

living planet symposium | BONN

23–27 May
2022

TAKING THE PULSE
OF OUR PLANET FROM SPACE

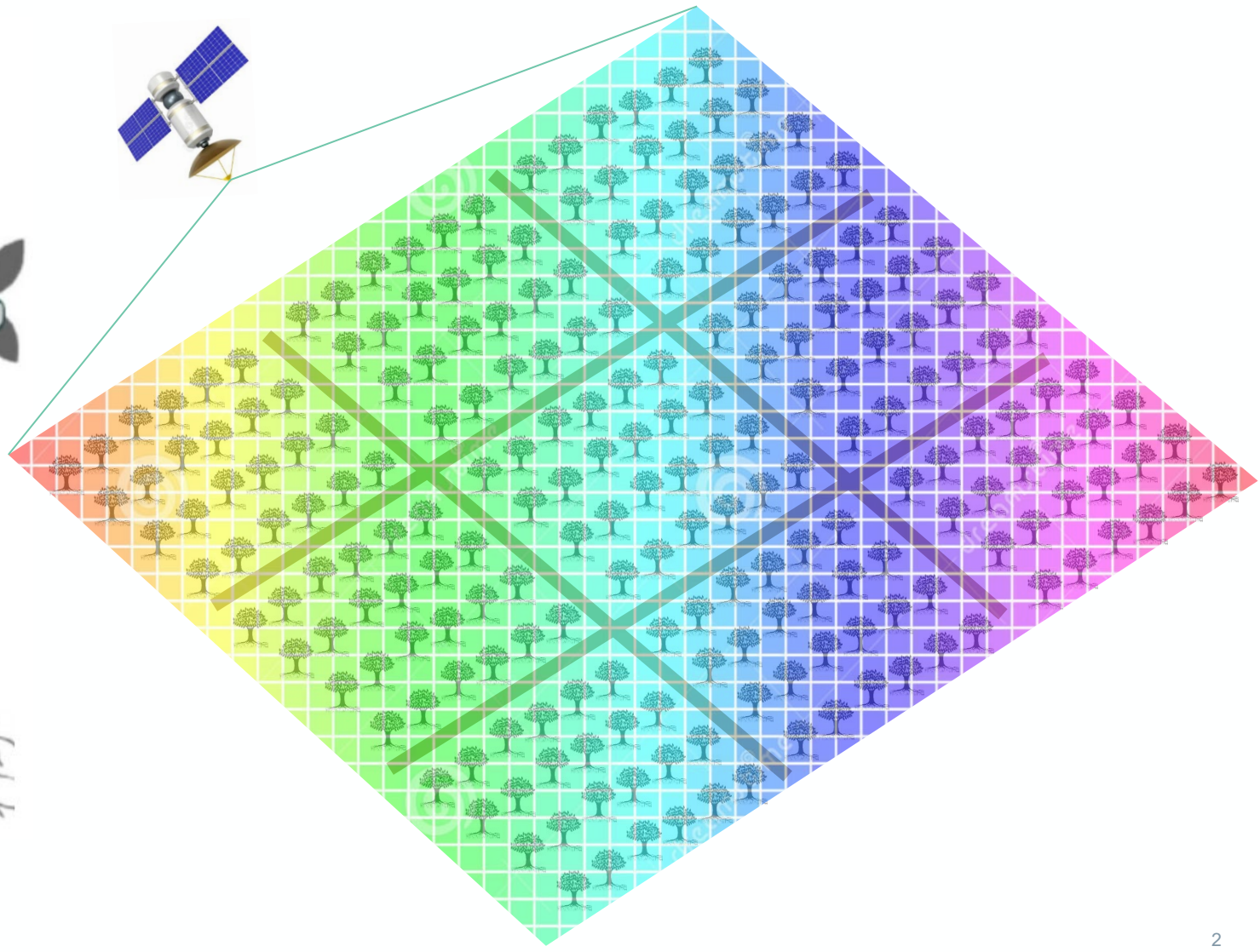
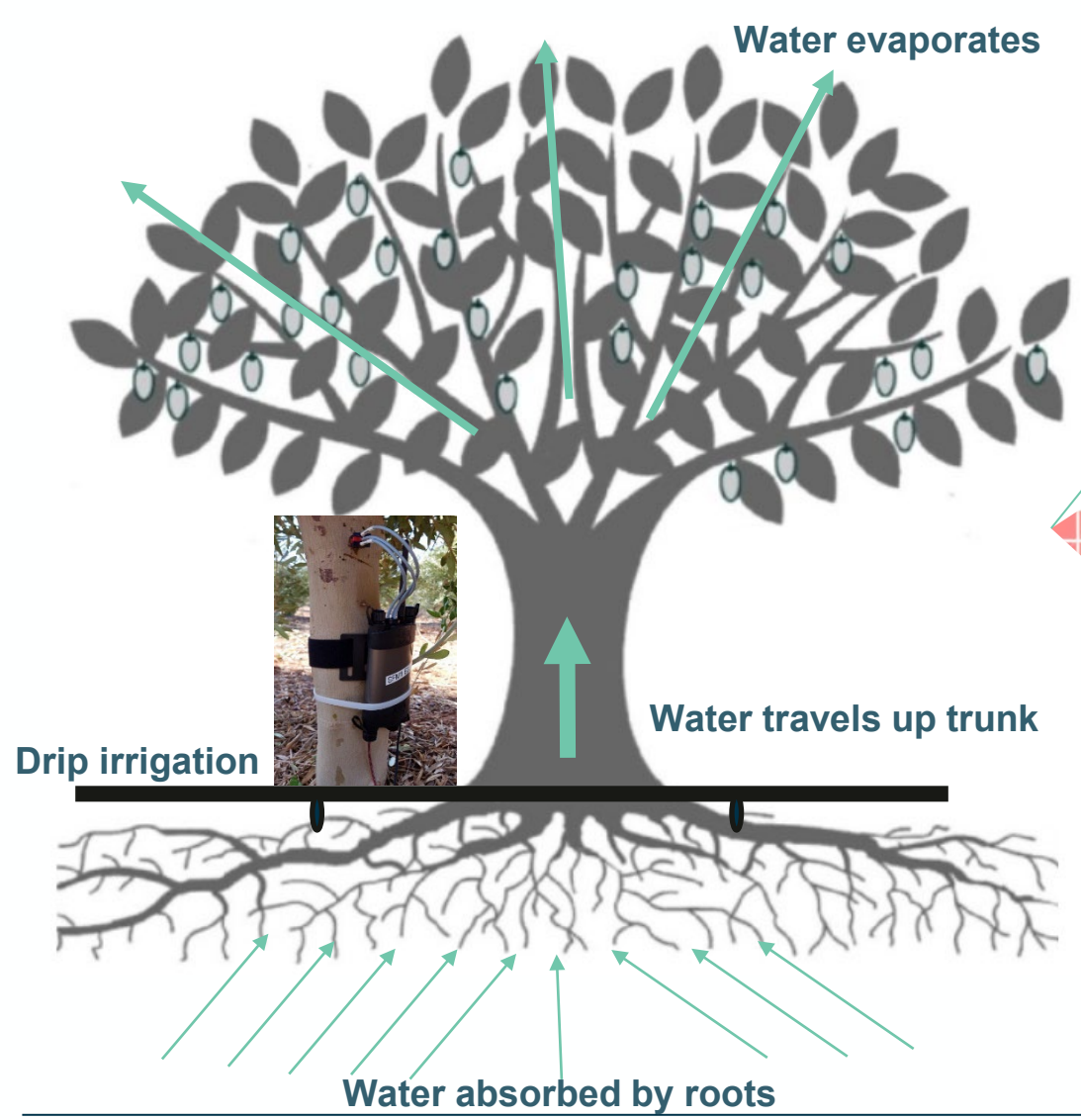


POTENTIAL OF SAR DATA TO IMPROVE IRRIGATION MANAGEMENT IN OLIVE GROVES

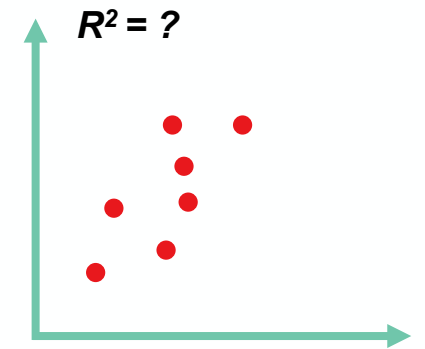
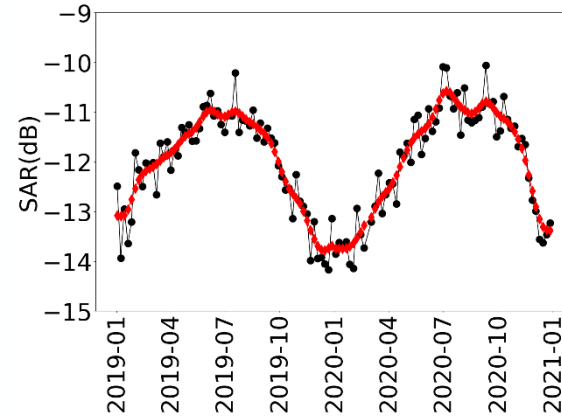
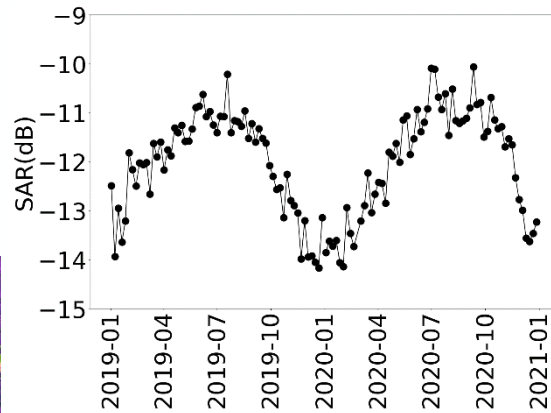
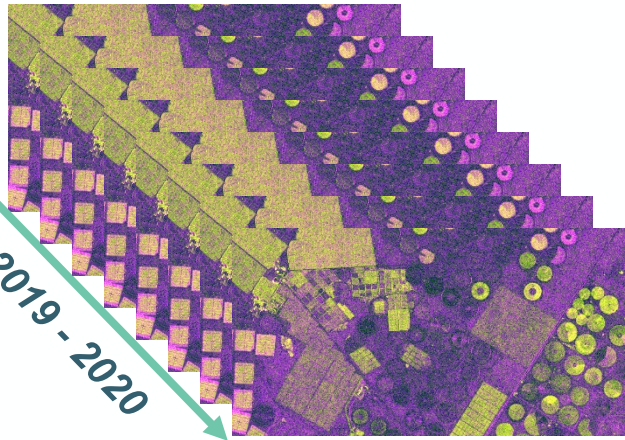
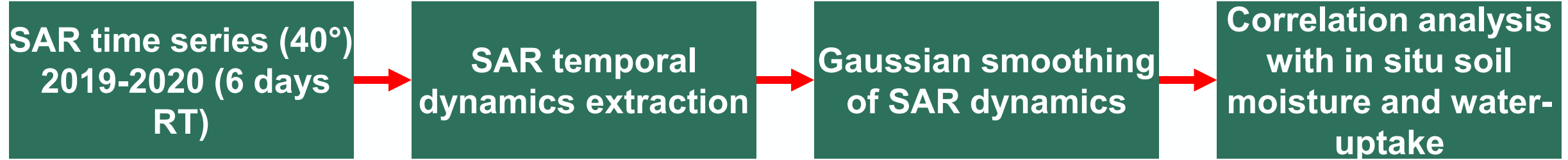
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25/05/2022

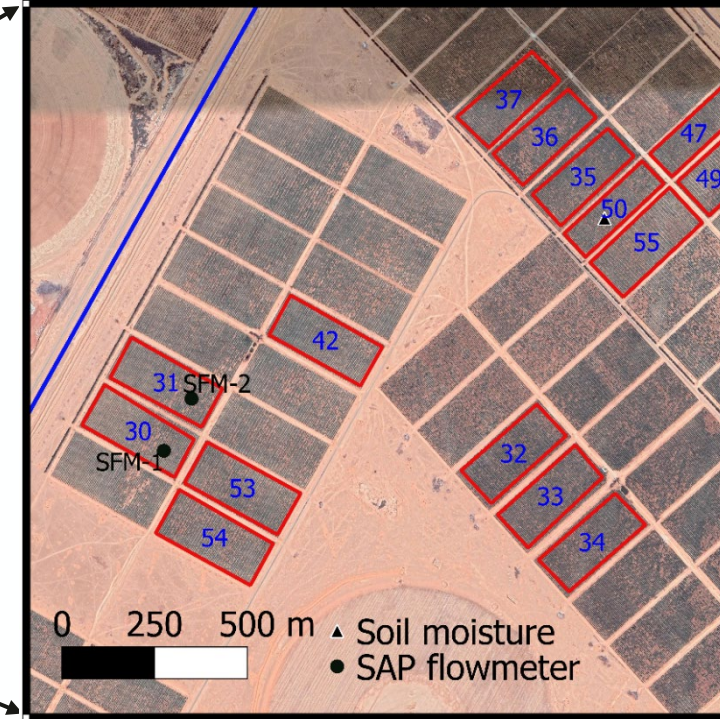
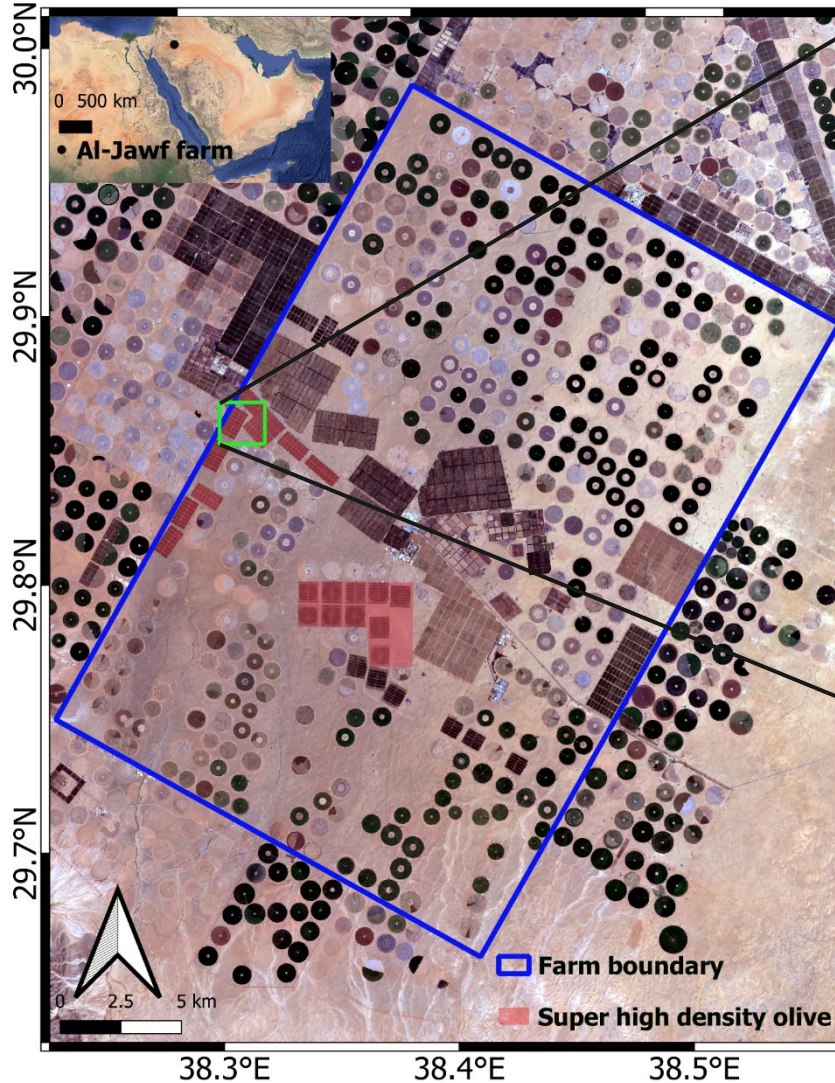
Introduction

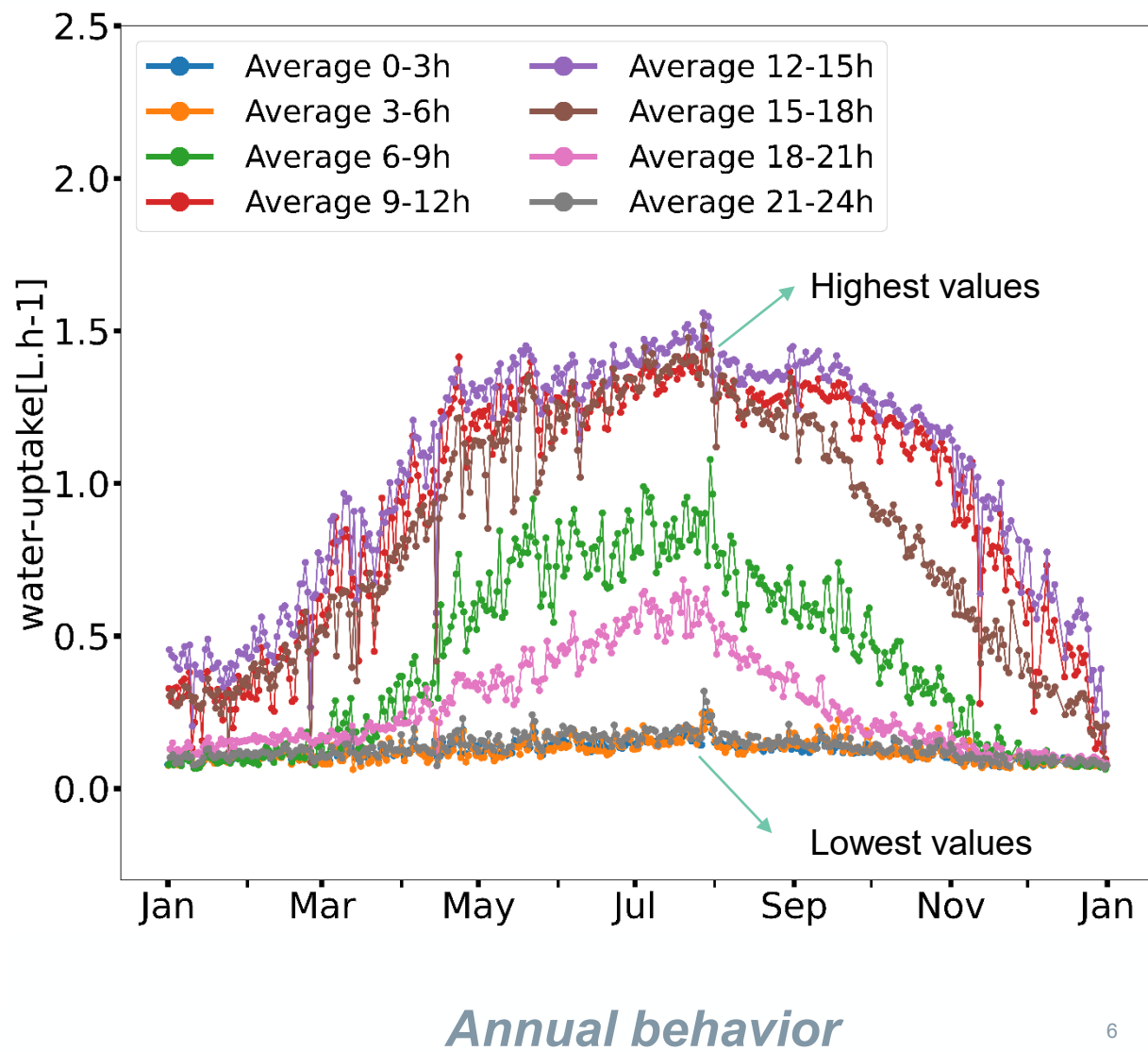
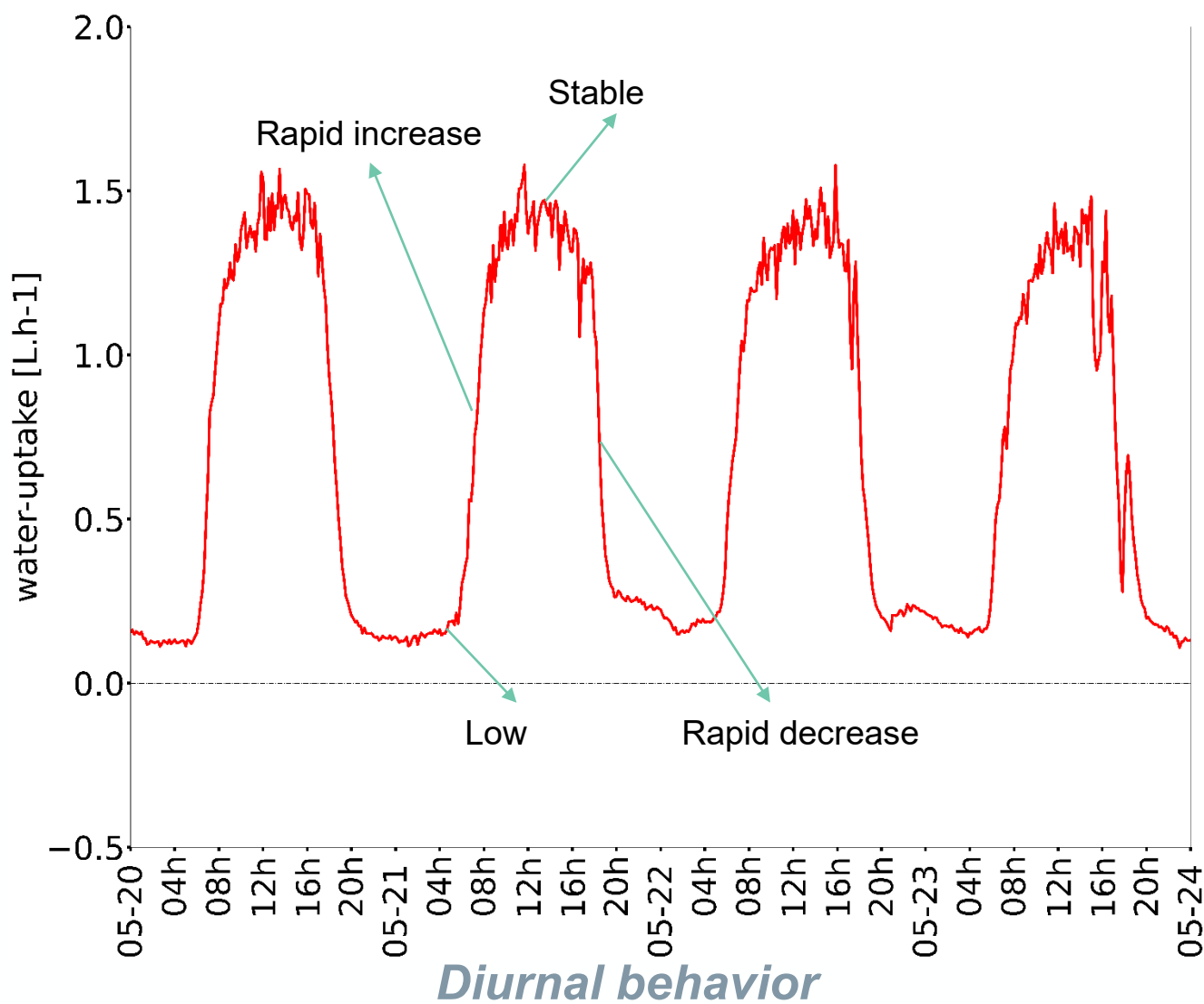


- Objective: explore the potential of C-band SAR data to assess the water-uptake rate in olive orchards
- Diurnal variation in microwave backscatter may originate from water movement in plants (McDonald et al., 1990)
- Water-uptake rate determines how much water passes from the soil to the plant at a given time
 - Possible correlation between SAR backscatter and water-uptake

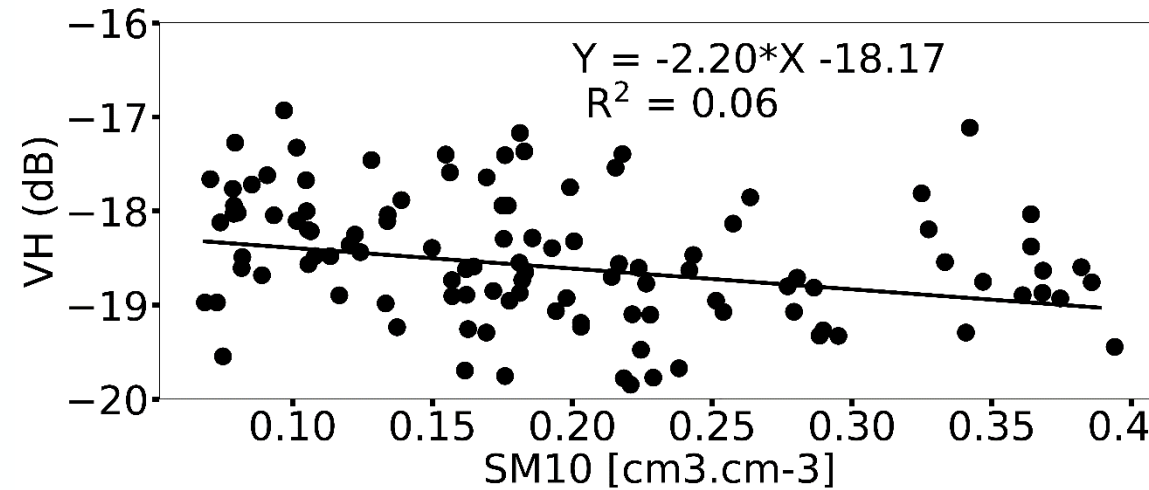
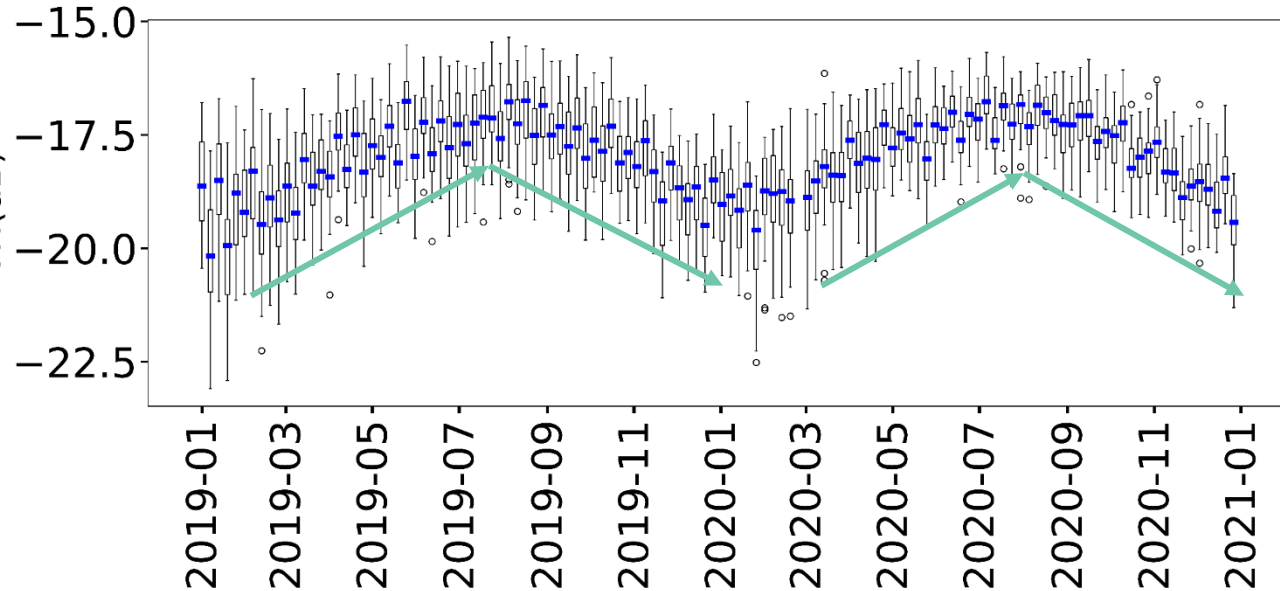
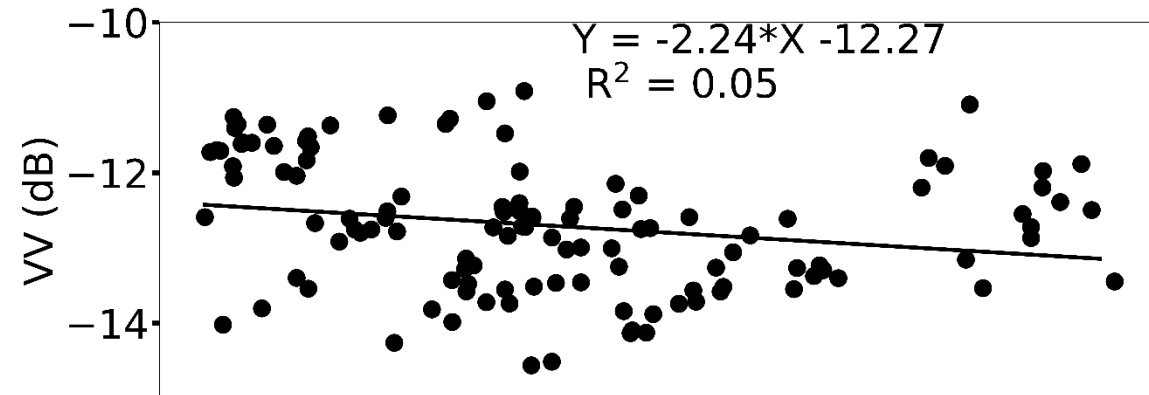
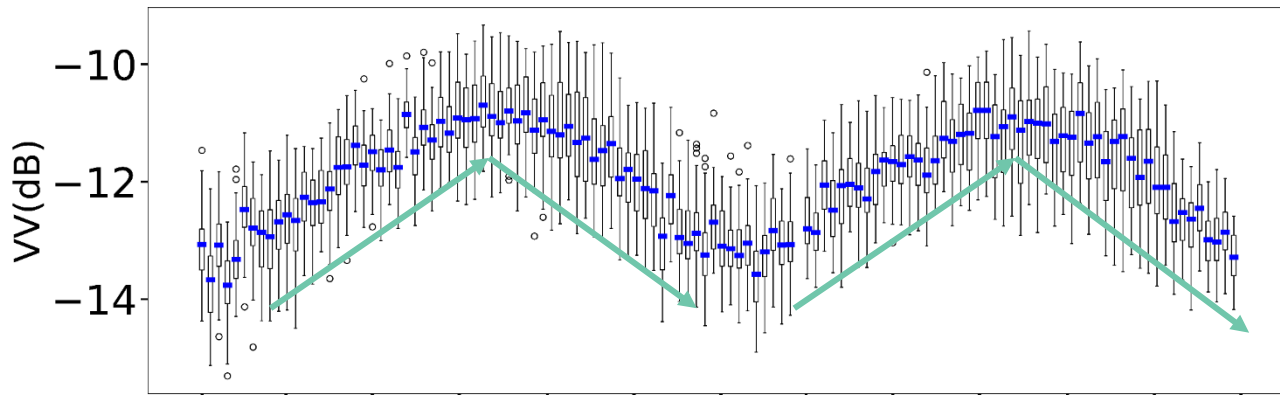


- One of the world's largest olive orchards
 - 6 million trees, 1667 trees/ha
- Two soil moisture Sensors
 - 10-min data 2019-2020
 - At 10 and 30 cm depth
- Two SAP flowmeters
 - 10-min data 2020
 - In plots with same conditions





Temporal behavior of SAR data



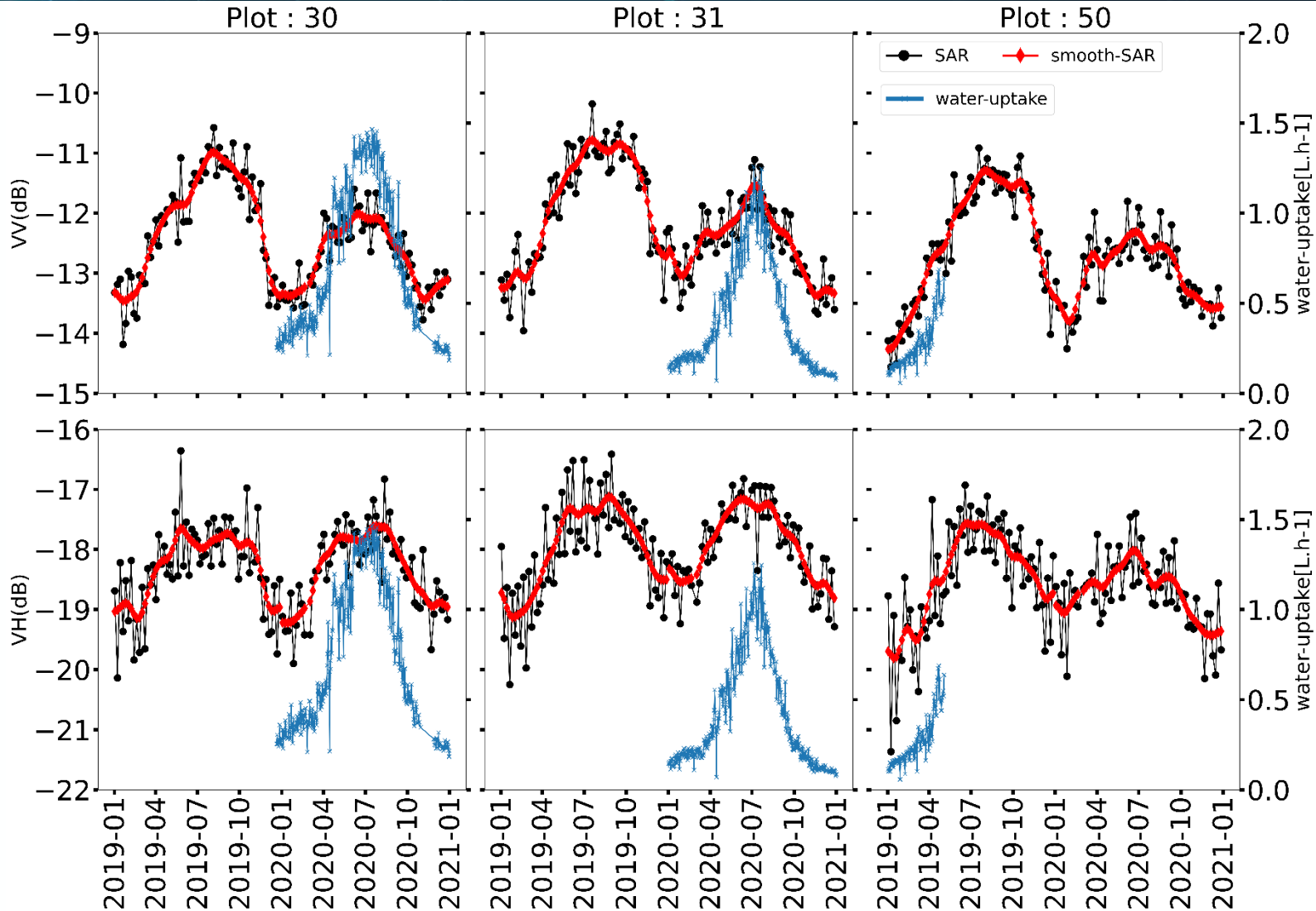
Temporal dynamic > S1 radiometric accuracy (0.7 dB)

No correlation between SAR and SM ⁷

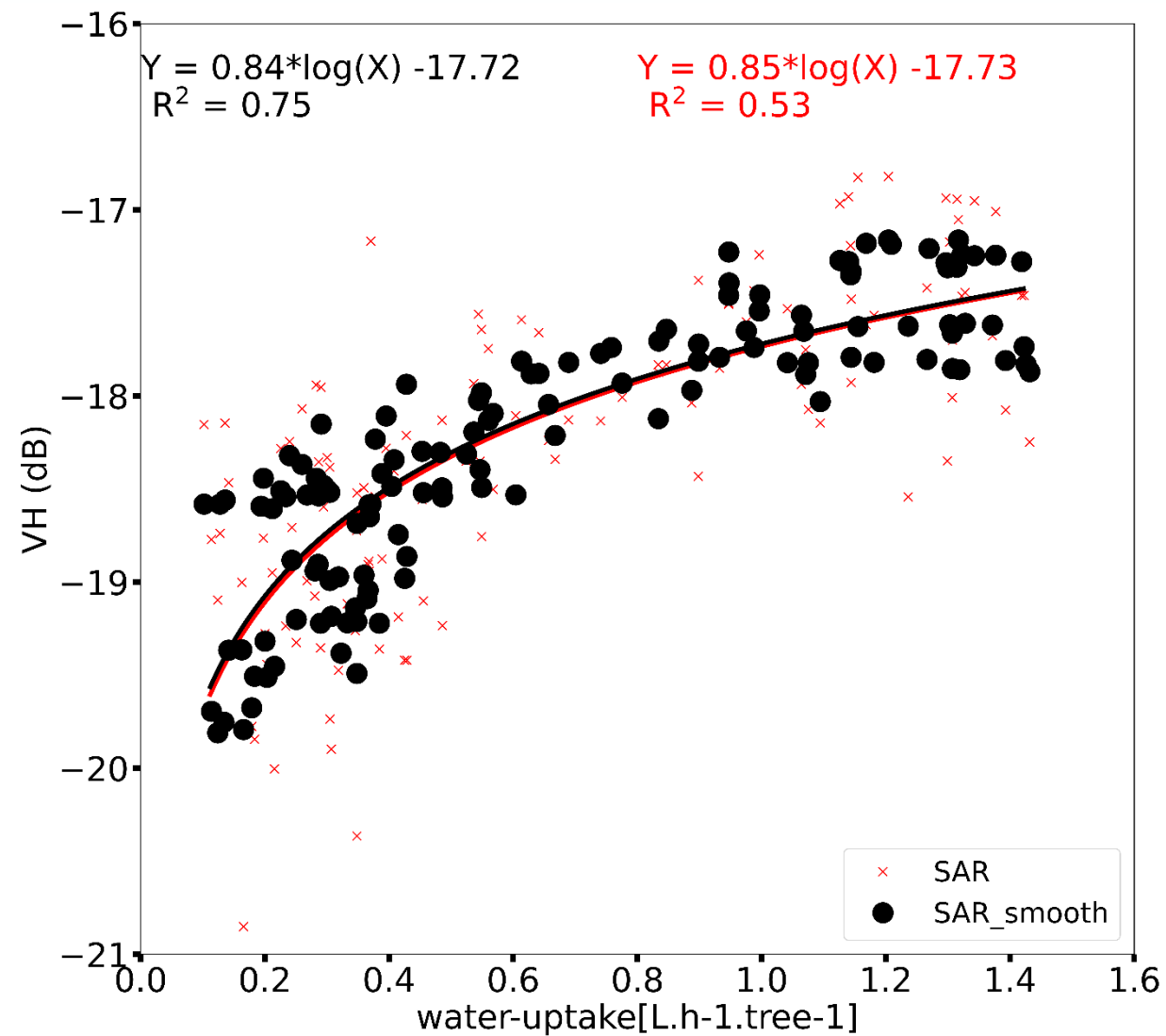
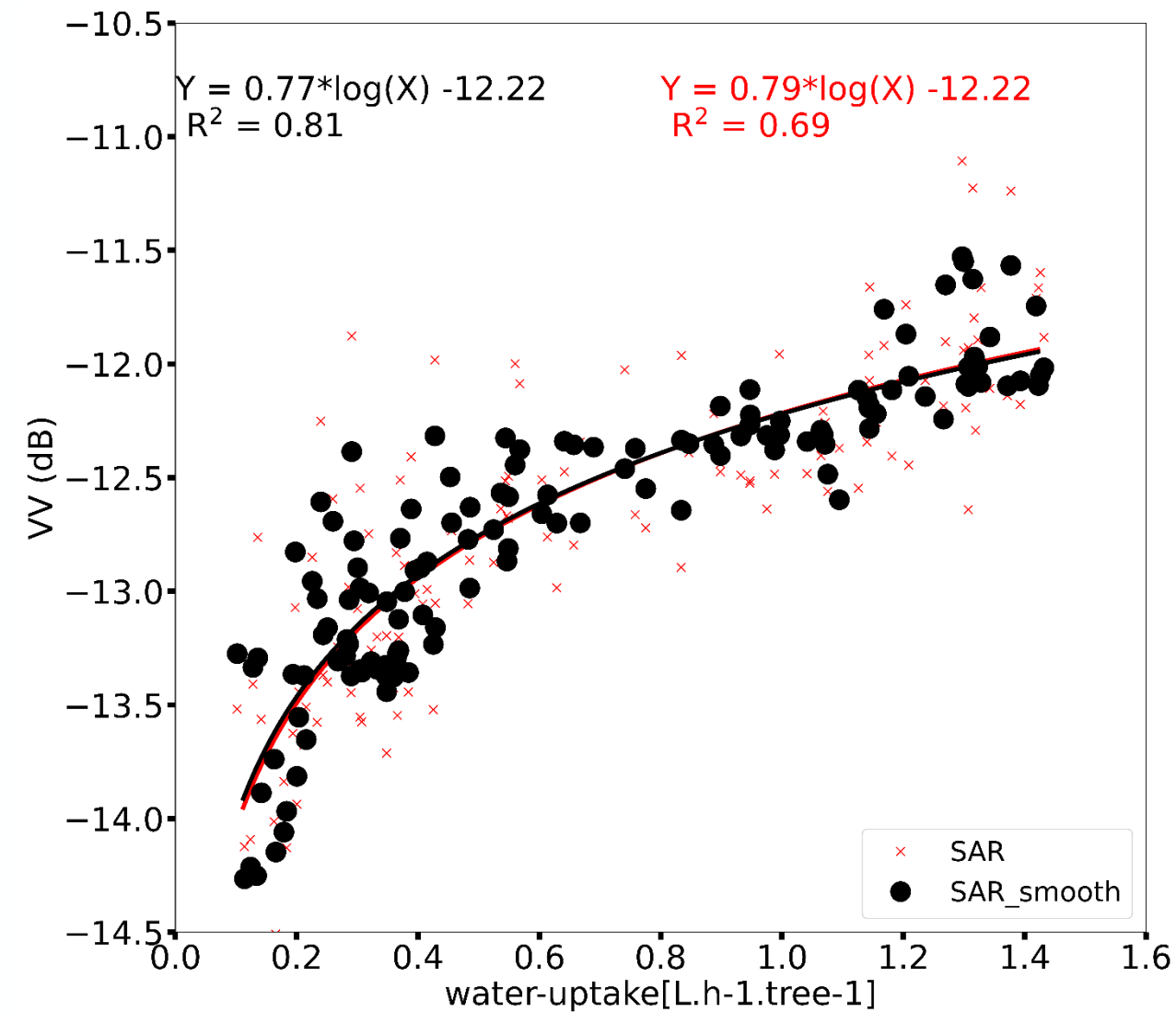


Temporal behavior of SAR data and water-uptake

- Smoothing: remove noise
- Similar temporal evolution was observed for both SAR and the water-uptake rate at 18:30



Correlation between SAR and water-uptake



- SAR backscatter increased between January to July/August and decreased towards the end of the year
- SAR dynamics was higher than the SAR radiometric accuracy → variation is driven by the canopy dielectric constant
- SAR dynamics was correlated with water-uptake rate measured at the same time of SAR acquisition (18:30), resulting in an R^2 of 0.81
- No correlation was observed between the SAR backscatter and soil moisture
- SAR backscatter do not show a response to any of the phenological stages

Thank you
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