



SEEDS - Sentinel EO-based Emission and Deposition Service

Deposition of Nitrogen and Ozone Products



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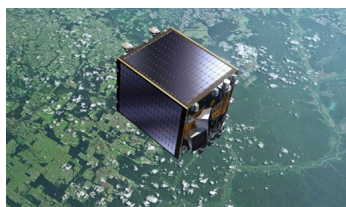
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Meteorologisch Instituut
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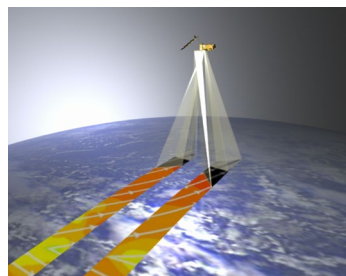
SEEDS Dry Deposition Concept

Satellite Observations

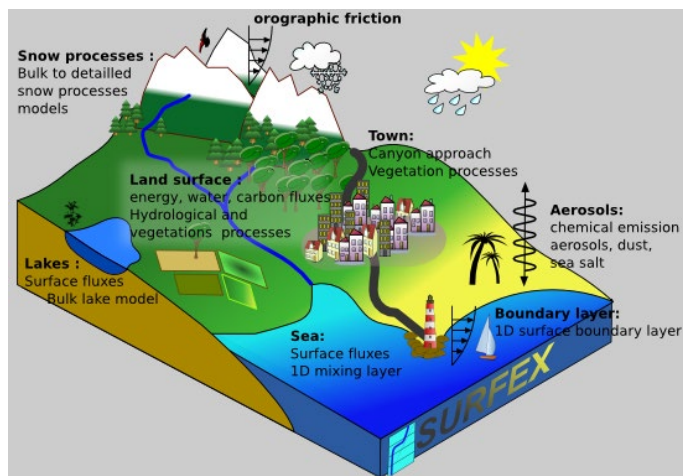
PROBA-V Leaf Area Index



Surface Soil Moisture



SURFEX LDAS-MONDE Data Assimilation



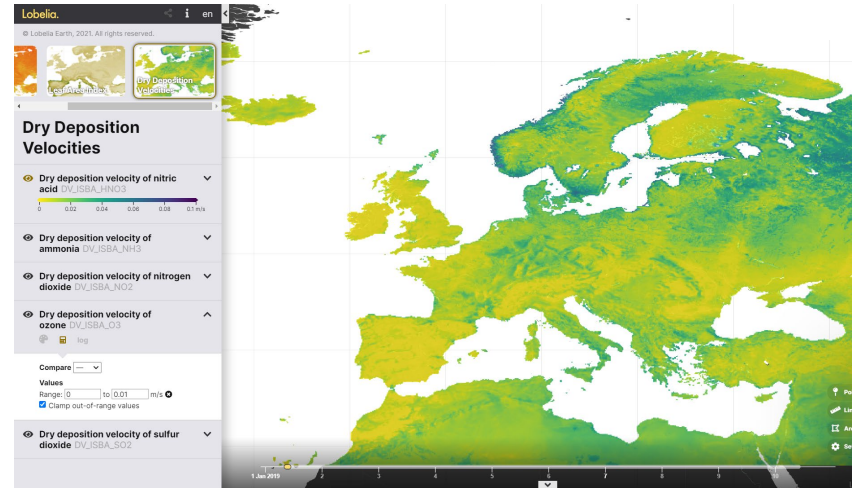
- Land surface modelling and data assimilation to feed into calculation of dry deposition.
- LAI, soil moisture, and vegetation dynamics play key role in dry deposition modelling.

SURFEX dry deposition model

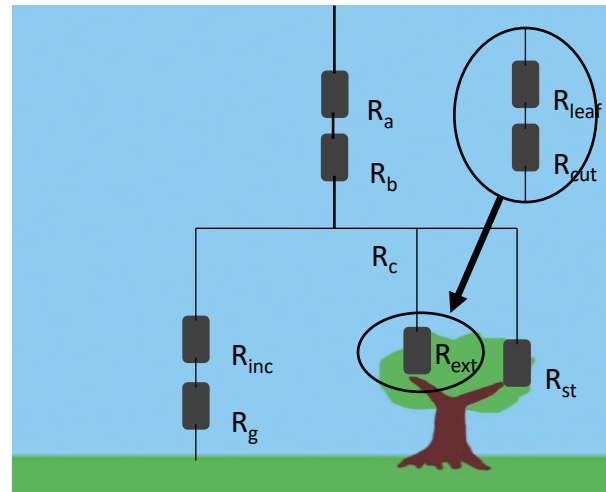
- Links to advanced vegetation model
- Uses assimilated LAI and soil moisture
- Dry deposition calculated for all surface types

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

- Dry deposition velocities and fluxes
 - Hourly values
 - Sub-grid resolution ($< 0.1^\circ \times 0.1^\circ$) at 'patch-level'
 - Assimilation analysis, open-loop (no assimilation), 96-hr forecast
 - CAMS european spatial domain
 - Available for ozone and nitrogen compounds (e.g., ammonia and nitric acid)



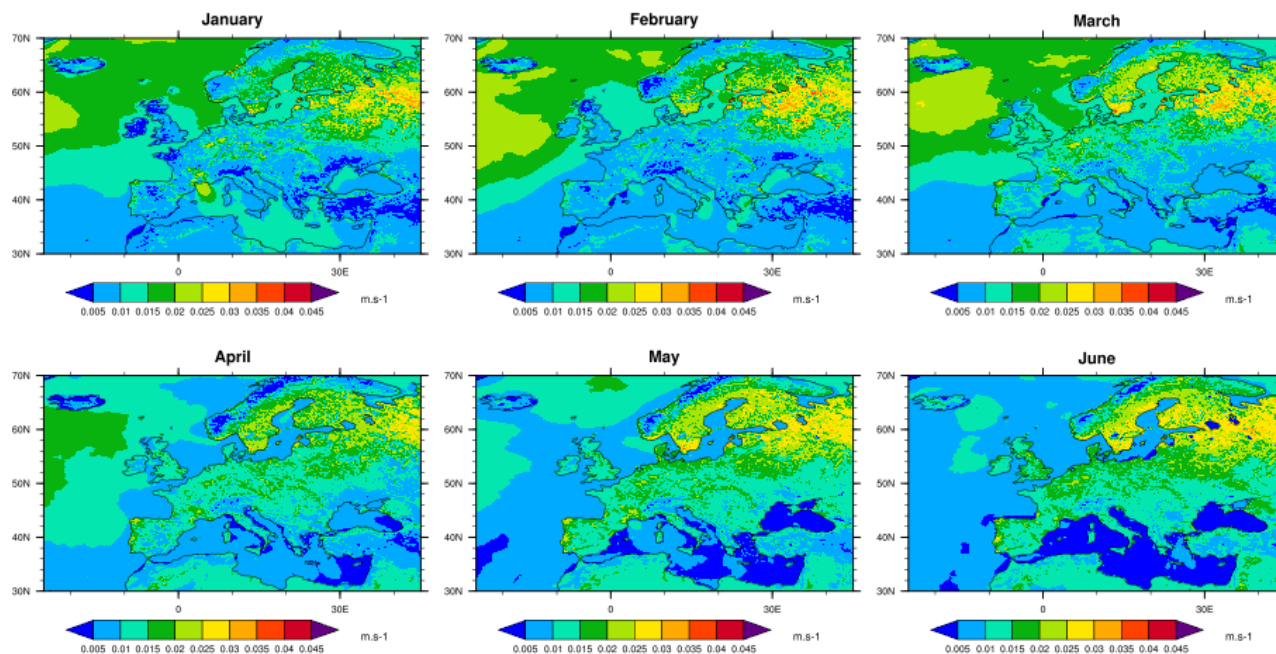
- Dry deposition diagnostics
 - Stomatal resistance
 - External leaf resistance
 - Canopy resistance
 - Ground resistance



SEEDS Dry Deposition Data Examples

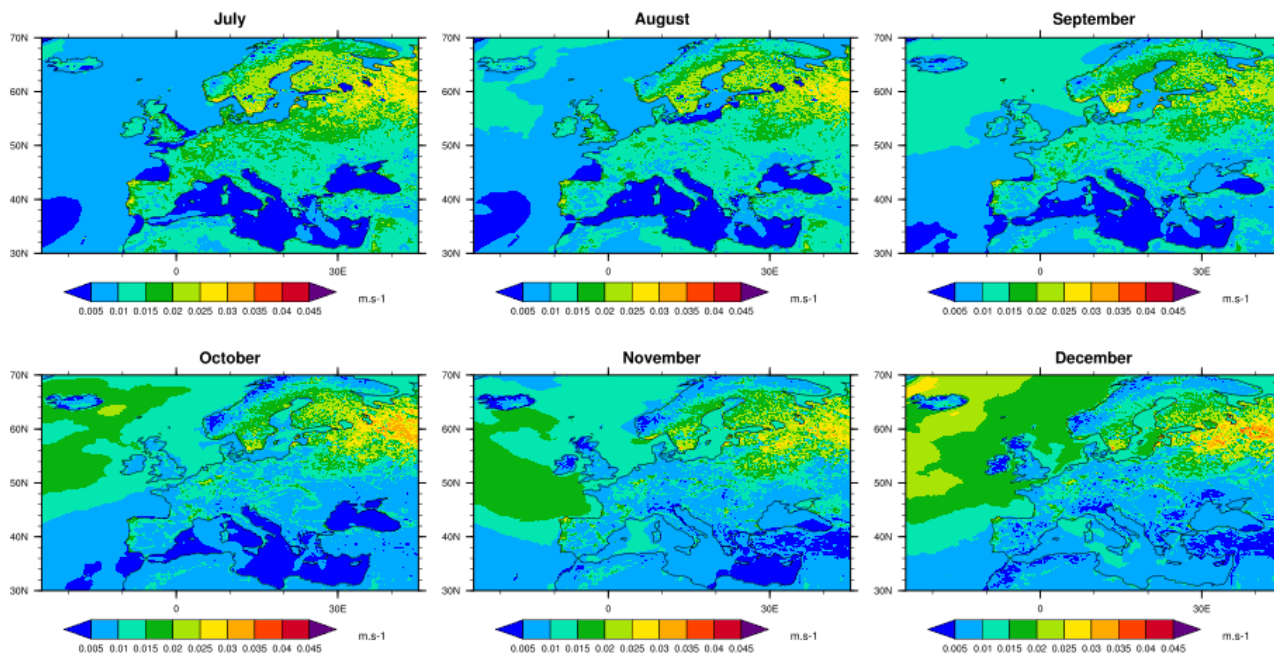
January-June 2019 Mean Dry Deposition for Nitric Acid

Monthly Mean HNO₃ Deposition Velocity Over the CAMS European Domain for 2019 - LAI Analysis



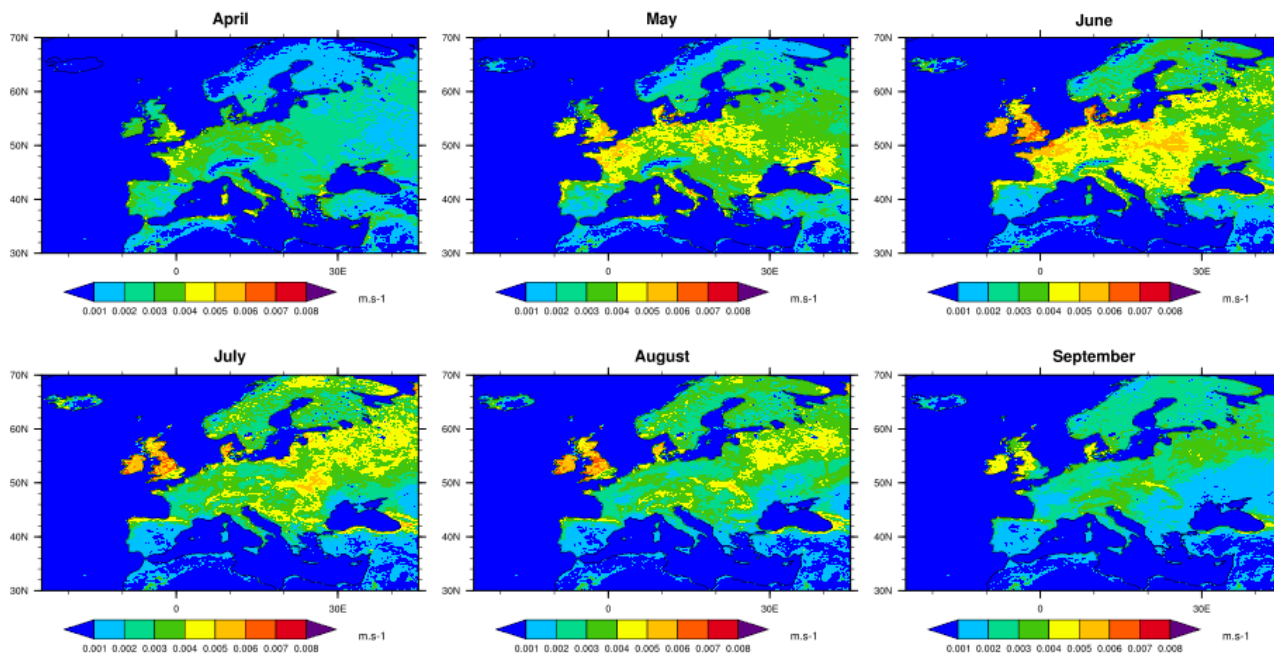
SEEDS Dry Deposition Data Examples

July-December 2019 Mean Dry Deposition Velocities for Nitric Acid



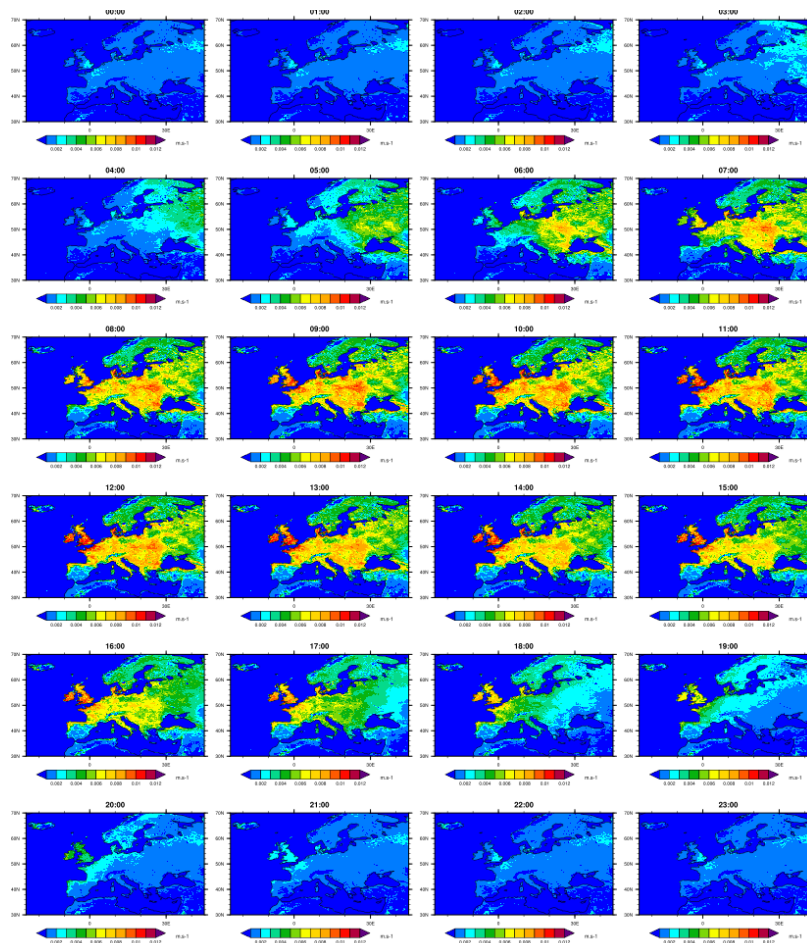
SEEDS Dry Deposition Data Examples

April-September 2019 Mean Dry Deposition Velocities for Ozone



SEEDS Dry Deposition Data Examples

Mean Hourly Dry Deposition Velocities for Ozone During June 2019

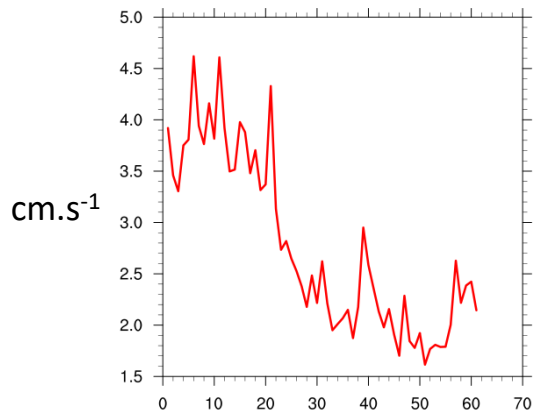




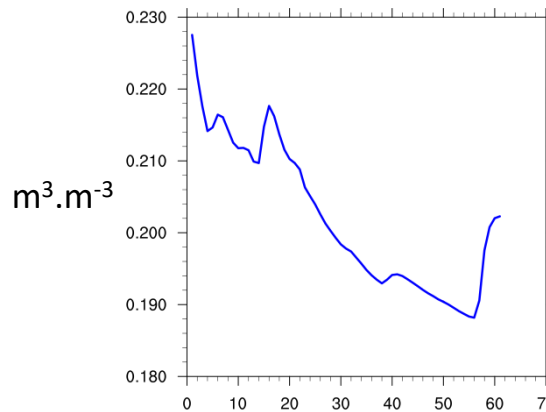
SEEDS Dry Deposition Data Examples

SW France

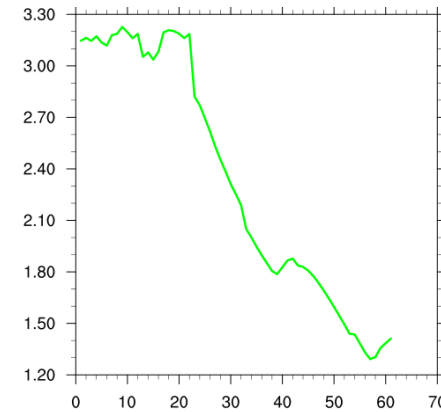
Ozone Dry Deposition Velocity



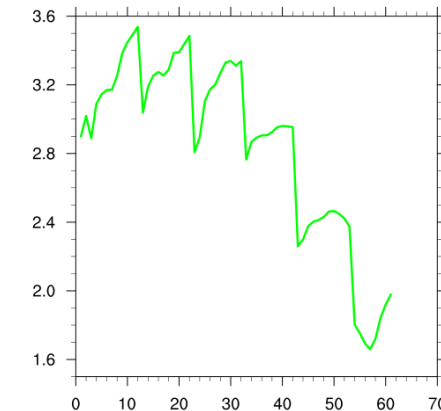
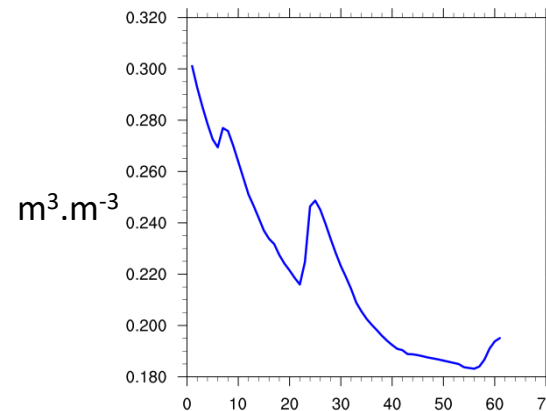
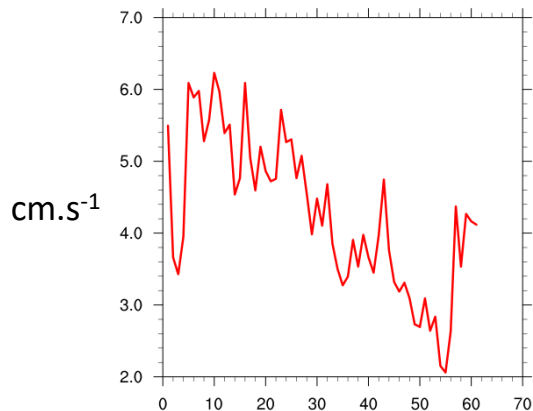
Root Zone Soil Moisture



Leaf Area Index



Vienna Region





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

- CAMS does not currently provide dry deposition information.
 - By linking dry deposition calculation to advances in land surface modelling and satellite data assimilation.
 - Development of a new integrated dry deposition scheme within SURFEX.
 - We provide a wide range of dry deposition types.
 - Deposition velocities and fluxes for ozone and nitrogen.
 - Dry deposition diagnostics
- We need feedback and interaction with **you** the potential user.



- SEEDS dry deposition data products have various potential applications
 - **Precision agriculture:**
 - i) to monitor ozone crop damage and nutrient deposition.
 - **Environmental impact monitoring:**
 - i) ozone damage to vegetation
 - ii) eutrophication in fresh waterways and coastal seas caused by deposition of reactive nitrogen.

Time for a short demonstration of the SEEDS data viewer...

Lobelia. en

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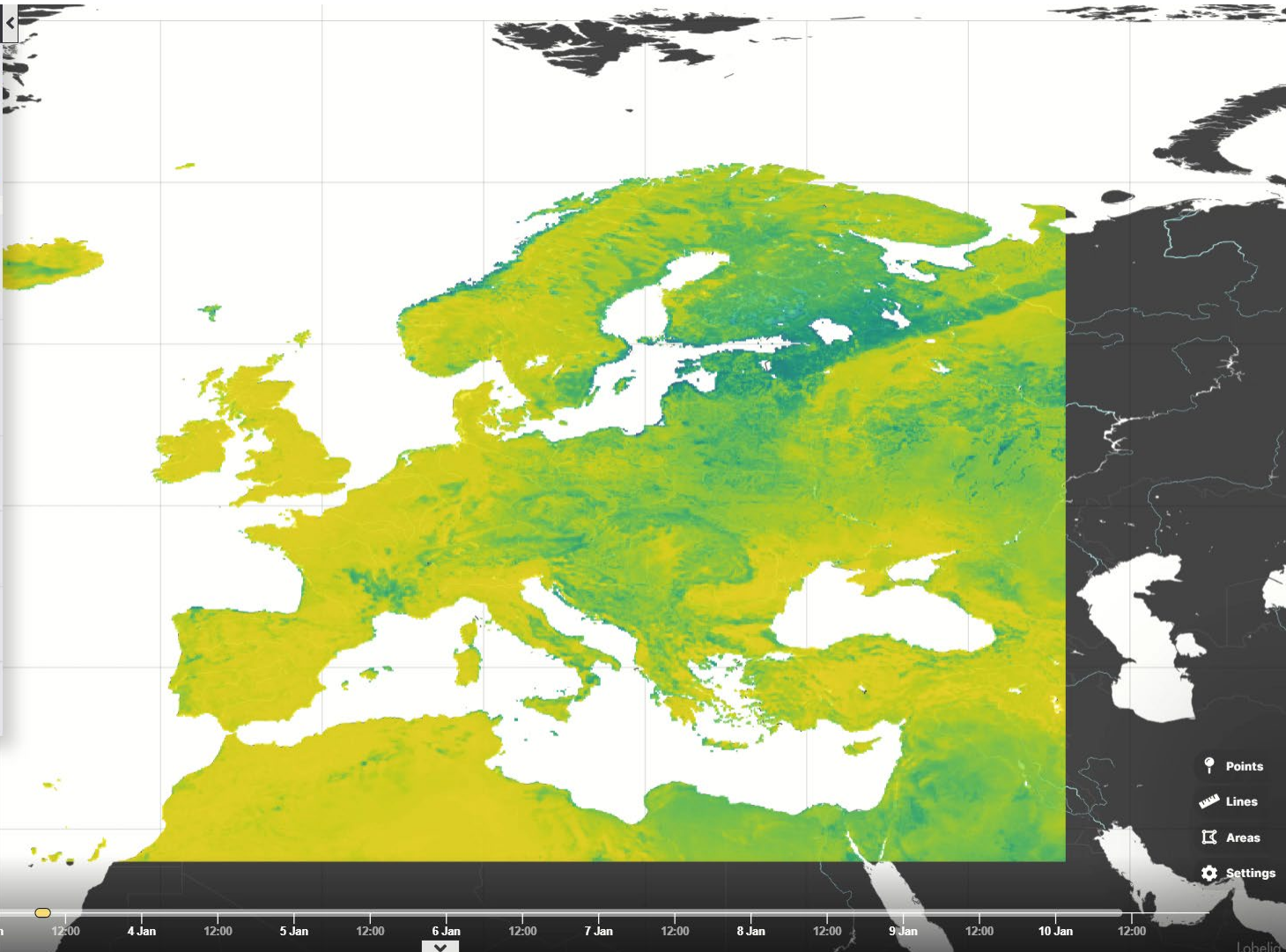
Leaf Area Index | Dry Deposition Velocities

Dry Deposition Velocities

- Dry deposition velocity of nitric acid DV_ISBA_HNO3
- Dry deposition velocity of ammonia DV_ISBA_NH3
- Dry deposition velocity of nitrogen dioxide DV_ISBA_NO2
- Dry deposition velocity of ozone DV_ISBA_O3
- Dry deposition velocity of sulfur dioxide DV_ISBA_SO2

0 0.02 0.04 0.06 0.08 0.1 m/s

1 Jan 2019 12:00 2 Jan 12:00 3 Jan 12:00 4 Jan 12:00 5 Jan 12:00 6 Jan 12:00 7 Jan 12:00 8 Jan 12:00 9 Jan 12:00 10 Jan 12:00



- Points
- Lines
- Areas
- Settings