

Planning of WMO Global Multi-hazard Alert System (GMAS) in relation to Tropical Cyclones

TECO

Ha Noi, Viet Nam, 26 – 27 Feb 2018

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香港天文台

HONG KONG OBSERVATORY

Outline

- Background of WMO GMAS
- Schematic of GMAS
- WMO Alert Hub
- Common Alerting Protocol (CAP)
- Enabling CAP in Severe Weather Information Centre (SWIC)
- Future's Plan

WMO Global Multi-hazard Alert System (GMAS) - Background

- Decision 3.2(1)/1 (EC-69 ,10-17 May 2017) on GMAS
- Vision
 - Recognized globally by decision makers as **authoritative warnings and information** related to high-impact weather, water, ocean and climate events
- Objectives
 - Provide authoritative information and advice into UN agencies and humanitarian community in both their operational and longer term decision
 - Aggregate authoritative source of information from Members

WMO Global Multi-hazard Alert System (GMAS) – Objectives

- Objectives (Cont'd)
 - Strengthen partnerships with stakeholders to deliver warnings to the general public in the most efficacious manner;
 - Raise the **visibility** of NMHSs at the national, regional and global scales;
 - Raise the **visibility** of WMO at the UN level;
 - Enhance the **authoritative voice** of Members;
 - Strengthen Members' capability and capacity to provide better service

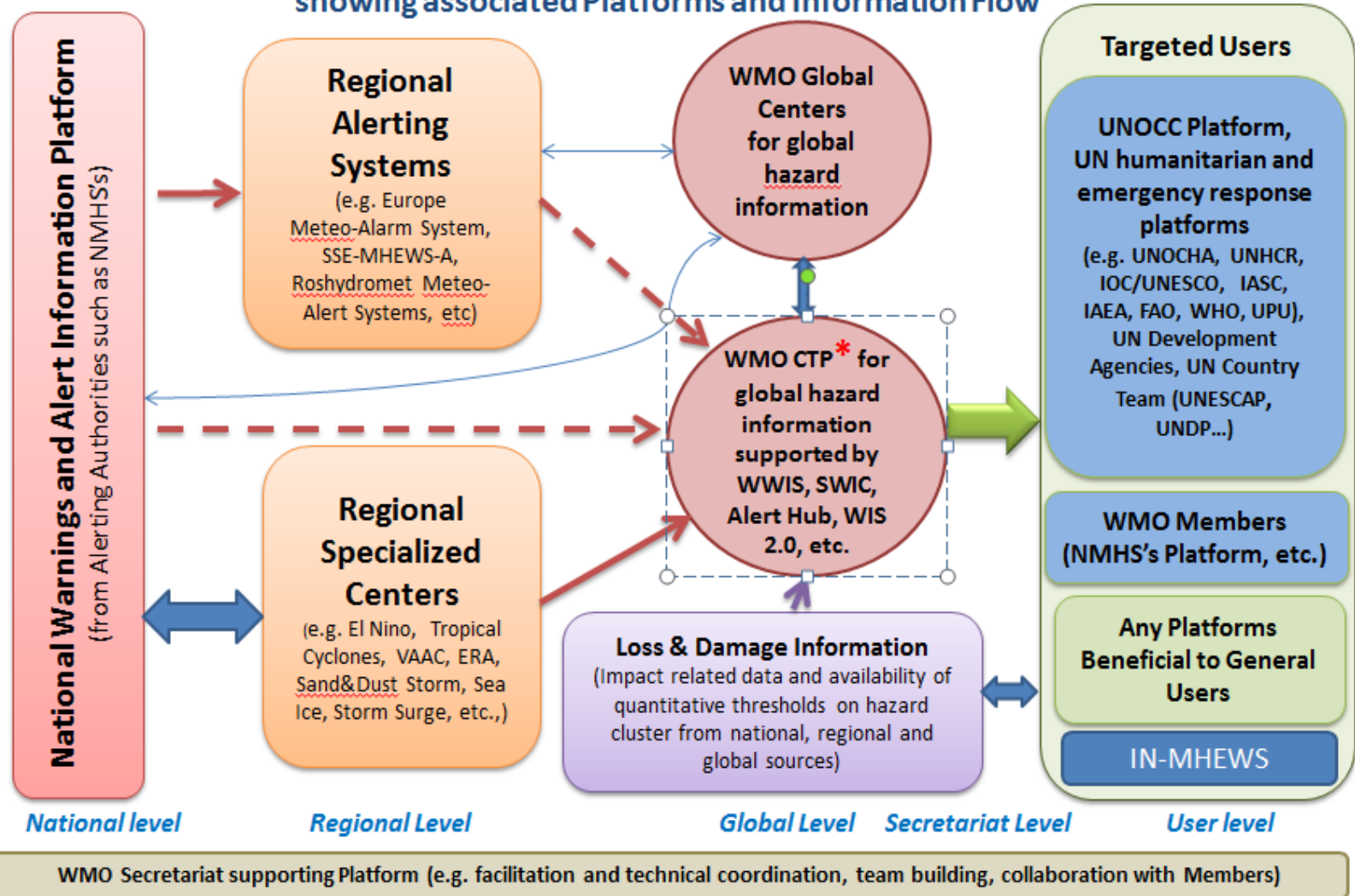
WMO Global Multi-hazard Alert System (GMAS) - Benefits

- Benefits
 - Help to **save** lives, livelihoods and property
 - Increased **recognition** of NMHSs products and services
 - Increased **standardization** of hydrometeorological warning information among WMO Members (through utilization of **CAP**)
 - Increased **sharing** and **harmonization** of hydrometeorological warnings and hazard products among Members
 - Increased focus on NMHS **capacity development** to provide reliable, actionable, and timely warnings
 - Improved user **decision-making** for humanitarian agencies
 - Quick **access to authoritative alerts** to better inform public, media, tourism sectors, other weather sensitive sectors

WMO GMAS Initiative

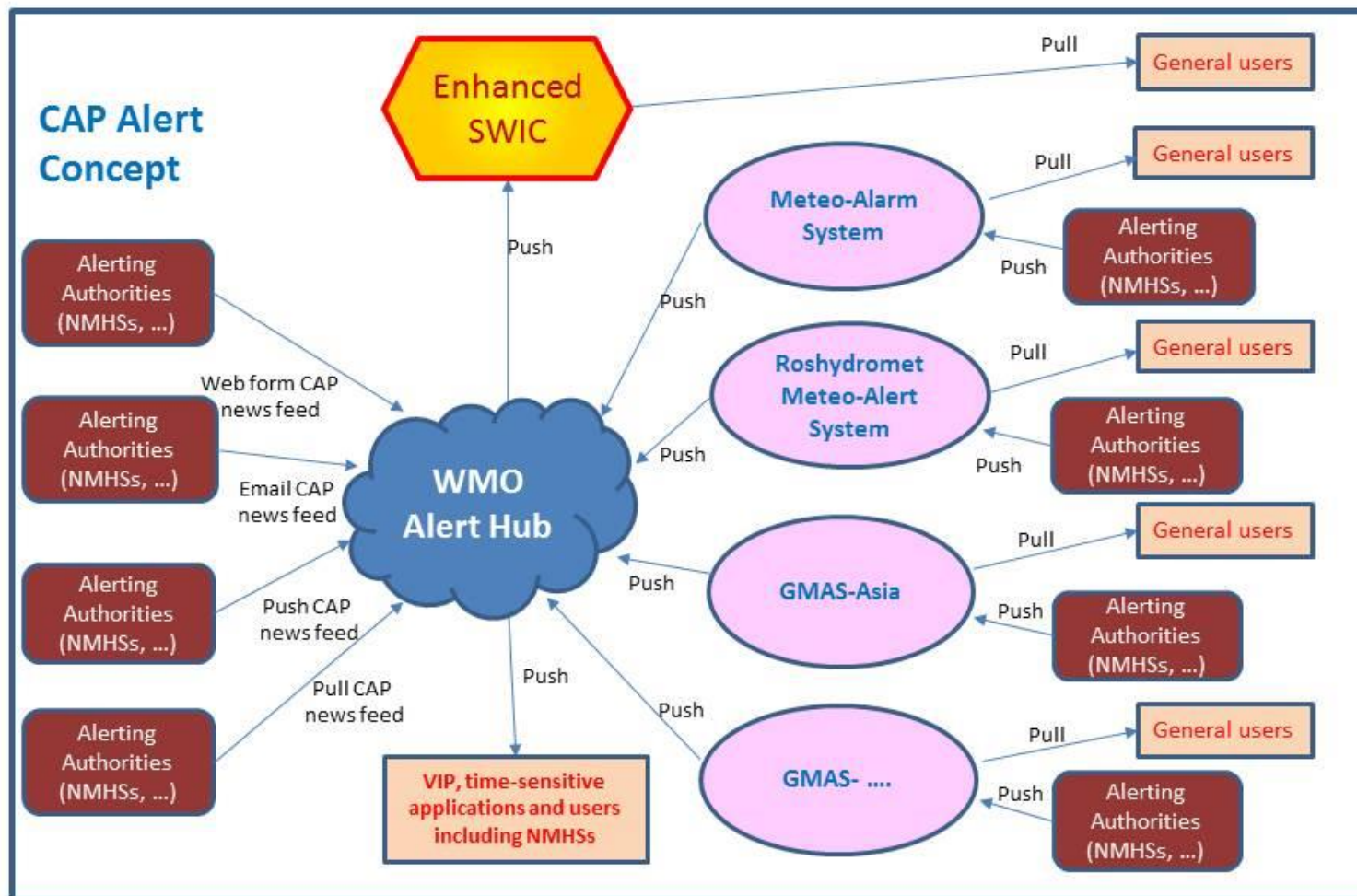
- EC-69 requested EC WG/DRR to
 - further advance the concept and the development of a strategy that emphasizes the following components:
 - Focus on the **benefits** to and **requirements** of users;
 - Emphasize that **NMHSs** are **official authoritative source** and in most countries, a single voice, on weather warnings in respective cases;
 - Consider the role of **RSMCs** in providing guidance to Members (e.g. tropical cyclones, and climate products);
 - Consider both the meteorological and hydrological aspects;
 - Accommodates public and private capacities and use cases;
 - Takes into account other service providers such as GDACS;
 - **Utilize the CAP** or other industry standards to enable a robust mechanism for aggregating warnings from Members.
 - develop a project plan with key deliverables for EC-70
 - Detailed plan aimed at **gathering the requirements**;
 - **Detailed proposal** which leverages existing mechanisms (e.g. CBS Management Group Task Team on DRR) in consultation with RAs and TCs.

Schematic of WMO Global Multi-Hazard Alert System (GMAS) showing associated Platforms and Information Flow

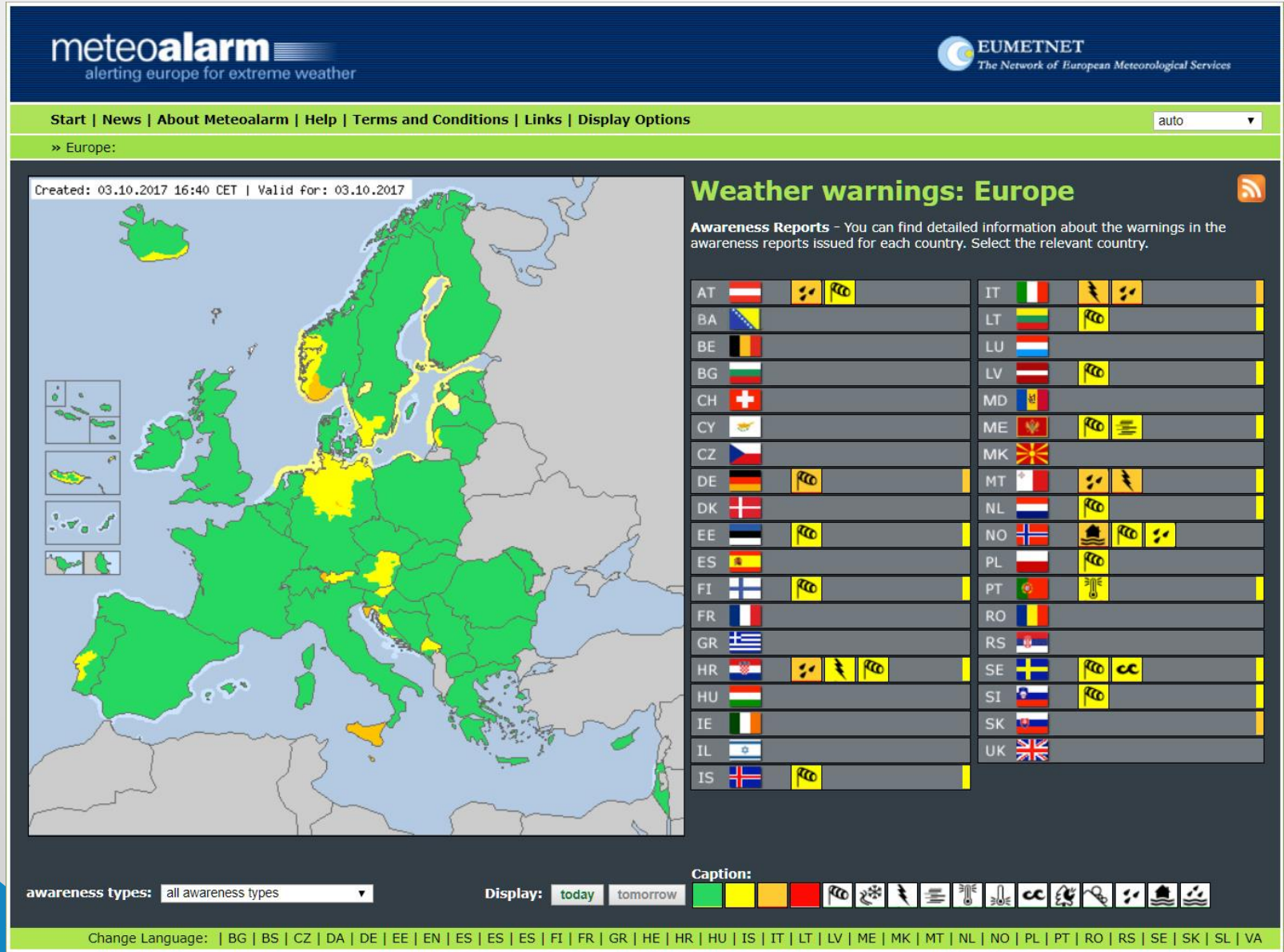


* CTP – Common Technical Platform is a framework with relevant protocols, standards, open systems, etc. which have been agreed by all relevant stakeholders to show all the authorized warnings and associated impact-related information that have been made available by WMO Members to be accessible to the decision makers and others.

WMO Alert Hub within GMAS



EUMETNET Meteoalarm



Roshydromet Meteoalert

ГИДРОМЕТЦЕНТР РОССИИ

О погоде - из первых рук



поиск по сайту

Федеральная служба по гидрометеорологии и мониторингу окружающей среды

English version

Главная Новости Прогнозы Фактические данные Климат Погода - другими глазами Моря и океаны О Гидрометцентре Контакты

Прогноз на неделю для города:

Россия СНГ Зарубежье Курорты

Абакан
Анадырь
Астрахань
Белгород
Благовещенск
Великий Новгород
Владикавказ
Волгоград
Воронеж
Грозный
Екатеринбург
Ижевск
Йошкар-Ола
Калининград
Казань
Кемерово
Кострома
Красноярск
Курск
Липецк
Майкоп
Москва
Нальчик
Нижний Новгород
Омск
Орел
Палана
Пермь
Петропавловск-Камчатский
Ростов-на-Дону
Салехард
Санкт-Петербург
Саратов
Ставрополь
Тамбов
Томск
Тура
Улан-Удэ
Усть-Ордынский
Хабаровск
Челябинск
Черкесск
Элиста
Якутск

Агинское
Архангельск
Барнаул
Биробиджан
Брянск
Владивосток
Владимир
Вологда
Горно-Алтайск
Дудинка
Иваново
Иркутск
Казань
Калуга
Киров
Краснодар
Курган
Кызыл
Магадан
Махакакала
Мурманск
Нарьян-Мар
Новосибирск
Орджоникидзевская
Оренбург
Пенза
Петрозаводск
Псков
Рязань
Самара
Саранск
Смоленск
Сыктывкар
Тверь
Тула
Тюмень
Ульяновск
Уфа
Ханты-Мансийск
Челябинск
Чита
Южно-Сахалинск
Ярославль

Новости

- На Урале мокрый снег и гололедица
- На юге Дальнего Востока прошли сильные осадки с порывистым ветром
- Директор Гидрометцентра России Роман Менделевич Вильфанд выступит с лекцией на Фестивале науки
- Прогноз средней температуры на декаду по территории России
- Об агрометеорологических условиях на территории России в сентябре и октябре 2017 г.
- На юге России намечаются перемены погоды

Новая версия веб-сайта Гидрометцентра России (адаптирована для мобильных устройств)

Погода за окном в Москве - данные автоматической метеостанции

Внимание граждан и организаций - информация о получении справок о погоде

Откуда возникают ошибки прогнозов?

[Все новости...>>](#)

Экстренная информация

Ночью и утром 4 октября в степных и предгорных районах Крыма...>>

Погода в Москве

[Текущая погода](#)

[Прогноз на неделю по миру](#)

Среда, 4 октября

ночью 3..5°
днём 8..10°

облачно; ночью без осадков; днём дождь, местами небольшой дождь
ветер ночью южный 3-8 м/с, днём южный 5-10 м/с, местами порывы 12-17 м/с

Четверг, 5 октября

ночью 5..7°
днём 9..11°

облачно, дождь

ветер южной четверти 5-10 м/с, местами порывы 12-17 м/с

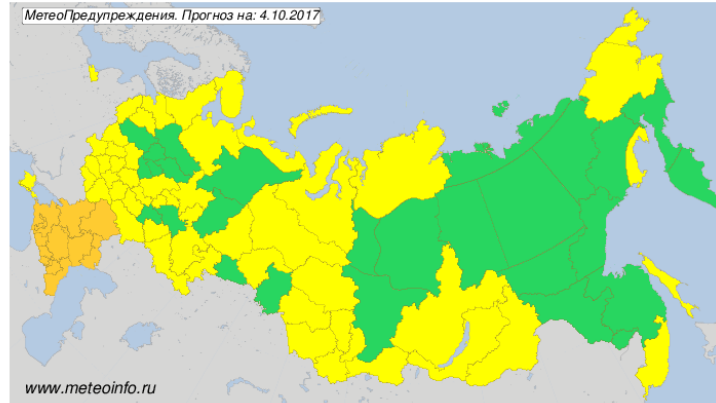
Пятница, 6 октября

ночью 5..7°
днём 9..11°

облачно, дождь

ветер южной четверти 5-10 м/с, местами порывы 12-17 м/с

Прогноз опасных и неблагоприятных гидрометеорологических явлений

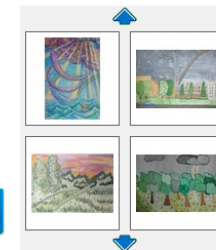


Северо-Западный федеральный округ. 5-6 октября в Ленинградской, Псковской областях сильный дождь.

Приволжский федеральный округ. 2-3 октября в Саратовской области высокая, местами чрезвычайная пожарная опасность.

Южный федеральный округ. 2-3 октября в районе Новороссийска (Краснодарский край) ветер 2 октября 23-28 м/с, 3 октября до 23 м/с. [Подробнее...>>](#)

Погода - глазами детей



Ваши дети любят рисовать? Их рисунки могут украсить этот сайт

[Им нужна ваша помощь](#)

Фактические данные

[Температура поверхности морей](#)

[Температура и осадки по](#)

[Московской области](#)

[Синоптические карты](#)

[Анимация радарных наблюдений](#)

[Прогностические карты](#)

Библиотека

[Труды Гидрометцентра России](#)

[А.И. Угрюмов: Когда пойдет дождь?](#)

[А.А. Васильев, Р.М. Вильфанд:](#)

[Прогноз погоды](#)

Экспорт прогнозов погоды

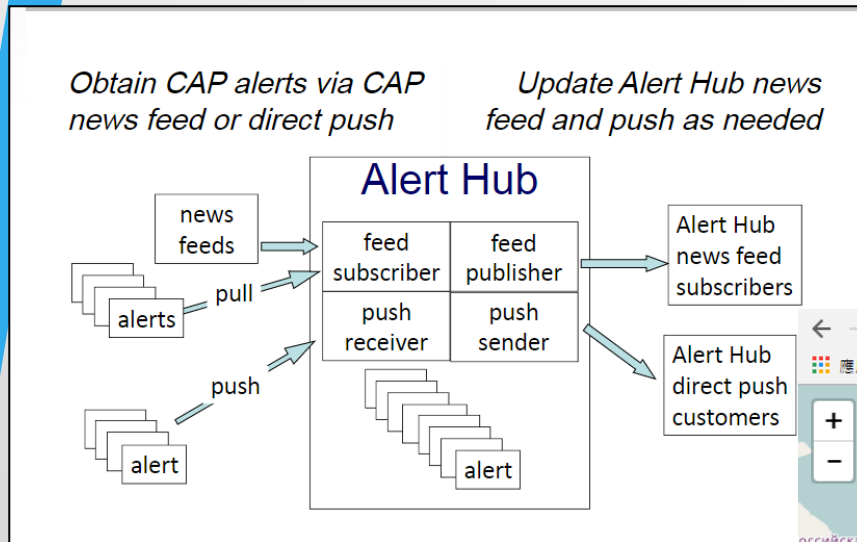
[Погодные информеры](#)

[Новостные ленты в формате RSS](#)

[Виджет с прогнозом погоды для](#)

[твоего компьютера](#)

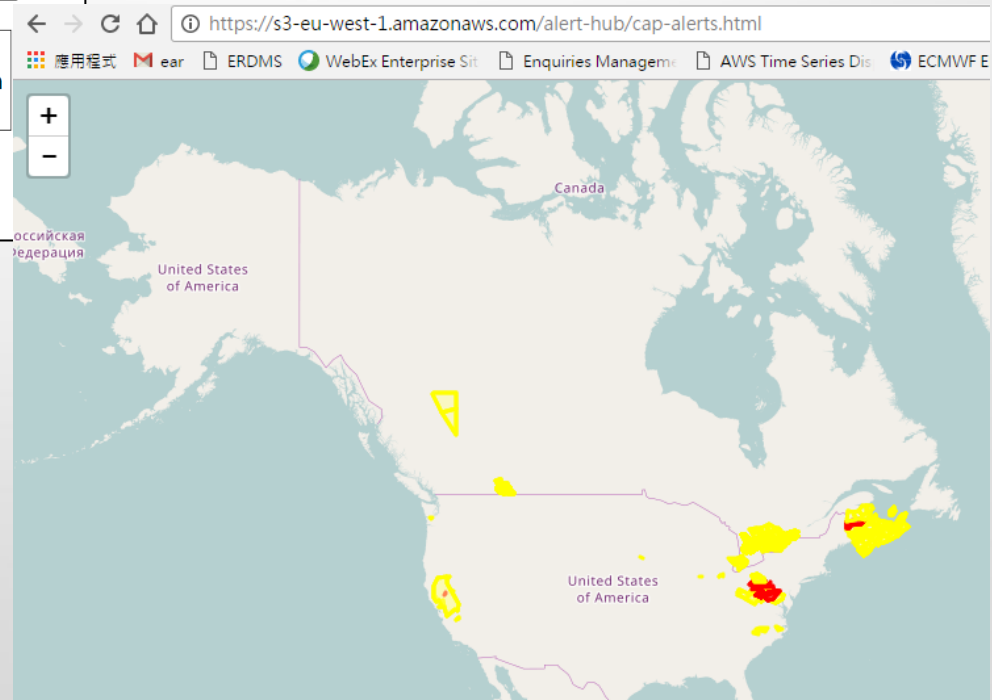
A Prototype of WMO Alert Hub



Development based on Filtered Alert Hub, which is a part of the NOAA Big Data Project.

Courtesy: Eliot Christian

The cloud-based Filtered Alert Hub aggregates emergency alerts worldwide.



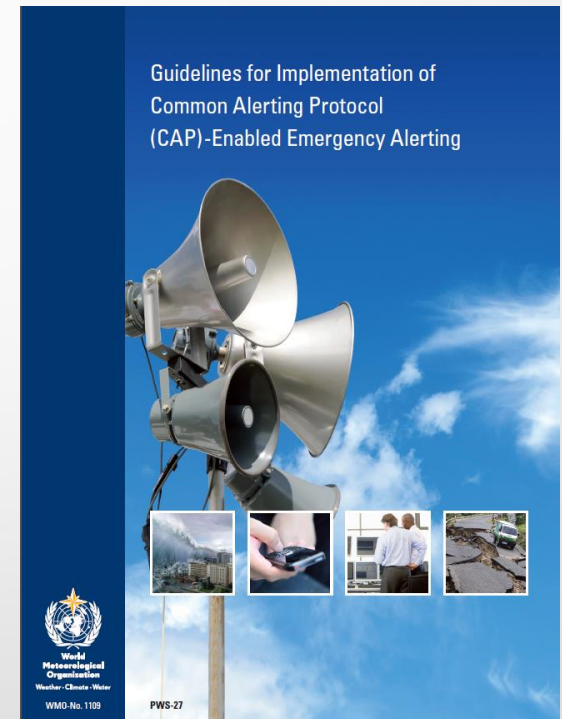
What is CAP?

The Common Alerting Protocol (CAP) is an **XML-based** data format for exchanging public warnings. It is a **standard** message format designed for All-Media, All-Hazard, communications:

- **over any and all media** (*television, radio, telephone, fax, highway signs, e-mail, Web sites, RSS "Blogs", ...*)
- **about any and all kinds of hazard** (*Weather, Fires, Earthquakes, Volcanoes, Landslides, Child Abductions, Disease Outbreaks, Air Quality Warnings, Transportation Problems, Power Outages ...*)
- **to anyone:** the public at large; designated groups (civic authority, responders, etc.); specific people

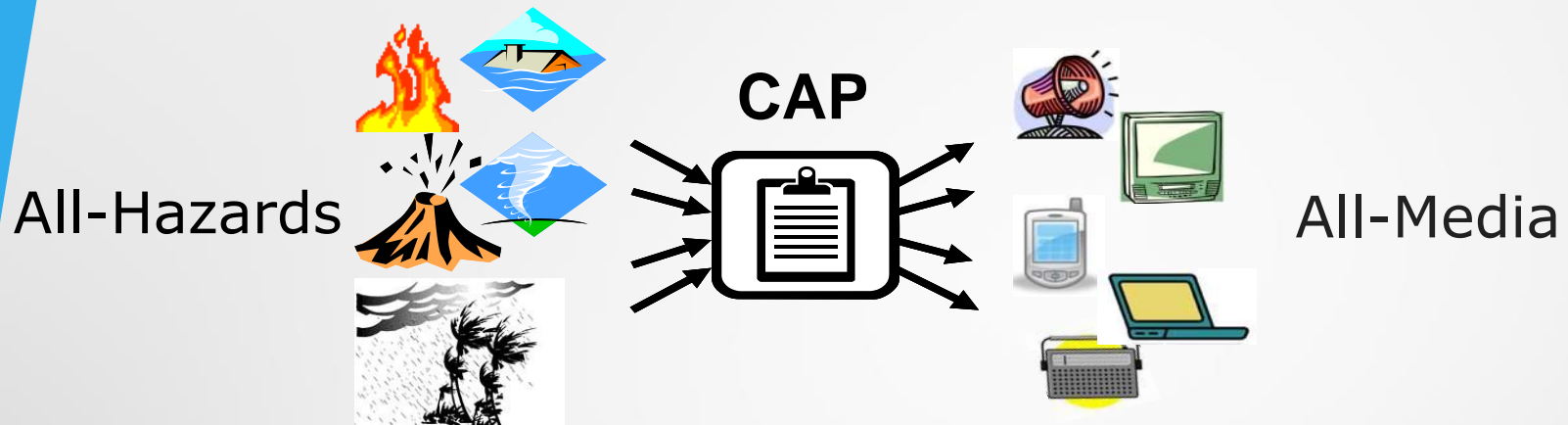
Cg-15 2007 endorsed adoption of CAP as standard for alerting

Cg-17 2015 reaffirmed the value of CAP



WMO-No. 1109

Benefits of CAP




- **Reduce cost/complexity** - A CAP message sender can activate multiple alerting systems with a single input
- **Facilitate common situation awareness** - Standardized alerts from many sources can be compiled for situational awareness, providing a whole picture across all types of local, regional, and national alerts
- **Consistency** - CAP provides consistency over multiple channels, allowing exact corroboration of alert information
- **Flexibility** - CAP useful for multilingual and special-needs populations.
- **Breakthrough standard** - Geographic information in a CAP alert allows targeting of users

CAP – Ideal Tool for Conveying Impact-based Forecast to Users

urgency	cap. alertInfo. urgency. code	The code denoting the urgency of the subject event of the alert message (REQUIRED)	<p>(1) The “urgency”, “severity”, and “certainty” elements collectively distinguish less emphatic from more emphatic messages.</p> <p>(2) Code Values:</p> <p>“Immediate” - Responsive action SHOULD be taken immediately</p> <p>“Expected” - Responsive action SHOULD be taken soon (within next hour)</p> <p>“Future” - Responsive action SHOULD be taken in the near future</p> <p>“Past” - Responsive action is no longer required</p> <p>“Unknown” - Urgency not known</p>
severity	cap. alertInfo. severity. code	The code denoting the severity of the subject event of the alert message (REQUIRED)	<p>(1) The “urgency”, “severity”, and “certainty” elements collectively distinguish less emphatic from more emphatic messages.</p> <p>(2) Code Values:</p> <p>“Extreme” - Extraordinary threat to life or property</p> <p>“Severe” - Significant threat to life or property</p> <p>“Moderate” - Possible threat to life or property</p> <p>“Minor” - Minimal threat to life or property</p> <p>“Unknown” - Severity unknown</p>
certainty	cap. alertInfo. certainty. code	The code denoting the certainty of the subject event of the alert message (REQUIRED)	<p>(1) The “urgency”, “severity”, and “certainty” elements collectively distinguish less emphatic from more emphatic messages.</p> <p>(2) Code Values:</p> <p>“Observed” – Determined to have occurred or to be ongoing.</p> <p>“Likely” - Likely (p > ~50%)</p> <p>“Possible” - Possible but not likely (p <= ~50%)</p> <p>“Unlikely” - Not expected to occur (p ~ 0)</p> <p>“Unknown” - Certainty unknown</p> <p>(3) For backward compatibility with CAP 1.0, the deprecated value of “Very Likely” SHOULD be treated as equivalent to “Likely.”</p>

Severe Weather Information Centre (SWIC)



WORLD
METEOROLOGICAL
ORGANIZATION

Severe Weather Information Centre

Official Observations. Official Warnings.

HOME

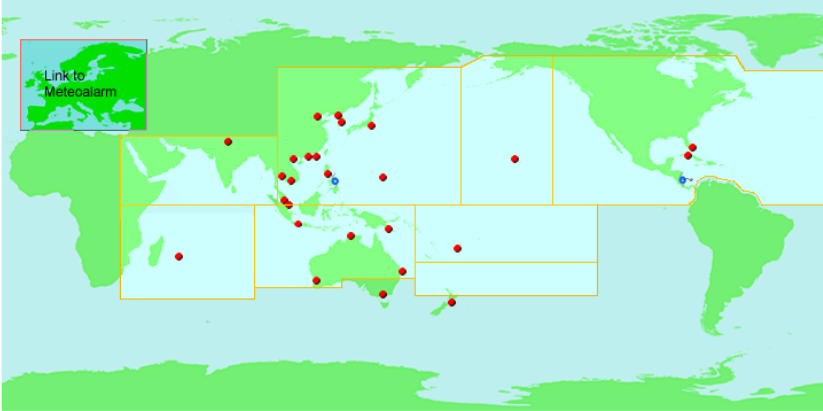
- Global Severe Weather
- Tropical Cyclones
- Heavy Rain/Snow
- Thunderstorms
- Gale
- Fog
- Official Observations
- Cloudiness & Rain

What's New

- SWidget 2.1 **NEW**
- Fog **NEW**
- Gale
- Introductory Pamphlet
- About this web site
- Participating Members
- Notes To Users
- Disclaimer

Links




- World Meteorological Organization
- Official World City



Link to Metacalarm

Last Updated at 2016-11-24 15:25 UTC [Past Positions](#)

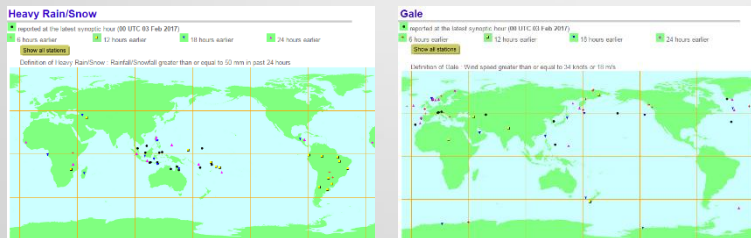
NOTES

- ▶ Click on the symbol  or  for advisories and warnings on the tropical cyclone.
- ▶ Click on the symbol  for information from individual WMO Members participating in the [web site](#).
- ▶ Click on individual boxes to view zoom-in maps.
- ▶ This page is best viewed with a display resolution of 1024 x 768 pixels.

- Centralised platform to provide **official authoritative** warnings and information issued by NMHSs
- Contains advisories issued by RSMCs/TCWCs
- Features warnings on tropical cyclones and worldwide information on severe weather

Challenges

- Not all hazards covered
- Inconsistent content/format
- Proliferation of warning websites from other sectors

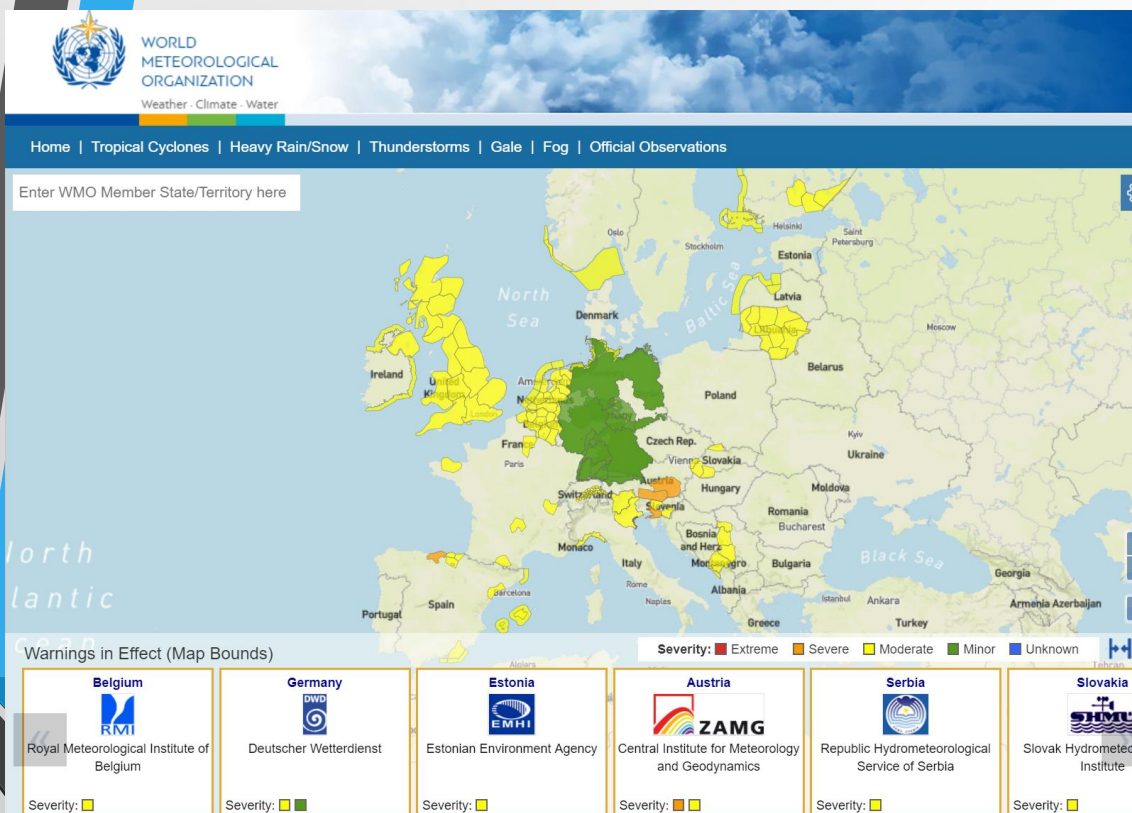


Enabling CAP in SWIC

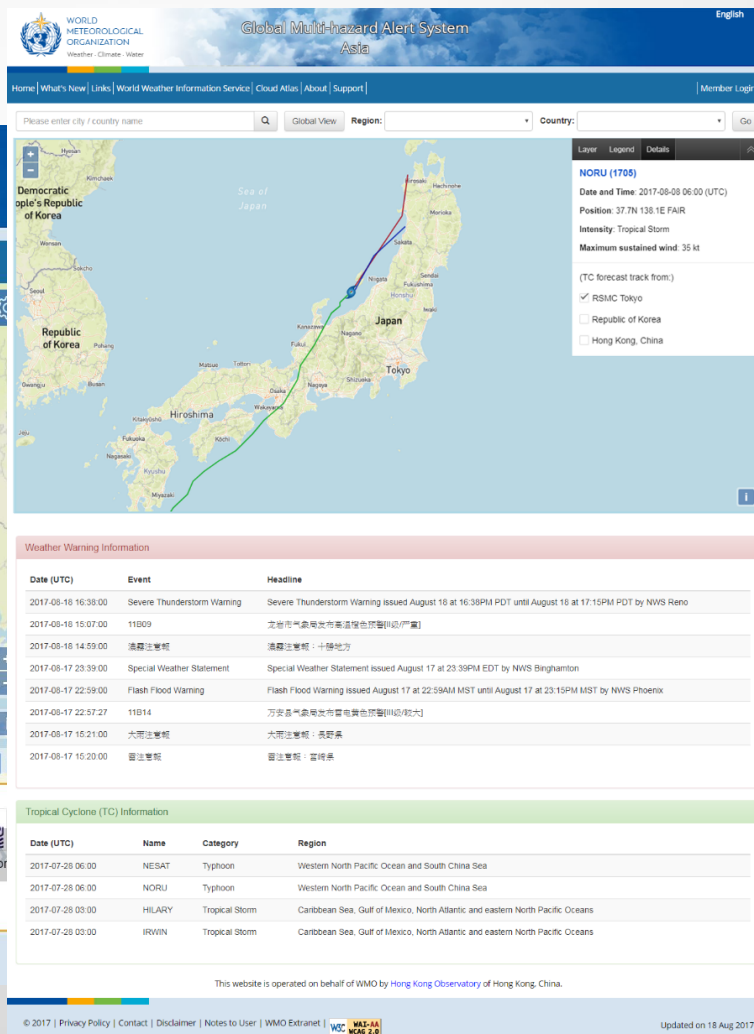
A PLATFORM TO COLLATE, DISPLAY & SHARE WARNINGS ISSUED BY NMHSS AND RSMCs/TCWCs

Tropical Cyclone

Warnings issued by NMHSS in CAP



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WMO World Weather Information Service (WWIS)



- Global official weather observations, weather forecasts and climatological information
- Official weather information from for 2,123 cities from 169 Members in 11 languages



Upgraded WMO WWIS website to incorporate Members alerts in CAP

<https://worldweather.wmo.int/>



HURRICANE WARNING REMAINS IN EFFECT.
Issued by: National Weather Service

Issued time: 2017-11-21T23:45:00-07:00
Effective time: 2017-11-21T23:45:00-07:00

Description
STORM SURGE WARNING IS CANCELLED

*LOCATIONS AFFECTED - Miami - Coral Gables - Kendall - Miami Springs - Hialeah - Miami Lakes - Cutler Ridge

* WIND - LATEST LOCAL FORECAST: Equivalent Tropical Storm force wind - Peak Wind Forecast: 40-50 mph with gusts to 75 mph - Window for Tropical Storm force winds: until early Monday morning - CURRENT THREAT TO LIFE AND PROPERTY: Moderate - The wind threat has decreased from the previous assessment.

- Remain braced against the reasonable threat for strong tropical storm force wind of 58 to 73 mph. - To be safe, efforts should fully focus on protecting life. Properties remain subject to significant wind impacts. - Now is the time to hide from the wind. Failure to adequately shelter may result in injury. Remain sheltered until the hazardous wind subsides. - POTENTIAL IMPACTS: Unfolding - Potential impacts from the main wind event are unfolding.

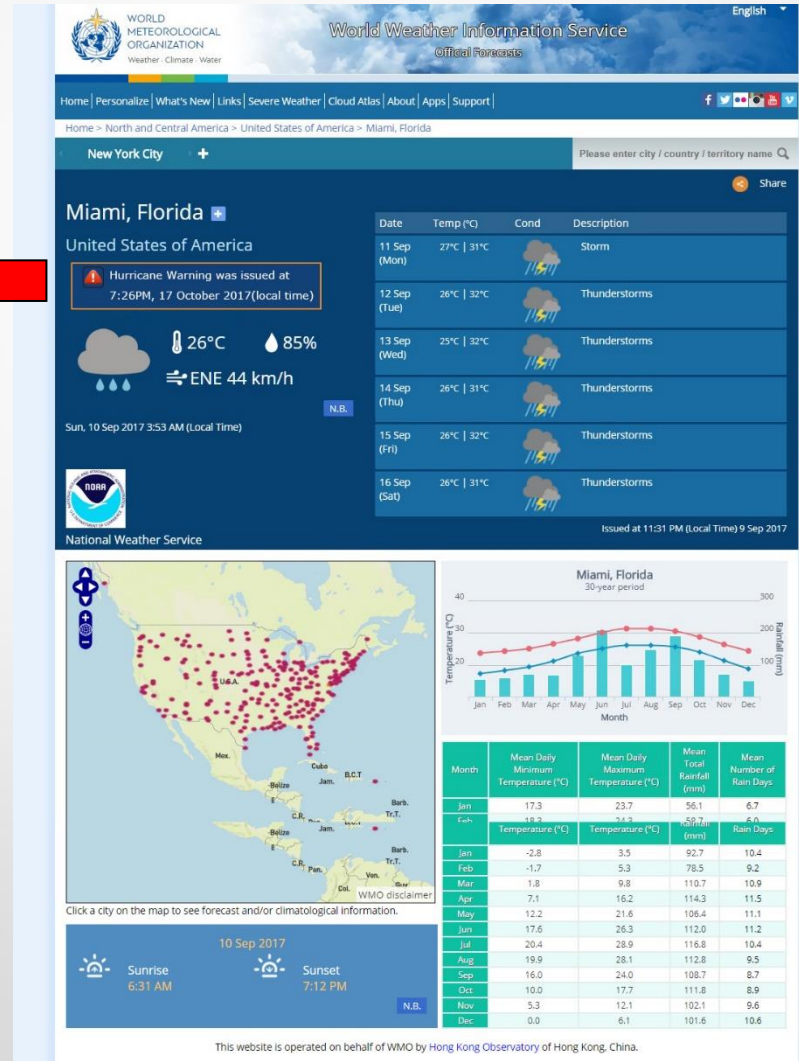
* STORM SURGE - No storm surge inundation forecast - CURRENT THREAT TO LIFE AND PROPERTY: None - The storm surge threat has decreased from the previous assessment. - Surf conditions may still be rough with some beach erosion. Stronger than normal rip currents may also be present. - Exercise due safety. - Review your seasonal plan and ensure readiness for the next storm surge event. - REALIZED IMPACTS: Being Assessed - Little to no additional surge impacts expected. Community officials are now assessing the extent of actual surge impacts accordingly.

* FLOODING RAIN - LATEST LOCAL FORECAST: Flood Watch is in effect - Peak Rainfall Amounts: Additional 10-14 inches, with locally higher amounts - CURRENT THREAT TO LIFE AND PROPERTY: Extreme - The flooding rain threat has remained nearly steady from the previous assessment. - Emergency considerations should include a threat of flooding. - Be safe and remain ready to protect against flooding rain impacts. - If flood related watches and warnings are in effect, heed recommended actions. - POTENTIAL IMPACTS: Devastating to Catastrophic - Extreme rainfall flooding may prompt numerous evacuations and rescues. - Ditches and canals may overwhelmingly overflow their banks in many places with deep moving water. Flood control systems and barriers may become stressed. - Flood waters can enter numerous structures within multiple communities, some structures becoming uninhabitable or washed away. Numerous places where flood waters may cover escape routes with streets, parking lots and underpasses submerged. Driving conditions become very dangerous. Numerous road and bridge closures with some weakened or washed out.

* TORNADO - LATEST LOCAL FORECAST: Tornado Watch is in effect - Situation is favorable for tornadoes - CURRENT THREAT TO LIFE AND PROPERTY: Moderate - The tornado threat has remained nearly steady from the previous assessment. - Emergency considerations should include a reasonable threat for tornadoes. - Be safe and remain ready to protect against tornado impacts. Stay informed. - Listen for tornado watches and warnings. If a tornado approaches, quickly move to the safest place within your shelter. - POTENTIAL IMPACTS: Significant - The occurrence of scattered tornadoes can hinder the execution of emergency plans during tropical events. - Several places may experience tornado damage with a few spots of considerable damage, power loss, and communications failures. - Locations could realize roofs torn off frame houses, mobile homes demolished, boxcars overturned, large trees snapped or uprooted, vehicles tumbled, and small boats tossed about. Dangerous projectiles can add to the toll.

* FOR MORE INFORMATION: - <http://www.weather.gov/mfi> - www.miamidade.gov - For storm information call 3-1-1

This web site is operated on behalf of WMO by Hong Kong Observatory of Hong Kong, China.
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Miami, Florida
United States of America

Hurricane Warning was issued at 7:26PM, 17 October 2017(local time)

26°C 85% ENE 44 km/h

Sun, 10 Sep 2017 3:53 AM (LOCAL Time)

National Weather Service

Issued at 11:31 PM (Local Time) 9 Sep 2017

Date	Temp (°C)	Cond	Description
11 Sep (Mon)	27°C 31°C	Thunderstorms	Storm
12 Sep (Tue)	26°C 32°C	Thunderstorms	Thunderstorms
13 Sep (Wed)	25°C 32°C	Thunderstorms	Thunderstorms
14 Sep (Thu)	26°C 31°C	Thunderstorms	Thunderstorms
15 Sep (Fri)	26°C 32°C	Thunderstorms	Thunderstorms
16 Sep (Sat)	26°C 31°C	Thunderstorms	Thunderstorms

Click a city on the map to see forecast and/or climatological information.

10 Sep 2017
Sunrise 6:31 AM
Sunset 7:12 PM

Miami, Florida
30-year period

Temperature (°C) and Rainfall (mm) by Month

Month	Mean Daily Maximum Temperature (°C)	Mean Daily Minimum Temperature (°C)	Mean Total Rainfall (mm)	Mean Number of Rain Days
Jan	17.3	23.7	56.1	6.7
Feb	17.3	23.7	56.1	6.7
Mar	17.3	23.7	56.1	6.7
Apr	17.3	23.7	56.1	6.7
May	17.3	23.7	56.1	6.7
Jun	17.3	23.7	56.1	6.7
Jul	17.3	23.7	56.1	6.7
Aug	17.3	23.7	56.1	6.7
Sep	17.3	23.7	56.1	6.7
Oct	17.3	23.7	56.1	6.7
Nov	17.3	23.7	56.1	6.7
Dec	17.3	23.7	56.1	6.7

This website is operated on behalf of WMO by Hong Kong Observatory of Hong Kong, China.

TC Warnings and Advisories

- TC warnings/advisories are **indispensable information** for users and should be made available in **GMAS & upgraded SWIC**
- Currently, limited TC information available on SWIC (current/past TC positions & hyperlinks to warning advisories).
- The upgraded SWIC is intended to include other TC info such as forecast positions/intensity, movement, wind radii, etc.
- **Challenge:** TC warnings/advisories issued by some RMSCs & TCWCs are in free text format, **NOT** machine-readable.
- Machine-readable format: facilitate reuse by GMAS and other applications.
- Examples: TC advisories from BoM (in CXML format) and RSMC Tokyo of JMA (in CAP format on experimental basis)

Recommendation: RSMCs and TCWCs provide TC advisories in machine-readable format to GMAS so that TC information in their respective responsible areas can be made available to GMAS for use by the UN humanitarian organizations, NMHSs and other global users.

Future's Plans

- Upgrade **SWIC** to become an online GIS-enable platform to aggregate, display and share authoritative warnings and alerts in CAP format from WMO Alert Hub and other industry standards
- A example of display platform for the **GMAS**
- Mature WMO Alert Hub aggregating official alerts and warnings from NMHSs and officially Registered Alerting Authorities (RAAs)
- Encourage NMHSs to adopt CAP format for their warnings and disseminate these warnings to WMO Alert Hub and thus **SWIC**
- Enhance **WWIS** to become a online GIS-enable platform for official weather observations, authoritative forecasts and warnings provided by NMHSs around the world
- To implement RA II Pilot Project on **Asian GMAS** (Resolution 5.2/10 (RA II-16))

Conclusion

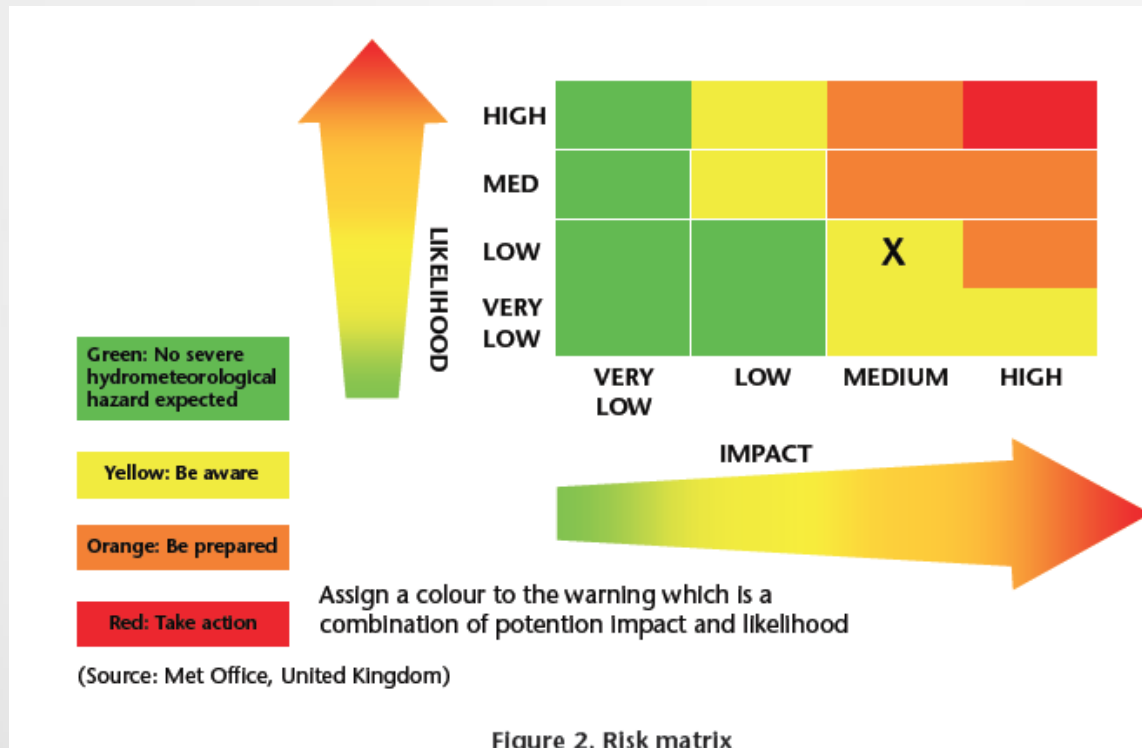
- Tropical cyclones are amongst the most destructive weather systems on the earth.
- **Effective dissemination of warnings** to users is very important in reducing the loss of life and damages.
- **GMAS** is a WMO global platform aggregating authoritative multi-hazard warnings issued by NMHSs and RAAs, **including RSMCs and TCWCs**.
- The NMHSs / RAAs contributing to GMAS will be recognized as **the only authoritative source of multi-hazard warning information**.
- It is highly desirable and essential for RSMCs and TCWCs to make available their TC advisories in **machine-readable format**



Thank you

Questions and Comments?
yftong@hko.gov.hk

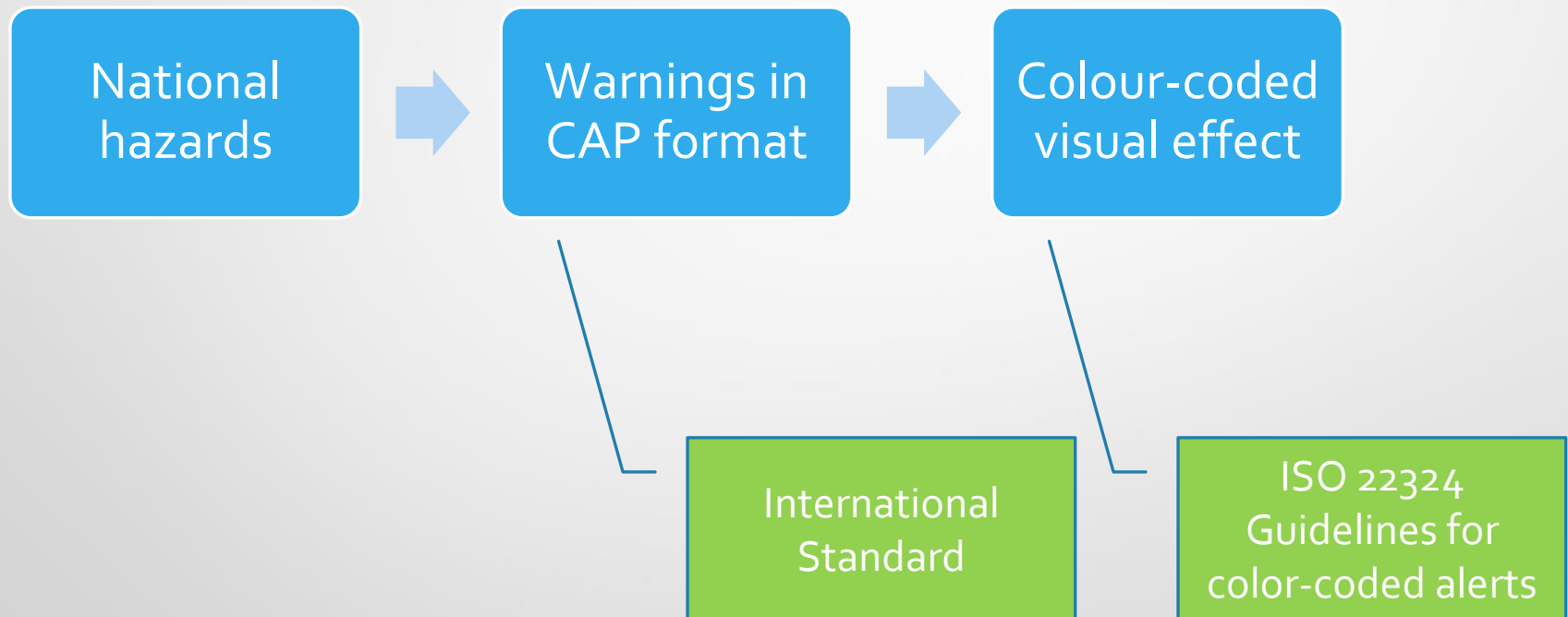
Impact Forecasting



- Consistent means for the early expression of potential impact, well in advance of a significant hydrometeorological event
- Progressively express changing expectations of risk as a function of varying exposure, vulnerability and hydrometeorological likelihood

WMO-1150 Guidelines on Multi-hazard Impact-based Forecasting and Warning Services

CAP – Potential candidate for Standardizing Impact-based Warning Presentation



ISO 22324

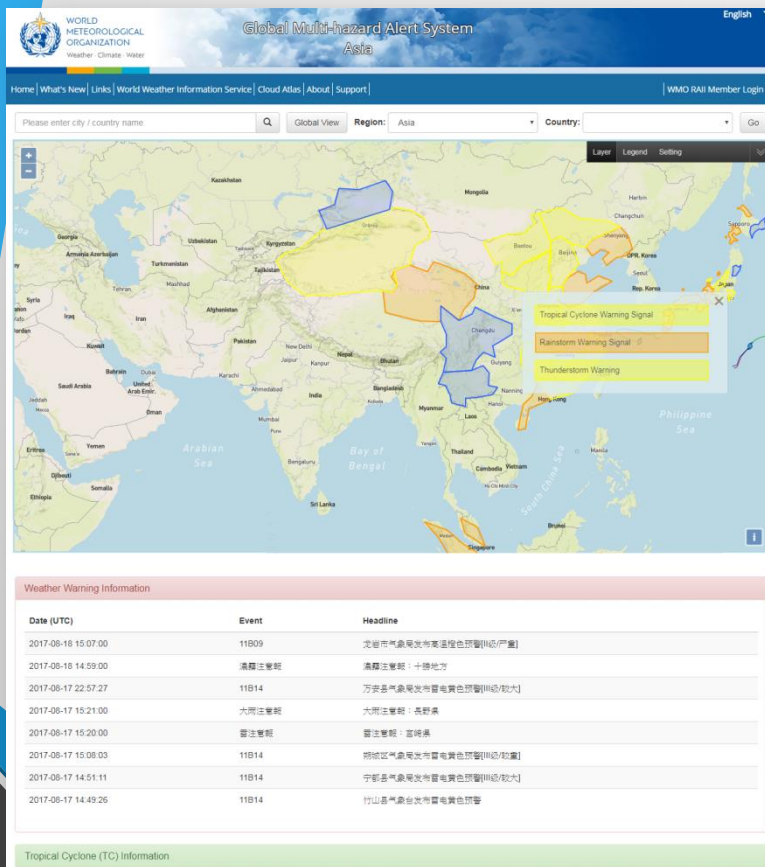
Guidelines for colour-coded alerts

- Red, yellow and green (and the spectrum in between in terms of hue) should be used to express status of hazard
- **Red** is associated with **danger** and should be used to notify people at risk to prepare to take appropriate safety actions **immediately**
- **Yellow** is associated with **caution** and should be used to notify people at risk to **prepare** to take appropriate safety actions
- **Green** is associated with a **safe** status and should be used to notify people at risk that **no action** is required

A Possible Strategy to Display Warnings in Upgraded SWIC

Scale-dependent granularity

Regional View



National View

