

Submission to SBSTA under mandate: FCCC/SBSTA/2021/L.5

Please accept this submission from the University of Exeter on behalf on the Global Carbon Project (GCP) in response to SBSTA's invitation to submit views on possible themes for the fourteenth meeting of the research dialogue to be held in conjunction with SBSTA 56 (June 2022) under mandate: FCCC/SBSTA/2021/L.5

The GCP is a large international research project within the Future Earth research initiative on global sustainability, and a research partner of the World Climate Research Programme.

We have developed a complete picture of the global carbon cycle, including both its biophysical and human dimensions together with the interactions and feedbacks between them.

Since 2006, we have produced the annual Global Carbon Budget. The report is an accurate assessment of anthropogenic carbon dioxide (CO₂) emissions and their redistribution among the atmosphere, ocean, and terrestrial biosphere.

In the report we quantify the five major components of the global carbon budget and their uncertainties.

- Fossil CO₂ emissions,
- CO₂ emissions from land use and land use change,
- Change in atmospheric CO₂ concentration,
- The ocean CO₂ sink,
- The terrestrial CO₂ sink.

The findings of the report are used widely including by the IPCC where the Global Carbon Budget makes a very significant contribution to the IPCC analysis around CO₂ sources and sinks.

The Global Carbon Budget 2021 is the 16th edition of the annual update. This edition includes contributions from 94 people across 70 organisations and 18 countries, constituting a large fraction of the carbon cycle research community. The Global Carbon Budget builds on established methodologies in a fully traceable and transparent manner. To ensure that it is built with the most robust data and science, each annual budget has been published in peer review journals. The 2021 edition is currently published as a preprint and is undergoing an open peer review in the journal *Earth System Science Data* (<https://doi.org/10.5194/essd-2021-386>). The 2020 edition was published in *Earth System Science Data* (<https://doi.org/10.5194/essd-12-3269-2020>).

With the First Global Stocktake of the Paris Agreement underway, the Research Dialogue scheduled for June 2022, provides a timely opportunity to look at the most up to date, scientifically robust analysis of CO₂ emissions, the remaining global carbon budget, and the ramifications for Global Climate Goals.

With this in mind, possible topics for dialogue could be:

1. The Global Carbon Budget 2021. Latest trends in global carbon sources and sinks, status of CO₂ emissions in a post-covid world, estimates of the remaining carbon budget to keep global temperatures below the climate targets of the Paris Agreement; and scale of international action required to reach Net Zero emissions by 2050.



2. Focus on terrestrial ecosystems. Soil and forest carbon sources and sinks. Analysis of the Global emissions and removals from land use and land use change. Comparison to national inventories.

3. Are the GHG inventories still fit for purpose? What are the current and upcoming methodologies to accurately report near real time anthropogenic CO₂ sources and sinks.

We would welcome the opportunity to discuss how we can further contribute to the Research Dialogue and SBSTA 56.

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