

The Rhône valley and beyond, a spreading area for Ambrosia: 98 years of pollen counts

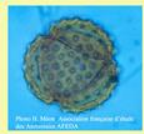
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² Université Claude-Bernard Lyon 1

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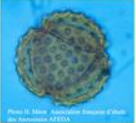


In France there is a rumour about *Ambrosia* pollen counts

« They are increasing »...

- Of course, we know
that short ragweed is spreading in our country...
- The **aim** of the study is to try to evaluate
the changing tendency of Ambrosia pollen counts
in the **polluted areas**: Rhône valley but also **beyond**.
- Are studied: **the weekly season average**
the weekly pollen peak
the length of the allergic risk
the length of the invalidating allergic risk



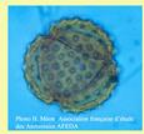


Our material is a Cour'trap



- This sensitive pollen trap allows for significant measurements as from 0.1 pollen grains per m^3 of air.
- It has been operating at Lyon-Bron since 1982.
- So, AFEDA has defined in 1990, thresholds and a pollen peak:
- "T.0.1 – T.5 – T.100 " are corresponding to a weekly pollen concentration average/ m^3 of air,
- Threshold 5 is reached when rate is ≥ 5 pollen grains: it starts the **period of the allergic risk**,
- Threshold 100 is reached when rate is ≥ 100 p. grains: it starts the **period of the invalidating allergic risk**,
- So we have defined the **length of the allergic risk** and the **length of the invalidating allergic risk**.





We present two kinds of results

1. Areas where measures were realized in 1984 and later,
beyond the Rhône valley: Nevers, Ambérieu-en-Bugey
on the Rhône valley: Lyon-Bron, Montélimar.
2. Other areas that were not included in the 1984 project:
beyond the Rhône valley: Vichy, Dijon, Angoulême,
Lyon-Saint-Exupéry,
on the Rhône valley: Vienne, Valence.



The Rhône valley



In France, **the Rhône valley** is situated on each side of the Rhône river downstream from Lyon.

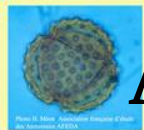
2 elements favoured ragweed spreading around Lyon:

- the wonderful extension of the city to the East.

Urbanisation progressively took the place of the polluted cultures that before being built-up became fallow lands or abandoned lands during one season or more;

- then, spreading to the **South**. 5 kinds of means of communication drove to the Mediterranean Sea: **the Rhône, national roads: N7 and N86, a motorway, the French high-speed train.**





After the first measures realized in Lyon in 1982 and 1983, 1984 measures showed that in France, Lyon was the area the most polluted by *Ambrosia* pollen

Ambrosia: weekly seasonal average, in France in 1984

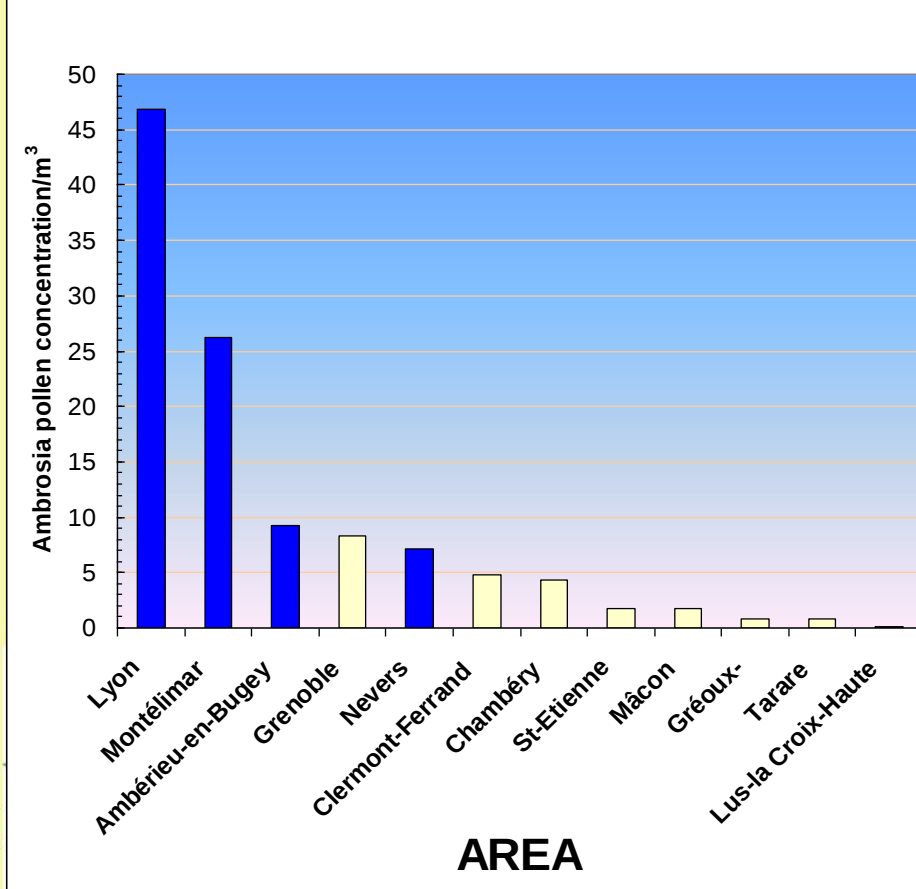
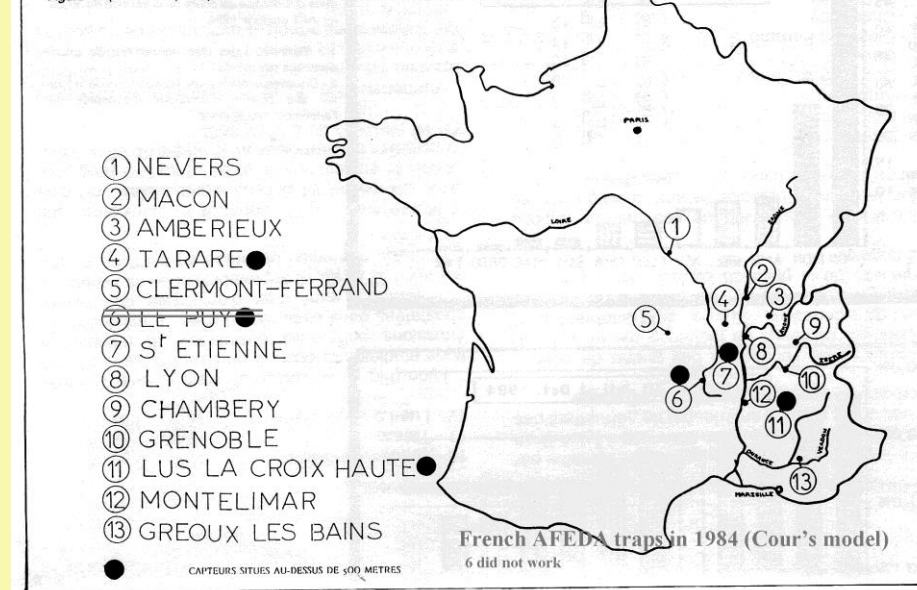


Figure 4 : (A.F.E.D.A.) - Implantation des capteurs 1984 (Le capteur n° 6 n'a pas été installé)



Reference: C. Déchamp, P. Cour. Allergie et Immunologie, 1985, 8, 438-461.

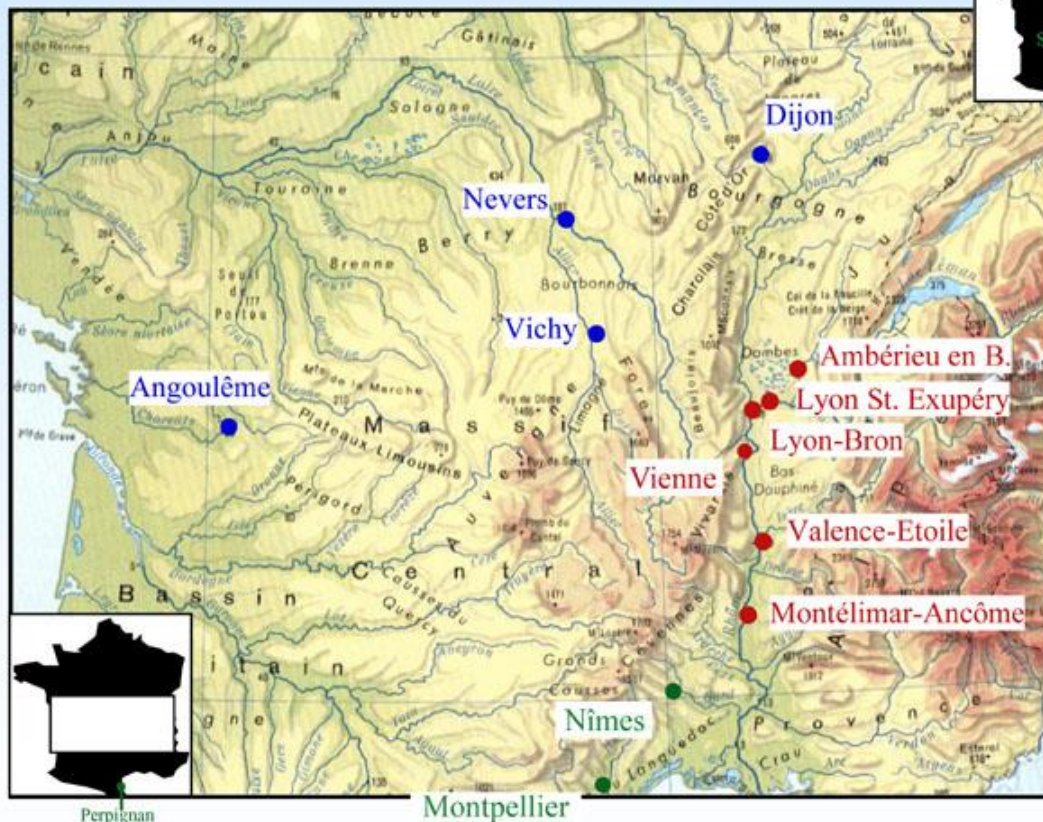
gress Lyon March 28-29 2012



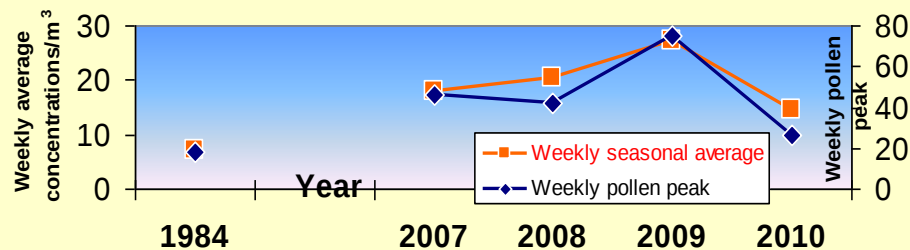
1) Areas where measures were realized in 1984 and later

beyond
the Rhône valley:
Nevers,
Ambérieu-en-Bugey

on the Rhône
valley:
Lyon-Bron,
Montélimar



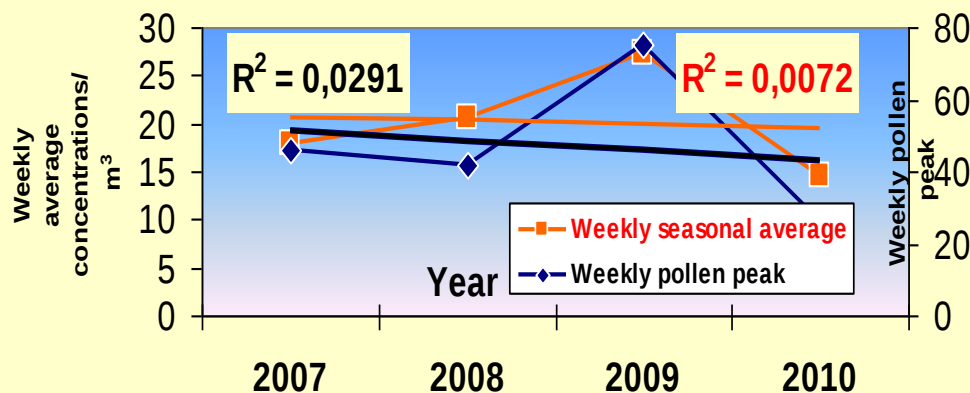
Ambrosia pollen evolution in Nièvre department: Nevers



Nevers: 190 km
North-west Lyon and
Rhône valley.
Since 1984 to 2007,
weekly season average:
increase 2.5 times



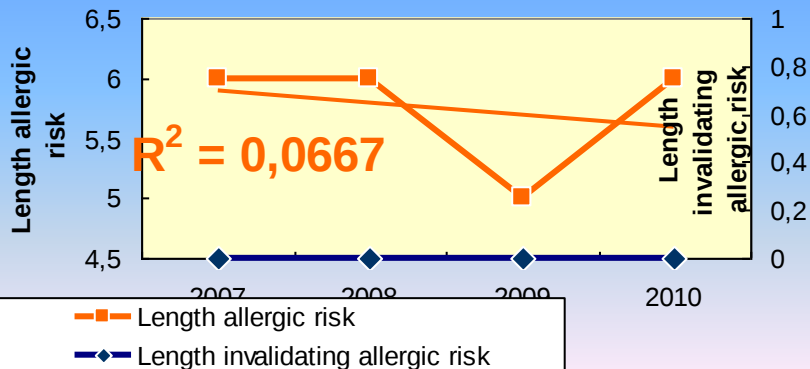
Ambrosia pollen evolution in Nièvre department: Nevers



2007 - 2011
36 weeks
(+9 in 1984)

Weekly season average :
decrease
Weekly pollen peak:
decrease

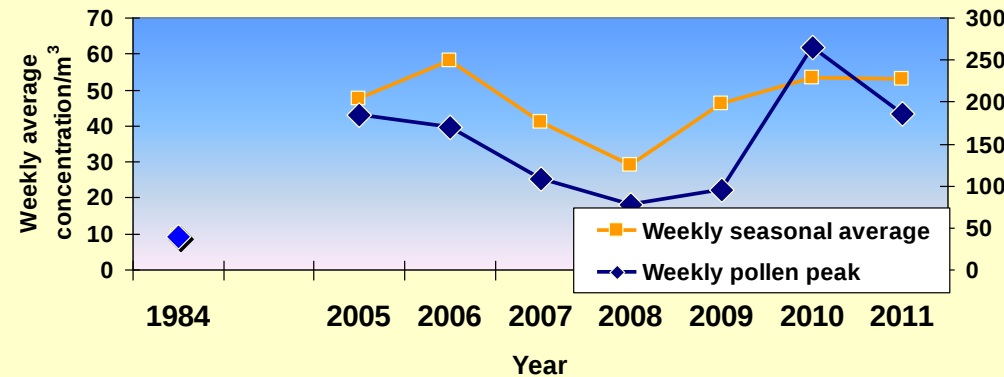
Ambrosia pollen evolution, Nièvre department: Nevers



Length of allergic risk:
decrease

Length of invalidating
allergic risk: nil

Ambrosia pollen evolution in Ain department: Ambérieu-en-Bugey



Ambérieu: 46km

North-east Lyon and Rhône valley

**Since 1984 to 2005,
wsa: increase 5 times**

2005-2011

63 weeks

(+9 weeks in 1984)

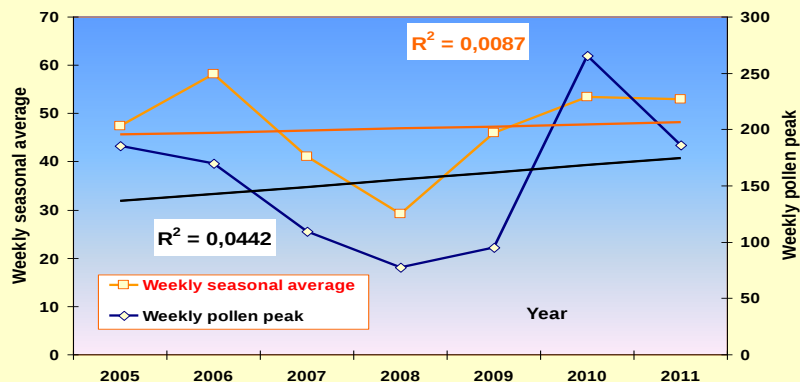
**Weekly season average:
moderate increase**

**Weekly pollen peak:
moderate increase**

**Length of the allergic risk:
increase**

**Length of the invalidating
allergic risk: stable**

Recent Ambrosia pollen evolution in Ain dept



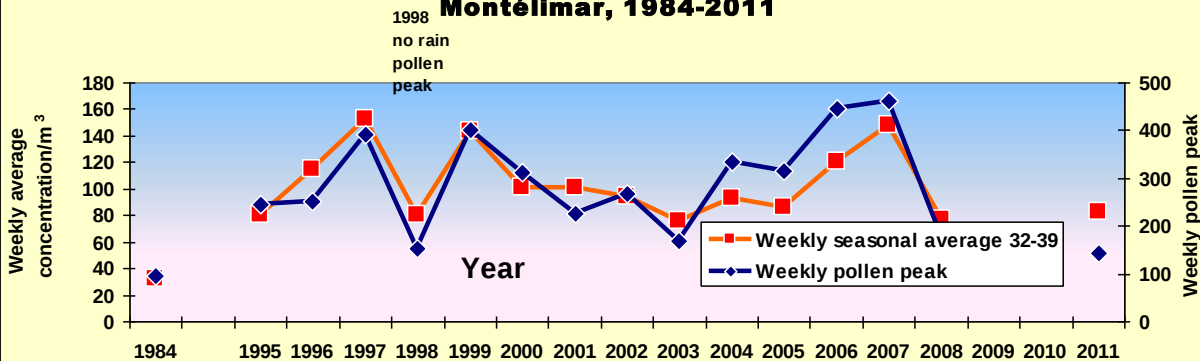
$R^2 = 0,1538$

—◆— Ambérieu Length of allergy risk
—◆— Ambérieu Length of invalidating allergy risk

$R^2 = 0,0089$

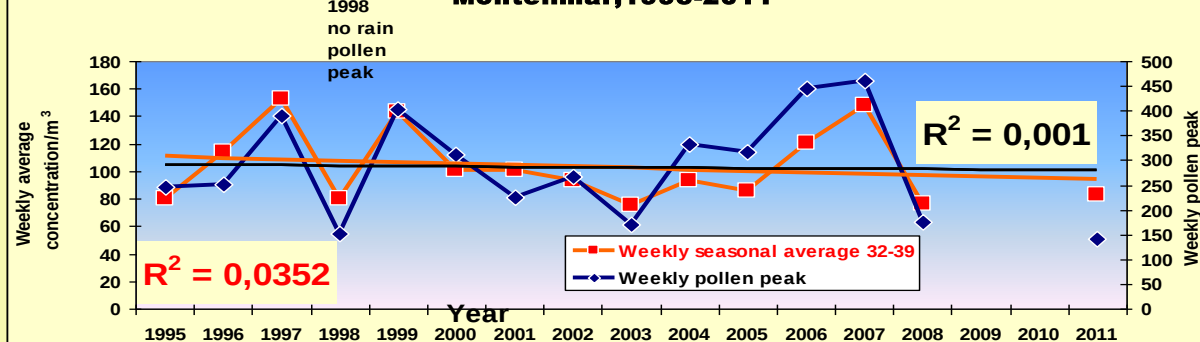
Ambrosia pollen evolution in Drôme department:

Montélimar, 1984-2011

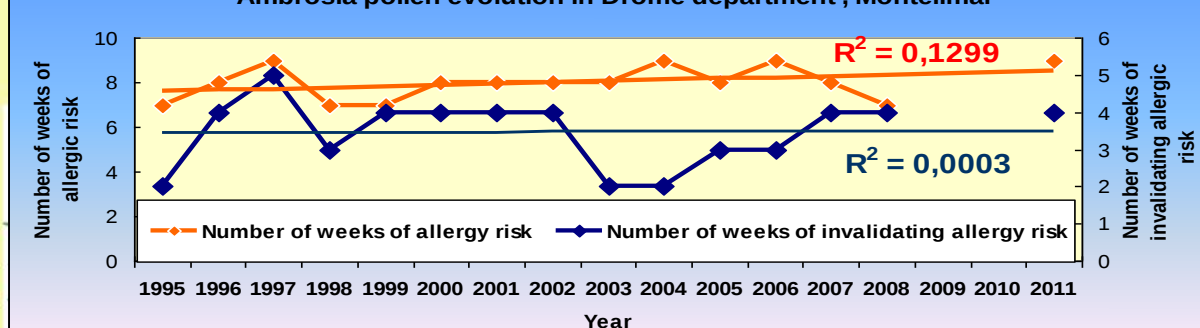


Ambrosia pollen evolution in Drôme department:

Montélimar, 1995-2011



Ambrosia pollen evolution in Drôme department, Montélimar



Rhône valley: Montélimar

134 km South Lyon

Since 1984 to 1995
Weekly season
average:

increase: 2.5 times

1995-2011

135 weeks (+9 in 1984)

-Weekly season
average: **stable**

-Weekly pollen peak:
decrease

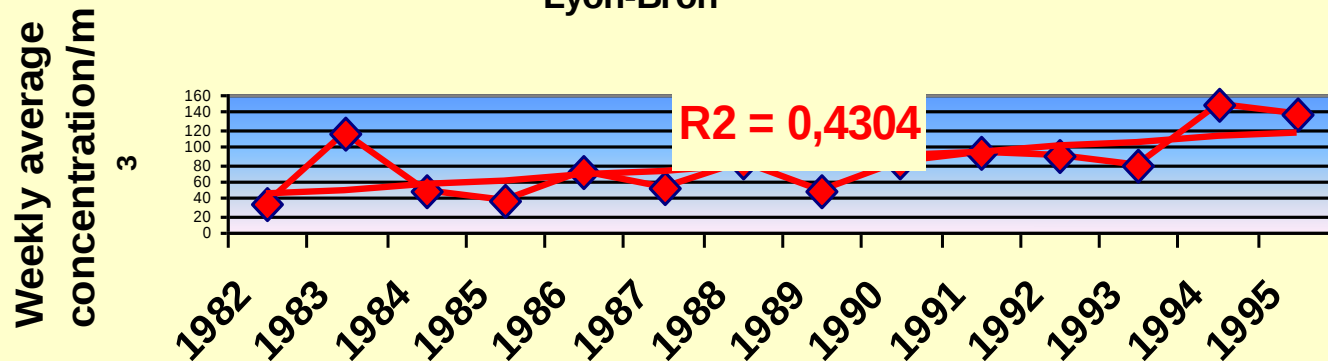
-Length of allergic
risk: **increase**

-Length of invalidating
allergic risk: **stable**



Ambrosia pollen evolution in Rhône department:

Lyon-Bron



Rhône valley:
LYON-Bron:

270 weeks

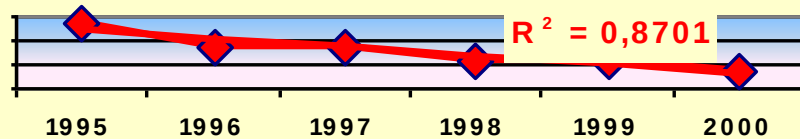
(+ 9 in 1984)

1982-2011,

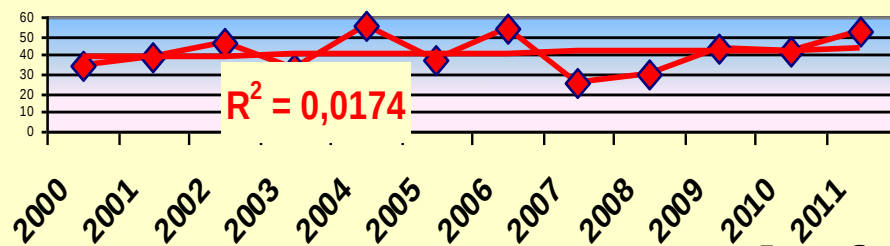
Wsa & pollen

Common Agricultural Policy

A pollen evolution: Lyon-Bron, later



A pollen evolution: Lyon-Bron, later



peak: decrease

Length of

allergic risk:

decrease

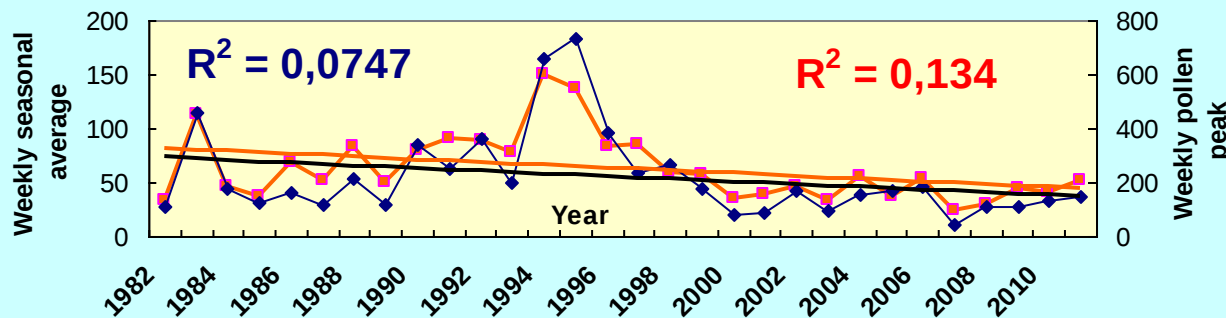
Length of

invalidating

allergic risk:

decrease

Ambrosia pollen evolution in Rhône department: Lyon-Bron



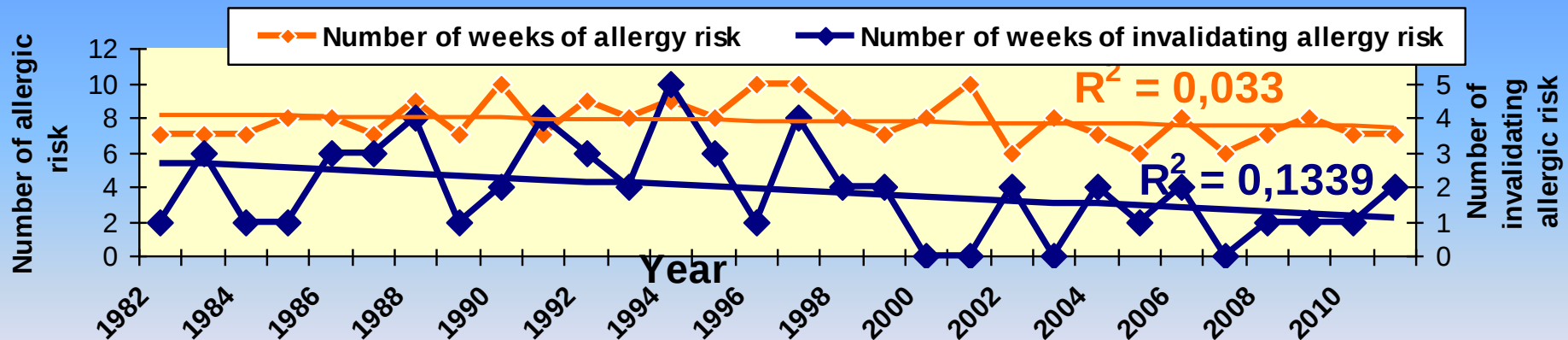
So for the areas measured in 1984,

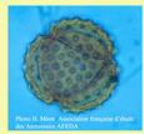


when there are later measures, we see that

- till the first analysis, Ambrosia pollen concentrations increased: from 2.5 to 5
- **on the contrary, from the last years (5 to 10) tendency is a decrease**

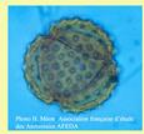
Ambrosia pollen evolution in Rhône department: Lyon-Bron





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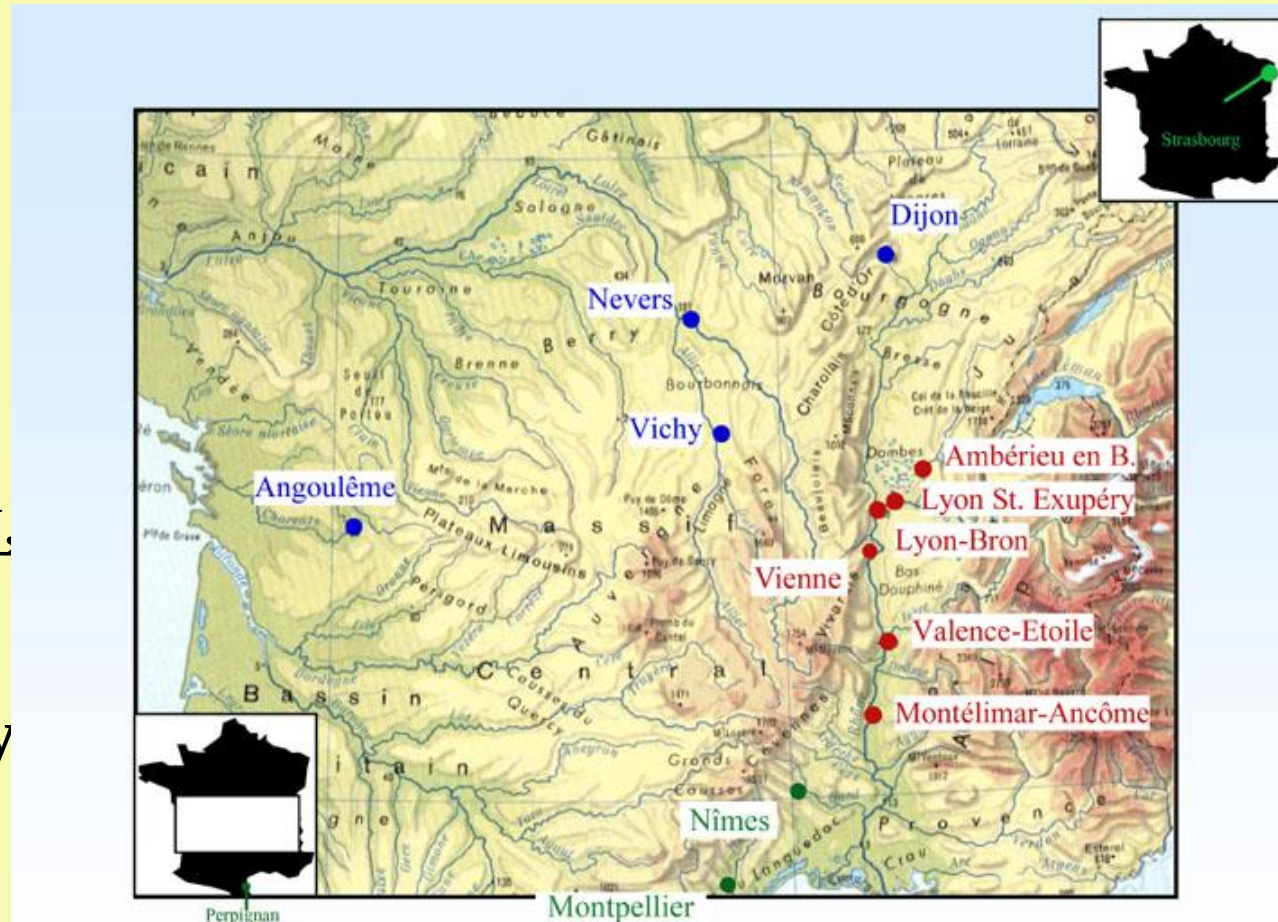




Other areas that were not in the 1984 project:

beyond the
Rhône valley:
Vichy, Dijon,
Angoulême
Lyon-Saint-Exupéry.

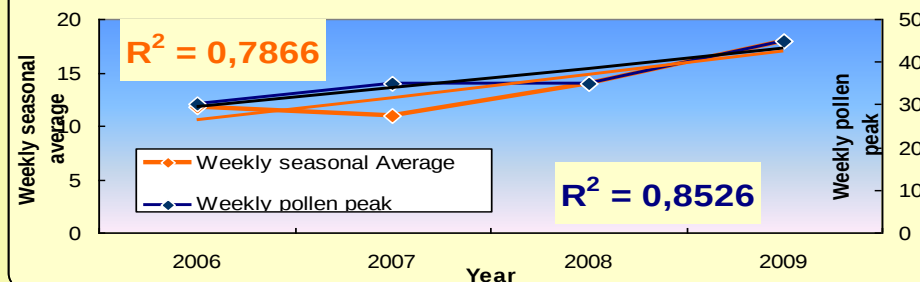
on the Rhône valley
Vienne, Valence



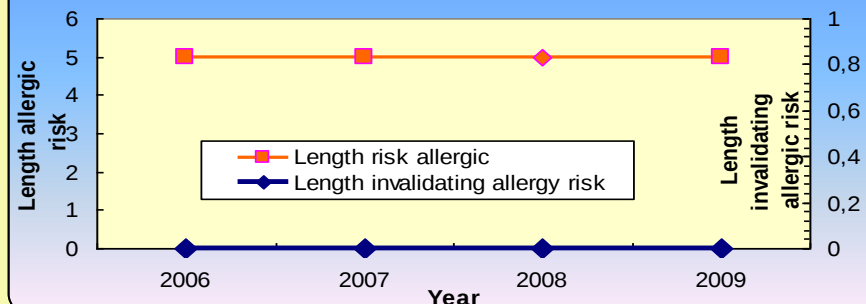


Vichy, Dijon, Angoulême: every criteria increases, except one that is stable

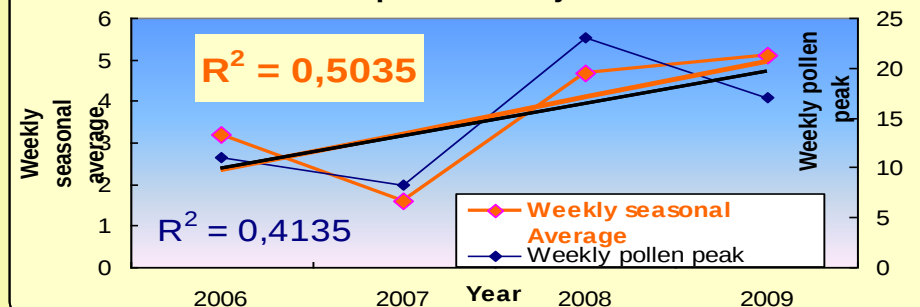
Ambrosia pollen evolution in Allier department: Vichy



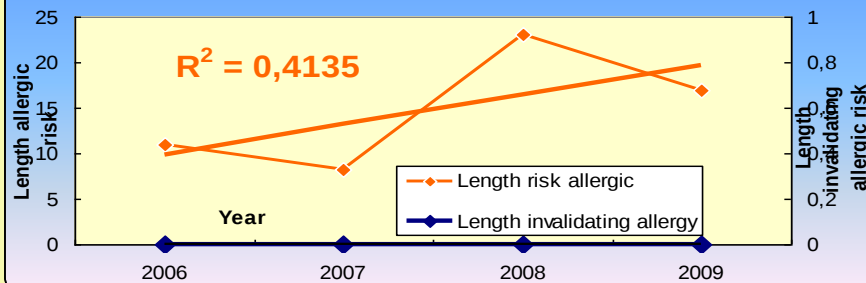
Ambrosia pollen evolution, Allier department: Vichy



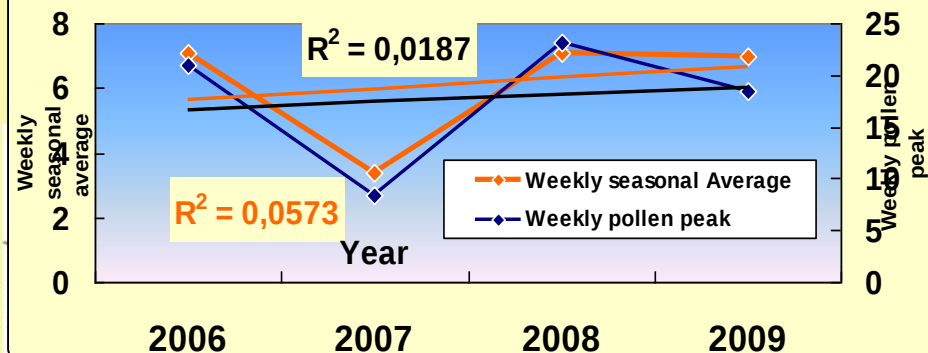
Ambrosia pollen evolution in Côte d'or department: Dijon



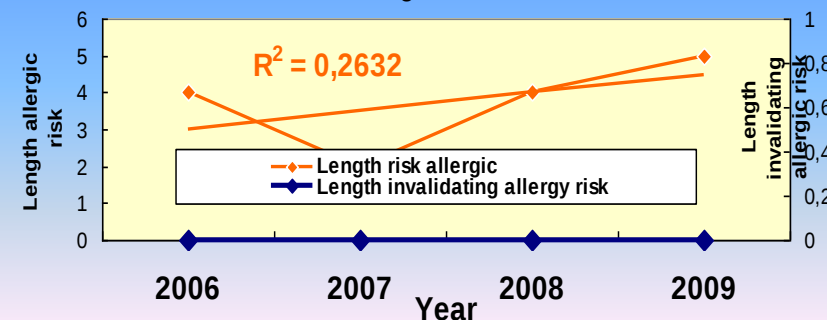
Ambrosia pollen evolution in Côte d'Or department: Dijon

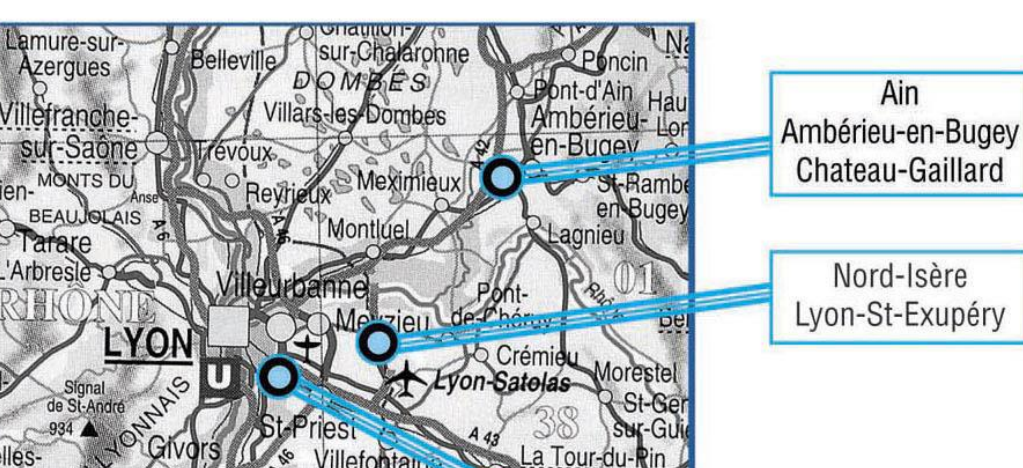


Ambrosia pollen evolution in Charente department : Angoulême



Ambrosia pollen evolution in Charente department: Angoulême





Lyon-Saint-Exupéry,
pollen counts began in
1996, their decrease
follows the decrease of
Lyon-Bron

1996-2011

144 weeks

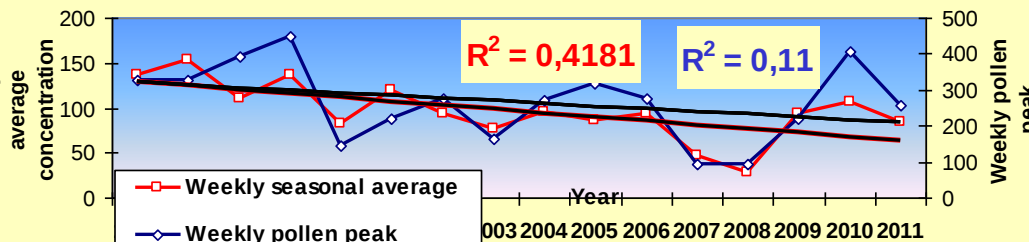
Weakly season average :
decrease

Pollen peak : **decrease**

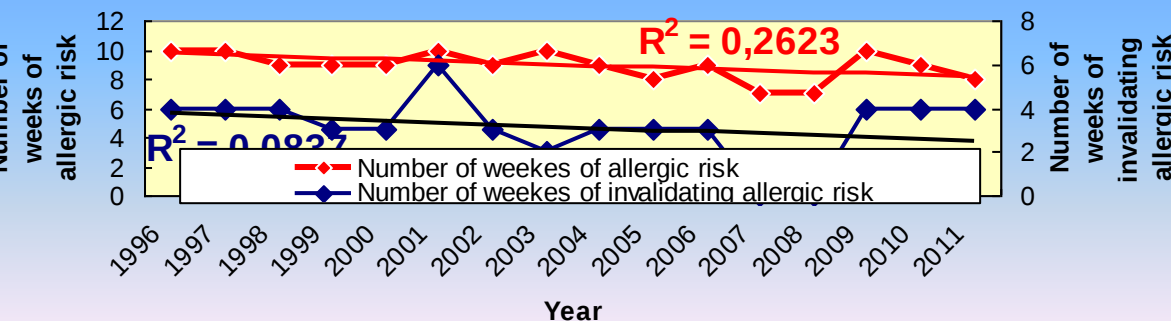
Length of allergic risk:
decrease

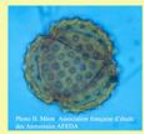
Length of invalidating
allergic risk: **decrease**

Ambrosia pollen evolution in Isère department:
Lyon-Saint-Exupéry, 1996-2011



Ambrosia pollen evolution in Isère department,
Lyon-Saint-Exupéry





Rhône valley: **Vienne**

20 km South Lyon



2001-2002, 24 weeks

Only two years because Vienne mayor (Isère deputy) suppressed the budget of the pollen trap

when he became the mayor.

There is no pollen trap in Vienne now.

Weakly season average : decrease

Pollen peak : decrease, 304 – 284 pollen/m³

Length of allergic risk: decrease, 10 -7 weeks

Length of invalidating allergic risk: decrease, 5 - 3 weeks

We cannot conclude on 2 years

**We also studied Aubenas in Ardèche (Montélimar latitude)
in 2001, one year**

Pollen peak was 39/m³, Length of allergic risk was 4 weeks

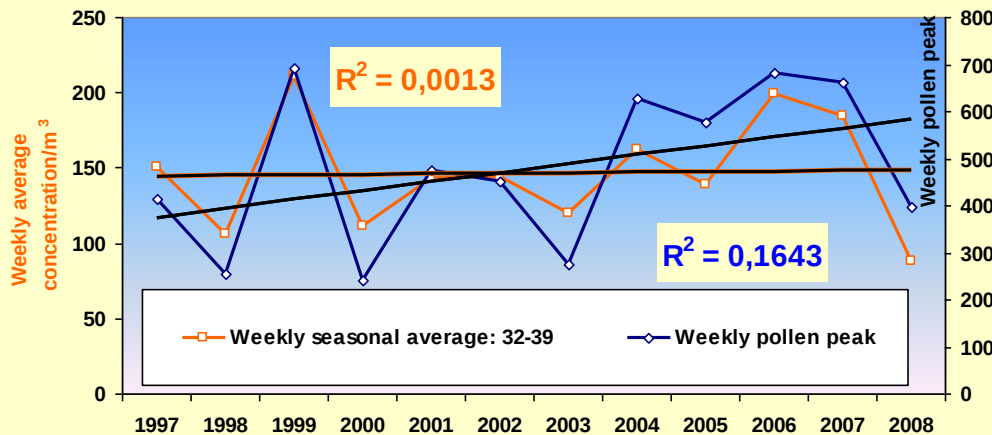


Rhône valley: Valence

100 km South Lyon



Ambrosia pollen evolution in Drôme department: Valence, 1997-20089



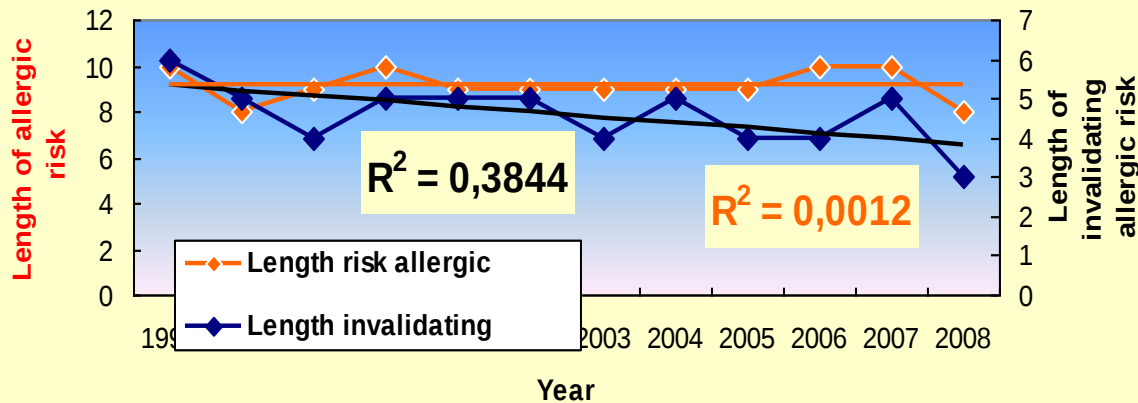
1997-2008:

108 weeks

Weekly season average:
stable

Weekly pollen peak:
increase

Ambrosia pollen evolution in Drôme department: Valence



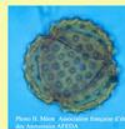
Length of allergic risk:
stable

Length of invalidating allergic risk: decrease

Even in this very polluted town, 3 criteria on 4: decrease or are stable

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Criterion	Criterion evolution	0	Decrease	Stable	Moderate increase: $r^2 < 0,1$	Increase: $r^2 > 0,1$
Weekly season average			Lyon-Bron Lyon-Saint-Exupéry Nevers Vienne	Montélimar Valence	Ambérieu Angoulême	Vichy Dijon
Weekly pollen peak			Lyon-Bron Lyon-Saint-Exupéry Nevers Montélimar Vienne		Ambérieu Angoulême	Vichy Dijon Valence
Length of the allergic risk			Lyon-Bron Lyon-Saint-Exupéry Nevers Vienne	Vichy Valence	Ambérieu	Montélimar Dijon Angoulême
Length of the invalidating allergic risk		Nevers Vichy Dijon Angoulême	Lyon-Bron Lyon-Saint-Exupéry Montélimar Valence Vienne	Ambérieu		

Blue: studied in 1984

Black: not studied in 1984

Red less than 5 years



Conclusion: the rumor about the increase of pollen counts is not justified on these sites

We have results for 10 sites,
98 years, 882 weeks, 40 criteria.

Criteria decrease, are stable or
they moderately increase
in 28 cases.

They were nil in 4 cases.

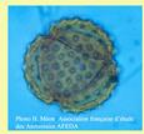
They increase in 8 cases:

for Valence and Montelimar , the 3
other criterions are good

for the other towns, Vichy, Dijon,
Angoulême: the number of
years is insufficient for a
conclusion.

Ambérieu is to take in account

Areas	Number of	
	years	weeks
Vienne	2	18
Angoulême	4	36
Dijon	4	36
Vichy	4	36
Nevers	4	36
Ambérieu	7	63
Valence	12	108
Montélimar	15	135
Lyon-Saint-Exupéry	16	144
Lyon-Bron	30	270
	98	882



Thank you



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