Hydro Warnings in CAP / Meteoalarm

Rainer Kaltenberger (EMMA/Meteoalarm PM)

EFAS Annual Meeting, JRC/Ispra (IT)

27 September 2022

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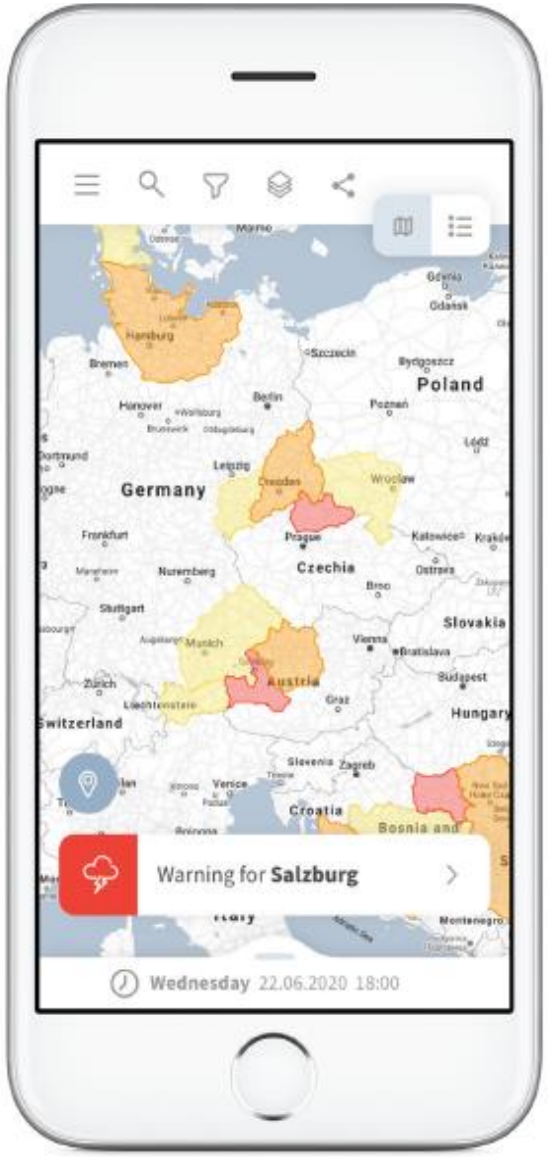

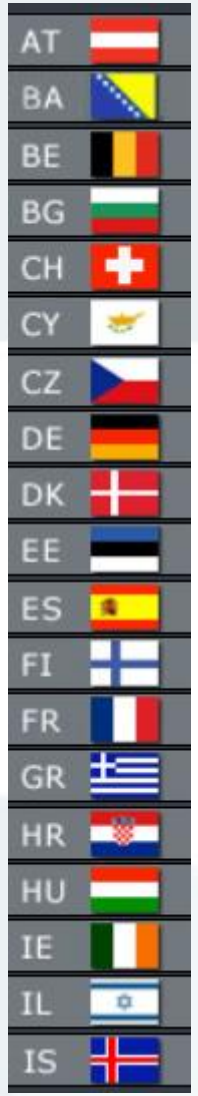

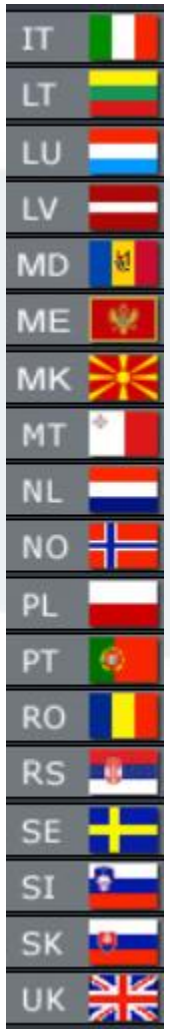

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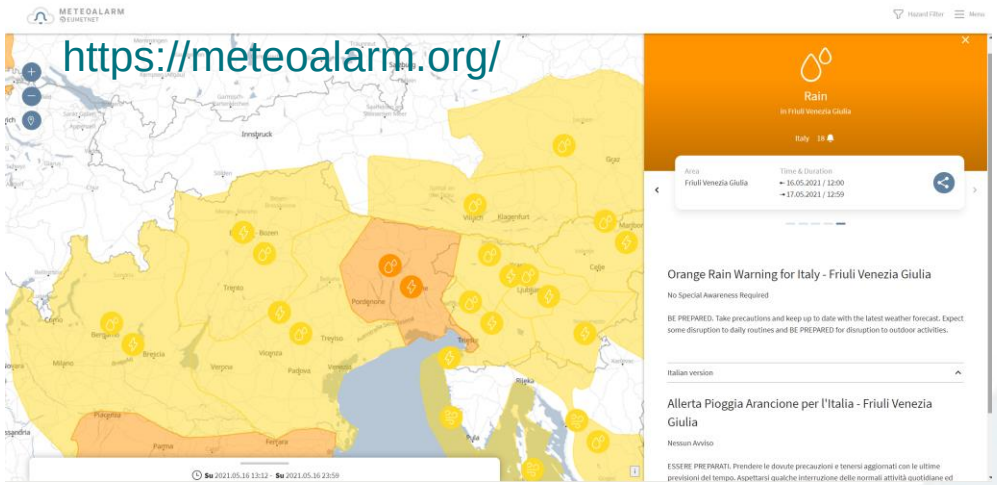
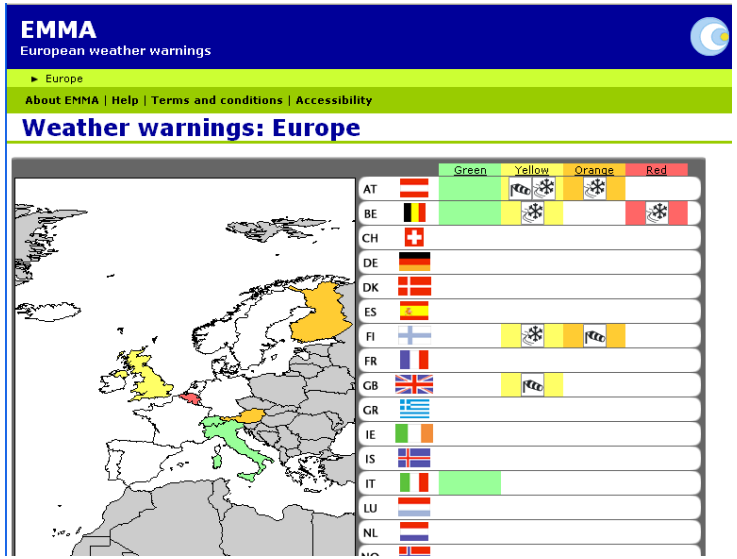
What is Meteoalarm?



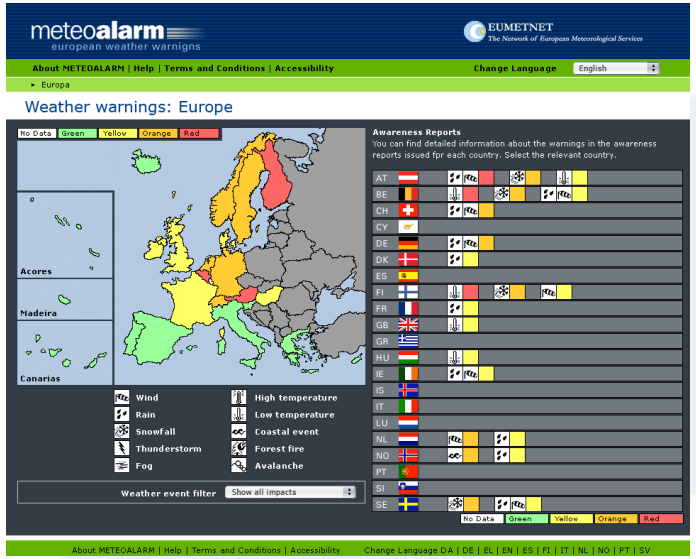
Meteoalarm Partner Group Meeting, Zagreb 2019

- An impact-oriented, common framework to **aggregate, display and make available** hydromet warnings of EUMETNET members in an **easy and understandable way** to the general public and to European (re)users
- Sources are 37 NMHSs and national partners
- **Multi-hazard programme** created in the mid 2000s
- Programme Management by ZAMG, NMS of Austria
- Meteoalarm 2.0 fully operational since June 2021

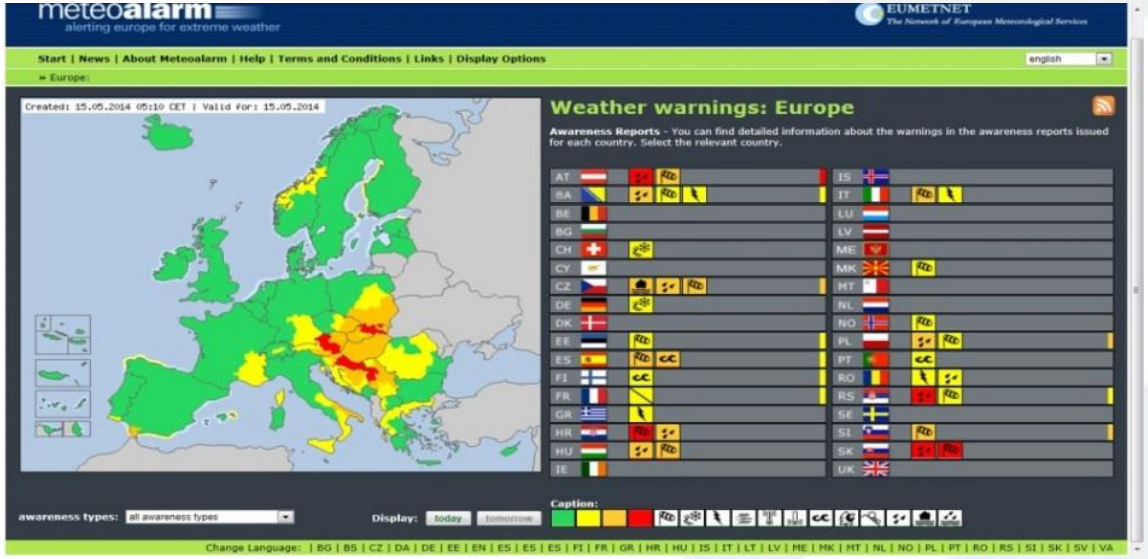
History



2007

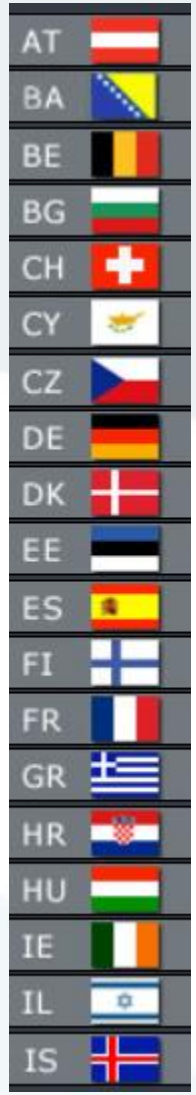


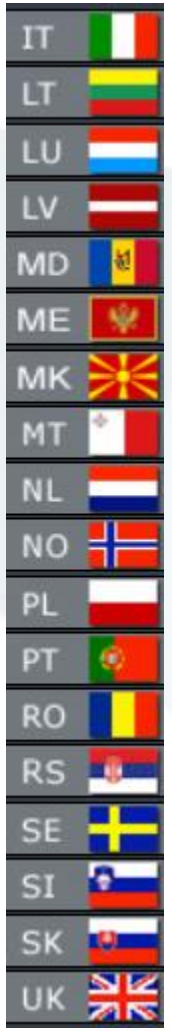
2010



2014

2021





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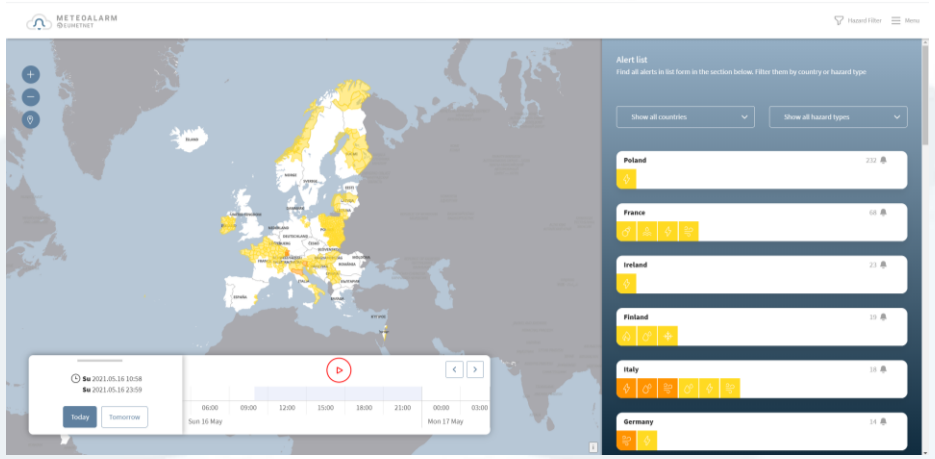
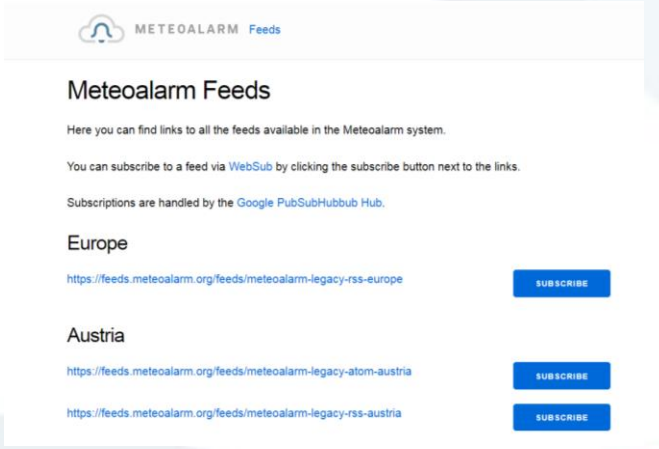
Hard facts

- **Integrated** regional warning system in 33 languages
- **Authoritative** warning information from 37 NMHSs
- **Easy understandable** four level colour code
- 12 warning parameters
- Supports impact descriptions, instructions and advisories
- Considered as **best practice** by WMO, World Bank, role model for GMAS
- Large information providers and the private sector are **re-users** of Meteoalarm information





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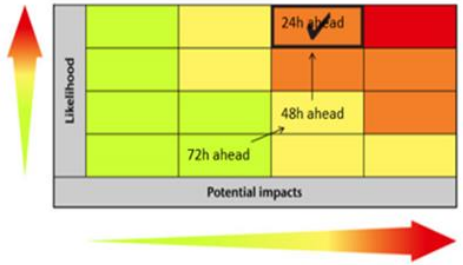
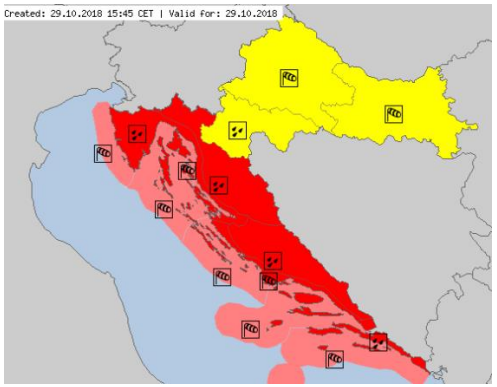
Concepts



UNISDR Sendai Framework compliant regional description of expected impact scenario and a clear advice what to do



Impact-oriented warning decision on a **national basis**
Added **common value** through **consistent warning philosophy**, easy and understandable
four level color code

Dissemination of warnings in CAP format to (re)users via feeds and the alert hub

Meteoalarm 3 C‘s:
Content
Communication
Co-operation

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Community Building

Communication with civil protection on national and European basis (ERCC), integration of national partners (hydro services,…)

Colour	One word	What to do?	Damage / Impact
Green	Weather report	usual phenomena	- - -
yellow	Be aware!	caution with exposed activities	exposed objects (avoidable)
orange	Be prepared!	keep informed in detail, follow advice of authorities	general damages (not avoidable)
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)

Joint development of guidelines and warning concepts allow an as far as possible harmonized approach

Regular meetings of Meteoalarm Expert Group, Meteoalarm Partner Group and CAP Working Group

Exchange of best-practices:
„How is it done in your country“?

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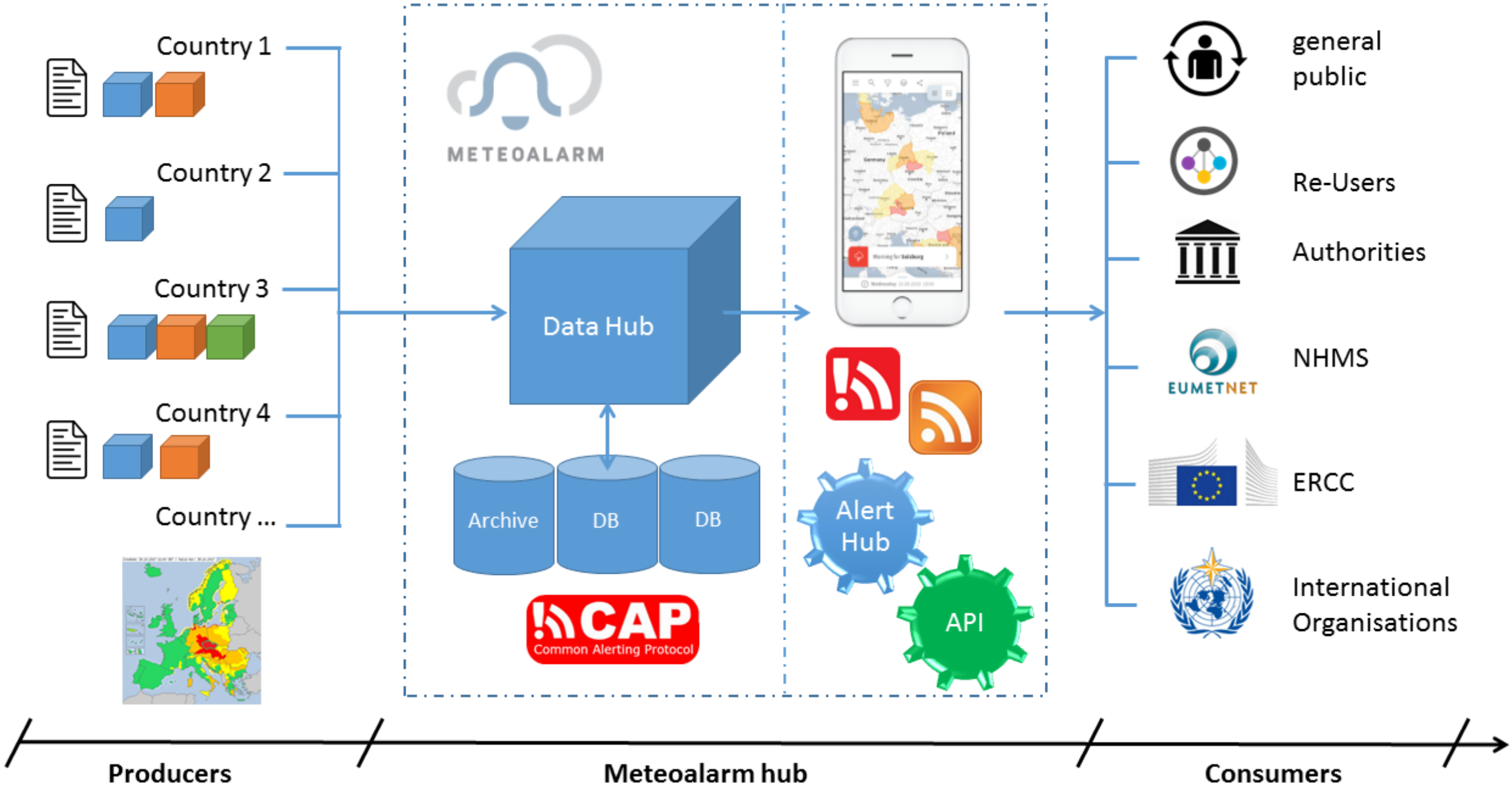
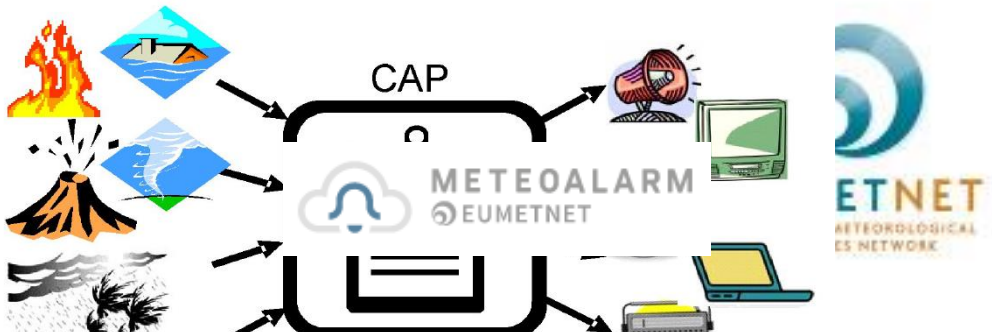

Country 1
Country 2
Country 3
Country 4
Country ...
METEOALARM
Data Hub
Archive
DB
DB
CAP
Common Alerting Protocol
Alert Hub
API
general public
Re-Users
Authorities
NHMS
EUMETNET
ERCC
International Organisations
Producers
Meteoalarm hub
Consumers

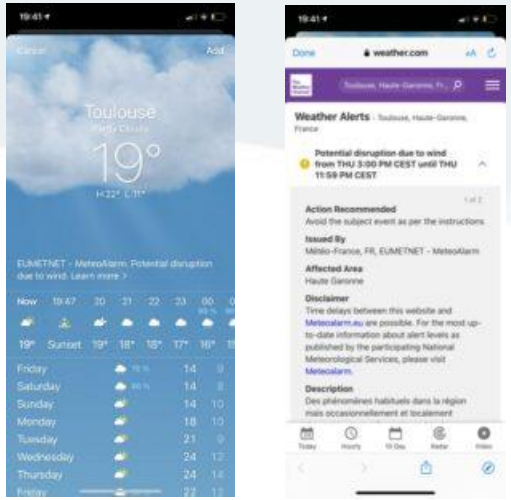
CAP and the WMO Register of Alerting Authorities

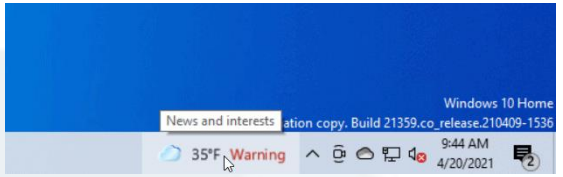
- The **Common Alerting Protocol (CAP)** is a standard, XML-based message (text) format designed for communicating **All-Media, All-Hazard** and Sendai-conform warnings
- Easy to disseminate in real-time via **publish/subscribe CAP feeds** (RSS, ATOM,…), and also via Message Queue (such as MQTT)
- Endorsed by WMO Cg-18 as **standard format for warnings**, currently in the process to get part of the WMO TechReg, CAP will be the backbone of WMO GMAS (Global multi-hazard Alert System)
- WMO has **a central role in registering alerting authorities** like NMHSs and their **CAP feeds** (listed via https://alertingauthority.wmo.int/), **generates trust** and strengthens the **single authoritative voice principle**
- **Take home message:** Make your warnings available via CAP (a XML-based format) and register the alert feed (RSS or ATOM) at the WMO Register of Alerting Authorities https://alertingauthority.wmo.int/ (contact: Adanna Robertson-Quimby arobertson@wmo.int if you need assistance).



Re-Users of CAP Warnings

- Hydromet warnings issued by Meteoalarm partners (NMHSs) via CAP feeds published at meteoalarm.org are disseminated to **hundred of million end-users worldwide** via **large information providers and re-users**, including
  - Google
  - Apple
  - IBM/The Weather Company
  - AccuWeather, MeteoBlue, Foreca.com…
- Prominent **products and services** include
  - Apple and Android standard weather app
    https://www.eumetnet.eu/apple-standard-weather-app-eumetnet/
  - Windows 10 / 11 Weather Widget
  - Apple Watch standard Weather App





Re-Users Needs – Lessons Learned

- Re-Users appreciate the **standardized technical format** („Meteoalarm CAP Profile“) across 37 countries and **harmonized warning levels**
- Warnings should entail a **tangible description of the impact scenario** (CAP element <description>) and a clear, actionable **advice on what to do** (<instruction>)
- These and other CAP elements to be filled with **„rich“ textual** content
- Warnings should feature at least **all offical, national languages plus English** (tourists, expats,…)
- Re-Users request more **meta data** to be made available in a **machine readable format** (e.g. details on warning system such as warning criterias/thresholds/parameters, how warnings are generated, IbW; alerting organisation logo, links to offical websites of warnings, definition of „high priority“ alerts,…)
- They want to be **timely informed about changes**, not just by Meteoalarm, but also by **national partners** (e.g. new warning parameters to be introduced, changes in warning system, in geocodes etc.)
- Originators of warnings should switch over to **polygons** rather than using geocodes
- **Feedback** on representation / visualization of warnings from NMHSs is appreciated
- Feedback will be incooperated into **new Meteoalarm CAP Profile v1.2** and **requirements of the next programme phase**

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Hydro Warnings in Meteoalarm

- Currently **15/37 countries** provide hydrological warnings to Meteoalarm
- **Flood-related warning parameters**:
  - Rainfall
  - Flooding
  - Rain + Flood
- Rain/flood was established for situations where flood warnings are issued by a NMHS for flood situations
- In other countries the metservice issues the rain warnings and the hydro service the flood warnings
- In many countries **flood** or **rain and flood** alerts typically include riverine flooding, whereas **flash floods** are covered by thunderstorm warnings and coastal flood by coastal event warnings
- **More warning parameters** (e.g. drought, landslide warnings) expected with new Meteoalarm CAP Profile v1.2 (2023)

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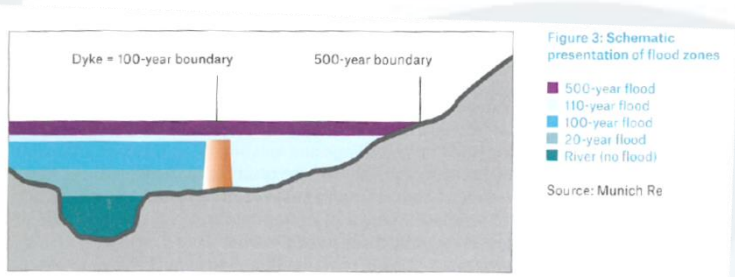
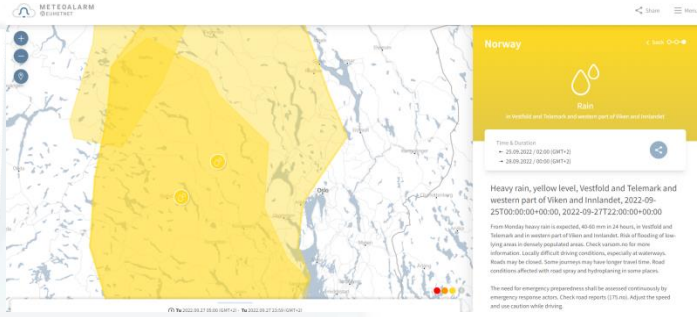
Flood Warnings: Thresholds, Zoning and Free Polygons

- **Threshold guidance** for warning levels of riverine flooding in Europe (as derived during the joint Meteoalarm and EFAS Meeting 2017 in Utrecht):

Green:	< HQ 2	CAP <severity>: minor
Yellow :	> HQ 2	CAP <severity>: moderate
Orange/amber:	> HQ 10	CAP <severity>: severe
Red:	> HQ 50	CAP <severity>: extreme

- Zoning: Affected administrative areas, flood zones, based on impact criteria,…
- Free (dynamic) polygons are supported by Meteoalarm since December 2021
  - To accomodate needs from the hydro community and support concepts of (event-based) impact-based warnings
  - Already picked up by NO, SE, SLO, NL
  - Specifications available at: https://edrop.zamg.ac.at/owncloud/index.php/s/9Xg7CTMZnfgfpaX





HQ: Highest annual discharge

What‘s Planned

- **2022-2023**
  - New Meteoalarm CAP Profile v 1.2 available, allows more flexibility, more warning parameters, consistent to needs of re-users of the private sector
  - Intranet features available for partners (e.g. archive, statistics module)
  - APIs (realtime and archive), make warnings available via CC BY 4.0 license (to meet EU regulation on HVDs)
  - Continued work with re-users and hydro community (e.g. on CAP good practices)
  - Storm naming layer
  - Continued support of WMO GMAS, reachout to OASIS
- **2024-2028 (requirements currently being drafted)**
  - EMMA/Meteoalarm continue as exchange platform for the hydromet warning community (“How is it done in your country”)
  - Work together with re-users of the private sector to optimize last mile of warning dissemination
  - Multi-hazard warnings (e.g. including flooding, landslides,…), jointly work on concepts regarding cascading and compound impacts
  - Market place concept for IbW system components (e.g. risk models)
  - Idenfity CAP best practices in our community and promote them via WMO CAP Helpdesk
  - WMO WIS 2.0 conform APIs (via MQTT)

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Wrap Up

1. **Make your warnings available via CAP** and **register** the alert feed (RSS or ATOM) at the **WMO Register of Alerting Authorities** https://alertingauthority.wmo.int/ (contact: Adanna Robertson-Quimby arobertson@wmo.int if you need assistance)
2. **Meteoalarm** now supports CAP warnings in **polygon format**, to accomodate needs from the hydro community and support concepts of (event-based) impact-based warnings. As a result a number of new hydro partners onboarded!
3. Are you involved in **CAP implementation** of hydro warnings? We are interested to hear about your experience: meteoalarm@zamg.ac.at

4. **Benefits** of becoming a **Meteoalarm partner**
   - Warnings made available via Meteoalarm in CAP format are re-distributed via re-users such as Google, Apple etc., reaching 100M‘s end-users worldwide
   - Community of practice regarding CAP implementation
   - Bridging between meteo and hydro community
   - Representation of CAP-interests of our hydromet community in OASIS committees
   - Work on joint concepts for warning criteria
   - Regular exchange between meteo and hydro community (how is it done in your country)
   - Interested? Contact us at meteoalarm@zamg.ac.at

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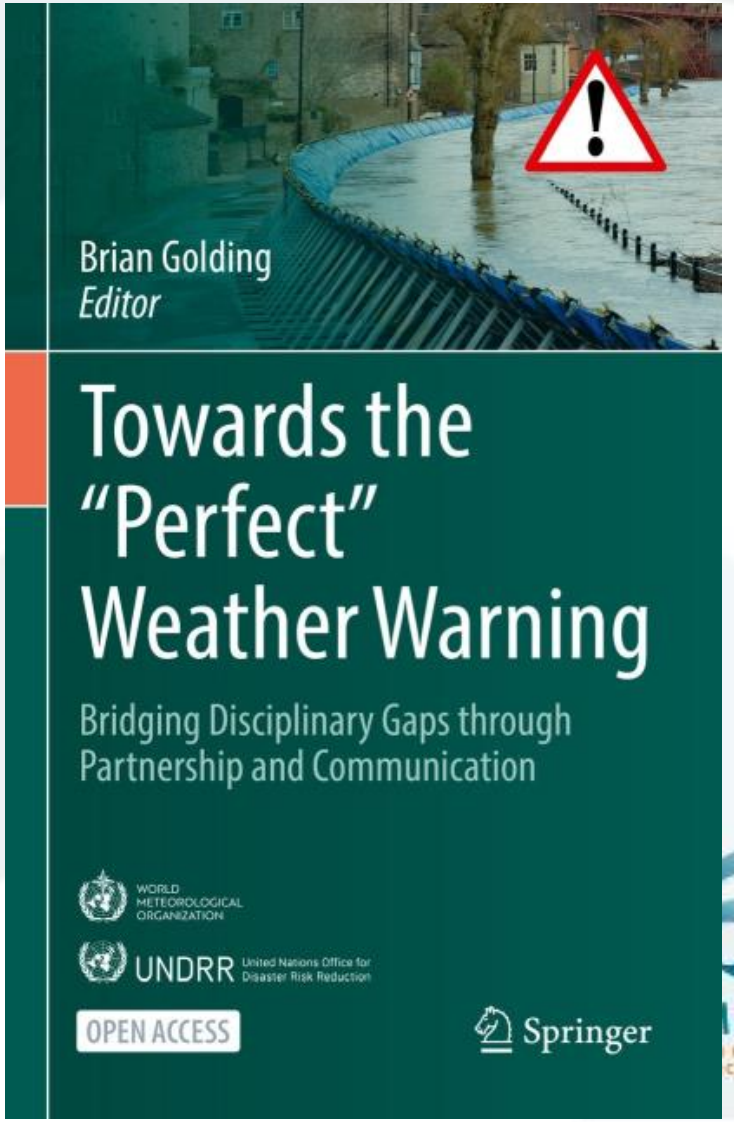
Reading tip:



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