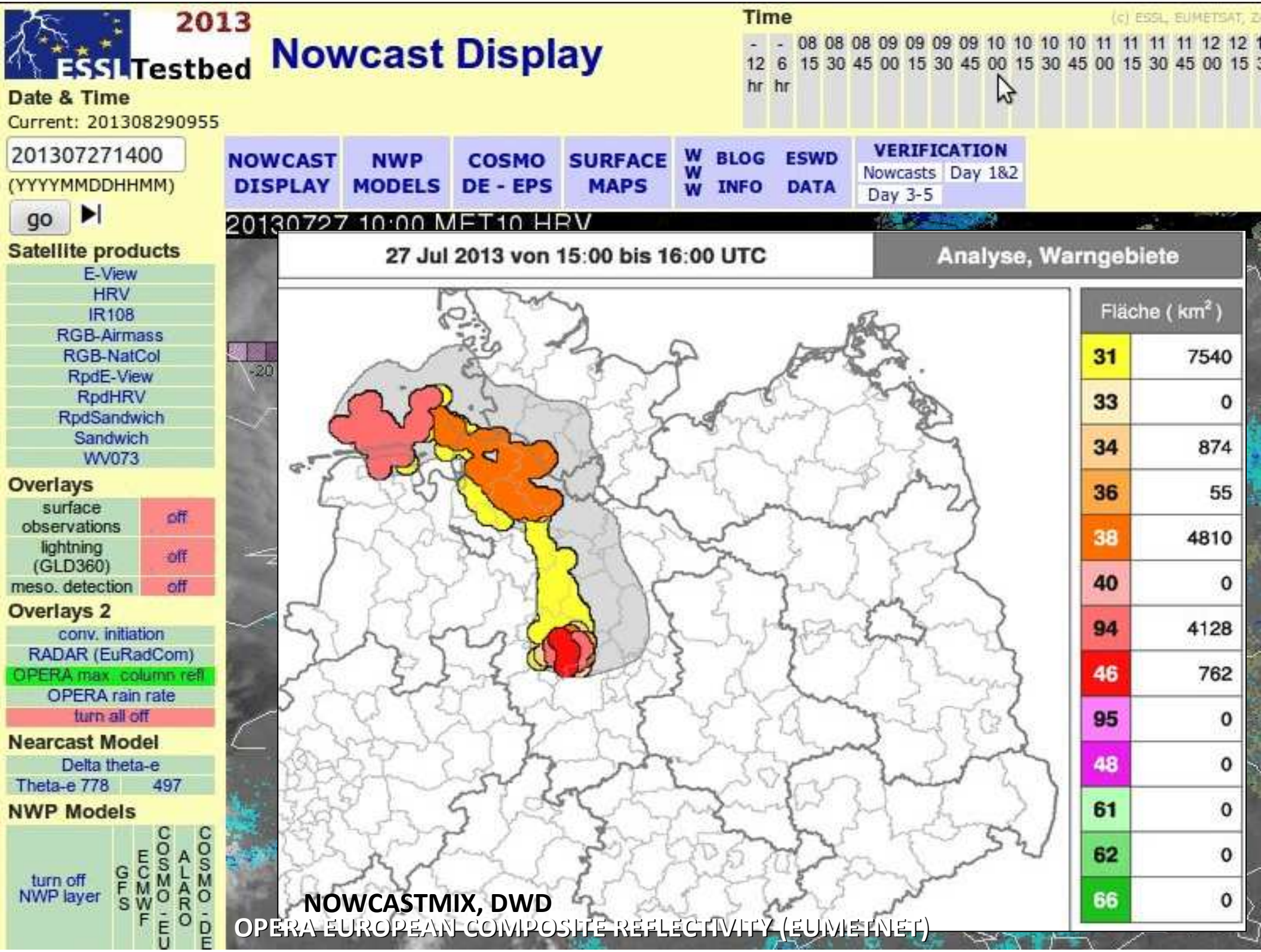
Verification data are small coloured symbols and lightning detections in magenta.

EXAMPLE 0-2 HOUR NOWCAST



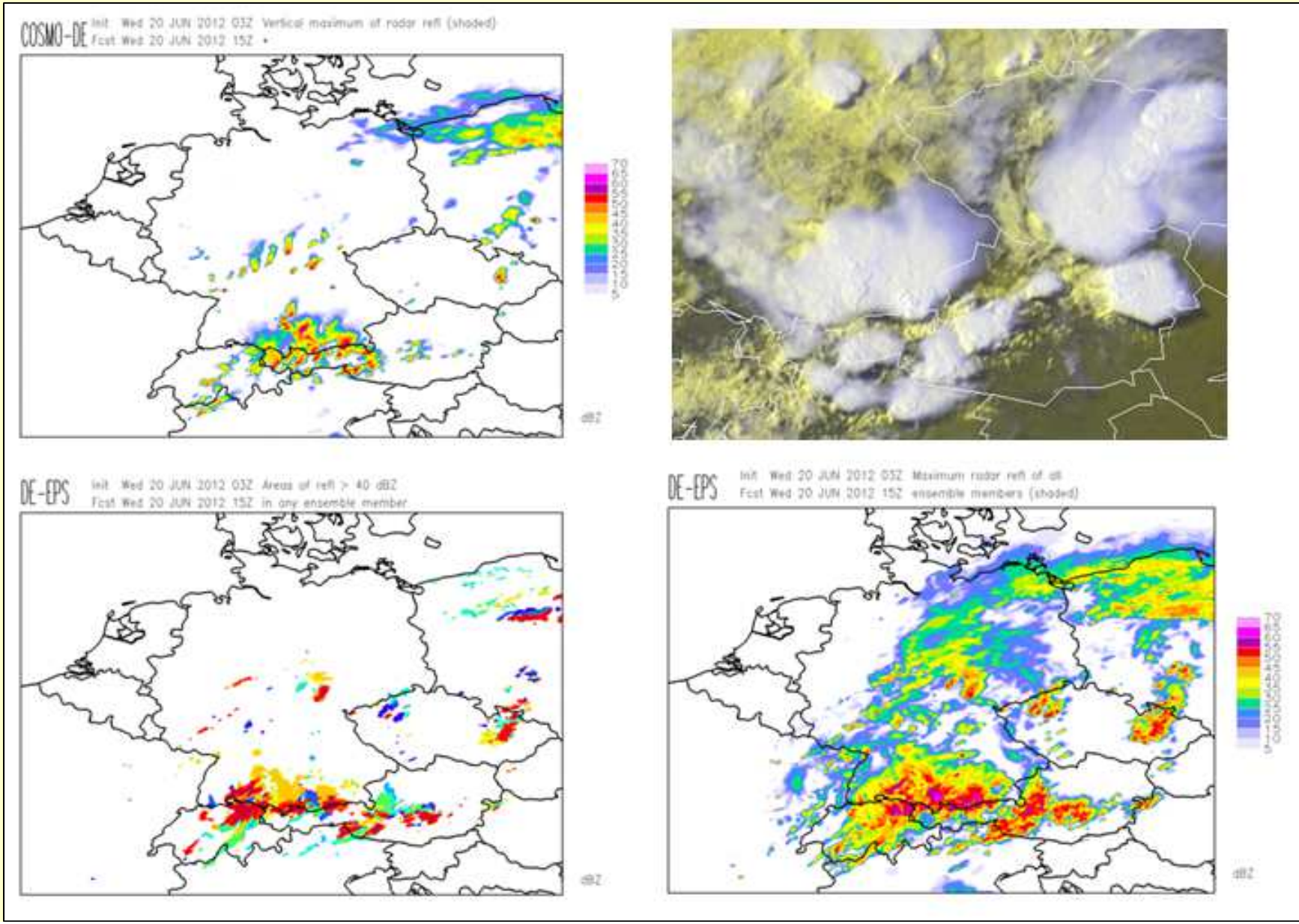
Testbed Data Interface




2013
ESSL Testbed
Nowcast Display
Time
Date & Time
Current: 201308290955
201307271400
(YYYYMMDDHHMM)
go
NOWCAST DISPLAY
NWP MODELS
COSMO DE - EPS
SURFACE MAPS
WWW BLOG INFO
ESWD DATA
VERIFICATION
Nowcasts
Day 1&2
Day 3-5
Satellite products
E-View
HRV
IR108
RGB-Airmass
RGB-NatCol
RpdE-View
RpdHRV
RpdSandwich
Sandwich
WV073
Overlays
surface observations
lightning (GLD360)
meso. detection
off
Overlays 2
conv. initiation
RADAR (EuRadCom)
OPERA max. column refl
OPERA rain rate
turn all off
Nearcast Model
Delta theta-e
Theta-e 778
497
NWP Models
turn off NWP layer
GFS
ECMWF
COSMO-EU
ALARO
COSMO-DE
27 Jul 2013 von 15:00 bis 16:00 UTC
Analyse, Warngebiete
Fläche (km²)
31 7540
33 0
34 874
36 55
38 4810
40 0
94 4128
46 762
95 0
48 0
61 0
62 0
66 0
NOWCASTMIX, DWD
OPERA EUROPEAN COMPOSITE REFLECTIVITY (EUMETNET)

NWP products

COSMO-DE-EPS 2.8 km ensemble visualizations



Link

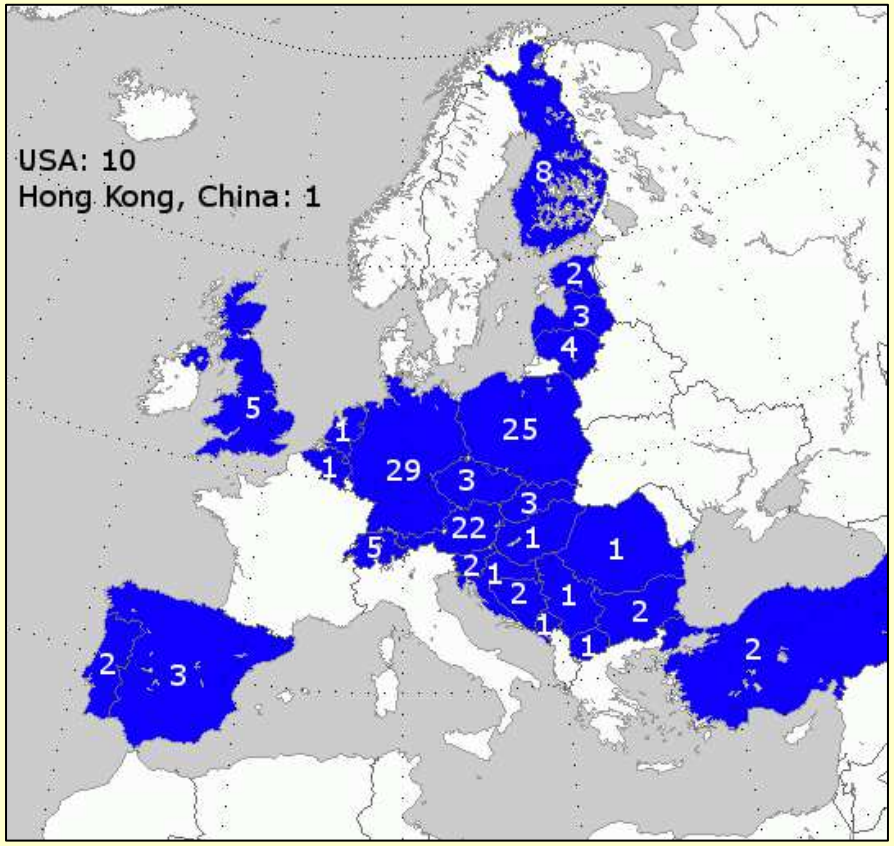
Products of 2012 and 2013

- Overshooting Top detection (NOAA/GOES-R)
- Enhanced U/V-shape / ring detection (GOES-R)
- Cloud Top Cooling (U. Wisc.)
- Convective Initiation (DWD/ EUMETSAT/UAH)
- NearCast (U. Wisc. / EUMETSAT)
- WREP (ECWMF)
- GLD360 (VAISALA)
- COSMO-DE-EPS visualizations (DWD)
- NowCastMIX (DWD)
- Mesocyclone Detection Algorithm (DWD)
- OPERA European radar composite (EUMETNET)

Participants

Participants from several countries during a random Testbed week.

Average grade given by participants on a scale from 1 (terrible) to 10 (fantastic): 8.6



Testbeds 2012 - 2014 total:

145 unique on-site participants from **27** countries

A limited number of NHMS employees additionally take part in the online-sessions only in cooperation with EUMETCAL.

Training

1. Operations Plan
2. Lectures
3. Online and on-site lectures by researchers

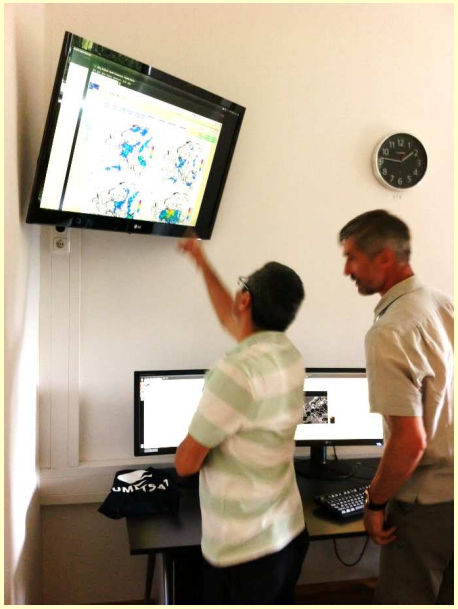
Activity:
A researcher / developer or forecasting expert presents a tool or discusses a forecasting topic.

on lightning detection systems…

on supercells…

and overshooting tops.

Possible roles of ESSL in the second phase of DRR-SEE Project



ESSL can offer:

1. The ESSL Testbed as a platform for **training** and **education** in nowcasting for hazardous weather, in particular convective storms to both **forecasters** and **researchers**

2. On-site training courses on the topic of convection
   given by ESSL and external experts

3. Facilitation of other small-scale training events in Wiener Neustadt

4. Contribution to the exchange of quality-controlled near **real-time 'ground truth' observations of severe weather** (ESWD)

European Severe Storms Laboratory

ESSL Testbed 2014

2 - 27 June, 13 – 24 October
ESSL Research and Training Centre
Wiener Neustadt, Austria

Scheduled events:

1 – 5 September:
Workshop Tornado and Wind Damage Assesment

8 – 12 September: Seminar
Forecasting Severe Convection I – Basic Level

13 – 24 October:
ESSL Autumn Testbed

2015: Seminar Forecasting Severe Convection II – Advanced (2015)

June 2015:
ESSL Summer Testbed

15 – 18 September:
European Conference on Severe Storms

Upcoming conference
14 - 18 Sept 2015
Wiener Neustadt

ECSS
European Conference on Severe Storms


Der Wasserturm


Der Dom


Der Reckturm


Die Militärakademie

Bonus slides

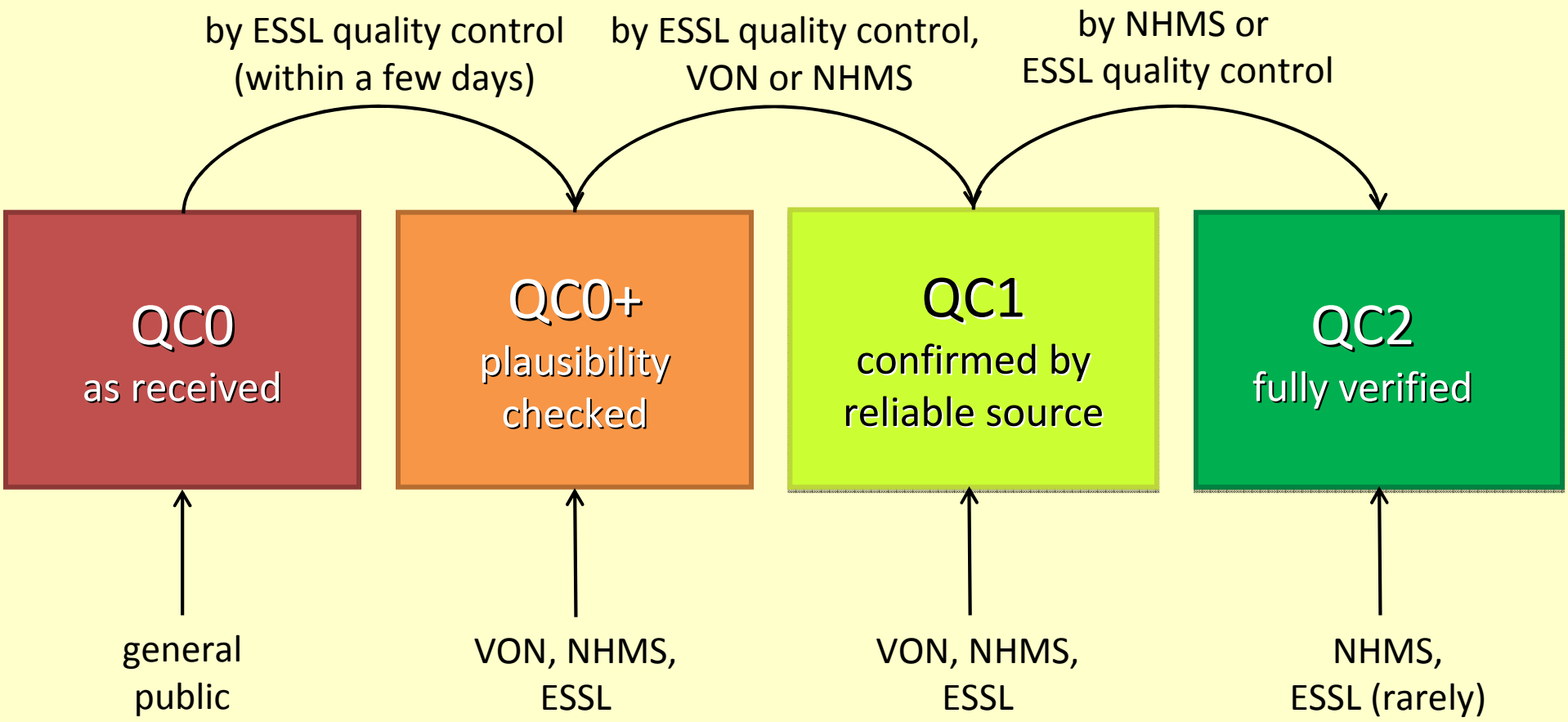
Convection Working Group products

An incomplete list of potential products:

- Convective Initiation product(s)
- Global Instability Index
- Temperature & humidity retrievals (NearCast !)
- Overshooting Top detection
- Rosenfeld – Storm Severity (R_{eff}) *
- Rosenfeld – Low-level humidity *
- Lightning Imager proxy data
- ...

Q: What is possible with polar orbiting satellites across Europe?

Quality control



* reliable sources include:
  - conclusive photo and/or video material, with accurate time & location
  - certified storm spotter reports

VON = Voluntary Observer Network
NHMS = National Hydro-Meteorological Service

SKYWARN EUROPE