

Ecosystem Conservation and Restoration: Open Information and Consultation Day for CSOs/NGOs

Atmospheric Composition Applications
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14/10/2022

Atmospheric Composition data can provide valuable info about ecosystems:

Emissions from ecosystems (GHG, BVOC, other trace gases)

Air Pollution affects ecosystems (Ozone, NO_x,...)

The Atmosphere is a medium of vital elements' transport for ecosystems
(dust dissemination)



NH₃ mainly from human activities
But ...

One single natural source detected:
Lake Natron (Tanzania)

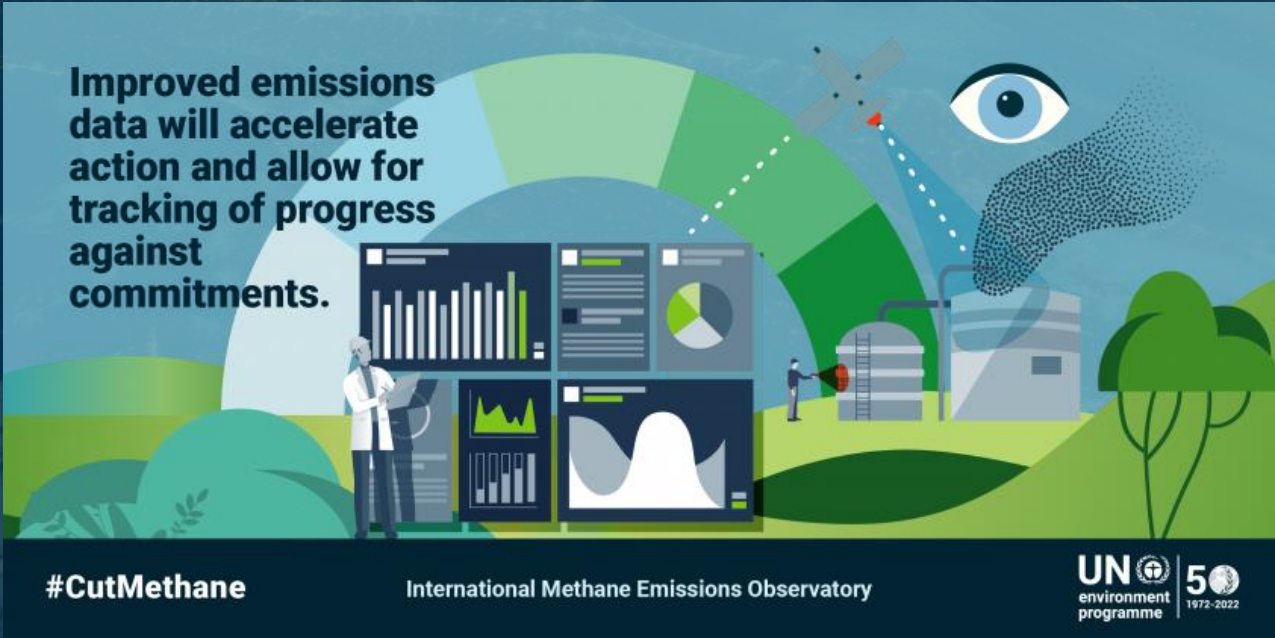
Flamingos ?
Plankton ?
Bacteria ?

NH₃ is also strongly linked to
human-induced pollution (fertilizers,
livestock)

The Deadly Lake Where 75 Percent of the World's Lesser Flamingos Are Born | Travel| Smithsonian Magazine

Clarisse, L., Van Damme, M., Gardner, W. *et al.* Atmospheric ammonia (NH₃) emanations from Lake Natron's saline mudflats. *Sci Rep* **9**, 4441 (2019).
<https://doi.org/10.1038/s41598-019-39935-3>

GHG Monitoring is a High Priority in the Global Policies Agenda: Anthropogenic and Natural Sources



Improved emissions data will accelerate action and allow for tracking of progress against commitments.

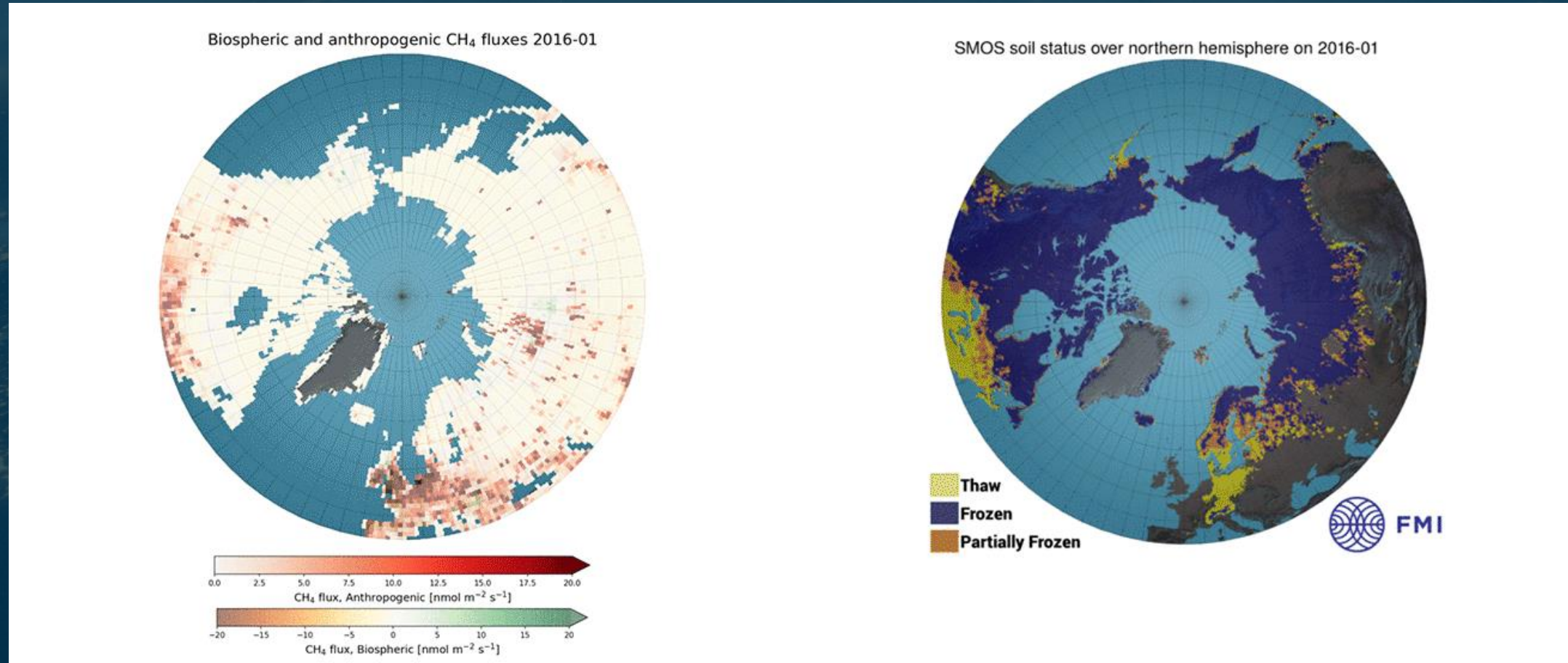
#CutMethane International Methane Emissions Observatory

UN environment programme 1972-2022

The infographic features a stylized illustration of a person in a lab coat looking at a dashboard with various charts and graphs. In the background, there is a large eye icon, a satellite in orbit, and industrial smokestacks emitting smoke.

Methane Emissions in the Arctic region

MethEO - Methane emissions in the Northern Hemisphere by applying both data from Earth Observing (EO) satellites and global atmospheric methane inversion model estimates - eo science for society





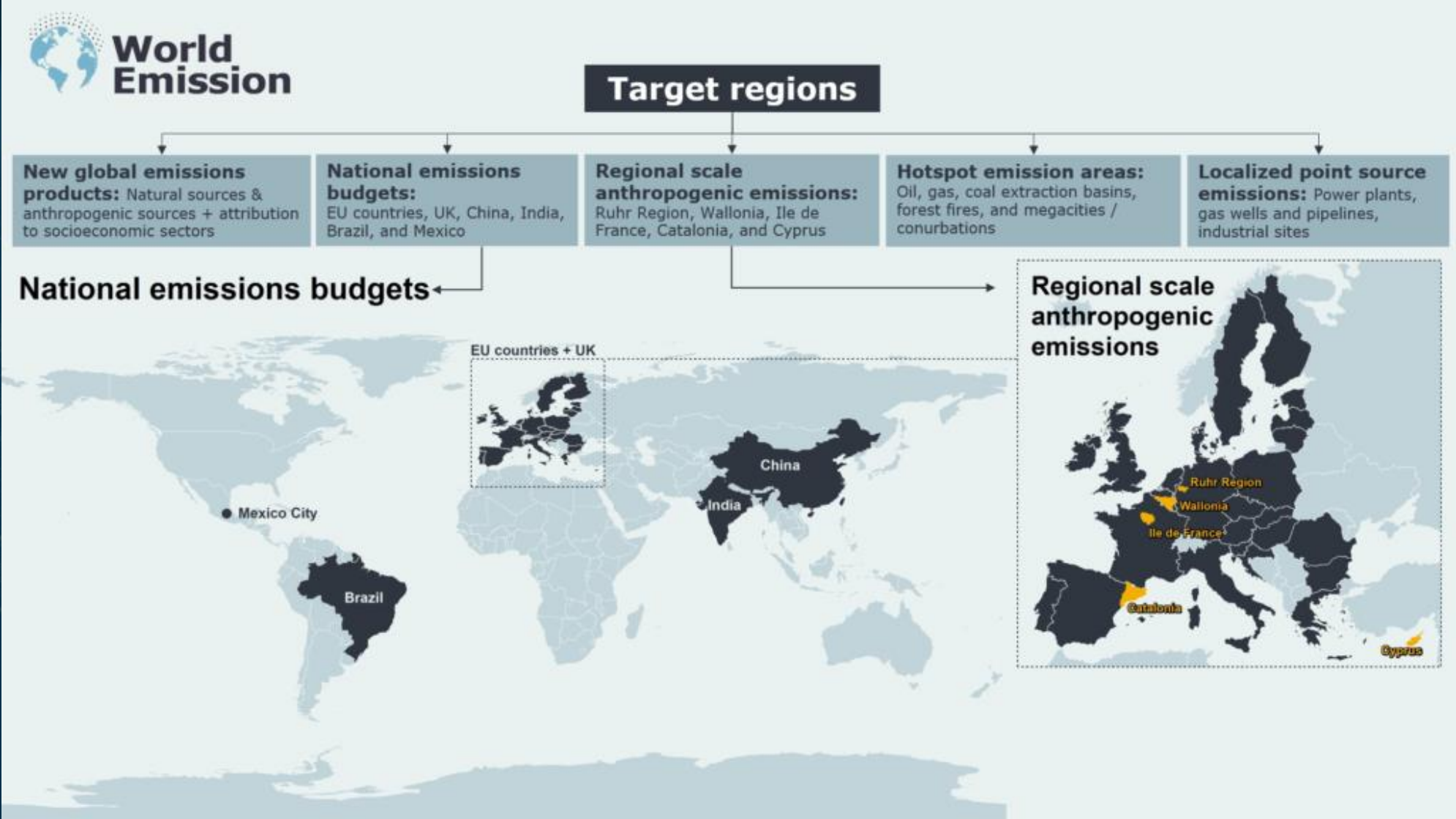
World Emission

Pollutant and greenhouse gas emission inventories



world-emission.com

	Local	Regional	Global
CO2	X	X	X
CH4	X	X	X
NH3	X	X	X
SO2	X		X
NOx	X	X	X
PM		X	
CO		X	X
CH3OH	X		X
VOC			X
CHOCHO			X
HCHO			X
Isoprene			X



Fires and biomass Burning



Close monitoring of fires with
Sentinel-2 and Sentinel-3



Copernicus Sentinel-2 captures wildfires in Gironde

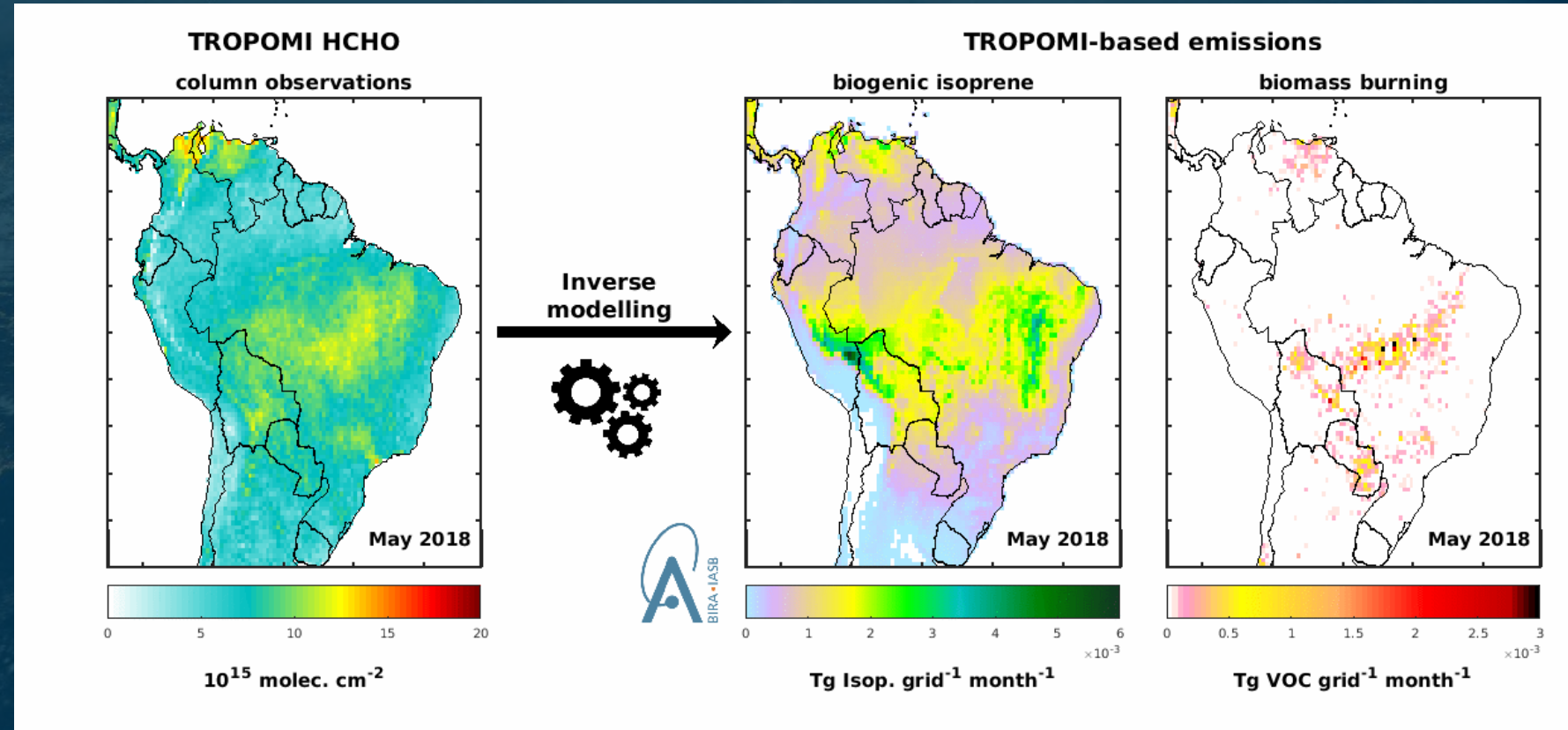


BVOC and biomass burning

ESA projects:

- GLYRETRO (CHOCHO)
www.glyretro.aeronomie.be/
- SOLFEO (BVOC in Amazonia)
[SOLFEO - Spaceborne Observations over Latin America For Emission Optimization applications - eo science for society \(esa.int\)](http://SOLFEO - Spaceborne Observations over Latin America For Emission Optimization applications - eo science for society (esa.int))

Animation from SOLFEO



Pollution from anthropogenic activities or natural phenomenon can alter ecosystems' health

Tropospheric Ozone

NO_x

PM

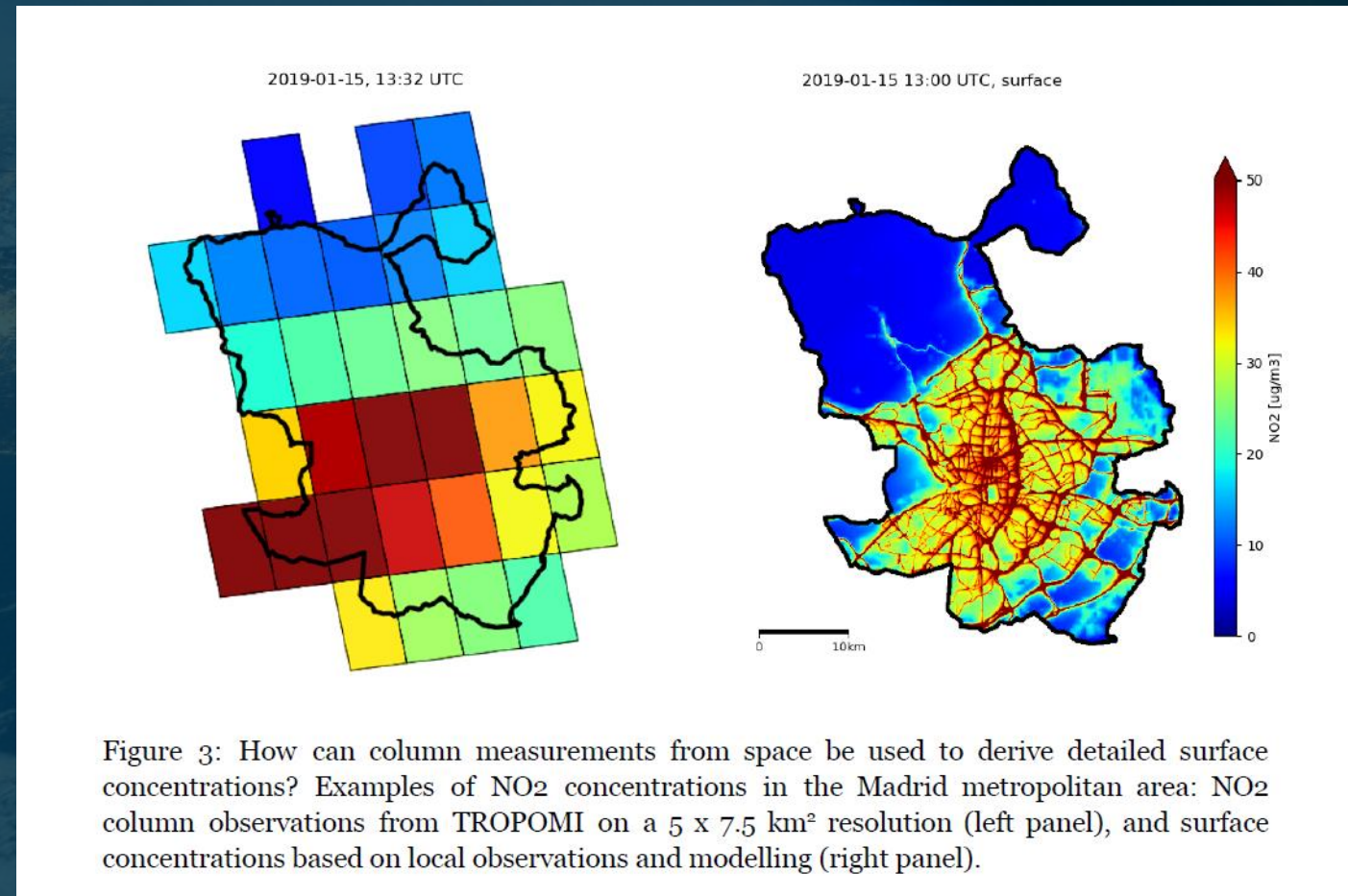
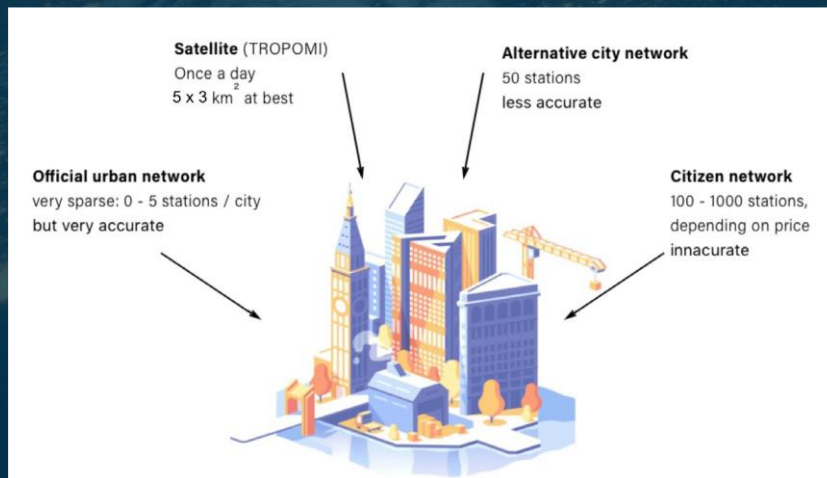
ESA projects: WorldEmission, AlpAirEO, CitySatAir,...



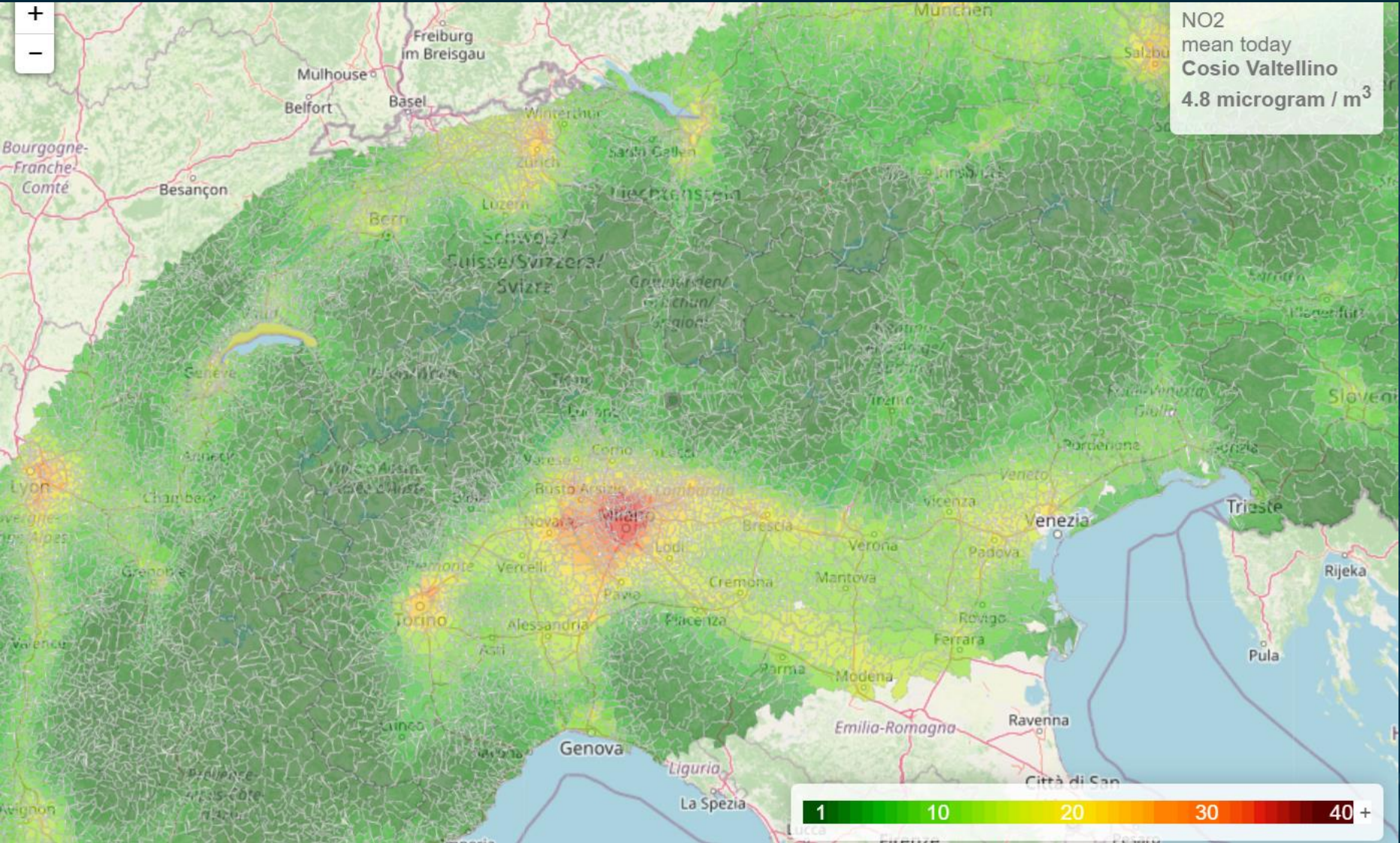
Pollution for Urban Ecosystems

Street Level Air Quality Service

Madrid, Oslo + Warsaw, Rotterdam



<https://citysatair.nilu.no/>

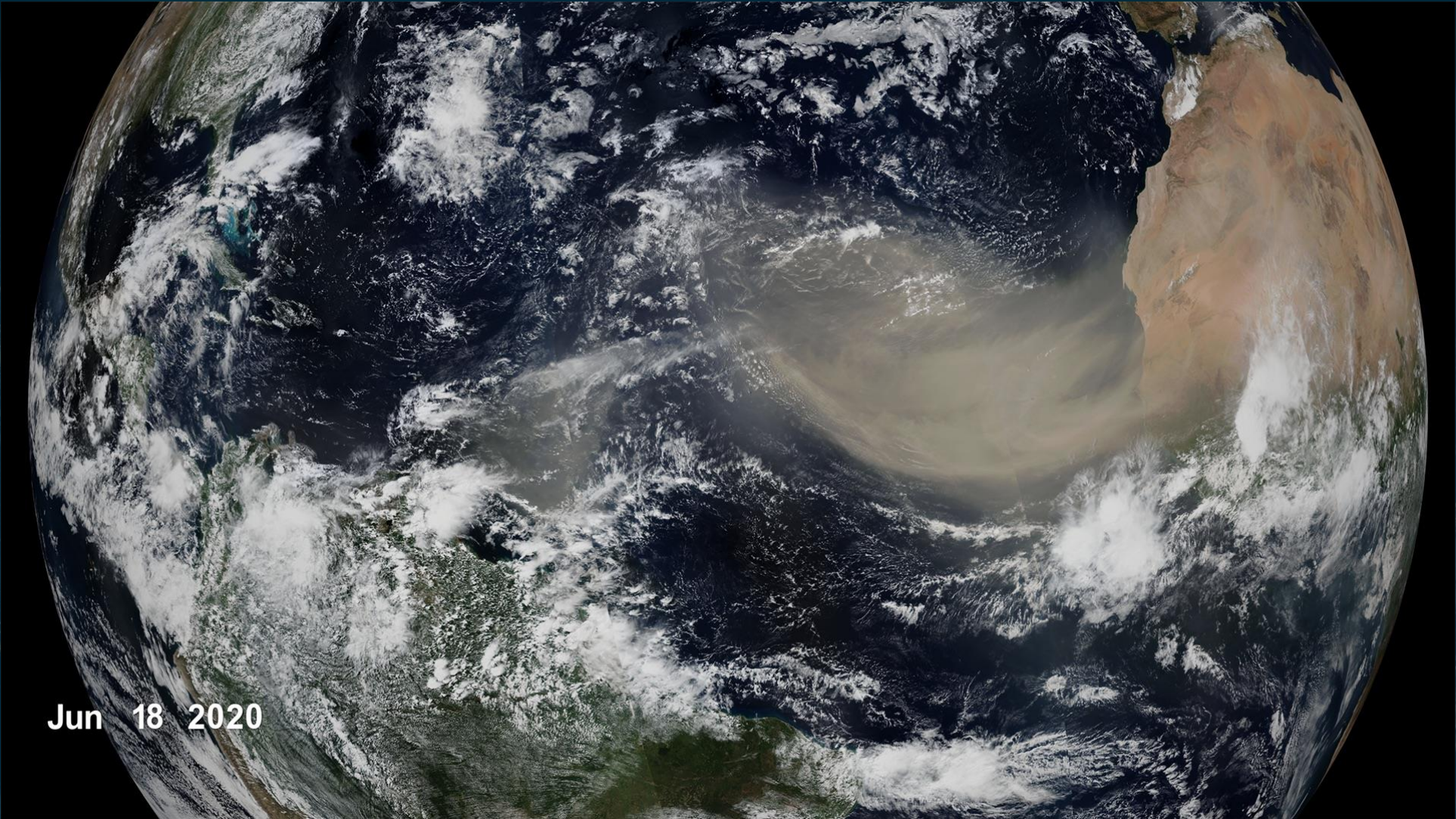


Air Quality Mapping
over the Alps

- Ozone
- NO2
- PM
- SO2
- AQ Index

wdc.dlr.de/AlpAirEO/

Dust dissemination into Oceans



Credits: NASA's Goddard Space Flight Center



SIF = Proxy for Gross Primary Productivity



[SENTINEL-5P+ INNOVATION SOLAR INDUCED CHLOROPHYLL FLUORESCENCE \(SIF\) - eo science for society \(esa.int\)](https://esa.int/eo-science-for-society)



ESA SIF-dedicated mission
To be launched in 2025

QUESTIONS ?