



Workshop on IPCC AR6 key issues on climate-carbon interactions: Minutes

Milestone 9

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About 4C

Climate-Carbon Interactions in the Coming Century (4C) is an EU-funded H2020 project that addresses the crucial knowledge gap in the climate sensitivity to carbon dioxide emissions, by reducing the uncertainty in our quantitative understanding of carbon-climate interactions and feedbacks. This will be achieved through innovative integration of models and observations, providing new constraints on modelled carbon-climate interactions and climate projections, and supporting Intergovernmental Panel on Climate Change (IPCC) assessments and policy objectives.

1 Workshop on IPCC AR6 key issues on climate-carbon interactions | Milestone 9

1.1 Introduction

Brussels, UKRO, Rue du Trône 4, 12 June 2019 at 14h.

The session on IPCC AR6 was held in day 2 of the kick-off meeting of CCiCC (now 4C), but integrated information from discussions in other sessions from the the three-days meeting. The attendance is provided in Appendix. The summary below presents the points and actions directly relevant to better informing IPCC.

1.2 Context: kick-off meeting

The meeting opened with a summary of the 4 key objectives for the project, corresponding the four work packages (WP), along with timeline, expectations and budget information. This was followed by 15-minutes overview sessions on each WP.

- WP1 - Understanding the contemporary carbon cycle.
- WP2 - Predicting the carbon cycle and climate for the global stocktake to the horizon of 2030.
- WP3 - Projecting the required mitigation effort over the 21st century.
- WP4 - Synthesis, dissemination and policy dialogue.

A plenary session was delivered for WP1-3, covering technical details of the proposed work. There were separate meetings of the Governing, Executive and External Advisory Boards. Slides presented during this meeting can be accessed from the Livenotes: <https://docs.google.com/document/d/1sa8ajXTaXfYIm2AzP4RUL2OmRPexq2y3fom77f6tmZs>

1.3 Summary of the IPCC workshop (T4.1.1)

The IPCC session focused on work that 4C can undertake in support of IPCC AR6 WG1 Chapter 5 objectives. This session was attended virtually by Pep Canadell (IPCC Chapter 5 coordinating lead author) and Peter Cox (UNEXE, IPCC Chapter 5 lead author). Victor Brovkin (MPG, IPCC Chapter 5 lead author) provided an overview of the IPCC assessment report under preparation, with information on carbon-related sections. This is available here: https://drive.google.com/file/d/1zrJj4OLd3gnO9d7ngg_RMQR9h9s2TNVV/view

Pep Canadell presented the specific content of Chapter 5 on Global carbon and other biogeochemical cycles and feedbacks. He highlighted issues of integration of observations and models, and noted the approach taken by the global carbon budget (led by Friedlingstein with many 4C researchers) as an example of integration. We also discussed how to inform future projections based on the near-term projections planned in 4C, and how these can be used as an intermediate between the long-term projections and the hindcast, although perhaps not for AR6. We had extensive discussion on the high sensitivity of the CMIP6 generation of models, and of the differences between the physical climate models and the full ESMs. Finally, we discussed the interface between the carbon cycle insights, versus the emissions insights that will be in other working groups.

IPCC authors made a strong request for 4C authors to review the next draft of AR6, and highlighted the cut-off date for paper submissions (31 December 2019).

The following papers were discussed in more detail to get the views of the 4C group, as they will inform elements of Chapter 5, are under preparation and will be published in time for inclusion in AR6.

- Arora, V. K., Katavouta, A., Williams, R. G., Jones, C. D., Brovkin, V., Friedlingstein, P., Schwinger, J., Bopp, L., Boucher, O., Cadule, P., Chamberlain, M. A., Christian, J. R., Delire, C., Fisher, R. A., Hajima, T., Ilyina, T., Joetzjer, E., Kawamiya, M., Koven, C., Krasting, J., Law, R. M., Lawrence, D. M., Lenton, A., Lindsay, K., Pongratz, J., Raddatz, T., Séférian, R., Tachiiri, K., Tjiputra, J. F., Wiltshire, A., Wu, T., and Ziehn, T.: Carbon-concentration and carbon-climate feedbacks in CMIP6 models, and their comparison to CMIP5 models, *Biogeosciences Discuss.*, <https://doi.org/10.5194/bg-2019-473>, in review, 2019.
- Jenkins S., M.Cain, P. Friedlingstein, N. Gillett, and M. R Allen, Quantifying non-CO2 contributions to remaining carbon budgets, *Nature*, submitted.
- Davies-Barnard, J Meyerholt, S Zaehle, P. Friedlingstein, V Brovkin, Y Fan, RA Fisher, CD Jones, H Lee, D Peano, B Smith, D Wårlind, and A Wiltshire, Nitrogen Cycling in CMIP6 Terrestrial Models: Progress and Limitation, *Biogeosciences* , submitted
- Friedlingstein P., Jones, M. W., O'Sullivan, M., Andrew, R. M., Hauck, J., Peters, G. P., Peters, W., Pongratz, J., Sitch, S., Le Quéré, C., Bakker, D. C. E., Canadell, J. G., Ciais, P., Jackson, R. B., Anthoni, P., Barbero, L., Bastos, A., Bastrikov, V., Becker, M., Bopp, L., Buitenhuis, E., Chandra, N., Chevallier, F., Chini, L. P., Currie, K. I., Feely, R. A., Gehlen, M., Gilfillan, D., Gkritzalis, T., Goll, D. S., Gruber, N., Gutekunst, S., Harris, I., Haverd, V., Houghton, R. A., Hurtt, G., Ilyina, T., Jain, A. K., Joetzjer, E., Kaplan, J. O., Kato, E., Klein Goldewijk, K., Korsbakken, J. I., Landschützer, P., Lauvset, S. K., Lefèvre, N., Lenton, A., Lienert, S., Lombardozzi, D., Marland, G., McGuire, P. C., Melton, J. R., Metzl, N., Munro, D. R., Nabel, J. E. M. S., Nakaoka, S.-I., Neill, C., Omar, A. M., Ono, T., Peregon, A., Pierrot, D., Poulter, B., Rehder, G., Resplandy, L., Robertson, E., Rödenbeck, C., Séférian, R., Schwinger, J., Smith, N., Tans, P. P., Tian, H., Tilbrook, B., Tubiello, F. N., van der Werf, G. R., Wiltshire, A. J., and Zaehle, S.: Global Carbon Budget 2019, *Earth Syst. Sci. Data*, 11, 1783–1838, <https://doi.org/10.5194/essd-11-1783-2019>, 2019.

1.4 Follow up with ScienceBrief

For knowledge dissemination and in support of research activities regarding the role of the Carbon Cycle in climate change during the current century, we will be able to make use of the novel internet platform ScienceBrief (sciencebrief.org) designed to assist researchers and promote scientific understanding.

ScienceBrief is written by experts from around the world and helps scientists to promote scientific evidence and incorporate it into existing scientific assessments. ScienceBrief is a transparent, continuous, and rapid system for deciding if, and to what extent, new publications alter current knowledge. ScienceBrief shows the status and strength of scientific consensus regarding climate change, whilst also highlighting controversies and additional research needs.

Crucial emerging topics regarding climate change understanding and impacts within the critical 2020-2030 period are being created on ScienceBrief to foster collaboration and real-time debate. These topics include:

Carbon Cycle

- CO2 emissions from fire activity, including in the Amazon
- Atmospheric increase of methane
- Southern Ocean CO2 sink

Climate Change Understanding and Projections

- Climate sensitivity
- Tipping points
- Melting of permafrost
- Ice-sheet instability
- Arctic sea ice

Climate Change Impacts

- Heat waves
- Floods and climate change
- Extreme fire risk and climate change

We identified a gap in policy need until IPCC AR6 will be published, to inform policy decisions ahead of the important COP26 meeting that will be held in Glasgow at the end of 2020. We are currently defining an activity to fill this gap, by creating foci statements around the key topics above. The creation of the topics and statements will occur as soon as possible; this will require the formation of an editorial board of esteemed scientists to draft and approve topic statements. The statements will be promoted within the relevant scientific communities in a bid to support the understanding of the relevant science prior to the COP26 in Glasgow, 2020.

Upon demonstrating the feasibility and success of this approach, we aim to evolve the topics to inform debate, prior to the release of the authoritative IPCC AR6 reports the following year. ScienceBrief can become a repository for the latest research which can quickly be investigated and updated in real time. It can also enable participation in the discussion of climate science for academics who are traditionally unable to take part in the collaboration, as well as non-academics who care deeply about the subject.

Following IPCC AR6, ScienceBrief will serve as a portal into the continuously updating science of climate change.

2 Annex

2.1 List of Participants

Table 1. Attendance List

NAME	ORGANIZATION
Aaron Spring	Max-Planck
Andrew Manning	UEA
Corinne Le Quéré	UEA – WP1
Erwin Goor	EASME
Hongmei Li	Max-Planck
Isadora Jimenez	BSC
Luke Gregor	ETHZ – WP1
Leo de Sousa-Webb	EXETER – WP5
Mike O'Sullivan	EXETER
Peter Landschützer	Max Planck
Peylin Philippe	LSCE – WP1
Pierre Friedlingstein	EXETER – WP5
Raffaele Bernardello	BSC – WP2
Robbie Andrew	CICERO
Stephen Sitch	EXETER – WP1
Stuart Jenkins	Oxford – WP3
Tatiana Ilyina	Max-Planck – WP2
Thomas Frölicher	Bern –WP3
Victor Brovkin	Max-Planck
<i>Virtual Presence</i>	
Glen Peters	CICERO – WP3
Ilaria Vigo	BSC – WP4
Jan Ivar Korsbakken	CICERO

Leo Hickman	Carbon Brief
Myles Allen	Oxford
Sonia Seneviratne	ETHZ – WP1
Pep Canadell	CSIRO & GCP

2.2 Kick-Off Meeting Agenda

Table 2. Agenda

DAY	ITEM
Tuesday 11 June	<p>14:00 – 14:20 CCICC overview: aims, timelines, etc.</p> <p>14:20 – 15:00 CCICC, expectation and support from EU.</p> <p>15:00 – 15:30 CCICC, coordination team role.</p> <p>16:00 – 16:15 WP1 overview: aims, timelines, etc.</p> <p>16:15 – 16:30 WP2 overview: aims, timelines, etc.</p> <p>16:30 – 16:45 WP3 overview: aims, timelines, etc.</p> <p>16:45 – 17:00 WP4 overview: aims, timelines, etc.</p>
Wednesday 12 June	<p>09:30 – 09:45 Intro to Break-out groups Pierre</p> <p>09:45 – 11:30 WP1, WP2, WP3 BOGs</p> <p>11:30 – 13:00 WP4 overview: aims, timelines, etc. + WP4 plenary discussion</p> <p>14:00 – 15:00 IPCC Session</p> <p>15:30 – 16:00 WP1-WP2 Plenary</p> <p>16:00 – 16:30 WP1-WP3 Plenary</p> <p>16:30 – 17:00 WP2-WP3 Plenary</p>
Thursday 13 June	<p>09:30 – 10:50 Reports from BOGs</p> <p>10:50 - 11:10 DPM Plenary</p> <p>11:30 –12:00 Governing Board meeting (one representative from each partner)</p> <p>12:00 –12:30 Executive Board meeting (WP leads)</p> <p>12:30 –13:00 External Advisory Board meeting (WP leads + EAB)</p>