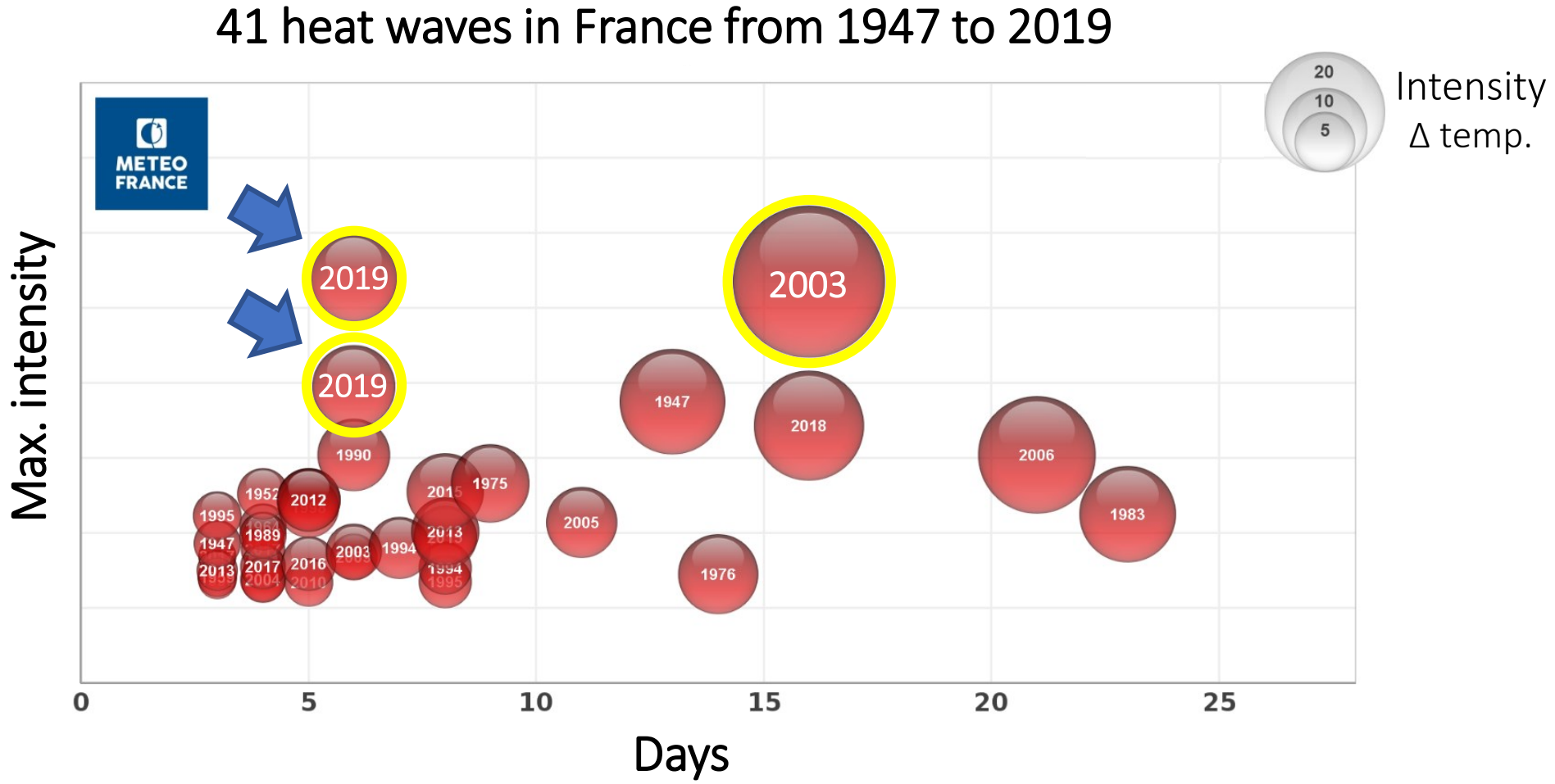
Impact of Heat Wave Episodes in Summer 2019 on the Carbon Flux inferred through modelling from ICOS Ecosystem stations in France

COJIMBRA, P., BUYSSE, P., LOUBET, B., SIMIONI, G., LAFONT, S., BERVEILLER, D., RUFFAULT, J., FLÉCHARD, C. R., MARTIN-ST-PAUL, N., BORNET, F., BRUT, A., CALVET, J-F., CHIPEAUX, C., CUNTZ, M., DARSONVILLE, O., DELPIERRE, N., DUFRÊNE, E., GALY, C., GOGO, S., JACOTOT, A., KLUMPP, K., LÉONARD, J., LILY, J-B., LIMOUSIN, J-M., LOUSTAU, D., MARLOIE, O., OURCIVAL, J-M, TALLEC, T., VOISIN, D., ZAWILSKI, B.

AGU Fall Meeting – 13/12/2021

Context

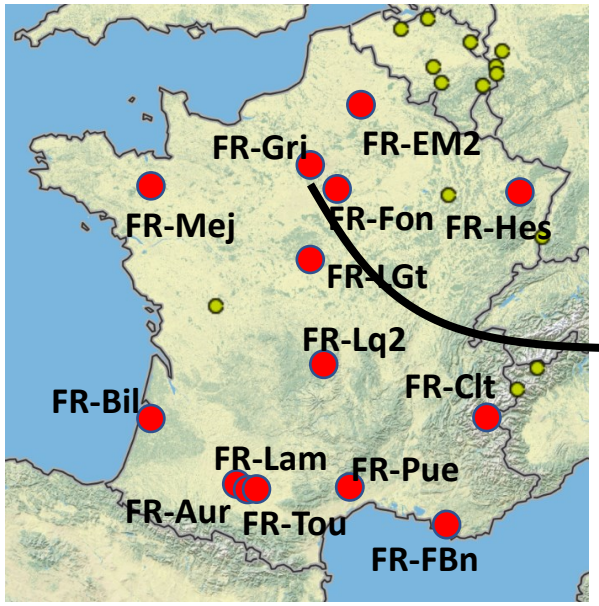
2019 short episodes with high anomaly



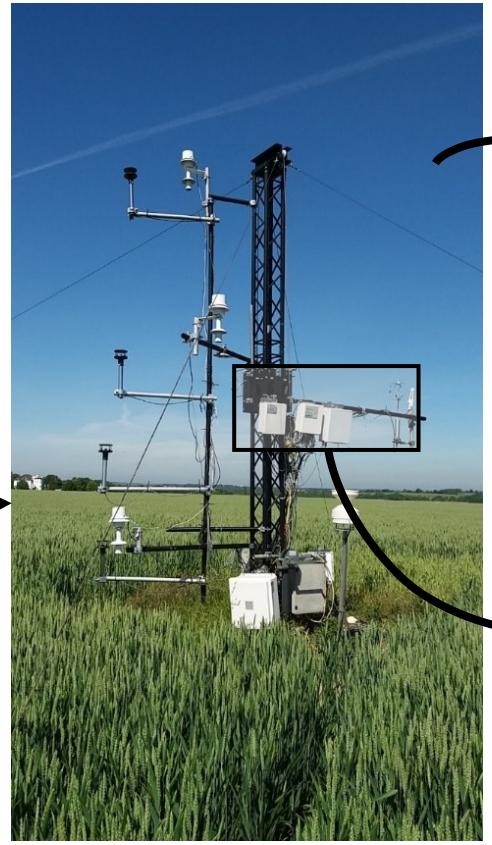
Material & Methods

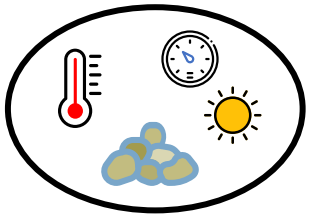
Observation Sites

ICOS National Network France



2004 – 2020





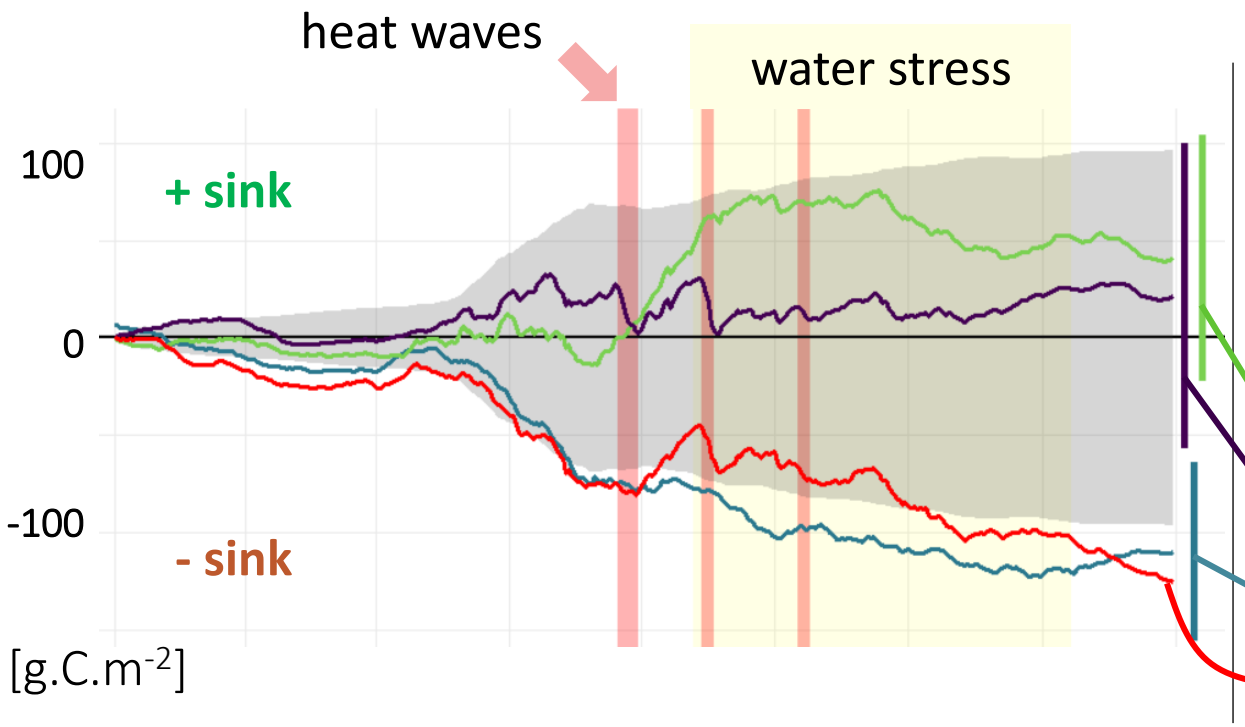
CO_2 flux

CO_2 concentration

vertical wind speed

All icons: flaticon.com

Approach
Observation versus references



- 2019, Barbeau, DBF, Paris region;
- Cumulated CO2 flux subtracted from historical average (AVG - FLUX ± RMSE);
- Heat wave impact by 3 indicators;

Photosynthesis and respiration model
Linear Regression (T, PAR, SWC, VPD)
Autoregressive
Observation

All icons: flaticon.com

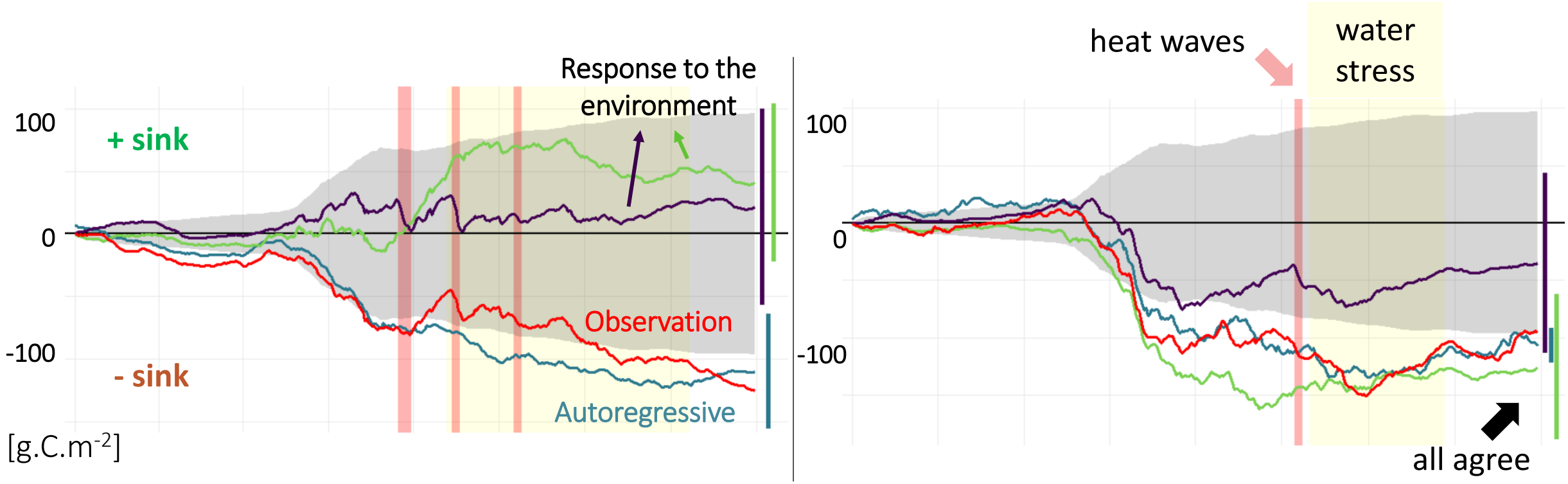
Year-cumulated CO_2 Flux: AVG - FLUX

Barbeau
Paris region

atypical
2019

×

typical behaviour
2016



It allows spotting years of anomaly.

All icons: flaticon.com

Comparison between two forest sites

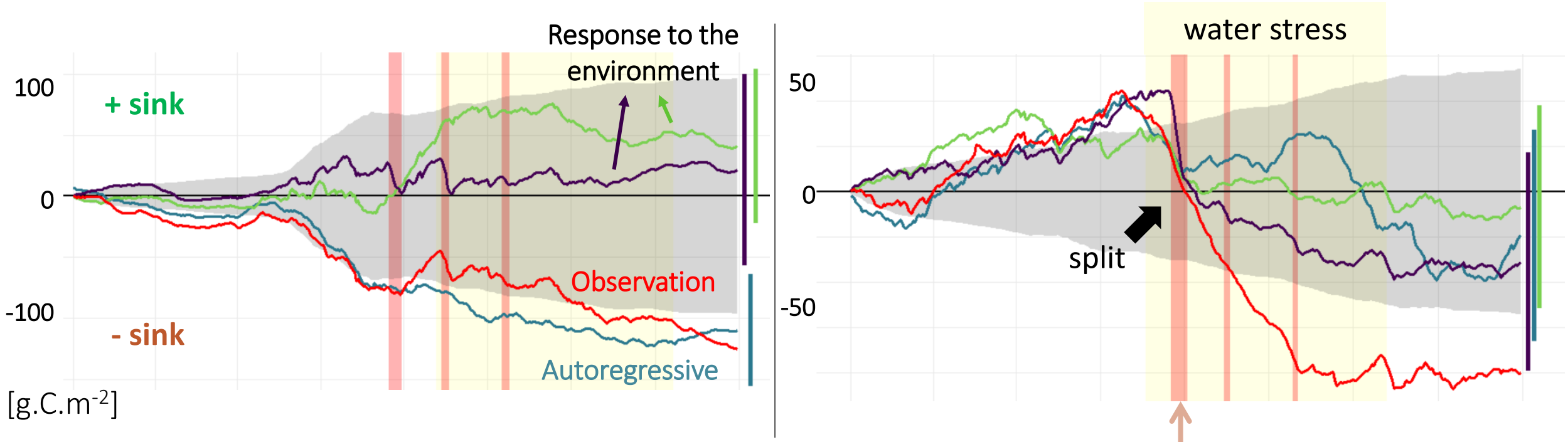
Barbeau
Paris region

DBF

2019

ENF

Font-Blanche
South



It suggests a change in behaviour after heat wave.

All icons: flaticon.com

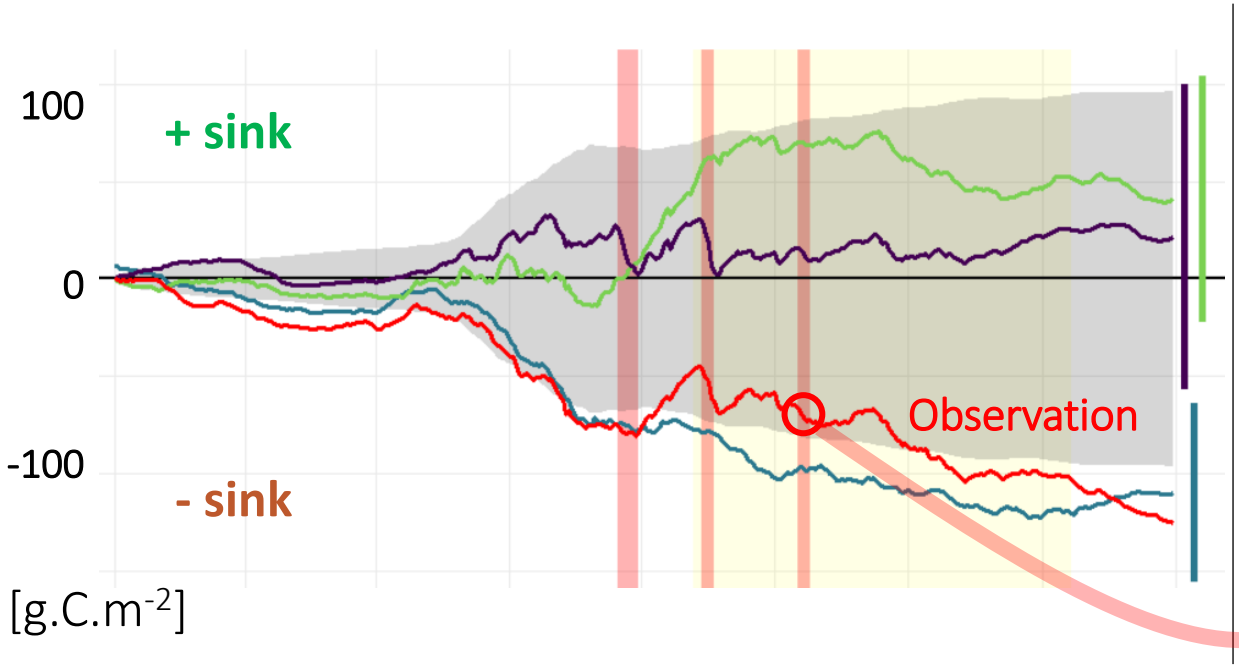
Flux variation on a day

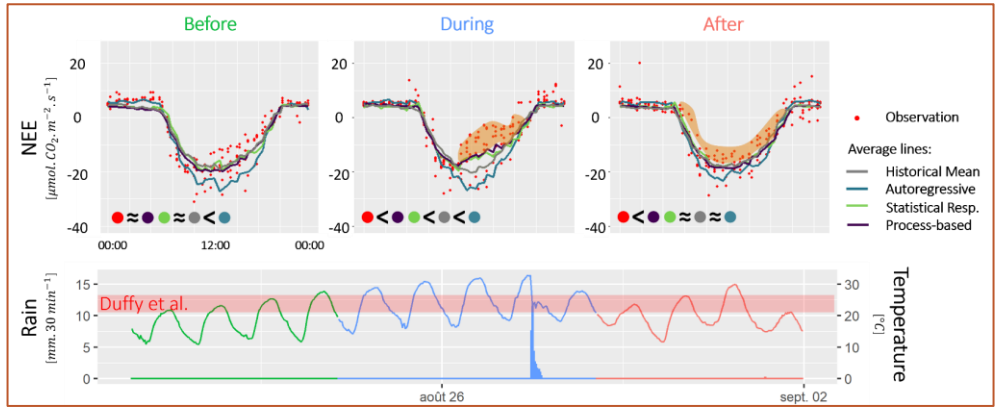
Barbeau
Paris region

year
2019

×

day
before x during x after





It allows to identify processes, e.g. stomata closure.

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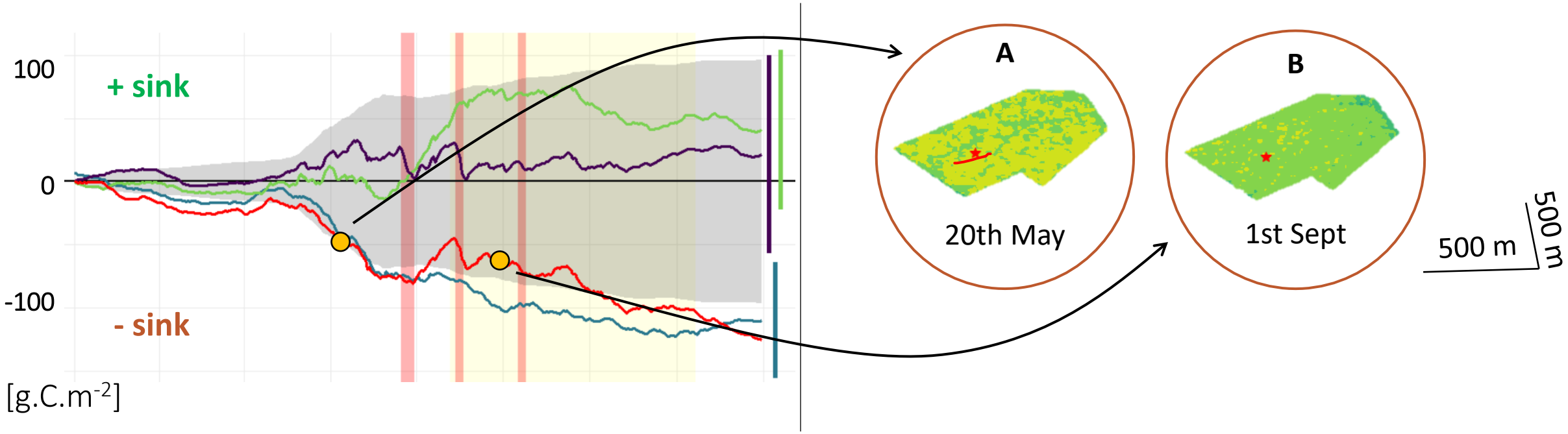
Perspectives

Barbeau
Paris region

observation
in loco

×

satellite ?
NDVI ?



Indicators can become more robust.

All icons: flaticon.com

Thank you

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