

Forest Fire assistance to French Civil Protection Authorities

Mathieu Regimbeau

27 May 2021

EO products for Wildfires 2021

Civil Protection needs

→ → **To obtain reliable information of decision support**

1. Preventive resources (forecasting)

- position firefighters and equipment on the ground
- South of France :
 - GAAR (Guet Aérien Armé - Armed Air Watch) - *(National strategy of rising/early fires massive attack)*
 - 3-4 days anticipation : call to external firefighters troops from other regions

2. In case of fire (monitoring)

- Organize the fight in an efficient way
- Priorize fires for air attack if needed *(Strategy of rising/early fires massive attack)*

Civil Protection needs

→ → **To obtain reliable information of decision support**

1. Preventive resources (forecasting)

- position firefighters and equipment on the ground
- South of France :
 - GAAR (Guet Aérien Armé - Armed Air Watch) - (*National strategy of rising/early fires massive attack*)
 - 3-4 days anticipation : call to external firefighters troops from other regions

2. In case of fire (monitoring)

- Organize the fight in an efficient way
- Priorize fires for air attack if needed (*Strategy of rising/early fires massive attack*)

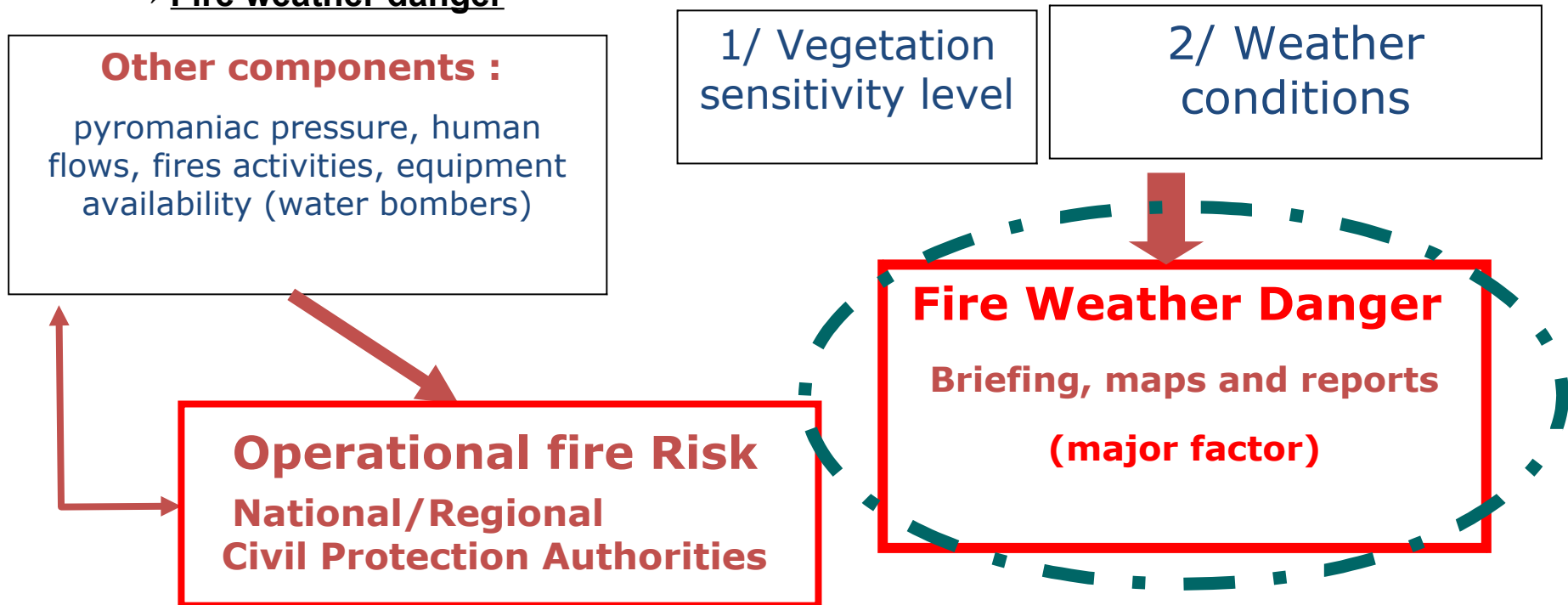
3. Concerned areas/fires

- Winter / Spring / “Summer” fires
- South France (SW – SE w/ dry summer winds & periods)
- North / Harvest – agricultural fires
- Increased vulnerability North / East forests

Meteo-France assistance to CPAs

From regional (50's) to national levels (1/2)

- Main institutional missions
- Dedicated and expert assistance
- **Fire weather danger**



- Fire ignition explained by many factors (90% human factors in France)
- Fire propagation, intensity, severity mainly driven by meteo and vegetation conditions
⇒ ⇒ Need for support (forecasting and monitoring)

Meteo-France assistance to CPAs

From regional (50's) to national levels (2/2)

1. Regional levels

- SW and SE areas : specific products/assessments
- Other regions since 2020
 - “Fire danger goes Northwards” (CC signal)
 - Dedicated fire weather reports from regional forecasters
- Weather parameters and Fire indices from national inputs



Meteo-France assistance to CPAs

From regional (50's) to national levels (2/2)

1. Regional levels

- SW and SE areas : specific products/assessments
- Other regions since 2020
 - Dedicated fire weather reports from regional forecasters
- Weather parameters and Fire indices from national inputs

2. National level

- Fire indices operational chains (2 runs a day)
- 1km resolution, Western Europe, D1 to D4
- Forecasts = Assessed & spatialised weather parameters
- Analysis = data fusion stations + models

- Canadian **reference** method FWI at 12utc
- Specific Meteo-France adaptations
- Local indices
 - Dissemination to forecasters, CPA's end-users



Fire indices in Météo-France

Fire indices daily sentivity (1/2)

Canadian method → FWI12

Fire weather conditions may vary a lot during the day

- Wind → all day long // Highest T's and lowest moisture ==> end afternoon (summer)

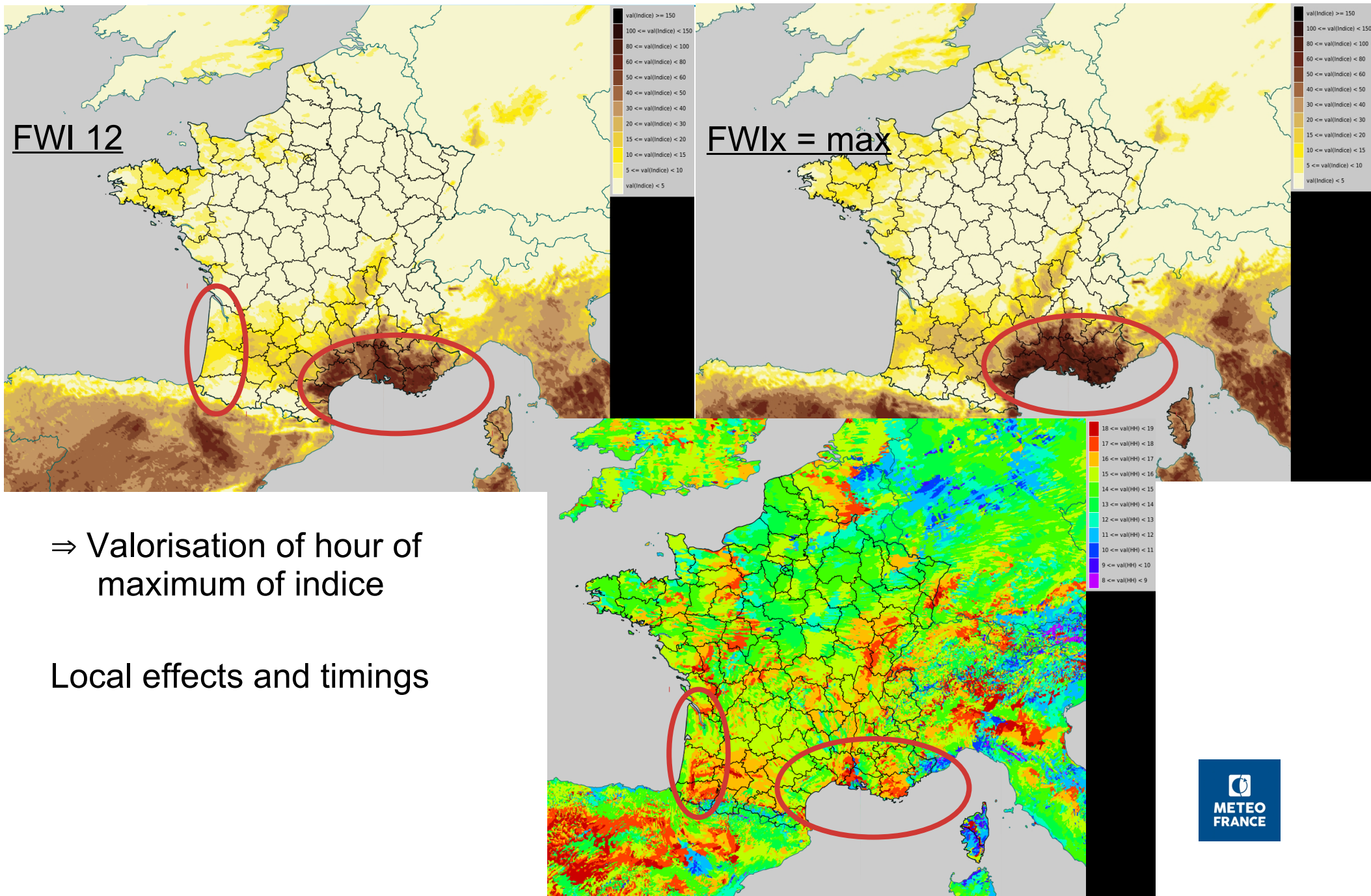
Max fire danger may vary (class, occurence)

Fire indices hourly computation

- → Apply FWI method to every hour of calculation
- 08 UTC to 18 UTC
- “Ensemble” approach → Danger = maximum FWIh

Wind variability == partial add. of gusts (0-8 km/h) into computation

Fire indices in Météo-France

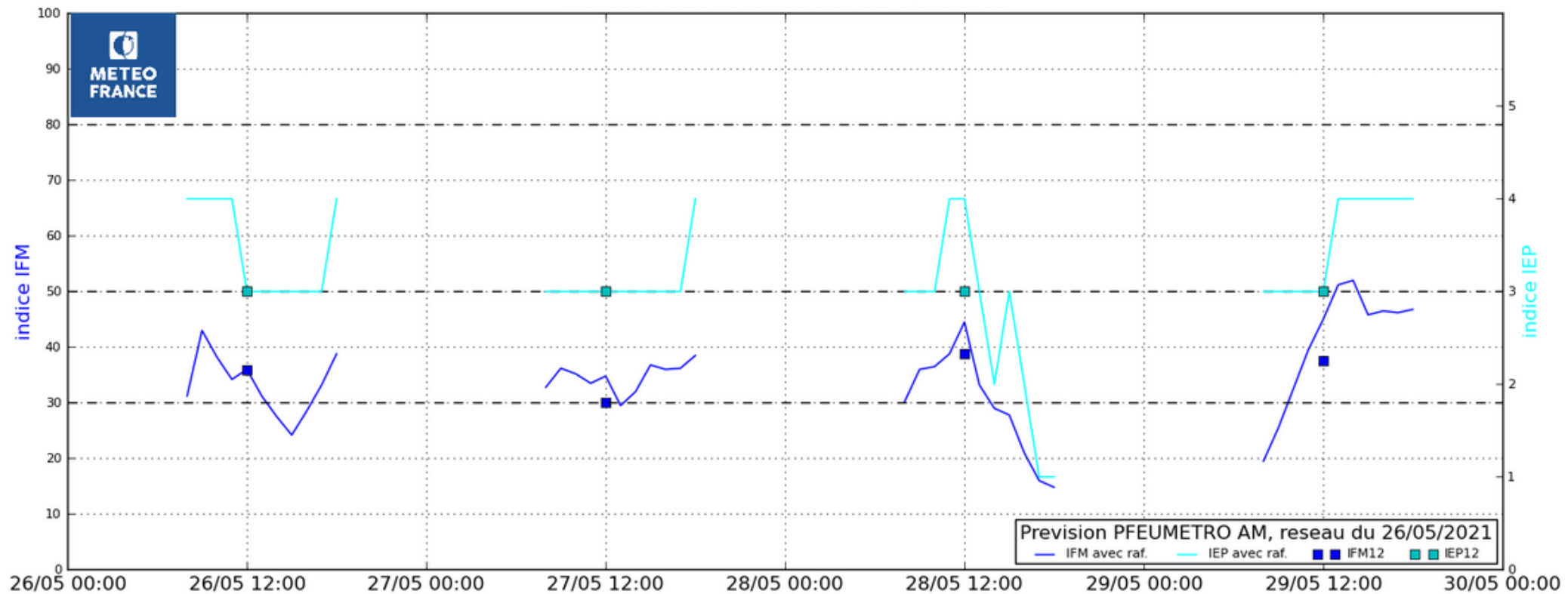


Fire indices in Météo-France

Fire indices daily sentivity (2/2)

Valorisation of hourly indices

- Hour of maximum of danger → operational interest for CPAs
- Hourly behavior of indices disseminated to CPAs (*new in 2021*)



Fire indices in Météo-France

→ → **Fire danger approach (1/3)**

1. Fire danger : Live Vegetation Danger

- FWIx common dedicated scale




- Common “fire danger classes” signification w/ CPA end-users
- Lessons learnt → good targeting of major fires

Fire indices in Météo-France

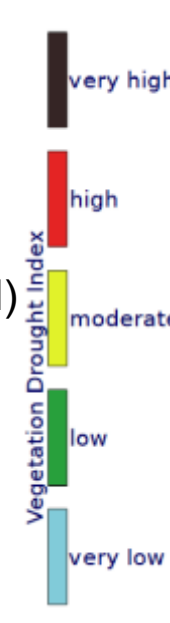
→ → **Fire danger approach (1/3)**

1. Fire danger : Live Vegetation Danger

- FWIx common dedicated scale
- 0 5 10 15 30 50 80
- A horizontal color bar representing the FWIx scale. It is divided into five segments: blue (0-5), green (5-15), yellow (15-30), orange (30-50), and red (50-80).
- Common “fire danger classes” signification w/ CPA end-users
- Lessons learnt → good targeting of major fires

2. Vegetation Drought Index/Assessment


- Info on vulnerability of modeled vegetation (from Canadian method)
- Combination Duff Moisture Code and Drought Coude
- Validation w/ in-situ observations (+previous campaign measures)



Fire indices in Météo-France

→ → **Fire danger approach (1/3)**

1. Fire danger : Live Vegetation Danger

- FWIx common dedicated scale
- 
- Common “fire danger classes” signification w/ CPA end-users
- Lessons learnt → good targeting of major fires



2. Vegetation Drought Index/Assessment

- Info on vulnerability of modeled vegetation (from Canadian method)
- Combination Duff Moisture Code and Drought Coude
- Validation w/ in-situ observations (+previous campaign measures)

3. Live Vegetation Integrated Danger

- Combination FWIx and Vegetation Drought Index
- To mitigate FWIx danger when vegetation not prone for major FF
- To increase FWIx Danger when very dry vegetation

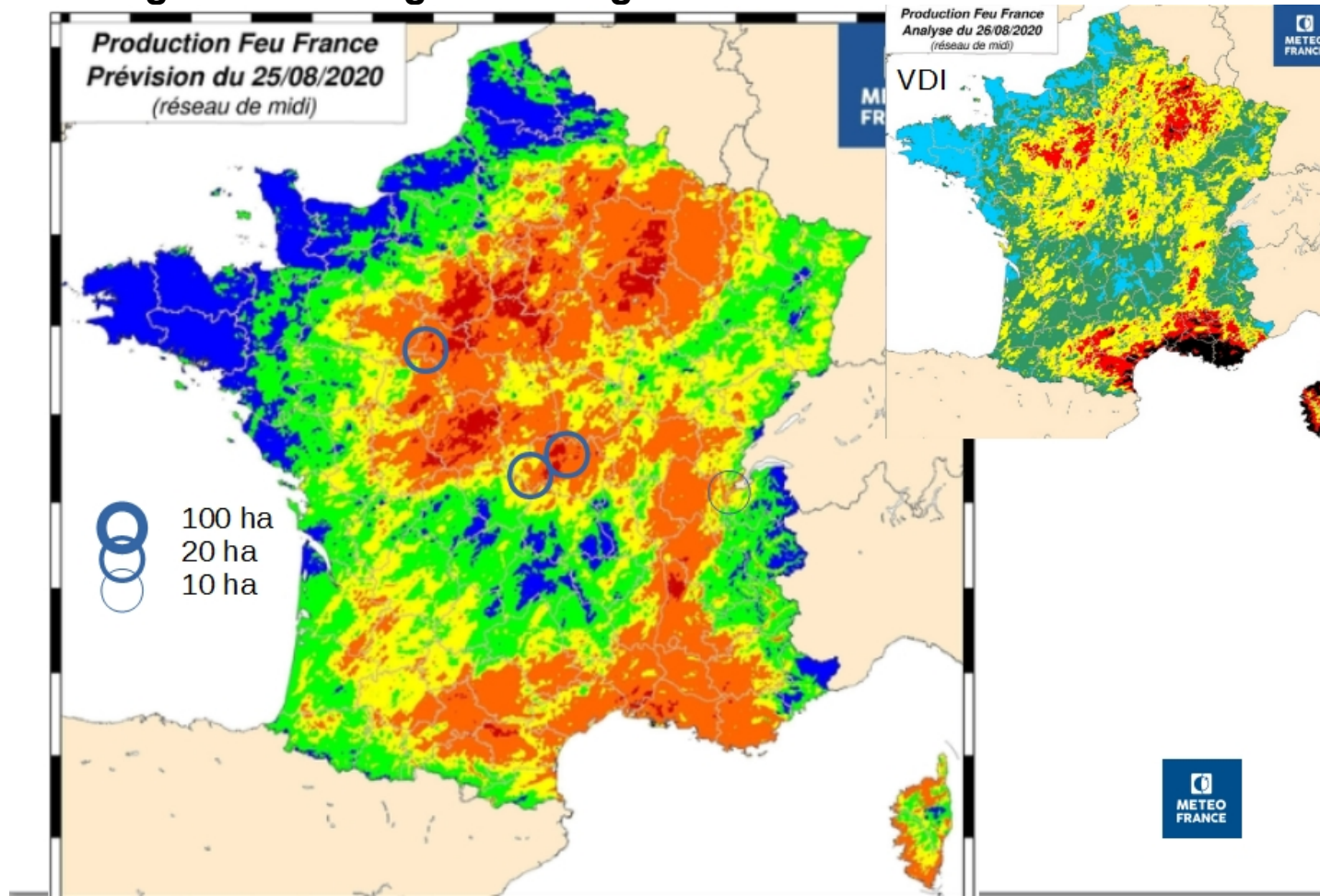
Fire indices in Météo-France

→ → Fire danger approach (2/3)

1. Live Vegetation : Vegetation Drought Index

- Target main sensitive areas

2. Live Vegetation : Integrated Danger



Fire indices in Météo-France

→ → **Fire danger approach (3/3)**

1. Live Vegetation : Vegetation Drought Index

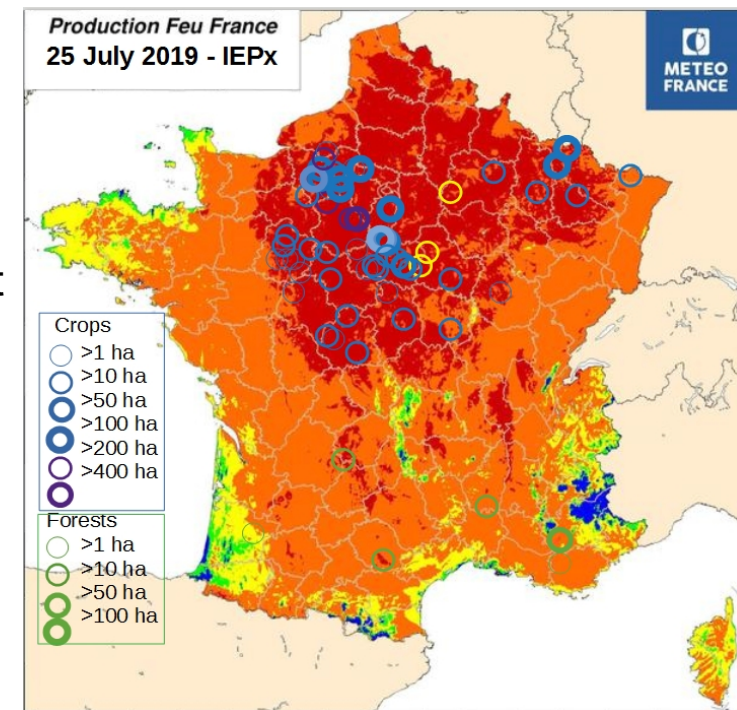
- Target main sensitive areas

2. Live Vegetation : Integrated Danger

- Combination FWI_x and Vegetation Drought Index
- To mitigate/increase Fire Danger depending on drought

3. Dead or Dormancy Vegetation Danger

- Winter fires, Crop Fires
- Combination Wind and Fine Fuel Moisture Code
- Eclosion/Propagation
- Hourly values → daily maximum
- Ex : 25 July 2019 : 50fires/4000ha



Wind / FFMC	< 80	80 – 85	85 – 89	89 – 93	93 – 96	> 96
0 – 10 knots						
10 – 20 knots						
20 – 30 knots						
> 30 knots						

Thanks for your attention !

Any questions

Slido #wildfires2021
mathieu.regimbeau@meteo.fr

April 2021 – 03-05 AM → →
Not wildfires ...
Anti-frost candles

