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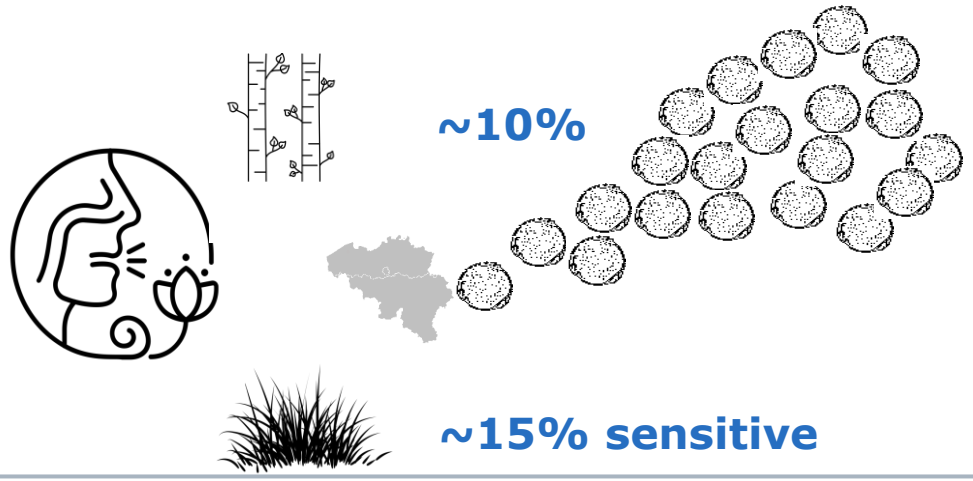


Timely information on birch & grass pollen levels in Belgium

Willem W. Verstraeten[1],
Nicolas Bruffaerts[2], Rostislav Kouznetsov[3], Marijke Hendrickx[2], Mikhail Sofiev[3], Andy W. Delcloo[1]

1. KMI, Belgium
2. Sciensano, Begium
3. FMI, Finland

Warnings for birch and grass pollen

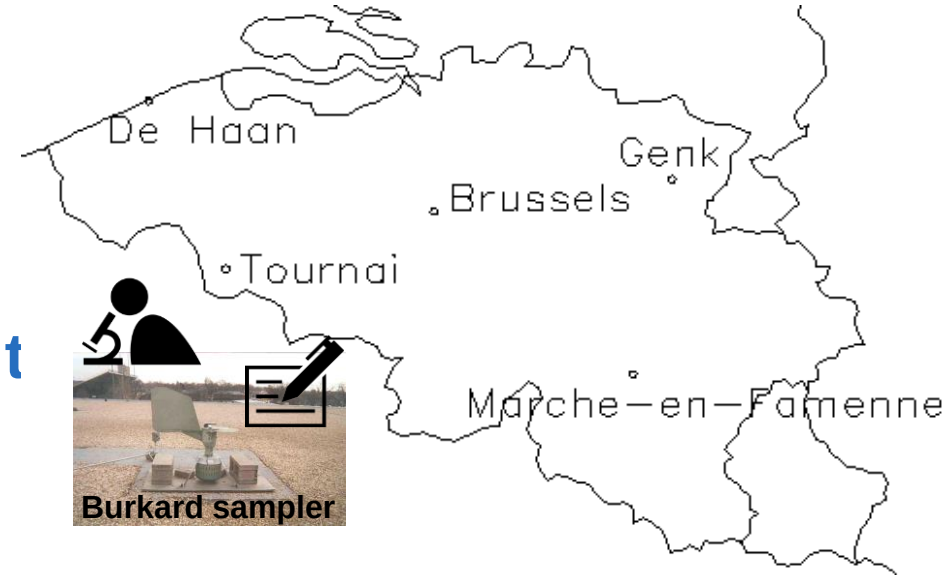
Medication, but not always very effective!

Avoidance!!!

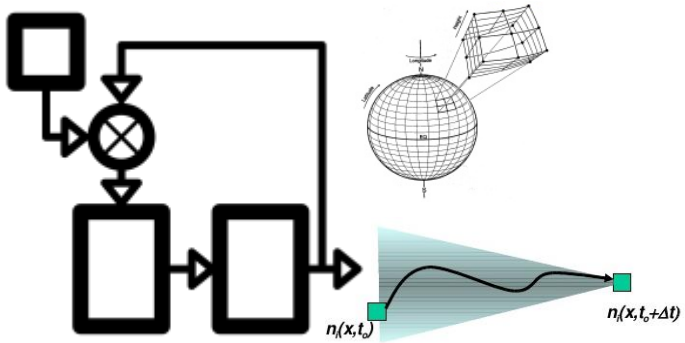
But which locations t avoid and at what times?

Warning system?

ISSUE:

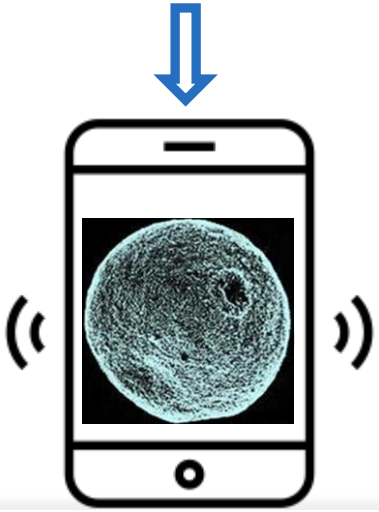


Lack of real-time and detailed spatial information on pollen levels



CTM SILAM

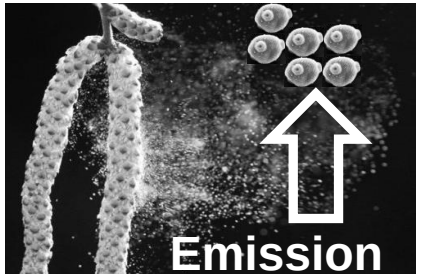
configured for birch & grass pollen

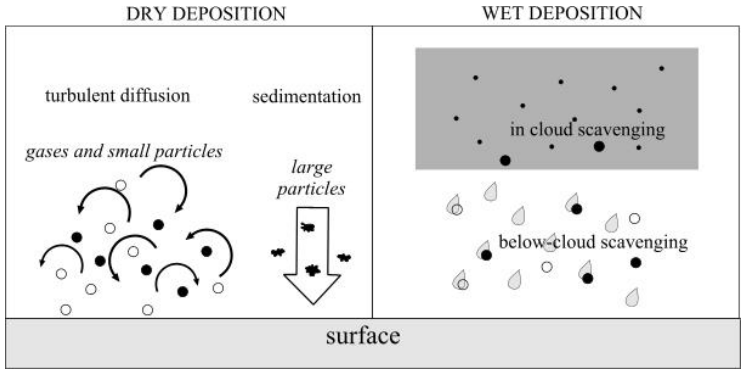


Pollen on the run: processes involved

Non-domestic pollen

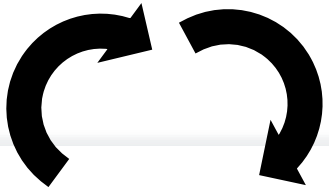
Transport



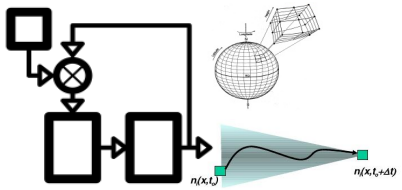


Dry & wet deposition

Resuspension

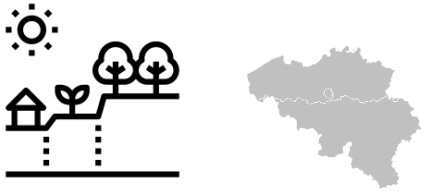


Pollen transport modelling



SILAM (System for Integrated modeLling of Atmospheric coMposition) => requires timely spatio-temporal inputs

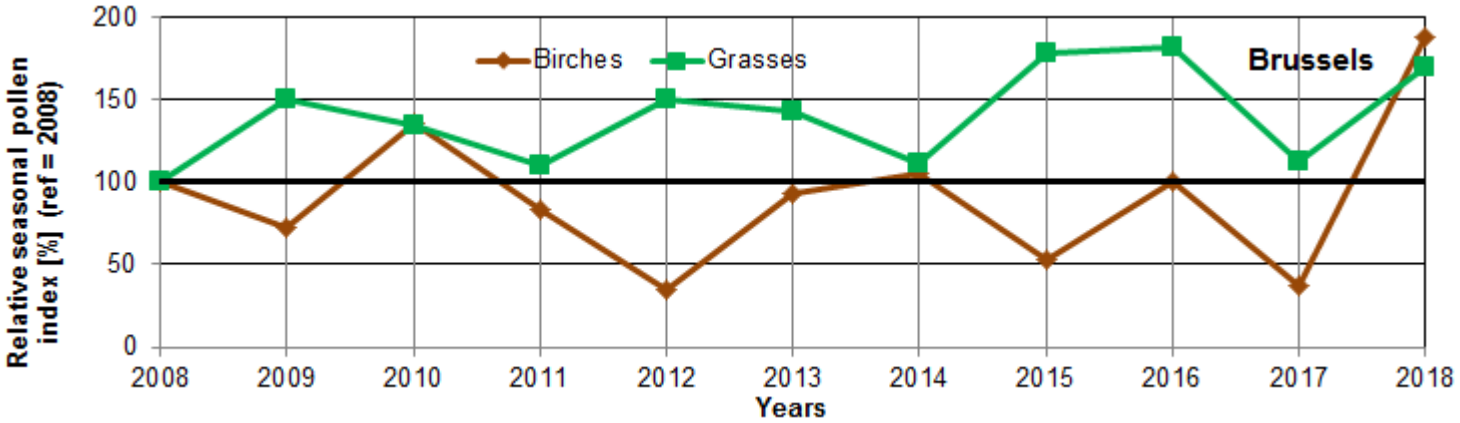
Meteorological data input => ECMWF!



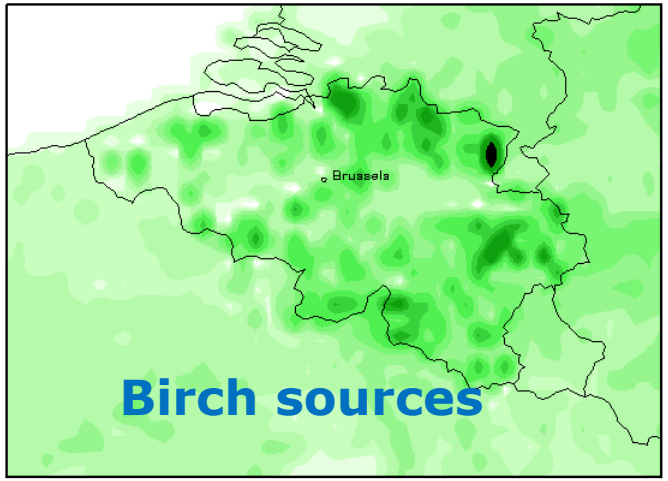
Emission maps: spatial distribution of pollen sources, **but …**

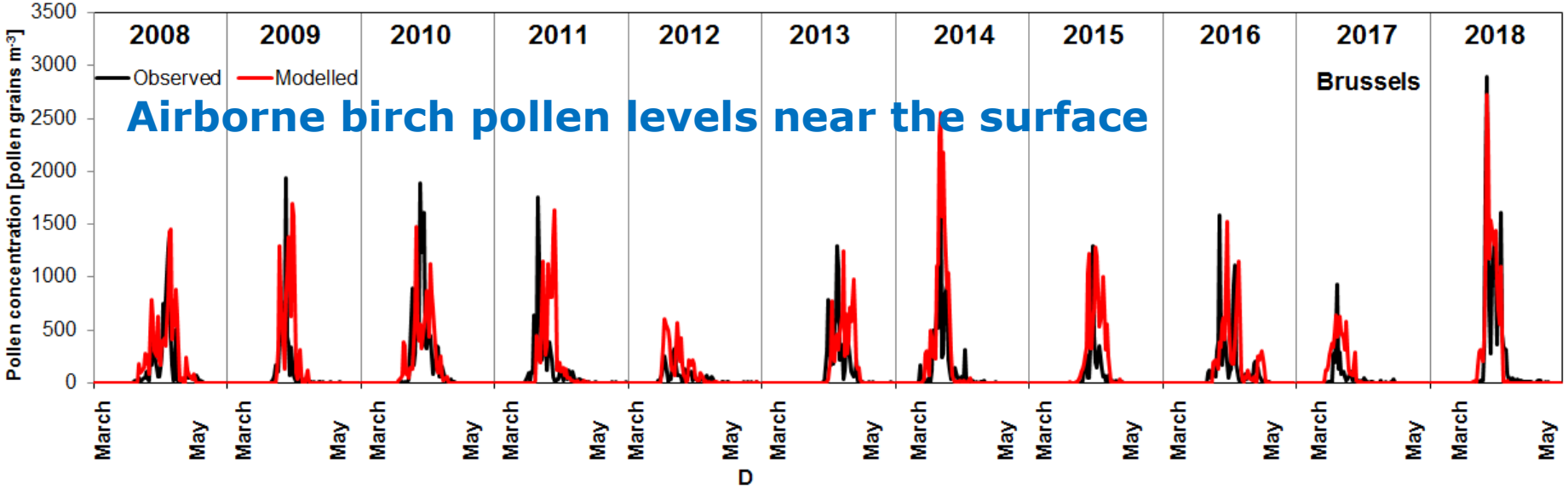
Large seasonal variations in pollen emissions:

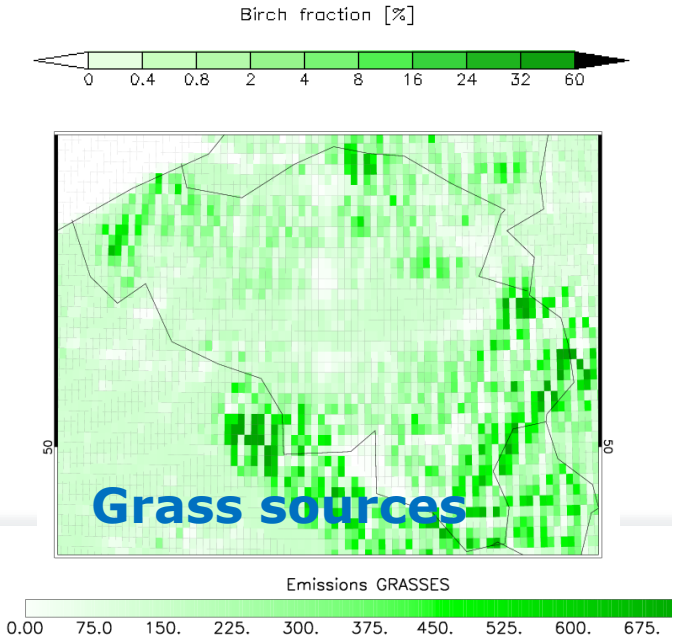
Relative amount of pollen observed at Elsene, Brussels
Source: Sciensano

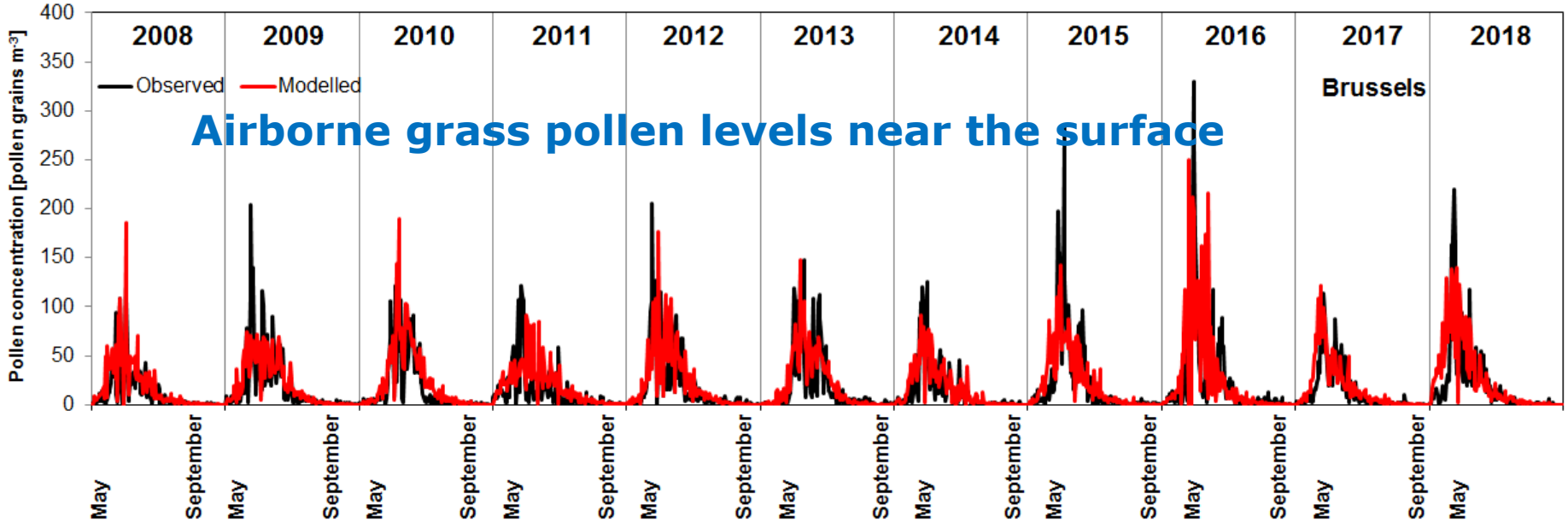


Pollen emission sources: mapping & modelling









Modelled and observed birch & grass pollen statistics

		De Haan	Tournai	Brussels	Marche-en-Famenne	Genk
BIRCH	**Daily values**					
	Slope	0.55	0.90	0.80	1.07	1.14
	Intercept	14.74	22.88	61.95	77.61	59.55
	R^2	0.30	0.57	0.40	0.59	0.49
	3-day average					
	Slope	0.84	1.10	1.03	1.27	1.41
	Intercept	7.83	8.84	41.53	58.01	6.24
	R^2	0.76	0.75	0.56	0.75	0.65
GRASS						
	Slope	0.31	0.44	0.65	0.56	0.45
	Intercept	5.08	14.03	8.98	15.78	12.24
	R^2	0.16	0.47	0.49	0.48	0.36
	3-day average					
	Slope	0.53	0.48	0.72	0.60	0.54
	Intercept	3.11	13.00	7.42	13.77	10.11
	R^2	0.50	0.61	0.68	0.67	0.54

Updated and temporally scaled emissions sources wrt the reference run: R^2 increased with ~50%; Slopes with ~60%

Updated and temporally scaled emissions sources wrt reference run: R^2 increased with ~100%; Slopes doubled

What did we learn?

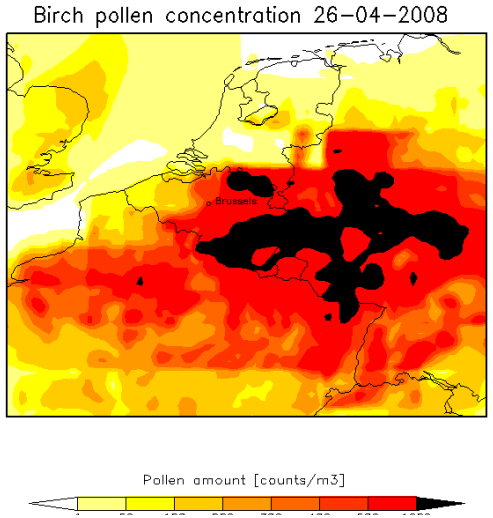
By running SILAM for birch & grass pollen compared to time series of pollen from monitoring stations in Belgium we learned that:

1. Updating pollen emission sources (maps) for SILAM is essential

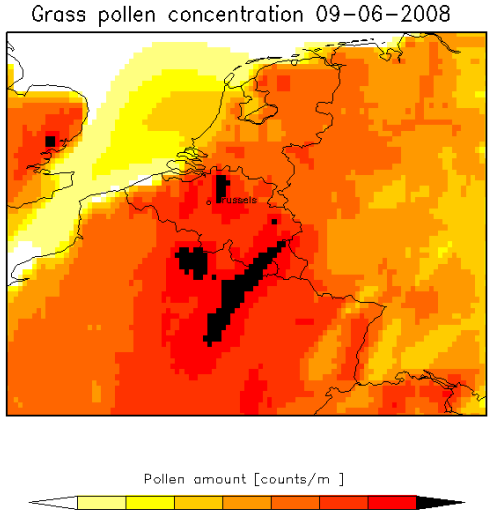
2. Introducing right start & end of pollen season in SILAM is crucial

3. Inter-seasonal variability of pollen must be accounted for

BIRCH pollen



GRASS pollen



THANKS!

Verstraeten et al., 2019 Aerobiologia

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