



International Ragweed Society

AFEDA database on airborne *Ambrosia* pollen concentrations, 1982-2019 (France)

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&

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Association Française d'Etude des Ambrosies (AFEDA)

<http://www.ambrosie-afeda.org/>



- The **French Association for the study of Ragweed (AFEDA)** is active since 1982.
- It measures the ***Ambrosia* pollen concentrations in the air**,
 - At present at five sites in the Lyon area, the cradle of the spread of ragweed in France: **Amberieu-en-Bugey** (since 2005), **Belley** (since 2013), **Lyon-Bron** (since 1982), **Lyon-Saint-Exupéry** (since 1996) and **Montélimar** (since 1995).
 - Formerly four other stations were also measured: Dijon, Nevers, Vichy, Angoulême.
- A **Cour trap** is working yearly during the *Ambrosia* pollination period (**from August to September, weeks 31 to 39**) and the Cour methodology is applied for samples treatment and pollen analysis.
- The network provides **information useful for medical and public health purposes**.
- Moreover, the length of the data series helps to **review the success of the methods applied to fight the ragweed expansion**.



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The base map is from <https://www.lepatriote.fr/content/images/2016/06/09/1929/296896carte-generique-verte.jpg>



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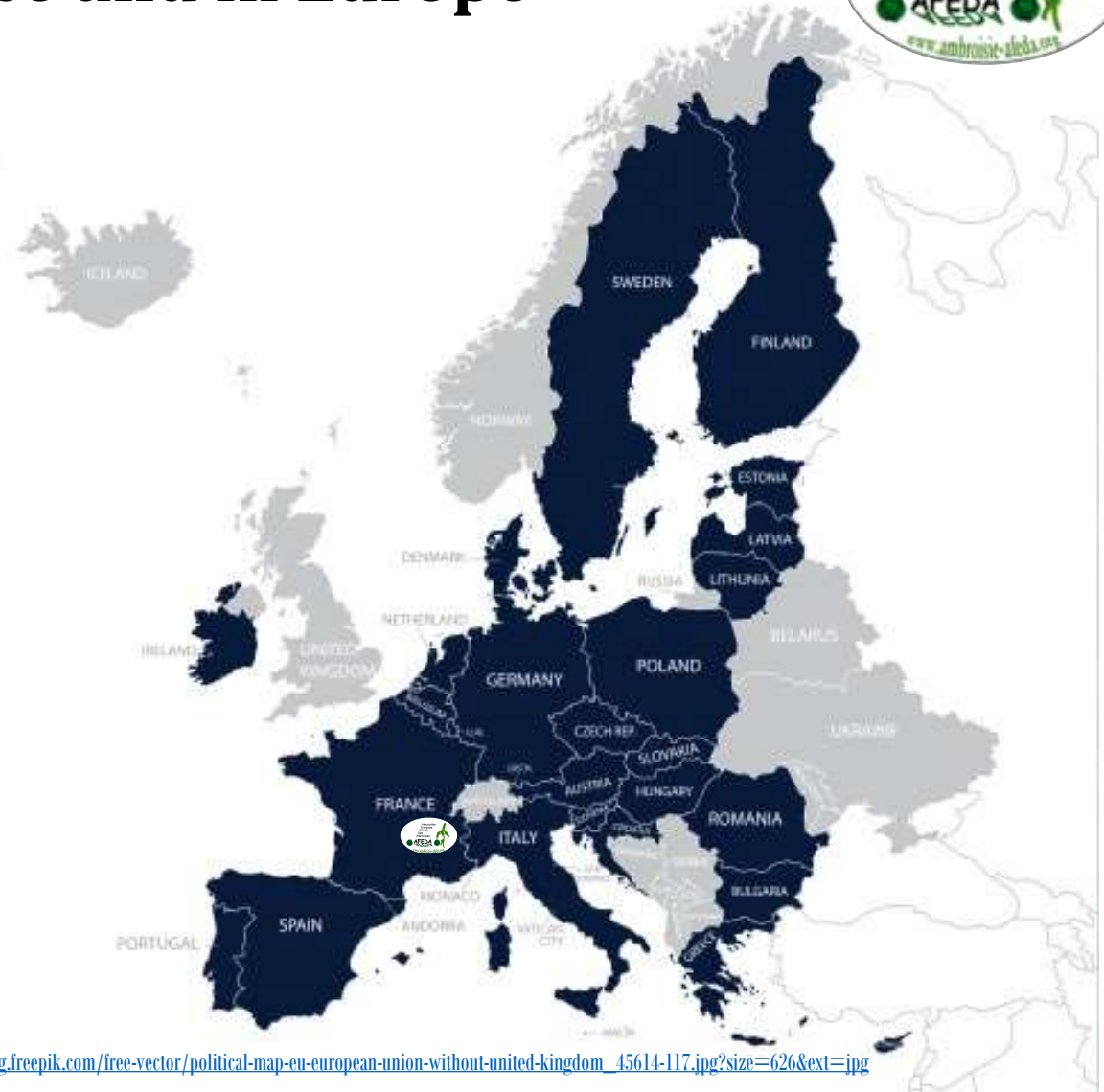
Auvergne-Rhône-Alpes region in France and in Europe



The base map is from https://upload.wikimedia.org/wikipedia/commons/thumb/8/8b/Auvergne-Rh%C3%B4ne-Alpes_in_France_2016.svg/624px-Auvergne-Rh%C3%B4ne-Alpes_in_France_2016.svg.png

EU European Union

- Austria (1995)
- Belgium (1958)
- Bulgaria (2007)
- Croatia (2013)
- Cyprus (2004)
- Czech Republic (2004)
- Denmark (1973)
- Estonia (2004)
- Finland (1995)
- France (1958)
- Germany (1958)
- Greece (1981)
- Hungary (2004)
- Ireland (1973)
- Italy (1958)
- Latvia (2004)
- Lithuania (2004)
- Luxembourg (1958)
- Malta (2004)
- Netherlands (1958)
- Poland (2004)
- Portugal (1986)
- Romania (2007)
- Slovakia (2004)
- Slovenia (2004)
- Spain (1986)
- Sweden (1995)

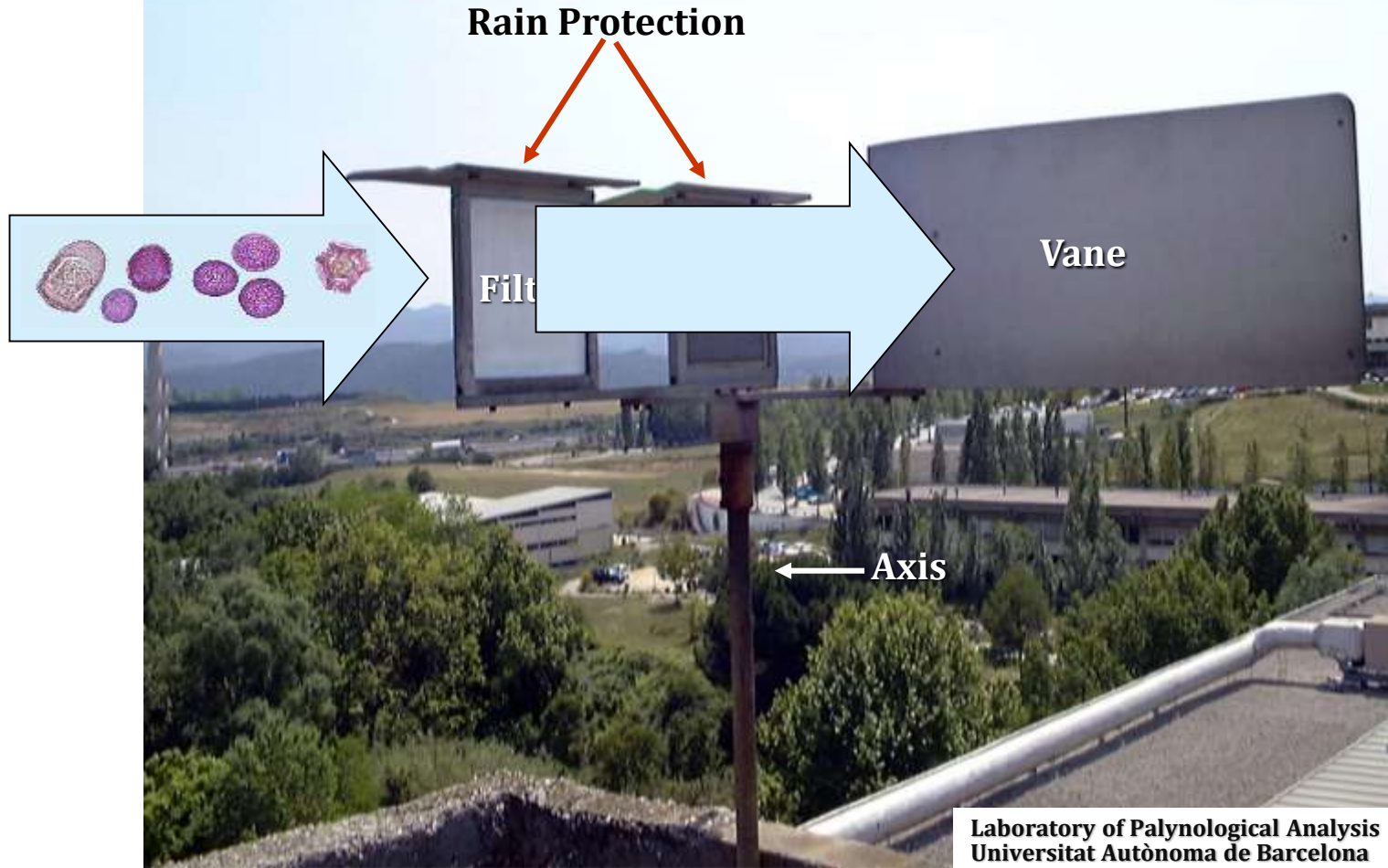


The base map is from https://img.freepik.com/free-vector/political-map-eu-european-union-without-united-kingdom_45614-117.jpg?size=626&ext=.jpg



COUR METHOD

Patent CNRS-ANVAR, Cour, 1974



COUR METHOD

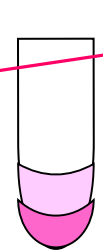
AFEDA sampling station at Lyon-Bron
Meteorological station from Météo-France



COUR METHOD

Gauze filter
 (1/2)

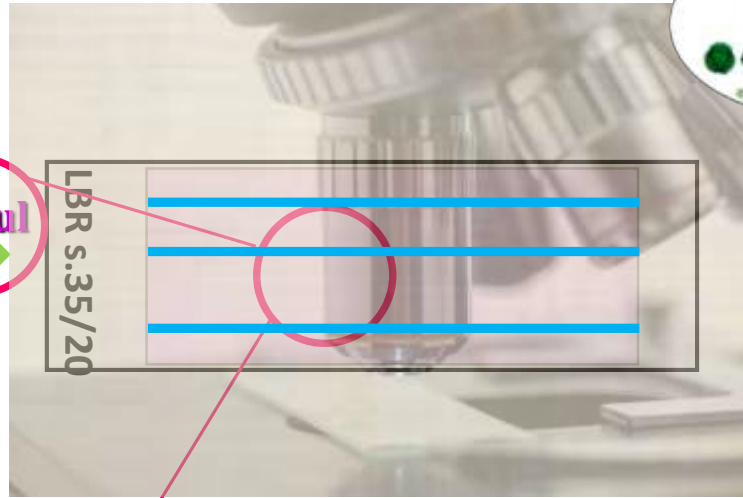
Laboratory protocol:
 H_2SO_4 , HCl, HF, KOH...
 Acetolysis (Erdtman 1960)
 Dilutions, centrifugations...



Glycerogelatin
 Pollen sediment V_0

V_t

50 μ l



Pollen spectrum:
 Number of pollen grains (total and per taxa)

Number of pollen grains per surface unit

Wind Anemometer lecture during the exposition period = longitude of the air column crossing the 20cmx20cm surface of the filter
 Efficiency (filter resistance) 1/5 of wind run

Number of pollen grains per volume unit: P/m^3
 (mean weekly concentration values)

Cour P.: 1974, Nouvelles techniques de détection des flux et des retombées polliniques: étude de la sédimentation des pollens et des spores à la surface du sol. *Pollen et Spores* **16**, 103-141.

Period under study

Ambérieu-en-Bugey (since 2005)
Belley (since 2013)
Lyon-Bron (since 1982)
Lyon-Saint-Exupéry (since 1996)
Montélimar (since 1995)

} week 31 to week 39

Concepts used in this study

Pollination Period Integral (PPI_n) = sum of the mean weekly *Ambrosia* pollen concentrations over weeks 31-39

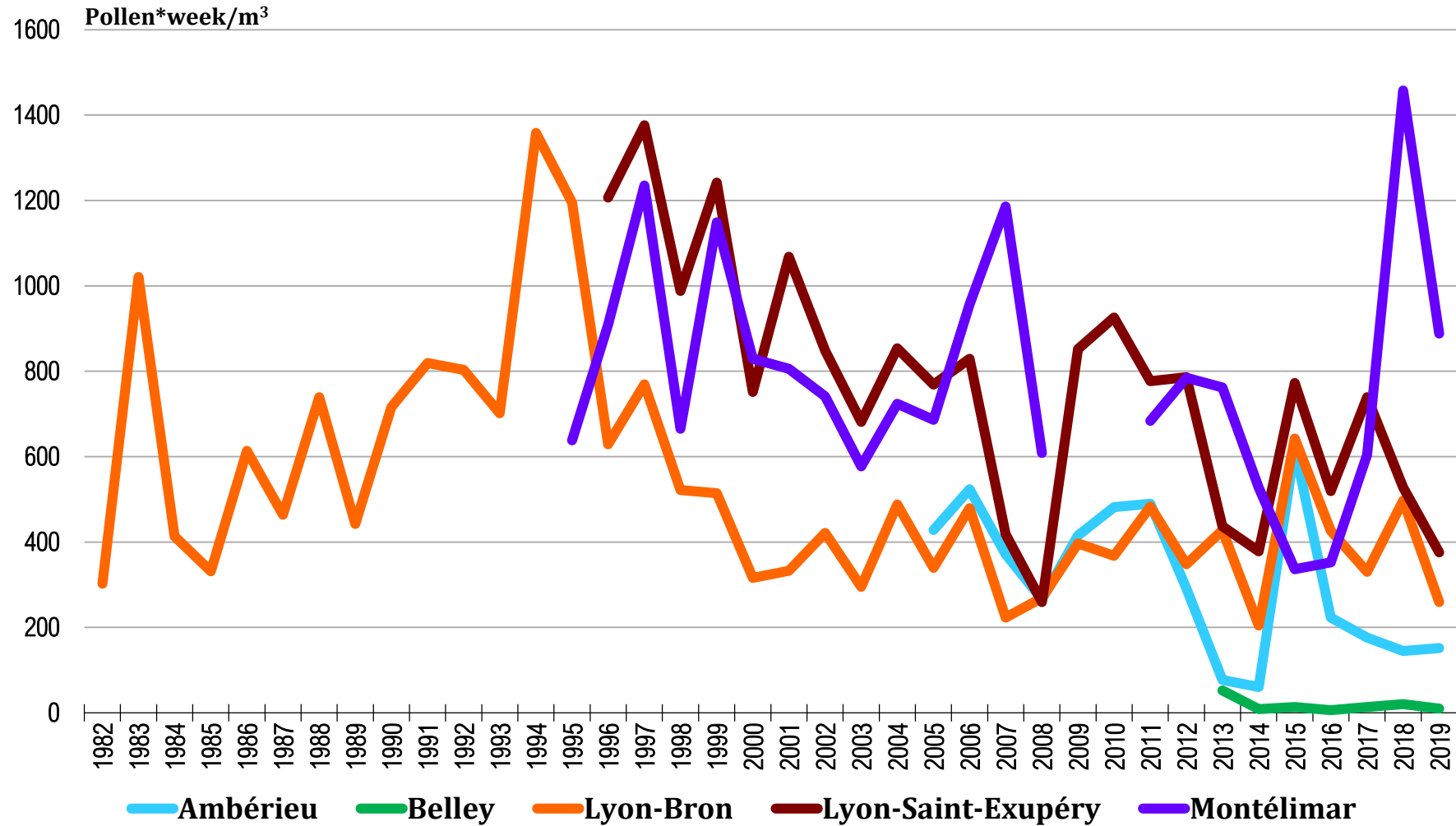
Peak concentration (Peak) = highest mean weekly *Ambrosia* pollen concentration for the weeks 31 to 39

Number of weeks with Allergy Risk (NwAR) = Nr of weeks with *Ambrosia* concentrations higher than 5 P/m³

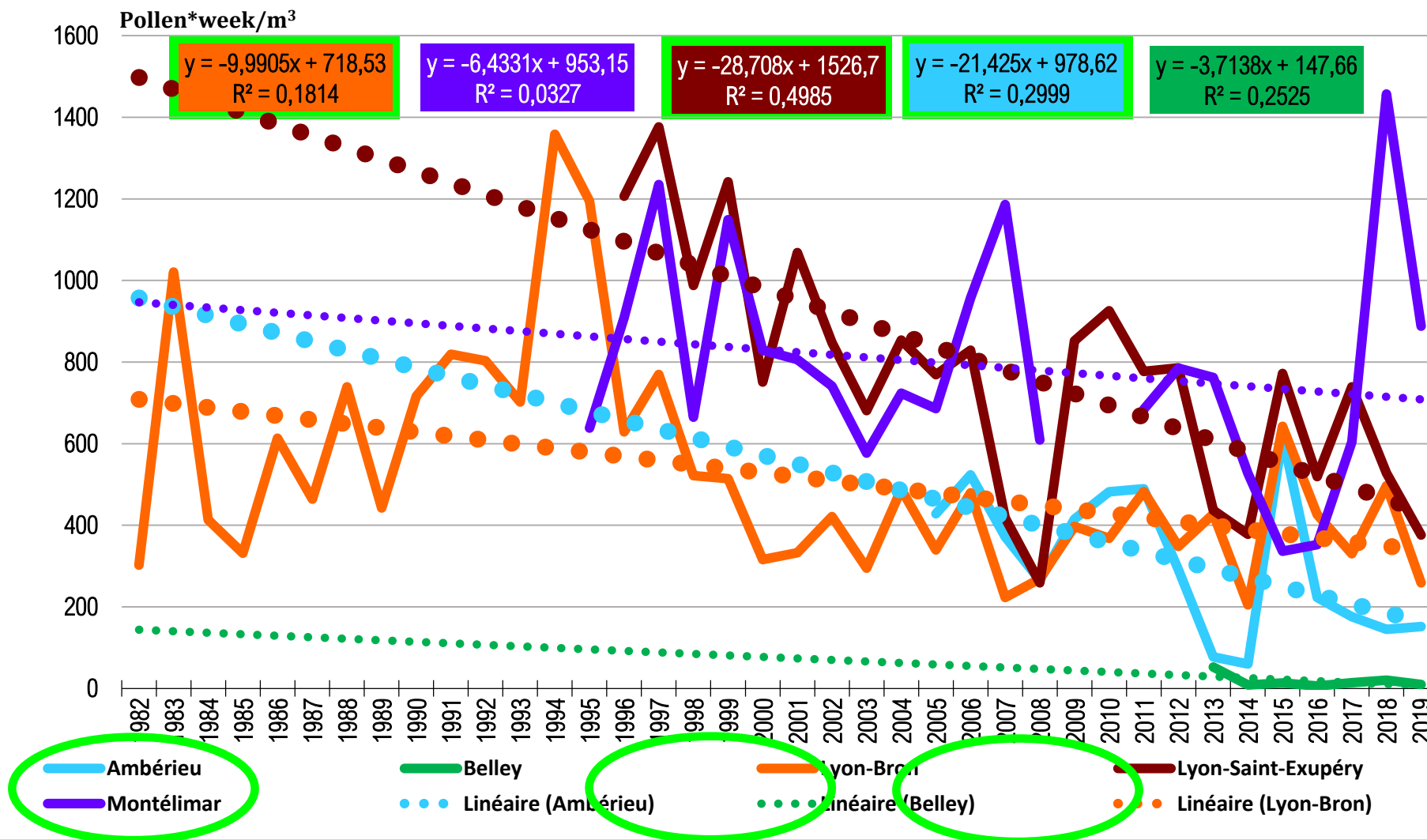
Number of weeks with Debilitating Allergy Risk (NwDAR) = Nr of weeks with *Ambrosia* concentrations higher than 100 P/m³

We have analyzed the **trends** of these parameters over the study periods

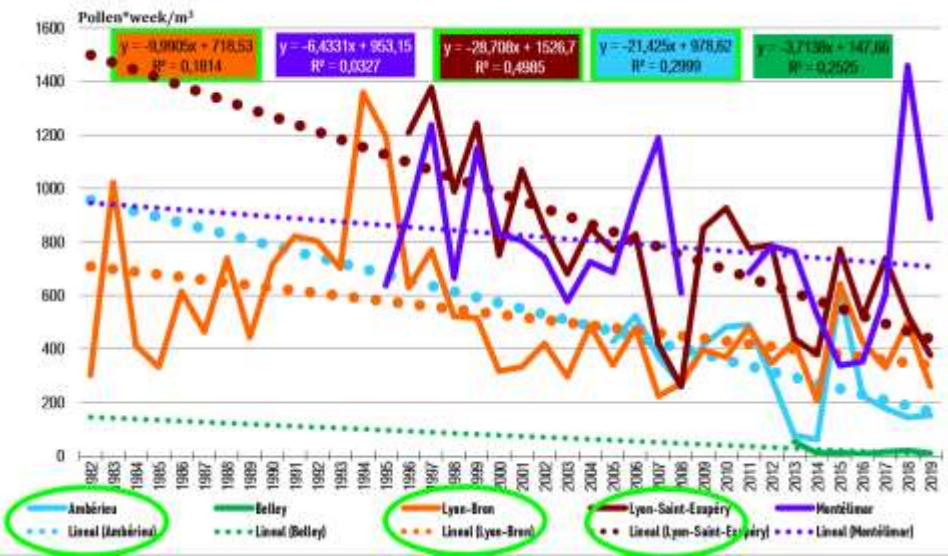
Pollination Period Integral (PPI_n), weeks 31-39



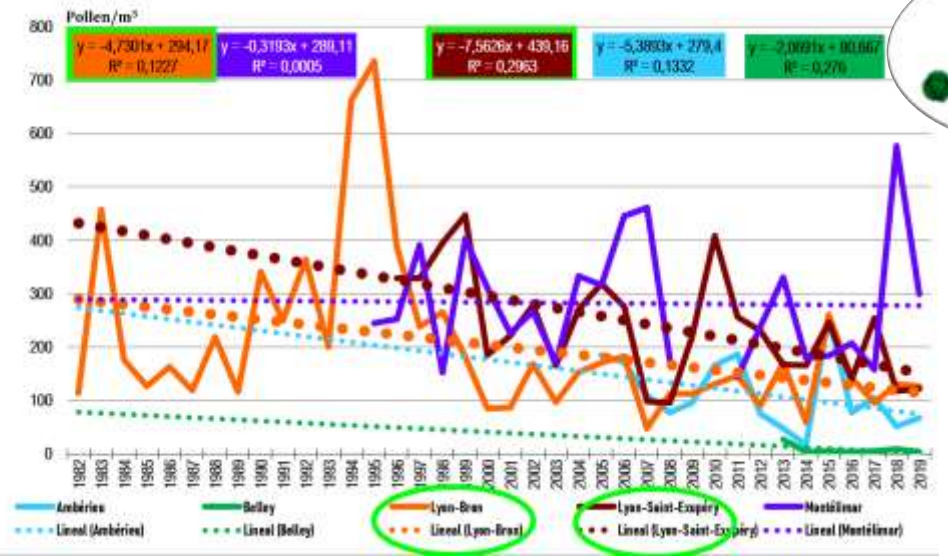
Pollination Period Integral (PPI_n), weeks 31-39 -TRENDS-



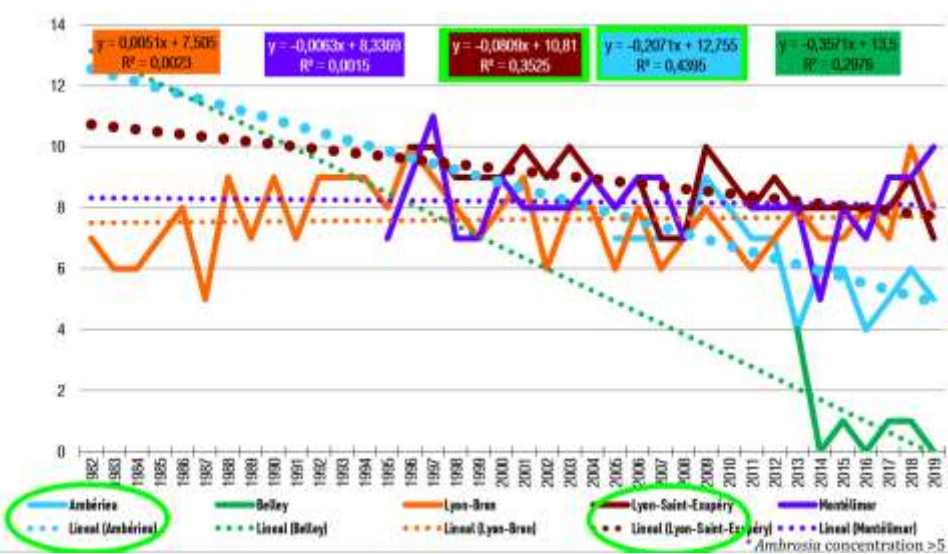
Pollination Period Integral (PPI_n), weeks 31-39 -TRENDS-



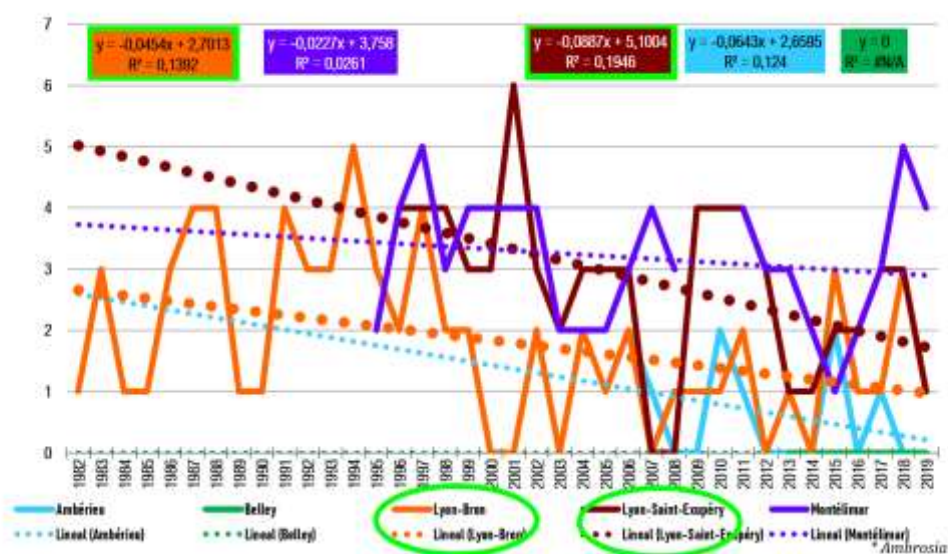
Peak concentration (Peak) -TRENDS-



Number of weeks with Allergy Risk* (NwAR) -TRENDS-



Number of weeks with Debilitating Allergy Risk* (NwDAR) -TRENDS-

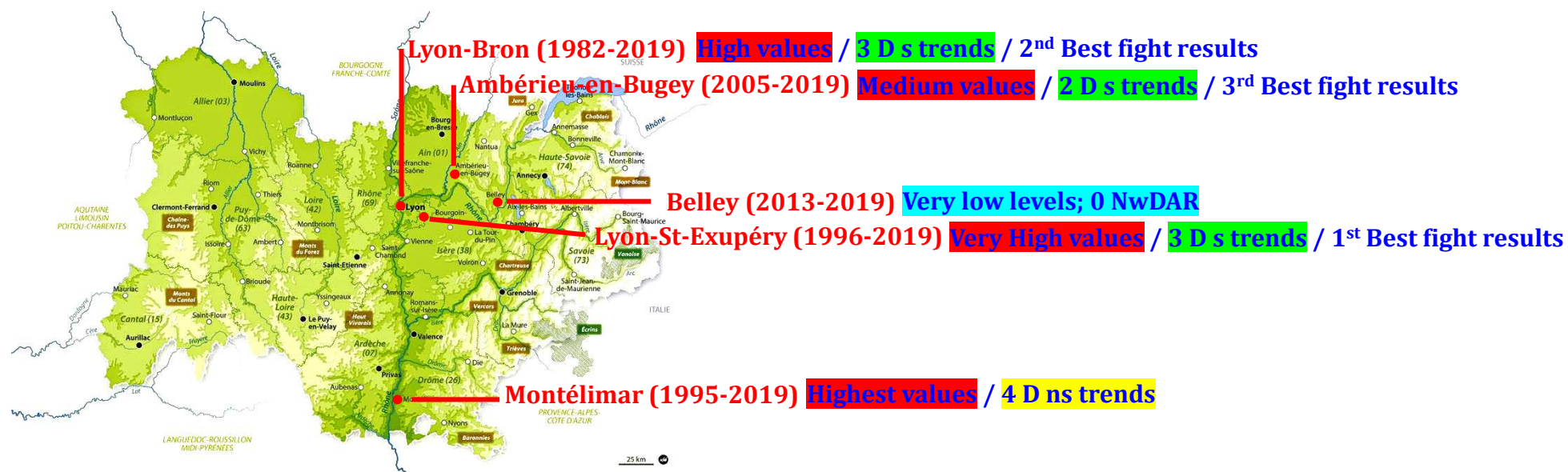


* Ambrosia concentration >5 P/m³

* Ambrosia concentration >100 P/m³

Summary of the results

	Period	Nr years	R ² min	PPI _n		Peak		NwAR		NwDAR	
				Trend	R ²	Trend	R ²	Trend	R ²	Trend	R ²
Ambérieu-en-bugey	2005-2019	15	0,2470	D	0,2999	D	0,1332	D	0,4395	D	0,124
Belley	2013-2019	7	0,4999	D	0,2525	D	0,276	D	0,2976	Null	Null
Lyon-Bron	1982-2019	38	0,1000	D	0,1814	D	0,1227	(I)	0,0023	D	0,1392
Lyon-Saint-Exupéry	1996-2019	24	0,1570	D	0,4985	D	0,2963	D	0,3525	D	0,1946
Montélimar	1995-2019 (except 2009-2010)	23	0,1640	D	0,0327	(D)	0,0005	(D)	0,0015	D	0,0261



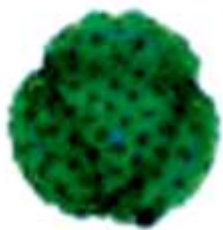
Conclusions

Concerning the values of the studied parameters,

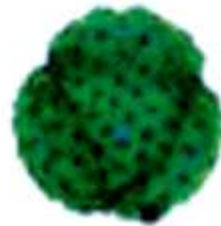
- Montélimar is the locality showing the highest values in all parameters (PPI_n, Peak, NwAR, NwDAR), followed by Lyon-Saint-Exupéry, Lyon-Bron, Ambérieu and Belley. This order of localities is repeated for all parameters.
- The trends observed are negative in all cases, except for
 - Peak concentration in Montélimar (no trend → decrease?)
 - NwAR in Lyon-Bron (no trend → increase?) and in Montélimar (no trend → decrease?)
- PPI_n is decreasing with statistical significance in Ambérieu, Lyon-Bron and Lyon-Saint-Exupéry.
- Peak concentration decrease is only statistically significant in Lyon-Bron and Lyon-Saint-Exupéry.
- The NwAR decrease is significant in Ambérieu and Lyon-Saint-Exupéry.
- The NwDAR decrease is significant in Lyon-Bron and Lyon-Saint-Exupéry.
- The methods applied to fight ragweed expansion seem to show positive results, although *Ambrosia* pollen is still an airborne allergen in the region.
- Projects to measure and inform doctors and the society are welcome and needed for a better public health.



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**Thanks
For
Your
Attention**

