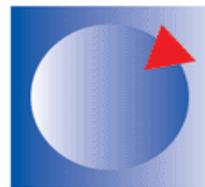




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# Meteorological vigilance An operational tool for early warning

Jean-Marie Carrière  
Deputy-director of Forecasting



**METEO  
FRANCE**

<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



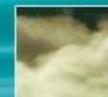
- The 1999 storms (26 and 27 December)
  - 92 dead, cost about 15 G€
  - Many fatalities because the communication to the public was not efficient enough and because the information (e.g. “windspeed higher than 100 km/h”) was not interpreted simply in terms of risk level





# 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





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## 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**

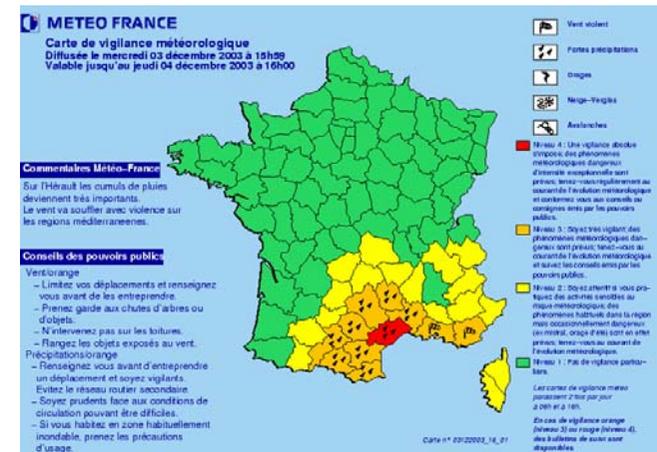


*The National Operational  
Centre for Interministerial  
Crisis Management  
(Ministry of the Interior)*



# 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)

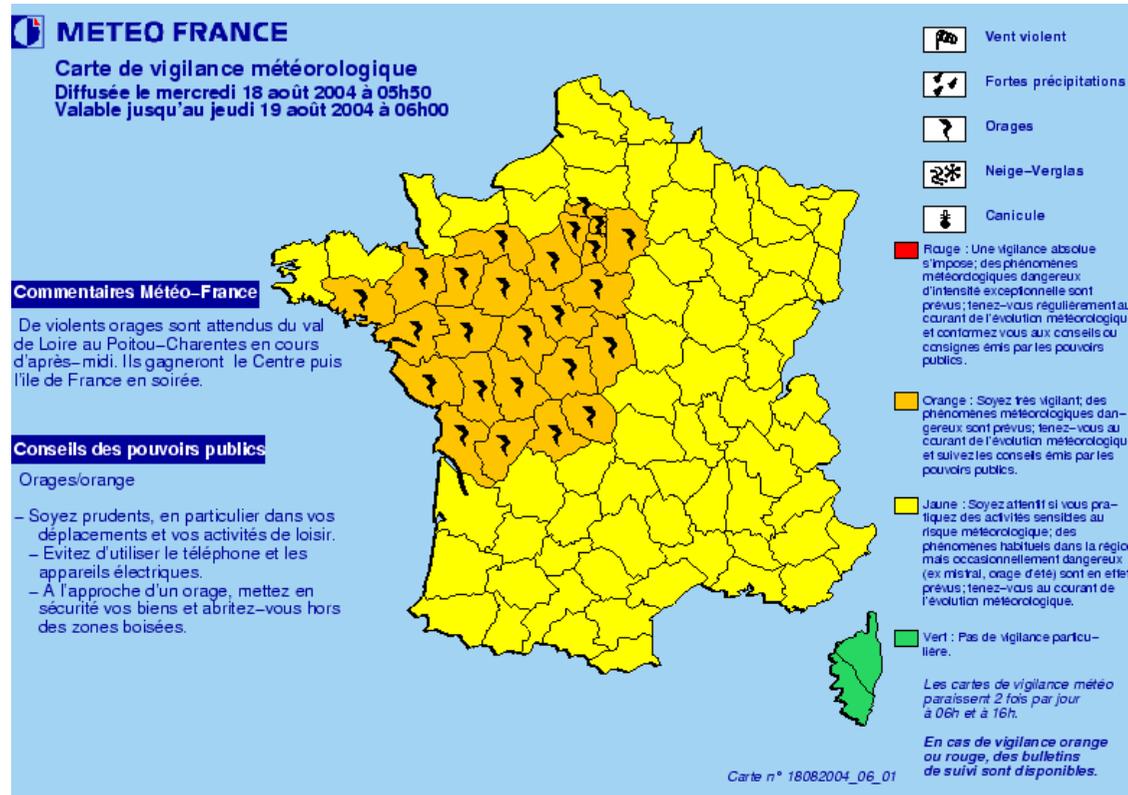
Longer term : fog, high breaking (sea) waves / coastal event,...





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# 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](http://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

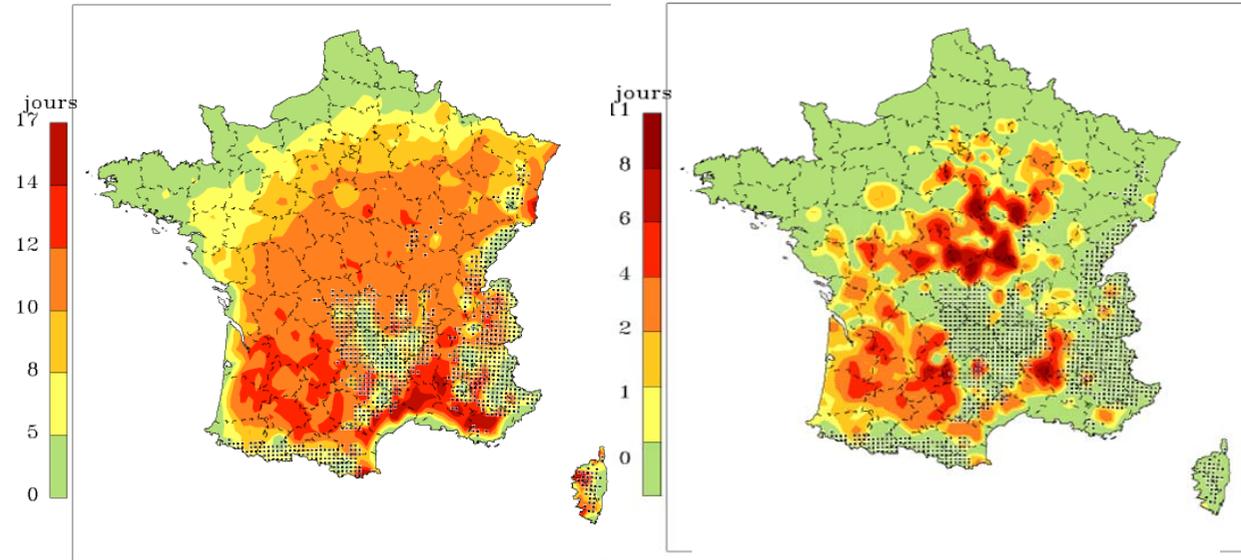


# Follow-up bulletins

- 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



Number of days with TX > 35°C

Number of days with TX > 40°C

- 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)



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# Heatwave and vigilance

- The National Heatwave Plan was set up by French Ministry of Health on the 1<sup>st</sup> 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



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# 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





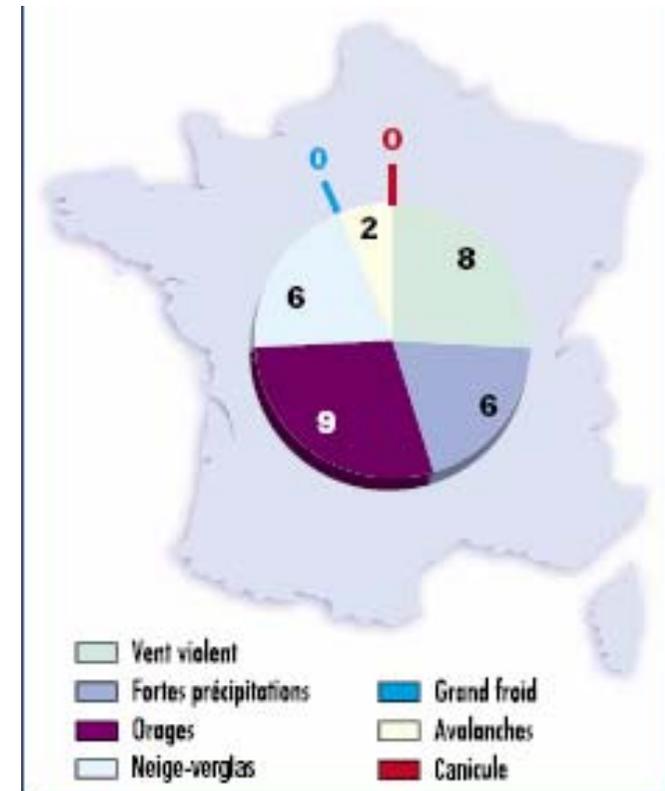
# The “annual assessment” document

- 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





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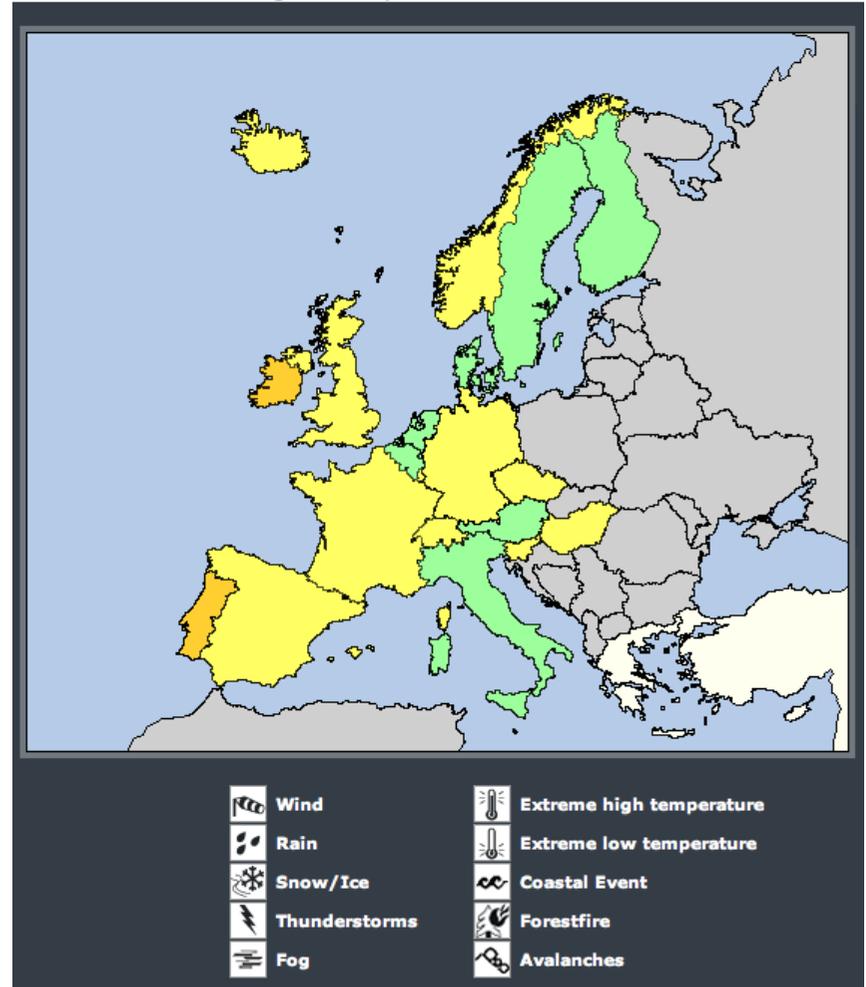
# European Multi- services Meteorological Awareness

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european weather warnings

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» Europe

## Weather warnings: Europe





# 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

