



Co-ordinated by
ECMWF



**CO₂
Human
Emissions**

CO₂ HUMAN EMISSIONS

A Horizon 2020
Coordination and Support Action

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Project coordinator
11/12/2017



CHE-CO2 Human Emission Project (& its numbers)

Aim:

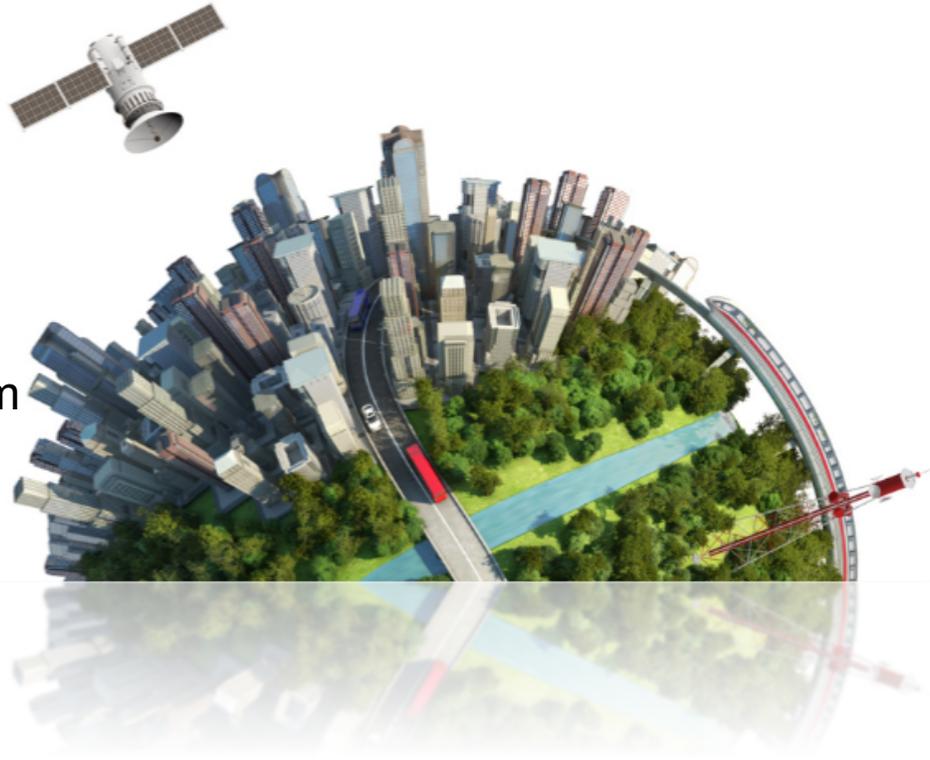
Build European monitoring capacity for Anthropogenic CO2 emissions

How:

Monitoring/Verification System (MVS) driven by Earth observations, from remote sensing and in situ, Combined with enhanced modelling system That includes CO2 fossil fuel emissions, (Cities) along with other natural and anthropogenic CO2 emissions & transport.

Why:

To support the Paris Climate Agreement and its implementation



Project Duration:

39 month

Project Funding:

3.75 ME (1.25 ME/year)

Consortium Numbers

22 partners Institutes

Work Content Numbers

7 work-packages:

5-Science development, 1-

International liaison,

1-Management & Coms

7 Milestones

45 Deliverables

344.25 Person Month

(Eq 8.8 FTE)

3 Project Reviews

(M15, M27Tech, M39)²



AIRBUS



iLab



SPASCIA



CHE Foundation: 2015 fossil CO₂ monitoring report

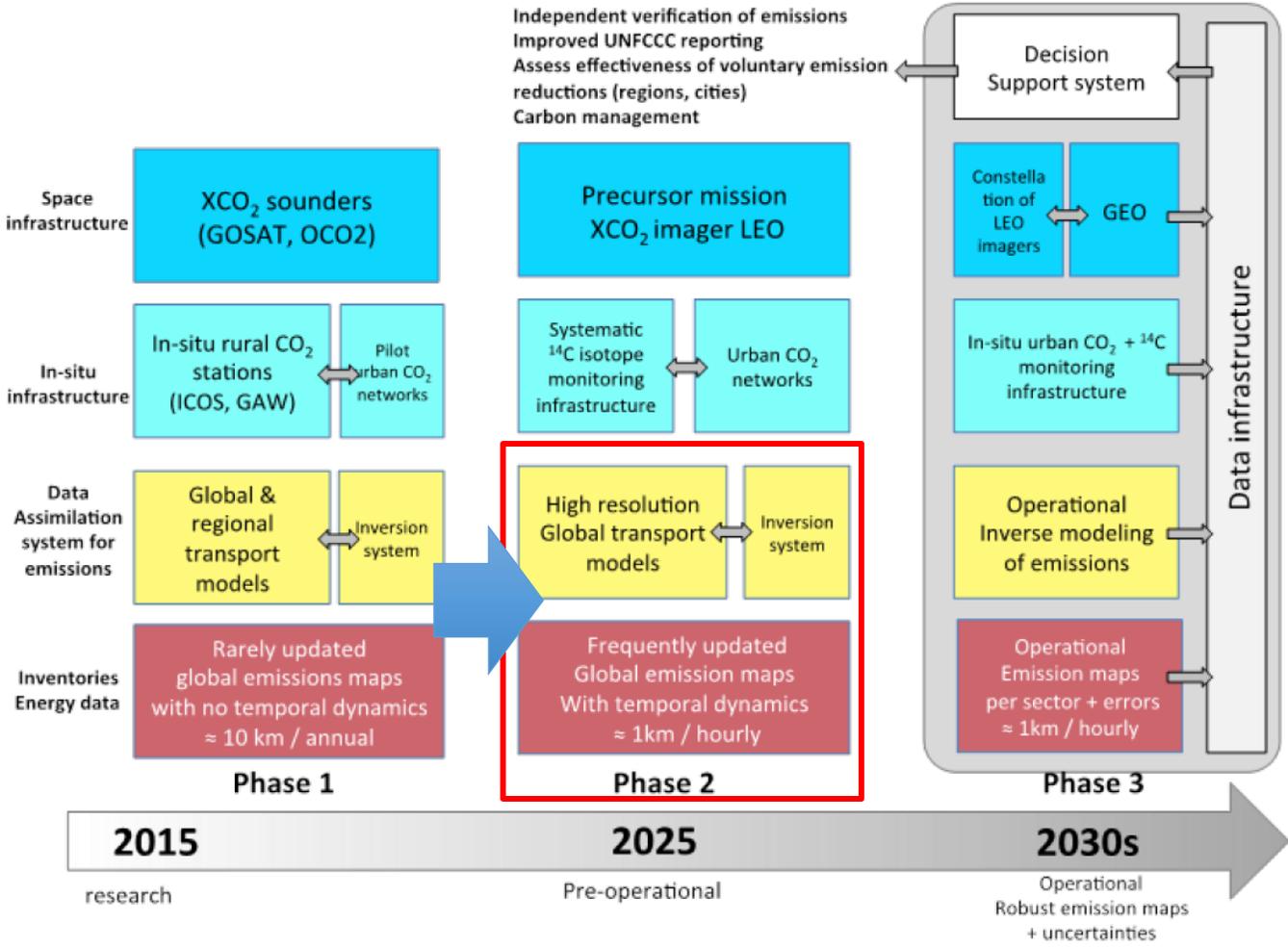
Towards a European Operational Observing System to Monitor Fossil

CO₂ emissions



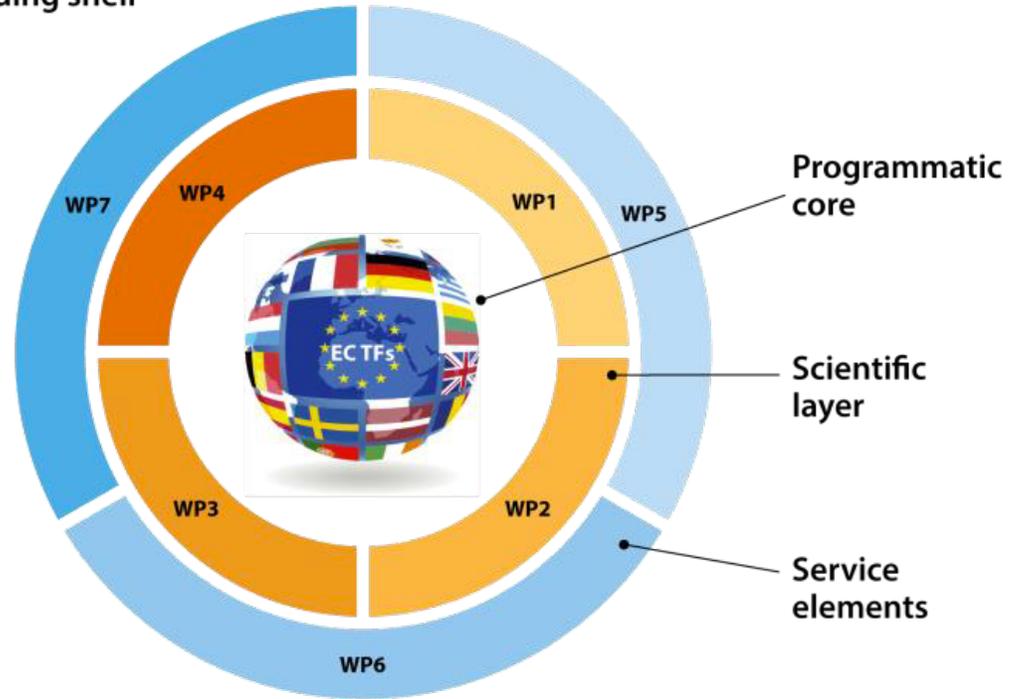
Final Report from the expert group

Recommended steps for implementation of a fossil CO₂ monitoring system



CHE Structure and Work Package Breakdown

CHE capacity building shell



CHE, H2020-Coordination and Support Action

CHE WBS

WP1 Coordinating Efforts on Reconciling top-down and bottom-up estimates, led by UEA 60.5 PM (39M, 1-39)

WP2 Coordinating Efforts on Library of simulations for emissions and atmospheric transport, led by EMPA (64.5 PM)

WP3 Coordinating Efforts on Uncertainty trade-off for fossil fuel emissions, led by ULUND (69.5PM)

WP4 Coordinating Efforts on Attributing CO₂ emissions from in-situ measurements, led by CEA (57.0 PM)

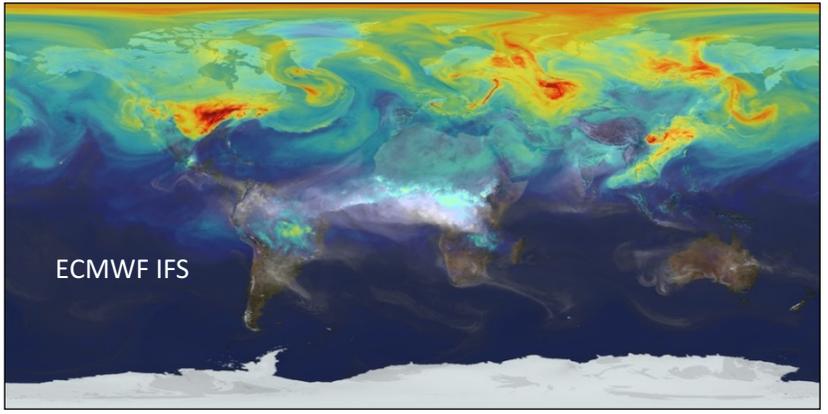
WP5 Towards a prototype of a European anthropogenic emission monitoring system, led by ECMWF 55.25 PM (24M 15-39)

WP6 International Stakeholder Coordination and Liaison, led by ECMWF (19.5 PM)

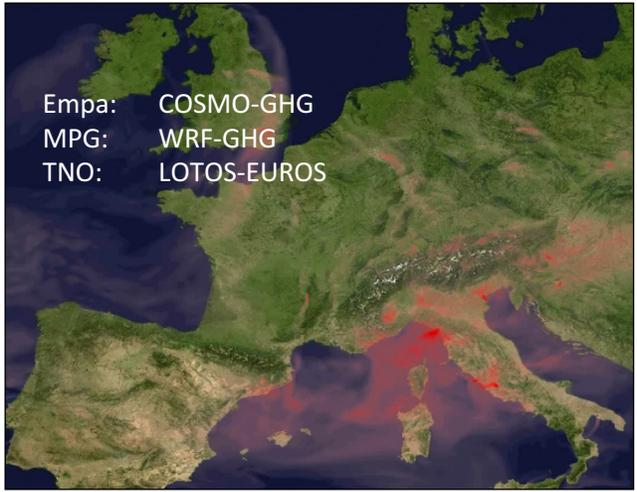
WP7 Project Management, Dissemination and Communication, led by ECMWF (18.0 PM)

Embracing multi-scale from local to global

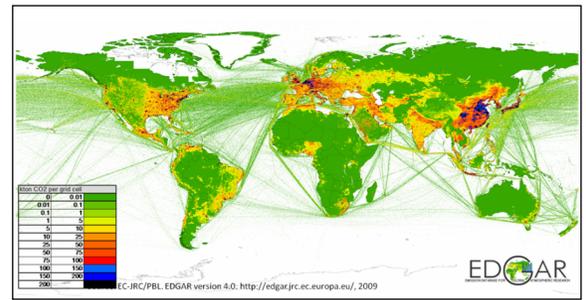
Global, ~ 9km resolution, ECMWF



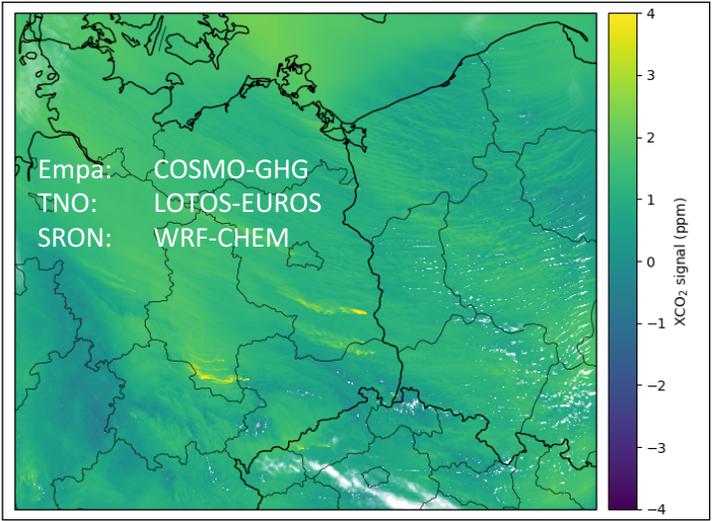
Europe, ~ 5 km, Empa, TNO, MPG



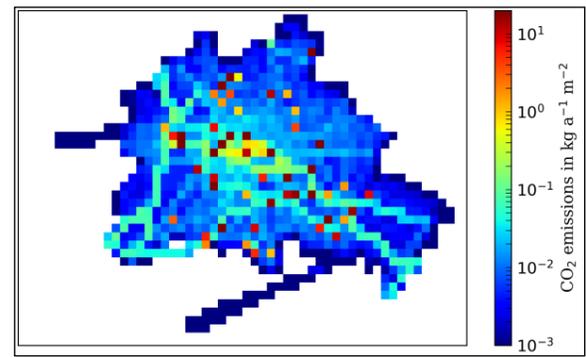
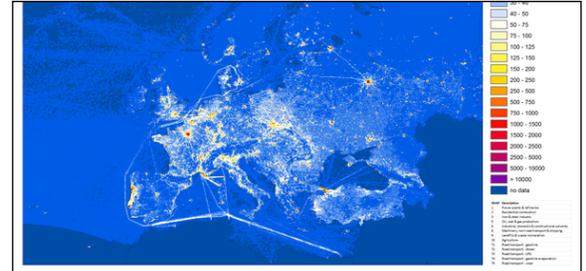
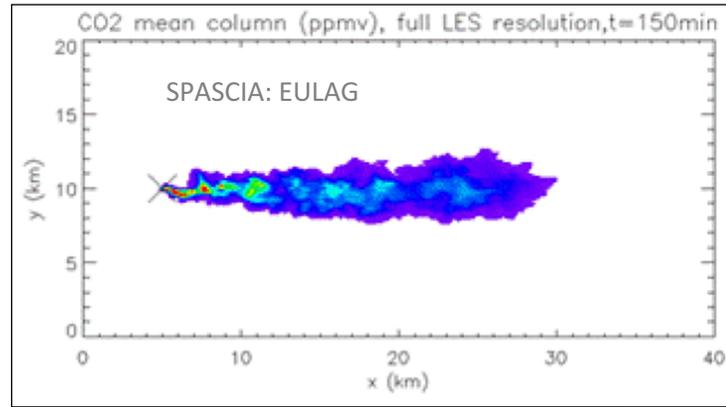
Global, Regional City emission



Regional, ~ 1 km, Empa, TNO, SRON



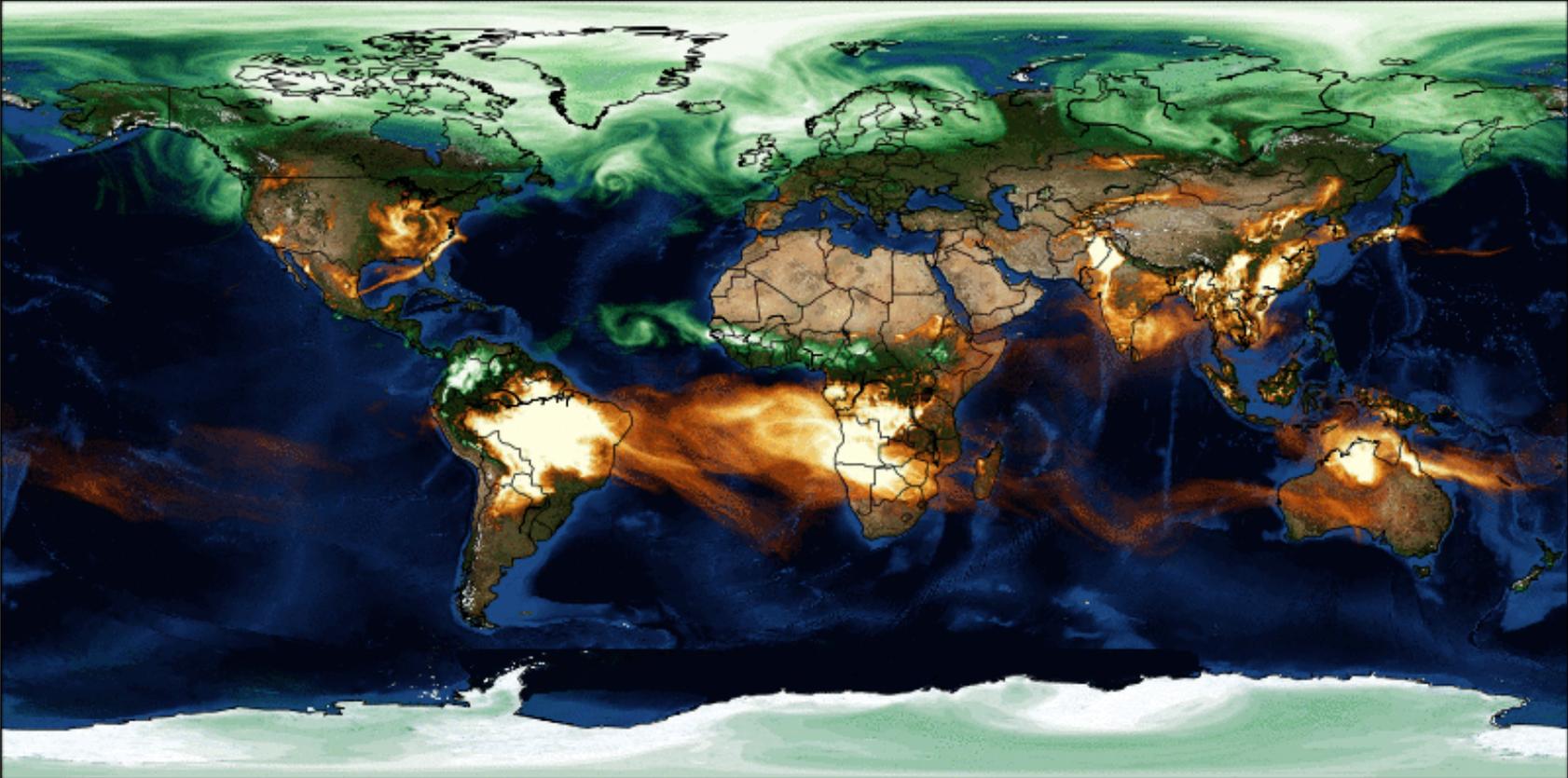
Point source, ~ 100 m, SPASCIA



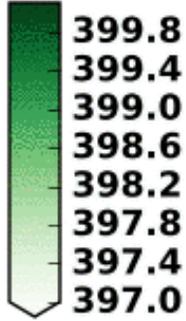
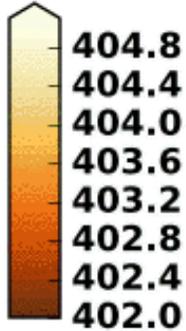
CO₂ emissions links with the weather

CO₂, CH₄, linCO, tagged tracers at Tco1279 (~9km) L137

20161001 03 UTC



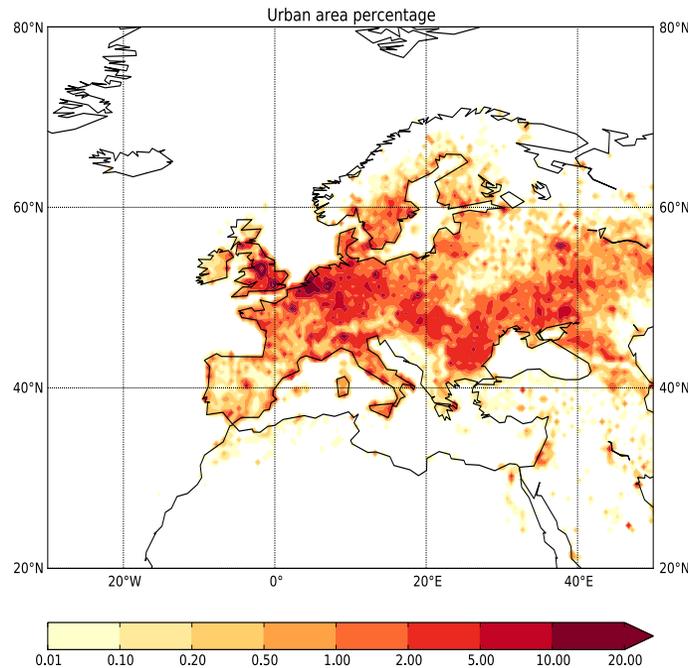
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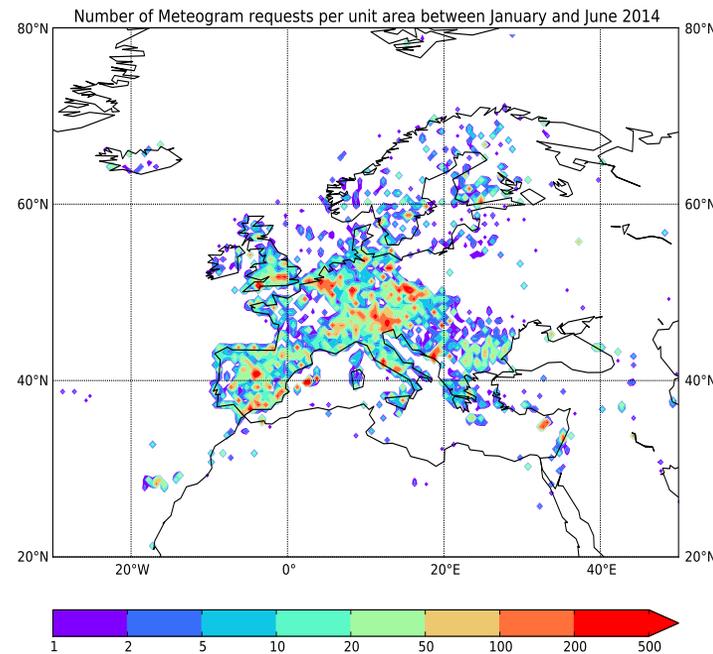
- CTESSEL NEE (BFAS correction Agusti-Panareda et al. ACP 2016)
- EDGARv4.2FT2010
- Takahashi et al. (2009)
- GFAS biomass burning
- IFS transport
- Bermejo & Conde mass fixer (Agusti-Panareda et al. GMD 2017)

CHE relevance and linkage with human activity

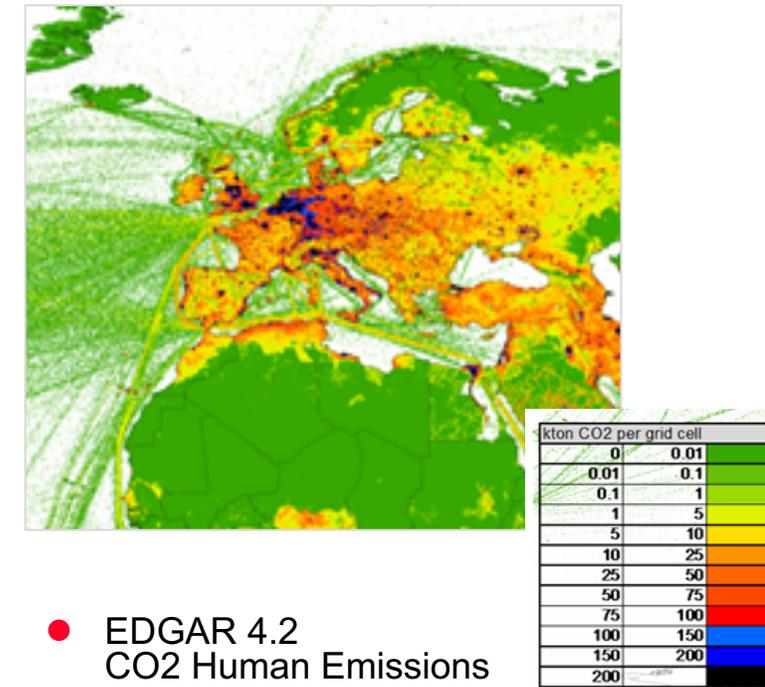
- More than half of world population is projected to live in cities by 2050 and sensitive to environmental information.
- Urban areas are important for the accurately monitor and prediction of extreme events such as heatwaves, urban flooding, pollution outbreaks and need to be represented in modelling systems.
- Urban mapping combined with emission factors can provide CO₂ anthropogenic fluxes



- Urban area (a, in %, from ECOCLIMAP, Masson et al., 2003)

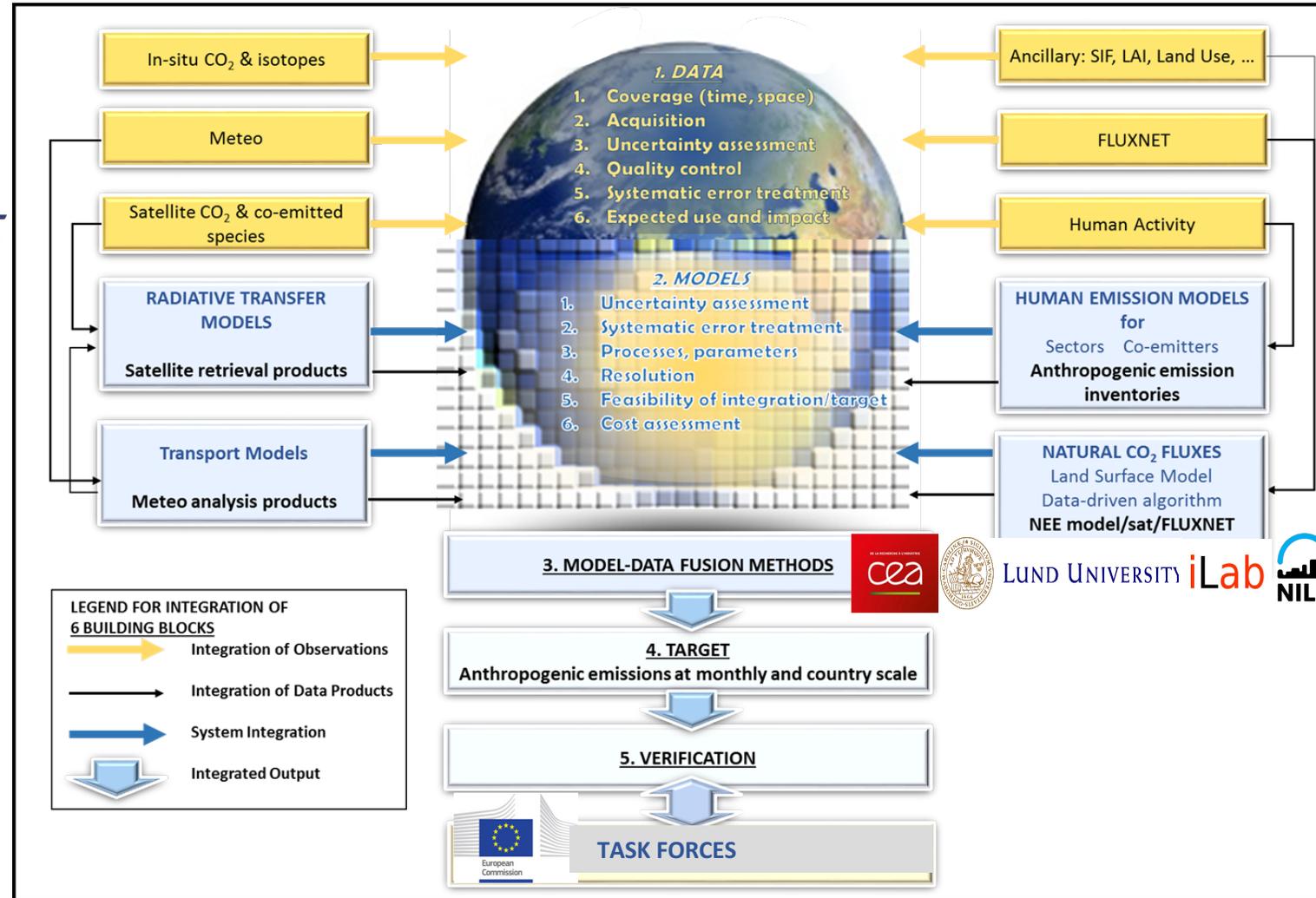


- Number of ECMWF forecast product requests from Member-States



- EDGAR 4.2 CO₂ Human Emissions

CHE Integration and capacity building



CHE global actors

European Commission

esa

EUMETSAT

ECMWF

Copernicus
Europe's eyes on Earth

CO₂ Task Force

WORLD METEOROLOGICAL ORGANIZATION
WEATHER CLIMATE WATER

GAW

IG³IS

GCOS
GLOBAL CLIMATE OBSERVING SYSTEM



CEOS
Committee on Earth Observation Satellites



United Nations
Framework Convention on
Climate Change



CO₂ Human Emissions¹

European Commission

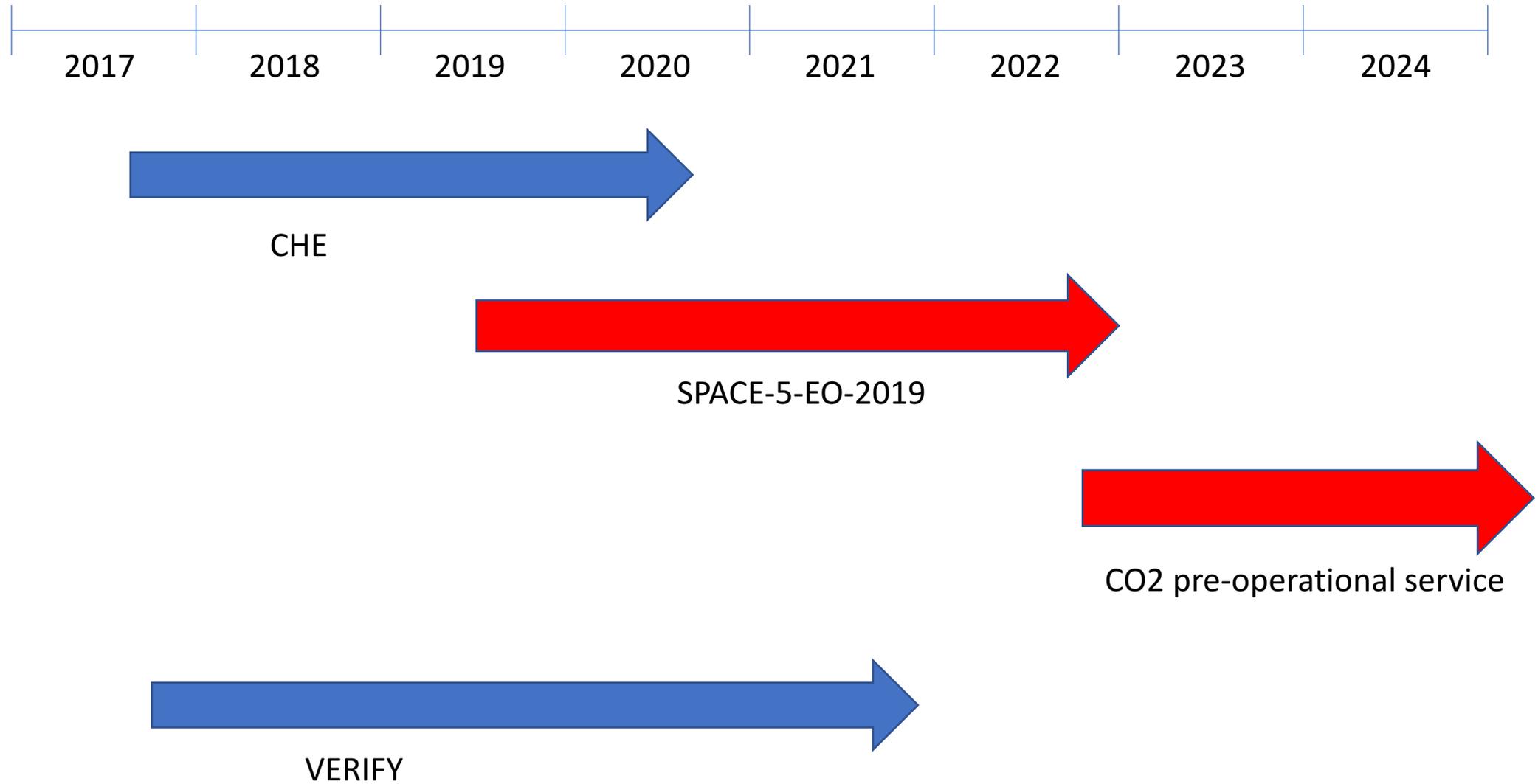
VERIFY

Others...

ICOS/FLUXNET

HORIZON 2020
The EU Framework Programme for Research and Innovation

CHE research-to-operation pathway



Summary and Outlook

- CHE Coordination and Support Action responds to EC ambition to build a CO₂ Monitoring and Verification System gathering expertise on
 - Earth Observations (satellite & insitu)
 - Integrated Monitoring System
- Follow-on Research and Innovation Actions will focus on
 - Monitoring and Verification System's fitness to support COP Goals
 - Pre-operational Readiness Assessment

CHE: Q & A

Thanks for your attention

SEAMOS
REALISTAS...
HAGAMOS LO
IMPOSIBLE



CHE Governance

WMO IG3IS Integrated Global Greenhouse Gas Information System

Goal: Support the success of post-COP21 actions of nations, sub-national governments, and the private sector to reduce climate-disrupting GHG emissions through a sound-scientific, measurement-based approach that:

- reduces uncertainty of national emission inventory reporting,
- identifies large and additional emission reduction opportunities, and
- provides nations with timely and quantified guidance on progress towards their emission reduction strategies (e.g., NDCs)

Principles

IG³IS will serve as an international coordinating mechanism and establish and propagate consistent methods and standards.

Diverse measurement and analysis approaches will fit within a common framework.

Stakeholders are entrained from the beginning to ensure that information products meet user priorities and deliver on the foreseen value proposition.

Success-criteria are that the information guides additional and valuable emission-reduction actions.

IG³IS must mature in concert with evolution of technology and user-needs / policy

CHE building blocks

