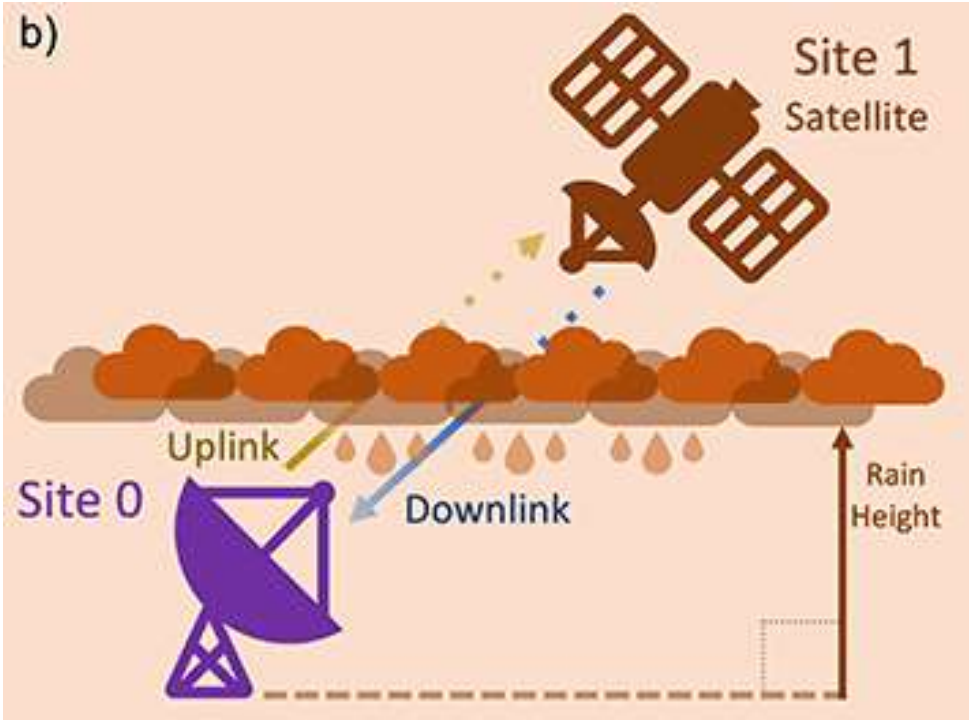
Outlook

- Satellite microwave links
- EUMETNET IoT expert group
- OS and crowdsourcing at DWD

Satellite microwave links

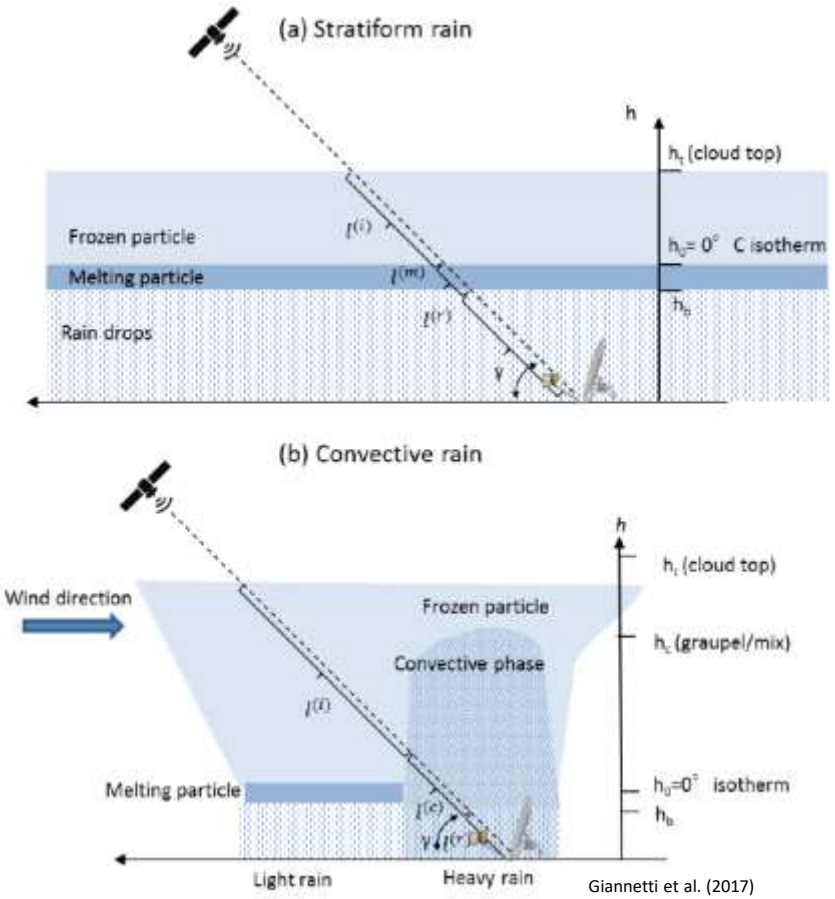
The principle



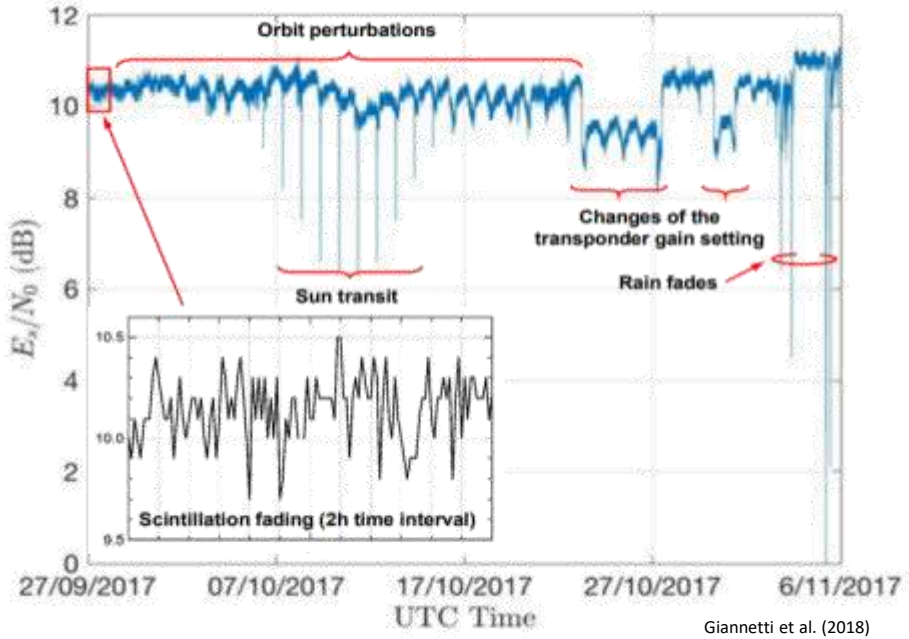
Satellite communication at Ku or Ka band

Giannetti et al. (2017)

Challenges

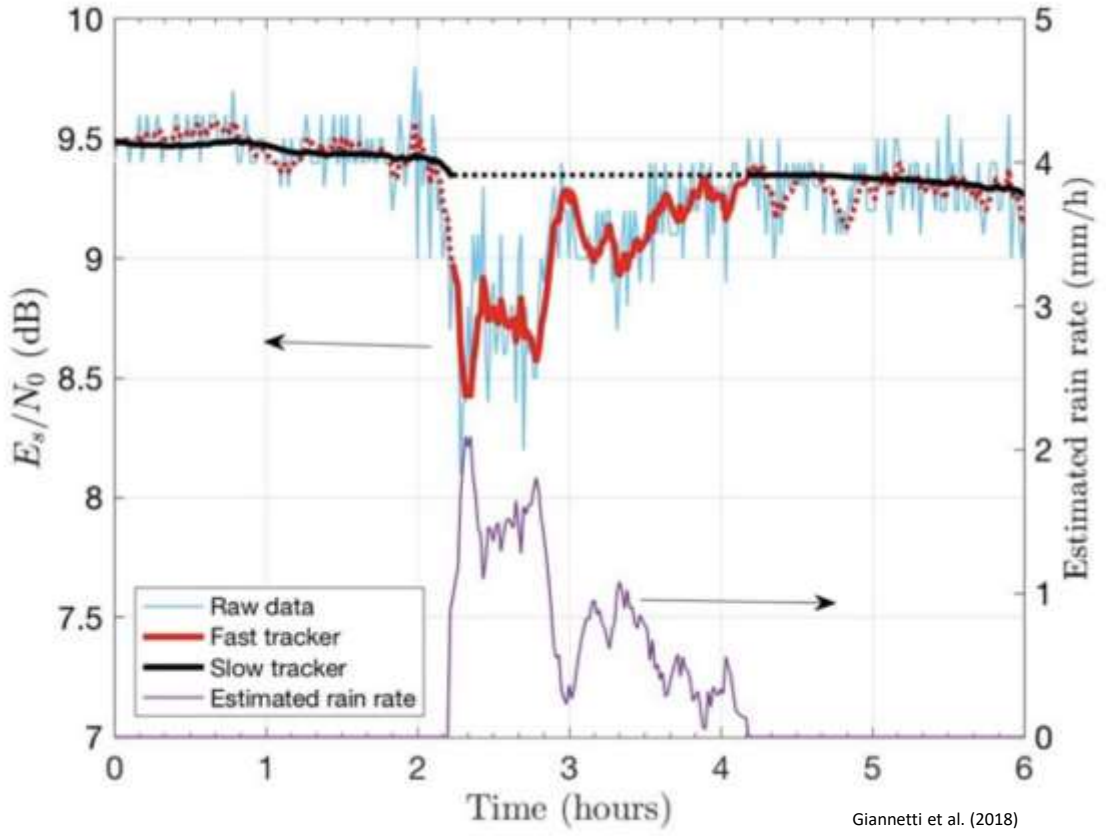


Giannetti et al. (2017)



Giannetti et al. (2018)

Showcase



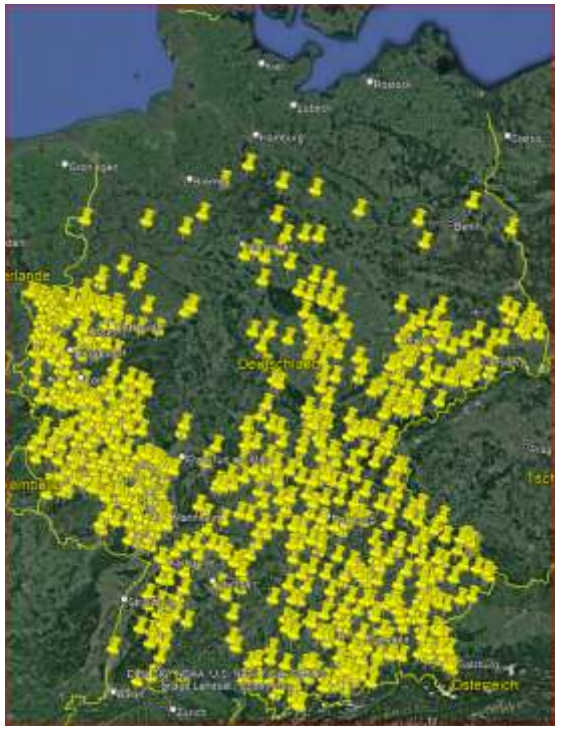
Giannetti et al. (2018)

Crowdsourcing and OS at DWD

Credits to Rafael Posada, DWD

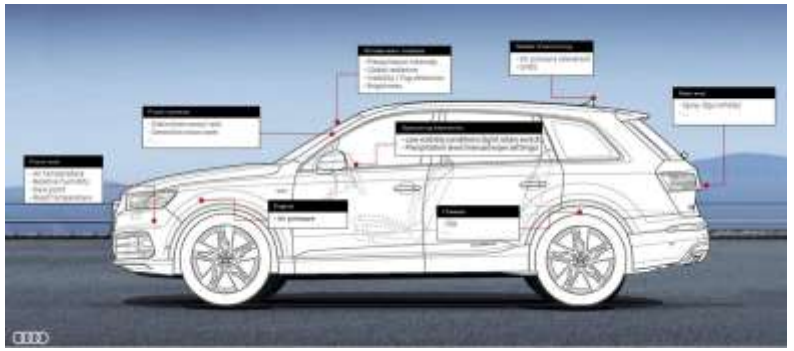
State of the art at DWD

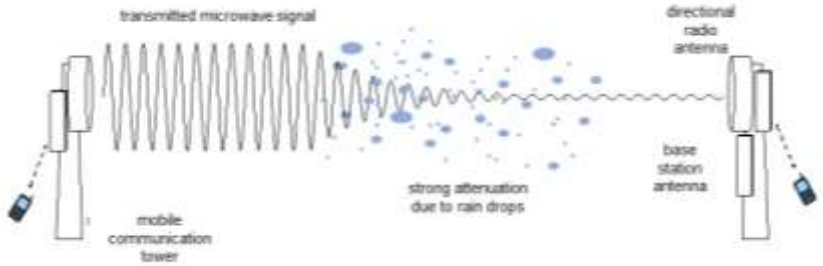
- **Third-party-data**
  - used at DWD (mostly classical synoptical data)
    - Precipitation data of the German federal states
    - Lightening data (company, data purchase)
    - These data are already collected by other organizations
  - not used yet
    - Integration of **PWS** data (company, data purchase) → The executive board's decision is still pending BUT real time data flow from EUMETNET from July on for 6 months
    - Use data from communities/larger cities



Precipitation stations from the German federal states.

State of the art at DWD

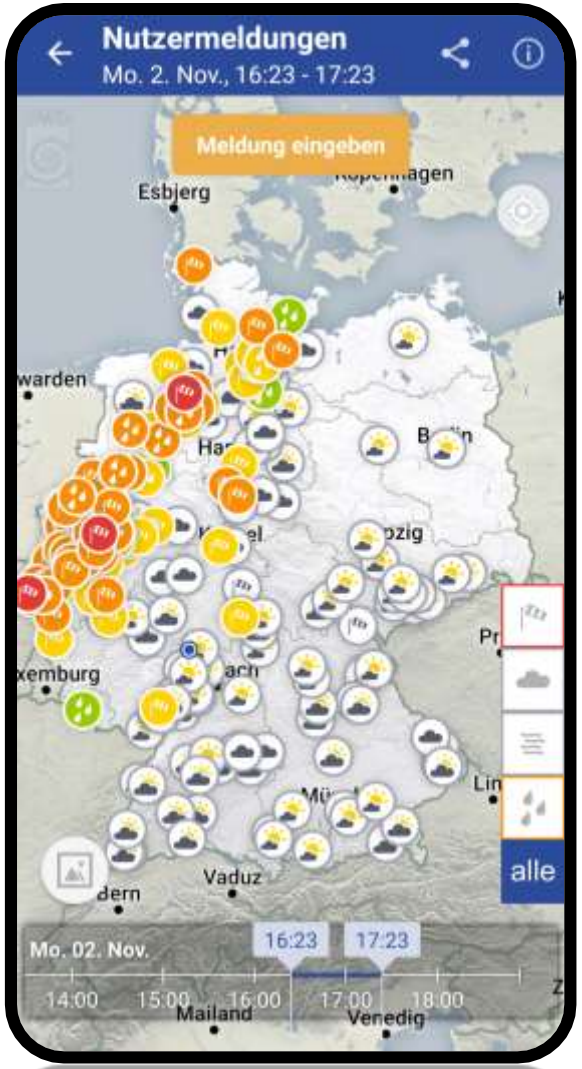




- **Projects**
  - FloWKar (2017-2020)
    - Weather data from road traffic for weather forecasts
    - Netatmo dataset assimilated into ICON-LAM (https://rmets.onlinelibrary.wiley.com/doi/10.1002/qj.4276)
  - HoWa-PRO (2022-2024)
    - Improve early flood warning for small catchment areas
    - Use of commercial microwave links (CMLs) attenuation date to derive rainfall estimates in real time
- **CML**
  - Market surve under way to get offers for CML data, → The executive board's decision is still pending

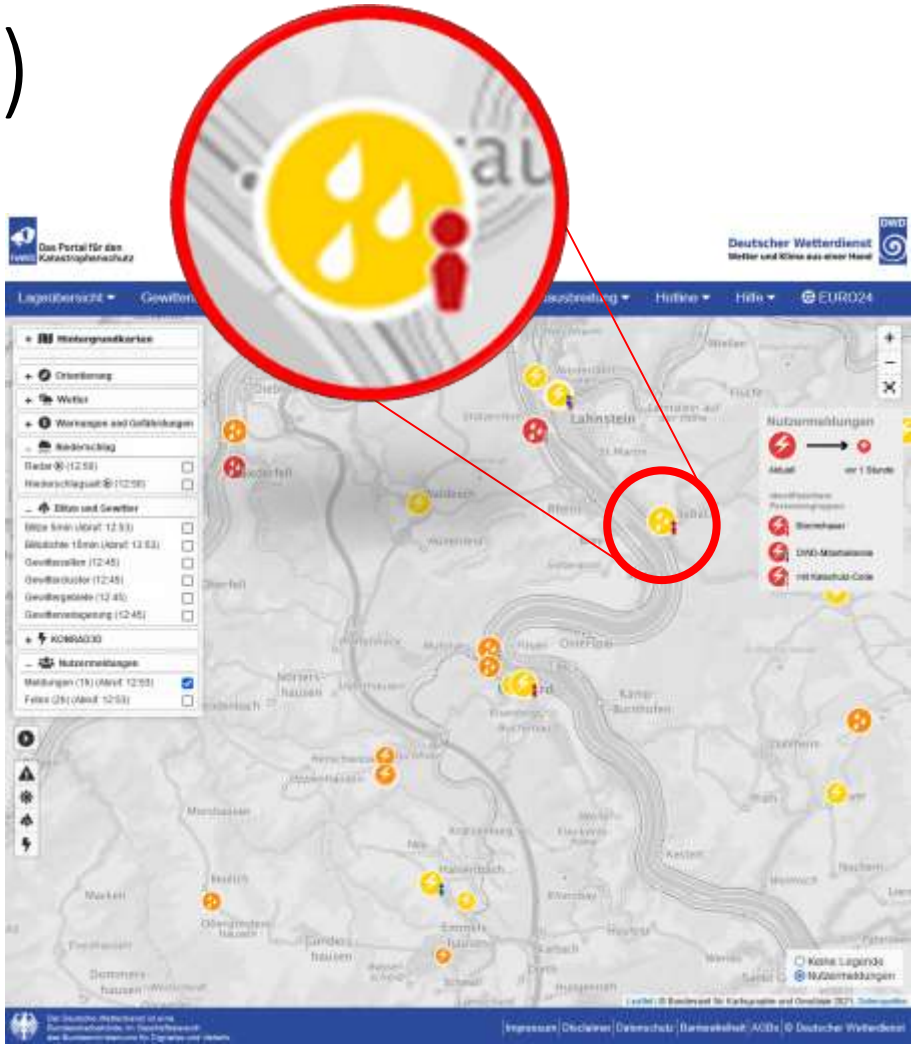
Crowd sourcing (WarnWetter-App)

- **Weather reports**
  - Since July 2020
  - Offer a chance to collect previously unavailable data (e.g. hail)
  - Complement existing synoptic station network by providing meteorological information at ground level at places where no weather station is located
  - 10 standardized meteorological categories
  - Automatic plausibility check
  - Number of reports per day very variable (over 1 Mio/Year)



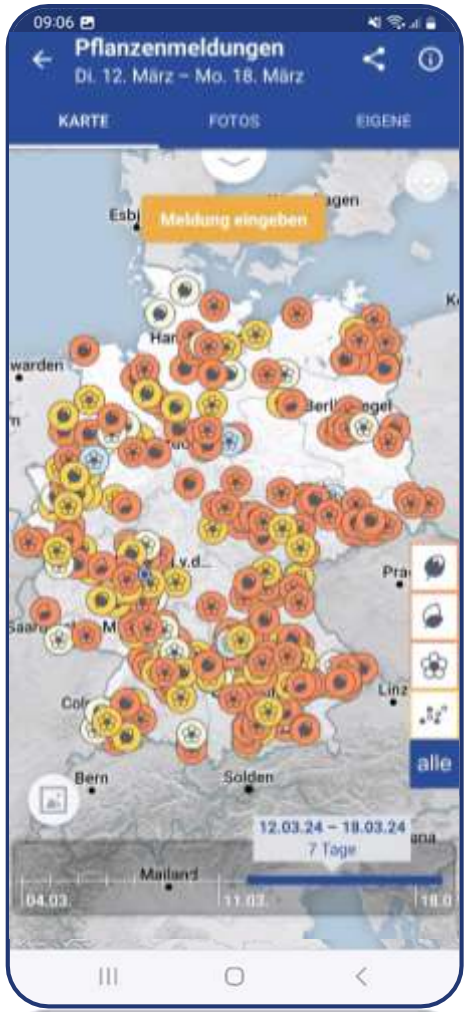
Crowd sourcing (WarnWetter-App)

- **Weather reports**
  - Observations from „qualified users“ are shown to forecasters
  - Used for research (e.g. to verify nowcasting method of DWD, KONRAD3D)
  - No manpower available for working with weather reports
  - Data available online in real time under https://opendata.dwd.de/weather/crowdsourcing



Crowd sourcing (WarnWetter-App)

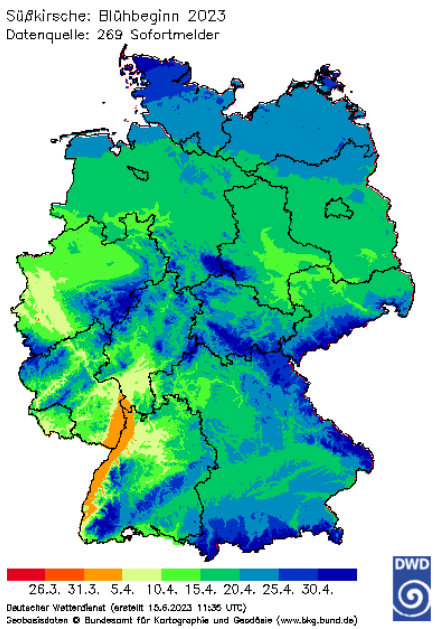
- **Phenological reports**
  - Since March 2023
  - Users provide information about the stage of plant development
  - Compliments stationary network of DWD (volunteer observers)
  - Currently 95 default phases can be reported
  - If possible, a climate categorization is provided
  - Maximum number of reports per day in spring (up to 600)
  - Automatic plausibility check & manual check
  - Number of total reports: 11.500 (2023) / 13.200 (2024)



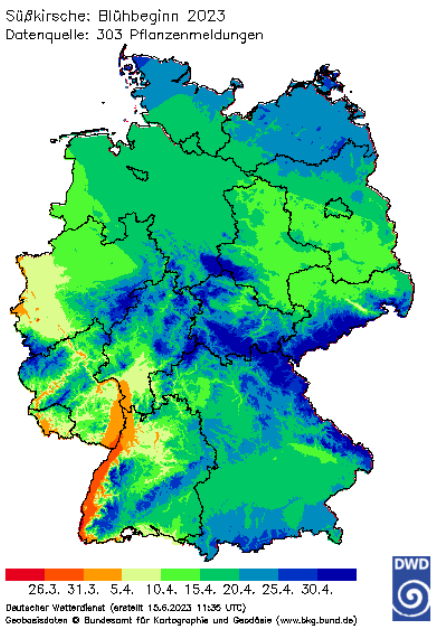
Crowd sourcing (WarnWetter-App)

Start of flowering – sweet cherry (2023)

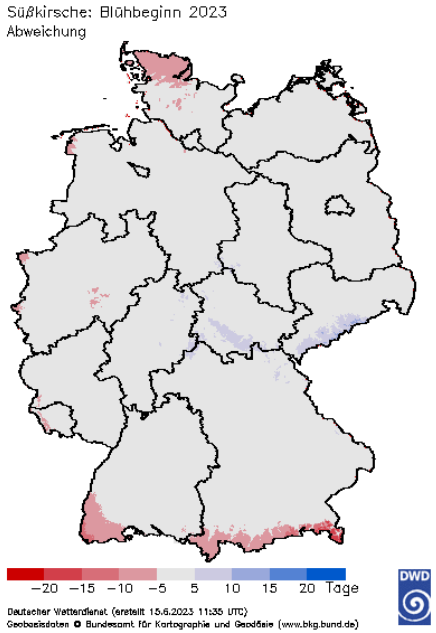
Stacionary observers



Pheno reports

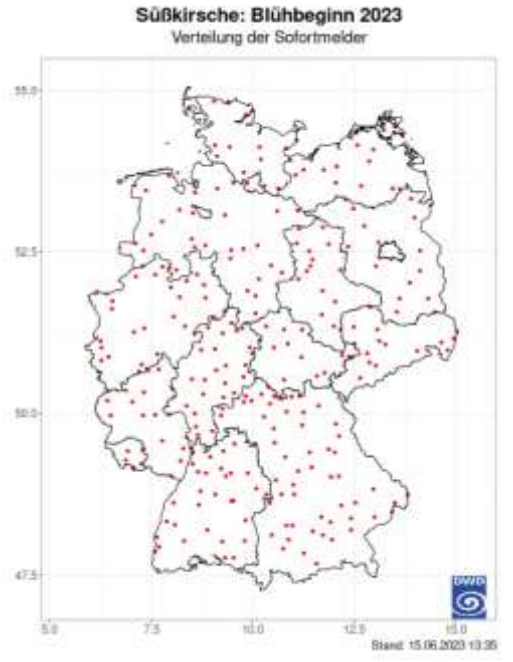


Difference



Pheno reports

Stacionary observers



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