



Co-ordinated by
ECMWF



CoC02

Prototype system for a
Copernicus CO₂ service

MONITORING HUMAN CARBON DIOXIDE EMISSIONS

From science innovation to
operational services

Richard Engelen & Gianpaolo Balsamo
ECMWF
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Welcome!

CoCO2 User consultation workshop

**How can atmospheric observations support city-scale
GHG inventories?**



CoCO2

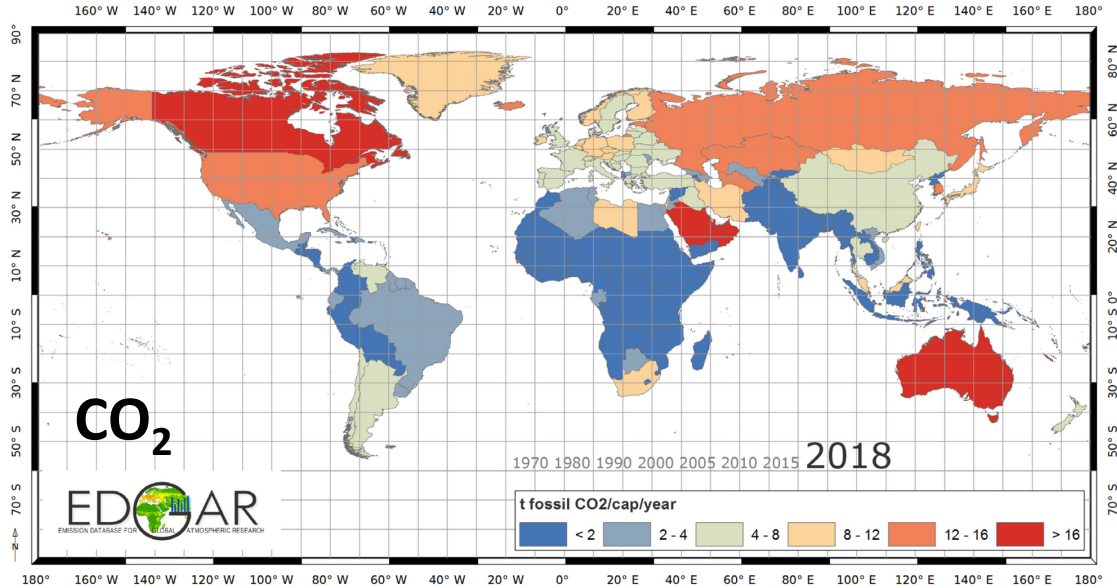
Prototype system for a
Copernicus CO₂ service



Local Governments
for Sustainability



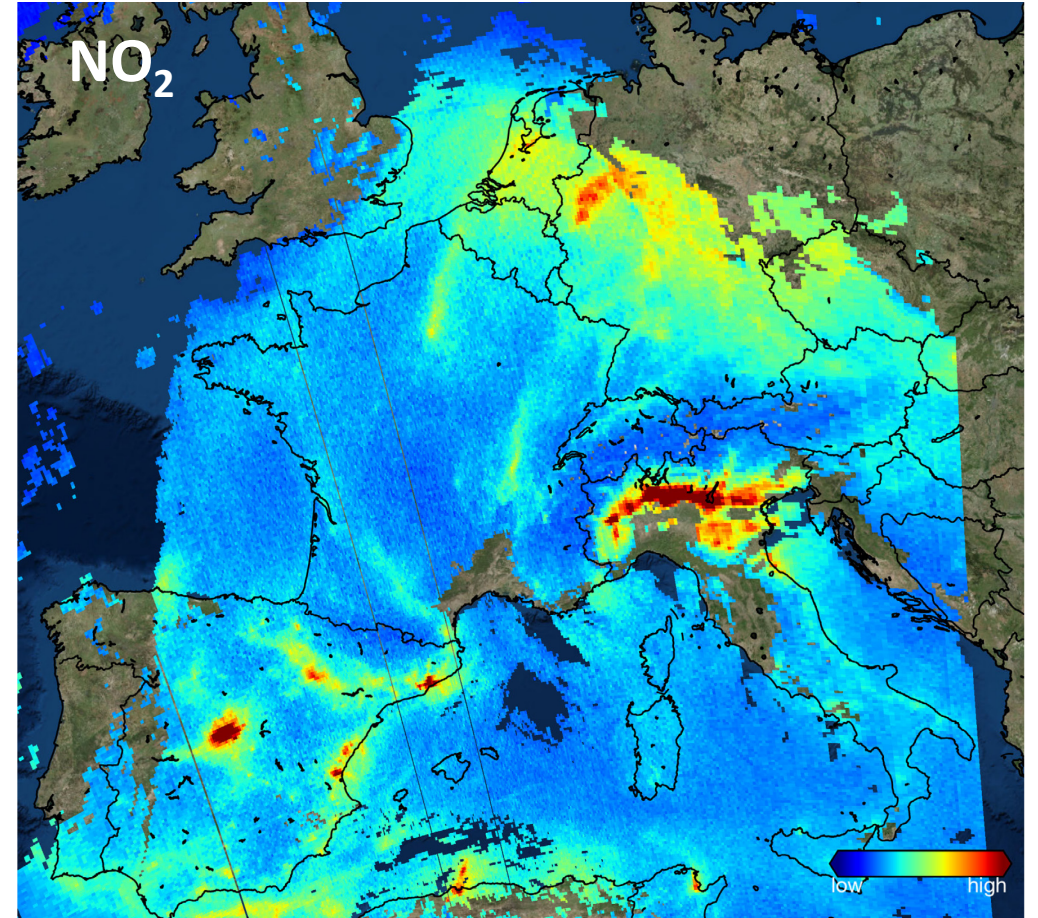
Understanding our emissions and how they change



CO₂ emission estimates based on nationally reported data

Observing atmospheric composition from space is a rapidly developing field. Many exciting new instruments, large and small, are being developed and launched.

Can we use Earth observations to improve our knowledge of anthropogenic emissions?



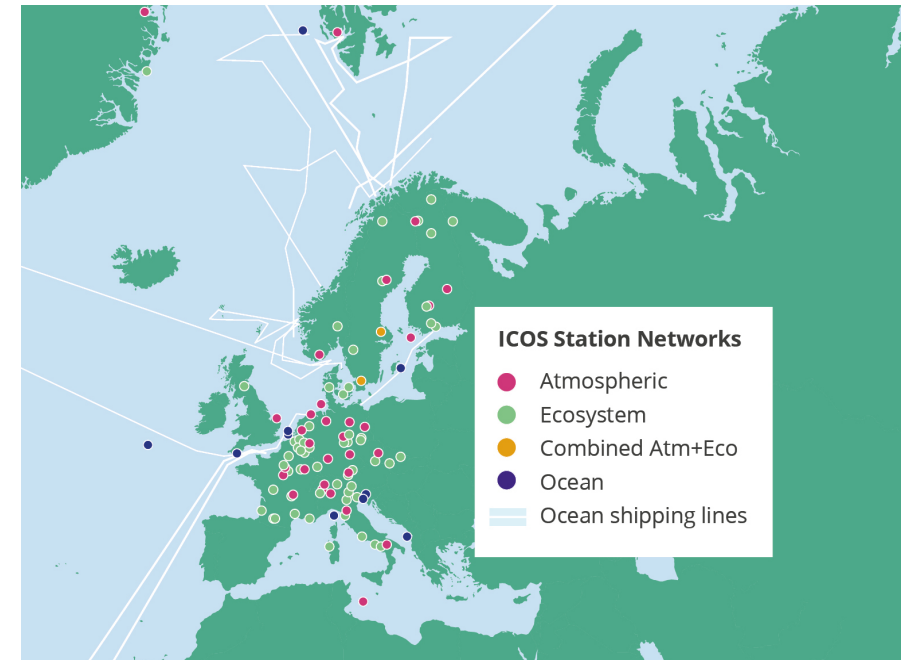
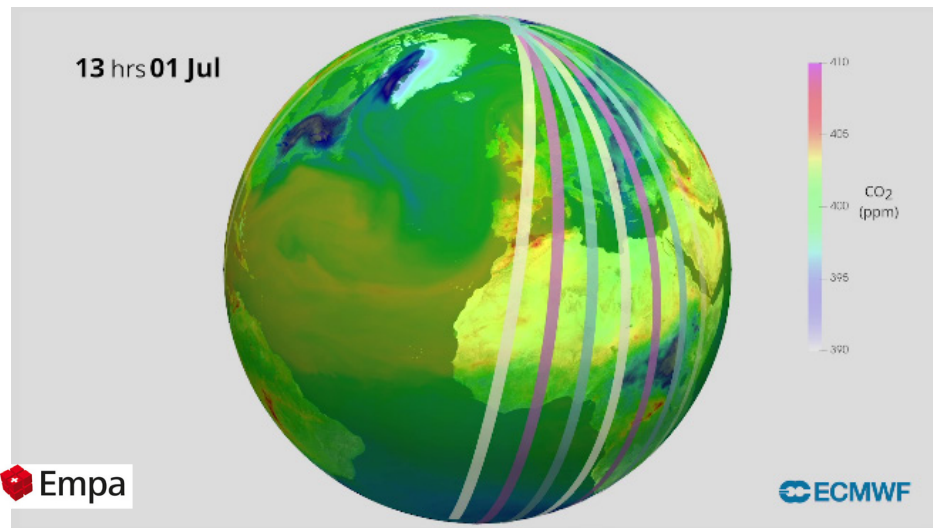
contains modified Copernicus Sentinel data (2017), processed by KNMI/ESA
NO₂ tropospheric columns observed by Sentinel-5p



The role of observations

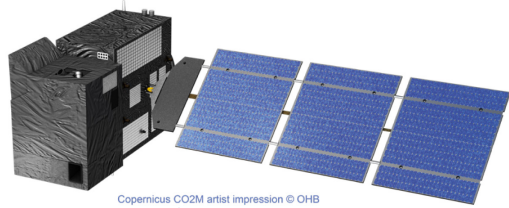


Observations provide an increasing source of real-time information on emissions.
While indirect – satellites only measure atmospheric concentrations or properties of the land and marine surface – observations are globally consistent and can often be calibrated against internationally agreed standards.





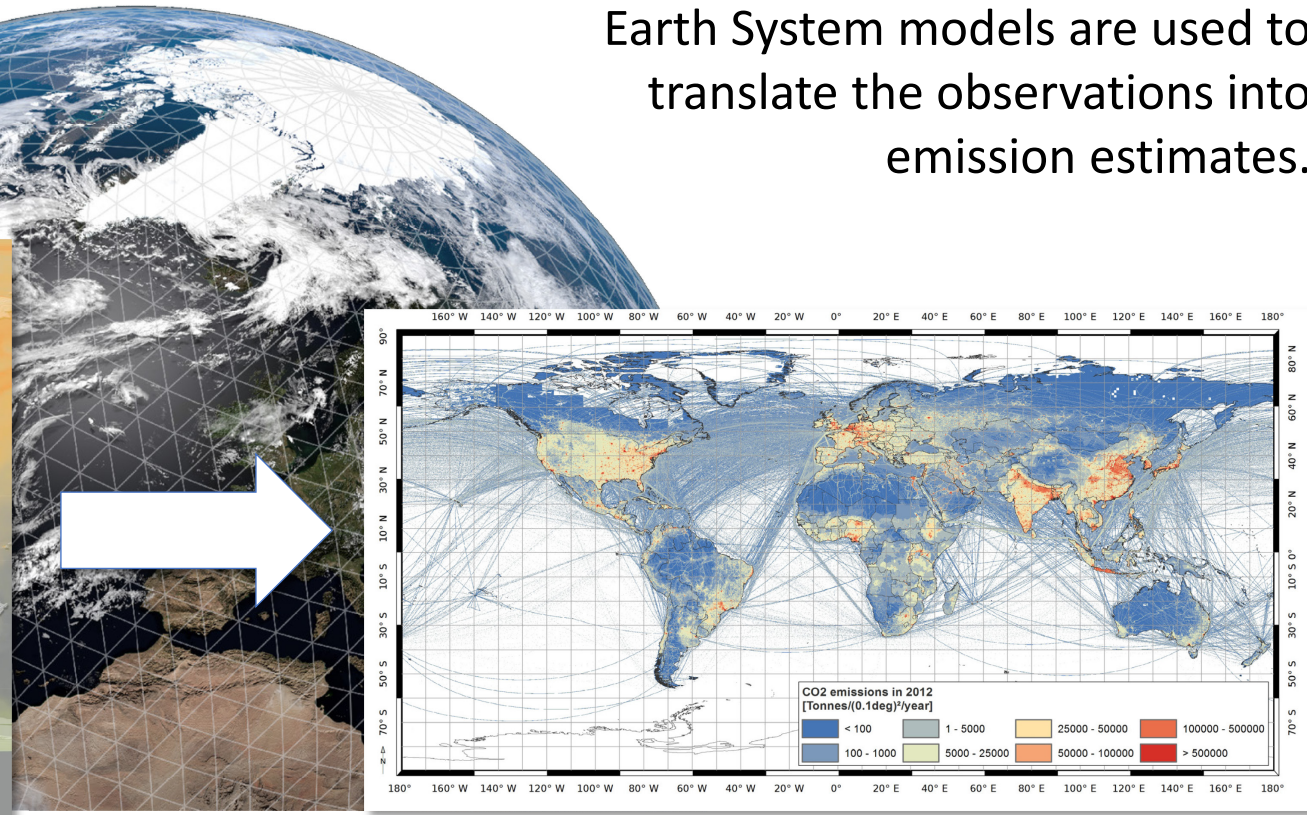
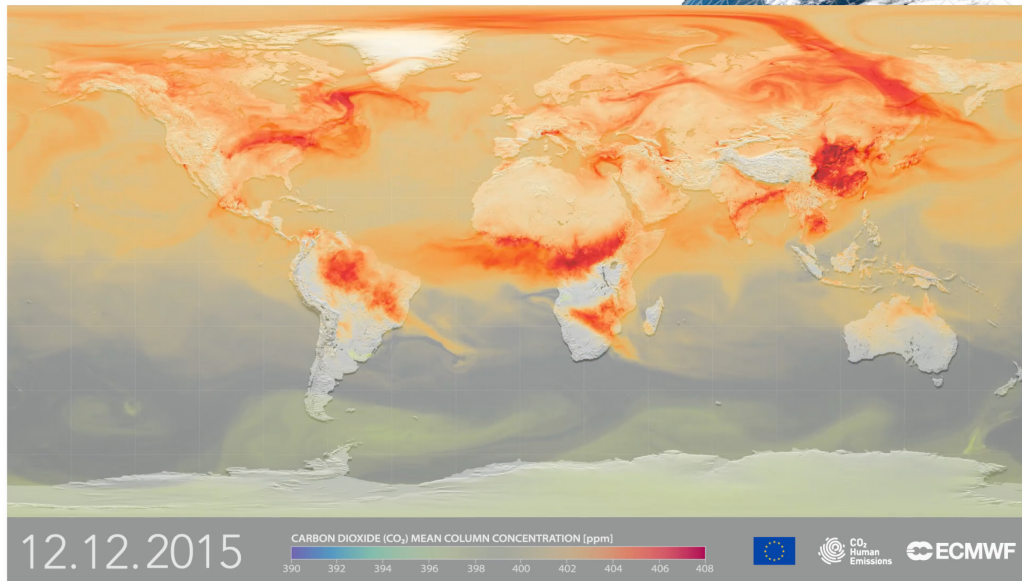
Challenges of observation-based emission monitoring



Copernicus CO2M artist impression © OHB

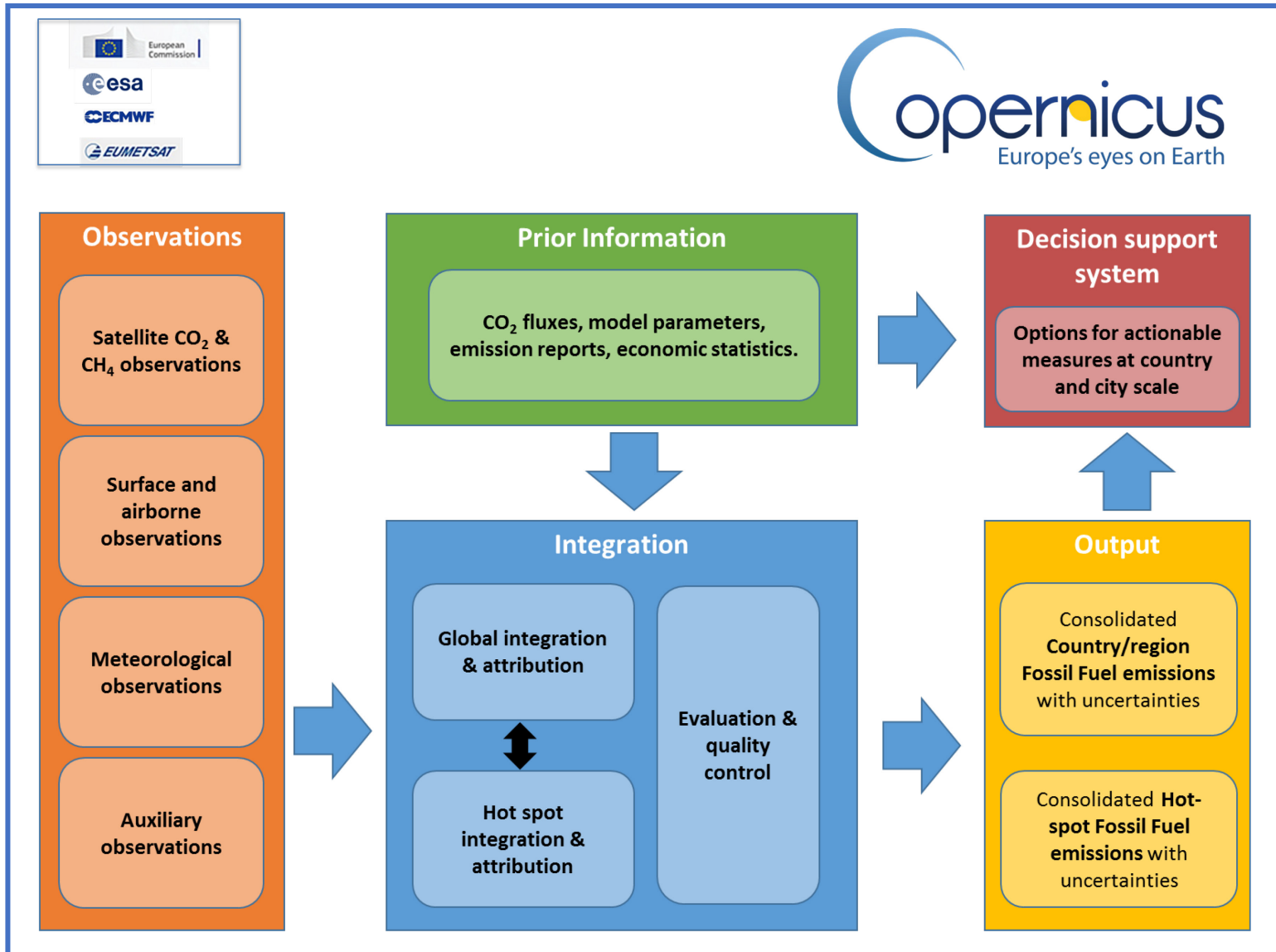
1. Satellites do not measure emissions directly; they measure the impact of emissions on the atmosphere.
2. Satellites see only the total impact of anthropogenic and natural effects.


Earth System models are used to translate the observations into emission estimates.





CoCO2: Developing a new Copernicus CO₂ monitoring service



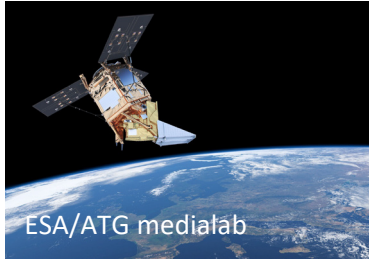
 **CoCO2**
Prototype system for a
Copernicus CO₂ service

 **Atmosphere
Monitoring Service**
atmosphere.copernicus.eu

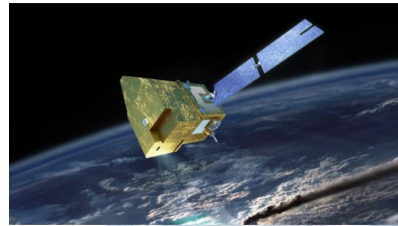




Moving forward: from science to services



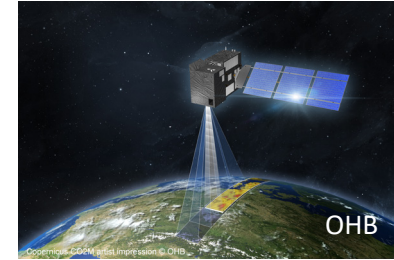
Sentinel-5p, OCO-2, GOSAT



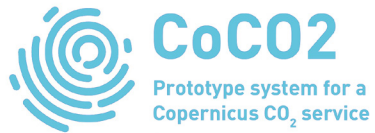
Microcarb, Merlin, ...



Sentinel-4&5



CO2M



2021

Innovation!



Atmosphere Monitoring Service

atmosphere.copernicus.eu

2026



Horizon 2020

Horizon Europe

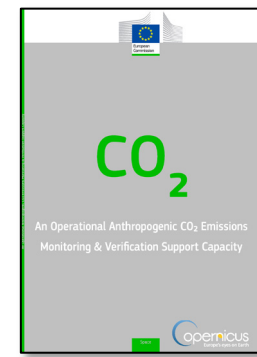


Observations – in situ



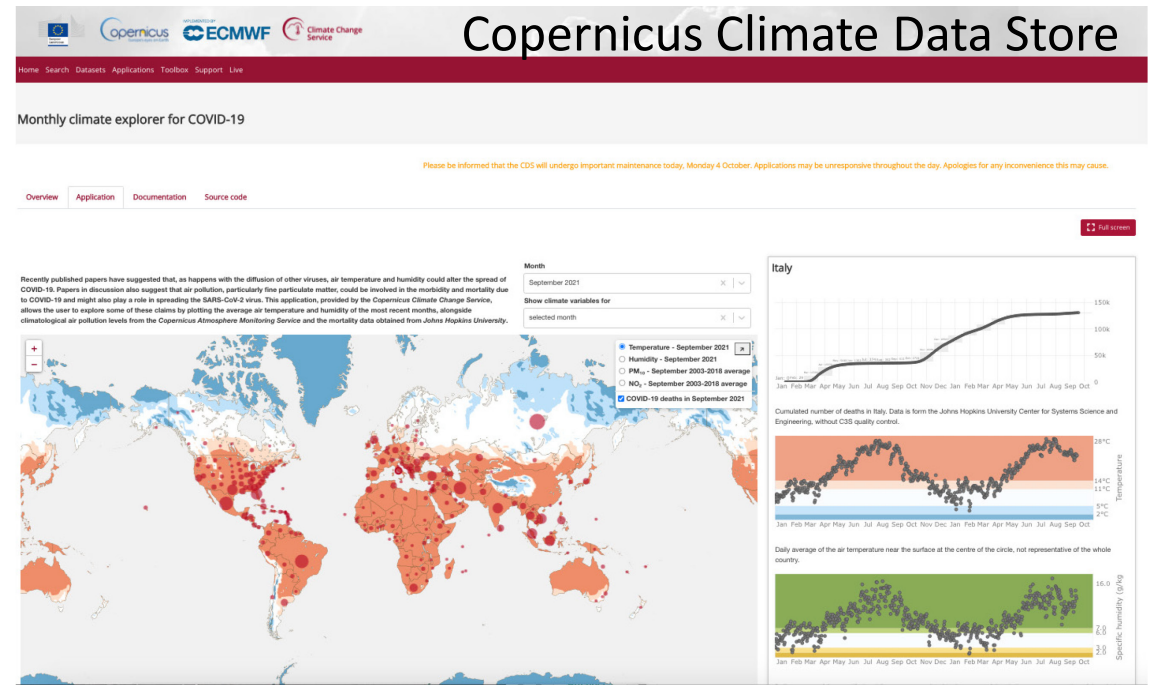
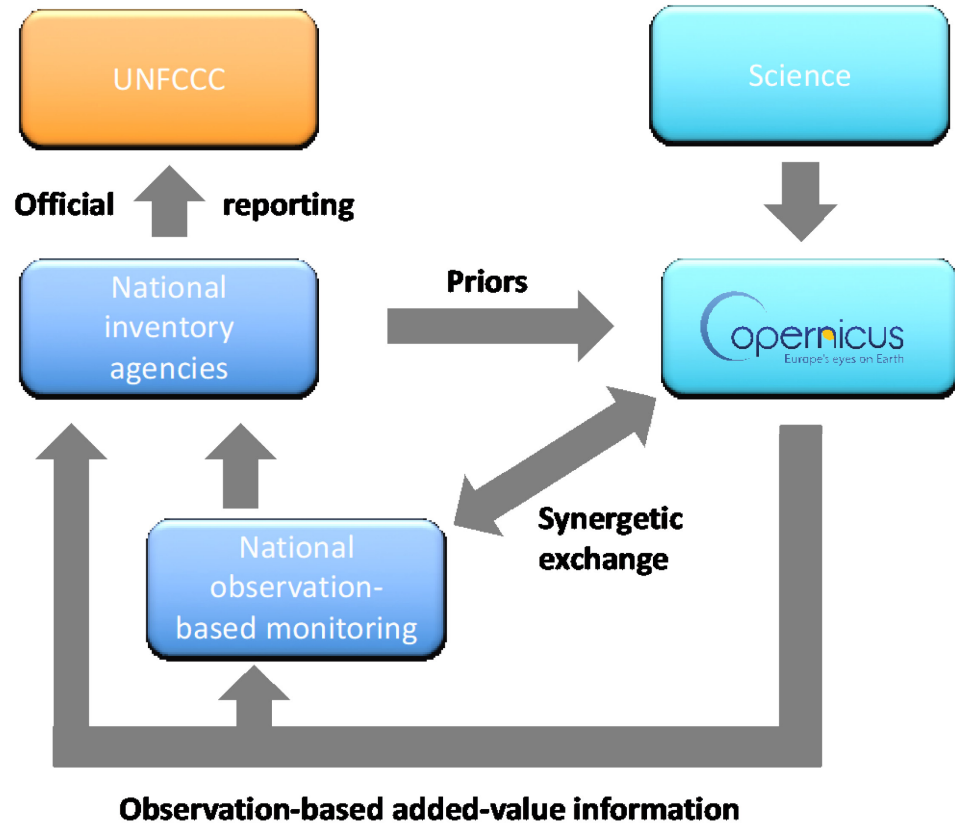
The in-situ observation component (atmosphere, land and ocean) is critical for the success of the CO₂ service. Close collaboration with international frameworks to exploit ways to strengthen this part of the service.

An operational service has specific requirements in terms of timeliness and automatic quality control. This was documented by CO₂ Task Force Green Report

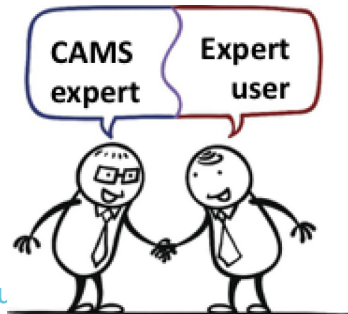




User engagement for co-designed user services



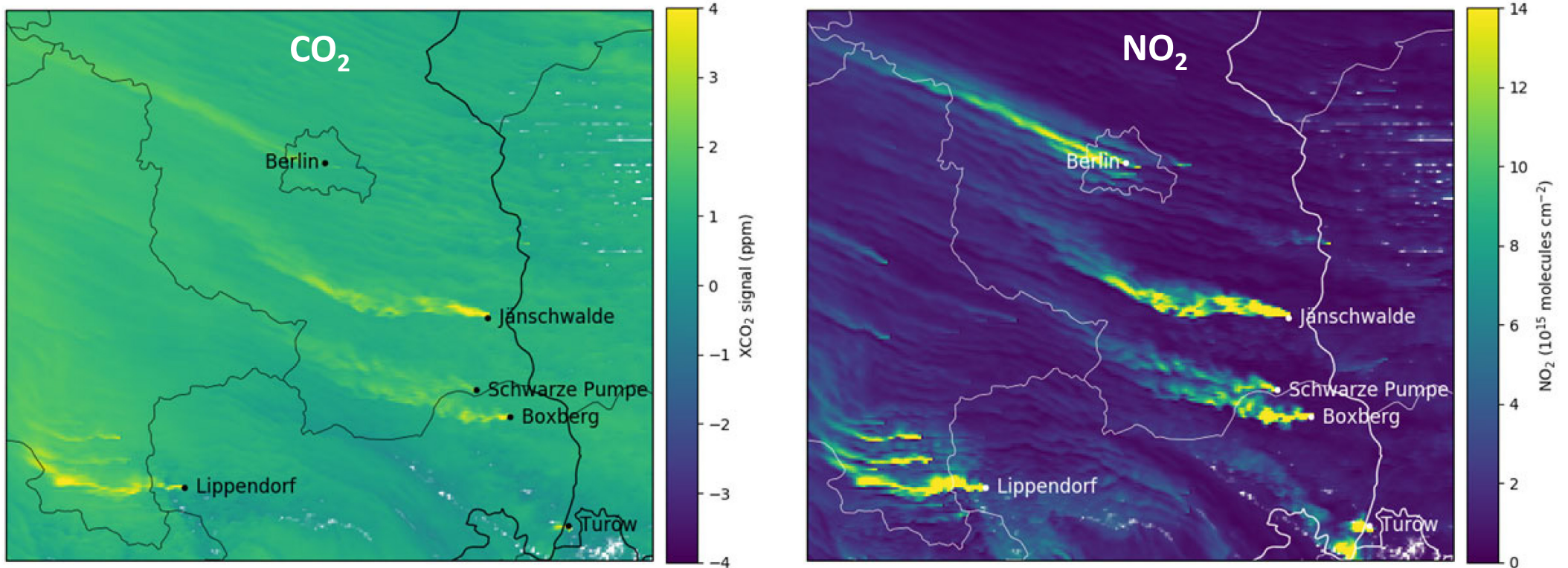
Web-based tools to make data accessible



United Nations Framework Convention on Climate Change



Back to cities – what we observe from space



We observe the impact of all emissions (and uptakes) together on the atmosphere.

But we can use observations from various pollutants to tell us more...

And we can use knowledge about relations between different pollutants to tell us more...

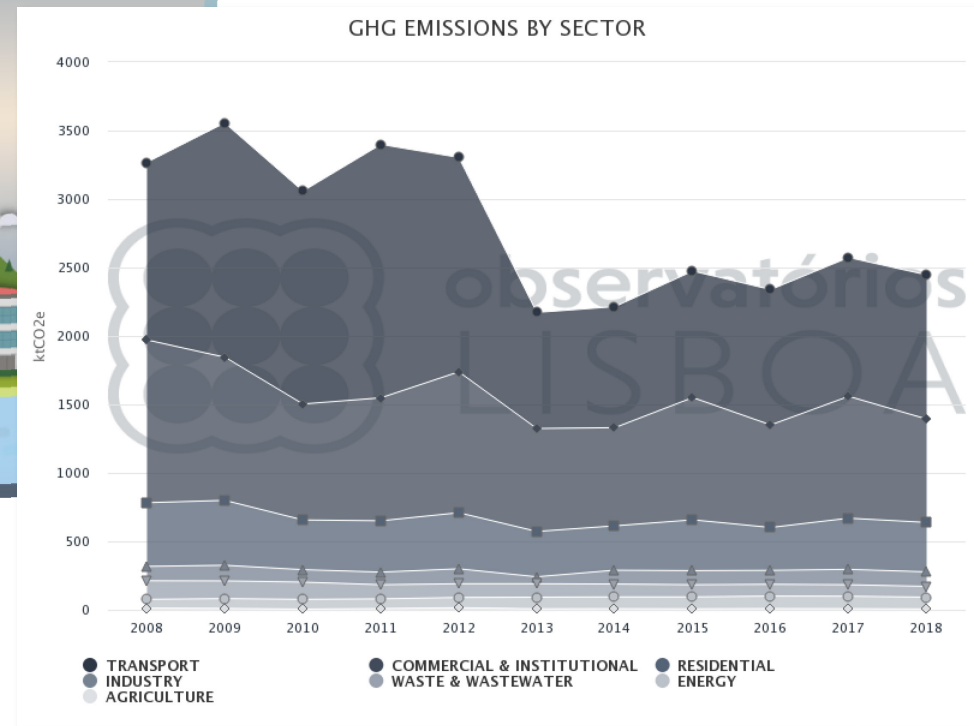


Back to cities – what we want to capture

the project | the city | resources



http://www.observatorios-lisboa.pt/en/info_emissoes.html

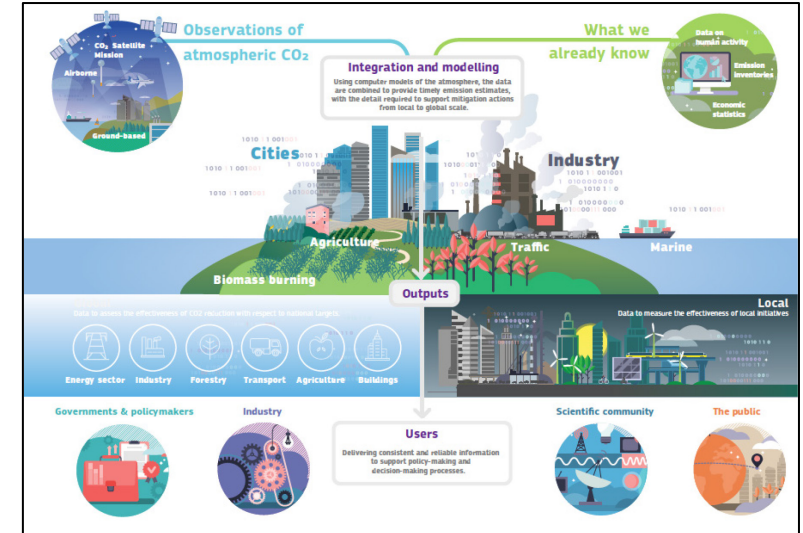




Aim of today



the project | the city | resources



Is there potential to link the two communities and if so, what are the right connection points?



This presentation reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



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