# Global Carbon Budget v2025 Dataset Descriptions

Version 1
5 November 2025

**Spreadsheets**
Global_Carbon_Budget_2024v0.5.xlsx
National_Fossil_Carbon_Emissions_2024v0.3.xlsx
National_LandUseChange_Carbon_Emissions_2024v0.2.xlsx

**Gridded data**
**Fossil_carbon_emissions_gridded_GCB2025_2015-2024_mean.nc**

- Data behind fossil carbon emissions in Figure 6a from GridFED. The file contains 2015-2024 decadal mean values as well as uncertainty. Full data set and methods can be found at: https://mattwjones.co.uk/co2-emissions-gridded/
- Units are kilograms of carbon dioxide per year. To convert to units of 'carbon', divide values by 3.664 (See Table 1 in the budget paper).

**Landuse_carbon_flux_gridded_GCB2025_2015-2024_mean.nc**

- Data behind net land use carbon flux in Figure 6b from the average of three bookkeeping models; BLUE, LUCE, and OSCAR. Gridded land use emissions for OSCAR are derived by spatially distributing their national data based on the spatial patterns of BLUE gross fluxes in each country. Peat emissions are included. The file contains 2015-2024 decadal mean values.
- Units are tonnes of kilograms of carbon per metre squared per year. Positive values are a flux from the land to the atmosphere.

**Ocean_carbon_uptake_GOBMs_gridded_GCB2025_2015-2024_mean.nc**

- Decadal and multi-model mean carbon uptake by oceans as simulated by the Global Ocean Biogeochemical Models. The file contains 3 variables (see paper for full definition of simulations):
    - fgco2_A_avg (Sim A: Ocean sink with varying atmospheric CO2 and climate)
    - fgco2_CminusB_avg (Sim C - Sim B: Ocean sink due to rising atmospheric CO2. This variable is used to produce Figure 12a)
    - fgco2_AminusC_avg (Sim A - Sim C: Ocean sink due to changes in climate. This variable is used to produce Figure 12b)
- Units are moles of carbon per metre squared per second. To convert to grams, multiply the values by 12. Positive values are a flux from the atmosphere to the ocean.

**Ocean_carbon_uptake_dataproducts_gridded_GCB2025_2015-2024_mean.nc**

- Ocean carbon flux as estimated by the 'surface ocean pCO2-based data products'. The file contains 1 variable:
    - fgco2_ensemble_avg (Decadal and multi-product mean ocean flux)

- Units are moles of carbon per metre squared per second. To convert to grams, multiply the values by 12. Positive values are a flux from the atmosphere to the ocean.

Figure 6c shows the mean of two above variables ‘fgco2_A_avg’ and fgco2_ensemble_avg’.

**Land_carbon_uptake_DGVMs_gridded_GCB2025_2015-2024_mean.nc**

- Data behind Figure 6d: Land carbon flux (in the absence of land-use change) as simulated by the Dynamic Global Vegetation Models. The file contains 1 variable:
    - SLAND (Decadal and multi-model mean ‘natural’ land flux from the S2 simulation)
- Units are kilograms of carbon per metre squared per second. Positive values are a flux from the atmosphere to the land.
- Note, this file does not include the RSS adjustment applied to the SLAND value in the GCB paper - here we provide the original DGVM output.

**Land_carbon_uptake_DGVMs_drivers_gridded_GCB2025_2015-2024_mean.nc**

- Data behind Figure 12: Land carbon flux as simulated by the Dynamic Global Vegetation Models due to rising atmospheric CO2 and changes in climate. The file contains 2 variables:
    - Landflux_CO2
    - Landflux_CLIM
- Units are grams of carbon per metre squared per year. Positive values are a flux from the atmosphere to the land.