Retrieval of surface soil moisture and irrigation events with GLORI and Sentinel-1

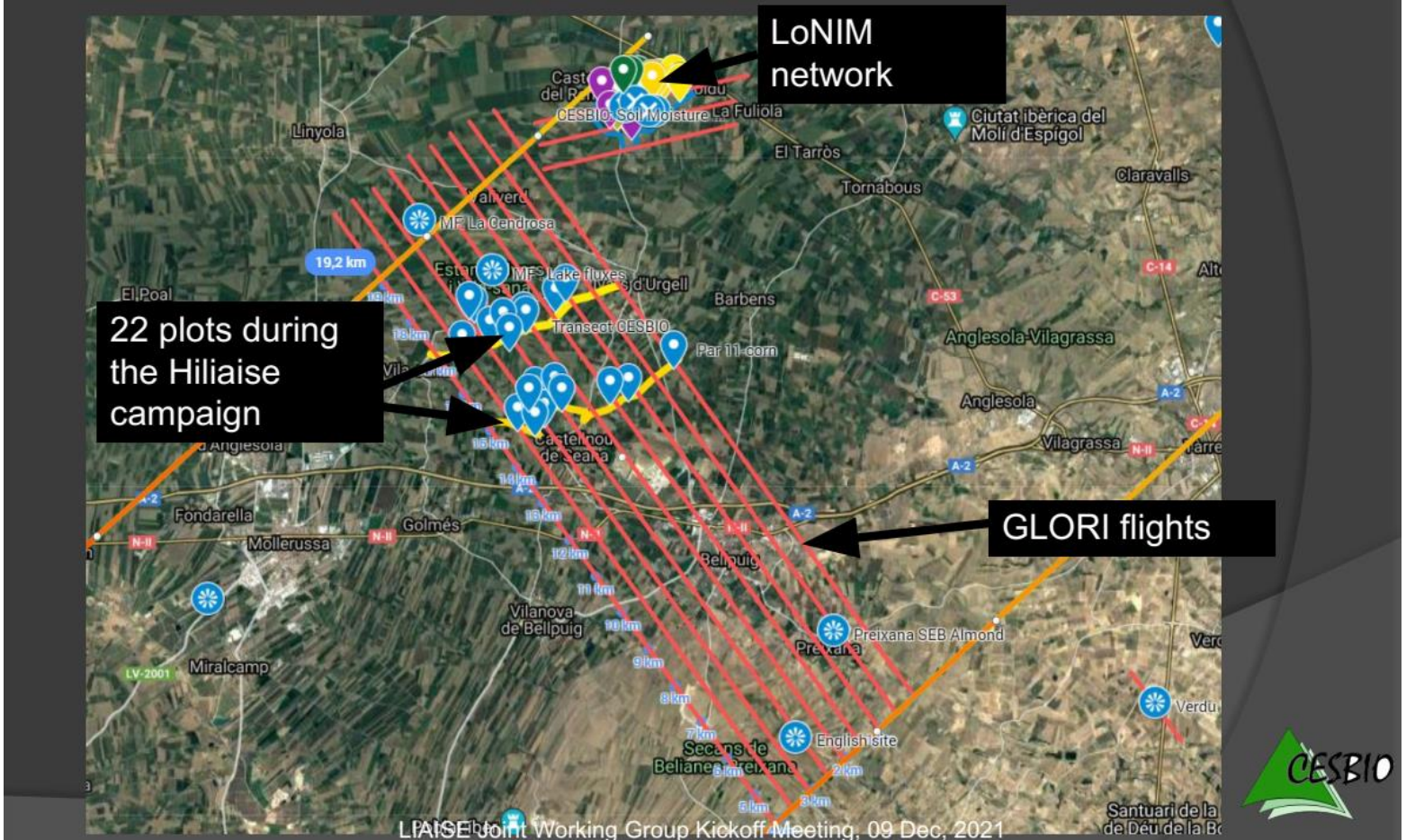
M. Le Page

Objectives

- Compare GLORI and Sentinel-1 approach of SSM retrieval with field Measurements
- Test algorithms for irrigation event retrieval and irrigation mapping

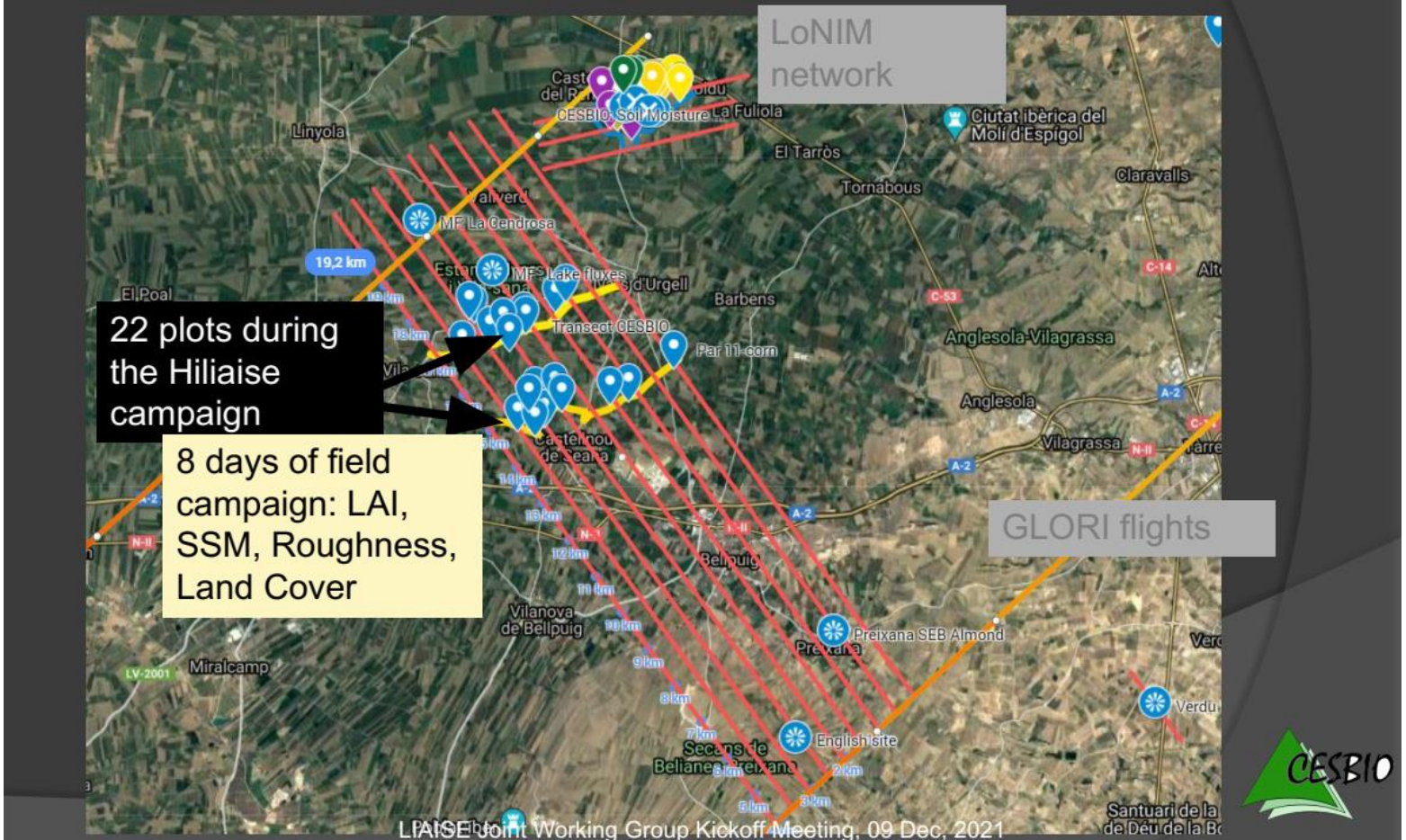
Soil Moisture: GLORI and Sentinel-1 – M. Le Page

Experimental setup



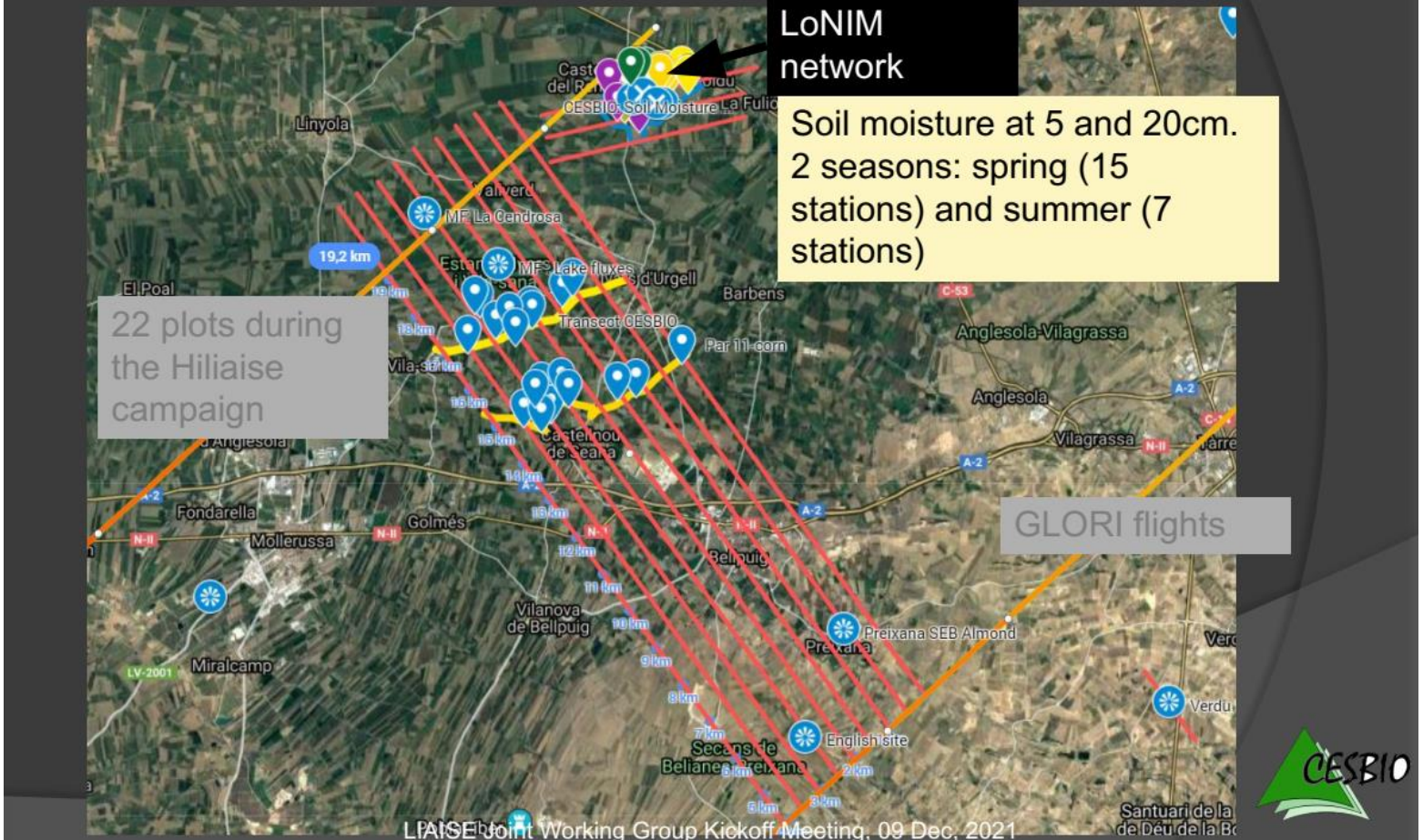
Soil Moisture: GLORI and Sentinel-1 – M. Le Page

Experimental setup



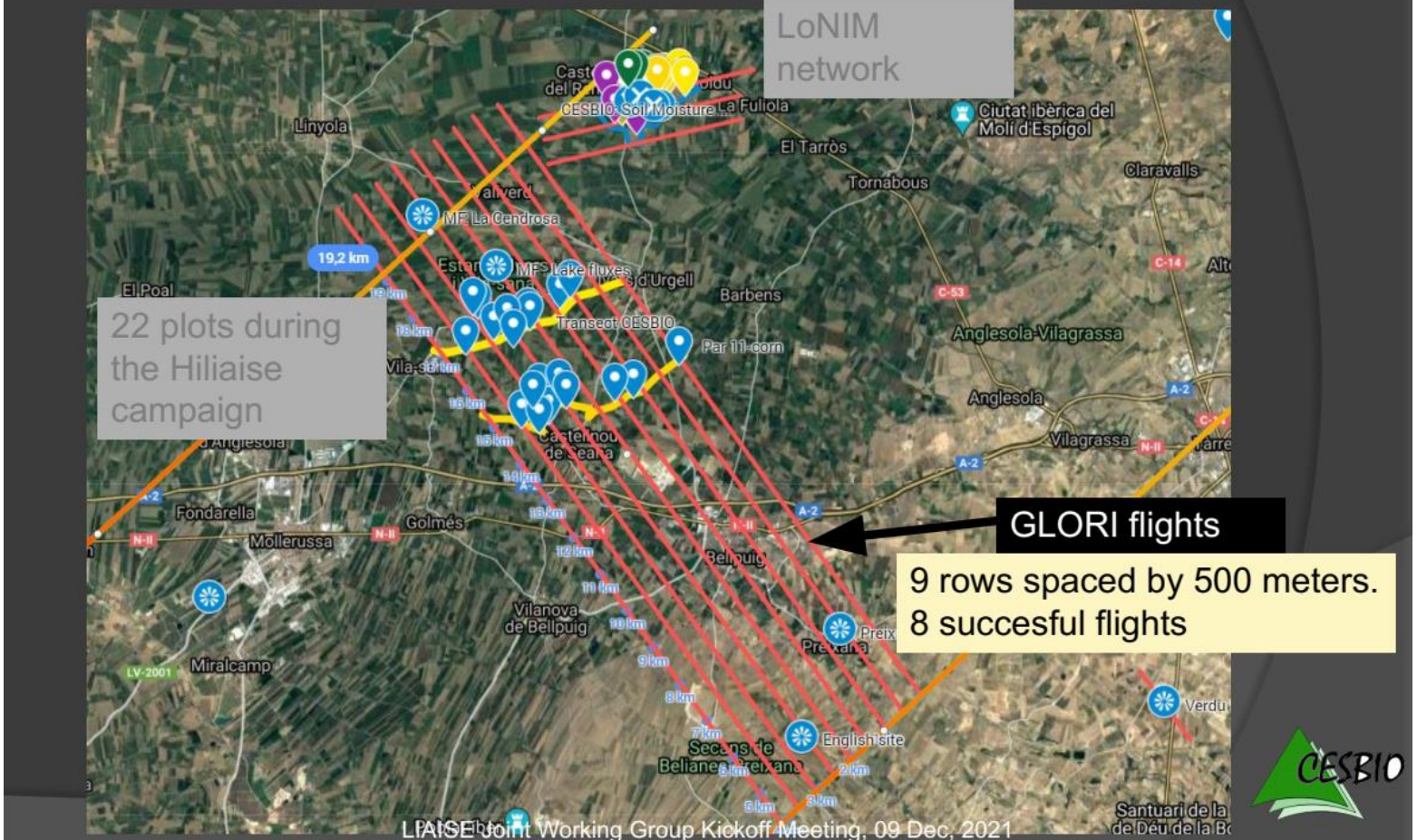
Soil Moisture: GLORI and Sentinel-1 – M. Le Page

Experimental setup



Soil Moisture: GLORI and Sentinel-1 – M. Le Page

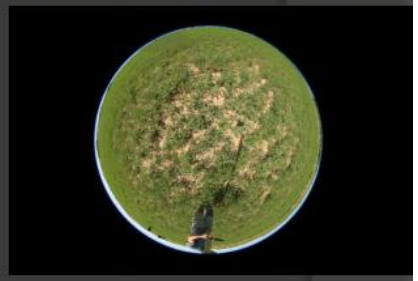
Experimental setup



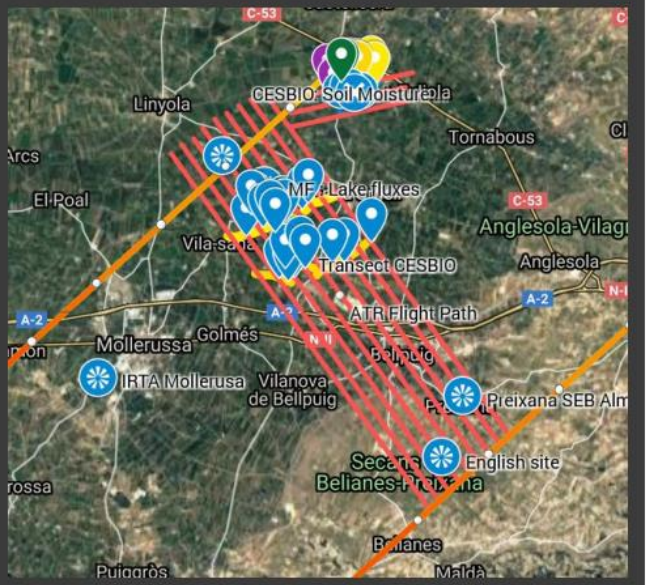
Soil Moisture: GLORI and Sentinel-1 – M. Le Page

Data processing

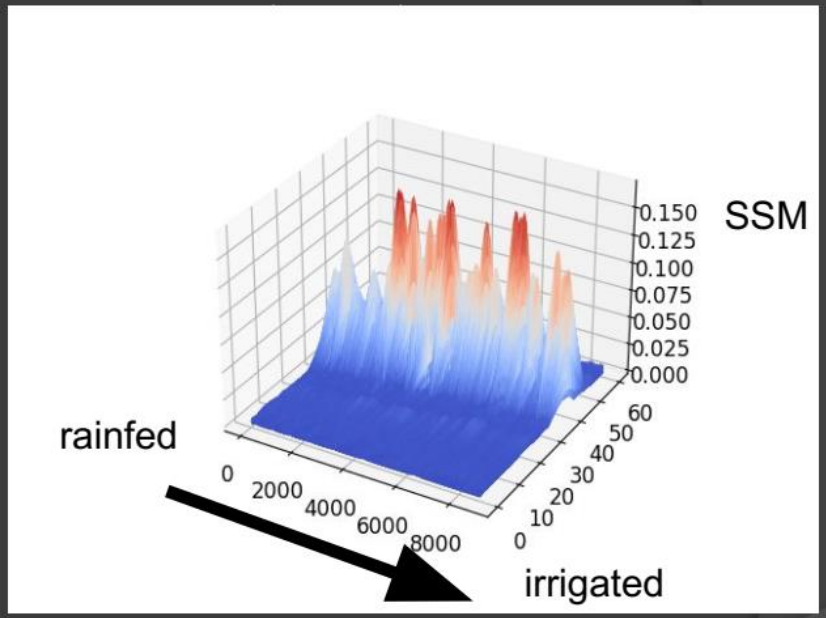
Dataset	Status
In situ Soil roughness	Done
In situ SSM	Done
LAI Hemiphoto	Done
Sentinel1 SSM	Done (from April to Sept 2021)
LoNIM Soil moisture	Under calibration
LandCover Map	Done
GLORI dataset	Processing/first results



First results on GLORI



One GLORI

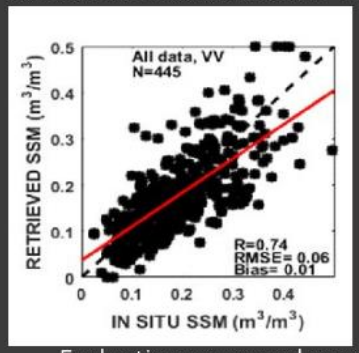


Soil Moisture: GLORI and Sentinel-1 – M. Le Page

Future work on irrigation

Irrigation mapping and retrieval based on Sentinel-1 and Sentinel-2 data

Surface soil moisture -SSM- mapping



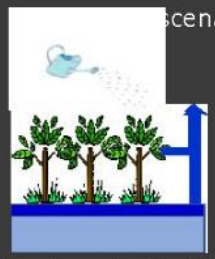
Ouaadi et al., RSE, (2020)

Evaluation on annual crops in Morocco and Tunisia

Irrigation retrieval at the field scale

Ouaadi et al., MDPI/RS, 2021

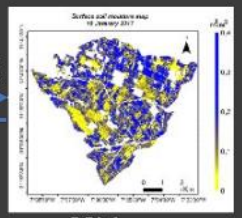
Stochastic generation of an ensemble of scenario (amount and timing)



Simple water budget model (FAO-56)

Particle filtering

« Optimal » timing and amount of water



SSM maps

☺ ~ 70% events detected for flooding / very good seasonal amounts (R > 0.98, RMSE < 32 mm)

☺ No false detection over rainfed field

☹ Uncertain around rainfall events

1) Classification of irrigated/rainfed (annual) crops

No need of « training » data / comparison to machine learning approaches

2) Joint use of SSM products and thermal infrared data

Thermal IR / LANDSAT-8 and -9

Surface temperature, ETR estimates (TSEB)

Radar / Sentinel-1

Surface soil moisture

CESBIO