Weather Warning System in Germany

and Ideas for Developing of CAP

Thomas Kratzsch

Head of Department Basic Forecasts

Deutscher Wetterdienst

Germany

Thomas.Kratzsch@dwd.de

Disaster Prevention in Germany

Outline

➔National Authorities - Federal Authorities for DRR-Management

➔DWD-Warning System

➔Ideas for the developement of CAP

The division of labour

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Protection of cultural assets

Supporting Critical Infrastructres and Transports

CBRN protection

Terrorist attacks

Self protection

Civil Protection

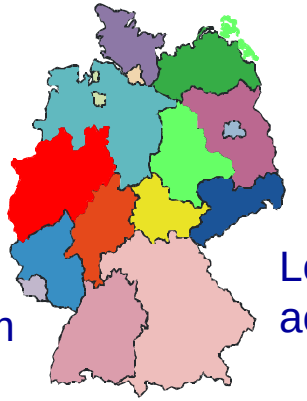
Flooding

Road traffic accidents

Forest fires

Storm

Local industrial accidents



Emergency management

Disaster assistance

National

16 Fed. States

The German civil protection system

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National

Planning, coordination, crisis management

States

Operative management

Local authorities

(municipalities, cities, etc.)

Acts of war / emergencies of national significance / disaster assistance for states

BBK · BUNDESPOLIZEI · Technisches Hilfswerk · Bundeswehr

Local / regional major disasters and emergencies

Common emergencies / emergency & fire services, techn. assistance

ASB Arbeiter-Samariter-Bund · Deutsches Rotes Kreuz · DIE JOHANNITER · Malteser ...weil Nähe zählt. · DLRG · DEUTSCHER FEUERWEHR VERBAND

Responsibilities

- DWD is authorized for weather (related) warnings
- Single Official Voice

- Due to federal structures there are different responsibilities
- for hydrometeorological (products and) warnings
- for flood (forecasts and) warnings
- for storm surges
- for civil protection (national – regional – local)

  Requirements distinguish btw. national – local authorities and public!
- for blocking and evacuation
- for instructions to the public

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Warning Management System of Deutscher Wetterdienst

Warning criteria

- same criteria for whole Germany
- defined in collaboration with national authorities for disaster management and hydrologists, based on evaluation of climate data
- Prepared for rural districts, vertical resolution: 200m
- different warning levels

Warning level	Expected weather conditions	Colour
Official warning of particularly extreme and severe weather	Extremely dangerous weather conditions	**Dark red / violet**
Official severe weather warning	Very dangerous weather conditions	**Red**
Official warning of significant weather	Dangerous weather conditions	**Ochre / orange**
Official weather warning	Possibility of weather-related risks	**Yellow**
No warning	**No weather-related risks**	**Green**

Weather phenomena
Violent gusts
Hurricane-force gusts
Extreme hurricane-force gusts
Severe thunderstorm
Intense heavy rainfall
Extremely intense heavy rainfall
Strong continuous rain
Extremely strong continuous rain
Heavy snowfall
Extremely heavy snowfall
Heavy snowdrifts
Black ice
Heavy thaw
Wind gusts
Storm gusts
Violent storm gusts
Thunderstorm
Heavy rainfall
Continuous / torrential rain
Snowfall
Snowdrifts
Slippery roads
Fog
Frost
Severe frost

Warning criteria - examples

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Warning of severe weather and particulary extreme and severe weather (I)		
Meteorological phenomenon	**tresholds**	**Name**
wind in ca. 10 m above free area	105 - 119 km/h	**Violent gusts**
	More than 120 km/h	**Hurricane-force gusts**
	widespread more than140 km/h	**Extreme Hurricane-force gusts**
very strong convective incident Thunderstorm with hail (hail with a diameter >1,5 cm), intense heavy rain, violent or hurricane-force gusts or local tornados	It is enough when only one of the attendent weather phenomena reaches the treshold of severe weather.	**Severe thunderstorm**
	It is enough when only one of the attendent weather phenomena reaches the treshold of extreme severe weather	**Extrem severe thunderstorm**
intense heavy rain	25 - 40 l/m² in 1 hour 35 - 60 l/m² in 6 hours	**Intense heavy rain**
	>40 l/m² in 1 hours >60 l/m² in 6 hours	**Extremely intense heavy rain**
strong continuous rain	>40 l/m² in 12 hours >50 l/m² in 24 hours >60 l/m² in 48 hours >90 l/m² in 72 hours	**Strong continuous rain**
	widespread >70 l/m² in 12 hours >80 l/m² in 24 hours >90 l/m² in 48 hours >120 l/m² in 72 hours	**Extremely strong continuous rain**

Remarks

DWD‘s warning system uses met. thresholds and 4 warning levels

DWD provides the official warnings in Germany „Amtliche W.“ for Desaster Management and the public

DWD warnings contain information about possible impact in close connection with the intensity of the warning element

DWD produces warnings in CAP-Format

DWD warnings are available on DWD-Website, on many websites from media and esp. in the DWD-Warn-App

DWD warnings are available at meteoalarm.eu, displayed for rural districts, english texts and impact-information are under developement

WarningApp for „the last mile“

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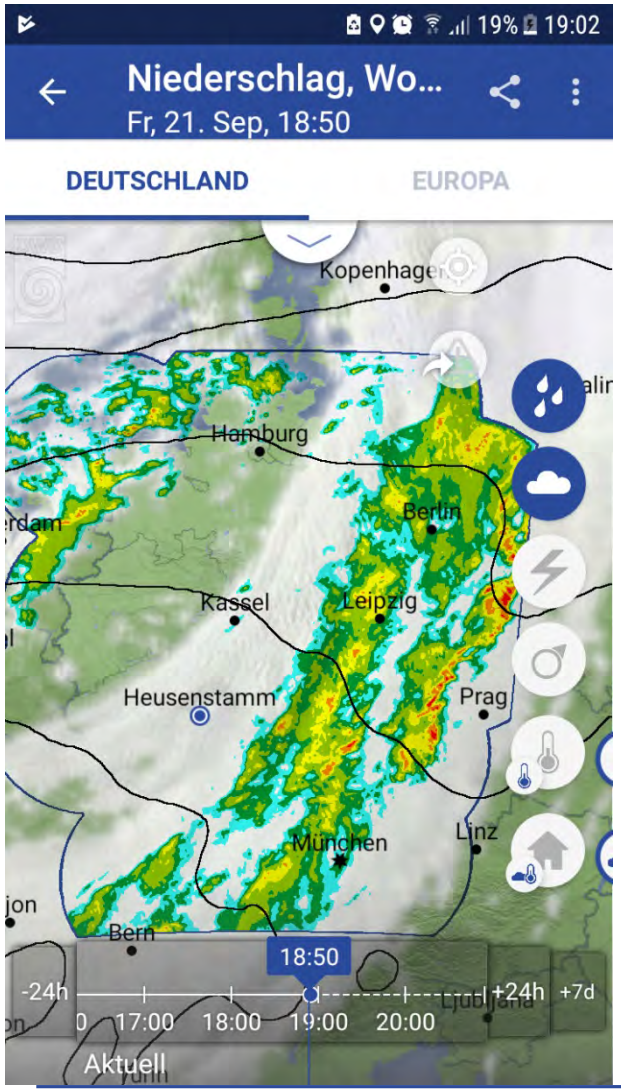

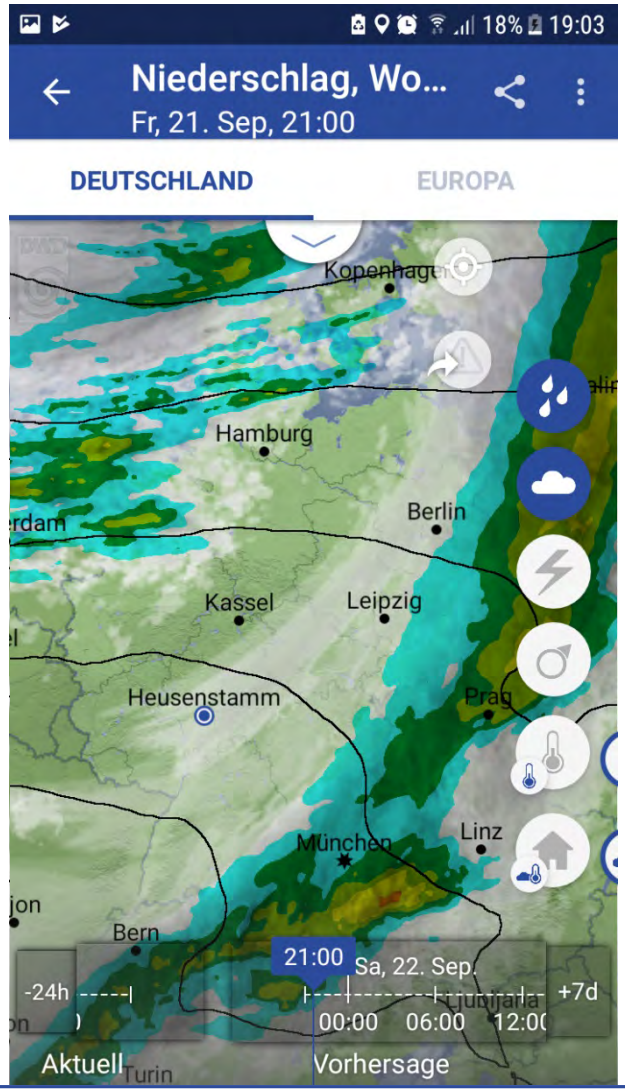

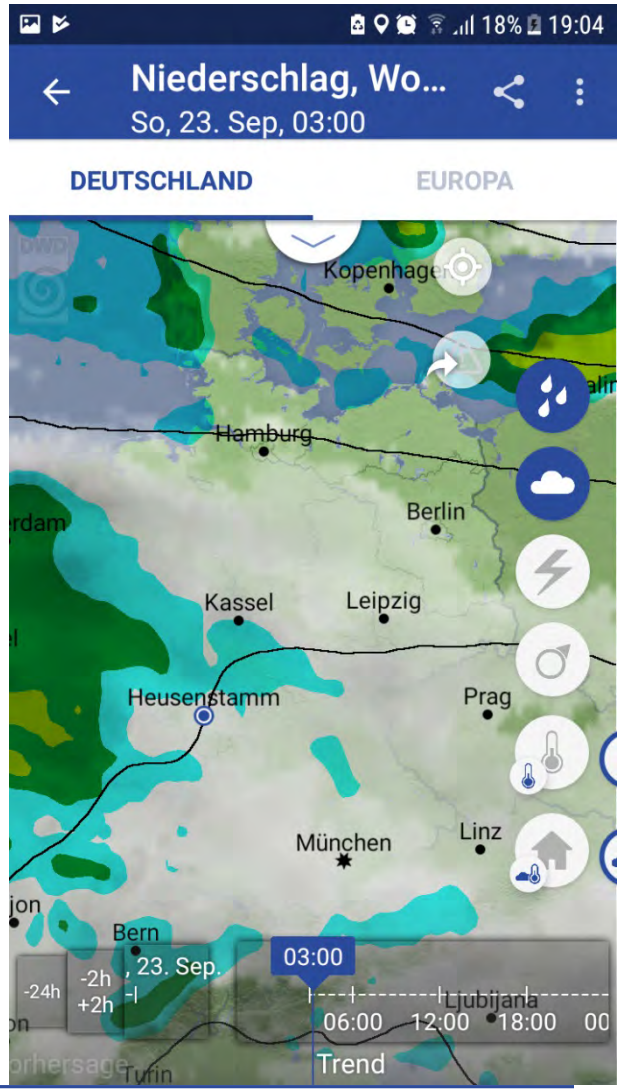

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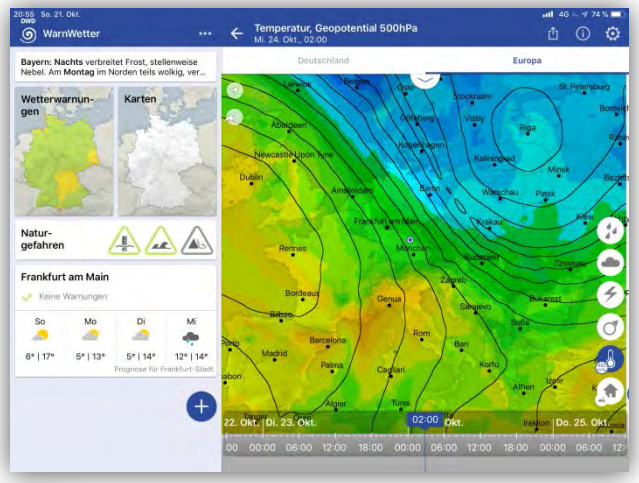

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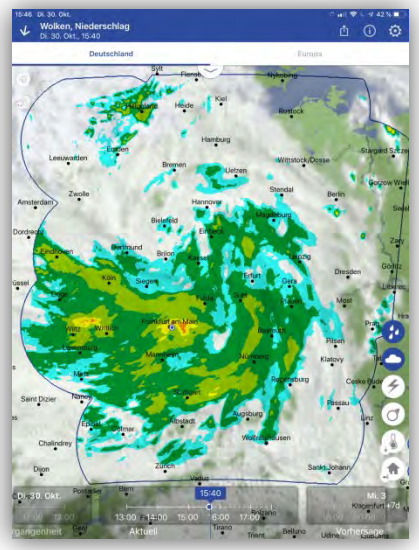

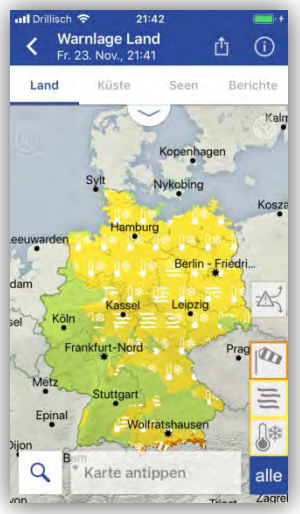

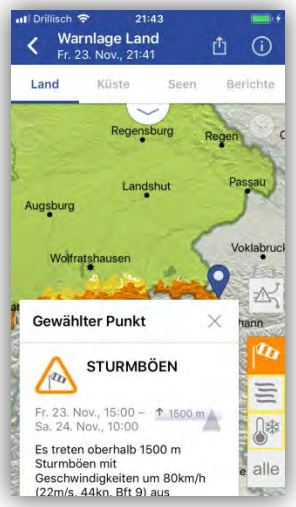

CAP – standards

Ideas for developments following different warning strategies in Europe

Developments of impact systems

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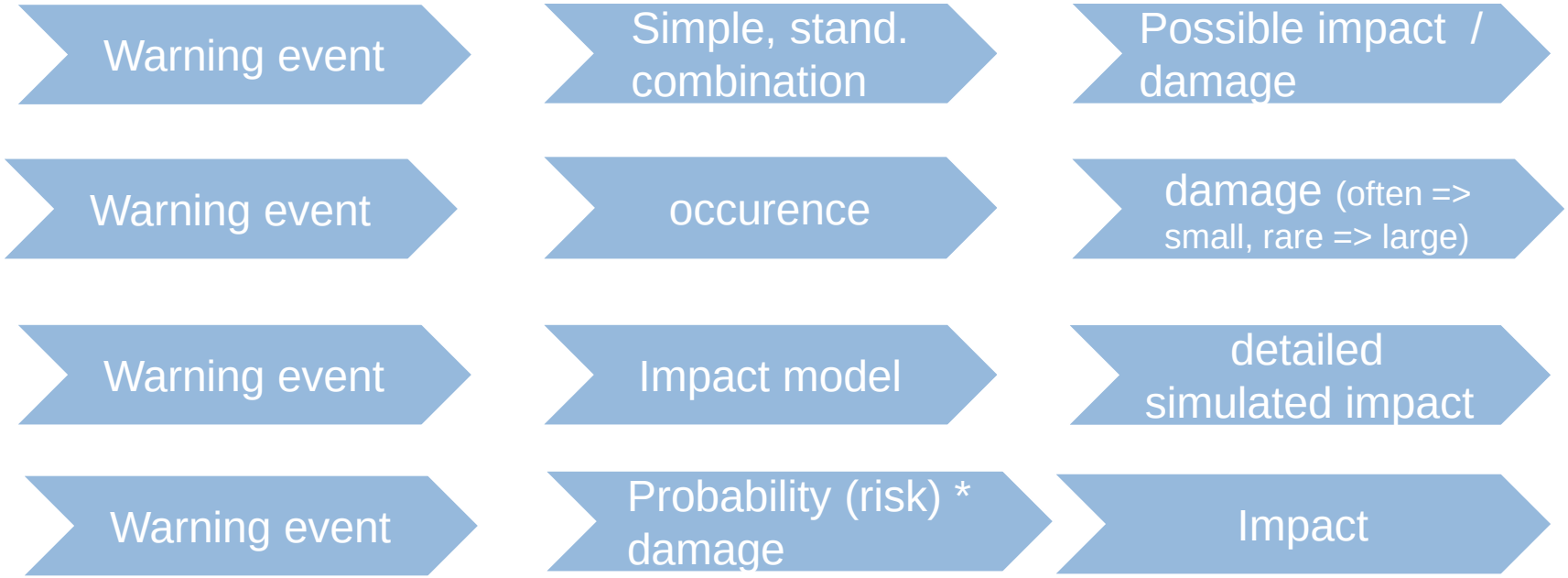
➔ **There are existing different warning systems/strategies in Europe and in the world**



➔ **Creation and standardisation of CAP (as soon as possible) is neccessary**

CAP – standard - Core elements:

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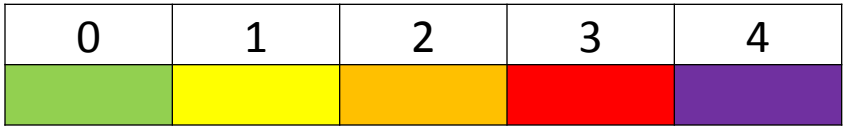
Location/warning area referenced areas: fix polygons or free polygons (lat/lon)
height of warned area (option?)

Date/time of issuing a warning
Date/time of begin of a warning
Date/time of end of a warning (in meteorology mandatory, for others as an option)

Warning type - event type
Severity level (0 to ?)
Colour code (option, national colour code)



Warning text meteorol. description (national language, others optional)
Impact text what will/may happen (national language, others optional)
Instructions what has to do be done (national language, others optional),
only for warnings for the public, if sender is authorized

CAP – standard - Options:

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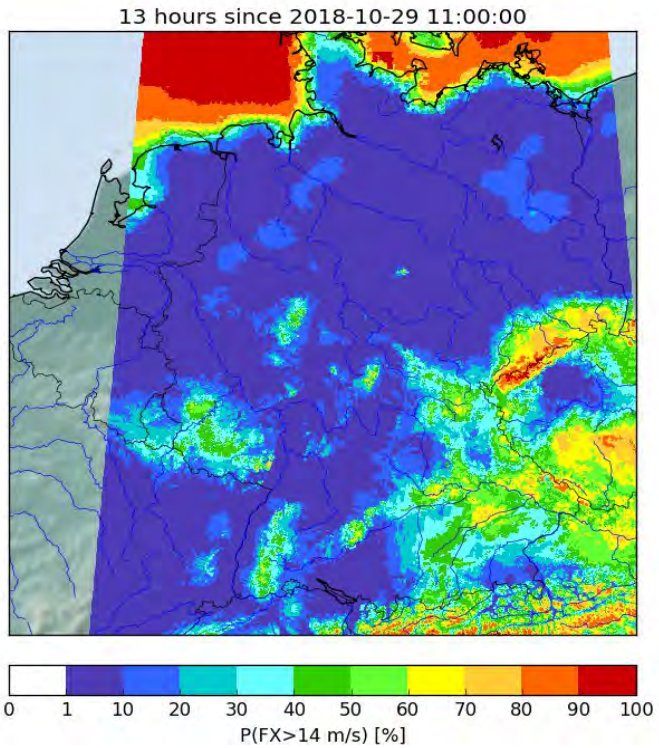
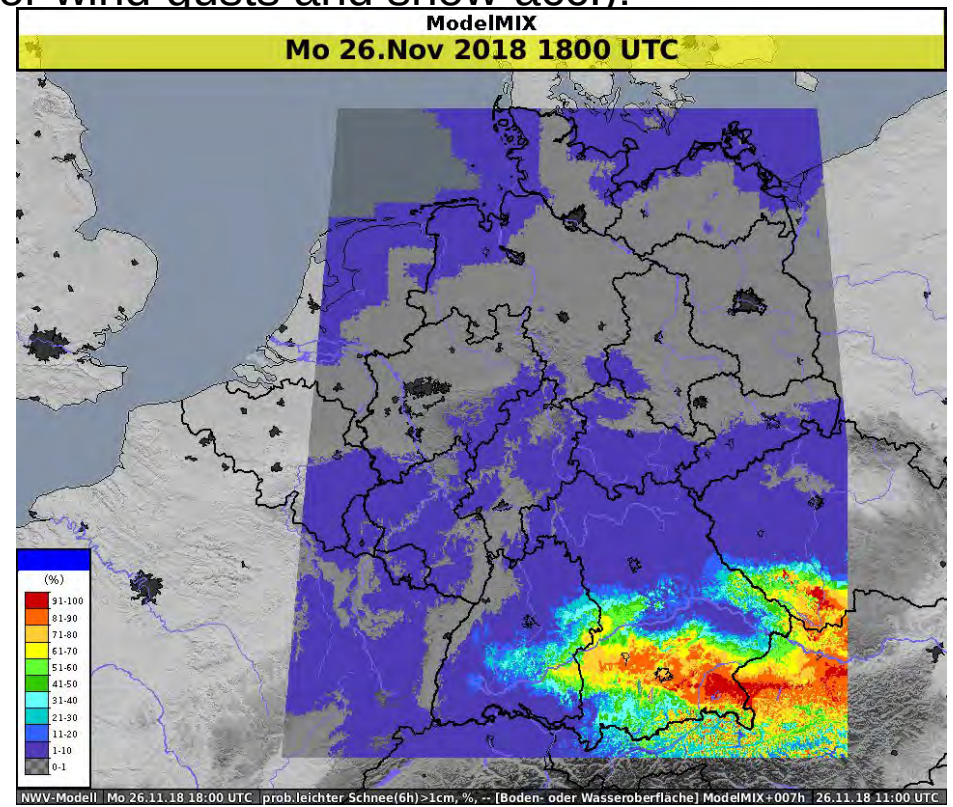
Probability/risk of occuring event in procent or words: unlikely-possible-likely
severity level depending on probability
colour code depending on probability

0	1	2	3

Based on statistical calibrated ensembles probabilities of reaching or exceeding thresholds can be calculated (examples for wind gusts and snow-acc.):





CAP – standard - Options:

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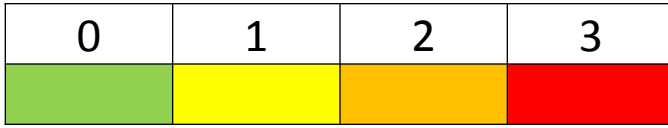
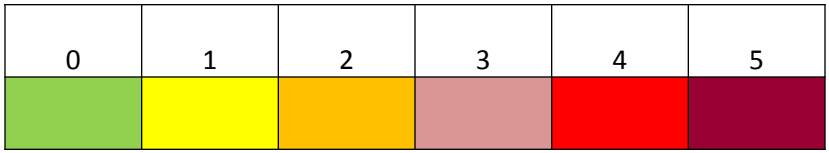


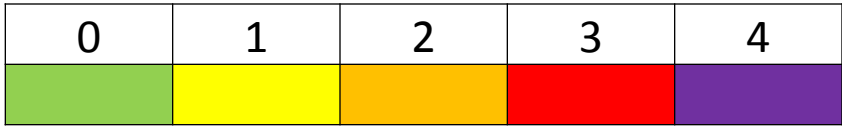
Returning period for warned event
severity level depending on ret.period
colour code depending on ret.period
In Germany: Popular in flood forecasting

exc. in years: 1 - 5 - 10 - 30 - 100



Possible impact
severity level depending on impact
colour code depending on impact

full text description or in categories



Possible categorization depending on impact/danger for:
(1)People on the street, animals on the field, tents
(2)Small destructions, blockings, effects on cars, traffics, light buildings, no open air events
(3)First destructions of infrastructures, buildings, effects on trains, airplanes
(4)Large influence on traffic, buildings, area blockings, evacuations possible

CAP – standard - Options:

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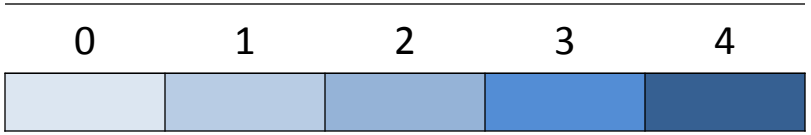
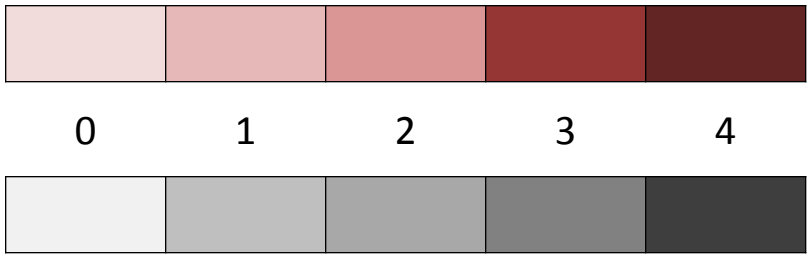
Probability/risk of occuring event
severity level depending on probability
colour code depending on probability



Returning period for warned event
severity level depending on ret.period
colour code depending on ret.period

Possible impact
severity level depending on impact
colour code depending on impact

Other colour codes/schemes seem to be possible, but for which skale?



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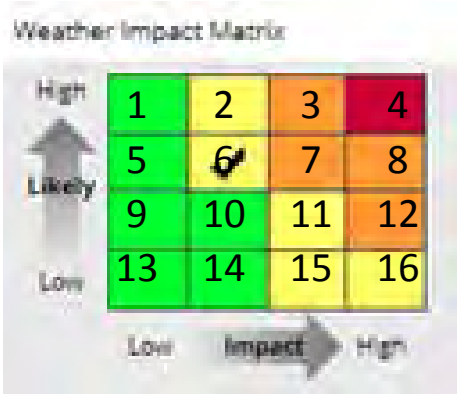
risk matrix



number of field from 4x4-matrix

does the public understand the details?

for professionals it is useful to know in which area of the matrix we are

In Germany we have not been asked for impacts from professionals users,
but for return periods and similar historical events:
storm last year, snow event 2010, heat summer 2003…

severity level depending on risk
colour code depending on risk

0	1	2	3

Vision: The Users may choose

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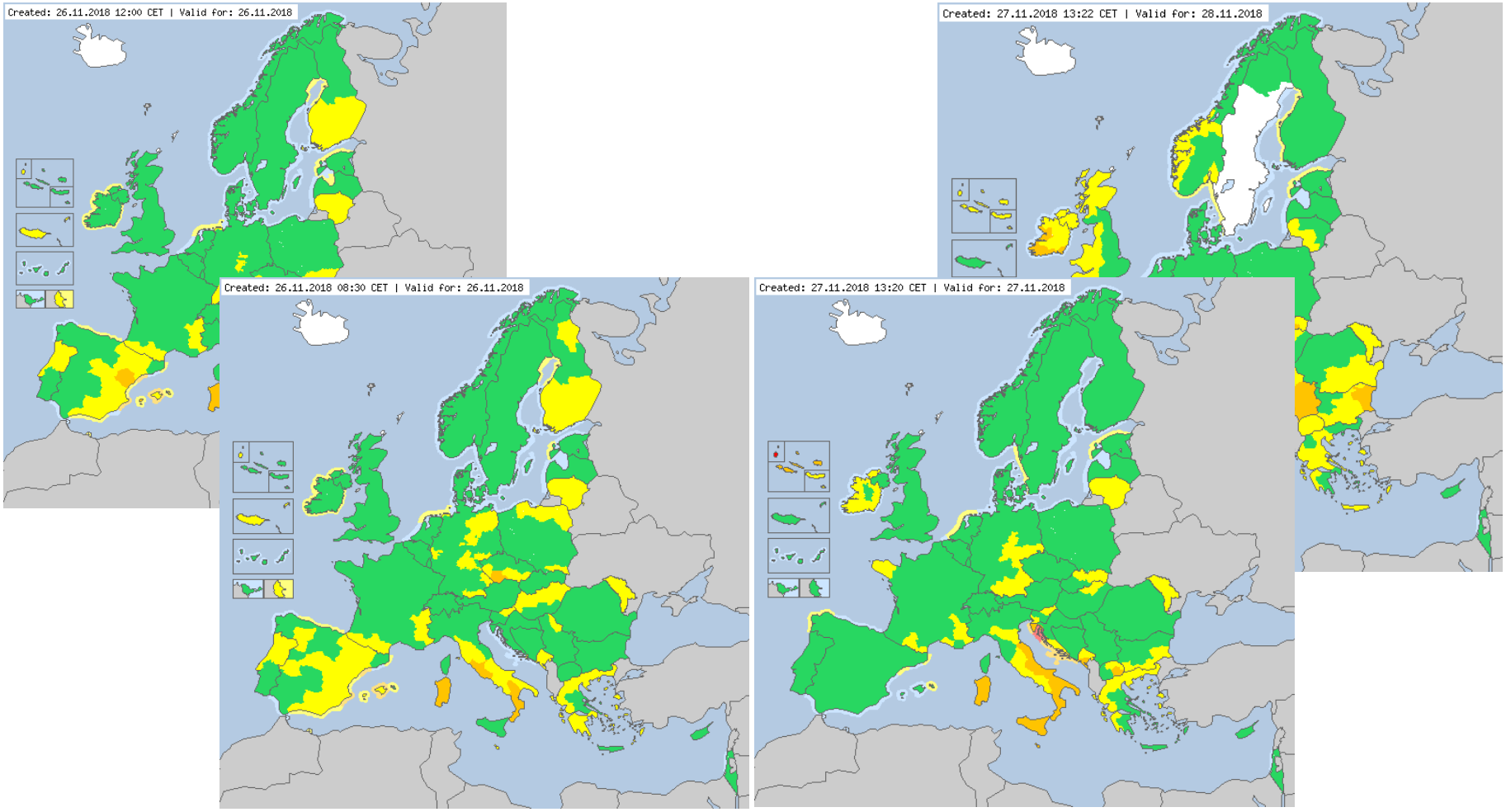
Based on met. thresholds

based on probabilities



Based on impact

based on return periods

CAP – standards - questions

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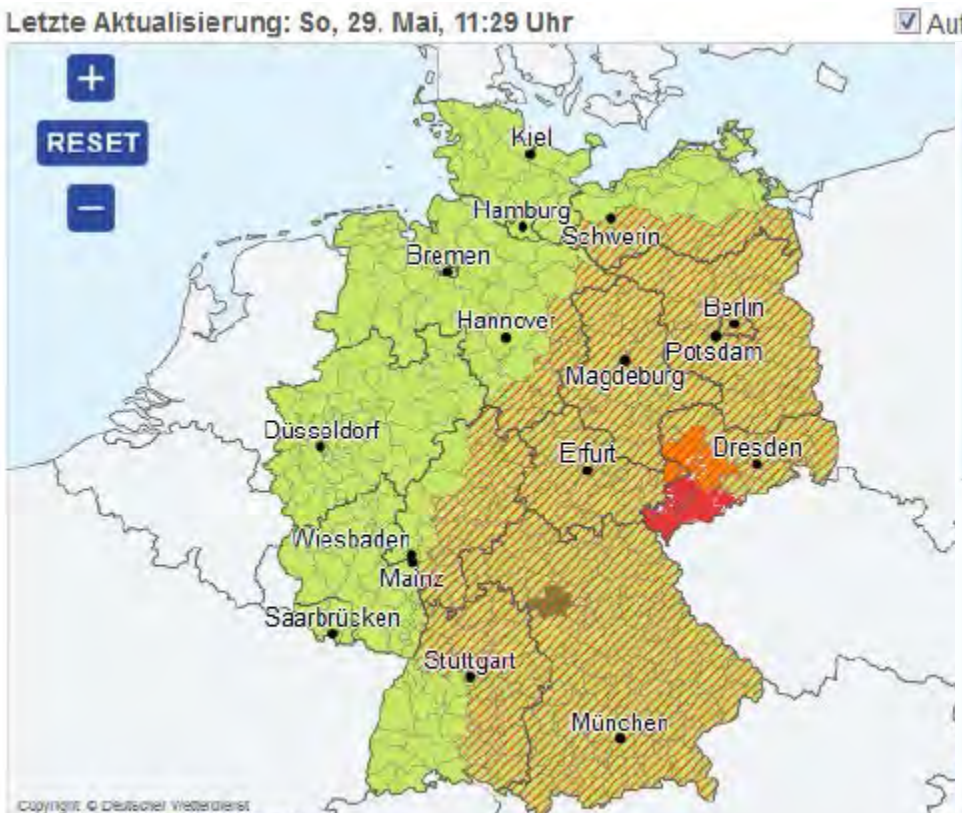
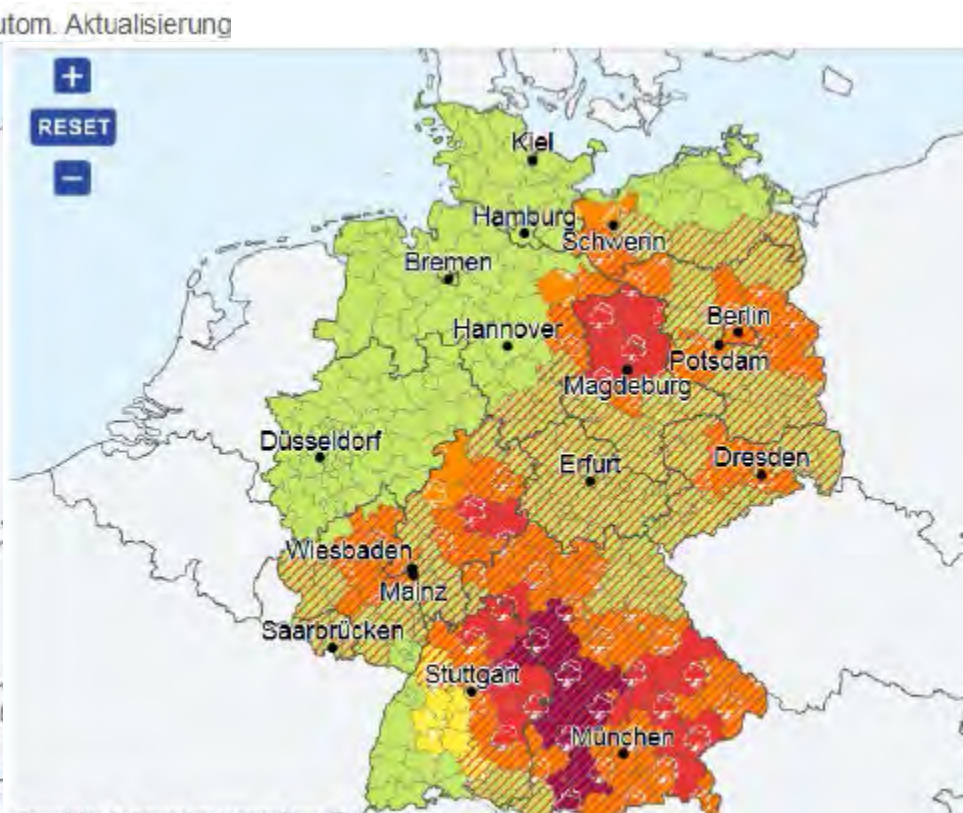
How to deal with uncertainty? DWD produces pre-warnings
visualisation should distinguish between
(urgent) warnings and **pre-warnings - watches**
warnings and **early warnings**
using „urgency“?





CAP – standards - questions

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How to issue warnings in different languages?

produce one single CAP or one for each language?
How many different languages are expected to be useful?

For **free polygons** the data amount for the same warning area increases fast…

CAP – standards - questions

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Have you thought about an area for restricted information only for crisis management, not for the public?

i.e. number of possibly effected people
Number of possibly effected or destroyed buildings,
effected hospitals or special CM-locations
effected important bridges, knots of highways and railways
knots of electric power lines of it-structures

Thank you for your attention !

Thomas Kratzsch
Head of Department Basic Forecasts
Deutscher Wetterdienst
Frankfurter Str. 135 – 63067 Offenbach
Germany

Thomas.Kratzsch@dwd.de

Tel: +49 (69) 8062 2254
Fax: +49 (69) 8062 2259