



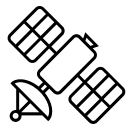
NO_x emissions from soils

- Nitric oxide (NO) emissions from soils
 - Ozone layer depletion
 - Global warming
 - Nitrogen deposition to natural ecosystems
- NO emissions are reported in terms of NO₂
- Few emission measurements of NO, relative to N₂O
- Emissions from both natural and anthropogenic sources
- Increased use of satellite imagery to measure atmospheric pollutant concentrations
 - Including NO
- Can be used to estimate emissions

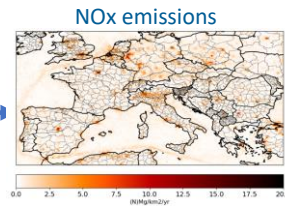
Deriving anthropogenic and soil NOx emissions from satellite observations

By Ronald van der A, Jieying Ding, Xiaojuan Lin (KNMI)

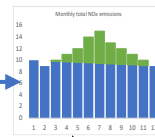
S5P/TROPOMI



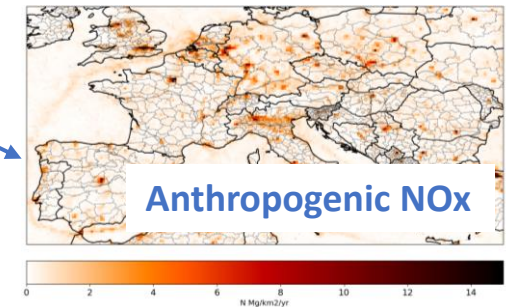
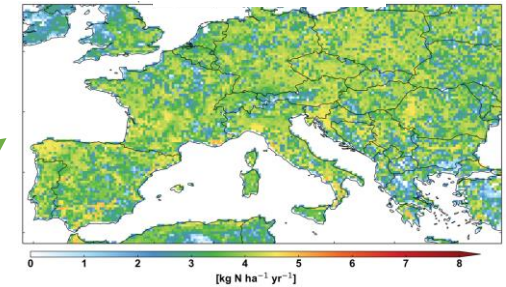
DECSO
Inversion
algorithm



Deriving soil NOx



Soil NOx



For only a selection of “purely” non-urban pixels in the domain:

1. Derive monthly NOx emissions as function of land-use fraction (forest, cropland)
2. Remove small remaining anthropogenic NOx

For all pixels:

3. Calculate soil NOx emissions per pixel using land-use fraction

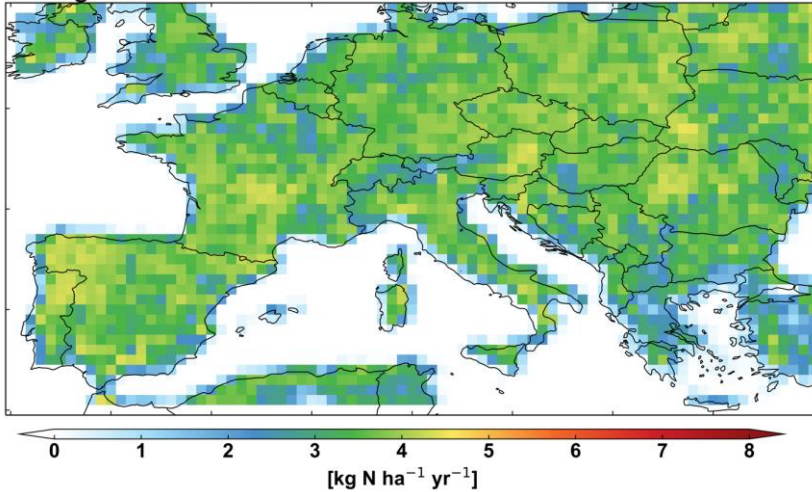
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004319



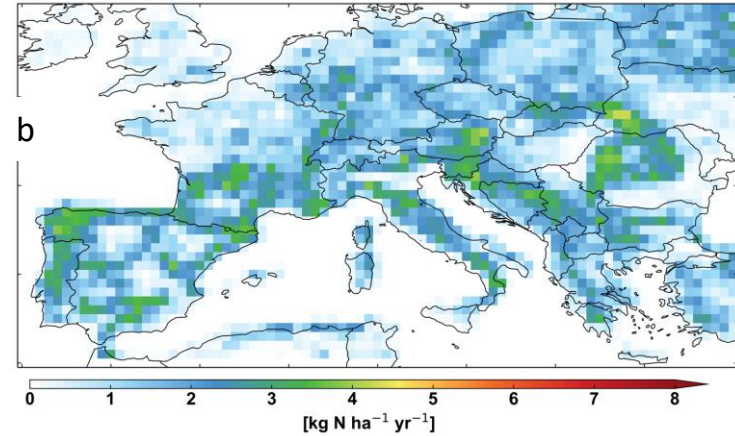
SEEDS
Sentinel EO-based Emission
and Deposition Service

Differentiation between cropland and forestry

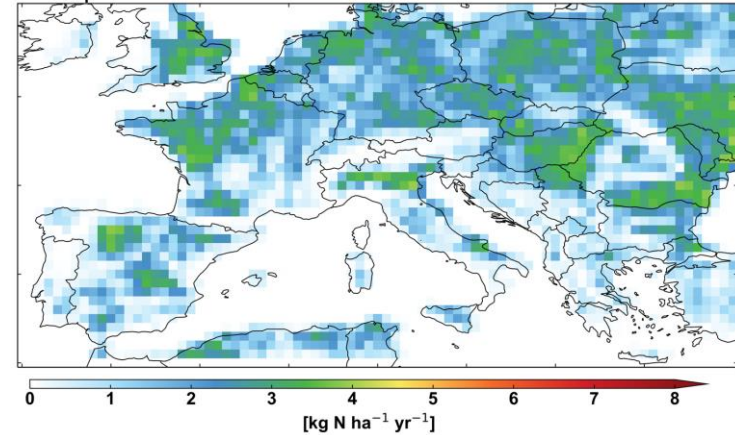
a RegridDED DECSO soil NOx emission



a Forest sector



c Croplands sector



- Satellite-derived soil emissions are shown for (a) total soil, (b) forest soil, and (c) cropland soil emissions. Based on land use data.

Presentation of SEEDS on Thursday

NO_x emissions from soils

- Gothenburg Protocol (version 1) included NO_x emissions from soils
 - But few Parties reported emissions
- Gothenburg Protocol (version 2) excluded NO_x emissions from soils
- Pressure to include NO_x from soils in the coming revision of the Protocol
 - Other sources of NO_x have been abated, so soil emissions relatively more important
 - Some soil NO_x emissions are anthropogenic (mainly agricultural)

NO_x emissions from soils

- Need to prepare for increased focus on NO_x emissions from soils
 - A lot of new data from China
 - Need more from Europe
- New data from satellite monitoring
 - Support gridding
 - Suggest higher emissions than currently estimated from some soils in S Europe
- Abatement measures will be considered by TFRN
 - Need an integrated approach to N management, to maximise synergies and minimise trade-offs