

A network of robotic monitors that use image recognition and artificial intelligence to determine allergic pollen flight in the air

Prof. Dr. Jeroen Buters¹, Dr. S. Hachinger²

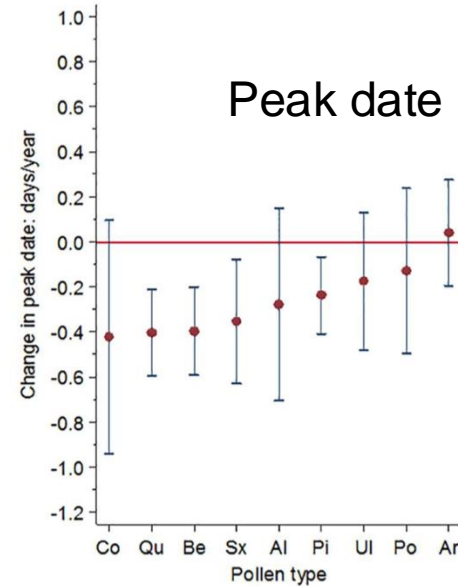
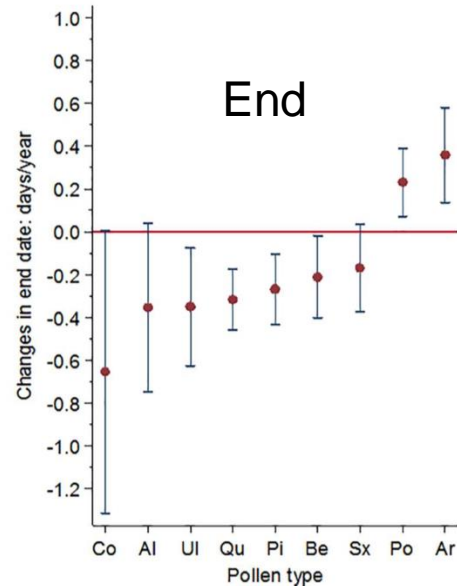
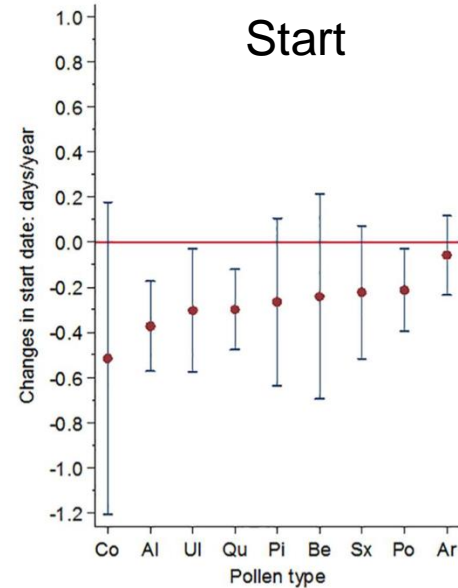
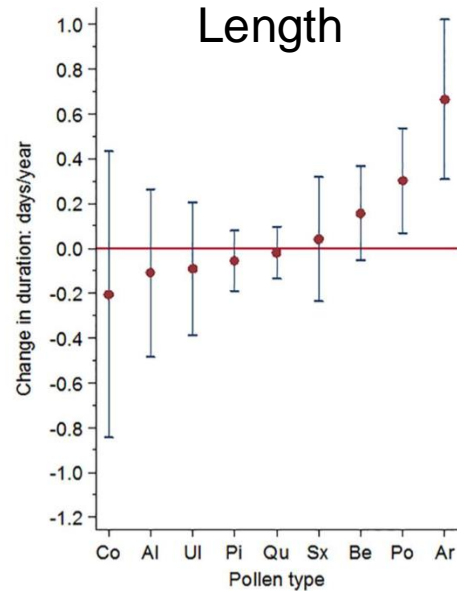
¹ ZAUM- Zentrum Allergie & Umwelt
Technische Universität München/Helmholtzzentrum München
² LRZ (Leibnitz Rechenzentrum), Garching, Germany



Conflicts of interest

Sponsor	Relationship
Government of Bavaria	Research grants ePIN (OPT, Health, KLIMA, Nowcasting, POMO etc.)
DFG	Research grant Wildfires
Helmholtzzentrum München	Research grants
Alk-Abello, HAL, Novartis, Thermo Fisher, Lofarma, Stallergenes, Allergopharma	Lectures honorarium
Philips	Study House Dust Mite
EU	Research Grant SYLVA, BioAirMet, AUTOpollen, HIALINE


Changes in Pollen Season in Scandinavia




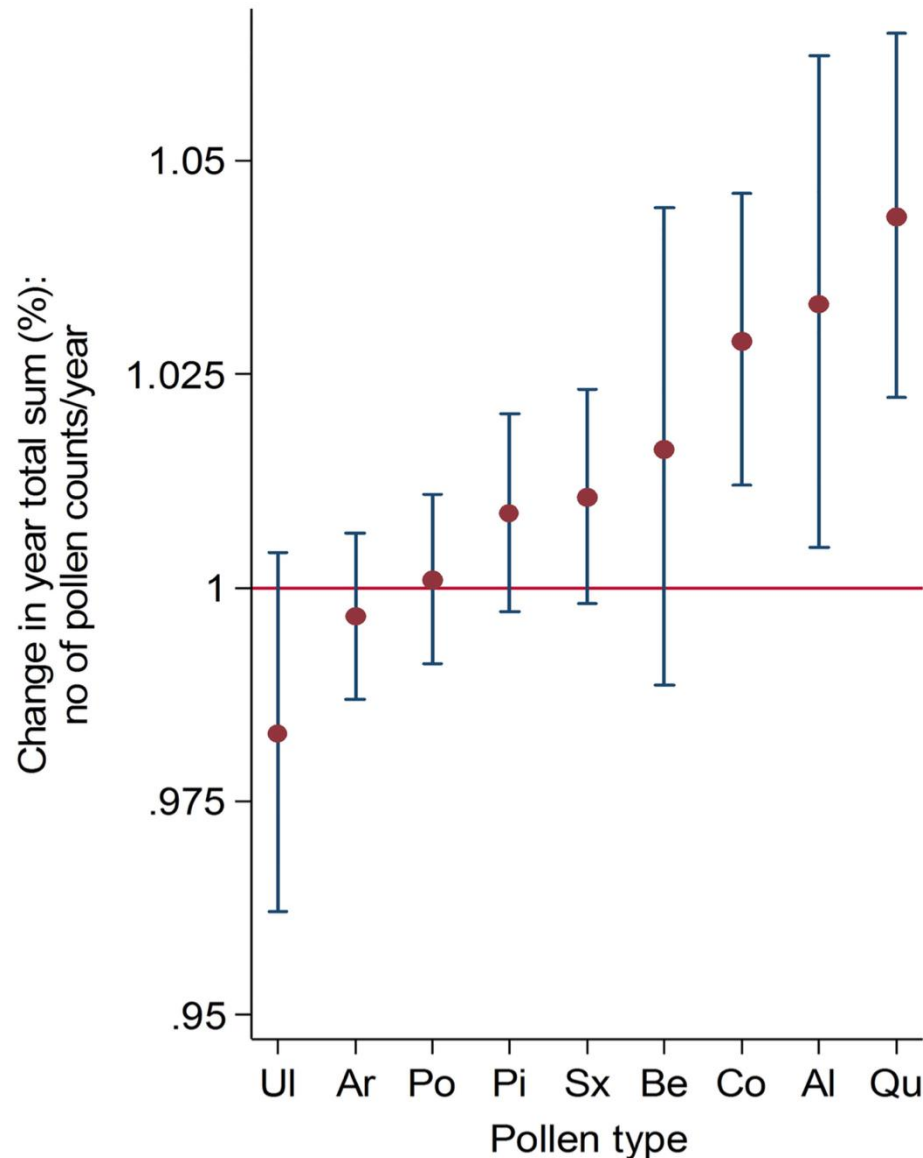
Co = hazel
Qu = oak
Al = alder
UI = elder
Pi = pine
Sx = willow
Be = birch
Po = grass
Ar = Artemisia

Total amount of pollen - measured till today -



More
Pollen 

Less 

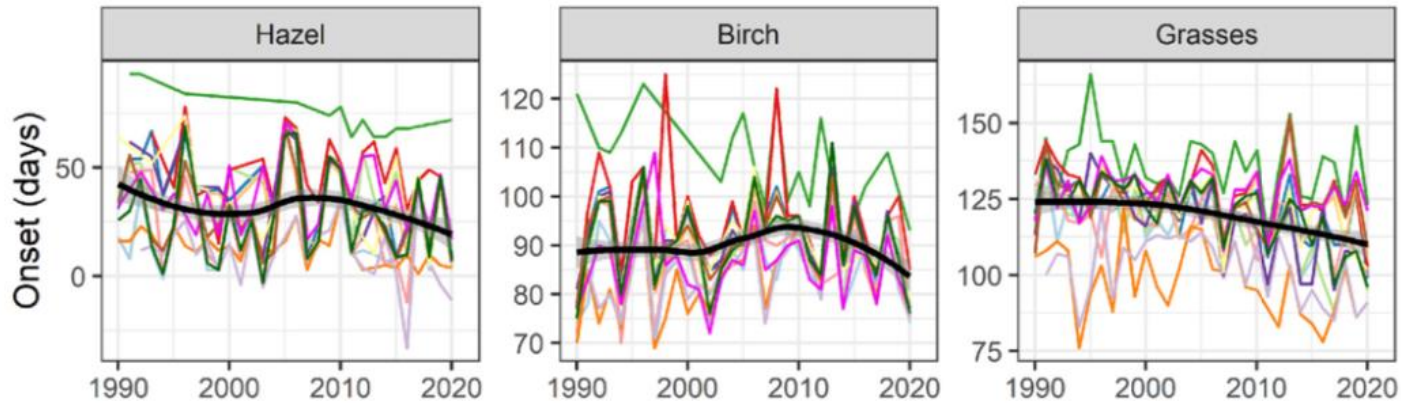


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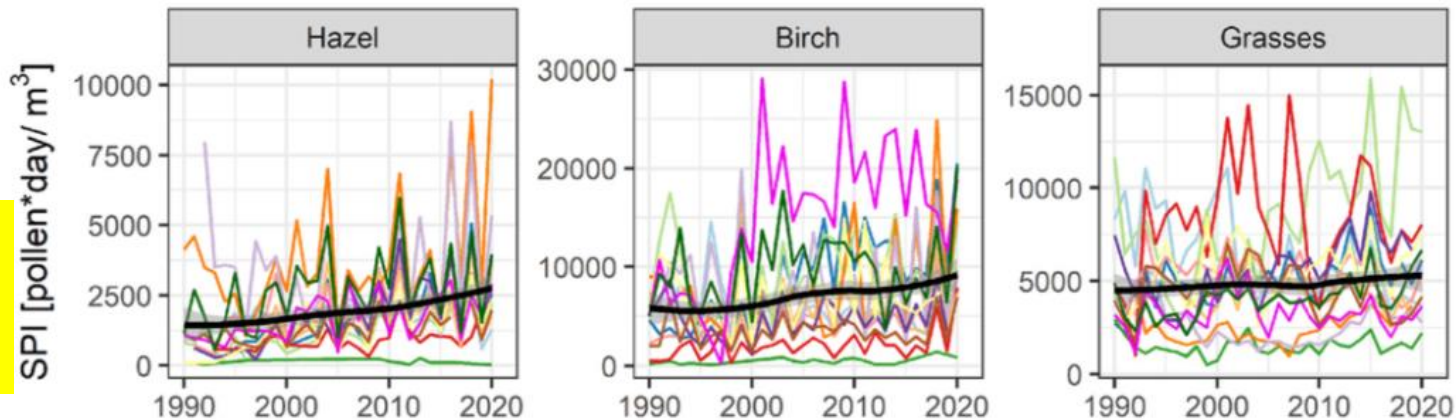
Climate change and pollen season



Start of the pollen season



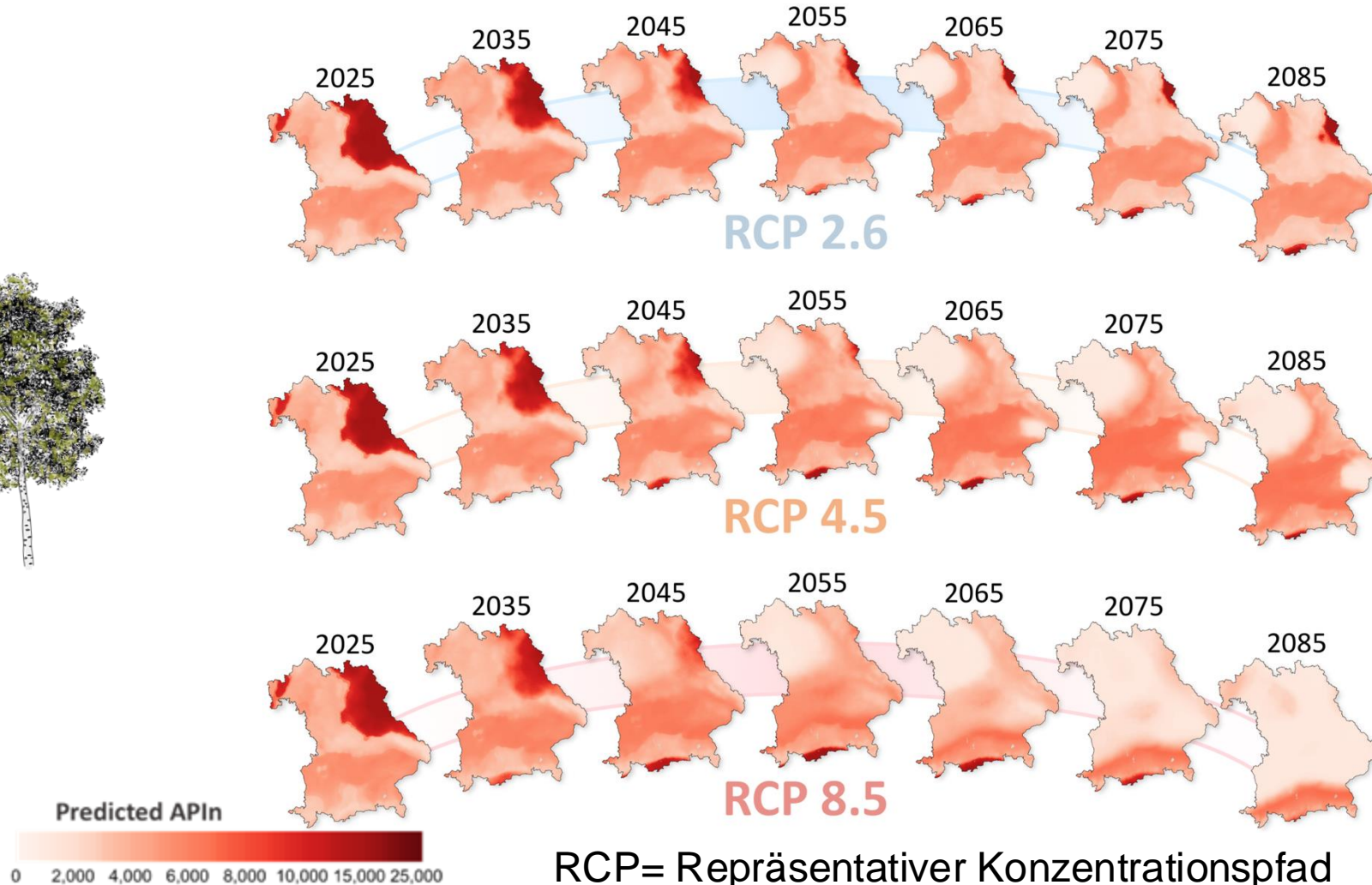
Amount of yearly pollen



- Basel
- Bern
- Buchs
- Davos
- Geneva
- La Chaux de Fonds
- Lausanne
- Locarno
- Lugano
- Luzern
- Muensterlingen
- Neuchatel
- Visp
- Zurich

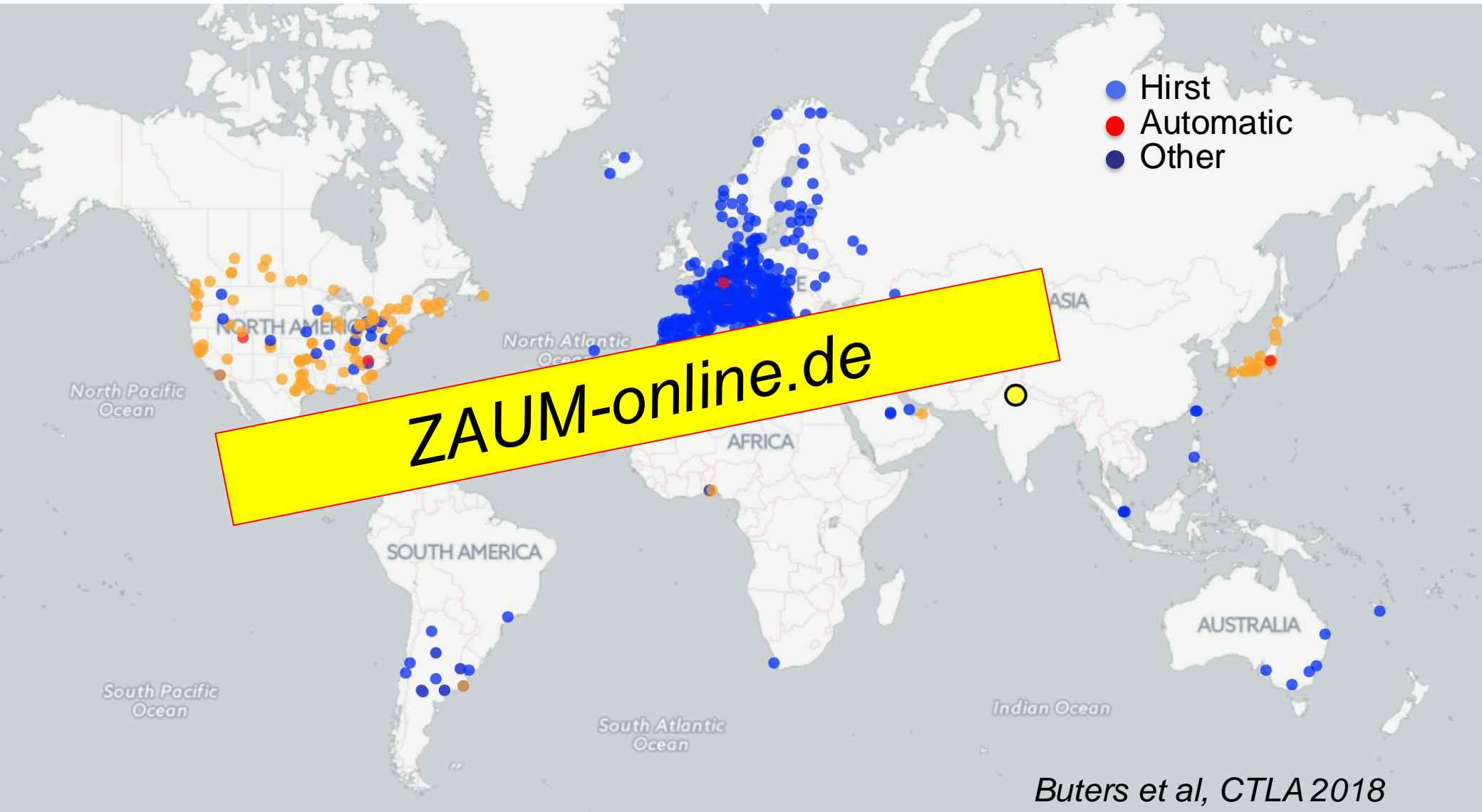
Glick et al.,
STOTEN
2021

Future expected birch pollen flight (modeled)



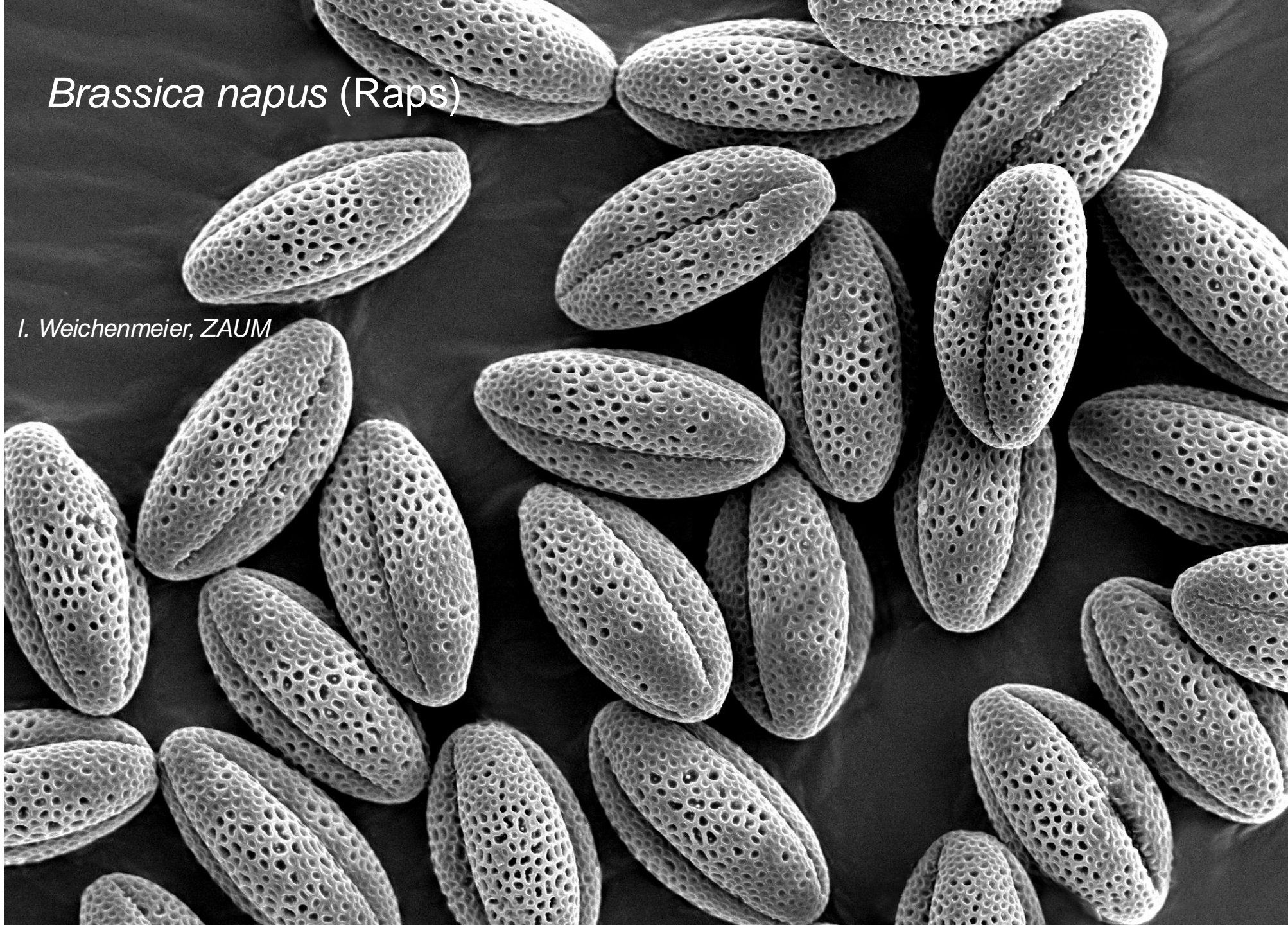
Monitoring Stations in the World

- biological particles, mostly pollen -

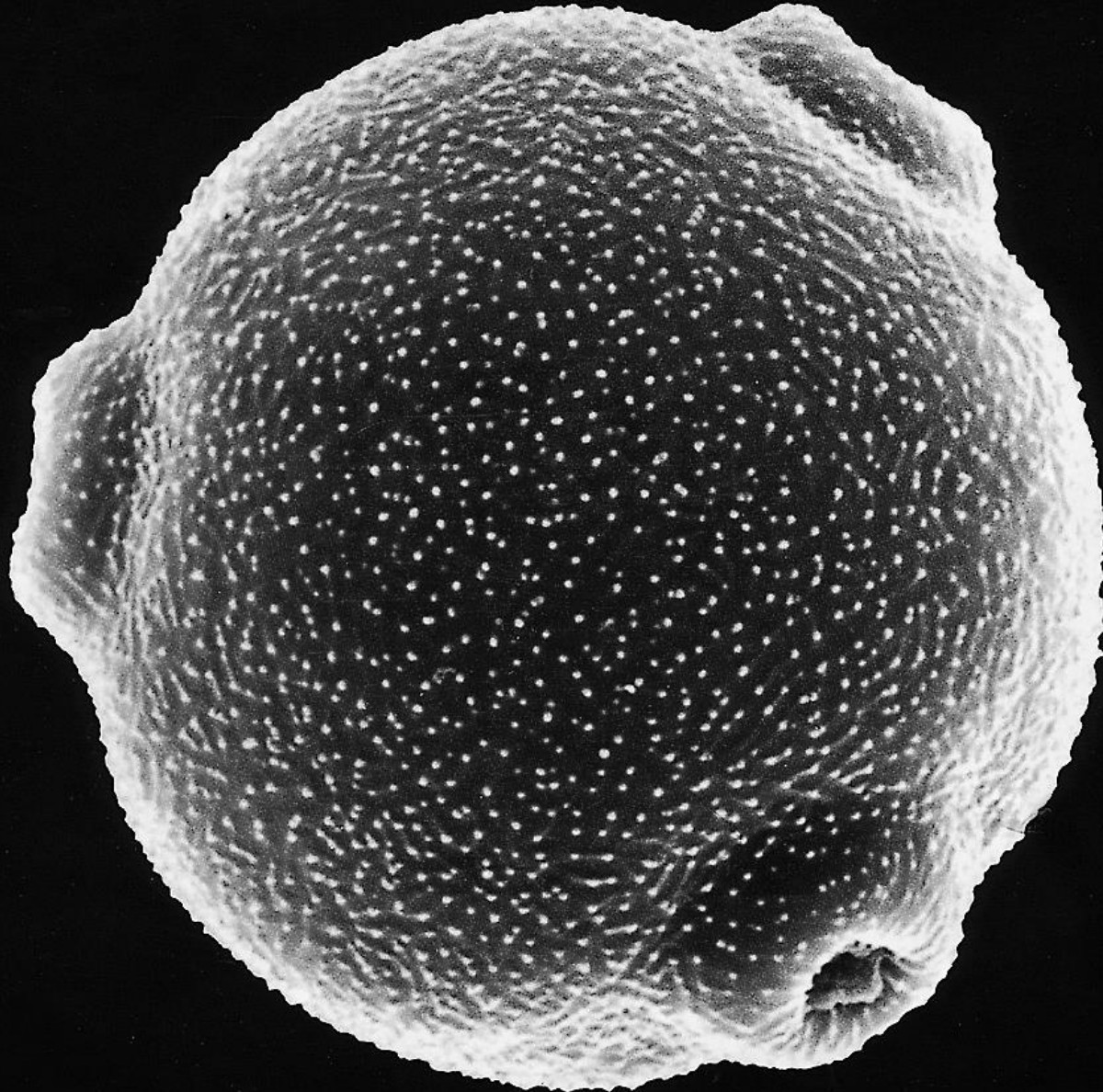


Brassica napus (Raps)

I. Weichenmeier, ZAUM

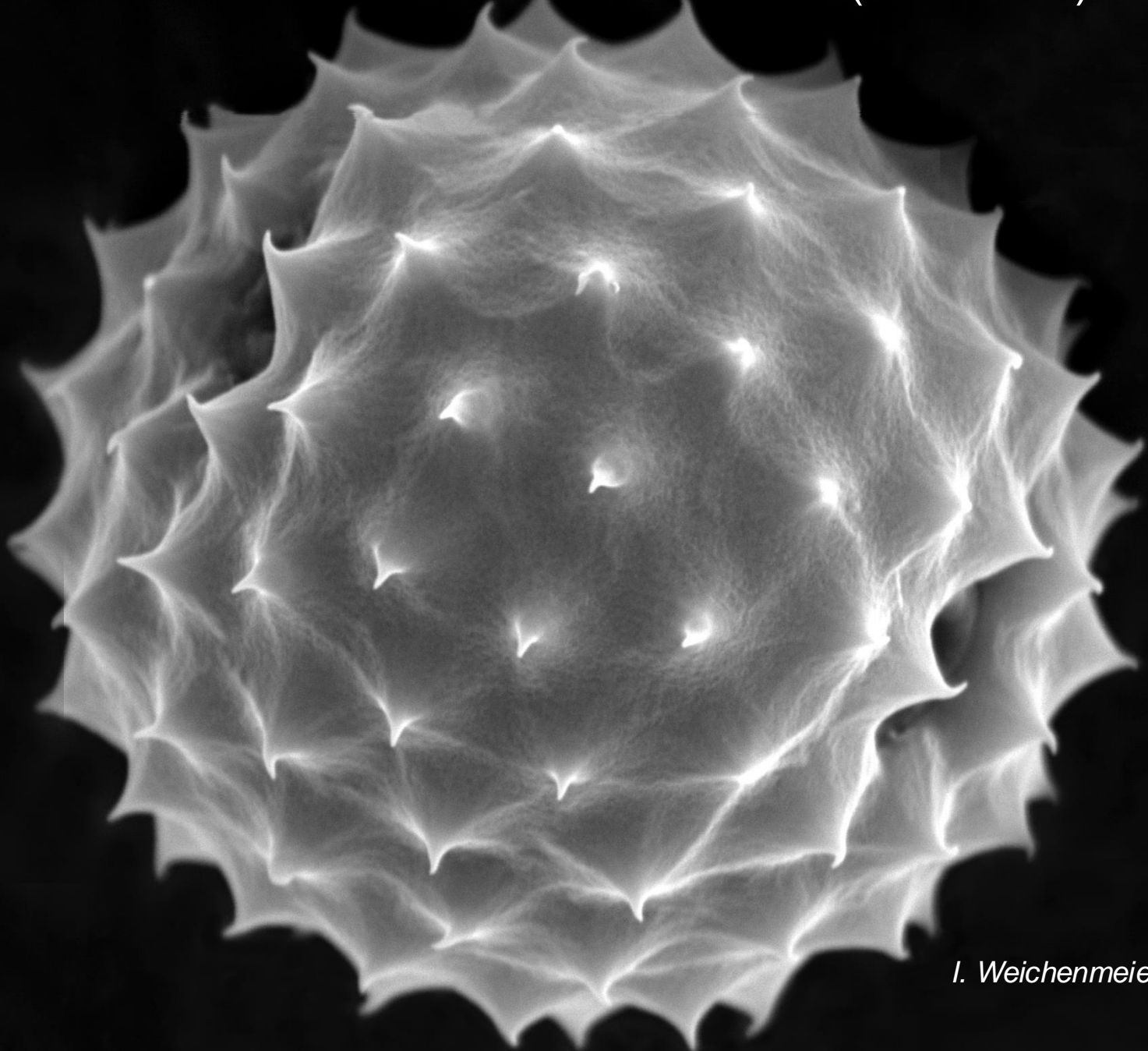


Betula verrucosa (Birke)



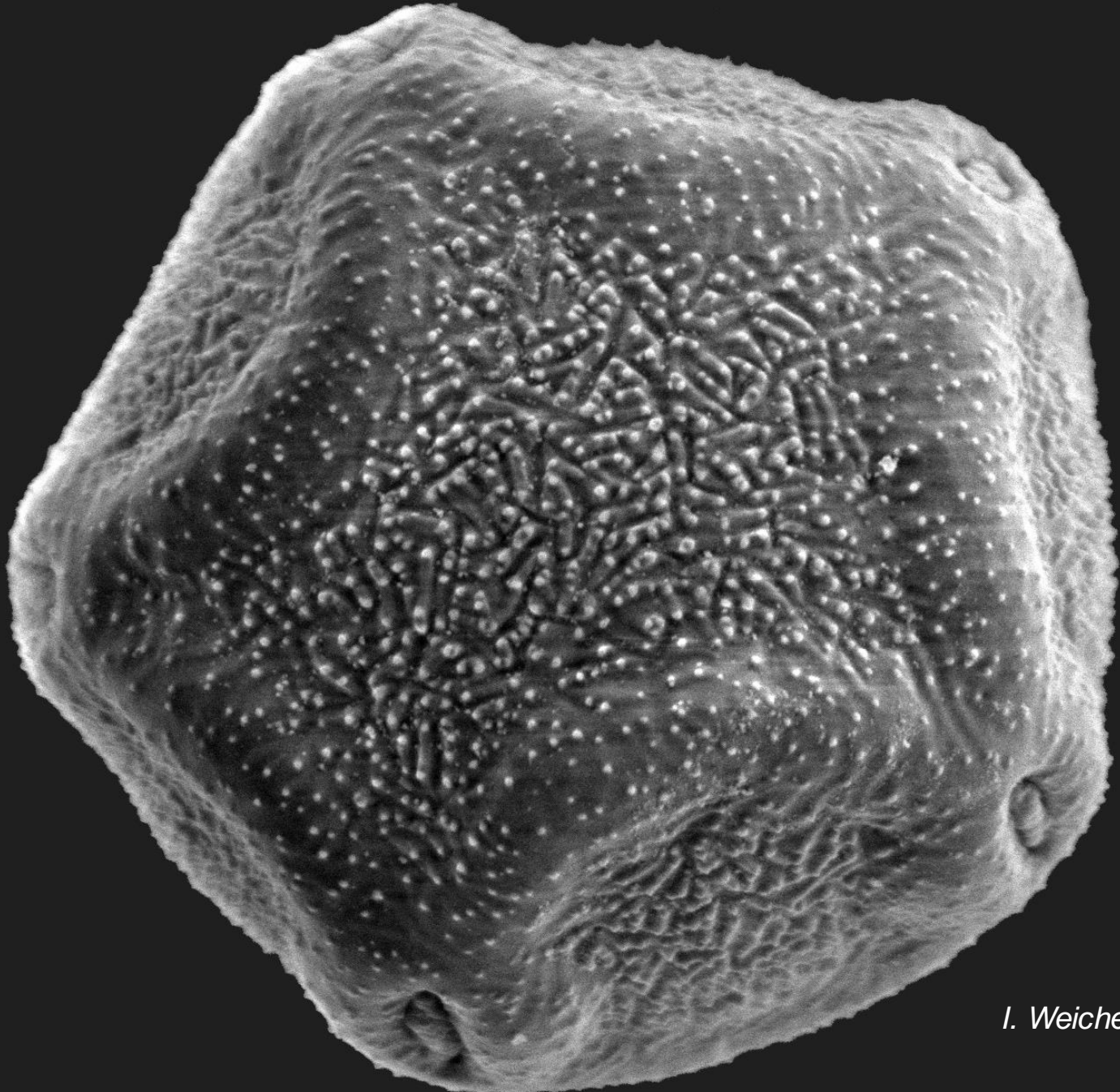
I. Weichenmeier, ZAUM

Ambrosia artemisiifolia (Ambrosia)



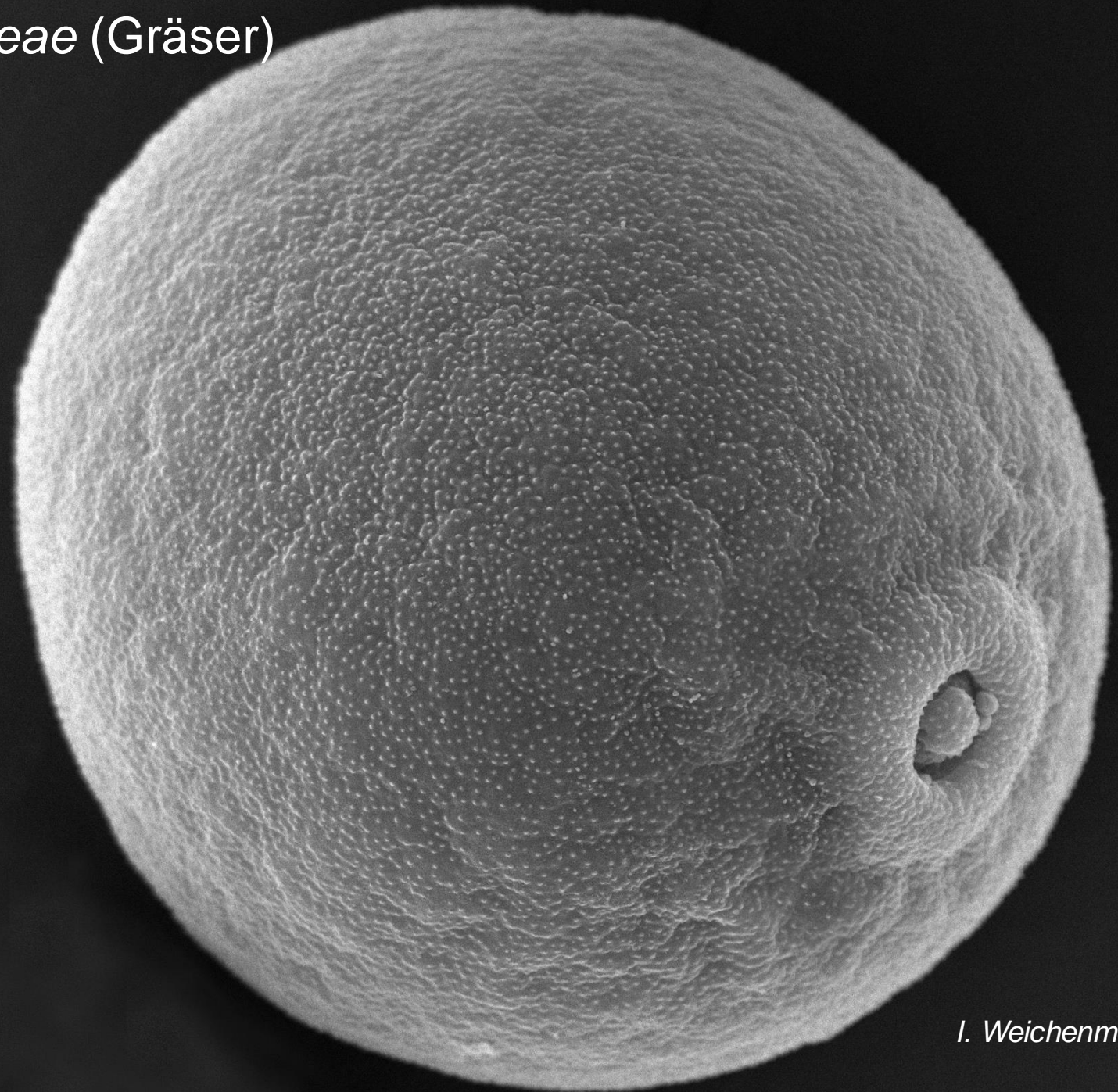
I. Weichenmeier, ZAUM

Platanus (Platane)



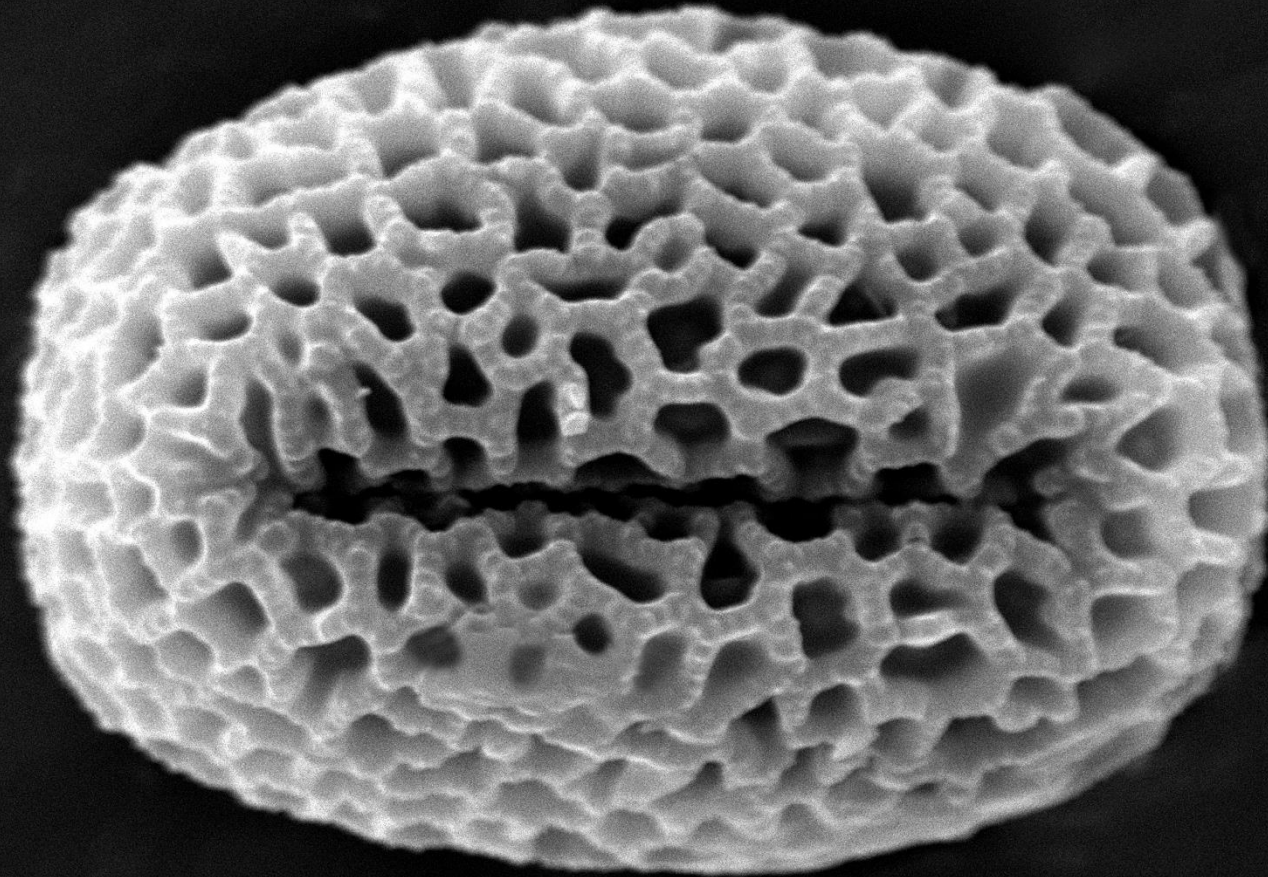
I. Weichenmeier, ZAUM

Poaceae (Gräser)



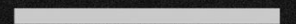
I. Weichenmeier, ZAUM

Olea Europea (Olive)

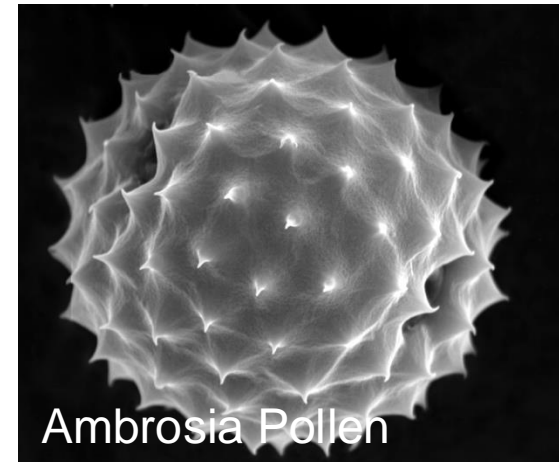
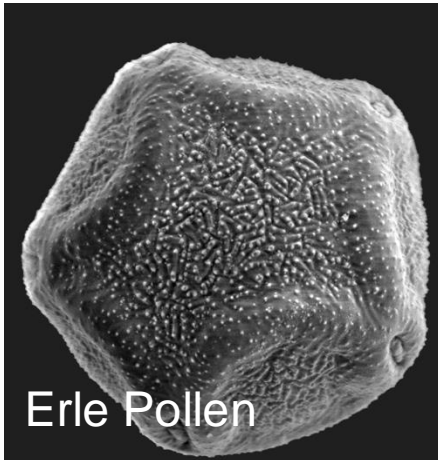


I. Weichenmeier, ZAUM

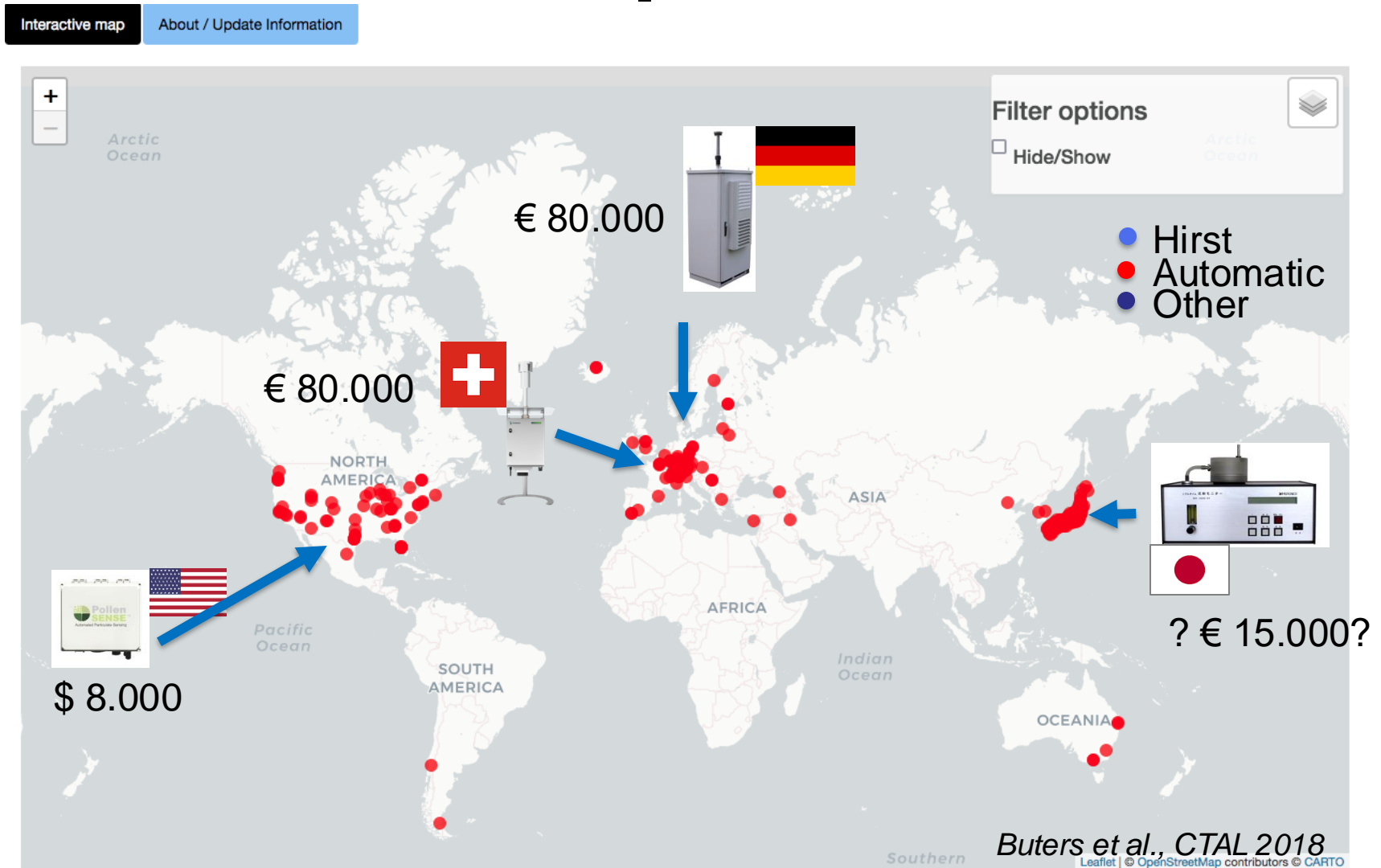
5 μ m



Manuelle Analyse von Pollen mittels Mikroskopie

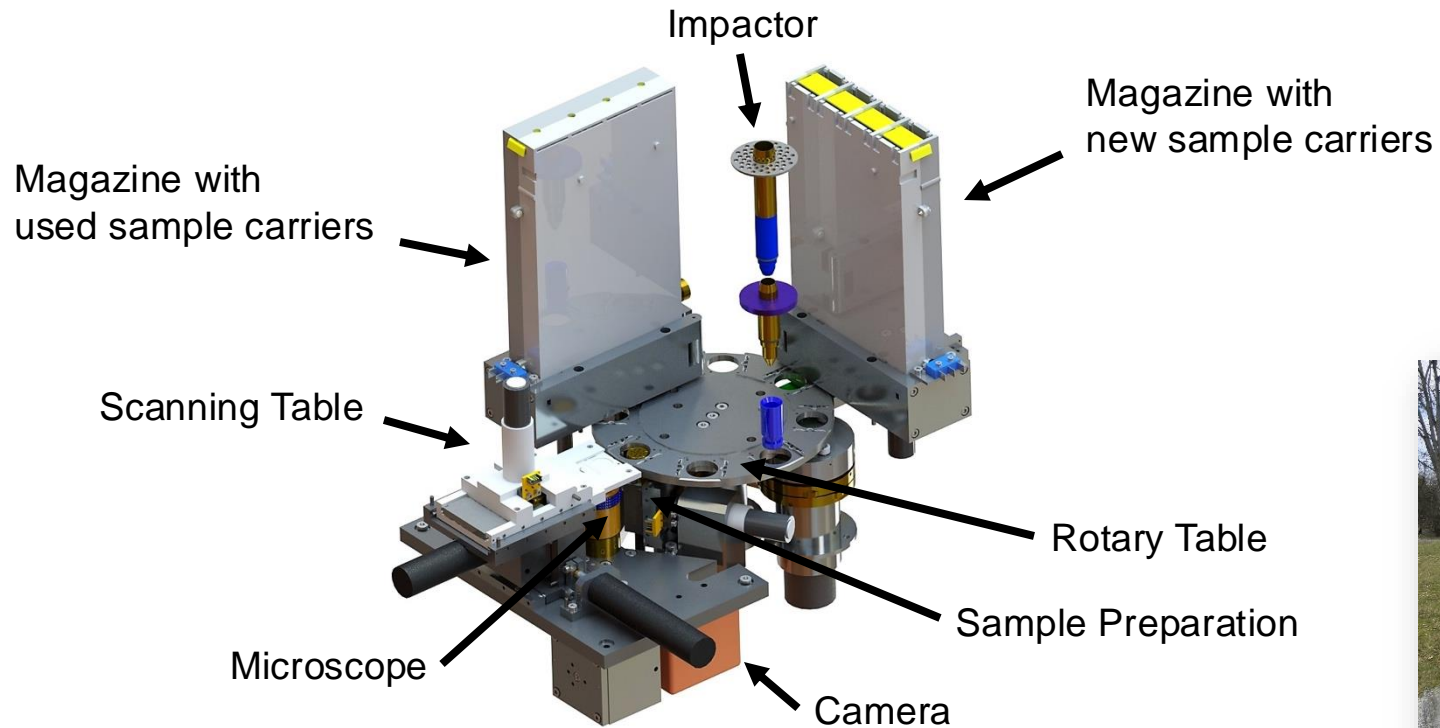


Automatic Pollen-Monitors over the World



Source:; buters, zaum-online.de

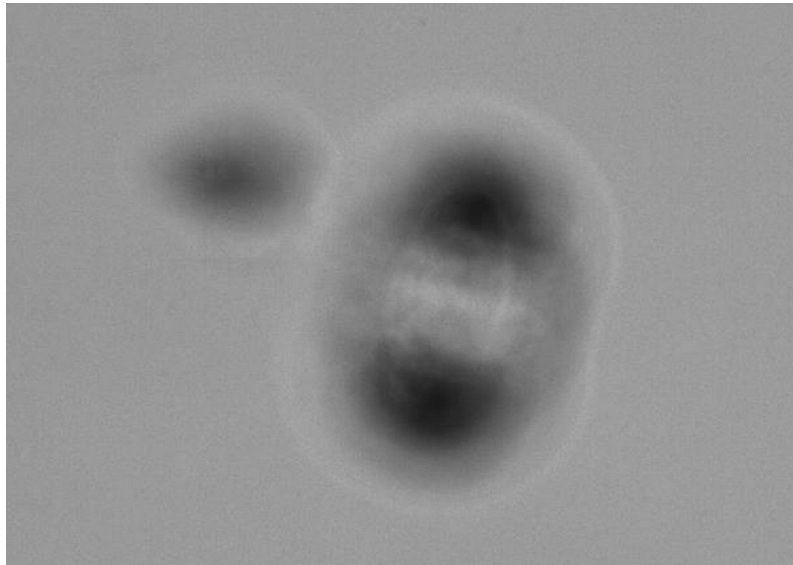
Way of functioning of the Hund POMO (BAA500)



BAA500 Bilder, einem 210-stack zur einem synthetin Bild

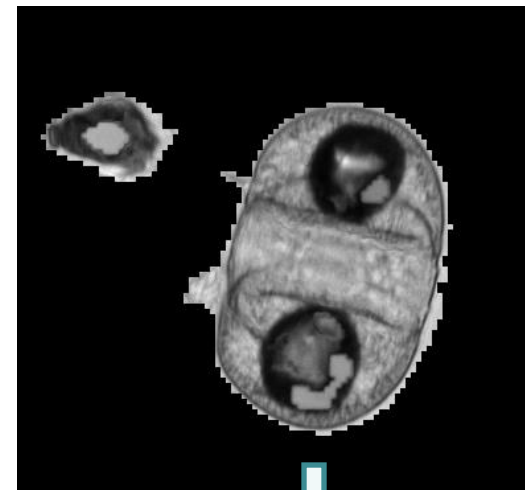


210 Focus Schichten pro Teilchen



Pinien Pollen

1 synthetisches Bild



Identifizierung ← Artificial Intelligence



www.pollenscience.eu Altötting, Germanay

Ort

Altötting

Pollen vorherige auswählen

Schimmel (Fungus), Brennnessel (Urtica), Alternaria (Alternaria), Eiche (Ql)

Zeitraum:

10 Monate

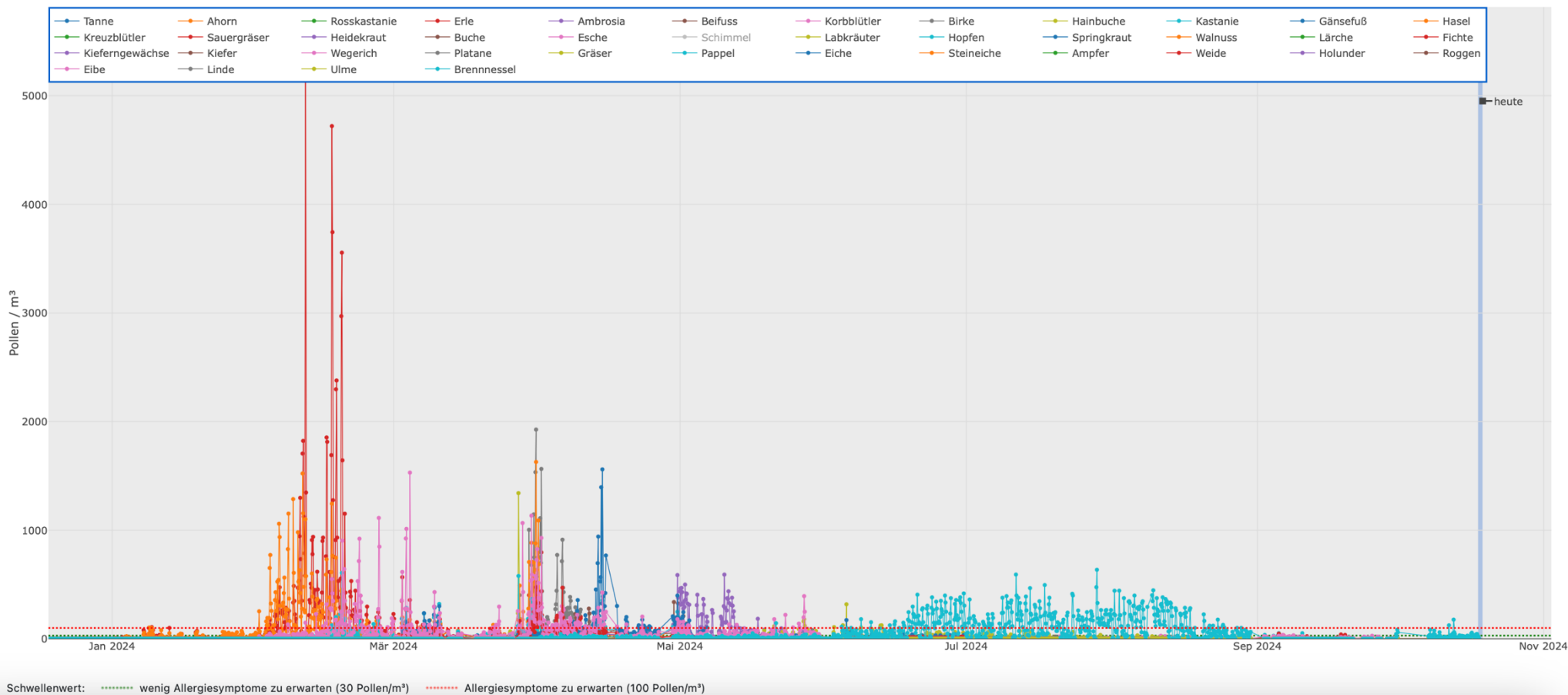
Anzeige

heute

Ausschnitt wählen

Zeitachse verschieben

Ansicht zurücksetzen



www.pollenscience.eu Munich 19 March 2025

location

Pollen [select all](#)

time range:

München Thalkirchner Straße

Mould (Fungus), Alder (Alnus), Hazel (Corylus), Oak (Quercus)

1 month

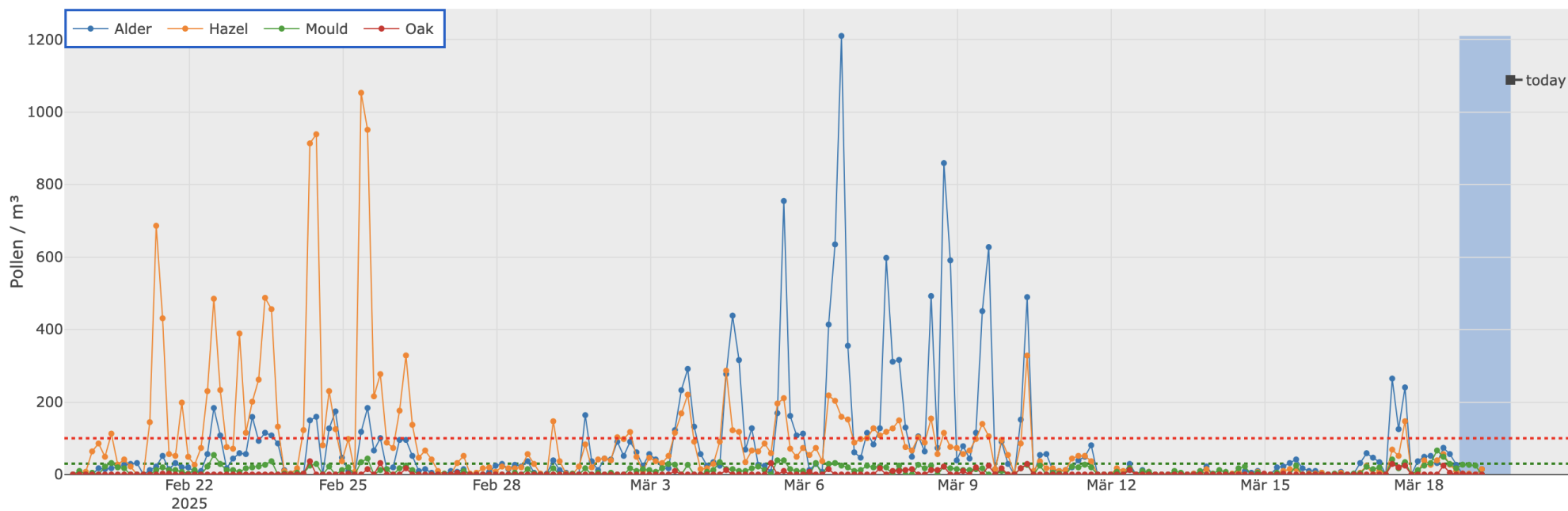
display

today

select area

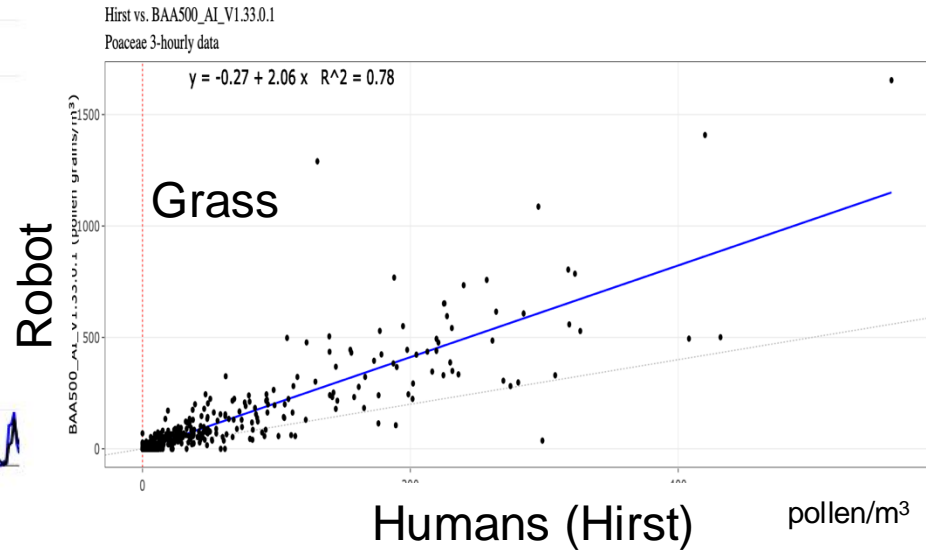
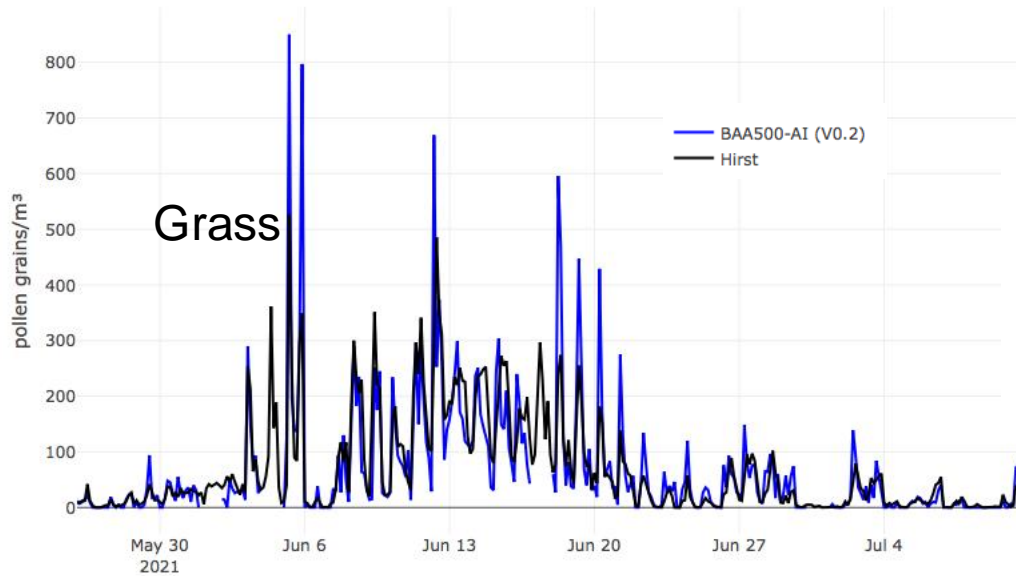
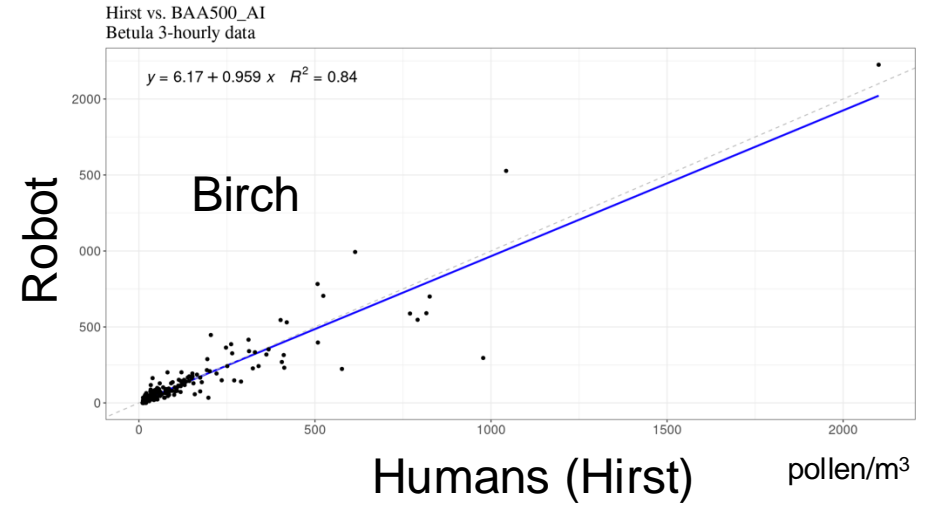
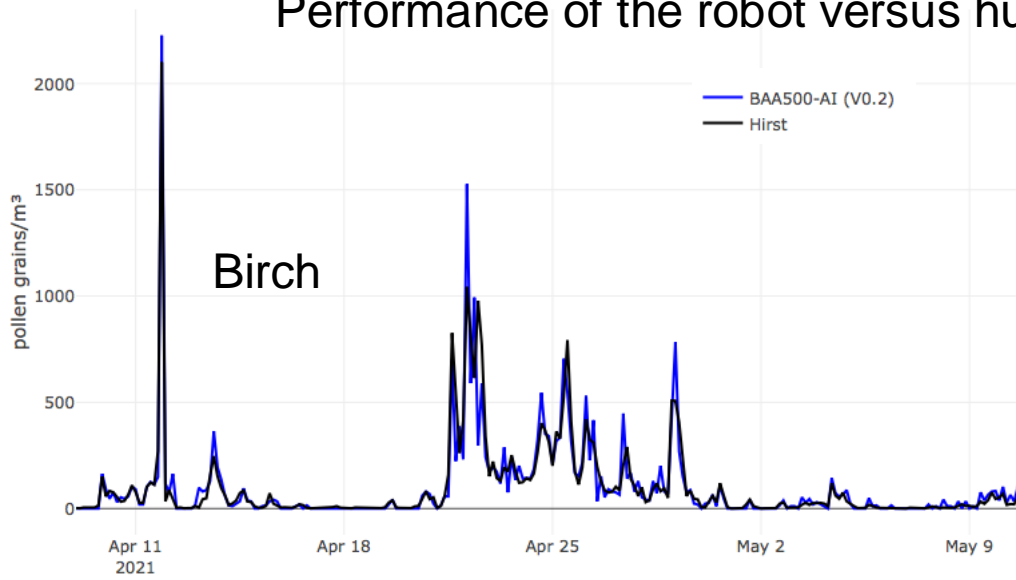
move time axis

reset view



threshold: few allergy symptoms to expect (30 Pollen/m³) allergy symptoms likely (100 Pollen/m³)

Performance of the robot versus humans: birch and grass pollen

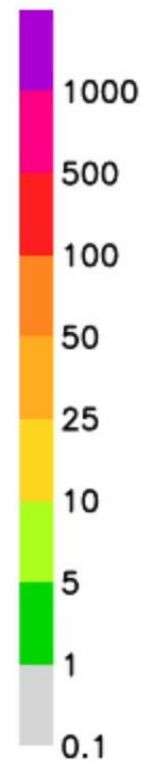
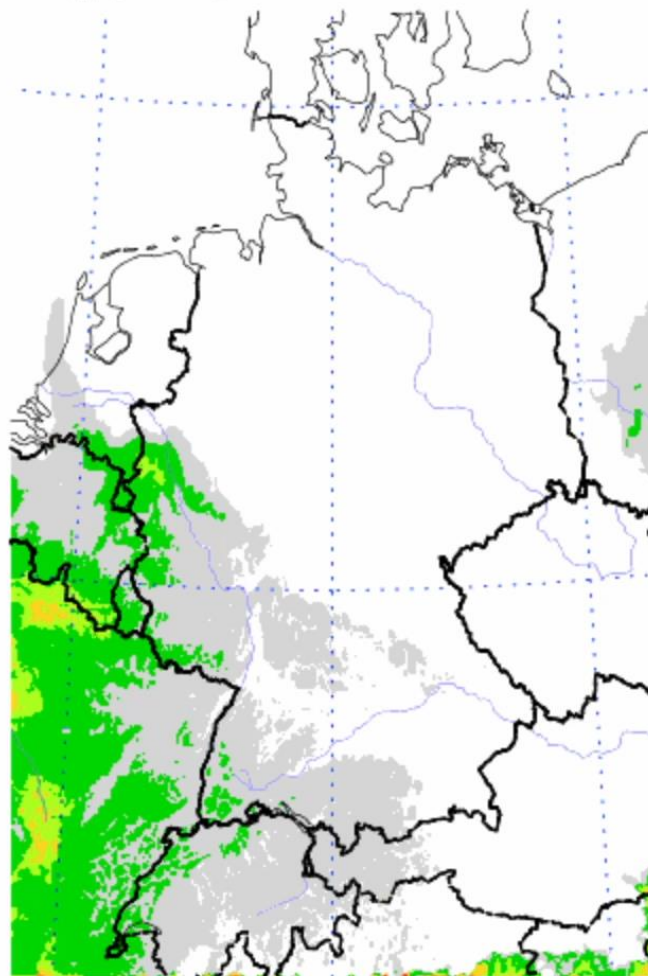


Next steps

- Re-analyse old data with the newest algorithm
- Eliminate false positive pollen counts
- Forecast pollen flight using near real-time data

SILAM model forecast: mugwort pollen (#/m³) 07Z10OCT2023

+0h
+1h
+2h
+3h
+4h
+5h
+6h
+7h
+8h
+9h
+10h
+11h
+12h
+13h
+14h
+15h
+16h
+17h
+18h
+19h
+20h
+21h
+22h
+23h
+24h
+25h
+26h
+27h
+28h
+29h
+30h
+31h
+32h
+33h
+34h
+35h
+36h



Conclusions

- Pollen are now online available
- AI and pollen recognition
 - Make the data transparent (anybody can check)
 - Re-analyse historic data with newer algorithms
 - Make a pollen forecast
- Check what is going on with www.Pollenscience.eu



www.pollenscience.eu

Online pollen count: Pollenscience.eu

13. November 2021



PollenScience.eu

[Aktuelle Daten](#)

[Historische Daten](#)

[Statistik](#)

[Hintergrund & Erläuterungen](#)

[Impressum](#)

[Logou](#)

Ort

Paris

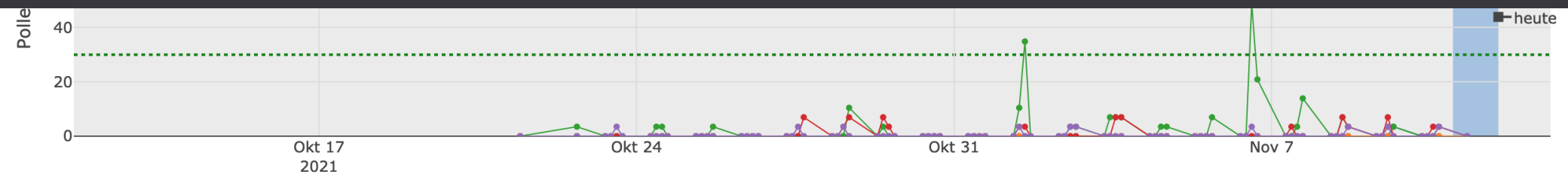
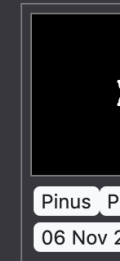
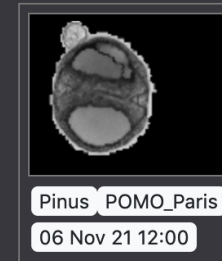
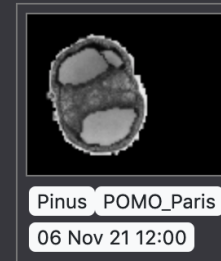
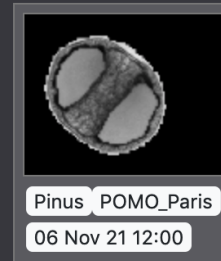
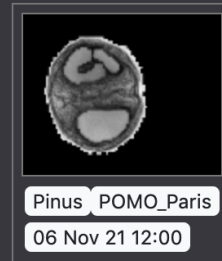
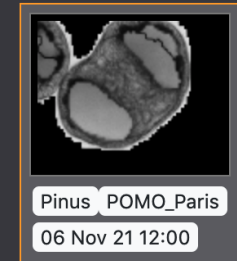
Pollen [\[alle auswählen\]](#)

Schimmel (Fungus), Hasel (Corylus), Kiefer (Pinus), Platane (Platanus), Linde (Tilia)

Device's Classification Pinus

The search result depends on your permissions.

20 results



Schwellenwert: wenig Allergiesymptome zu erwarten (30 Pollen/m³) Allergiesymptome zu erwarten (100 Pollen/m³)