

SEEDS - Sentinel EO-based Emission and Deposition Service

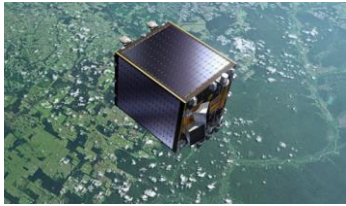
Soil moisture and LAI products



Jean-Christophe Calvet, CNRM/Meteo France

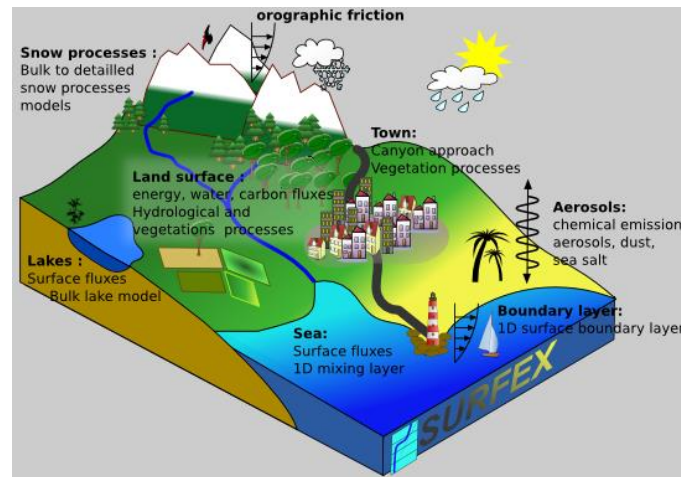
Satellite Observations

**PROBA-V
Leaf Area Index**



**(Copernicus
Global Land
Service)**

SURFEX LDAS-MONDE Data Assimilation



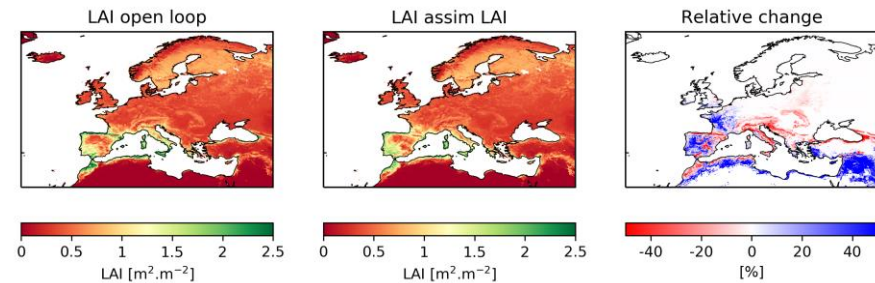
SURFEX dry deposition model

- Links to advanced vegetation model
- Uses assimilated LAI and soil moisture
- Dry deposition calculated for all surface types



- Land surface modelling and data assimilation to feed into calculation of dry deposition.
- LAI, soil moisture, and vegetation dynamics play key role in dry deposition modelling.

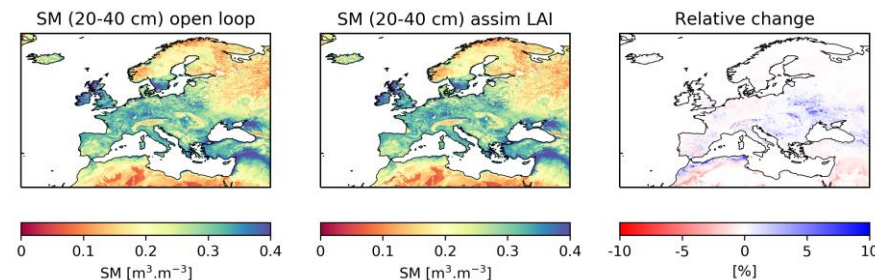
- **Deposition velocities**
- **Dry deposition diagnostics**

- Land surface variables
 - $0.1^\circ \times 0.1^\circ$ resolution
 - & sub-grid variability
 - Assimilation analysis, open-loop (no assimilation), 96-hr forecast
 - European spatial domain



LAI and soil moisture (-0.3 m) analysis for the first 10 days of 2019

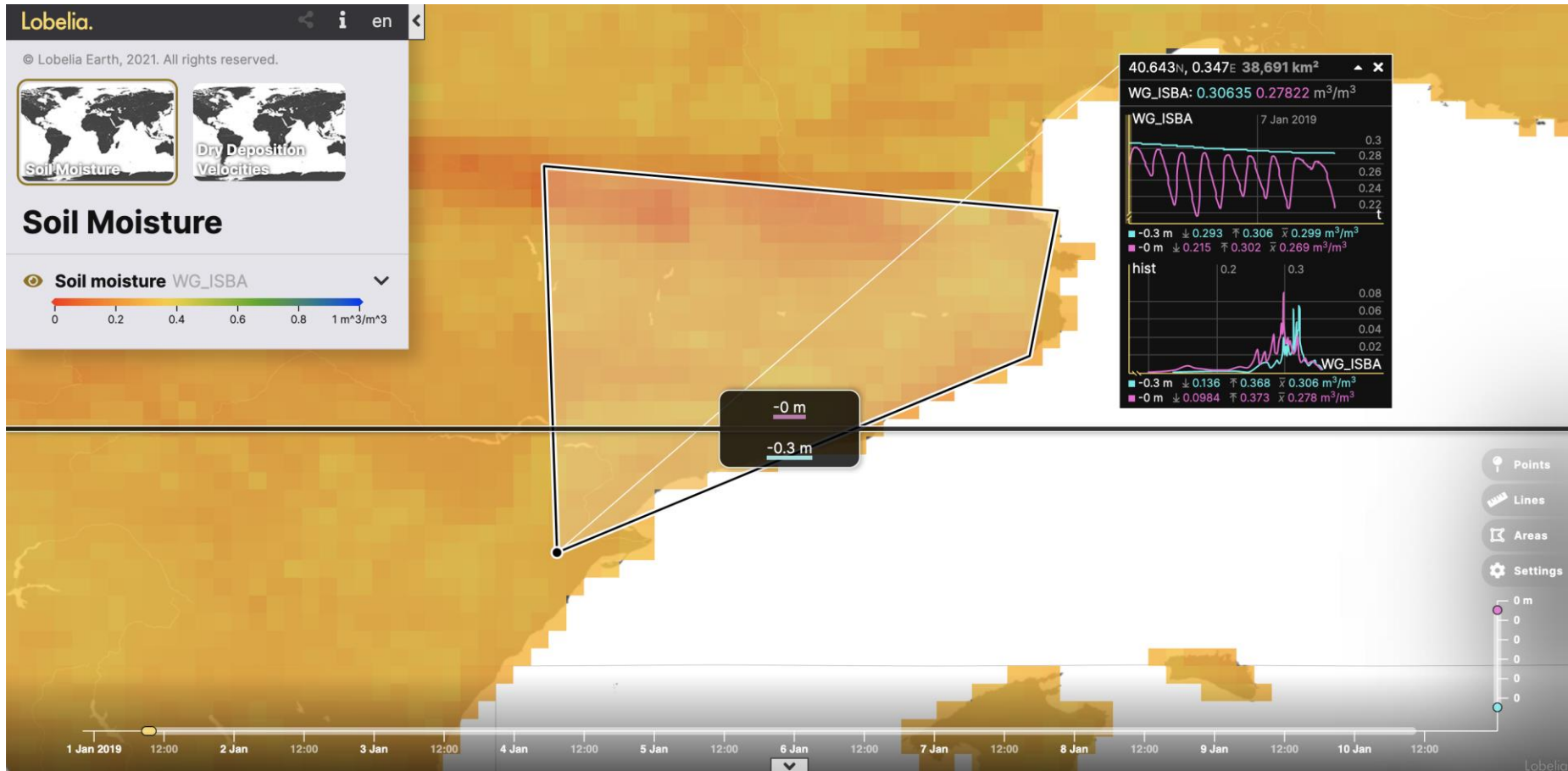
-  Leaf area index
 - Daily mean values
-  Soil Moisture
 - Hourly values



How do SEEDS products advance beyond the state-of-the-art?

- Land surface data assimilation of PROBA-V LAI
- SEEDS uses the state-of-the-art land surface model SURFEX
 - A 14-layer diffusion-based soil scheme
 - An advanced dynamic vegetation model
 - High spatial resolution of $0.1^\circ \times 0.1^\circ$
- SURFEX uses a state-of-the-art land classification map at $1 \text{ km} \times 1 \text{ km}$ resolution

Examples of SEEDS Land Surface Data



- Agricultural management
- Atmospheric chemistry
- Clay shrinking / Land slide risk monitoring
- Forestry management (drought effects, fire risk, ...)
- Pastoral farming (forage production)
- Water resource management
- ...