

EGU26-22427, updated on 04 Apr 2026

<https://doi.org/10.5194/egusphere-egu26-22427>

EGU General Assembly 2026

© Author(s) 2026. This work is distributed under the Creative Commons Attribution 4.0 License.



The LULUCF Data Hub: regional- and national-level discrepancies between independent global datasets and national GHG inventories.

Joana Melo¹, Simone Rossi¹, Frédéric Achard¹, Ramdane Alkama², Josep G. Canadell³, Sandro Federici⁴, Pierre Friedlingstein^{5,6}, David Gibbs⁷, Nancy Harris⁷, Viola Heinrich^{8,9}, Michael O'Sullivan⁵, Glen P. Peters¹⁰, Julia Pongratz^{11,12}, Melissa Rose⁷, Rosa Roman-Cuesta¹, María J. Sanz^{13,14}, Clemens Schwingshackl¹¹, Stephen Sitch⁵, and Giacomo Grassi¹

¹European Commission, Joint Research Centre (JRC), Ispra, Italy

²Université de Bordeaux, France

³CSIRO, Canberra, Australia

⁴Institute for Global Environmental Strategies, IGES, Hayama, Japan

⁵Faculty of Environment, Science and Economy, University of Exeter, Exeter, UK

⁶Laboratoire de Météorologie Dynamique, Institut Pierre-Simon Laplace, CNRS, École Normale Supérieure, Université PSL, Sorbonne Université, École Polytechnique, Paris, France

⁷World Resources Institute, Washington DC, USA

⁸GFZ Helmholtz Centre for Geosciences, Potsdam, Germany

⁹School of Geographical Sciences, University of Bristol, UK

¹⁰CICERO Center for International Climate Research, Oslo, Norway

¹¹Department of Geography, Ludwig-Maximilians-Universität München, Munich, Germany

¹²Max Planck Institute for Meteorology, Hamburg, Germany

¹³Basque Centre for Climate Change (BC3), Bilbao, Spain

¹⁴Ikerbasque Foundation, Euskadi Pl., 5, 48009 Bilbao, Spain

Land use plays a critical role in achieving the Paris Agreement goals, yet inconsistencies between global carbon models, Earth Observation (EO), and national greenhouse gas inventories (NGHGs) lead to significant mismatches in CO₂ emission estimates. NGHGs, reported by countries using IPCC guidelines, guide national policies, while global models and satellite-based Earth Observation estimates support independent evaluations. Ensuring comparability among these datasets is essential.

Here we introduce the LULUCF Data Hub, an interactive platform hosted by the EU Forest Observatory to visualize CO₂ emissions and removals as reported by countries to the UNFCCC, alongside independent global land-use emission datasets. NGHGI data indicate a global net LULUCF sink of -2.3 Gt CO₂ yr⁻¹ (on average 2000-2023), with declining deforestation emissions and increasing forest sinks. For total LULUCF, a good agreement emerges between the translated results from the Global Carbon Budget (GCB 2024, representing the modelling scientific community) and NGHGs at global level, both in magnitude – with the original gap of 7.2 Gt CO₂ yr⁻¹

(2000-2022 average) reduced to 0.8 Gt CO₂ yr⁻¹ – and trend. When combining estimates for forest and deforestation, the translated results from Global Forest Watch (GFW, representing the EO scientific community in this study) also show a similar magnitude than NGHGI, but a divergent trend.

While the translation methodology used here effectively addresses conceptual differences among the studied datasets at the global level and for most countries, we highlight regions and countries where disagreements in estimates persist. We provide insights into possible reasons for these discrepancies and indicate areas where further research is warranted. The ultimate objective of the LULUCF data hub is to stimulate dialogue and foster collaborative efforts across different communities to reach a greater consensus on the magnitude and trends of land use emissions and removals, in support of the implementation of the Paris Agreement and in anticipation of the next UNFCCC Global Stocktake.