Global Carbon Budget v2023 Dataset Descriptions

Version 1
28 November 2023

Spreadsheets
Global_Carbon_Budget_2023v1.0.xlsx
National_Fossil_Carbon_Emissions_2023v1.0.xlsx
National_LandUseChange_Carbon_Emissions_2023v1.0.xlsx

Gridded data
Fossil_carbon_emissions_gridded_GCB2023_2013-2022_mean.nc

- Data behind fossil carbon emissions in Figure 6a from GridFED. File contains 2013-2022 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_GCB2023_2013-2022_mean.nc

- Data behind net land use carbon flux in Figure 6b from the average of three bookkeeping models; BLUE, H&C2023, and OSCAR. Gridded land use emissions for H&C2023 and 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. File contains 2013-2022 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_GCB2023_2013-2022_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 11a)
    - fgco2_AminusC_avg (Sim A - Sim C: Ocean sink due to changes in climate. This variable is used to produce Figure 11b)
- 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_GCB2023_2013-2022_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_GCB2023_2013-2022_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.

Land_carbon_uptake_DGVMs_drivers_gridded_GCB2023_2013-2022_mean.nc

- Data behind Figure 11: 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.