

**A Tool for Monitoring, Reporting  
and Verification of Carbon Farming  
as well as large-scale analyses on  
Carbon Sequestration -  
EO4CarbonFarming**

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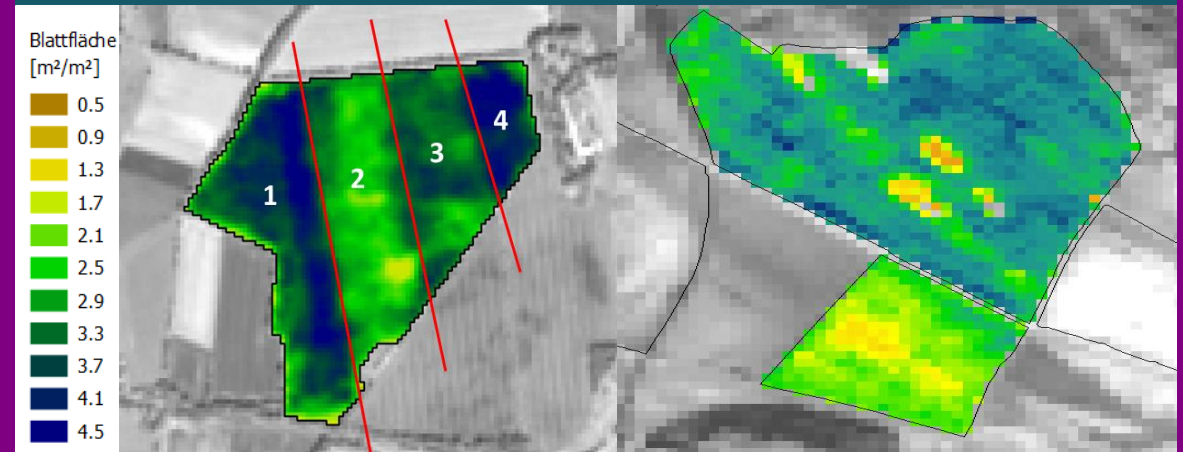
**WATER – FOOD - ENERGY  
Nourishing the Future**



## Harvest and Yield Prediction

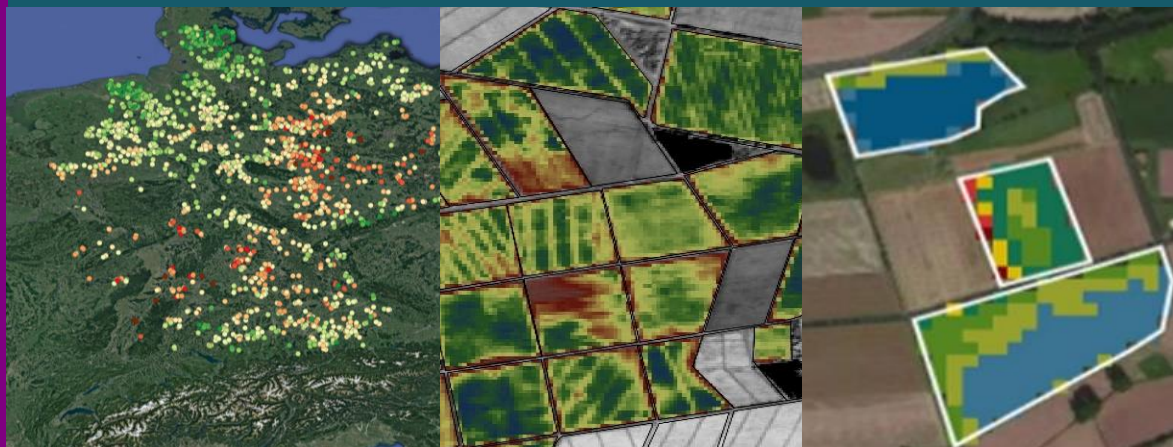


## Optimization of Agricultural Measures

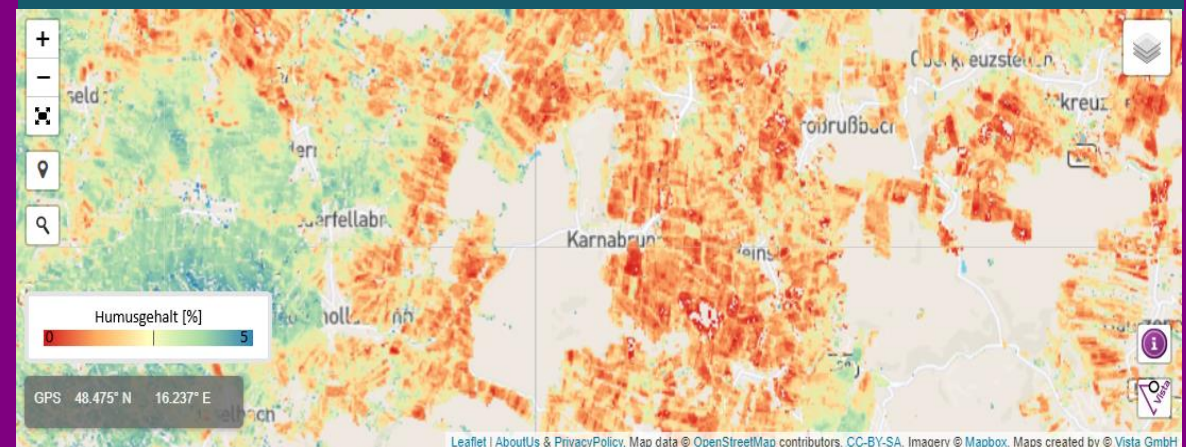


# Vista's Core Competencies

## Crop Monitoring and Risk Management



## Sustainability and Carbon Farming



# Vista's USP: We accelerate the sustainable transformation of agriculture by connecting the real and digital worlds



- Satellite data

- In-situ data statistics (soil, climate, etc.)

- Ensuring scientific excellence



- Inhouse IT-expertise

- PROMET as core model

- Use of cloud computing and AI



- Combining observation and simulation in digital twins

- Digitally simulate strategic decisions



- Direct sales to key customers

- Indirect sales via API and integration in partner platforms



Data  
Generation

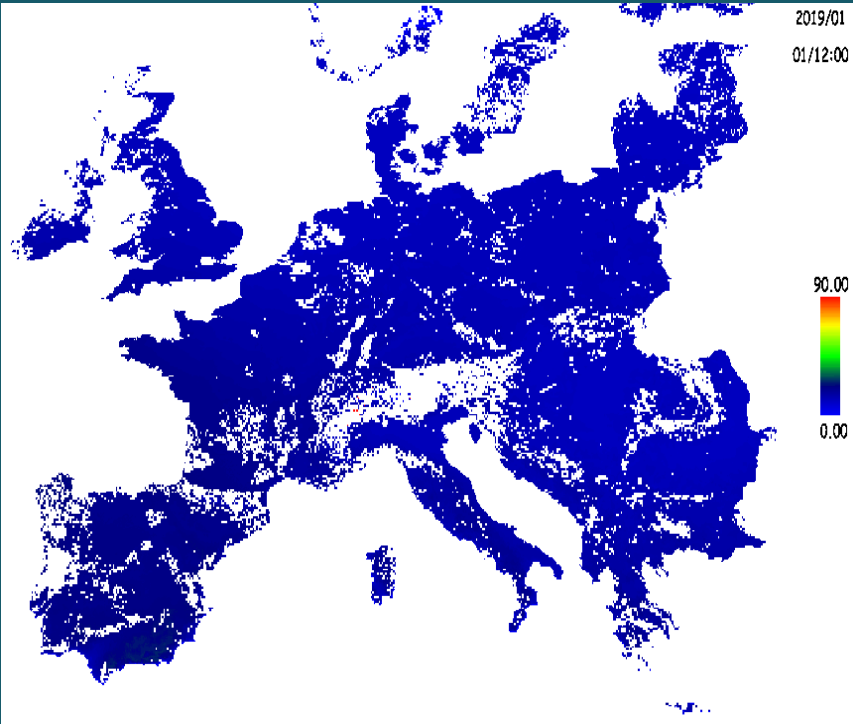
Big Data  
Processing

Digital Twin

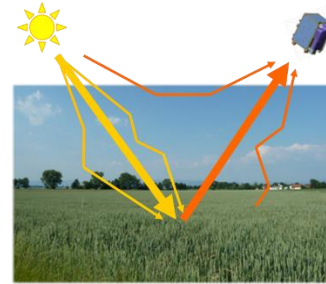
Services

# Using Digital Twins for Yield Assessment and Forecast based on Vista's PROMET, radiative transfer modelling (SLC) and EO data assimilation

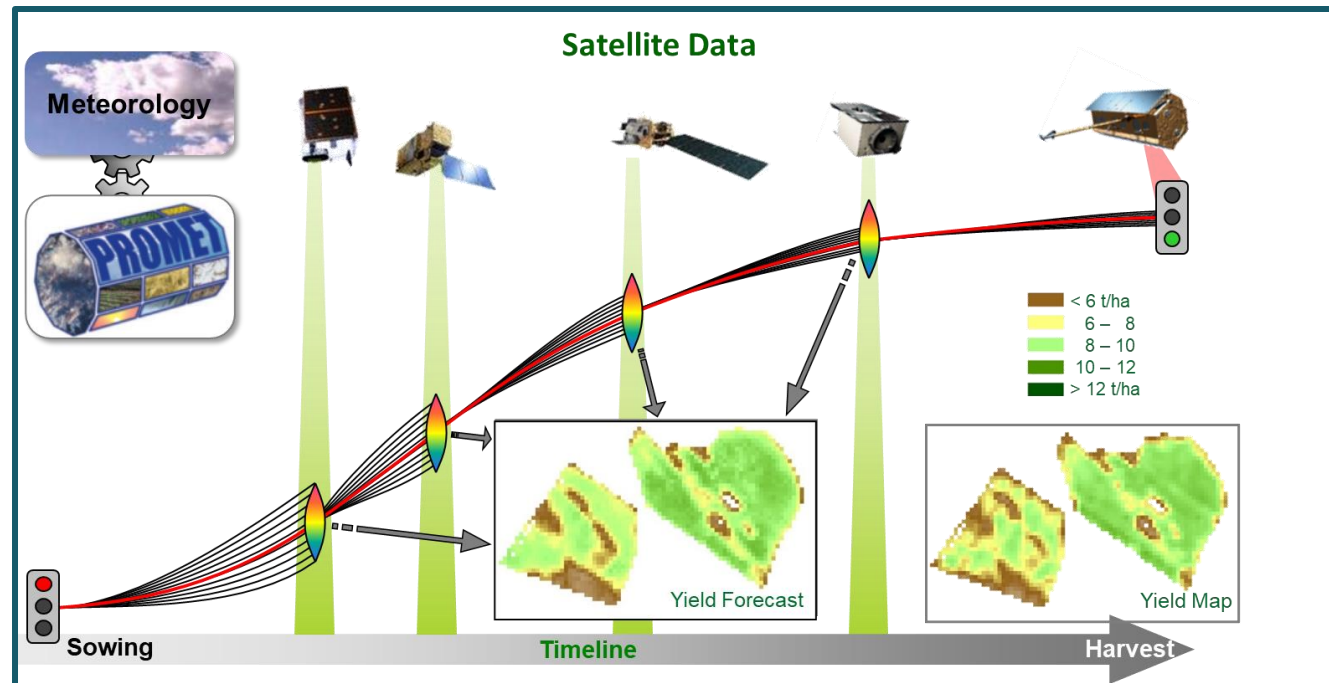
PROMET simulates crop growth, yield, the water-, carbon-, nitrogen cycles considering all relevant land surface processes under different agricultural management alternatives e.g. wheat phenology in Europe:



SLC Soil Leaf Canopy Reflectance Model

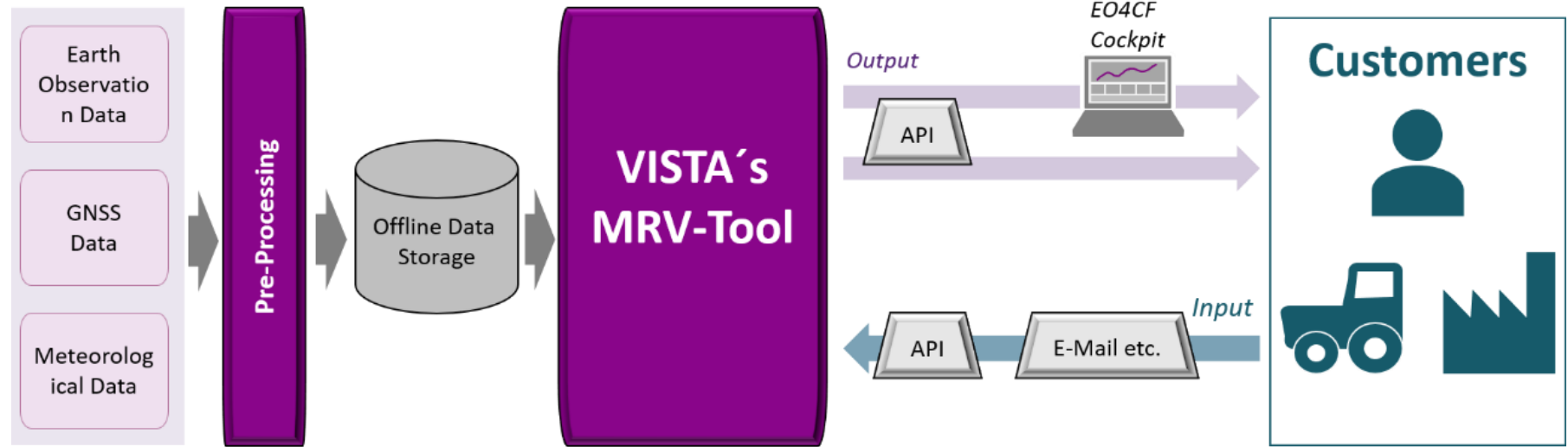


Data assimilation approach using radiative transfer modelling for multi-temporal multi-source EO data



# Vista's EO4CarbonFarming – an EO-based tool for sustainable farming measures and Carbon Farming

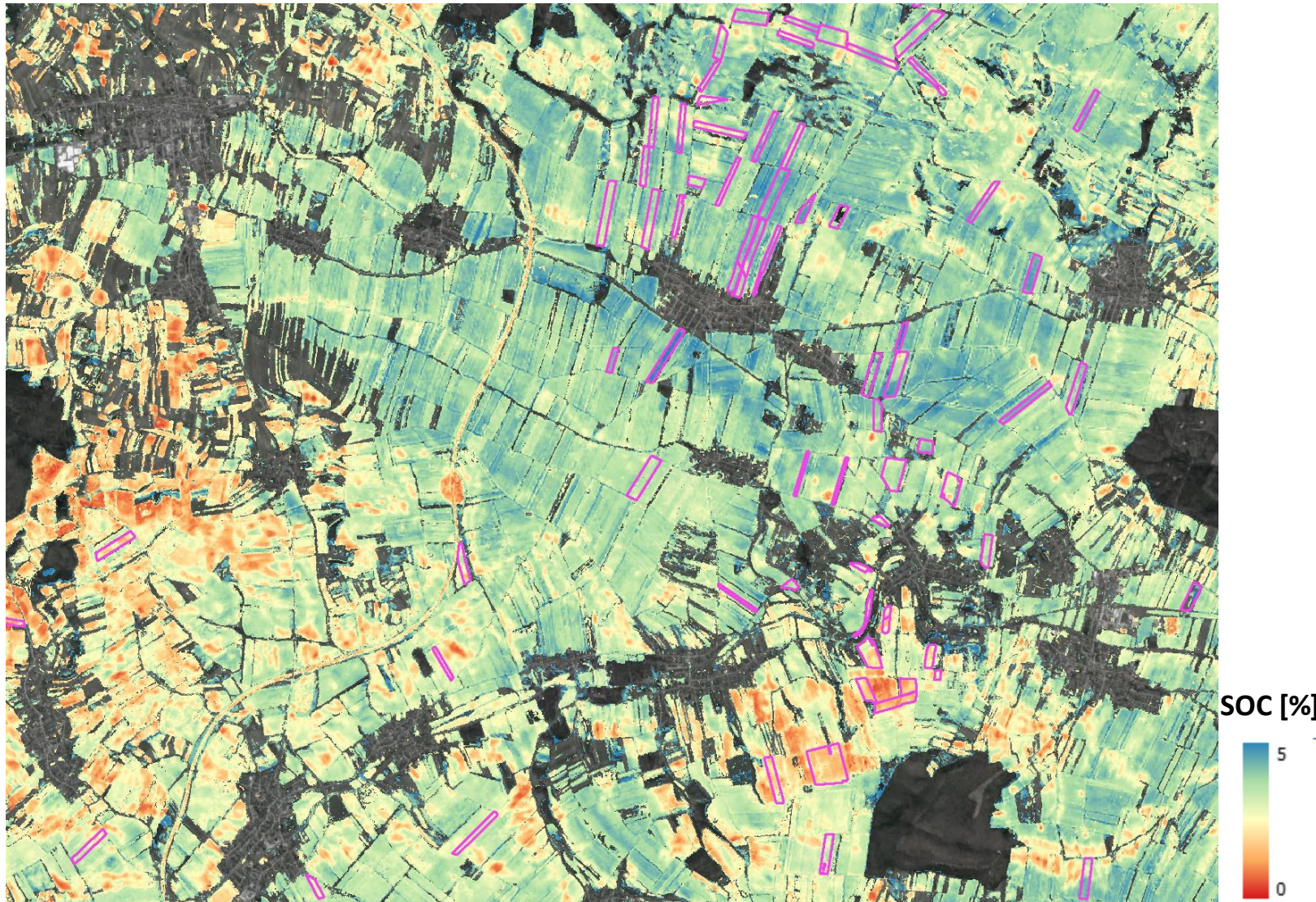
**Goal:**  
**Monitoring, Reporting and Verification (MRV-Tool)** of measures to improve sustainability and carbon sequestration in agriculture using satellite data and modeling



## Service-Outputs:

- Quantification of the distribution of the humus content in the soil
- **Monitoring** of measures, e.g. development of intercropping
- **Reporting** of measures, e.g. the effect of crop rotations and intercropping on carbon sequestration
- **Verification** of the implementation of measures, e.g. by certifiers

# Vista's SOC Map: Case study Austria – several hundred agricultural fields



- The SOC Map shows the detailed SOC content within the fields in a 10x10 m resolution
- SOC content map based on generic or localized calibration produced for agricultural areas
- When calibrated:  
MAE = 0.07 % SOC = laboratory accuracy

# Vista's SOC Map: Case study Austria – several hundred agricultural fields

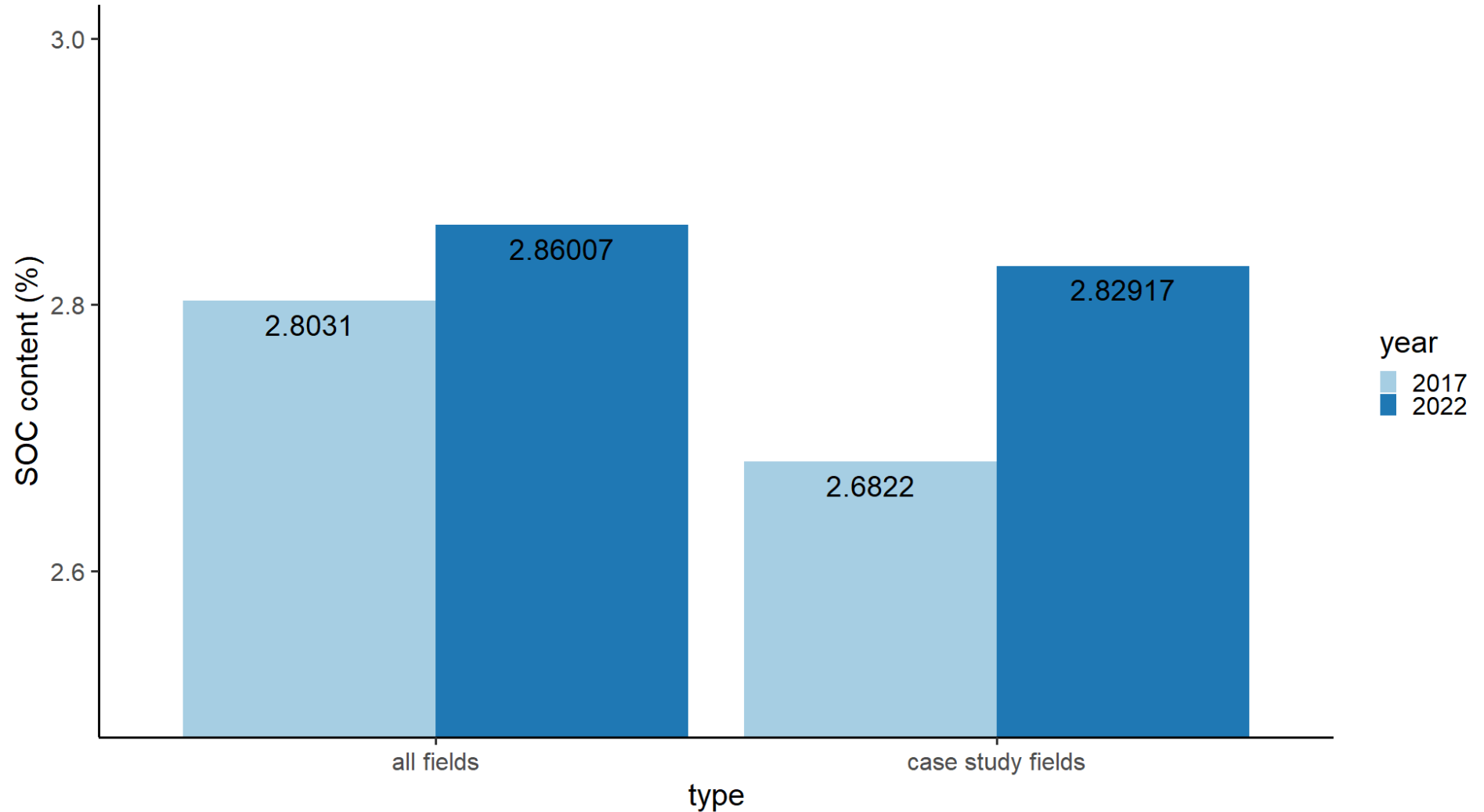


- SOC content difference 2017-2022
- Carbon increases but also carbon losses in the soil!
- Important question: Do carbon farming measures have an impact?

# Increase in SOC within fields that have been managed taking Carbon Sequestration into account



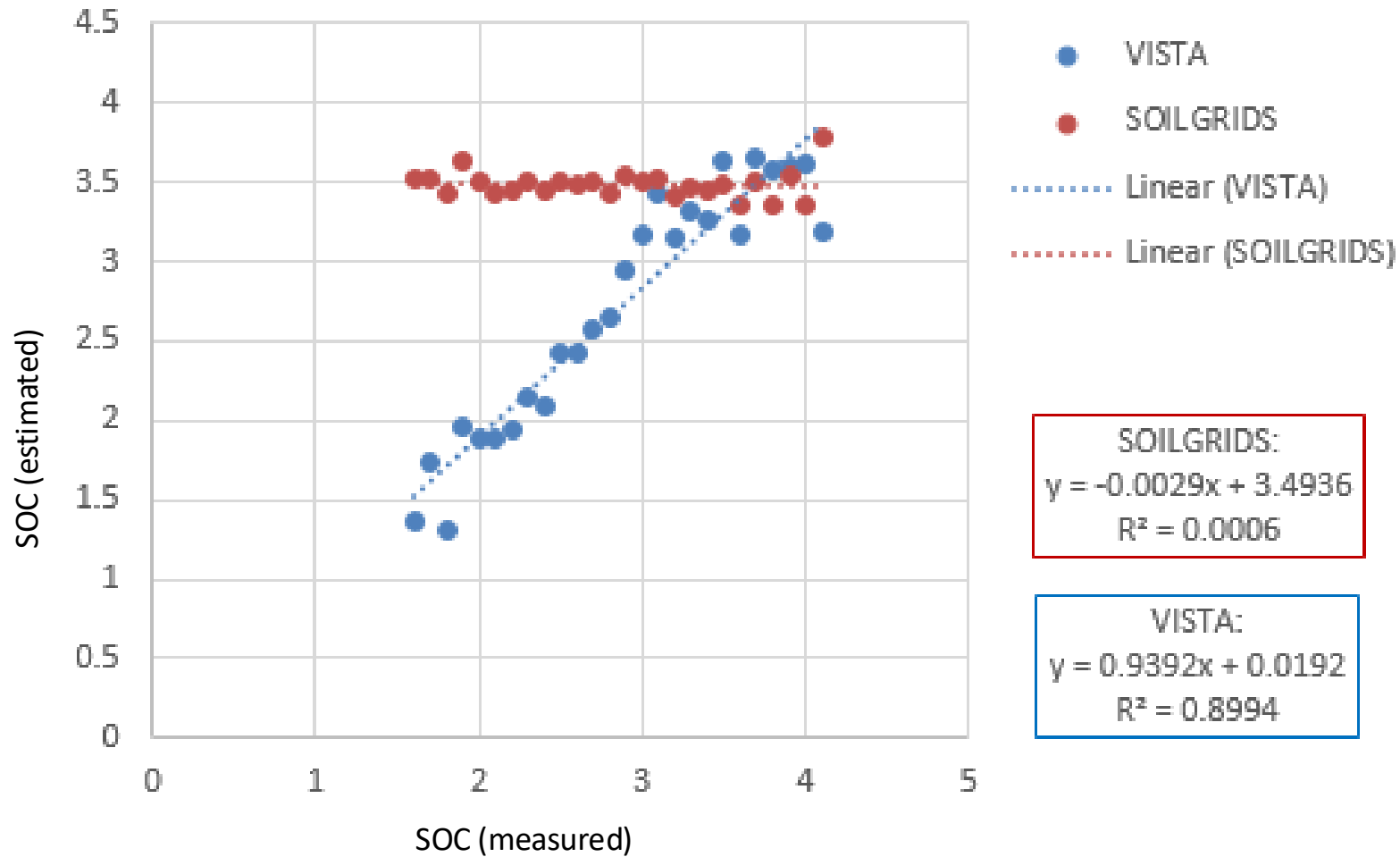
SOC content mean changes - comparison of all fields vs case study fields



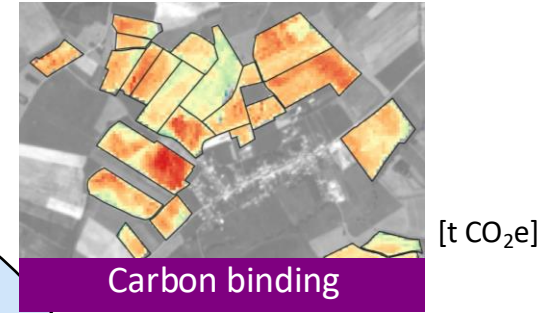
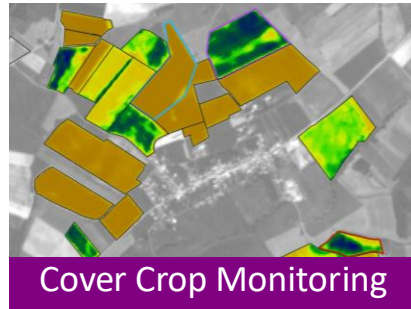
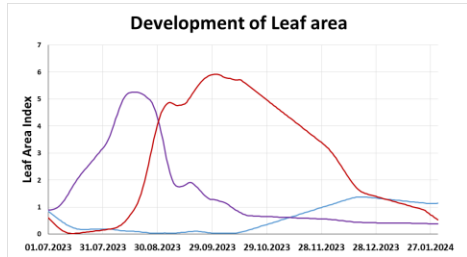
Comparison of SOC content increase over all fields in the region compared to the case study fields show that management with regards to SOC measures pays off.

# Vista's analysis captures the range of SOC in agricultural soils in detail (10x10m)

Comparison Validation VISTA vs. Validation SOILGRIDS with soils samples



# Vista's Carbon Farming MRV Tool – monitoring management measures as well as results!



# EO4CarbonFarming Cockpit: The User Interface to the MRV Tool

The screenshot displays the EO4CarbonFarming Cockpit user interface. On the left, a sidebar contains the EO4 CarbonFarming logo, a lock icon, and a 'My Service' section with a 'SELECTION' button. Below this, the 'SERVICE' is set to 'Monitoring and reports', with 'ORDER-ID' 6 and 'FIELD-ID' 127. A 'Functions' button is at the bottom. The main map area shows a 'Leaf-Area-Index' heatmap with a color scale from 0.0 (dark brown) to 7.0 (green). An 'Information' panel is open, providing details about EO4CarbonFarming (EO4CF) as a service for monitoring, reporting, and verification of carbon farming measures. It states that EO4CF includes all agricultural activities for sustainable CO2 reduction and sequestration. The MRV Tool provides functionalities to monitor carbon in plants and soil, report on measures like crop rotation and catch crop planting, and verify them. A second map view on the right shows 'Catch-Crop-Detection' results with a legend: green for 'yes', orange for 'not sure', black for 'no', and grey for 'no data'. A sidebar on the bottom left shows 'FIELD-ID' 123 and a 'Functions' button. The map uses Mapbox data and includes navigation controls like zoom in (+) and zoom out (-) buttons.

Results are available via the user interface or via API to implement in other front ends.



We are looking forward to discuss  
further!

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