Meteorological vigilance
An operational tool for early warning

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http://www.meteo.fr
The French meteorological vigilance procedure

Context
Routine working of the meteorological procedure
Users feedback and assessment
European extension - The EMMA project
Conclusions
• The 1999 storms (26 and 27 December)
  - 92 dead, cost about 15 G€
  - Many fatalities because the communication to the public was not efficient enough and because the information (e.g. “windspeed higher than 100 km/h”) was not interpreted simply in terms of risk level
Why?

• Effective since the 1st of October 2001, replaced older (BRAM and ALARME) procedures in effect since 1993

• Goals
  – to better inform, thanks to a simple and summarized message that focuses on dangerous phenomena and the need to stay informed
  – To improve the efficiency of the communication by “translating” the intensity of forecast meteorological parameters into a risk level
  – to improve anticipation
  – to broaden information dissemination
How?

• A two-tiers system
  – The meteorological vigilance chart
  – A follow-up bulletin in case of a dangerous phenomenon
For whom?

• Governmental Services
  – National
  – Zonal (administrative area made of multiple “departments”)
  – Departmental (a department is a regional administrative unit)

• Media

• The public at large

The National Operational Centre for Interministerial Crisis Management (Ministry of the Interior)
The meteorological vigilance map (1/3)

• This map of mainland France represents for the next 24 hours a definition of potential meteorological danger
• Granularity: departmental
• Four levels of risk, associated with 4 colours: green, yellow, orange and red
The meteorological vigilance map (2/3)

• Phenomena concerned
  – Violent winds
  – Heavy precipitation
  – Thunderstorms
  – Snow/icing
  – Avalanches
  – Coldwave
  – Heatwave

*Under study:*
Short term: flood (operational cooperation with Flood Forecast Centres)
Longer term: fog, high breaking (sea) waves / coastal event,…
The meteorological vigilance map (3/3)
The 4 vigilance levels (1/2)

Green (level 1)
- No particular vigilance is required

Yellow (level 2)
- Be attentive if practising activities exposed to meteorological risk, for some phenomena have been forecast, that are occasionally dangerous, although usual in the region (e.g. mistral wind, summer thunderstorms); keep informed about weather development.
The 4 vigilance levels (2/2)

Orange (level 3):
- Be very vigilant; dangerous meteorological phenomena have been forecast; keep informed about weather development and advice broadcast by the authorities

Red (level 4):
- Absolute vigilance is required; dangerous and exceptionally intense meteorological phenomena have been forecast; keep regularly informed about weather development and conform to advice or orders broadcast by the authorities
Production

- Published twice a day, broadcast at 6 h and 16 h local time
- Exceptional production may be initiated outside these hours (if the risk significantly increases or diminishes), as necessary
- Choice of the colour: by the concerned Interregional Forecasters of Météo-France;
- In case of an orange or red level on at least one department:
  - A clear, concise text about the forecast phenomenon
  - Advice on recommended behaviour, drawn up by authorities
Dissemination

• In projected (“push”) mode
  – National level: Civil Defence Organization, Road Safety Organization, Health Watch Institute (InVS), Ministry of Ecology, Ministry of Health, Media
  – Zonal level: Civil Defence Organization, Road Safety Organization, Regional Direction of Health and Social Affairs (DRASS);
  – Departmental: prefectures (i.e. respective administrative centres of departments), services in charge of Civil Defence, Transportation, Flood warning, and Health and Social Affairs

• In take-over (“pull”) mode on www.meteo.fr web-site:
  – Media
  – City Mayors
  – Every user in the general public

• Backup Internet site
Follow-up in case of orange or red level(s)

- At Météo-France national forecasting level
  - Co-ordination of forecasting
  - A follow-up national level report

- At Météo-France regional levels
  - The Interregional Centres are responsible for broadcasting follow-up reports
  - The departmental centres play an essential role as interface with their local partners: prefects (i.e. respective heads of prefectures), rescue services, customers, media
Follow-up bulletins

- Produced in case of orange or red level of vigilance;
  - Every 3 hours in general
- Content
  - Bulletin number, reference of the associated map
  - Type of event,
  - Location and spell (time of start and finish)
  - Present situation, development
  - Description of the event (comparisons, return period)
  - Possible consequences
  - Advice on behaviour
  - Time of the next report
Heatwave and vigilance

- The heatwave episode in August 2003:
  - An intense and widespread episode
  - Well forecast by Météo-France (press releases)
  - Catastrophic consequences (about 15000 dead in France)
Heatwave and vigilance

• The National Heatwave Plan was set up by French Ministry of Health on the 1\textsuperscript{st} of June 2004

• It was decided to include heatwave phenomena in the existing meteorological vigilance system

• The InVS (French National Institute of Health Survey) and Météo-France defined for each department of mainland France a “biometeorological indicator”
  – calculated from minimum and maximum temperatures observed or forecast on the very day, the next day and two days later,
  – compared with day and night temperature thresholds corresponding to a risk of excess mortality
Usefulness and common knowledge

• The general public: a wide common knowledge
  – The chart is very well known (74%)
  – To such an extent => one feels sufficiently informed (80%)
  – Main access to information (96%) is by the TV

• Civil safety services: a noticeable procedure improvement
  – improved anticipation (+)
  – a smaller number of false alarms (+)
  – Inclusion of local expertise (+)
  – Bulletins to be improved (-)
  – Communication to be made towards mayors and the general public
Vigilance is not crisis management

- The meteorological vigilance (Météo-France) must be distinguished from crisis management procedures (Civil Defence Organization)
  - Meteorological vigilance => follow-up bulletins for a potential risk
  - Alarm => use of civil defence means for rescue
  - The meteorological vigilance can be used by Civil Defense Authorities and the public to get prepared
  - Risk culture

- Thunderstorms, a particular case
  - Thunderstorms remain difficult to forecast accurately, there is an important spatio-temporal heterogeneity upon a small geographical area like a “department”
A dynamic procedure...

- Assessed by a follow-up group in which procedure partners meet 3 times a year
- An interministerial steering committee meets once a year for deciding on procedure developments
- An annual assessment is co-authored
The “annual assessment” document

- An institutional communication tool on meteorological vigilance; feedback about procedure and presentation of statistical data;
- A 20 page document, deliberately a digest
- Published and produced by Météo-France, with logos from the 4 Ministries: Interior, Ecology, Transportation and Health
- A foreword co-signed by Météo-France & Ministry of the Interior
Statistical data 2004

- Distribution of orange vigilance episodes according to the type of phenomenon in 2004:
  - For each episode one prevailing phenomenon was retained
- 31 orange vigilance episodes
- 57 separate days with orange vigilance
Progress made in terms of a risk culture

8-9 September 2002
• flash flood in the Gard area: very severe human loss, with 24 people killed;

1-4 December 2003
• flooding in the South of France: 7 people killed
European Multi-services
Meteorological Awareness

• A Eumetnet project (the network of European meteorological services)
• Based on the French meteorological vigilance
  – Same 4-colours code with corresponding danger level
  – Around 24h lead time
• Different levels of visualization
  – European level : colour by country
  – National level : colour by local area (France: departement as for the French vigilance map)
• Static information in all national languages
• Open to the public by the end of 2006
European Multi-services
Meteorological Awareness
Conclusions

• Continuous improvement
  – A partnership procedure providing real progress: focusing on the most dangerous events, conversion of meteorological thresholds into risks, massive and parallel distribution
  – Mindful of staying close to end-users
• Vigilance: a concept which has been making rapid strides
  – Geographically with setting-up of a European meteorological vigilance
  – Meteorologically with the addition of other types of phenomena