Nature runs for AQ and GHG in CAMS and CHE

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Transforming satellite observations into user-driven services.
Atmosphere Monitoring

Copernicus Atmosphere Monitoring Service

Fire emissions

Greenhouse gas fluxes

Radiative forcing

Emissions

Solar radiation

Policy tools
CAMS data sets

**CAMS global reanalysis**
- chemical and aerosol species
- 2003 – 2018
- 80 km; 60 levels

**CAMS global GHG reanalysis**
- CO₂ & CH₄
- 2003 – 2018 (in progress)
- 80 km; 60 levels

**Control runs for reanalysis**
- Details as reanalysis

**Flux inversions with corresponding atmospheric concentrations**
- CO₂, 1979 – 2018, 3.75° x 1.9°, 39 levels, 3-hourly
- CH₄, 1900 (2009) – 2017, 6° x 4°, 25 levels, 6-hourly
- NO₂, 1995 – 2017, 3.75° x 1.9°, 39 levels, 3-hourly
CHE-CO2 Human Emission Project (& its numbers)

Aim:
Build European monitoring capacity for anthropogenic CO₂ emissions

How:
CO₂ emission estimation system driven by Earth observations (remote sensing and in situ) combined with enhanced modelling system

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)
Global nature run

CO\textsubscript{2}, CH\textsubscript{4}, linCO, tagged tracers at Tco1279 (~9km) L137 (Agusti-Panareda et al., 2019, ACP)

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

https://www.che-project.eu/news/che-tier-1-co2-global-nature-run
ECMWF progress on CO$_2$/CH$_4$ global nature runs

- Tier1 nature run (available now)
  - IFS CY43R1
  - Annual EDGARv4.2FT2014
  - Monthly ocean fluxes from Takahashi et al. (2009)
  - Tagged CO2 tracers with anthropogenic, biogenic, ocean, biomass burning emissions

- Tier2 nature run (December 2019)
  - IFS CY46R1
  - EDGARv4.3.2 with monthly profiles (EDGARv4.2FT2010)
  - New ocean fluxes from SOCAT (Roedenbeck v16)
  - New tagged CO2 tracers with ECMWF emission groups (energy, manufacturing, transport, settlements, other)
  - Update of NEE bias correction (BFAS, Agusti-Panareda et al. 2016)
Series of regional simulations

More details on request. Data will become available on CHE website.

CO滓 HUMAN EMISSIONS