National Catastrophes

vrs adjusters

Natural Catastrophes in Europe
-
focusing on their impact on Romania

Key Speakers:

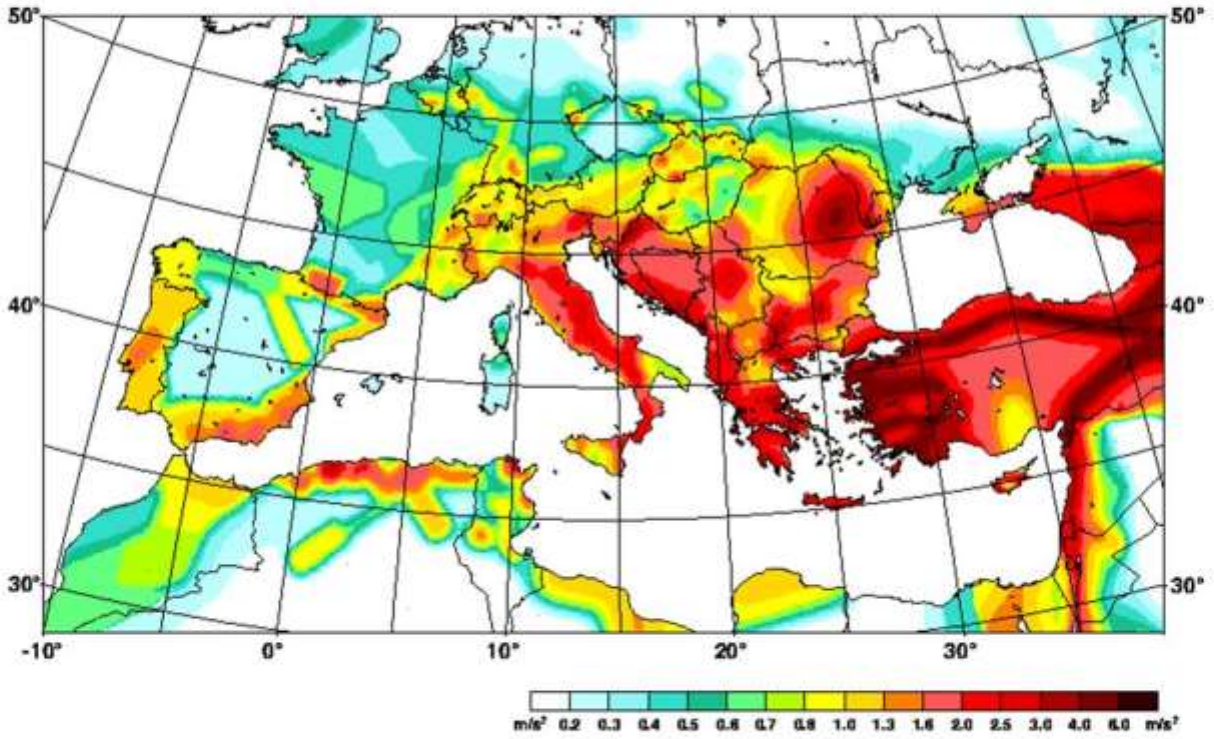
Mrs Georgiana Popescu – Insurance Business Consultant, Romania
Mr Andreas Schaffhauser – ZAMG, Austria
Mr Constantin Ionescu – NIEP, Romania
Mr Francesco Cincotti – vrsCincotti, Italy

vrs ssp

Seismic Hazards

vrs adjusters

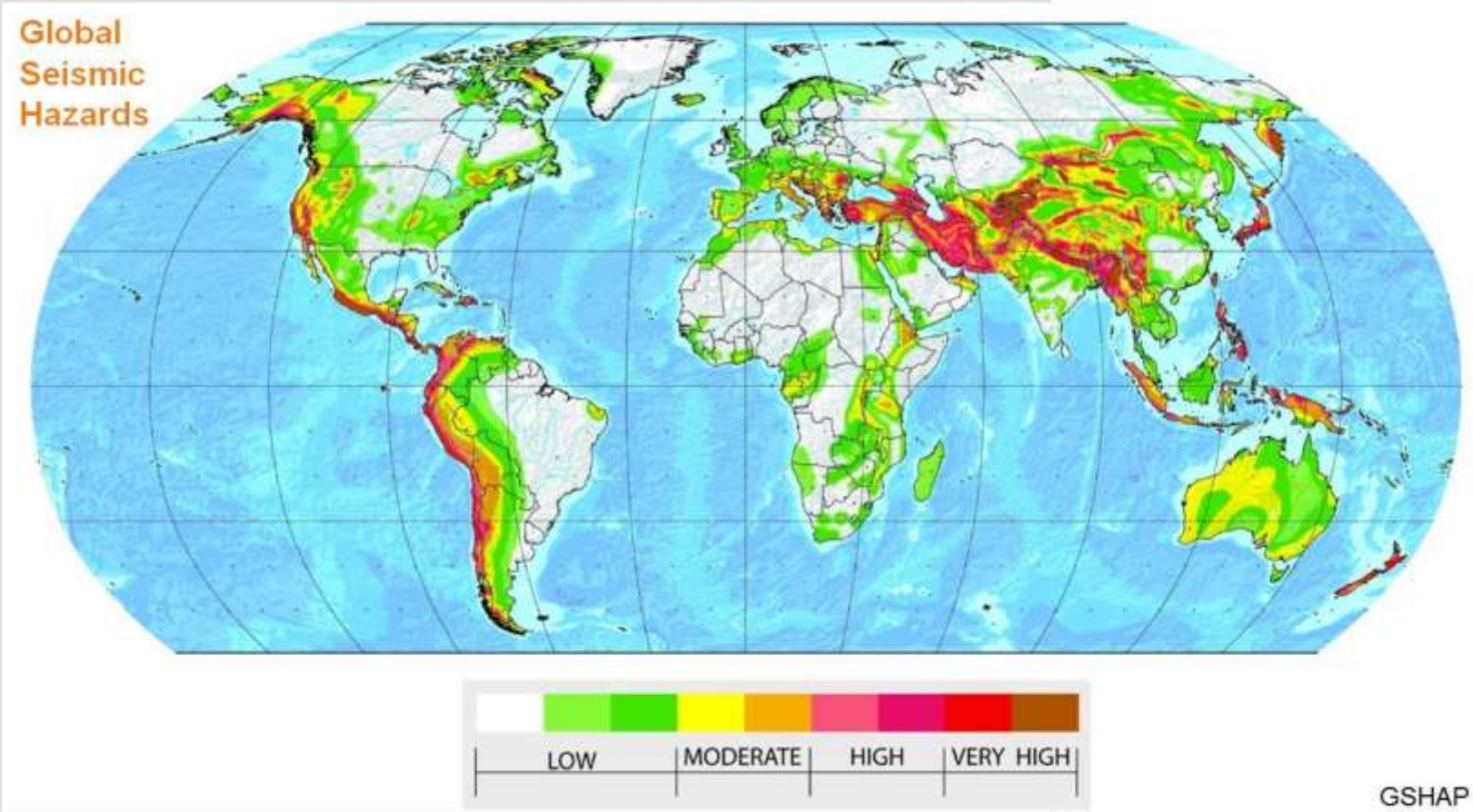
Seismic Harzards in Europe



GSHAP

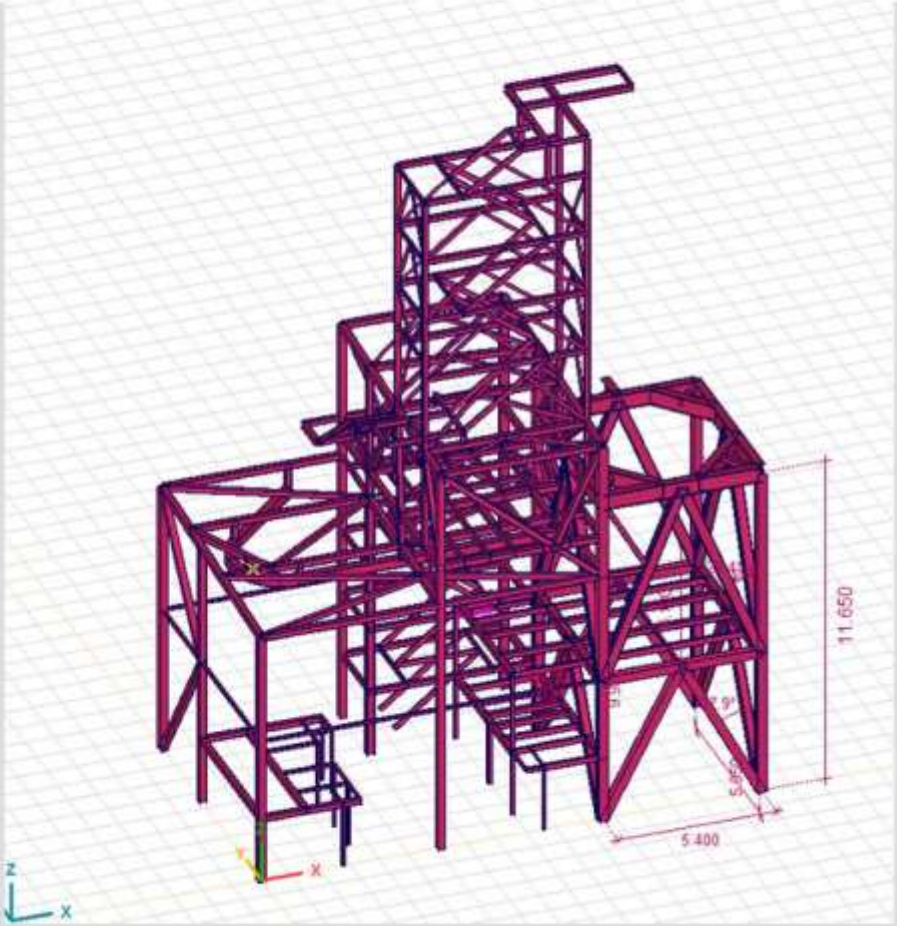
Seismic Hazards

vrs adjusters



Calculation

vrs adjusters



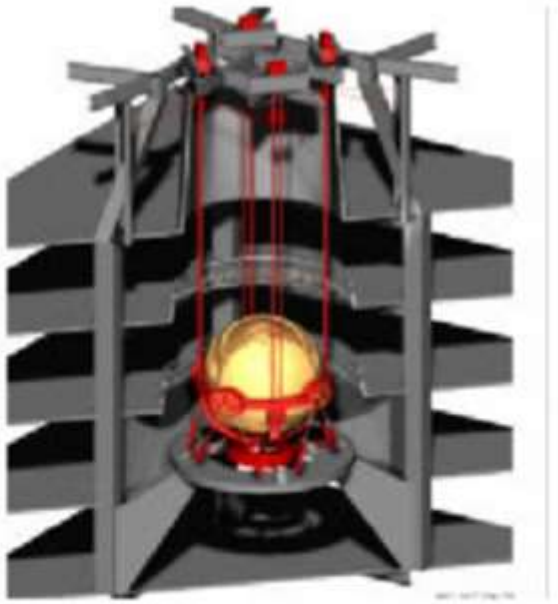
Calculation of steel construction for a silo and mill in Armenia

Seismic Hazards

vrs adjusters

DCTower,
Vienna

Pendulum



Meteorological warnings underwent significant changes in the last ten years

Andreas Schaffhauser ZAMG

ZAMG
Zentralanstalt für
Meteorologie und
Geodynamik

Content

- ZAMG
- Observations
- Numerical models
- Weather forecasts
- Warnings and DRR

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Meteorology and ZAMG – brief review

1654 first instrumental observations in Innsbruck

1763 continous observations

1829 first geomagnetical observations

1851 foundation of the Zentralanstalt für Meteorologie und Geodynamik

1897 seismic observations in Kremsmünster

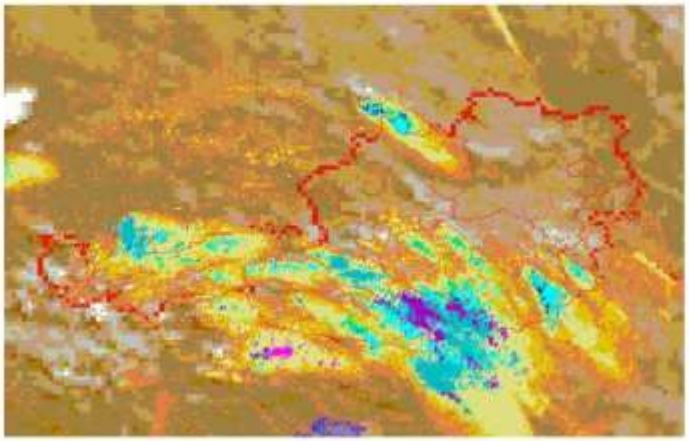
1991 ZAMG starts commercial activities

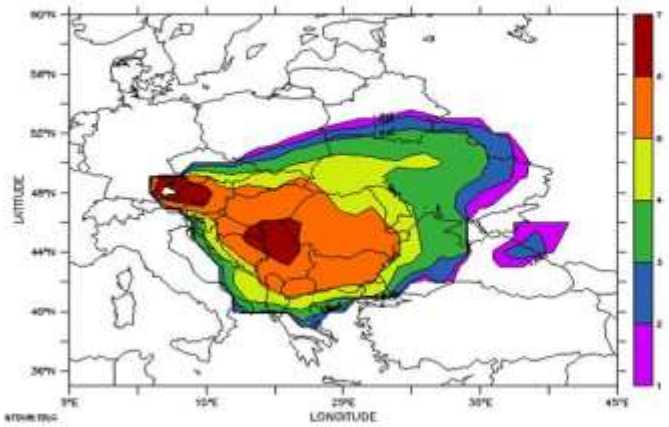
2015 290 employees

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Responsibilites and services

ZAMG	Austrian national weather and geophysical service
Weather	weather forecastes severe weather warnings special forecasts (z.B. road weather) observations, modelling
Environment	dispersion of pollutants crisis management (z.B. nuclear power plants) expert assessment and expertise





ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Responsibilities and services

Climate Observations

Data correction and interpretation

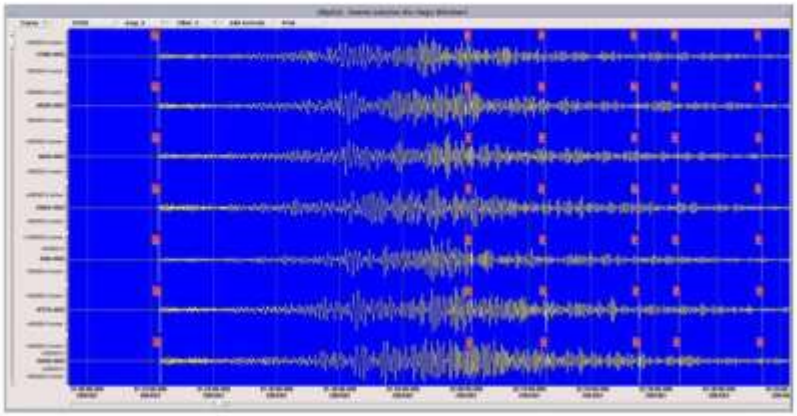
expert assessment and expertise

Modelling, climate szenarios

Geophysik seismological service

geomagnetics / geoelectrics

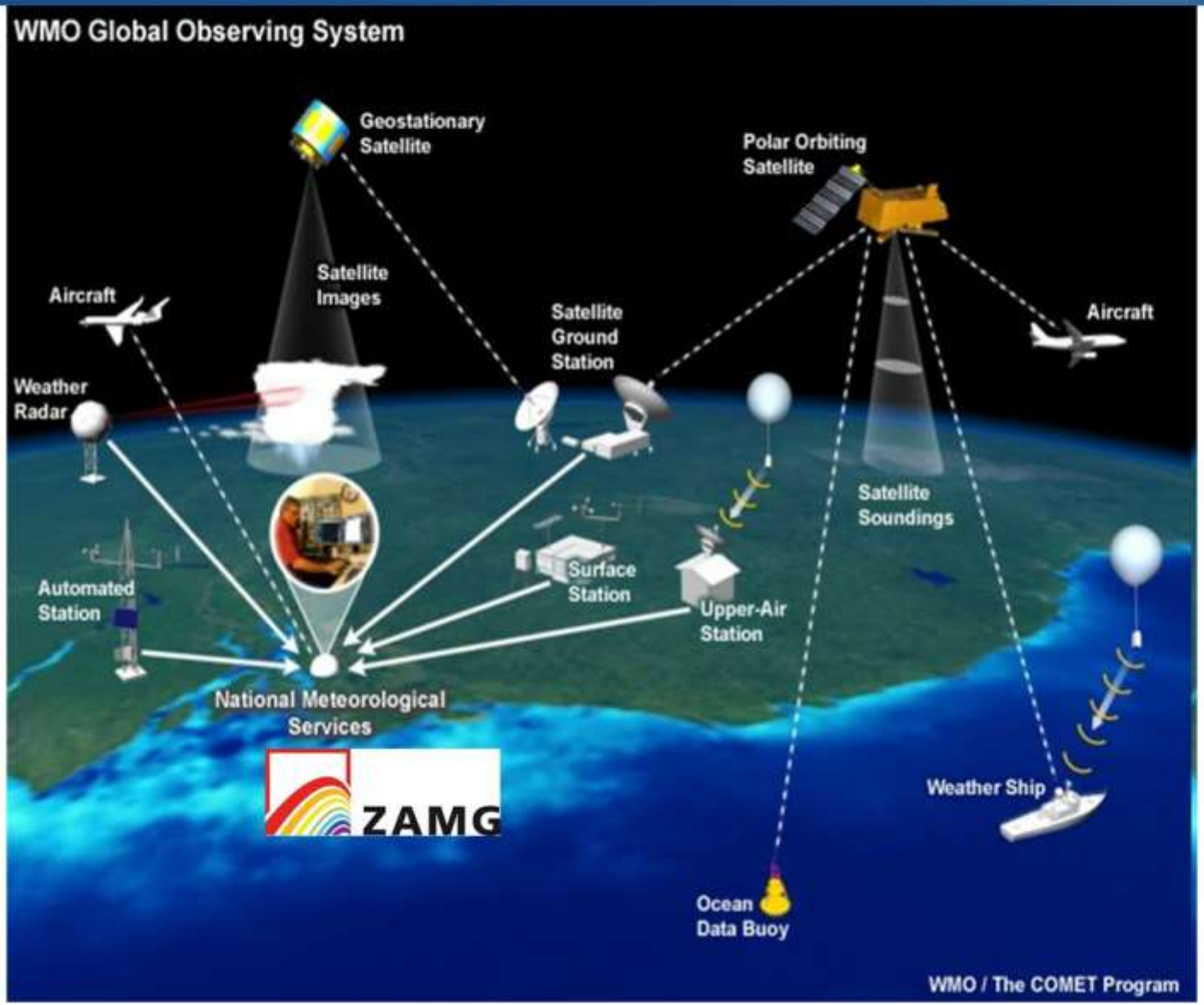
Archeoprospection



ZAMG
Zentralanstalt für Meteorologie und Geodynamik

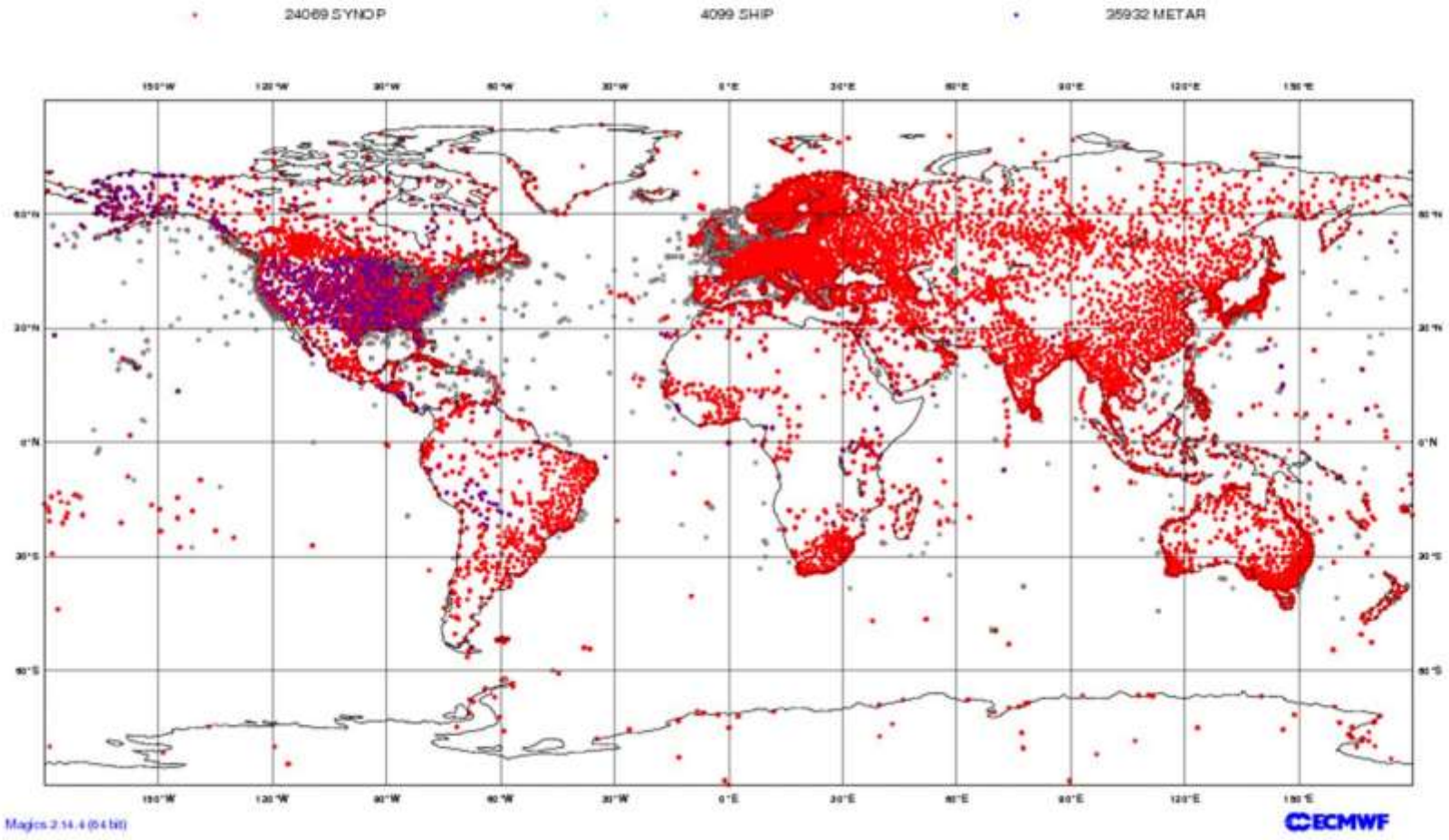

Meteorologisches Messnetz in Österreich
ZAMG: TAWES (248)
ZAMG: Minitaklis (2)
Ö3 (12)
ACG (4)
Stand 01.10.2014
0 10 20 30 40 50
100 km

Global Weather observations



Data coverage - weather observations and und sea (ships)

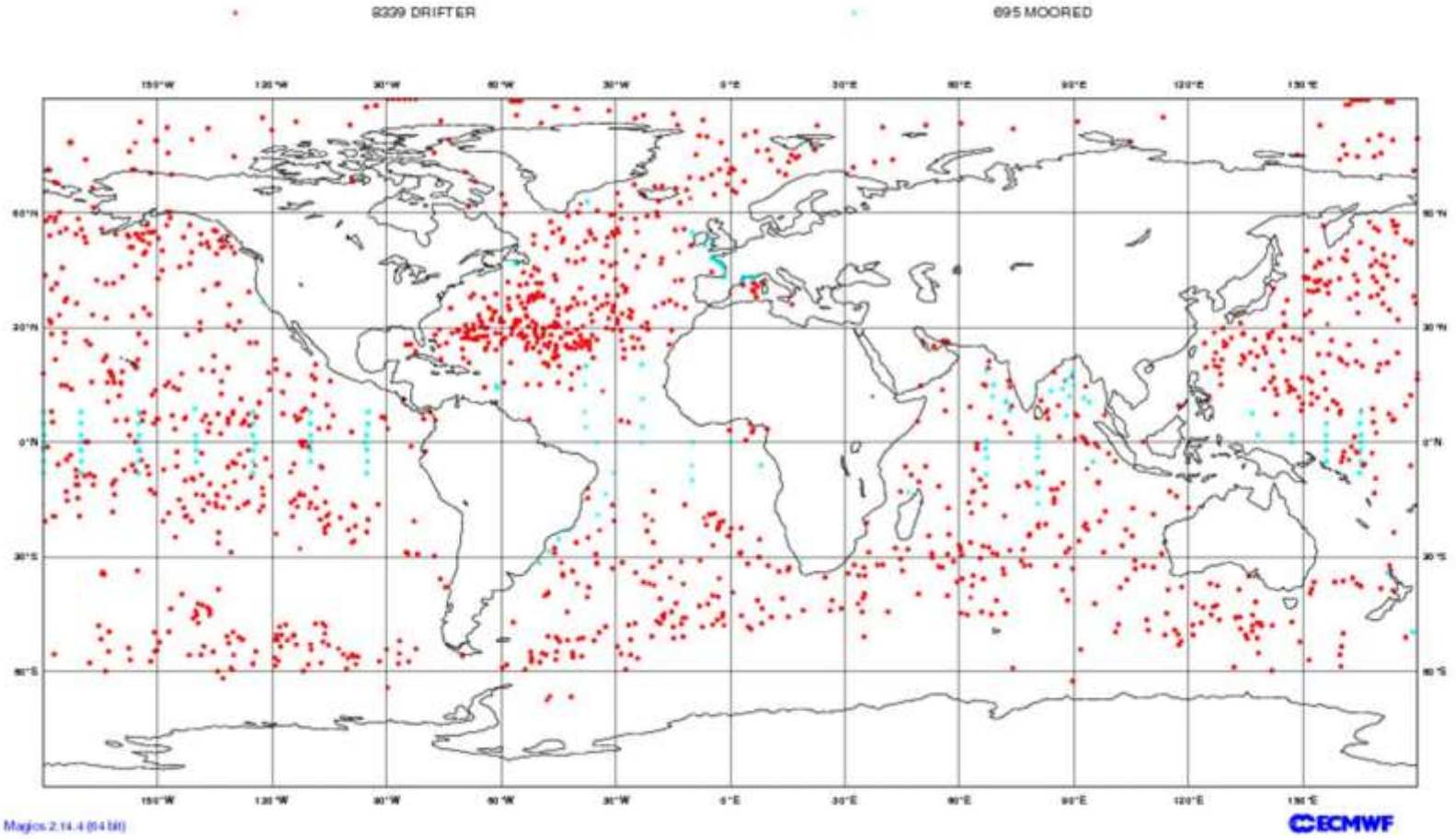
ECMWF Data Coverage (All obs DA) - Synop-Ship-Metar
26/Nov/2014; 00 UTC
Total number of obs = 64100



ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Data coverage - buoys

ECMWF Data Coverage (All obs DA) - Buoy
26/Nov/2014; 00 UTC
Total number of obs = 9034

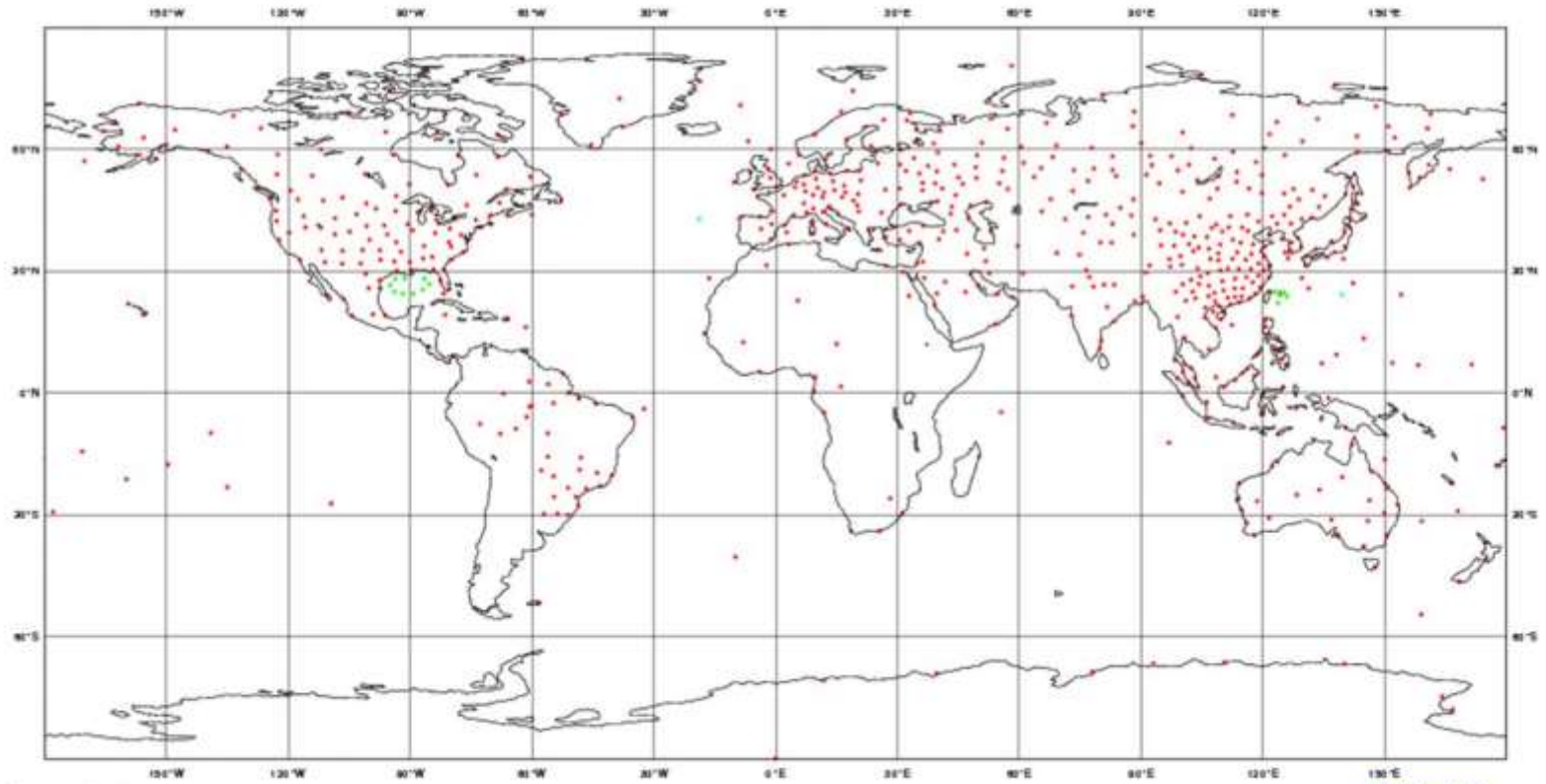


ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Data coverage – soundings

ECMWF Data Coverage (All obs DA) - Temp
26/Nov/2014; 00 UTC
Total number of obs = 662

2 SHIP
646 LAND
0 MOBILE
14 DROPSONDE



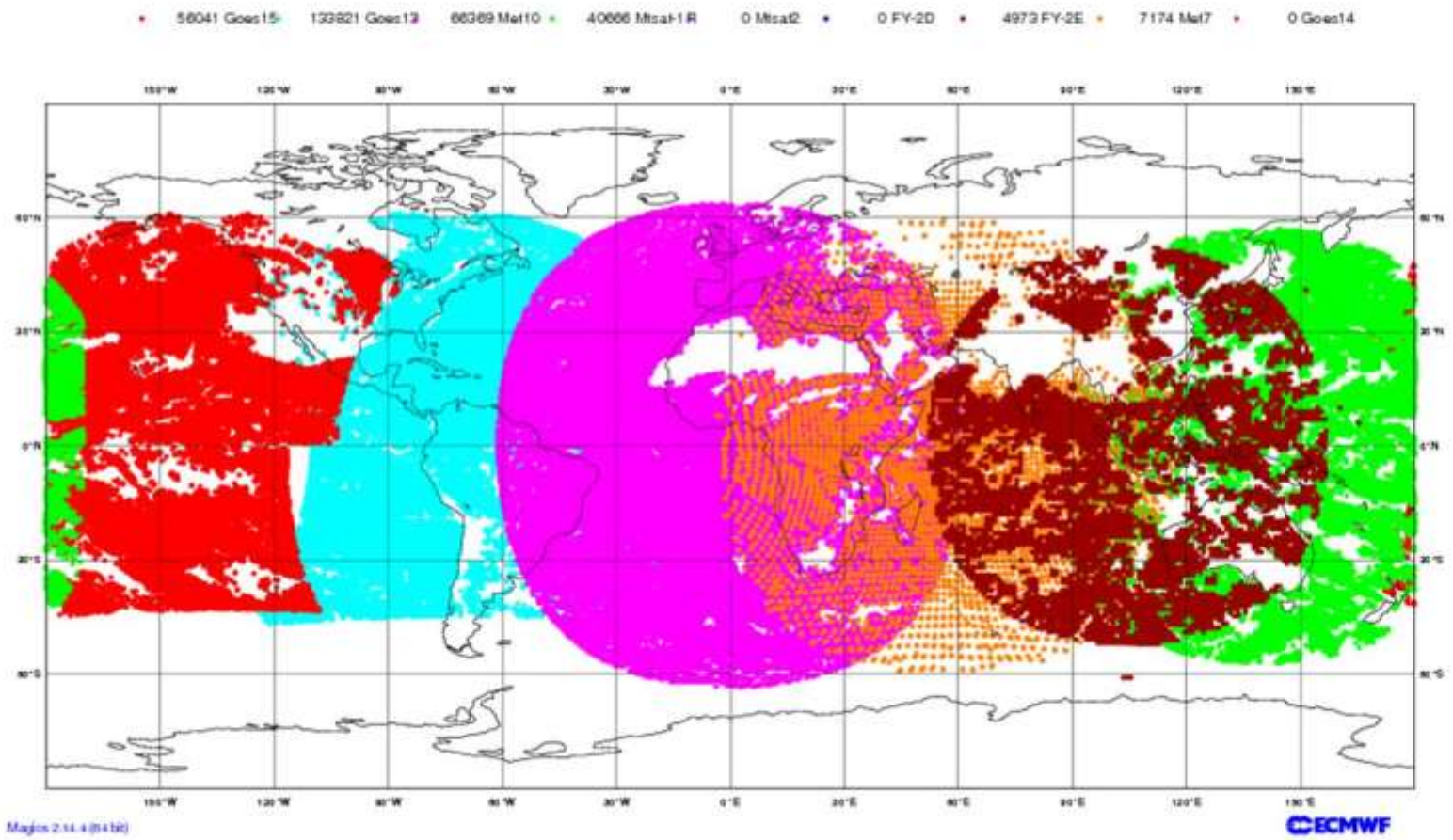
Magics 2.14.4 (64 bit)

ECMWF

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Coverage – wind observations (Satelliten)

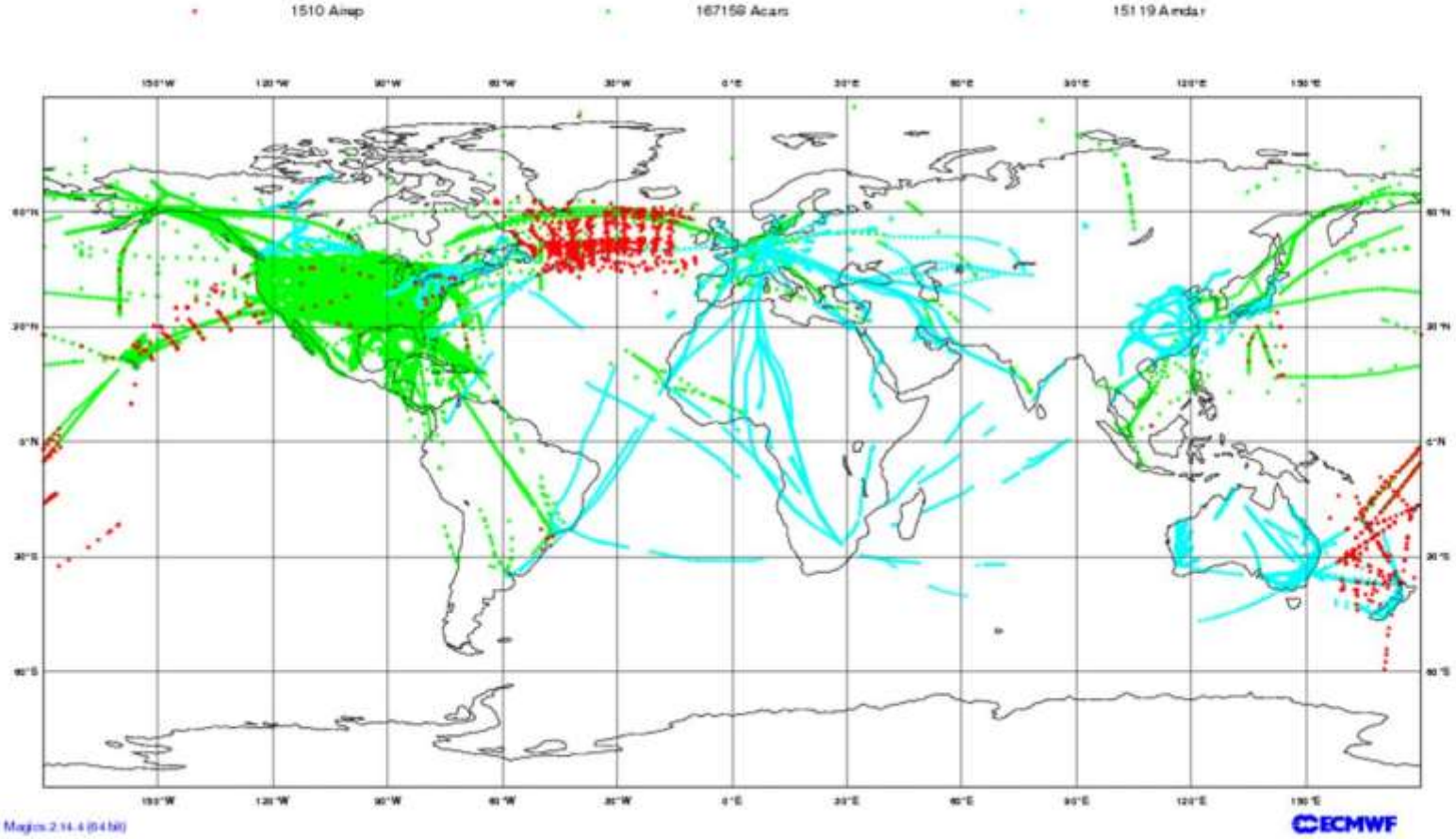
ECMWF Data Coverage (All obs DA) - AMV IR
26/Nov/2014; 00 UTC
Total number of obs = 309044



ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Data coverage – aircraft observations

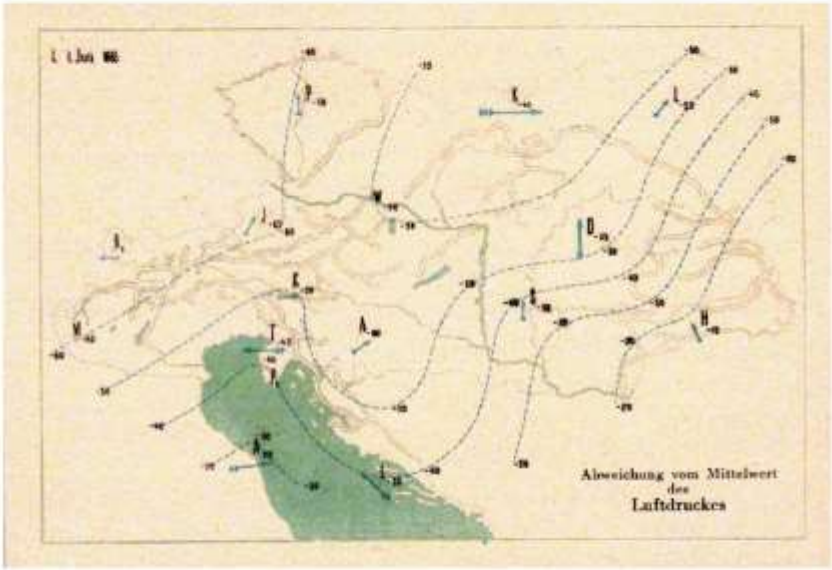
ECMWF Data Coverage (All obs DA) - Aircraft
26/Nov/2014; 00 UTC
Total number of obs = 183787



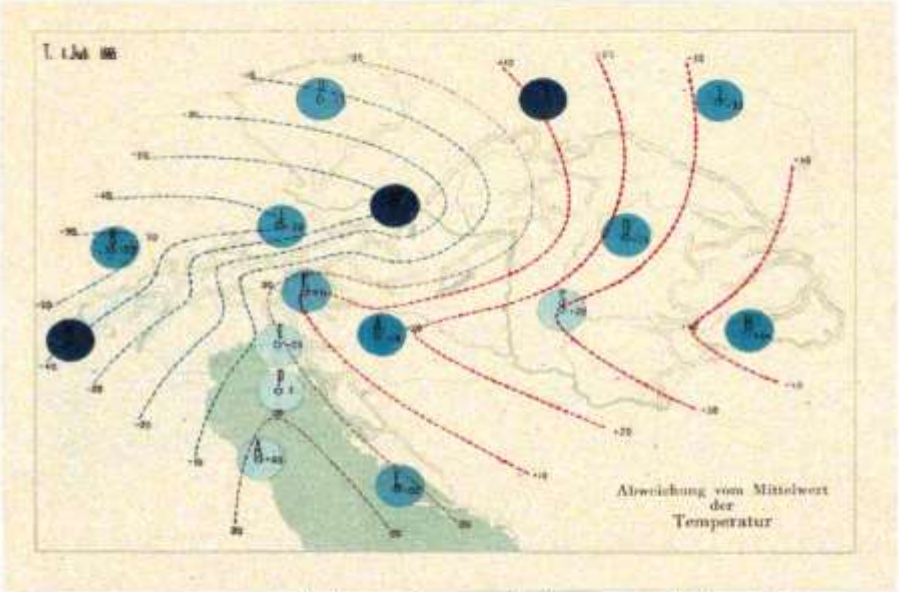
ZAMG
Zentralanstalt für Meteorologie und Geodynamik

historical weather

First weather map of ZAMG was published on **1. Juli 1865**



Air pressure

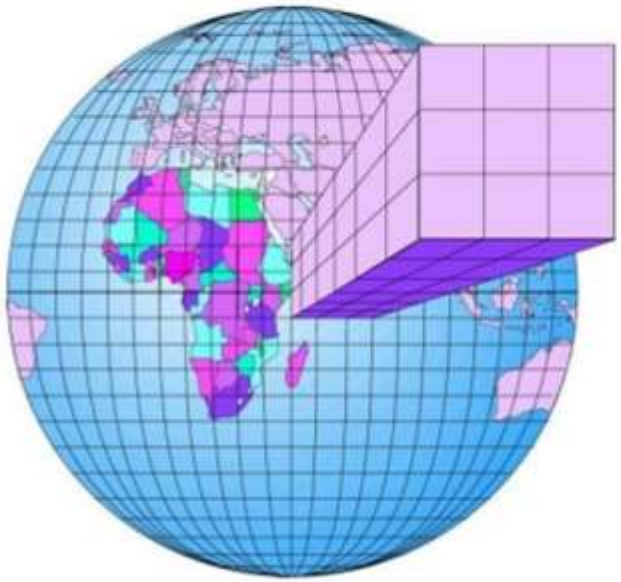


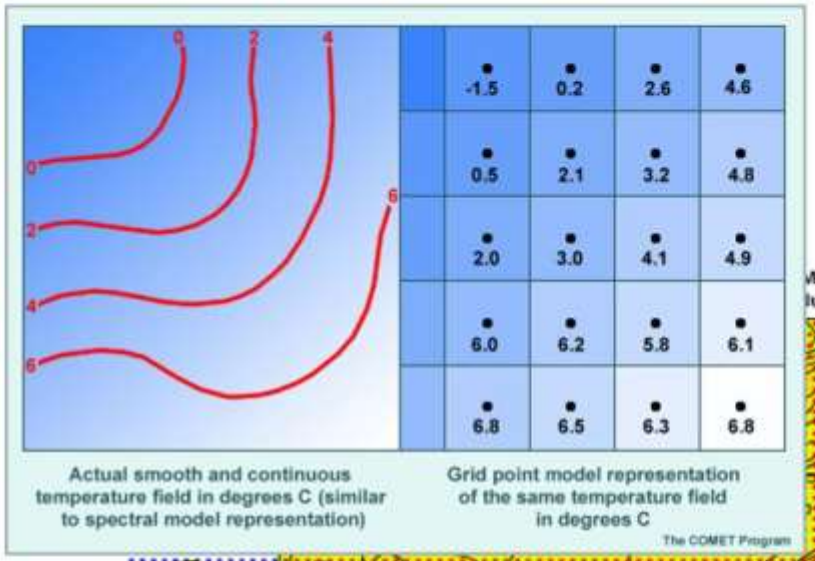
Temperature and cloudiness (sky conditions)

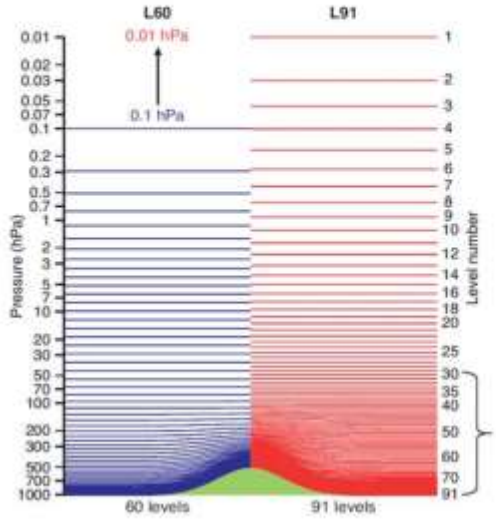
Stations: Vienna, Lesina (Hvar), Pula, Triests, Milan, Ancona, Bludenz, Ischl, Klagenfurt, Prague, Krakov, Liviv, Zagreb, Szeged, Debrecen and Sibiu.

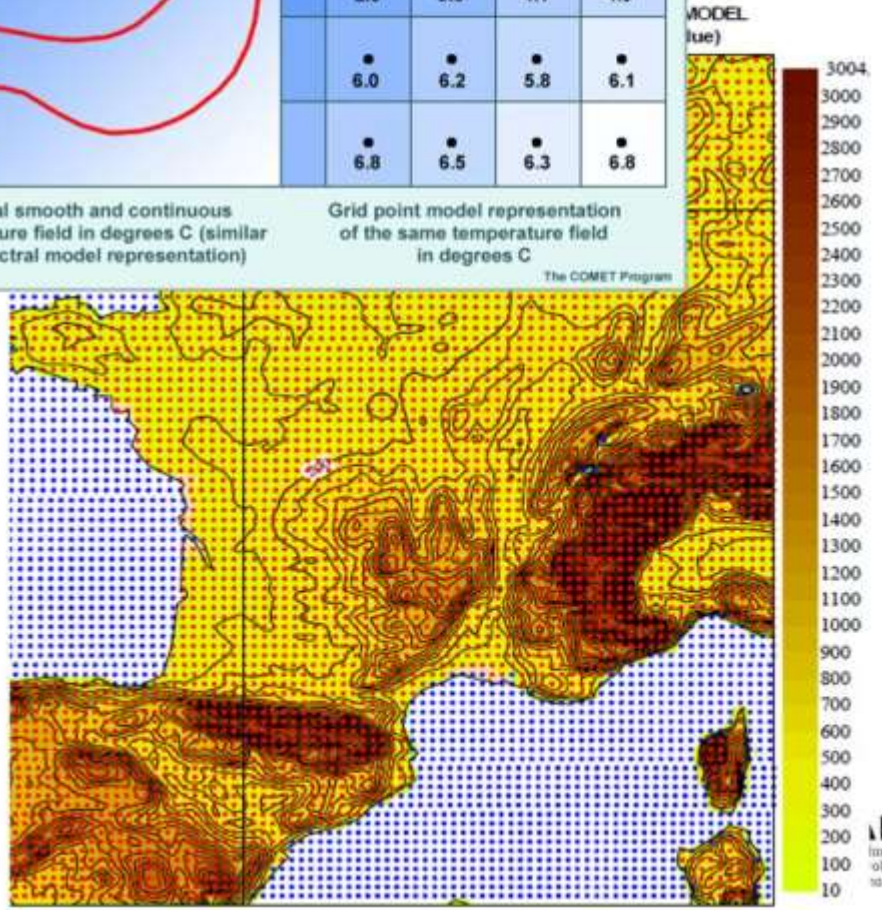
ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Numerical models – ECFMWF







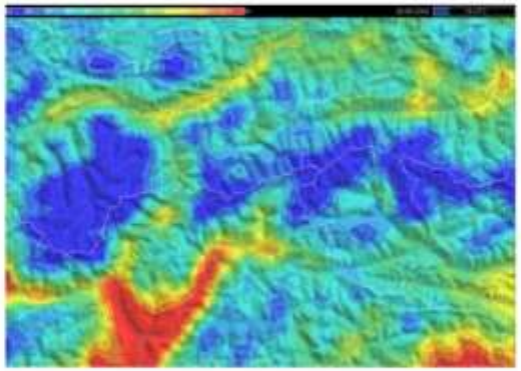


numerical weather prediction @ ZAMG

ZAMG developed for the Alps together with 16 national weather services the regional numerical forecast model **ALARO**, horizontal resolution is 4.8 km.

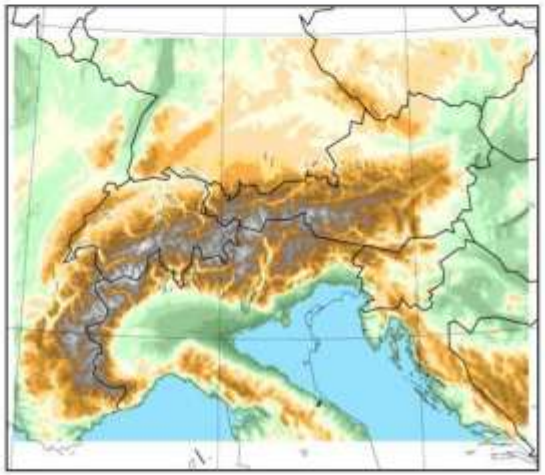
Since spring 2014 ZAMG is running the next generation **AROME** model, reducing the horizontal resolution down to 2.5 kilometers.

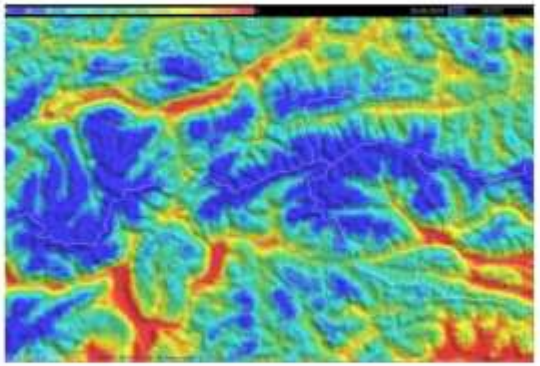
ALARO-AUSTRIA5



+ 72 h, 4.8 km

AROME-AUSTRIA

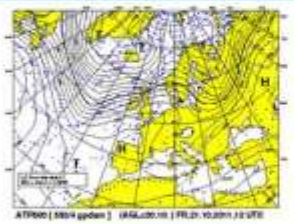




+ 30 h, 2.5km

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Nowcasting INCA (short range forecasts)



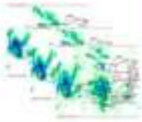
Météo France, Toulouse
ARPEGE GLOBAL

ECMWF, Reading
ECMWF GLOBAL

ALADIN/ALARO5 LAM

ZAMG
INCA

→ Analysis
→ Nowcasts
→ Forecasts



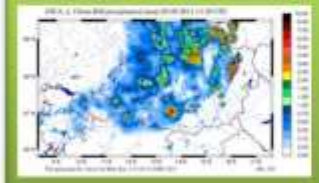
Observations

Radar

Topography

Satellite

Hydrology



Warnings

Special forecasts

INCA: **I**ntegrated **N**owcasting through **C**omprehensive **A**nalysis

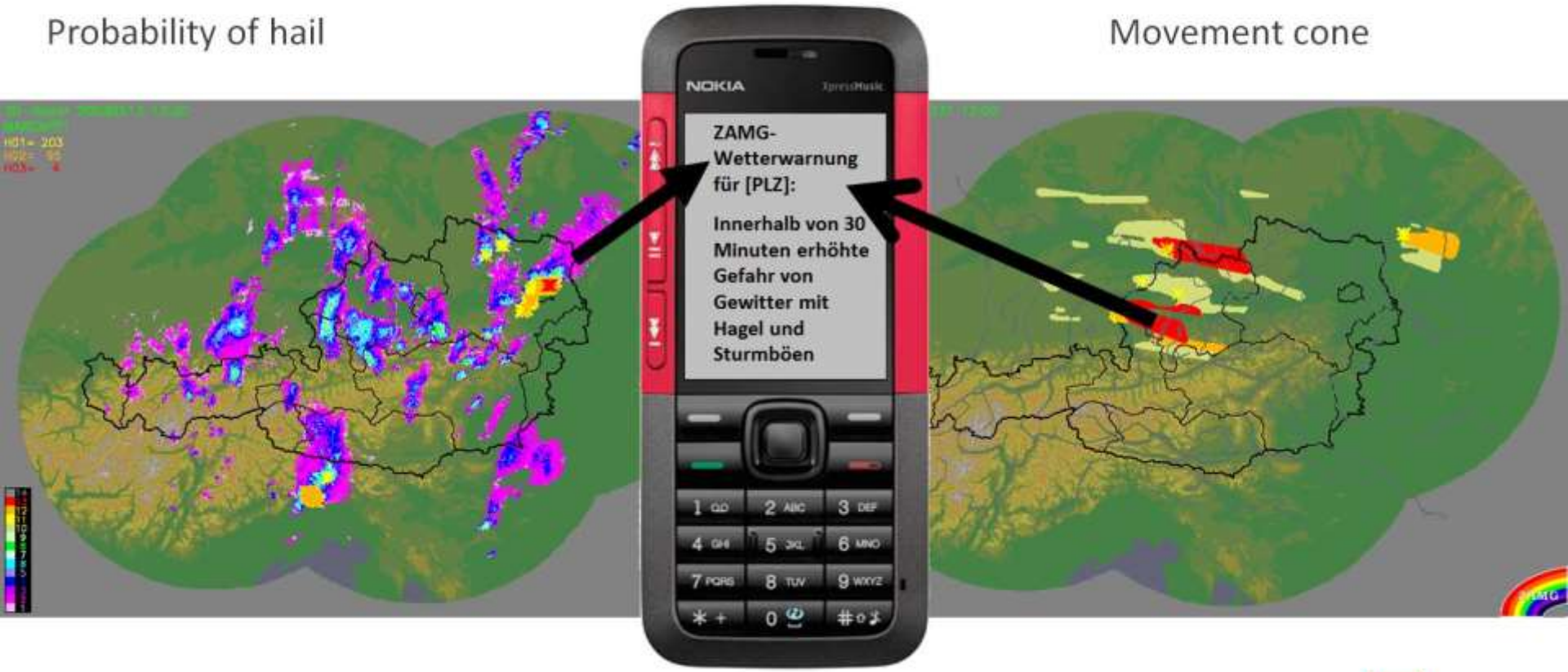
ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Autmatic hail and thunderstorm warnings

basend on lightning detection, 3d radar images and storm tracks (A-TNT)

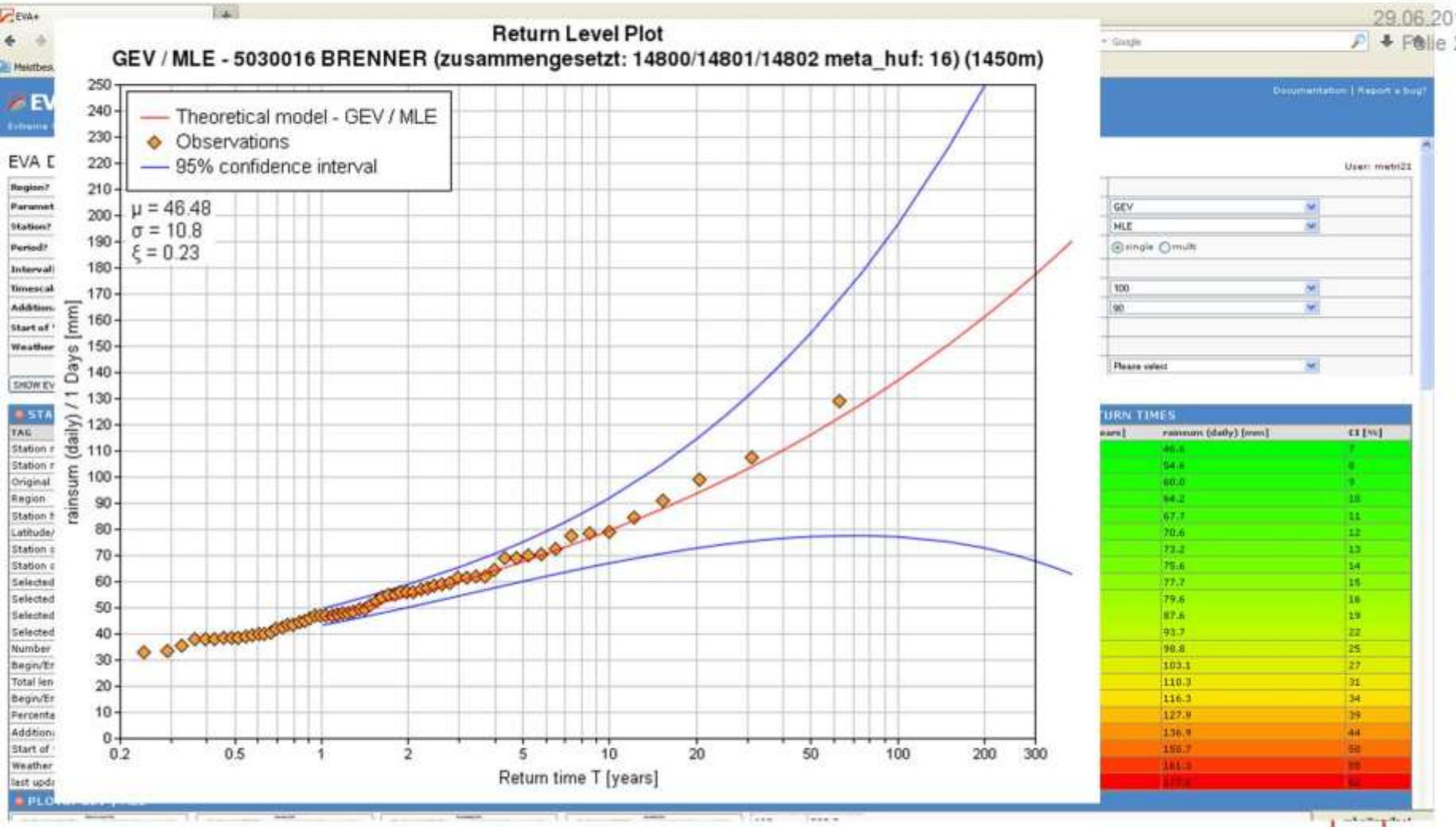
Probability of hail

Movement cone



ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Extreme Value statistics EVA+



ZAMG
Zentralanstalt für Meteorologie und Geodynamik

EVA MAPS

return periods forcasts (rain snow)

EVAMAPS

Help

Parameter: hn	go	real	past	clima	Parameter: rr	go	real	past
2010-06-07 06 UTC + 1d	0	0	0	0	2010-06-07 06 UTC + 1d	0	0	
2010-06-07 06 UTC + 2d	0	0	0	0	2010-06-07 06 UTC + 2d	0	0	0
2010-06-07 06 UTC + 3d	0	0	0	0	2010-06-07 06 UTC + 3d	0	0	0
2010-06-07 06 UTC + 4d	0	0	0	0	2010-06-07 06 UTC + 4d	0	0	0
2010-06-07 06 UTC + 5d	0	0	0		2010-06-07 06 UTC + 5d	0	0	0

Model run: ECMWF AGL 20081116 12 UTC
Datum: 20081117 06 UTC - 20081122 06 UTC
Parameter: hn
Summe: 5 Tag(e)
model: user , factor: 10.0

- 10 - 30 Jahre
- 30 - 50 Jahre
- 50 - 100 Jahre
- >100 Jahre
- nicht bestimmbar

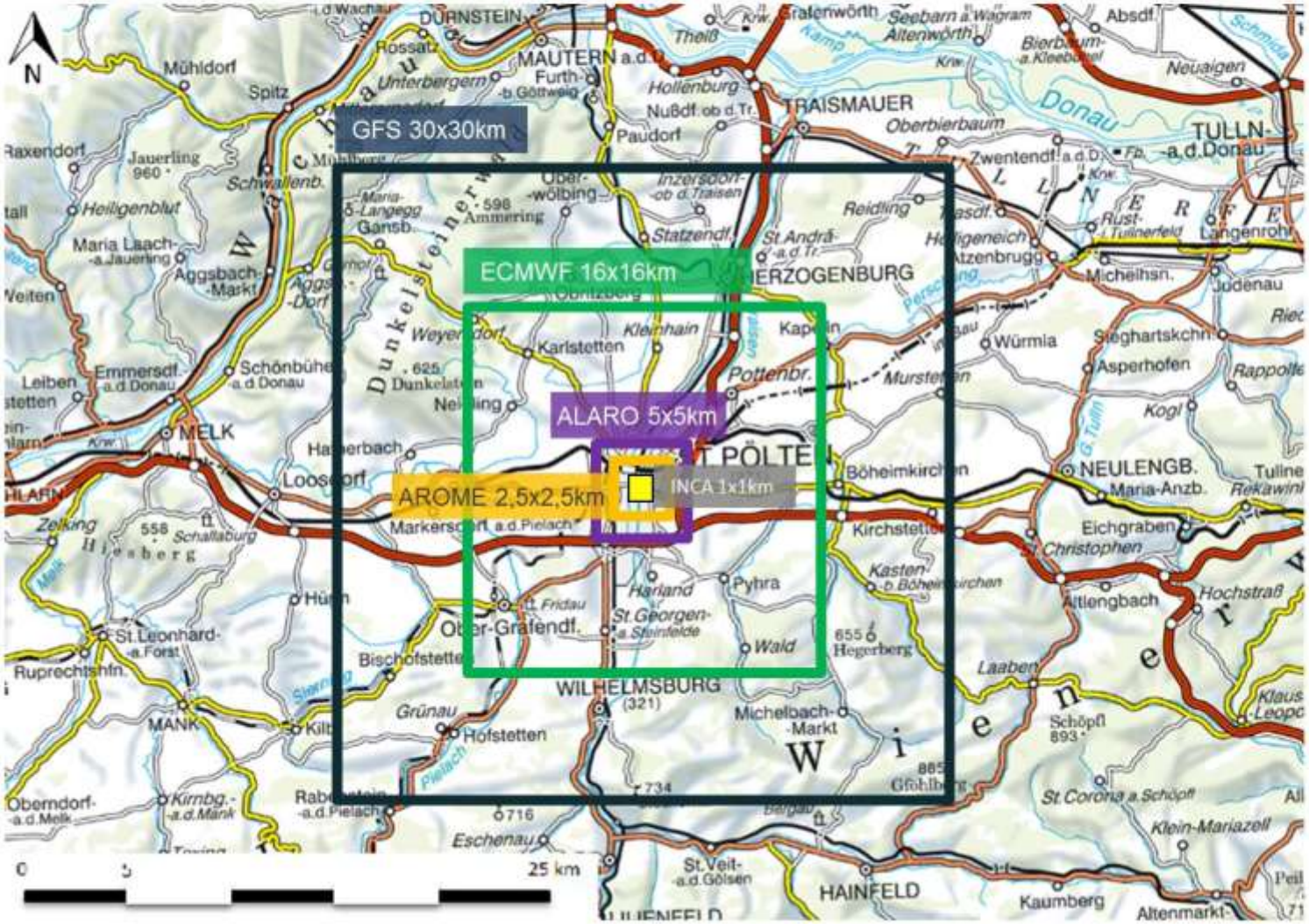
RIETZENRIED (FLIRI) (1080m)

Wert (FC): 79.0cm
geringste bestimmbare Jährlichkeit (b): **150**
mögliche Jährlichkeit (m): Länge der Reihe x 3 = 279
Untergrenze: 150a/ 77cm
Obergrenze: 200a/ 80 cm
Jahre verwendet/fehlend: 93/ 3

Done

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Numerical models – spatial resolution



ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Fact-Sheet Models @ ZAMG

- ECMWF
  16km, 00/12 UTC, +240h forecast
- ECMWF-EPS
  32km, 00/12 UTC, +360h forecast 50 members
- ALARO
  5km, 00/06/12/18 UTC, +72h forecast
- ALARO LAEF
  11km, 00/12 UTC, +72h forecast 16 Members
- AROME
  2.5 km, 3-hourly , +30h forecast
- INCA
  1km, 15min/h, +12h forecast, 15min/1h
- Ensemble INCA
  1km, 15min/1h, +12h forecast

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Seamless + Probablistic + cell tracking

information

global ensemble
~ 30km resolution
7 days

extreme weather possilbe

regional ensemble
~ 10km resolution
3 days

detailed forecast

precise warning

local ensemble
~ 2.5km resolution
1.5 days

take action !

forecast + uncertainty

exact forecast

nowcasting ensemble
+ A-TNT
~ 1km resolution
0-6 hours

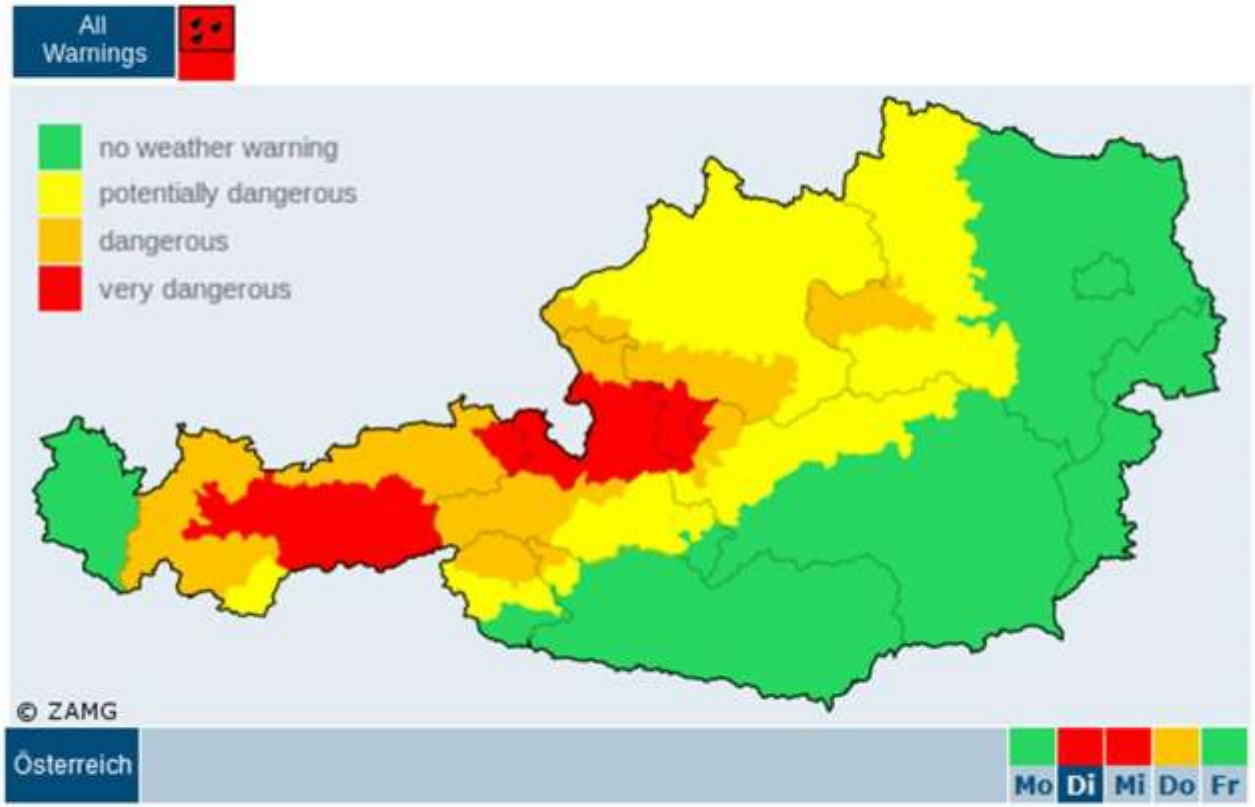
ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Weather Warnings – Example from ZAMG

Legend

- Storm
- Rain
- Snow
- Black Ice
- Thunderstorm
- Heat Stress
- Cold Stress

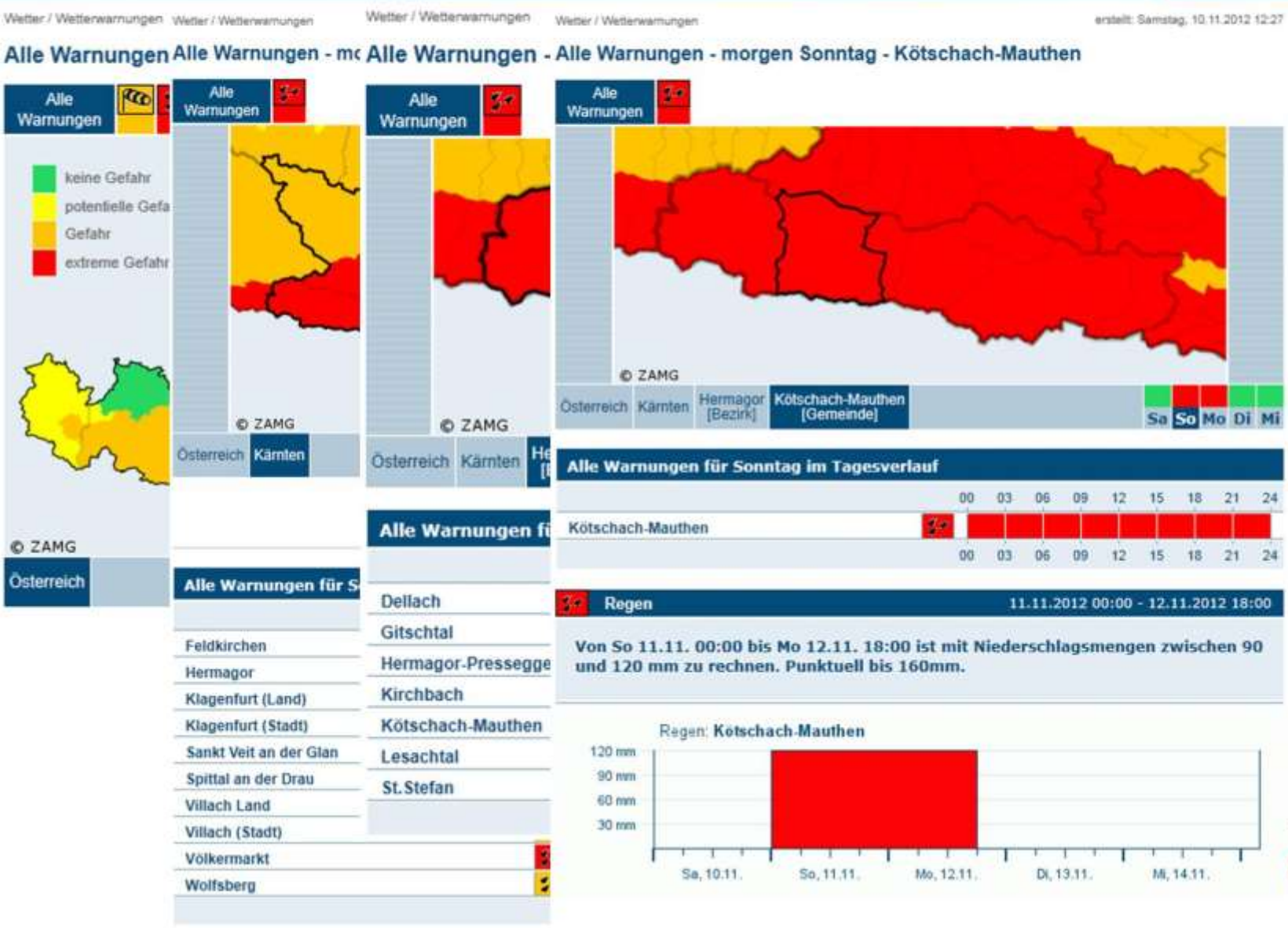
- Supplementary Warnings
- Strong Winds in Higher Regions
- Current Thunderstorms
- Current Thunderstorms with Hail



www.zamg.ac.at

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

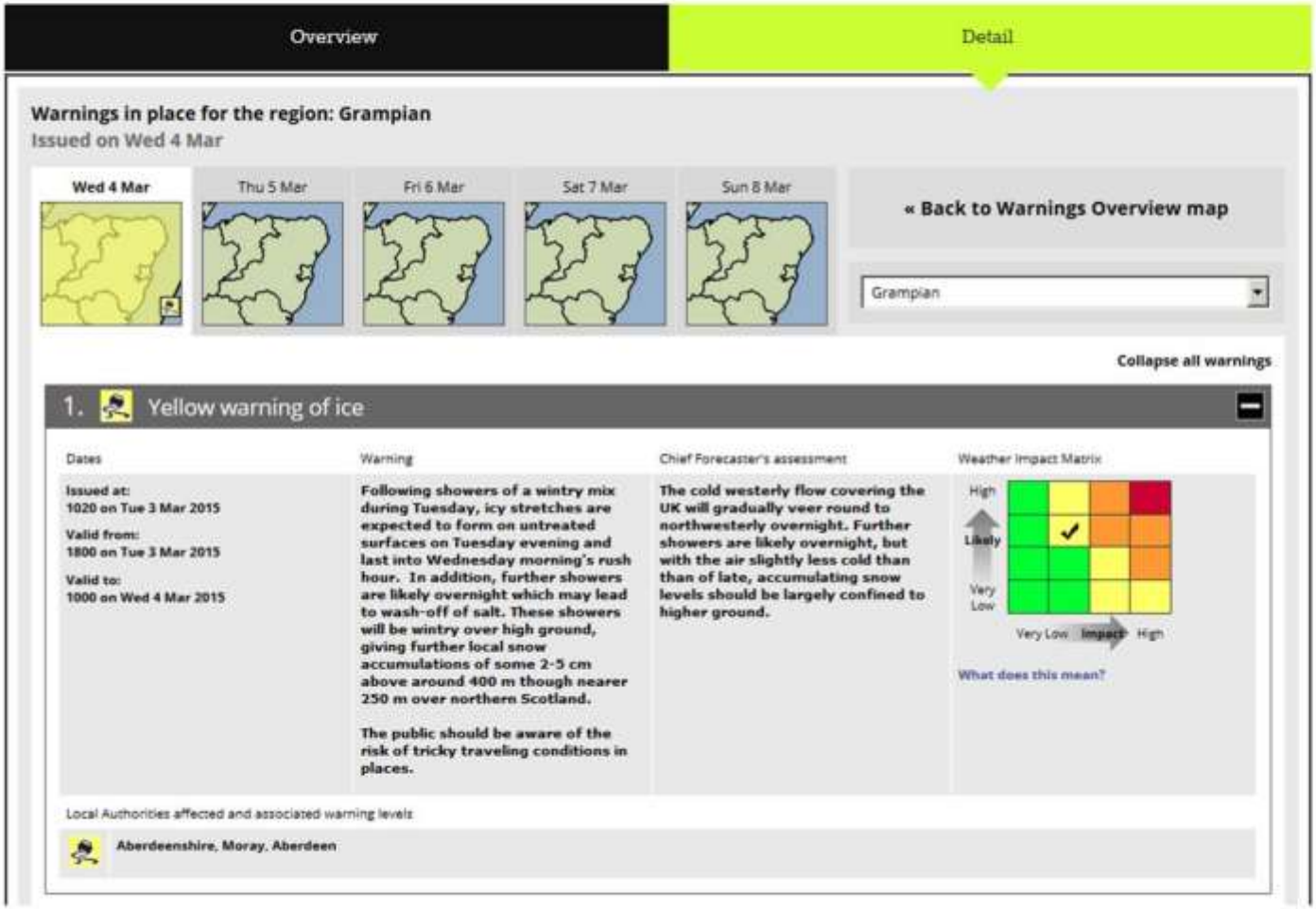
Warnings at ZAMG Homepage



ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Example from Met Office – Weather Impact Matrix

National Severe Weather Warnings - United Kingdom



Transition from „pure meteorology“ to „impact“well under way

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Sendai Framework of actions
7 global targets for 2015 - 2030

Substantially reduce global disaster **mortality**
(aiming to lower average per 100,000 global mortality between 2020-2030 compared to 2005-2015)

Substantially reduce the number of **affected people** globally
aiming to lower the average global figure per 100,000 between 2020-2030 compared to 2005-2015.

Reduce direct disaster **economic loss** in relation to GDP

Substantially reduce disaster damage to **critical infrastructure**
and disruption of basic services (among them health and educational facilities, including through developing their resilience by 2030)

Substantially increase the number of countries with national / local **DRR strategies**
by 2020.

Substantially enhance **international cooperation** to developing countries through
adequate and sustainable support to complement their national actions for implementation of this framework by 2030.

Substantially increase the availability /access to **multi-hazard early warning systems**
and disaster risk information and assessments to the people by 2030.

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

SFA: new paradigm

Paradigm shift in national or local agencies (as NMHS), in:

1. Advancing from the current status as providers of forecasts and early warnings to providers of:

   impact-based forecasts* and *risk-informed warnings

2. Assuming *active roles* in all aspects of disaster risk management to better support national disaster management agencies and local communities in reducing disaster risk

3. Providing better *risk-based* decision support services.

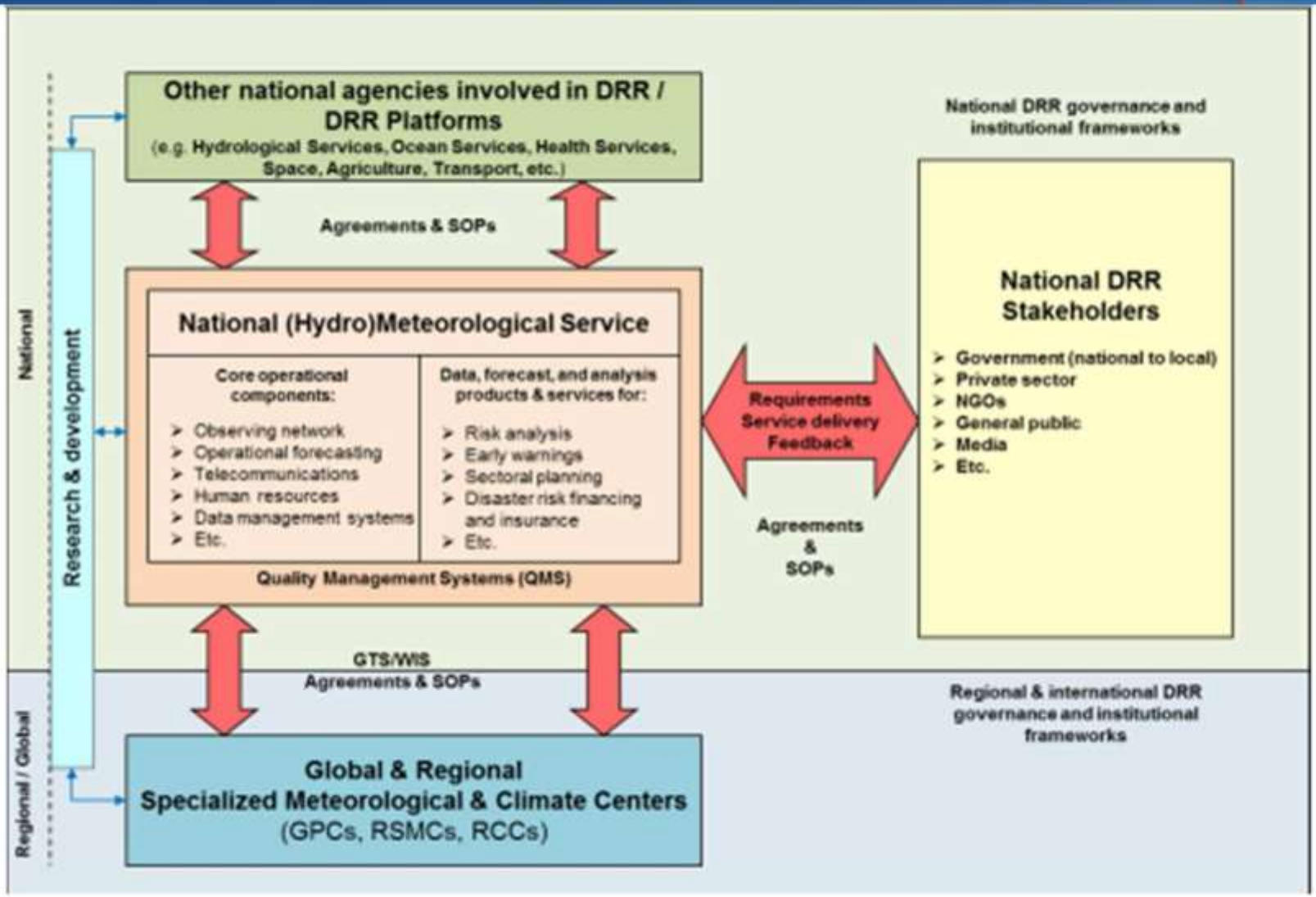
ZAMG
Zentralanstalt für Meteorologie und Geodynamik

SFA: putting principles into practise

1. On which level is prevention – warning – response undertaken?
2. How do these levels interact?
3. Top down vs bottom up?
4. How to reach the local level?

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Institutional cooperation (WMO work plan 2015 - 2020



ZAMG
Zentralanstalt für Meteorologie und Geodynamik

A warning situation– who needs to know what?

time, location, severity, certainty . . . .

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

A warning situation– who needs to know what?

Severe thunderstorms

source: Fabian Lackner, meteopics

Laundry on the balcony? Event management? Canal system?

EUMETNET
The Network of European Meteorological Services

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Definition of warnings (ISDR)

What is a warning?

Tangible and understandable description of an expected damage scenario

+

a clear advice what to do

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Definition of warnings

How to communicate within the chain of information?

Meteorology - Civil Protection

Well prepared conversation:

Evaluating the information on upcoming damage scenarios

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Definition of warnings

How to communicate within the chain of information?

Meteorology – Public:

Less prepared conversation:

What to do?
Why?
Which are similar events?

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

ISDR – guidelines on Early warning systems

Integrate within DRR — EWS is not a stand-alone

Aim for synergy across levels: community, national, regional, global

Insist on multi-hazard EWS

Systematically include vulnerability

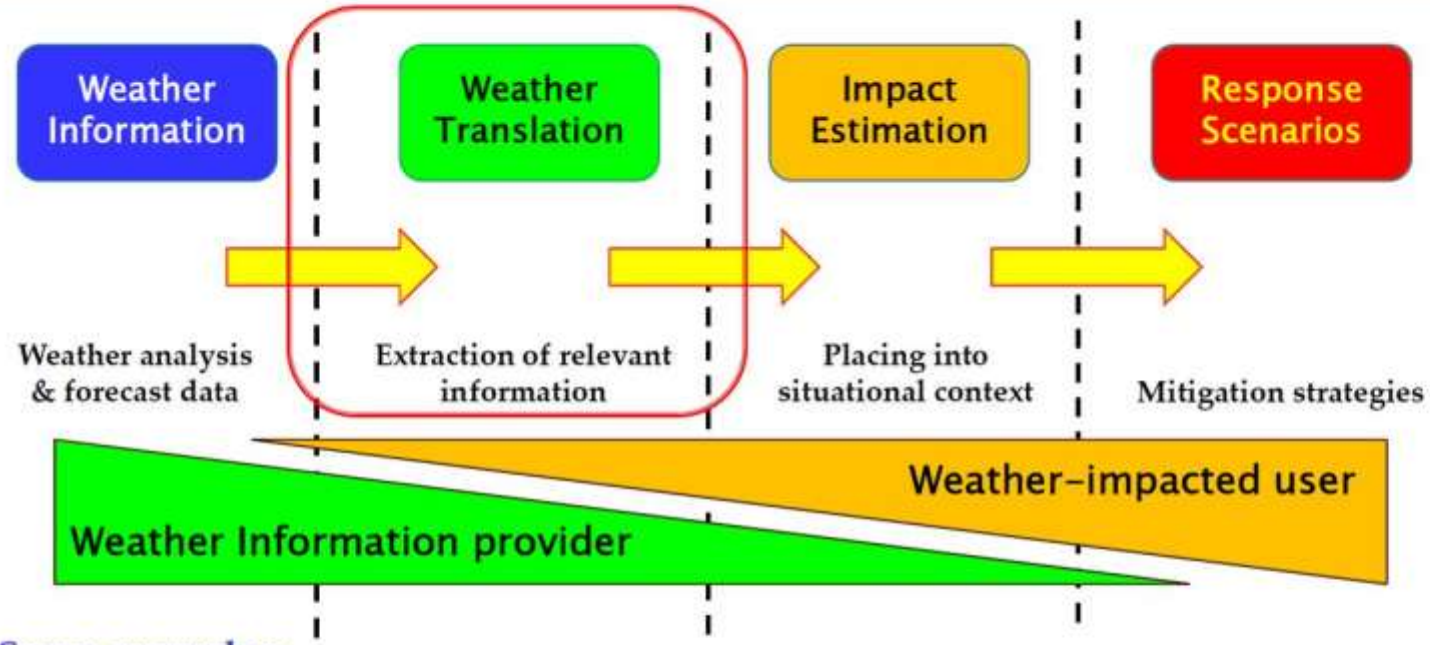
Accommodate multiple timescales

Account for evolving risk and rising uncertainty

Build partnership and individual engagement

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Weather translation and integration



Some examples:

Airport operation	Ceiling & visibility (flight categories)	Reduced capacity (arrival rates)	Ground delay programs
Dam operation	Precipitation & runoff (water level)	Overflow or breaking, minimal discharge	Controlled release of water
Power plant operation	Winds below/above critical thresholds	Reduced power generation	Balancing grid with other power sources

Curtesy of Dr. Matthias Steiner of NCAR

Standardised European Warnings - public

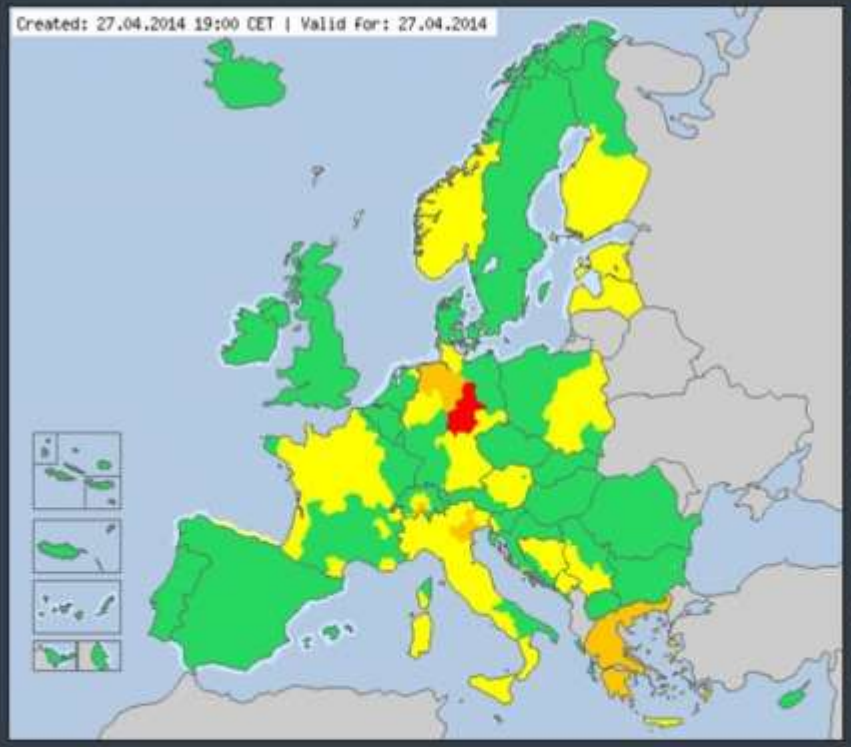
meteoalarm
alerting europe for extreme weather

EUMETNET
The Network of European Meteorological Services

Start | News | About Meteoalarm | Help | Terms and Conditions | Links | Display Options

english

» Europe:



Weather warnings: Europe

Awareness Reports - You can find detailed information about the warnings in the awareness reports issued for each country. Select the relevant country.

AT		IS	
BA		IT	
BE		LU	
BG		LV	
CH		ME	
CY		MK	
CZ		MT	
DE		NL	
DK		NO	
EE		PL	
ES		PT	
FI		RO	
FR		RS	
GR		SE	
HR		SI	
HU		SK	
IE		UK	

awareness types: all awareness types

Display: today tomorrow

Caption:

Change Language: | BG | BS | CZ | DA | DE | EE | EN | ES | ES | ES | FI | FR | GR | HR | HU | IS | IT | LT | LV | ME | MK | MT | NL | NO | PL | PT | RO | RS | SI | SK | SV | VA

European Warnings – Civil Protection : 5 days

meteoalarm
alerting europe for extreme weather

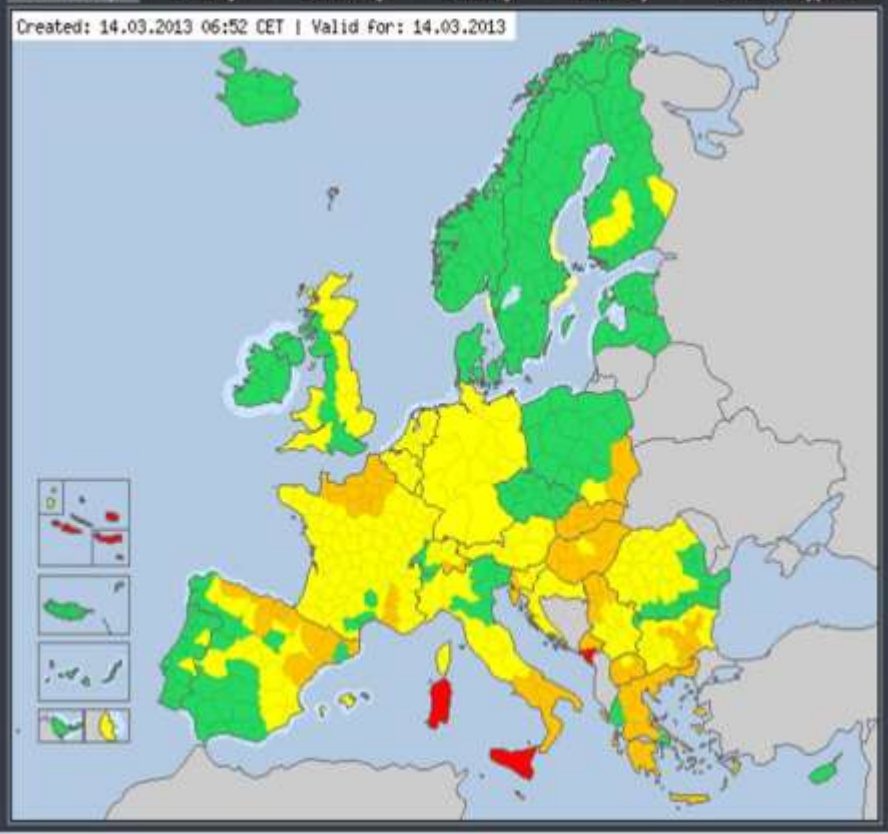
EUMETNET
The Network of European Meteorological Services

Start | News | About Meteoalarm | Help | Terms and Conditions | Links | Display Options

mstaudinger english

» Europe:

Thursday | Friday | Saturday | Sunday | Monday | all Warntypes



Weather warnings: Europe

Awareness Reports - You can find detailed information about the warnings in the awareness reports issued for each country. Select the relevant country.

AT		IT	
BE		LT	
BG		LU	
		LV	
CH		ME	
CY		MK	
CZ		MT	
DE			
DK		NL	
EE		NO	
ES		PL	
FI		PT	
FR		RO	
GR		RS	
HR		SE	
HU		SI	
IE		SK	
IS		UK	

Caption:

Meteoalarm – National level

meteoalarm
alerting europe for extreme weather

EUMETNET
The Network of European Meteorological Services

Start | News | About Meteoalarm | Help | Terms and Conditions | Links | Display Options

mstaudinger english

» Europe » Bosnia-Herzegovina

Weather warnings: Bosnia-Herzegovina

Awareness Reports - You can find detailed information about the warnings in the awareness reports issued for each area. Select the relevant area.

Banja Luka	
Bihac	
Foca	
Livno	
Mostar	
Prijedor	
Sarajevo	
Trebinje	
Tuzla	
Visegrad	

awareness types: all awareness types

Display: today tomorrow

more information:

FHMZ

Federalni hidrometeorološki zavod Bosne i Hercegovine

RHMZ RS

Republički hidrometeorološki zavod Republike Srpske

Caption:

Meteoalarm – district (regional) level

meteoalarm
alerting europe for extreme weather

EUMETNET
The Network of European Meteorological Services

Weather warnings: Banja Luka

valid from 27.04.2014 12:00 CET **Until** 27.04.2014 18:59 CET
Thunderstorms Awareness Level: **Yellow**

Očekuje se grmljavina / Isolated thunderstorm are expected

Back to Europe:

Back to Bosnia-Herzegovina:

Display: today tomorrow

more information:

RHMZ RS

Republički hidrometeorološki zavod Republike Srpske

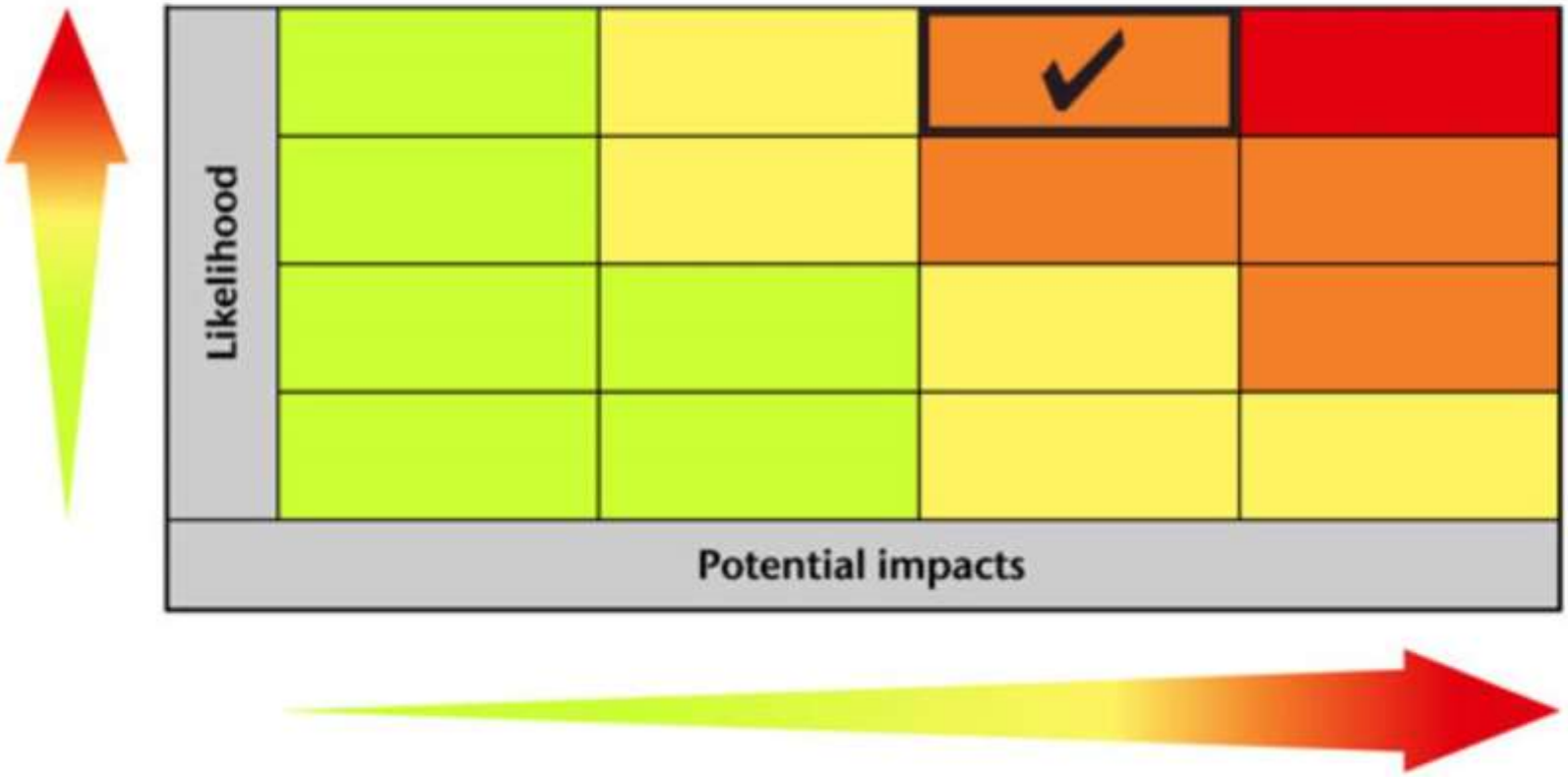
Meteoalarm Lessons learned (www.meteoalarm.eu)

- 4 – level colour code seen as understandable „language“
- Transition from „pure meteorology“ to „impact“well under way
- Links to www.meteoalarm.eu from more than 1300 websites
- Approx. 6 Bio hits since start
- High acceptance with public and professonal institutions
  - Civil Protection, First responders (national level)
  - „European“ usage by tourists & professionals

Warning matrix

Colour	One word	What to do?	Damage / Impact	Used how often? (Area approx. 300 000 km2)	Meteo Treshholds e.g. Rain (area + impact related)
Green	Weather report	usual phenomena	- - -	usual phenomena	Examples
yellow	**Be aware!**	caution with exposed activities	exposed objects (avoidable)	> 30 per year	> 54 mm/12h
orange	**Be prepared!**	keep informed in detail, follow advice of authorities	general damages (not avoidable)	1 to 30 per year	> 80 mm/12h
red	**Take action!**	**follow order of authorities under all circumstances be prepared for extraordinary measures**	extreme damage and /or casualties *extreme damage (mostly) on large areas, threatening life and properties* (not avoidable, even in otherwise safe places)	less then 1 year *+ large (5000km2) scale phenomena*	> 140 mm/12h

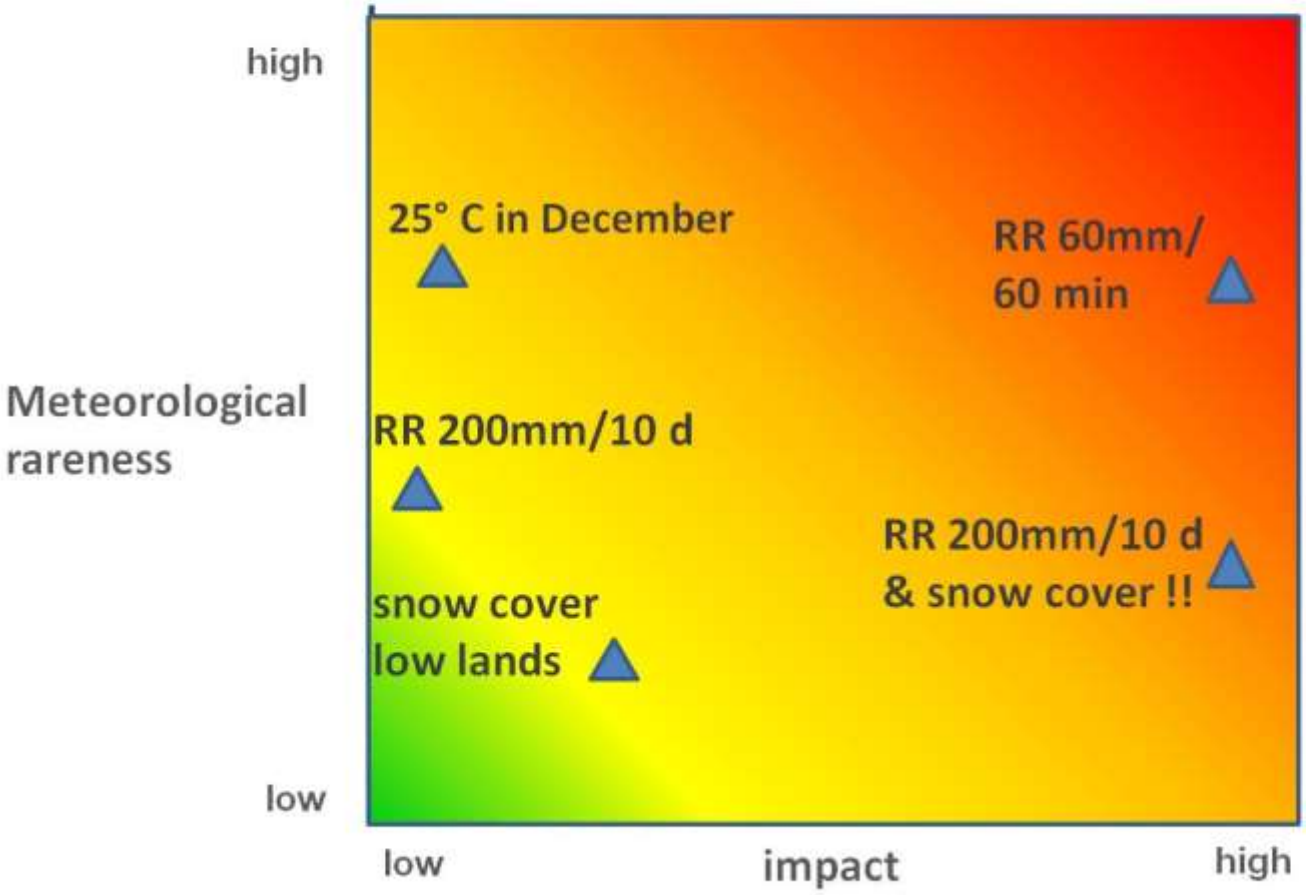
Likelihood vs impact



ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Meteorological rareness vs impact

Is the likelihood of an event recognized under multi parameter conditions?



ZAMG
Zentralanstalt für Meteorologie und Geodynamik

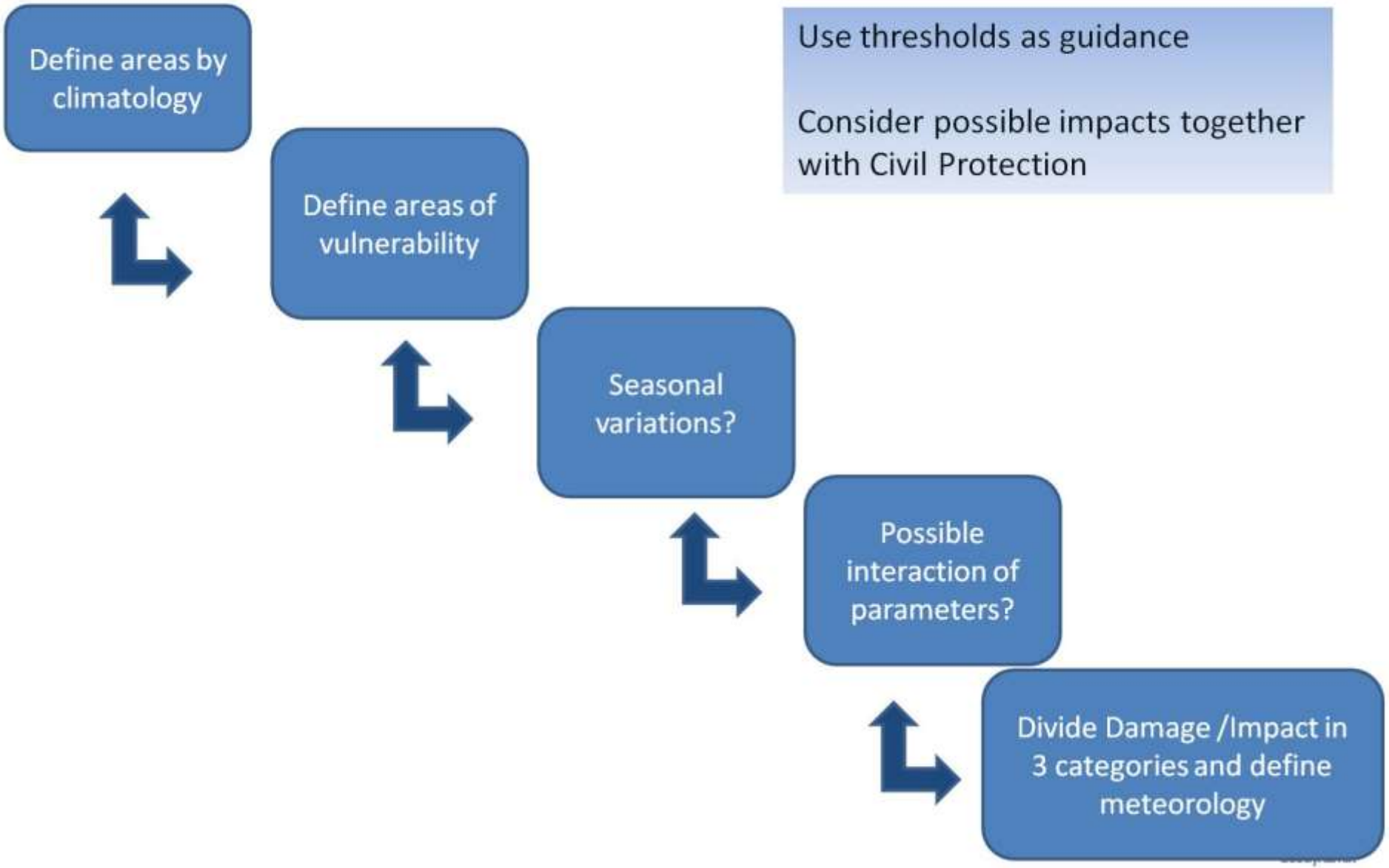
Warning strategies - Certainty

The communication of probabilities has significantly improved the communication between meteorologists and educated users.

Alert level Level of confidence	Green	Yellow	Orange	Red
0 – 5%				
5 - 30%				
30 – 60%				
>60%				

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Defining „thresholds“ for warnings



Use thresholds as guidance

Consider possible impacts together with Civil Protection

Thresholds (Serbia)

FEBRUARY			
	2- Yelllow	3 - ORANGE	4 - RED
	Wind gusts > 14 m/s (>50km/h)	Wind gusts > 17 m/s (>60km/h)	Wind gusts > 28 m/s (>100km/h)
	Wind gusts > 17 m/s (> 60km/h) above 1000m	Wind gusts > 24 m/s (>85km/h) above 1000m	Wind gusts > 28 m/s (>100km/h) above 1000m
	Heavy rain or showers	Heavy Rain/showers - at least 10 mm (l/m²) within a 3-hour period	Heavy Rain/showers - at least 20 mm (l/m²) within a 3-hour period
	Rain - at least 10 mm (l/m²) within a 12-hour period	Rain - at least 20 mm (l/m²) within a 12-hour period	Rain - at least 30 mm (l/m²) within a 12-hour period
	Rain - at least 20 mm (l/m²) within a 24-hour period	Rain - at least 40 mm (l/m²) within a 24-hour period	Rain - at least 50 mm (l/m²) within a 24-hour period
	Snow with the formation of a small snow cover	Formation / increase in snow cover ≥ 5cm within 6-hour period	Formation / increase in snow cover ≥ 10cm within 6-hour period
	Wet snow	Formation / increase in snow cover ≥ 10cm within 12-hour period	Formation / increase in snow cover ≥ 15cm within 12-hour period
		**Formation / increase in snow cover ≥ 15cm within 12-hour period above 1000 m**	**Formation / increase in snow cover ≥ 30cm within 12-hour period above 1000 m**
	Melting snow cover	Sudden melting snow cover	Rain combined with sudden melting snow cover
	Light freezing rain/drizzle	Moderate or heavy freezing rain/drizzle	Widespred freezing rain/drizzle

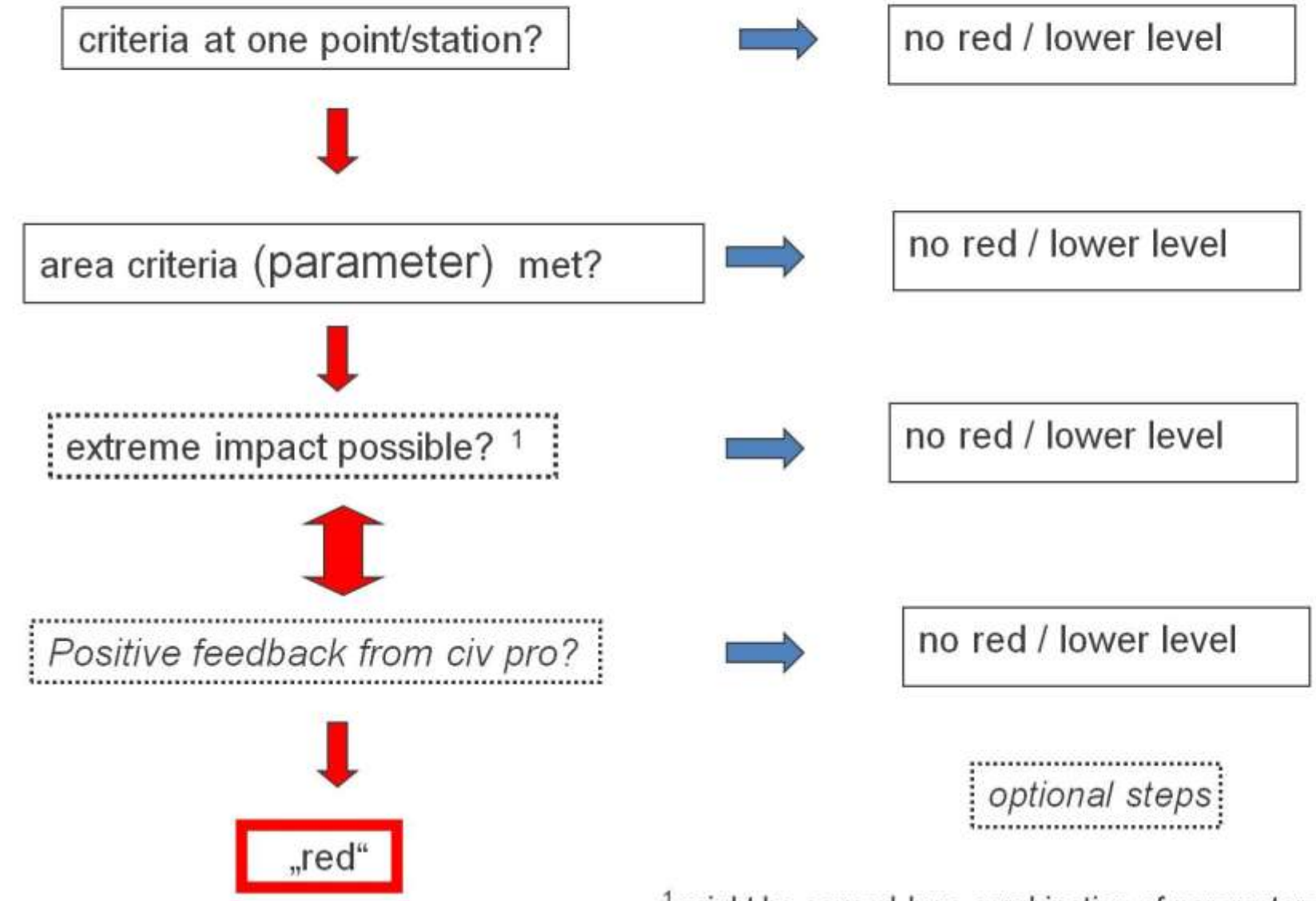
TAB-1 | TAB-2 | TAB-3a | TAB-3b | TAB-4I | TAB-4II | TAB-4III | TAB-5 | TAB-6 | TAB-7 | TAB-8

Changing with:

- time of the year,
- climatology of the area ,
- vulnerability

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Determining alert levels



[1] might be caused by a combination of parameters

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Intranet – homogenisation of forecaster work

Meteoalarm
Alerting Europe for extreme Weather

EUMETNET
The Network of European Meteorological Services

13.03.2008

logged in: Michael Staudinger | Help(Wiki) | who is online | logout

Message of today:

2008

Position: Emma Intranet | Forum | Forecasts | debriefing EMMA

Topic: debriefing EMMA

posted on 01.03.2008 09:43:35 by Karim Hamid

Hi

It seems that the storm EMMA (what's the name!) had very similar characte

Behind the frontal systems of this low, a squall line (SQL) moved over Wes
SQL was nestled within the dark stripe, the region of high PV-values (exact
the SQL, with at 3km, winds up to 85 kts. In combination with ground winds

Here in Belgium there were gusts up to 120 km/h with widespread wind dan

It seems that the wind damage can be followed from the Netherlands up to
this countries should be collected, but unfortunately this isn't te case).

Have a nice day
Karim Hamid

Weblink: users.fulladsl.be/sab4195/storm18012007.pdf

Attached Images:

Attached Documents:
lewp.jpg
lewp2.jpg
lewp3.jpg
lewp4.jpg
lewp5.jpg

Replies

Author	Header
Jan Sulan	**Re:debriefing EMMA** Posted: 01.03.2008 14:15:45
	First reports from Czech Republic Thanks to thunderstorms max wind gusts were in s damages are serious - many places without electric Also some local floodings.

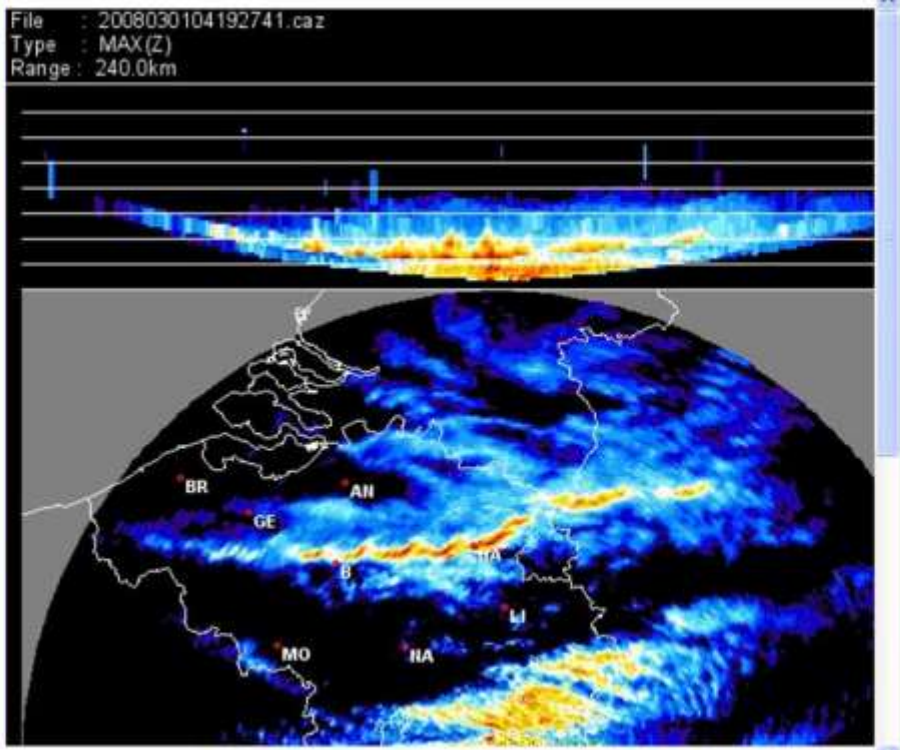
http://www.meteoalarm.eu/intranet/upload/documents/lewp.jpg - Windows...

http://www.meteoalarm.eu/intr

Datei Bearbeiten Ansicht Favoriten Extras ?

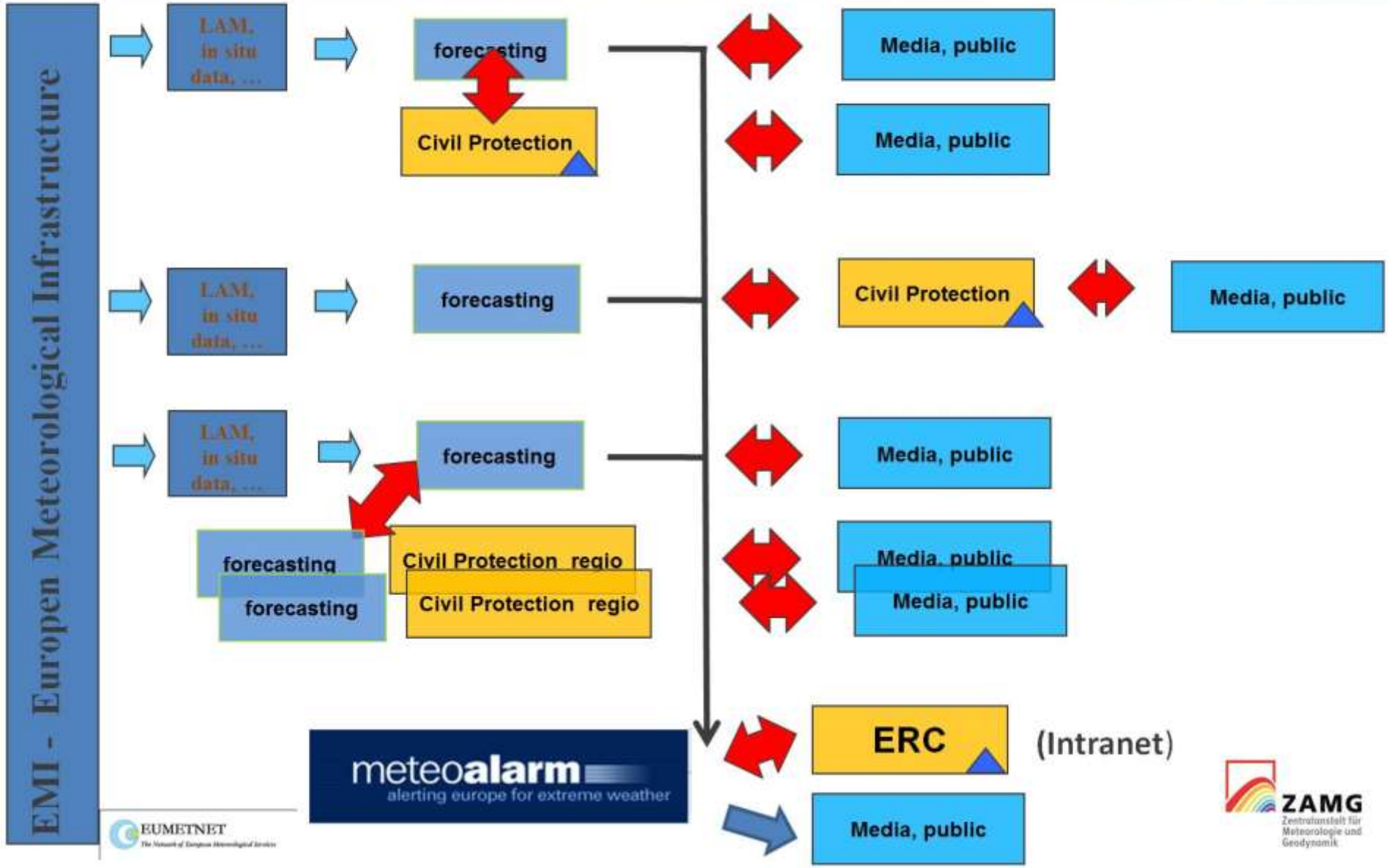
http://www.meteoalarm.eu/intra...

Seite Extras

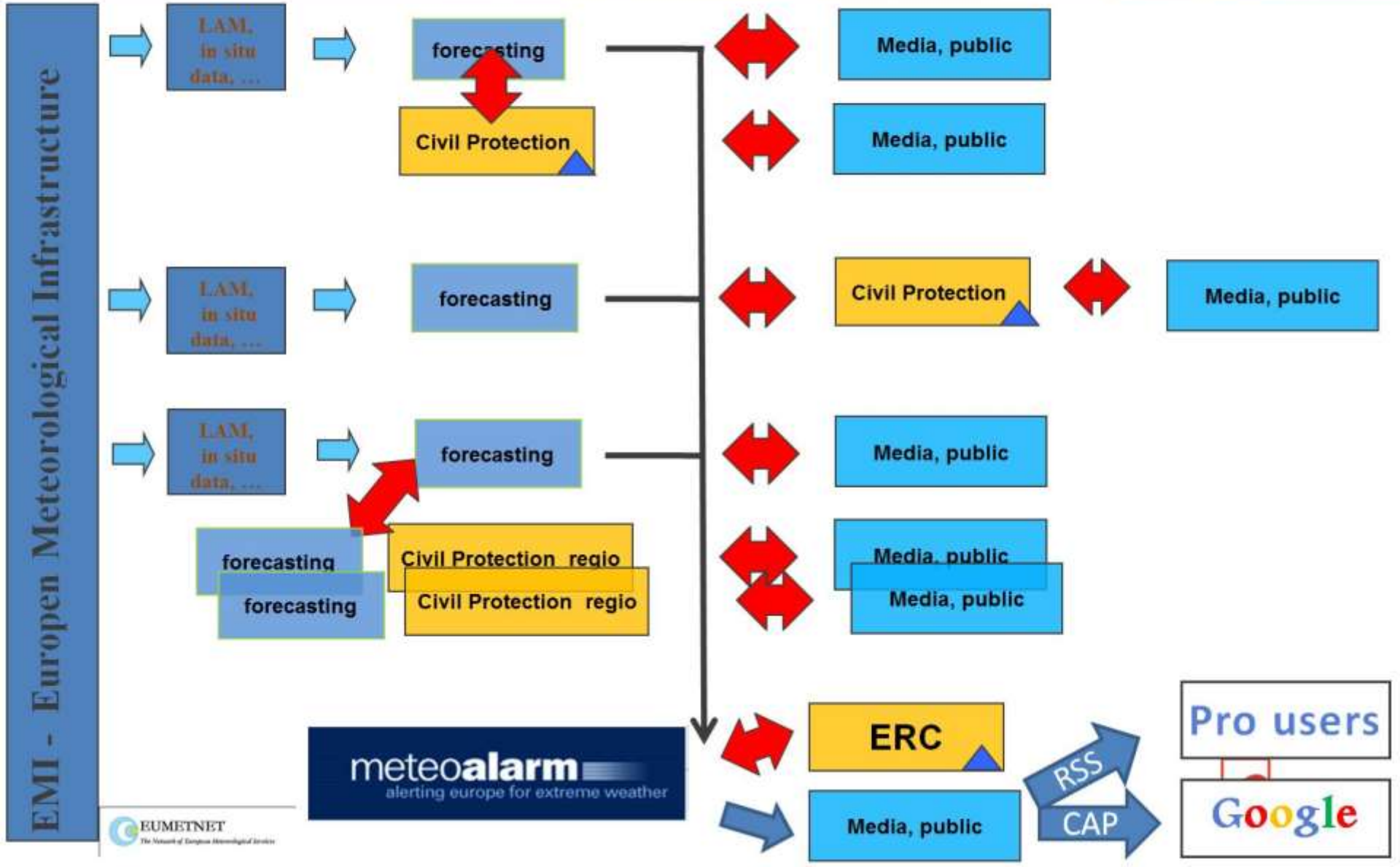


ZAMG
Zentralanstalt für Meteorologie und Geodynamik

Different pathes towards the public and CP



Different pathes towards the public and CP



It´s all about communication

meteoalarm
alerting europe for extreme weather

CP

Two way communication to Civil Protection

What ought to be communicated

- Certainties/ probabilities?
- possible Scenarios ?
- Local and regional impact conditions?
- What has happened so far?

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

EUMETNET Meteoalarm www.meteoalarm.eu

- will provide the most relevant information needed to prepare for **extreme weather**, expected to occur somewhere over Europe
- **understandable** by all actors from the private and public sector
- 4 – level colour code seen as understandable „language“
- **harmonized** as far as possible
- is the website that integrates all important severe weather information originating from the official National Public Weather Services across a large number of European countries.
- This information is presented consistently to ensure coherent interpretation as widely as possible throughout Europe.
- **High acceptance** with public and professonal institutions
  - Civil Protection, First responders (national level)
  - „European“ usage by tourists & professionals

Enhancing disaster preparedness for effective response

- Be prepared to act appropriately in **response** to warnings
- EWS for natural hazards work only if governments have appropriate systems and their stakeholders and public know how to respond
- Ensuring access to **timely environmental hazard information**
- Communicate impact-based forecasts and risk-informed hazard warnings to end-users in a manner that is **efficient, timely, understandable** and **actionable**
- Strengthening early warning systems and tailor them to **users needs**, including social and cultural requirements.
- Recognize multi-hazard EWS as an **integral part of disaster risk reduction**. They provide integrated and seamless services for all components of disaster risk reduction for various hazard types and lead times, from the national level to local communities.

Thanks for your attention

ZAMG
Zentralanstalt für Meteorologie und Geodynamik

TECHNICAL CHALLENGES ON FORECAST AND HANDLING EARTHQUAKES

by

Gheorghe MARMUREANU, Constantin IONESCU, Alexandru MARMUREANU

National Institute for Earth Physics, Bucharest

marmur@infp.ro

Bucharest, June 25, 2015

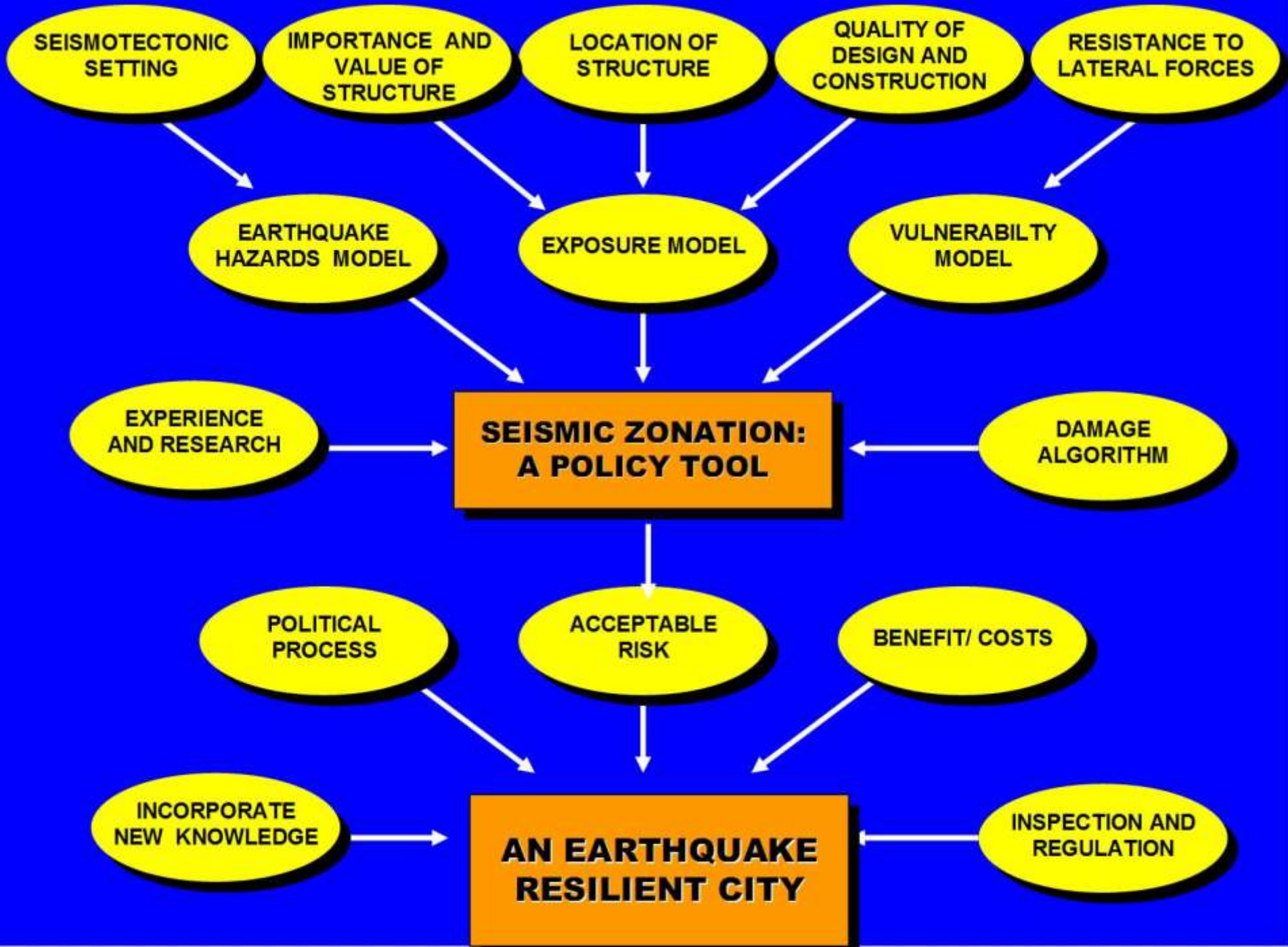
The 1977, Mw=7.4 Vrancea earthquake, h=95 km, BUCHAREST= IX½ MSK; RUSSE = IX MSK

High dynamic amplification at long periods, dangerous for high buildings, that makes Bucharest the most dangerous capital city of Europe

In Romania: 1578 dead and 11,321 injured (90% of dead and injured 67% of Bucharest), 36 blocks in Bucharest, fell to the ground, 32,900 houses collapsed or severely damaged 35,000 families homeless, tens of thousands of buildings damaged, many other damage and destruction in the industry and economy etc. On the territory of **Bulgaria:** 285 dead and injured, 8470 buildings partially destroyed and ruined etc.

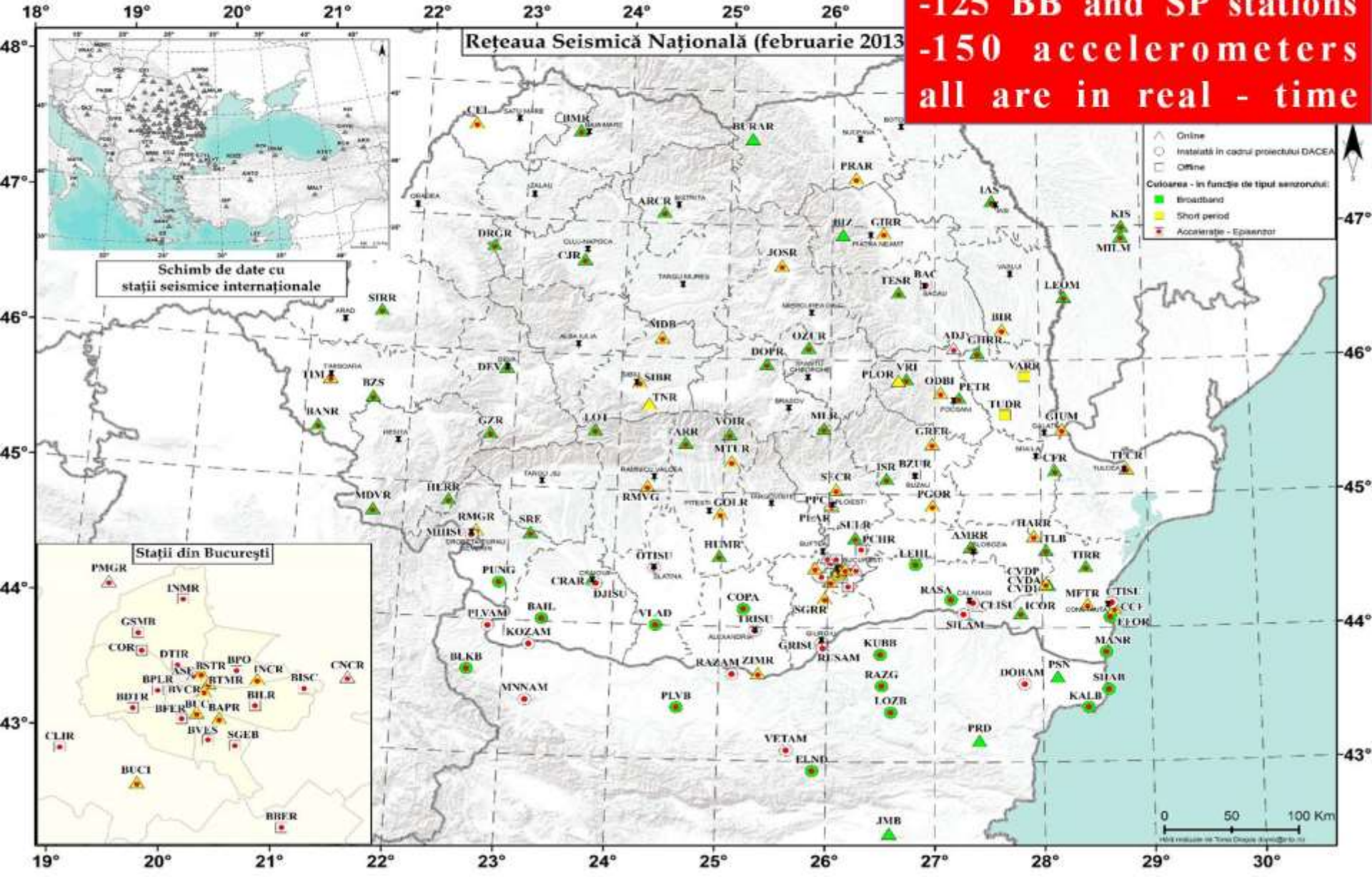
What can be done to increse resilence ?

Disaster of Fukushima Daichii - Japan.
March 11,2011
Mw = 9.0


SEISMOTECTONIC SETTING
IMPORTANCE AND VALUE OF STRUCTURE
LOCATION OF STRUCTURE
QUALITY OF DESIGN AND CONSTRUCTION
RESISTANCE TO LATERAL FORCES
EARTHQUAKE HAZARDS MODEL
EXPOSURE MODEL
VULNERABILTY MODEL
EXPERIENCE AND RESEARCH
SEISMIC ZONATION: A POLICY TOOL
DAMAGE ALGORITHM
POLITICAL PROCESS
ACCEPTABLE RISK
BENEFIT/ COSTS
INCORPORATE NEW KNOWLEDGE
AN EARTHQUAKE RESILIENT CITY
INSPECTION AND REGULATION

ROMANIAN SEISMIC NETWORK + SEISMIC STATIONS IN CROSS BORDER AREA

The RSN consist in:
-125 BB and SP stations
-150 accelerometers
all are in real - time



The quality of life and the security of infrastructure (including human services, civil and industrial structures systems, financial infrastructure, information transmission and processing systems) in every nation are increasingly vulnerable to disasters caused by events that have geologic, atmospheric, hydrologic, and technological origins.

Investment of intellectual and material resources to prevent and mitigate such disasters is critical to every sector of our global society. In world, earthquakes are responsible for 15% of total number of events, and 30% of the total damages[1].

Forecasting and warning capabilities play a main role in determining the extent and nature of short and long terms preparedness measures and thus the impact of a hazard, assuming they are supported by effective dissemination systems. However, theoretical forecasting capabilities also varies significantly among hazard types.

Broad known areas of seismic activity can be monitored, permitting the identification of locations where a build-up in tensions is occurring.

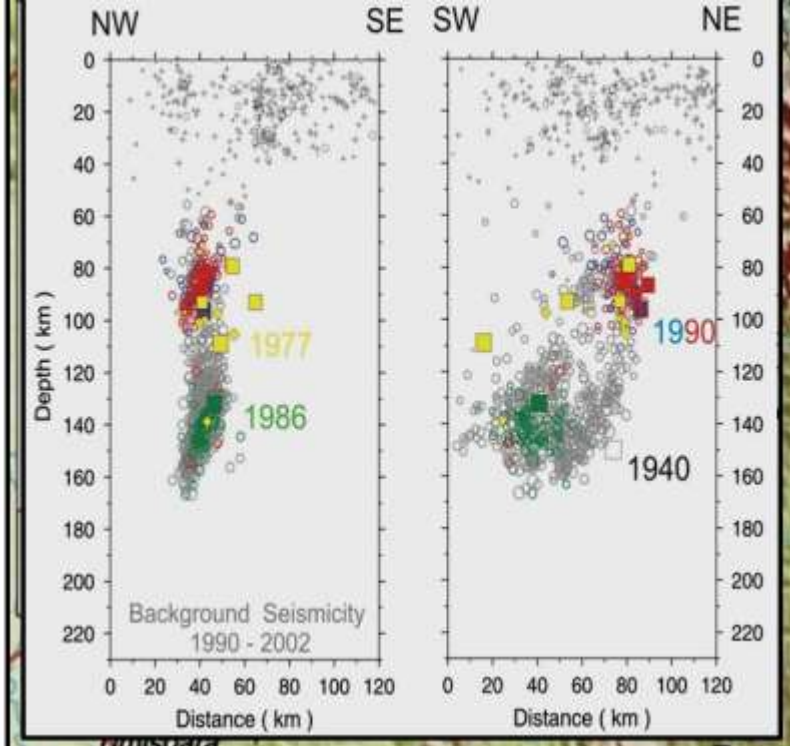
Loss of human life may also be high, reflecting high vulnerabilities to natural disasters and poor warning capabilities, while disasters can exacerbate existing levels of poverty and indebtedness [17].

Every disaster starts with an hazard and

" any hazard is a threat not the actual event " !

Each disaster is unique, not only in physical impact but also in time, as in turn expressed in terms of the stage of technical and scientific advancement and the prevailing economic environment and circumstances within which hazard occurs.

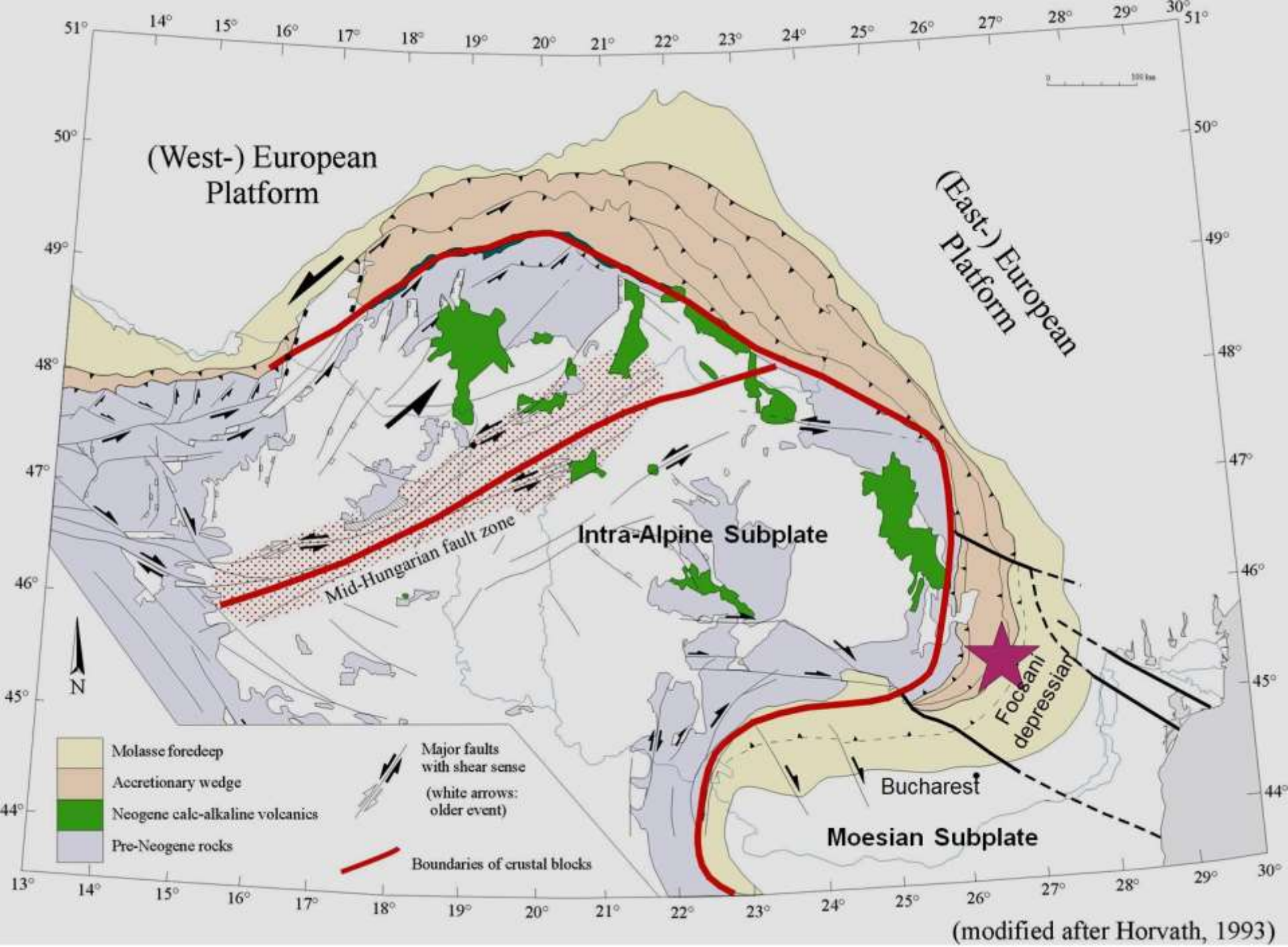
The current state of modern technology and our knowledge of the processes associated with earthquakes, tsunamis etc. allows early warning systems to be developed for the purpose of mitigating the effect such events have on human society[2-5].

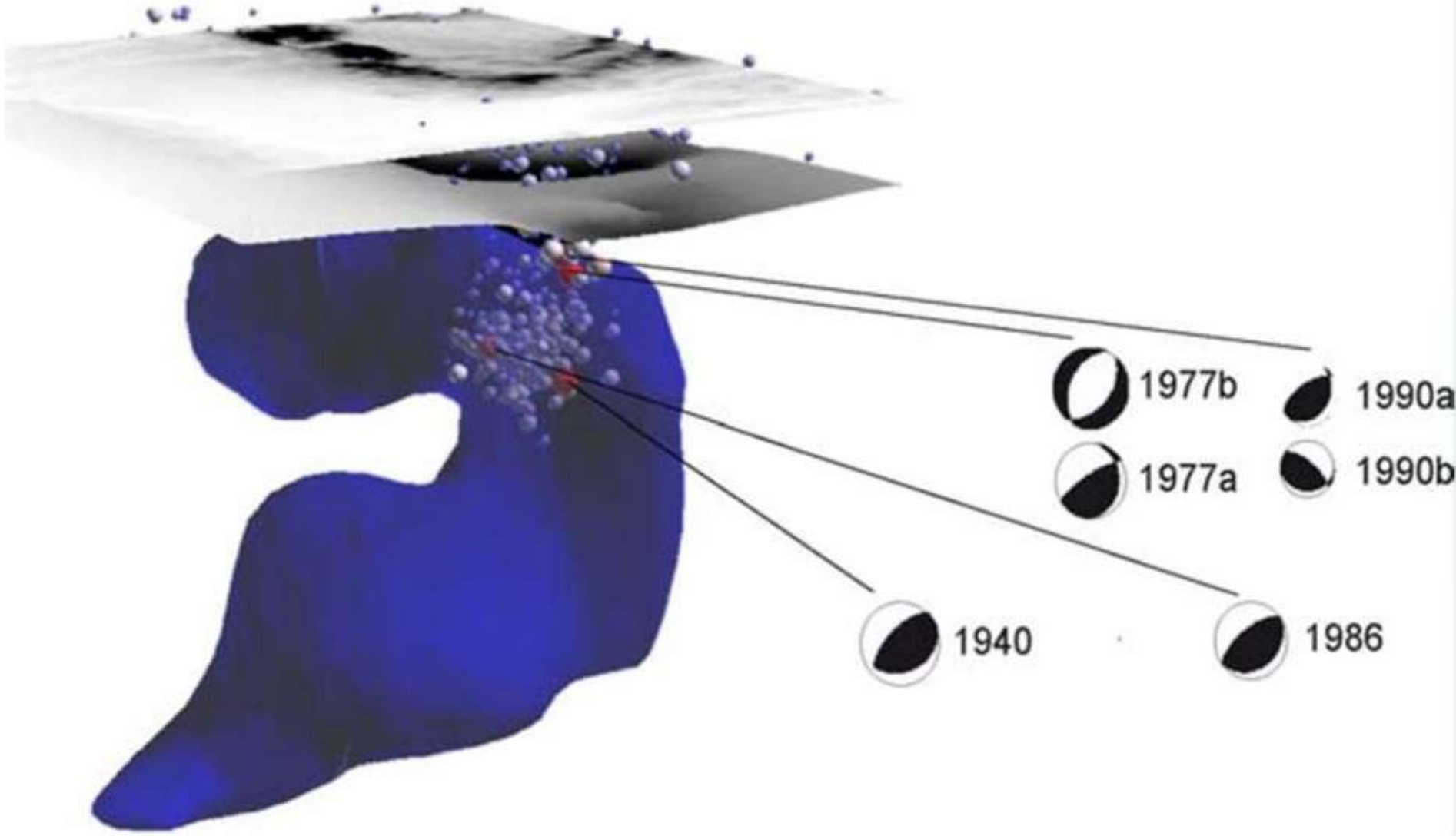


Seismicity

Suceava
BURAR
Iasi
HAD
Kishinev
Bacau
TES
BER
OZU
GHR
VRI
PLO
VAR
Brasov
TUD
VOI
MLR
SIR
LTR
Galati
TLC
CFR
SEC
FUL
LUC
Pitesti
GOL
Ploiesti
SUL
AMR
TIRR
Bucuresti
Cernavoda
Craiova
BMG
SCH
MSA
Constanta
GAL
ZML
Giurgiu
Kozloduj

< 60km > 60km
: MD = 3 : MD = 6
: presumably explosion


(West-) European Platform
(East-) European Platform
Intra-Alpine Subplate
Mid-Hungarian fault zone
Focsani depression
Bucharest
Moesian Subplate
N
Molasse foredeep
Accretionary wedge
Neogene calc-alkaline volcanics
Pre-Neogene rocks
Major faults with shear sense
(white arrows: older event)
Boundaries of crustal blocks
(modified after Horvath, 1993)



Topograhy and Moho layer and the isosurface of the 2.2% p-wave velocity anomaly of the Vrancea area from the seismic tomography work

Early warning refers to the provision of timely and effective information that will allow actions to be undertaken that will reduce the effects of such events [6].

In the case of earthquakes, early warning may also refer to the period immediately following an earthquake, where information such as shake maps would be invaluable to disaster response and management authorities, as well as the forecasting of aftershocks[9,10,11].

Researches in early warning for geological disasters could cover all natural geological phenomena:

(i).volcanic crisis;(ii)-landslides;(iii)-earthquakes;(iv)- tsunami.

A disaster is the set of failures that occur when three continuums:(i)-people,(ii)-community (i.e.,a set of habitats, livelihoods, and social constructs), and,(iii)-recurring events (e.g., floods, earthquakes, tsunami...) intersect at a point in space and time, when and where the people and community are not ready [7,8].

The concept:

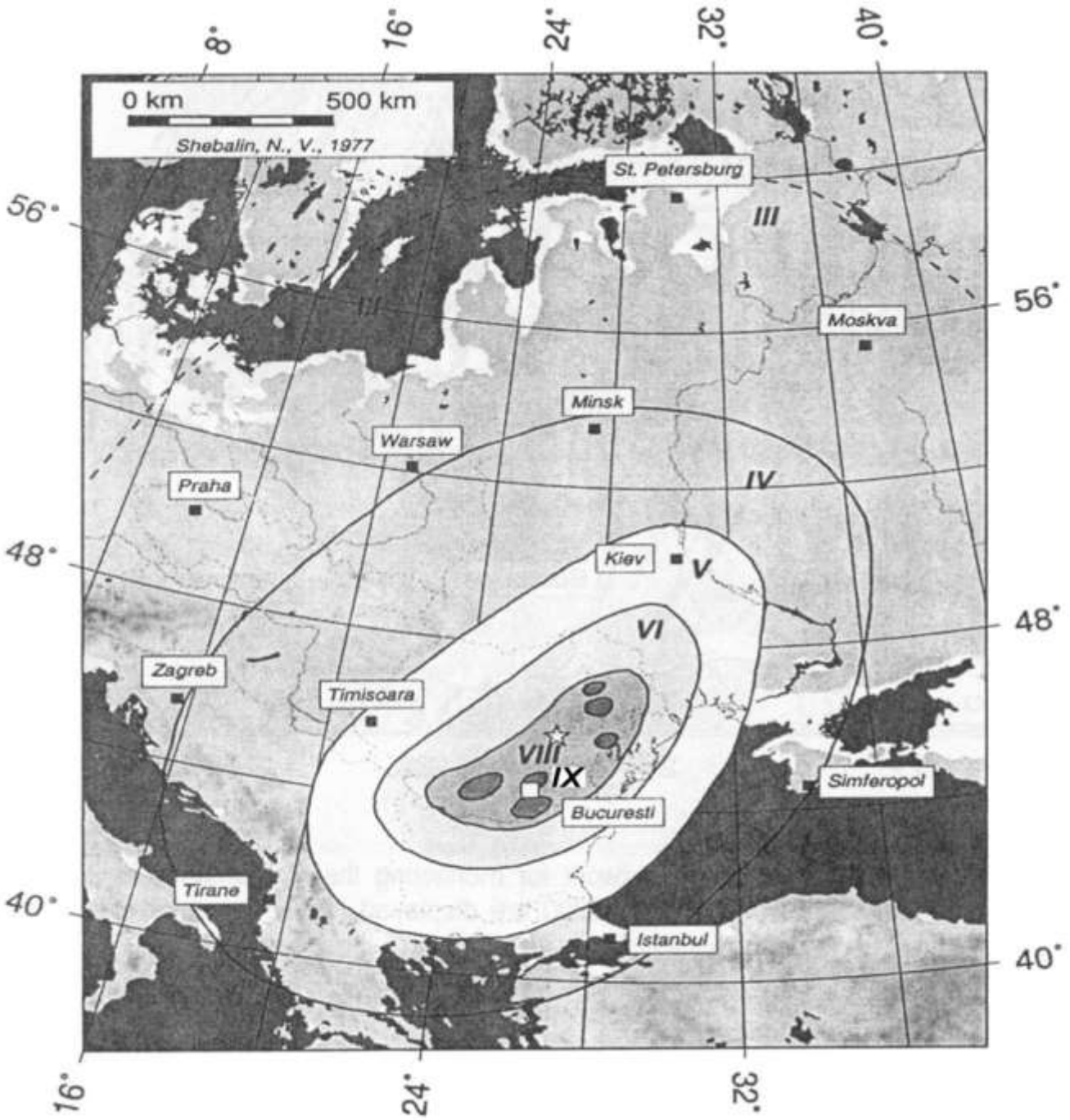
"Earthquakes and tsunami see no borders"!

Romanian early warning system is working and now it was part of regional projects in connection to Cross-Border European Territorial Cooperation Programme supporting the development of the border area between Romania and Bulgaria(2010-2013).

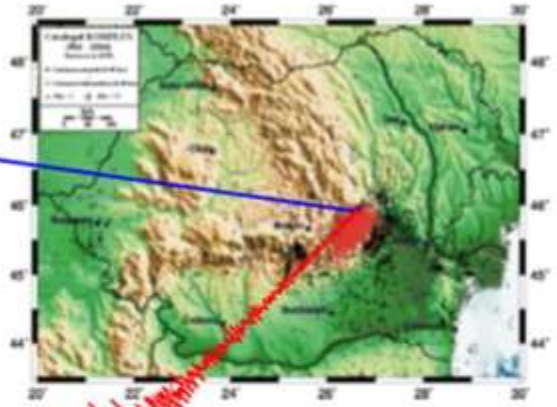
Romanian EWS is meant to contribute for mitigation of the consequences of natural hazards produced by earthquakes and tsunami events in particular in large towns and highly populated areas on the left and right side of Danube River[16].

The idea was and is to increase cross-border resilience to natural and man-made disasters. To increase Europe's *resilience* to crises and disasters is a topic of highest political concern in the EU and its Member States and Associated Countries. This concerns both man-made threats (accidents…) and natural hazards such as e.g. floods, earthquakes, tsunamis, landslides etc.[11-13]

Resilience concepts need also to take into account the necessity to anticipate, to plan and to implement a substitution process in a crisis or disaster, aiming to deal with a lack of material, technical or human resources or capacities necessary to assume the continuity of basic functions and services until recovery from negative effects and return to the normal situation. [6,14,15,18,19]



The seismic effect of Vrancea earthquakes from Moscow to Central Europe and Cairo (October 26,1802, M_W=7.9)



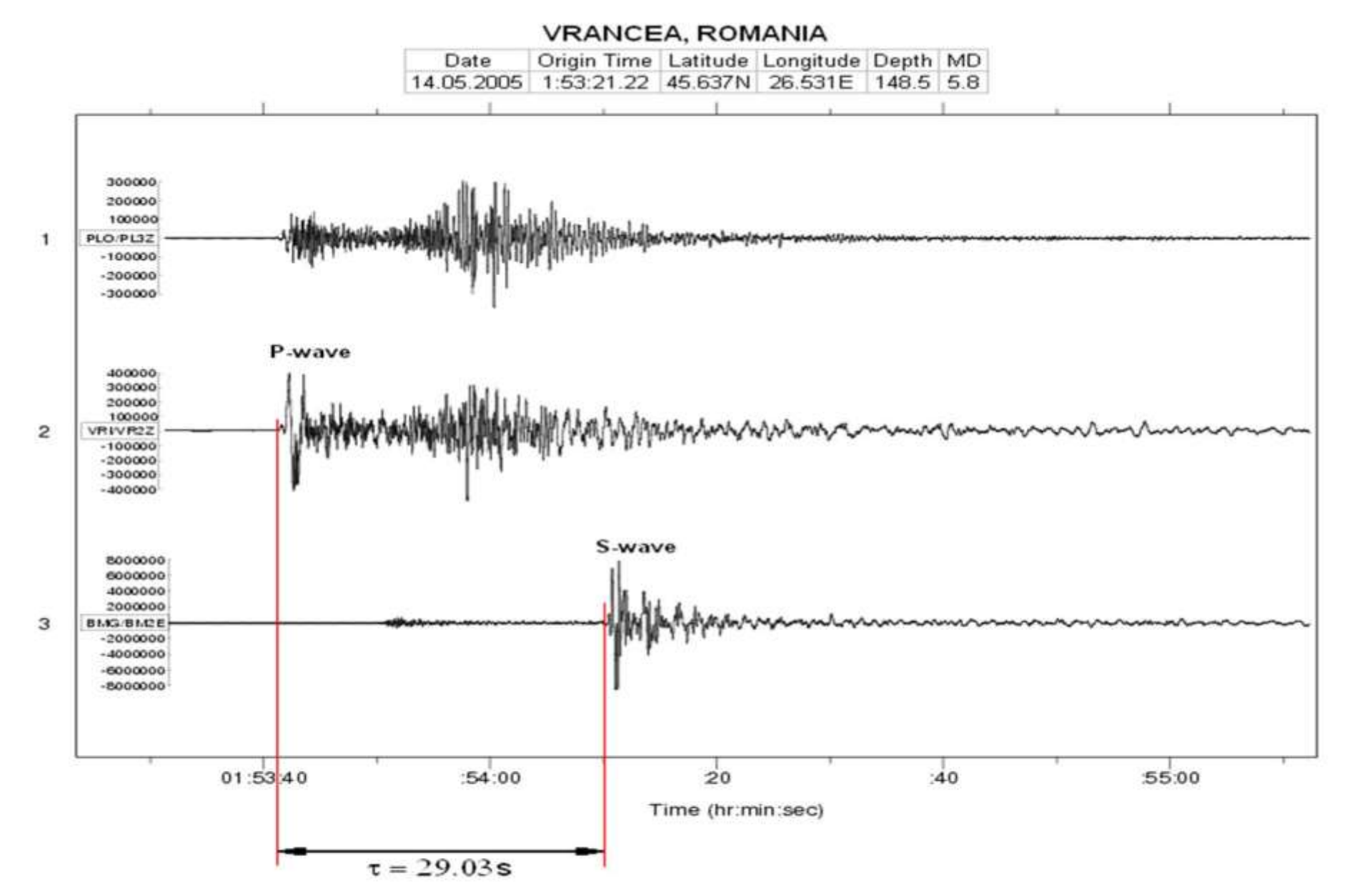
National Institute for Earth Physics, Romania
Geophysical Institute, Karlsruhe University, Germany

EARLY WARNING SYSTEM (EWS)

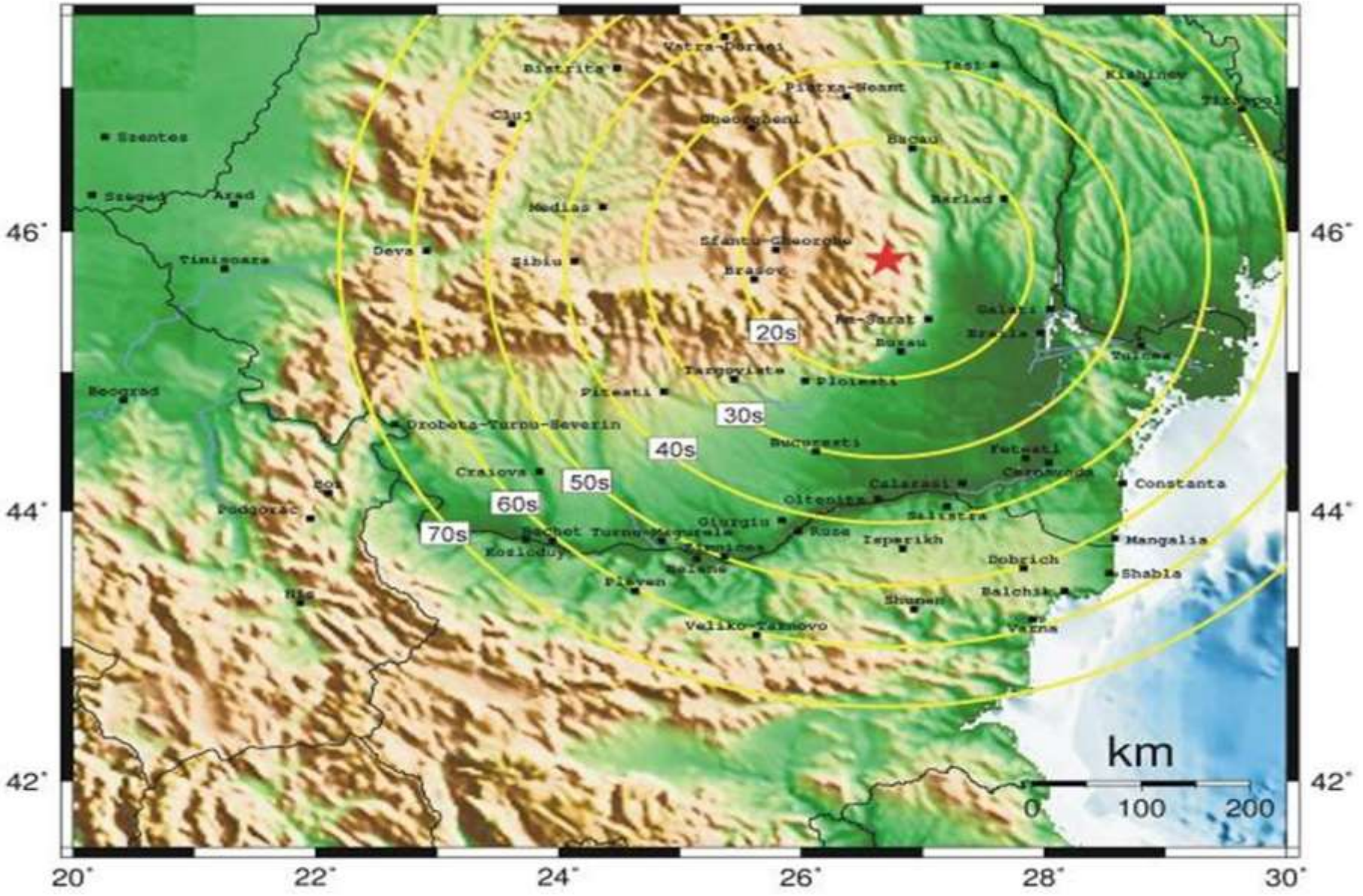
30 seconds

National Institute for Earth Physics
Bucharest-Magurele,
12 Calugareni Str.
PO BOX: MG-2, 077125 Bucharest
Telephone: +40 21 4050670
Fax: +40 21 4050673
e-mail: marmur@infp.ro
Web : http://www.infp.ro

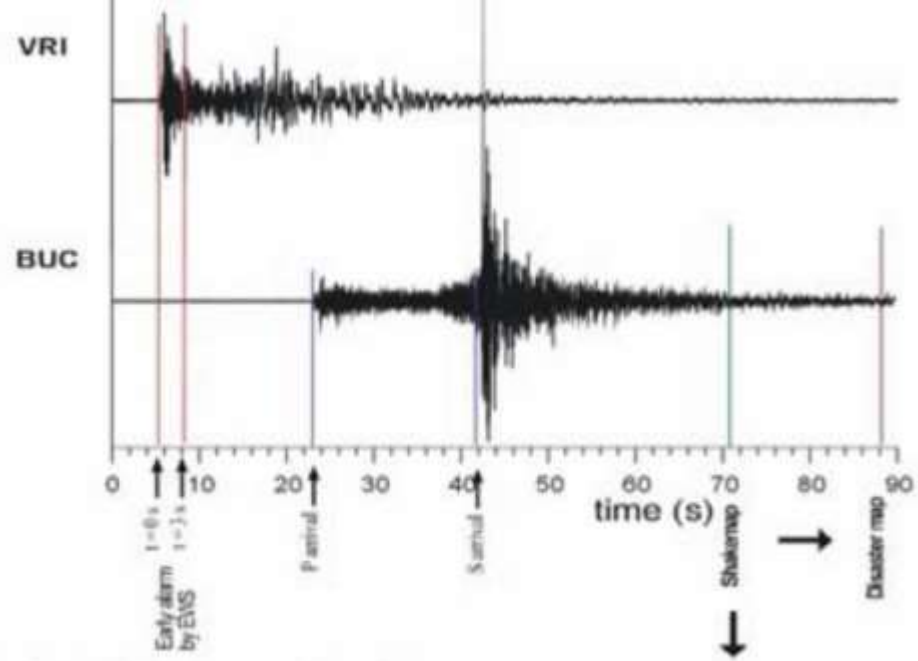
Early Warning System developed by National Institute for Erath Physics and *winner of 2006 IST European Prize.[5,9,10,12]*



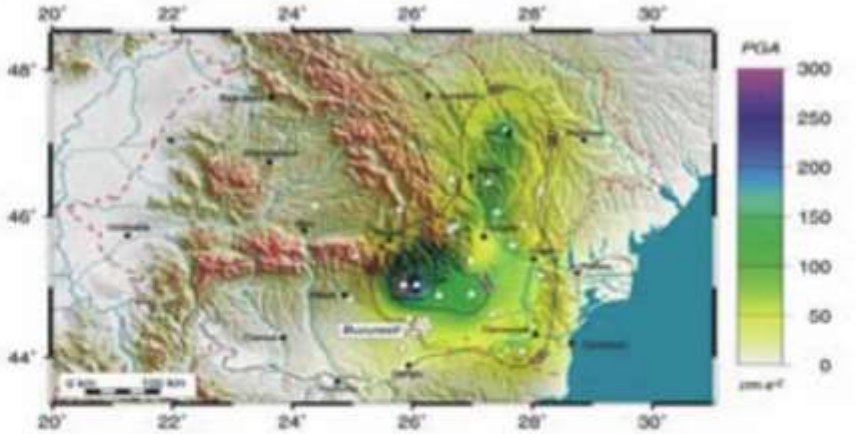
Earthquakes at depth h =150 km, 29.03 seconds the warning time for Bucharest[5]



Time of Vrancea earthquake alert, time ranging from several seconds to 1.0 minute[16]



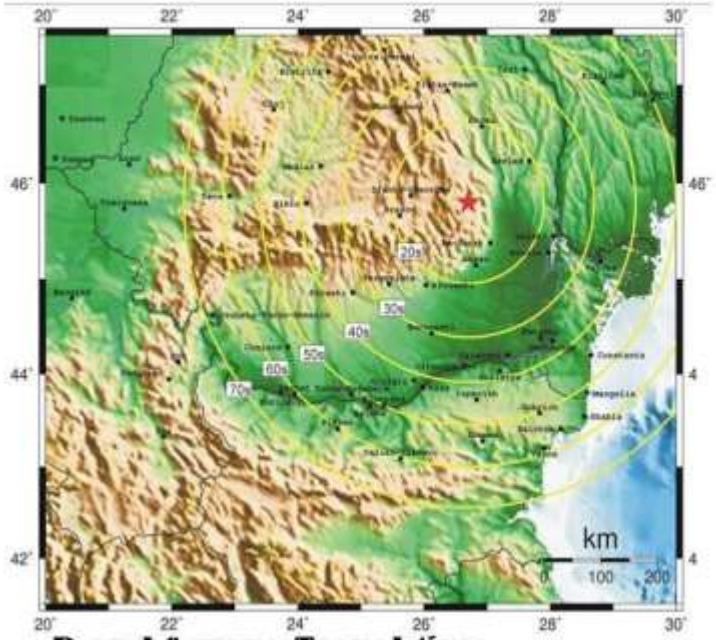
On March 16, 2006 the European Commission has selected Romanian "Early Warning System for Strong Eathquakes" made by the National Institute for Earth Physics (Bucharest) as winner of the European Programme for Information Society Technologies in 2006 (www.ist-prize.org)



Disaster Map

EWS ,
Shake Map &
Disaster Map

location in seismic risk management, in security of critical infrastructure systems as a system of systems in Romania and cross-border area…[12]



P and S wave Travel time

The products will be accesible until S wave arrive in site.

Predicted Alert Map

Time Alert

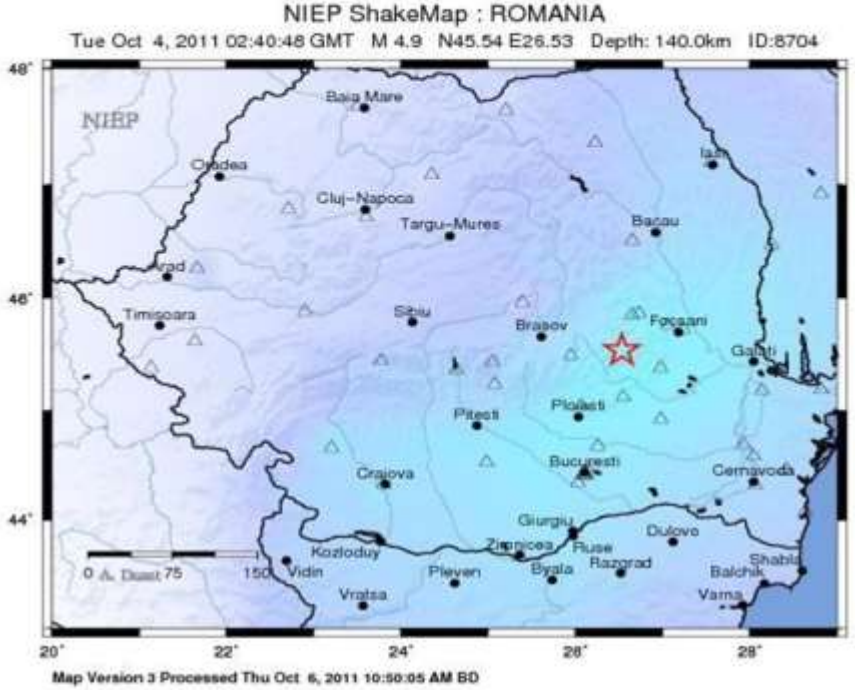
Ex. Vrancea eq.
30 seconds before S
Wave arrive in site

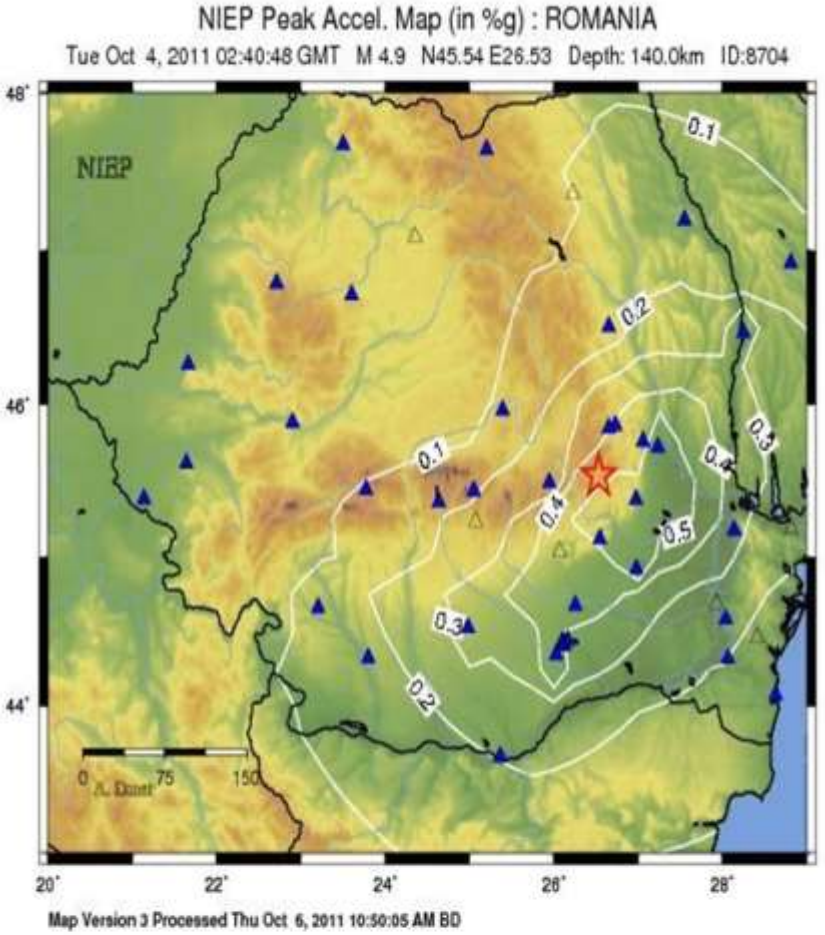
Users

ISU, CP, CJ, Infrastr.
Municipatities

Google Map parameters

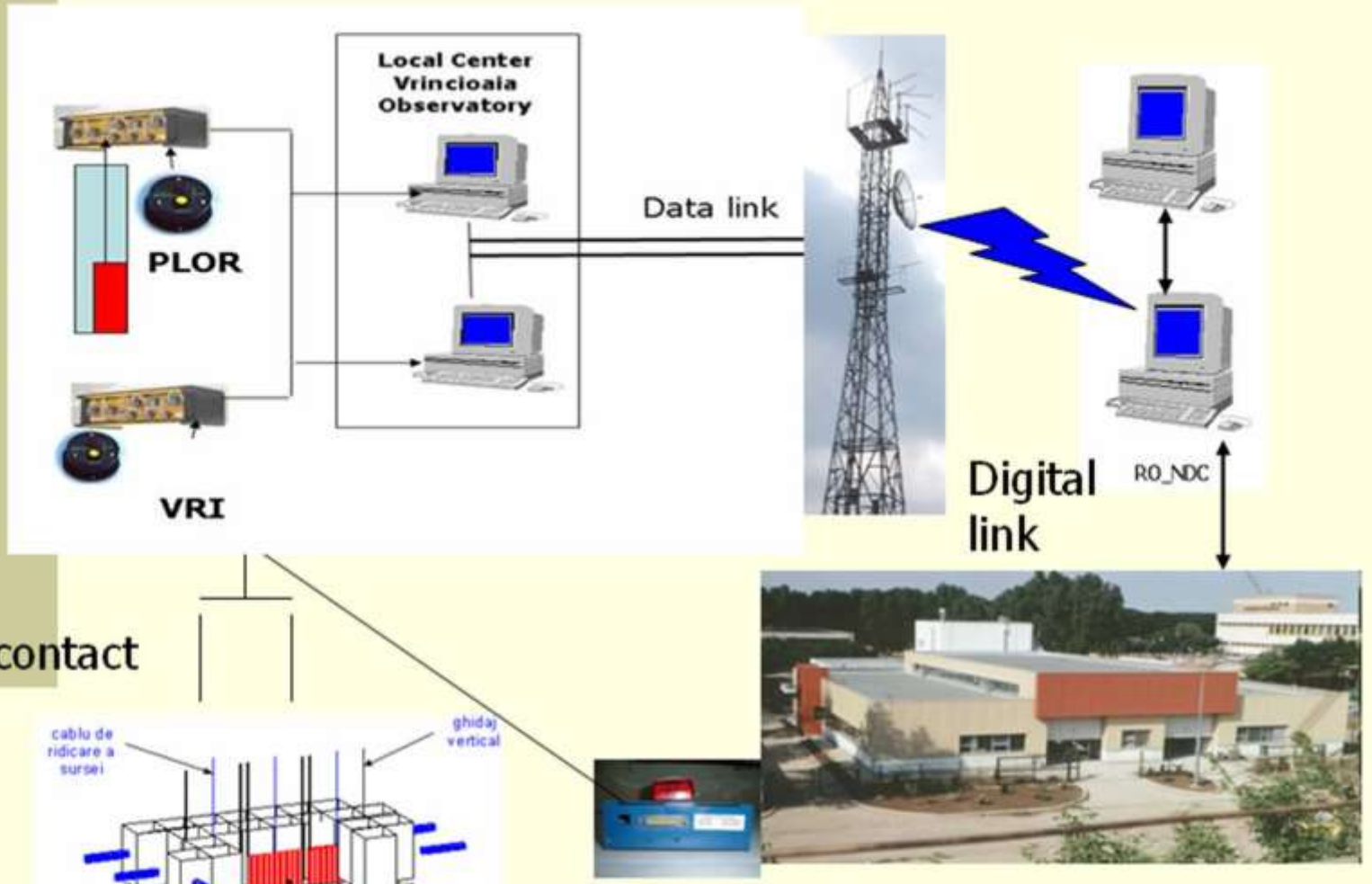
Earthquake EWS and type of products;intensity map locations[16]





PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
INSTRUMENTAL INTENSITY	I	II–III	IV	V	VI	VII	VIII	IX	X+

Shake Maps in real time[16]



Shutdown Cobalt-60 nuclear radiation source in safe position on Măgurele Physics Platform, Bucharest, Romania[5,7]

FOCUS ON REDUCING RISK, EARLY ACTIONS AND INCREASE COMMUNITY RESILIENCE

Accountability, participation, predictability and transparency are identified as the key features of an effective governance structure that does foster development and support risk reduction.

On the other hand ,though, they are of direct relevance in the process of risk reduction because they facilitate the diversification of livelihood and enable the application of market-based instruments as incentives for physical mitigation measures, all of which reduces vulnerability.

MITIGATING EARTHQUAKE RISK

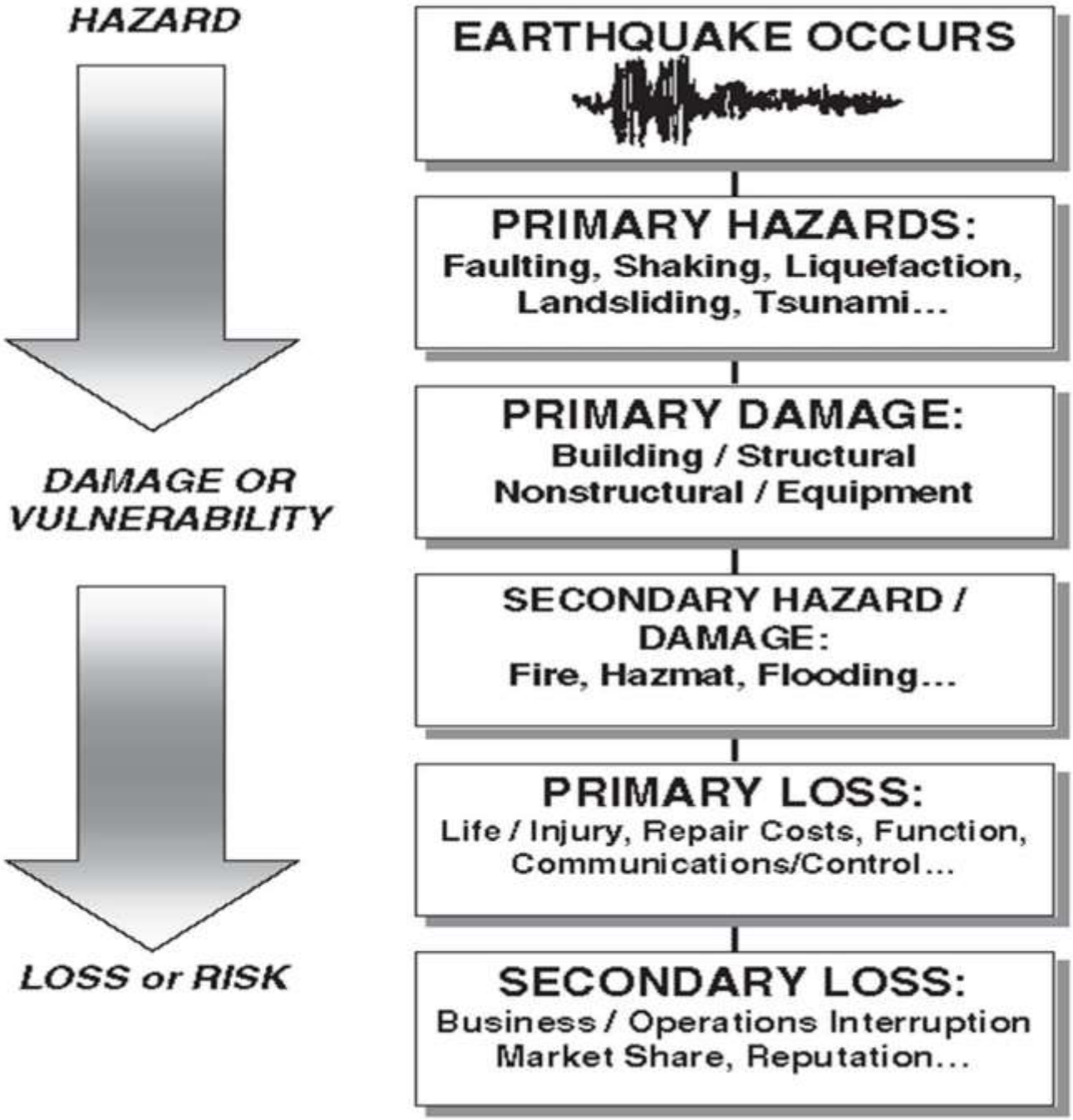
The first step in understanding earthquake risk is to dissect the earthquake risk or loss process into its constituent steps. Damage and loss can be reduced, or mitigated, in a number of ways.

1.PRIMARY HAZARDS: Faulting, Shaking, Liquefaction, Landslide , Tsunami…

2.PRIMARY DAMAGE : Building / Structural Nonstructural / Equipment… Primary damage mitigation is the purview of design professionals, who have developed a large toolkit for bracing, strengthening, or otherwise improving the earthquake performance of buildings and other structures, nonstructural elements, equipment, and contents.

3.SECONDARY HAZARD/DAMAGE: Fire, Flooding… Secondary damage is typically due to the interaction of several problems, and can be a very complex issue. It is therefore best mitigated prior to the earthquake, through better handling of materials and improving of infrastructure. Since this cannot be done everywhere, it must also be mitigated via improved emergency response, that is, via analysis of the problem, acquisition of the necessary equipment, and ongoing training and exercises.

4.PRIMARY LOSS: Life/Injury,Repair Costs,Function,Communications/ Control..



1.Earthquake loss process.

SECONDARY LOSS:

Business / Operations Interruption Market Share, Reputation…

Loss is mitigated via damage control, that is, via improved emergency planning and response. Since the damage has not been prevented, coping with the damage so as to minimize loss is necessary.

The other dimension of loss mitigation at this stage is financial, that is, earthquake insurance. Earthquake insurance can be effective in selected circumstances, but it does nothing for life loss or injury, and typically only partially offsets primary financial loss.

The farther down in the damage process one goes, the more difficult is mitigation. Secondary losses, such as business interruption, often cannot be fully mitigated.

- **Technical challenges, forecasting and warning capabilities are playing a main role in determining the extent and nature of short and long terms preparedness measures and thus the impact of a hazard.**
- **Loss of human life may be high, reflecting high vulnerabilities to natural disasters and poor warning capabilities, while disasters can exacerbate existing levels of poverty and indebtedness. Earthquakes in large urban centers are capable to causing enormous damage. The development of forecast prediction methodologies for the great damaging earthquakes has been complicated by the fact that the largest events repeat at irregular intervals of hundreds to thousands of years…**
- **To increase Europe's *resilience* to crises and disasters is a topic of highest political concern in the EU and its Member States and Associated Countries. This concerns both man-made threats (accidents…) and natural hazards such as e.g. earthquakes, tsunamis, landslides etc.**

- **Resilience concepts need also to take into account the necessity to anticipate, to plan and to implement a substitution process in a crisis or disaster, aiming to deal with a lack of material, technical or human resources or capacities necessary to assume the continuity of basic functions and services until recovery from negative effects and return to the normal situation.**
- **Romanian EWS is a device for shutting down of the dangerous industrial processes before strong earthquakes arrives, a decision support system to European environment assessment. EWS is more than a technological system to detect, monitor and submit warnings. It should be viewed as part of an European real-time information system that provide early warning, about an earthquake impeding hazard, to the public and disaster relief organizations seconds before.**
- **Romanian EWS is a winner of European IST (Information Society Technology) Prize Awards (2006). Integration of early warning system into real-time information systems turns out to be crucial in disaster management.**

- **Early Warning System should be viewed as part of a general real-time information system that provide rapid information to the public and disaster relief organizations before (*early warning*) and after a strong earthquake (*shake map*), *as a decision support system to European environment assessment* .**
- **On the other hand, this early warning system will offer the first *input data in shake map construction*. The shake map allows us to rapidly portray (3-4 minutes) the extent of shaking in a simplified form suitable for immediate post-earthquake decision-making and will provide a sound starting point for immediate loss estimation using such methods.**

REFERENCES:

[1]. Freeman,P.K.(2000). Natural Disasters and Poverty,pp-55-61,Disaster Risk Management Series Nr.2..The WorlBank,Washington,D.C.,2000,*Ed.A.Kreimer & M. Arnold.*

[2]. Ionescu,C.,Mărmureanu,A.(2005), Rapid Early Warning System (REWS) for Bucharest and Industrial Facilities, presentation at *Caltech University,* July 2005

[3].Ionescu,C.,Böse,M.,Wenzel,F.,Mărmureanu,A.,Grigore.A.,Mărmureanu,Gh.(2007).Early Warning System for Deep Vrancea Earthquakes,p.342-350,in book: Earthquake Early Warning Systems, Ed. Gasparini,P.,Manfred,G., Zschau,J,*Verlag* ,ISBN:13- 978-3-540-72240-3;

[4]. Ionescu C., Mărmureanu A., Mărmureanu Gh.(2008).The First European Early Warning System (EWS)for Deep Strong Vrancea Earthquakes is Working , *2008-April EGU-European Geo. Union, Vienna.*

[5].Ionescu, C.(2008).Researches on seismic early warning system, in real time, to industrial facilities with major risk to strong and deep Vrancea earthquakes, Ph. D Thesis. Institute of Atomic Physics Library.

[6]. Mărmureanu,G.,Wenzel,F.,Ionescu,C.,Marmureanu,A.(2002).The vulnerability and resilience of large urban systems(megacities) to strong Vrancea earthquakes, *Proceedings of the Interna tional Conf. on Earthquake Loss Estimation and Risk Reduction,*Oct.26,2002,Bucharest,391-404.

[7]. Mărmureanu, G.,Ionescu C.,Marmureanu A.,Grecu B.,Cioflan C.(2007).The Early Warning System (EWS) as First Stage to Generate and Develop Shake Map for Bucharest to Deep Vrancea Earthquakes *2007-December AGU Fall Meeting,Seismology,S13-Earthquake Early Warning: Design and Application Around the World; Reference Number: 10451.*

[8]. Mărmureanu, G., Ionescu C., Marmureanu A.(2007),Early Warning System and Shake Map for DeepVrancea Earthquakes and Place of Them in Seismic Risk Management, *International Disaster Reduction Conference, 2007 Harbin,China; published in book:Strategy and Implemntation of Integrated Risk Management(2008).*Ed.:Shaoyu Wang etc.ISBN:978-7-80080-885-2,*Qunyan Press,*China.

[9].Mărmureanu, G.,Ionescu C., Marmureanu A.(2008).Early Warning System, Shake Map and Disaster Maps for Deep Vrancea Earthquakes Developed in Romania as Parts of Disaster Reduction and Risk Management;*International Disaster and Risk Conference,IDRC Davos, 2008*, August 25-29, 2008,

[10].Mărmureanu ,A.(2009).Rapid magnitude determination for Vrancea early warning system,*Romanian Journal of Physics,* Volume 54, No.9-10.

[11].Mărmureanu, A.,Ionescu C.,Marmureanu Gh.(2009).Benchmark of Romanian Early Warning System, *European Geosciensces Union(EGU),Vienna , Austria,*19-24 Aprilie 2009.

[12].Mărmureanu,G.,Marmureanu,A.,Ionescu,C.(2010),Romanian early warning system part of seismic hazard/risk mitigation mechanisms; *International Disaster and Risk Conference,IDRC Davos, 2010,* April 20-27, 2010,Switzerland.

[13]. Mărmureanu,A.,Ionescu,C.,Cioflan,C.O(2011).Advanced real-time acquisition of the Vrancea earthquake early warning system,*Soil Dynamics and Earthquake Engineering,*Vol.31,Issue 2, Special Issue SI,16-169.

[14].Wenzel,F.,Oncescu,M.C.,Baur,M.,Fiederich,F.,Ionescu,C.(1999).An early warning system for Bucharest, *Seismological Research Letters,*70,2,161-169;

[15].Wenzel,F.,Marmureanu,G.,Calinescu,S.(2002).Earthquake early warning systems.Examples and perspectives, *Proceedings of the International Conference on Earthquake Loss Estimation and Risk Reduction,*Oct.24-26,2002,Bucharest,341-353. [19].

[16].****Danube Cross-border System for Earthquake Alert*(DACEA) Romania(NIEP) &Bulgaria (Acad.of Science etc.).*Contract nr.52570/05.08.2010* and *„Set-up and implementation of key components of regional early-warning system for marine geohazards of risk to the Romanian-Bulgarian Black Sea coastal areas"*: Romania (GeoEcoMar Institute,NIEP) & Bulgaria.(Academy of Science).*Contract nr.83154/30.11.2010* between NIEP and GeoEcoMar;

[17].****IDNR:Working Group N.5 on National & Local Capabilities of Early Warning* by Andrew Maskrey & Jose Sato Jose etc.,Lima,Peru,July,1997.

[18.***SAFER(FP-6) Project: Seismic Early Warning for Europe (2006-2009),*Contract nr.036935*;

[19].***REAKT(FP-7)Project: Strategies and Tools for Real Time EArthquake RisK ReducTion, *Contract nr. 282862*(2011-2014).

The NIEP comand room from Bucharest

Thank you for your attention !

Observation Point (the lowest basement of reactor buildings)		Observed Data (interim)[2]			Maximum Response Acceleration Against Basic Earthquake Ground Motion (gal)			Scram Setpoint (gal)	
		Maximum Response Acceleration (gal)							
		Horizontal (N-S)	Horizontal (E-W)	Vertical	Horizontal (N-S)	Horizontal (E-W)	Vertical	Horizontal (E-W)	Vertical
Fukushima Daiichi	Unit 1	460	447	258	487	489	412	135	100
	Unit 2	348	550	302	441	438	420		
	Unit 3	322	507	231	449	441	429		
	Unit 4	281	319	200	447	445	422		
	Unit 5	311	548	256	452	452	427		
	Unit 6	298	444	244	445	448	415		

March 11,2011.Fukushima Daiichi Nuclear Power Plants. Observed and Design Basis Seismic Data[1]

"CATASTROPHE CLAIMS HANDLING – THE THAILAND FLOODS 2011 TO 2012"

vrs adjusters

Time and date: vrs European Meeting -Thursday, 25th June 2015

Location: Bucharest

Presenter: Peter Chart

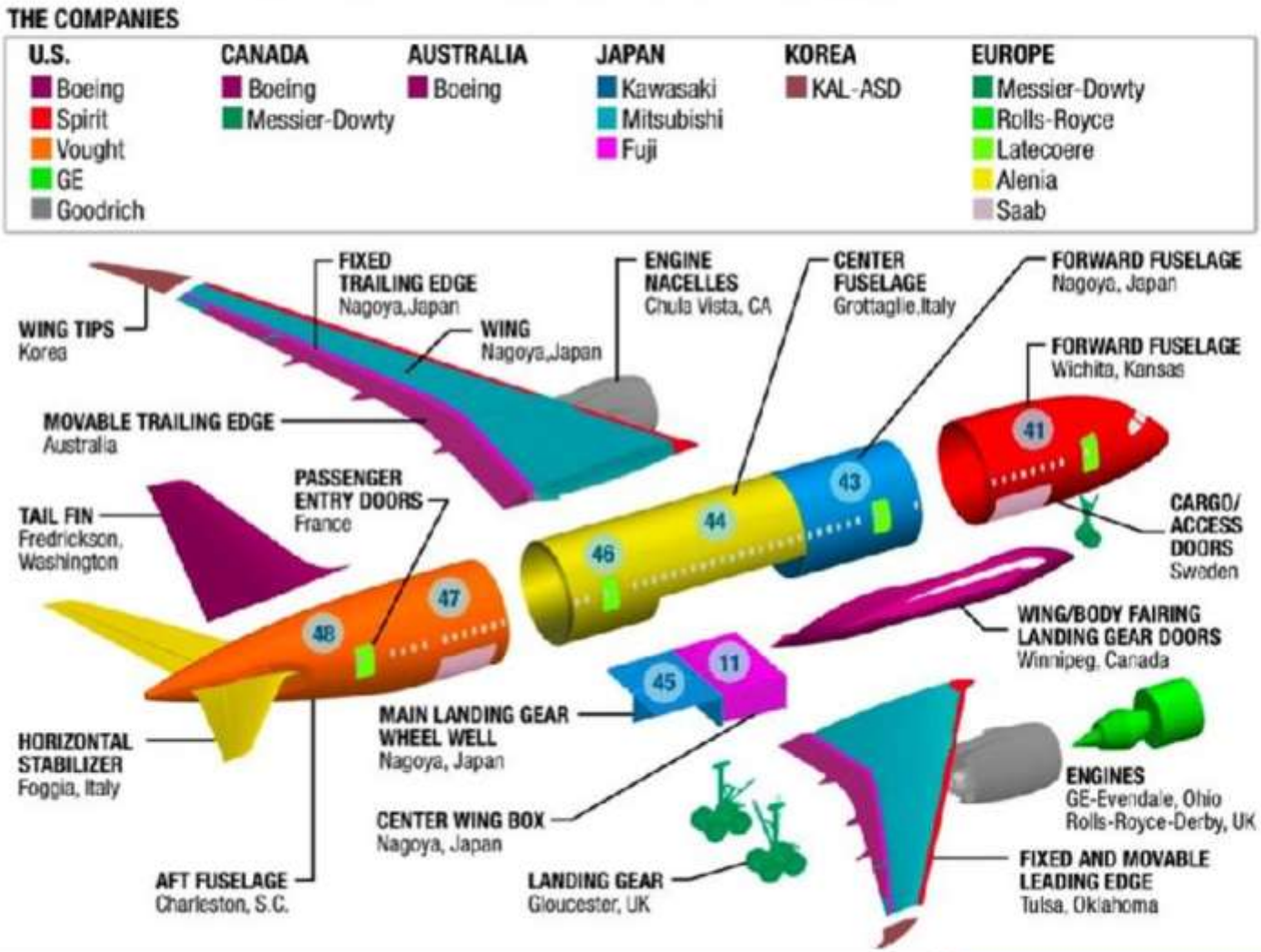
CATASTROPHIES

vrs adjusters

- Financial impact is going to be far greater because of:-
  - Global economy
  - Minimal stocks retained – manufacture on demand
  - Increased number of outsourced suppliers around the world
- Widely regarded that they are going to be more frequent
  - Global warming

CATASTROPHIES – THE GLOBAL ECONOMY

vrs adjusters



CATASTROPHIES – PROOF OF GLOBAL WARMING

vrs adjusters

BACKGROUND TO THE THAILAND FLOODS

vrs adjusters

- Thailand has mountain ranges to the west, east and north
- Central Thailand is about 1,000km x 1,000km and is FLAT
- Communications to and from the central heartland are good
- Thailand has little history of earthquakes in the industrial heartland
- No history of tsunamis hitting the industrial heartland
- Labour is very cheap
- Countries particularly Japan outsource a significant part of their manufacturing processes to Thailand

HOWEVER

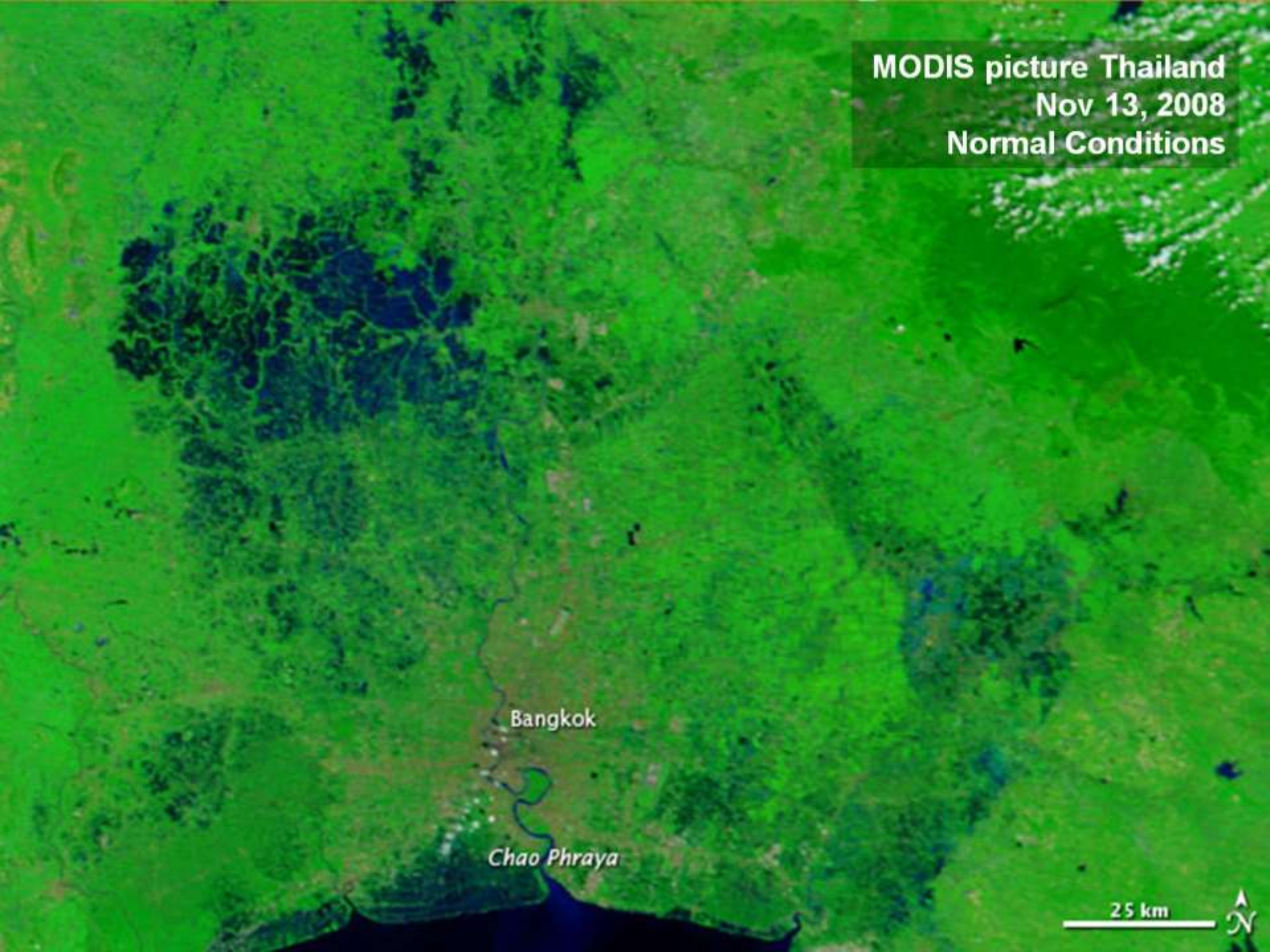
vrs adjusters

- The central area of Thailand has many rivers flowing from the mountains to the Gulf of Thailand across the central plain
- The central plain is only a few metres above sea level
- The country is the world's largest producer of rice. Why? Because the centre of Thailand floods on a regular basis!
- Summer 2012 - 3 months torrential rain in North Thailand, Laos and China
- Dams overflowed in North Thailand
- 4 river networks flowing across the central plain flooded for 4 months

RESULT

vrs adjusters

- Catastrophic flooding from 25 July 2011 to January 2012
- Flood waters rose from August through to January
- 620 deaths – 13 million people affected.
- 65 of Thailand's 77 provinces affected including:
  - Industrial heartland to the north of Bangkok
  - Greater Bangkok
- Over 30% of country flooded and 800,000 homes destroyed
- The largest insured flood losses ever– circa $50 billion


MODIS picture Thailand
Nov 13, 2008
Normal Conditions
Bangkok
Chao Phraya
25 km
N


Bangkok
Chao Phraya
25 km

CONDITIONS FROM THE AIR

vrs adjusters

CONDITIONS ON THE GROUND

vrs adjusters

HOW DO WE RESOURCE EVENTS LIKE THIS?

vrs adjusters

- Competitors fly people in before the catastrophe arrives
  - On the ground provide daily reports / bulletins to insurers, brokers and risk managers around the world
  - Accept instructions in advance of losses occurring – Prague
  - Markets around the world have people on the ground that they know and trust
- vrs Adjusters tend to be more reserved and send people in to assist the local offices once claims have arisen and instructions received
  - Reduces cost of handling claims
- Should we review our approach and co-ordination?

TESCO CLAIM - HOW WE RESOURCED THE CLAIM

vrs adjusters

- Local office provided twice weekly updates from August to mid November – hugely appreciated by insurer, broker and Tesco
- By November recognised flood waters were still rising, we sent out 5 adjusters for 2 weeks to work with our local adjusters
- We agreed a strategy of flying 3 or 4 adjusters out for 6 to 8 day periods every 3 to 4 weeks

TESCO CLAIM - HOW WE RESOURCED THE CLAIM

vrs adjusters

- Structured team:-
  - Damian Glynn and I along with local office lead adjuster and RGL would meet with the UK Board Director of Tesco and Thailand's Managing Director / Finance Director or Heads of department each day
  - Others from the UK and Thailand adjusting and forensic accountancy teams would inspect sites or meet with Finance or Property Departments to go into the detail of the claim, processes and figures

TESCO CLAIM – HOW WE RESOURCED THE CLAIM

vrs adjusters

- Typical day:-
  - 6.30am – vrs Adjusters team meeting reviewing data from RGL overnight
  - 8.30am - commence 1st of approximately 10 meetings each day with Head Office staff in Bangkok
  - 10 pm - Team meet up for dinner back near hotel and review days activities
  - Midnight - Adjourn to bar to agree what we required from RGL overnight and what we needed to achieve the following day
  - 2am to 4 am – Bed
  - 6.30am start again

THE TESCO CLAIM

vrs adjusters

- After 7 days only inspected 12 sites by 4x4, lorry and boat
- Dangers:-
  - Crocodiles and deadly snakes

MODES OF TRANSPORT CONSIDERED AND REJECTED

vrs adjusters

MODES OF TRANSPORT CONSIDERED AND REJECTED

vrs adjusters

HOW DO YOU GET TO SEE THE SITES

vrs adjusters

HOW DO YOU GET TO SEE THE SITES

vrs adjusters

FIXING THE RESERVE

vrs adjusters

- Decided to charter a helicopter
- Material Damage financial modelling
  - Hypermarkets, Supermarkets, and Express stores
  - 100mm of flood water. 600 mm of flood water, 1.5 metres flood water
- Assessment from the air:-
  - 30 stores viewed
  - Reserves by flood water and abandoned cars in car parks
- Calculation of Reserve
  - Accurate to within 5%

POLICY ISSUES

vrs adjusters

- Number of £100,000 policy deductibles?
- Wide area damage was everywhere (Orient Hotels v Generali)
  - Never has there been such a wide area damaged
  - Potential huge implications to the value of the BI claim
  - How did we handle this issue – Discuss the Issues with Re-insurers in advance

POLICY ISSUES

vrs adjusters

- Policy Limits – Required careful analysis
  - Damage at Suppliers (Suppliers Extension)
  - Damage at Suppliers to Suppliers
  - Damage at Customer's Premises (Customers Extension)
  - Denial of Access (Damage)
  - Denial of Access (Non-Damage)
  - Loss of Electrical Supply (Utilities extension)
  - Public Authorities Clause

BEAT THE COMPETITION TO REOPEN STORES

vrs adjusters

- Tesco Lotus had 2 main competitors:-
  - Seven Eleven
  - Big C
- Hugely important to open stores before the competition
- Big C claims were being handled by vrs Vering, and Michel, Tancrède and I got to know each other well, and whilst there was fierce competition between Tesco Lotus and Big C, the close relationship between Vering and Vericlaim grew
- We though had a master plan to open our stores earlier than the competition (which we kept a secret) until now!!!

BEAT THE COMPETITION

vrs adjusters

Global adjusting and claims management

www.vrsadjusters.com

TRUST IS SO IMPORTANT IN THE SETTLEMENT OF MAJOR LOSSES

vrs adjusters

- Try to ensure claims are handled at the highest possible level of insurers and policyholder
- Discuss all issues when they arise – **Good communication is essential**
- Insured and Policyholder had issues around policy cover - **Try to put this to one side and try to resolve at the end.**
- Reduce the emotion around issues - **Manage the expectations of all parties**
  - Emphasise the merit in other parties views - **Manage the expectations of all parties**
  - Emphasise the downside of the parties views - **Manage the expectations of all parties**
- Speed of decision making - **Is very important**
- Final Settlement – **In a bar following dinner at 3am**

vrs adjusters

We thank you for your
time and attention

Our Mission

vrs adjusters

To deliver independent global **expertise** in corporate, commercial and complex claims through **outstanding** service, **empowered** staff and an **aspirational** environment.

"EARTQUAQUES IN ABRUZZO AND EMILIA ROMAGNA"

vrs adjusters

Time and date: vrs European Meeting - Thursday, 25th June 2015

Location: Bucharest

Presenter: Francesco Cincotti

Italy and Earthquakes

vrs»adjusters

Most of the Italian peninsula is exposed to moderate-to-high seismic risks and, as a result, it has a history of devastating earthquakes …

…Among them we recall the Earthquake in Abruzzo (2009) and the Earthquake in Emilia Romagna (2012)

6th April 2009 – ABRUZZO is hit by a violent earthquake

vrs adjusters

- 3:32 am: a shock recorded at 6.3 magniture (Richter Scale) with epicentre located in the area between Roio Colle, Genzano and Collefracido affected Abruzzo
- The earth continued to tremble over the following days, with 150 shocks recorded on 7th April and 106 the day after: 56 of these had a magnitude greater than 3.0, and three were greater than 5.0.
- The Civil Protection issued a seismic alert lasting four weeks, advising the populations affected not to return to their homes, even if they were unharmed or only slightly damaged.

6th April 2009 – the region of Abruzzo is hit by a violent earthquake

vrs adjusters

Earthquake of April 2009 – Human Losses & Damage Recorded

vrs adjusters

- **308 people** lost their lives during the night of 6 April, including 286 Italians, 6 Macedonians, 5 Romanians, 2 Czechs, 2 Palestinians, 2 Ukrainians, 1 Greek, 1 French, 1 Israeli, 1 Argentinian and 1 Peruvian.
- The work of the Civil Protection and volunteers made it possible to extract several survivors from the rubble during the following days.
- Considerable damage to both residences (about 15,000 houses went destroyed) and local historical and artistic heritage was recorded (10,000 only in L'Aquila), with over one hundred churches immediately declared unfit for use.

Earthquake of April 2009 – Financial Aspects

vrs adjusters

- The earthquake caused serious damage to the economic and productive fabric of L'Aquila: many companies were forced to close.
- The number of students, enrolled in the university, declined freezing university fees (University of L'Aquila was a very famous Italian institute also abroad) and al the related cultural and social activities.
- The government also launched an unemployment benefit for those who lost their jobs because of the earthquake.
- To boost the economy, efforts were made to use local companies and cooperatives for the supplies of materials and works for the reconstruction.

Estimated Loss

vrs adjusters

Total damage deriving from the earthquake:

€ 10,000,000,000.00

Total Insured Claims:

€ 350,000,000.00

Earthquake of April 2009 – Government Aids

vrs adjusters

The Abruzzo Decree: a few weeks after the earthquake, the government issued the "Abruzzo decree", which provided the immediate allocation of aid totalling 70 million euro and a series of measures to assist the population affected, and involving:

- the suspension of payments for social security, welfare and insurance premiums against accidents and work-related illnesses for self-employed people, who were also to receive a compensation from the state for three months.

- For two months, payments for utilities were suspended; mortgage repayments were suspended for four months. Bank accounts were opened to receive donations and all pharmaceuticals requiring a prescription were supplied without any bureaucratic procedures.

- Provisional wooden houses were built and put at homeless people disposal

Earthquake of April 2009 – Recontructions

vrs adjusters

- From the very beginning, organising the reconstruction appeared very difficult.
- This was because of the condition of the historic centre of L'Aquila (all was damaged and unsafe)
- The first demolitions were carried out a year after the earthquake and building were classified.
- A million tonnes of rubble was removed and disposed in the historic centre of L'Aquila, hampered by legal restrictions. Problems arose from the lack of suitable disposal facilities.
- it is estimated that the reconstructions will require at least ten years and will cost 10 billion euro.
- A contribution was also given to the families of displaced persons for the damages suffered by their homes, for an amount of 2 billion euro.

Loss Adjusting activities

vrs adjusters

20th May 2012 – EMILIA ROMAGNA is hit by a violent Earthquake

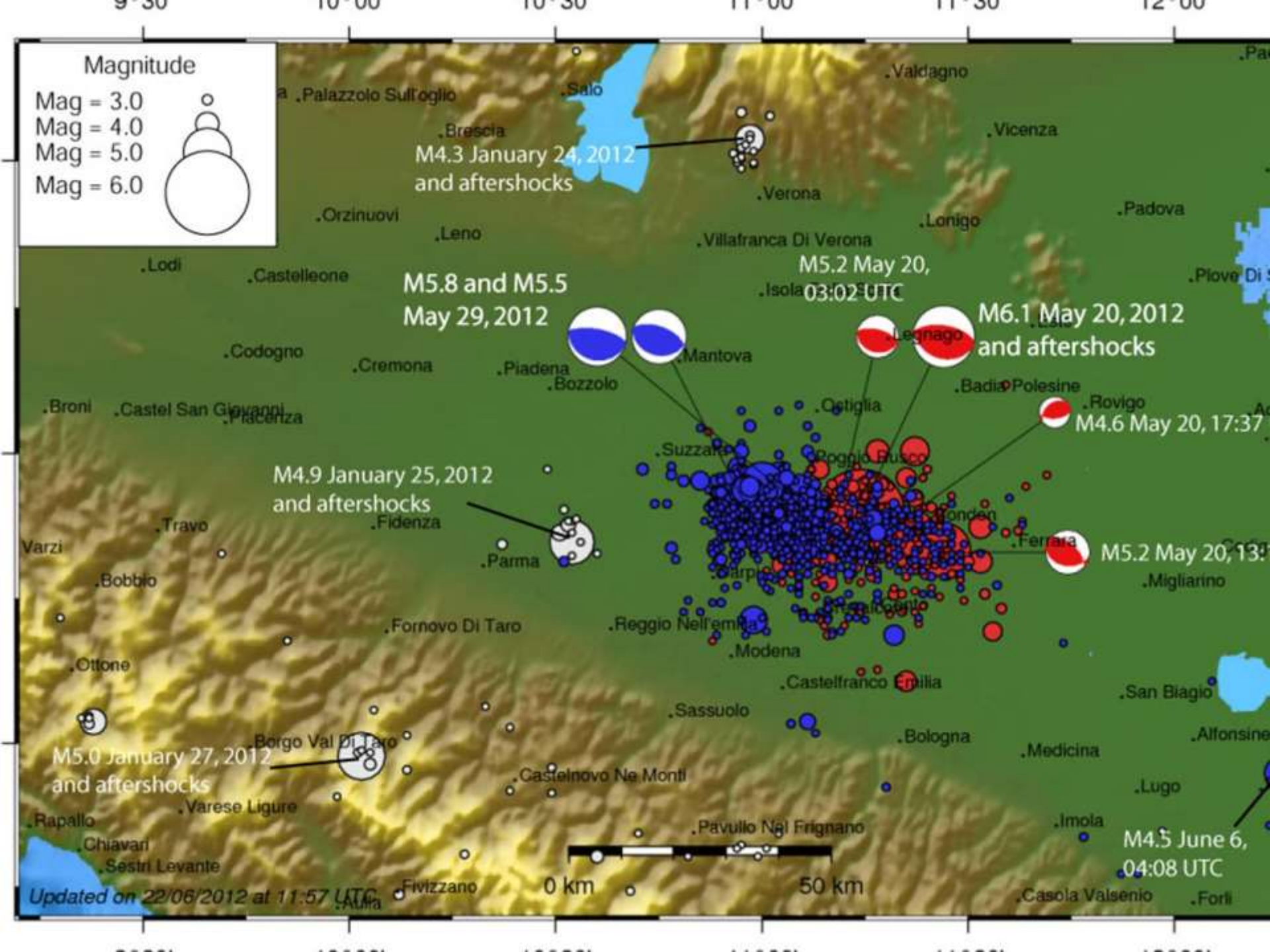
vrs adjusters

- h. 4:04 am: an earthquake of magnitude 6.1 (Richter Scale) lasted about 20 seconds
- The epicenter was established at 36 km north – northwest of Bologna (and exactly in Finale Emila, Mirandola and S. Felice Sul Panaro)
- Aftershocks followed in the morning along the day and, among the most significant ones:
  - 05:05am (magnitude 4.9)
  - 11:28am (magnitude 4.3)
  - 03:21pm (magnitude 5.1)
- Shakes lasted for several weeks, generating a phenomena defined as "seismic swarm"
- The Government declared "State of Natural Disaster"

29th May 2012 – Emilia Romagna is hit by a second Earthquake

vrs adjusters

- A new earthquake of magnitude 5.8 (Richter Scale) affected Italy in the morning of Tuesday 29th May with a first shock at 9 o'clock with epicenter among Carpi, Medolla and Mirandola (about 15 km north-west of the previous shocks)
- The earthquake was always centered in the province of Modena, near Bologna, the heartland of the country's manufacturing industry.
- Tuesday's quake was followed by several aftershocks all along the day. Italy's Institute of Geology reported that the main aftershocks measured 5.3 and 5.1 magnitude.


Magnitude
Mag = 3.0
Mag = 4.0
Mag = 5.0
Mag = 6.0
M4.3 January 24, 2012
and aftershocks
M5.8 and M5.5
May 29, 2012
M5.2 May 20,
03:02 UTC
M6.1 May 20, 2012
and aftershocks
M4.6 May 20, 17:37
M4.9 January 25, 2012
and aftershocks
M5.2 May 20, 13:
M5.0 January 27, 2012
and aftershocks
M4.5 June 6,
04:08 UTC
Palazzolo Sull'oglio
Salo
Brescia
Valdagno
Vicenza
Verona
Orzinuovi
Leno
Lonigo
Padova
Villafranca Di Verona
Lodi
Castelleone
Codogno
Cremona
Piadena
Bozzolo
Mantova
Legnago
Badia Polesine
Rovigo
Broni
Castel San Giovanni
Piacenza
Ostiglia
Suzzara
Fidenza
Travo
Varzi
Parma
Ferrara
Migliarino
Bobbio
Fornovo Di Taro
Reggio Nell'emilia
Modena
Ottone
Castelfranco Emilia
San Biagio
Sassuolo
Bologna
Medicina
Alfonsine
Borgo Val Di Taro
Castelnovo Ne Monti
Lugo
Varese Ligure
Rapallo
Chiavari
Sestri Levante
Pavullo Nel Frignano
Imola
Fivizzano
Casola Valsenio
Forlì
0 km
50 km
Updated on 22/06/2012 at 11:57 UTC

Earthquake of May 2012 – Human Losses & Damage Recorded

vrs adjusters

- The two events combined killed **26 people**

- Several industrial facilities suffered severe damage: Emilia Romagna is a region highly industrialized (in the 10 municipalities mostly affected at least 8,000 factories can be counted), with particular attention to the biomedical area – the second one in terms of importance in the world, automotive (motor valley), and food productions with several farms.

e.g. Damage to several factories of **Parmigiano Reggiano (D.O.P)**, thousands of wheels (24-40K) went lost/ destroyed.

Earthquake of May 2012 – Damage Recorded

vrs adjusters

- Historical buildings were severely affected by the event
- Schools: 429 was the final number of the buildings which suffered damages in the areas of Ferrara, Modena, Reggio Emilia and Bologna. 343 out of 429 damaged buildings were considered accessible and/or recoverable
- Damage to the infrastructure was moderate

Estimated Loss

vrs adjusters

Total Damage (two events):

€ 13,000,000,000.00

Total Insured Claims:

€ 1,300,000,000.00

This is recorded as the biggest insured loss for the country

Titan Italia– an example of cooperation between vrs Cincotti & vrs Vericlaim

vrs adjusters

Total amount of the ascertained damage: € 39,950,000.00, of which:

Property Damage: € 10,250,000.00
Business Interruption: € 29,700,000.00

How did the Insurance Companies handle earthquake related claims?

vrs adjusters

We thank you for your

time and attention

Global Reach
Local Expertise

vrs adjusters

NATCAT – important insurance issues for all involved parties

June, 2015, Bucharest

Georgiana Popescu – Insurance Business Consultant

Romanian insurance market

vrs adjusters

- 1,9 bln.EUR Gross Written Premium in 2014 for Life and Non-Life insurance market
- 36 companies with 10 international insurers
- Property Damages market of 11,86% (217 mil EUR)
- First discussions related to systemic risks of local insurance market
- Focus on CAT protection during the last years

Is a major event a reality !?!

vrs adjusters

International studies show:

- Each year, 1 business of 500 will face a major claim

- 43% of companies facing a major claim will close the activity and another 29% will disappear in max. 2 years after the claim

Can we name an important major NATCAT event for Romania?

vrs adjusters

Earthquake from 1977!

- Powerful earthquake with a recorded magnitude of 7.4 on the Richter scale which lasted aprox.1 minute

- 1,578 people lost their lives, crushed or suffocated under the ruins, of which 1,424 were in Bucharest.

- The total number of injured rose to 11,300, while 32,900 buildings were damaged or destroyed, losses in amount of 2 bln. USD

What have we learned from ”77 NATCAT event?

vrs adjusters

- To impose clear NAT CAT procedure with general rules for all the sectors!

Develop ability to face unexpected situations at the given moment!

- Important military and civil resources needed.

- A new major event is expected during the next years!

Estimation related to +/ - 5 years!

- Insurance market will play a vital role with important social impact in case of a future major event;

Are we prepared to face another major NATCAT event?

vrs adjusters

1. Small and medium local companies (SME):

- SME represent 99,7% of the total local companies
- No legislative constraints for insurance protection
- Banks / leasing companies are requesting only Property Damages cover for buildings / equipment, as a condition to provide financing solutions
- What about supplementary costs in case of a severe event?

A business has

10% chances to survive to a big loss without

Business Interruption cover!

How are we protecting our clients?

vrs adjusters

Clients' general perception:

- Insurance premium is a supplementary cost!

Save the money if the insurance is not obligatory!

Following a major event, Managers and Owners have a common point a view:

They thought this cannot happen to them!

- An adequate insurance protection solution is required in order for the economic process to continue after a major event.

Can we change

- the risk management approach of bank/leasing sector ?

or

- clients' perception?

How are we protecting our clients?

vrs adjusters

2. Romanian Habitants

PAID

- 19,96 mil people in Romania

- PAID (Romanian Pool of Insurance Against Natural Disasters) an insurance-reinsurance company, privately owned, with insurance companies as shareholders and governed by specific legislation

- PAID results as at 30.04.2015
  - ✓ 1.526.902 PAD policies
  - ✓ 1.208.170,5 RON Claims Paid
  - ✓ 17,35% Penetration Ratio

- 28,6 mil EUR Gross Premiums in 2014

Is the local insurance market mature enough to face a major NATCAT event?

vrs adjusters

- Reinsurance protection of local insurers is adequate?
- Is present systemic risk in case of big EQ?
- PAID protection is enough for population?
- Are clear claims procedures in force?
- Is sufficient Loss adjuster presence?
- Is the legislative control adequate?
- Are crises management scenarios prepared?

Conclusions:

vrs adjusters

Insurance solutions provided to the economic sector,

the education of population

and

the legal framework

have to take into account that

Romania has exposure to the risk of earthquake

with big **impact on the national economy**, including the social component for affected population!

vrs adjusters

We thank you for your
time and attention!

Panel Discussion

vrs adjusters

Natural Catastrophes in Europe
-
focusing on their impact on Romania

Participants:

Mrs Georgiana Popescu – Insurance Business Consultant, Romania
Mr Andreas Schaffhauser – ZAMG, Austria
Mr Constantin Ionescu – NIEP, Romania
Mr Francesco Cincotti – vrs Cincotti, Italy

vrs ssp