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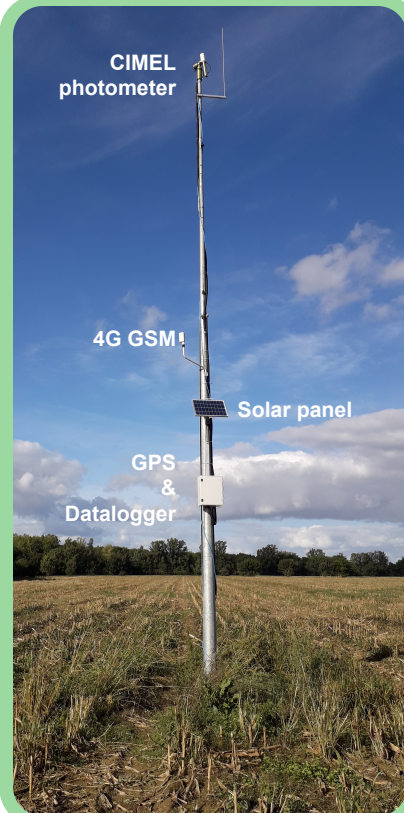
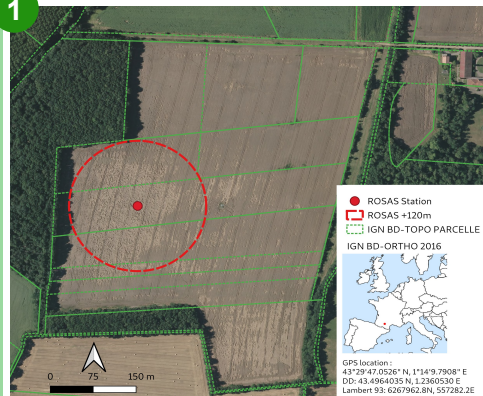
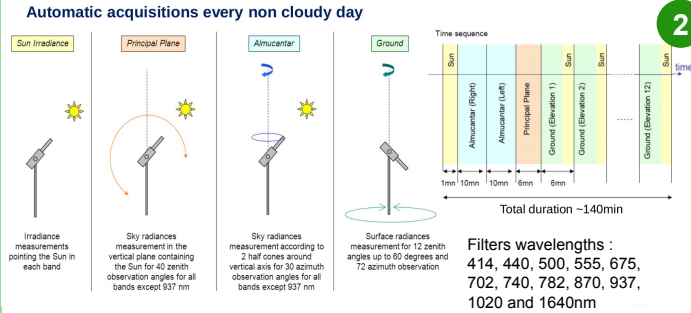
Quality assessment of the MAJA atmospheric correction processor over a farmland area with a new operational in-situ ROSAS station

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Objectives

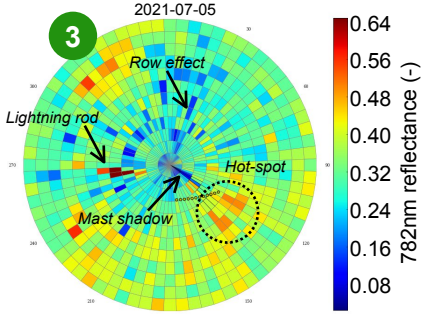
- Atmospheric Correction processors validation requires **in-situ surface reflectances** to go beyond the usual algorithms inter-comparison
- Pre-existing ROSAS stations in La Crau (France) and Gobabeb (Namibia) have a strong homogeneity of reflectances in space and time, which is good for sensor calibration
- The new Fr-Lam ROSAS station is set-up since 2021 in an **agricultural field (1)** with a 3-crops rotation cycle every 2 years, offering a **strong intra- and inter-annual variation of surface reflectances**
- Opportunities to **validate reflectances over vegetation with various BRDF, anisotropy, rows and adjacency effects**

ROSAS protocol



- The ROSAS protocol designed by the CNES allows to reconstruct in-situ BRDF from a **sequence of measurements (2) using a multispectral photometer**
- A CIMEL CE318 with 12 filters is installed on top of a 10m high mast, and sequentially **acquire sun, sky and ground irradiances**
- Data are quality controlled and post-processed to reconstruct a BRDF rose **(3)**
- For **Level 2 EO products validation**, the reflectances are fitted to the sensor's bands spectral functions and sensor view angles.

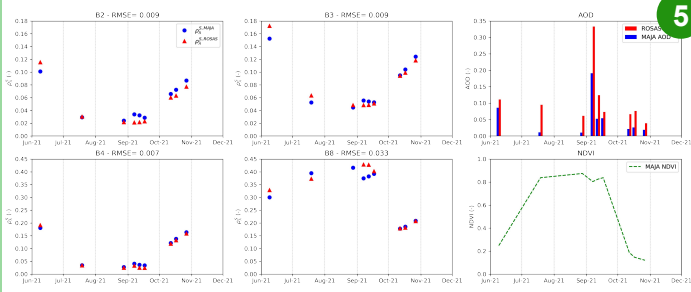
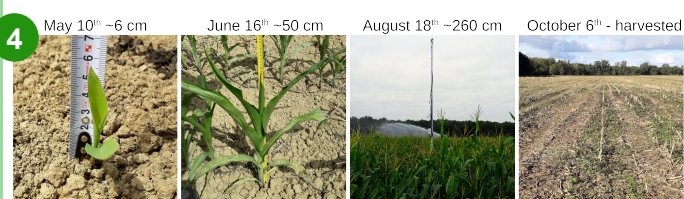
Measurements



Results

- The Sentinel-2 surface reflectances processed by the Atmospheric Correction processor **MAJA** are compared with **Fr-Lam** measurements
- To meet quality criteria, only **perfectly clear sky** acquisitions are used for validation, leading to only 9 samples **(5)**
- RMSEs are below 9.10^{-3} for bands 2, 3 and 4, which is **better than the specifications** ;
- Poorer RMSEs were obtained for band 8, reasons of which are still to investigate

- Fr-Lam is intended to **acquire continuously BRDF in the coming decade**, leading to a rich BRDF collection
- Started in March 2021, the ROSAS Fr-Lam made its first acquisition over a **full growth cycle** of silage maize
- Resulting surface reflectances reflect changes from bare soil to small sparse plants, reaching up to 2.6m high before harvest **(4)**



The Fr-Lam site aims at becoming a key level-2 validation site for existing and coming missions.

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