

Work Package 7

Work in 2018-2019

Corinne Le Quéré, University of East Anglia

Antonio Bombelli, CMCC

Emmanuel Salmon, Werner L Kutsch, ICOS ERIC







T7.1 Contribution to scientific assessments of GHG cycles

Work in 2018-2019:

- integrate VERIFY results in existing synthesis (e.g. the Global Carbon Budget)
- analyse results over the EU



Corinne Le Quéré, University of East Anglia



The global carbon cycle (revamp of key graphic)



Publication of the 2018 global carbon budget





Comparison of top-down inversion based on surface data and bottom-up process models \rightarrow key results (with CHE for the inversions)



top-down inversions suggest:

- 1) a larger CO₂ sink over land in the North
- 2) larger decadal variability in the extra-tropical oceans

compared to process models

VERIEN

LOB

New development of data-based metrics to encourage and support model improvements (with CHE for the inversions)



ocean models using SOCAT pCO₂ data



atmospheric inversions using CGADIP aircraft vertical profiles



this is an initial step intended to grow with future updates



Le Quéré et al. ESSD 2018



Analysis of emissions over Europe

change in CO₂ emissions since 1990 in 17 EU countries + USA



nature LETTERS climate change https://doi.org/10.1038/s41558-019-0419-7

Drivers of declining CO₂ emissions in 18 developed economies

Corinne Le Quéré ¹*, Jan Ivar Korsbakken², Charlie Wilson¹, Jale Tosun⁴, Robbie Andrew², Robert J. Andres⁵, Josep G. Canadell⁶, Andrew Jordan¹, Glen P. Peters² and Detlef P. van Vuuren⁷⁸

The common drivers of decarbonisation among countries during 2005-2015 are:

- renewable energy is replacing fossil fuels
- 2. energy use is decreasing
- 3. countries have a large number of energy and climate policies in place

(note it is *not* due to change in consumption emissions)



T7.1 Contribution to scientific assessments of GHG cycles

Next steps:

- pursue the model evaluation metrics to support and encourage model improvements
- expand analysis of land-use CO₂ emissions by decomposing processes in models
- start integration of multiple GHG ${}^{\bullet}$

Decarbonisation to meet the Paris Agreement

projected global CO₂ emissions that meet the Paris Agreement



es in Europe, and the US, have decreased their CO₂ emissions







nd consumer-facing innovations









T7.2 Dissemination and coordination with global data synthesis efforts

- **Part 1: Communication objectives**
- Part 2: Cooperation









VERIFY cooperation with Global Initiatives including UNFCCC/SBSTA, GEO, GCOS and WMO/IG3IS

Part 1: Communication objectives

Different communication channels to different target groups:

Operators

Users

Stakeholders











Dissemination towards stakeholders in some tweets

SBSTA 48, Bonn 2018



Tenth Meeting of the Research Dialogue, the science-policy interface to support action. (1) Science for understanding (2) Science for action (3) Science for renewable energy and (4) Global observations to support sence. #RD10 #SB48Bonn @ICOS_RI unfcc.int/node/61001



7:17 AM - 3 May 2018

3 Retweets	7 Likes	€ So €	icos/li=	0	



llowing

Over 300 top scientists across the world discussed **#greenhousegases** in the ICOS Science Conference in Prague last week: icosri.eu/event/434 #carbon #ICOS2018SC

ICOS Conference, Praha 2018



2:58 AM - 18 Sep 2018

7 Retweets 15 Likes 🥸 🥞 🖢 🌒 🎒 🌍 🥪 🥪

♀ 1,7 ♡ 15 🗹

GEO WEEK, Kyoto 2018





@ICOS_RI DG @wlkutsch moderates the session about "#EarthObservation in support of the #ParisAgreement" at #GEOWeek2018 @GEOSEC2025 #Kyoto



10:40 PM - 30 Oct 2018







ICOS INTEGRATED CARBON OBSERVATION SYSTEM



The new Paris paradigm: From "policy driving policy" to "science driving policy" and "policy driving science"



Courtesy of Joanna Post, UNFCCC

Table 4: VERIFY main targeted dissemination events in alphabetical order

Event	Description
AGU – American Geophysical Union Fall Meeting	Annually
EGU – European Geophysical Union	Annually. These broad conferences allow for reaching out to the many disciplines
General Assembly	(Earth system modelers, Earth observation, land system science) involved in this comprehensive effort.
GEIA Global Emissions InitiAtive annual conferences	Biannually conference of world-wide experts on emissions compilation, modelling, evaluation
GEO Plenaries and other GEO relevant meetings	According to the GEO meeting calendar
GGMT - WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques	Biannually
ICDC – International Carbon Dioxide Conference	The ICDC is held every four years. The next event is in 2017. The following 2021 event coincides with the end of VERIFY, and we will organise a major activity (e.g., specific session) with the main outcomes of the project, particularly related to CO_2 .
ICOS Science Conference	Annually
NCGG – International Symposium on non-CO ₂ greenhouse gases	Once every two or three years
NOAA Annual Meetings	Annually
Open Science Conferences of FutureEarth core projects (such as of core project SOLAS)	Several project participants are involved in Future Earth Core Projects (e.g., GCP), and we will ensure that VERIFY activities are promoted at those events to aid dissemination and to receive high level feedback on progress.
Scientific events at UNFCCC Conference of the Parties (e.g. COP28)	The Global Carbon Budget is generally launched with a side-event and press conference at each UNFCCC COP. Building on that highly successful experience, we will aim for annual side-events at the UNFCCC Conference of the Parties to disseminate latest findings and receive feedback from policy makers on progress.
UNFCCC SBSTA side events	Annually. As with the UNFCCC COPs, we will aim for side-events at relevant SBSTA meetings to ensure broad dissemination and feedback from stakeholders.







T7.2 Dissemination and coordination with global data synthesis efforts

Part 2: VERIFY cooperation with Global Initiatives including UNFCCC/SBSTA, GEO, GCOS and WMO/IG3IS









Global Climate Indicators

	Temperature and Energy	Atmospheric Composition	Ocean and Water	Cryosphere
ndicators	Surface Temperature	Atmospheric CO2	Ocean Acidification	Glacier Mass Balance
Headline	Ocean Heat	Where are ecosystems and the biosphere?	Sea Level	Arctic and Antarctic Sea Ice Extent



Paris Agreement Sub-Group (PASG) of the GEO Programme Board: established to address the observational needs of the Paris Agreement in the frame of GEO.

- In the current GEO Work Programme "Climate" is a topic cross-cutting all the 8 GEO SBAs.
- The GEO Carbon and GHG Initiative is not flying well perhaps too much overlap with GCOS.

GEO makes up its mind and will discuss further at the next GEO Programme Board Meeting, Geneva 21-22 March.

GEO Plenary and Ministerial Summit in Canberra, 4-9 November 2019.

• Important event to target policy level.







Objective #1

Provide information to inventory builders in support of their efforts to reduce uncertainty of national emission inventory reporting to United Nations Framework Convention on Climate Change (UNFCCC).







Objective #2

Provide information to industry and private sector businesses that will help locate and quantify previously unknown emission reduction opportunities such as fugitive methane emissions from industrial sources.

Read More



Objective #3

Support subnational government entities such as cities and states that represent large greenhouse gas (GHG) source regions (e.g., megacities) with actionable information on their GHG emissions at the needed spatial, temporal and sectoral resolution to evaluate and guide progress towards emission reduction goals

Read More

Read more





Objective #4

Support the Paris Agreement's global stock take as governments and the UNFCCC define their requirements.



Conclusion

- The support of (and dissemination focus on) GCP is crucial
- We are already disseminating (sometimes secretly)
- We need a clear branding
- We can only disseminate what is sent us and labelled to VERIFY
- Communication goes both directions (how to improve dialogue with stakeholders and users?









14-02-2019 ICOS workshop on strategies to monitor greenhouse gases in urban environments

Helsinki / Hyytiälä, Finland, July 1 -4, 2019

Cities are hot spots for anthropogenic greenhouse gas (GHG) emissions - however, cities are also areas where GHG emission reduction efforts will show first and most significant changes in the atmosphere. Developing methods to independently monitor and validate GHG emissions from cities is critical now after the 2018 UN Climate Change Conference.

This affects also ICOS, for example, how should and could urban GHG measurements



be included in the ICOS continental long-term strategy. Urban GHG measurements have been discussed within the ICOS community for long already and also some initiative actions have been taken. H2020 RINGO project includes work packages and tasks related to this, and an ICOS Urban Working Group has also been established to explore this issue, and to develop strategies and standards for a sustained, long-term monitoring of GHGs in urban areas.

Welcome to the ICOS workshop on strategies to monitor greenhouse gases in urban environments from July 1 to 4, 2019 in Helsinki / Hyytiälä.

This workshop has the goal to define measurement needs and goals, discuss and address challenges of urban monitoring, and work towards a comprehensive roadmap for embedding urban measurements in a coherent and standardised effort within the long-term observation infrastructure of ICOS, considering also how this can contribute to and integrate with other organisations and networks, such as WMO IG3IS.

See the draft agenda