Discussion from week 8

Impact on Nature

Droughts in the Amazon

Boreal wild fires

Climate and Biodiversity crises are the same.

Nature as carbon sink

- Natural ecosystems sequester carbon that is released by human activities.
- As nature is depleted, the capacity to sequester and store carbon decreases as well.
- The carbon sequestration service of Nature is desperately needed for humanity to meet the Paris Agreement goal.
- Tropical rain forests are losing their ability to act as carbon sink:
  - Congo basin – sink
  - Amazon rain forest – not a sink at the moment
  - South-East Asian rain forest - source

Fate of anthropogenic CO_2 emissions (2013–2022)

Sources

35.3 $GtCO_2$/yr

88%

12%

4.7 $GtCO_2$/yr

= Sinks

18.9 $GtCO_2$/yr

47%

31%

12.3 $GtCO_2$/yr

26%

10.4 $GtCO_2$/yr

Budget Imbalance:
(the difference between estimated sources & sinks)

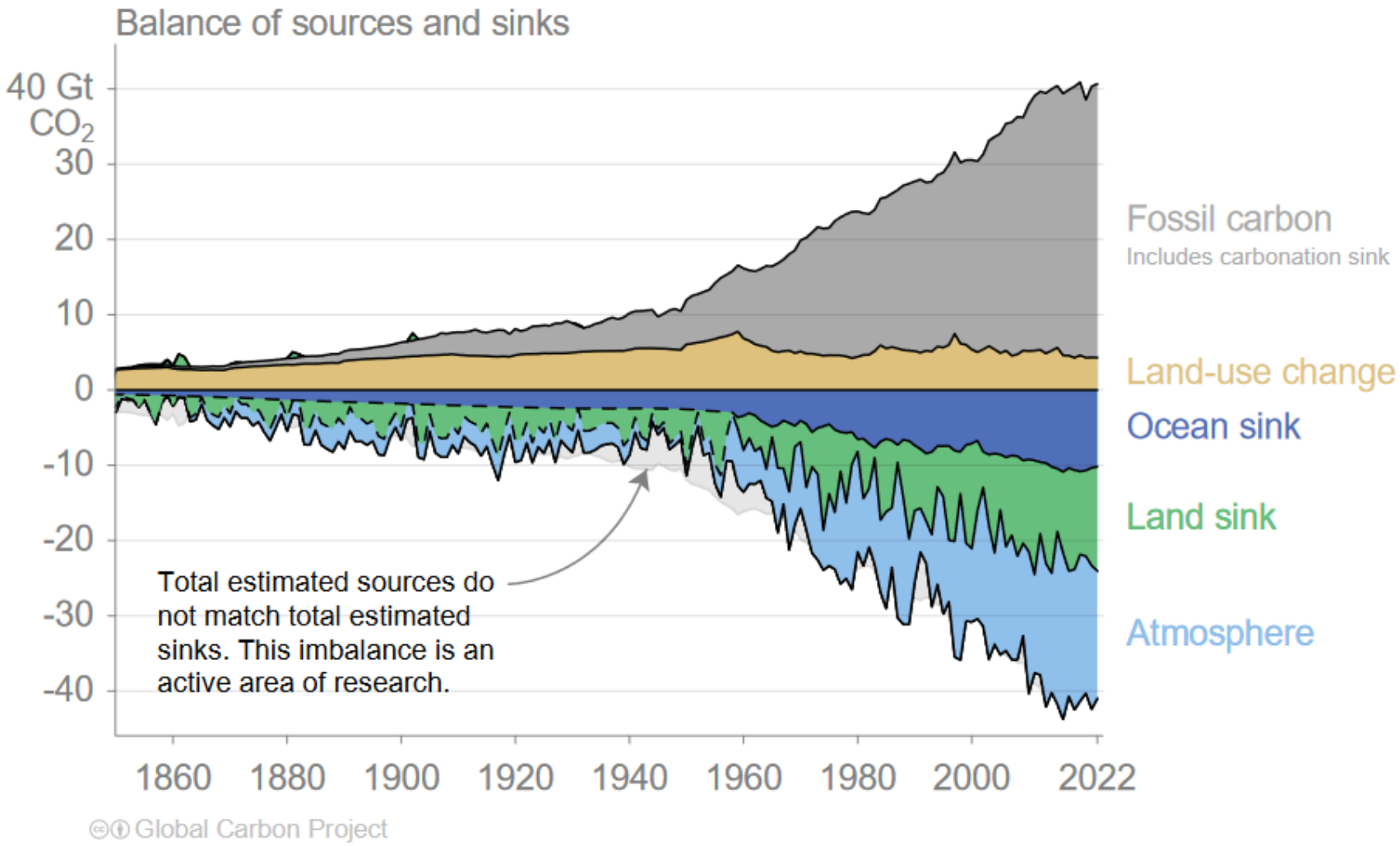
4%

-1.6 $GtCO_2$/yr

https://globalcarbonbudget.org/carbonbudget2023/

Source: Friedlingstein et al 2023; Global Carbon Project 2023

Carbon sources and sinks



https://globalcarbonbudget.org/carbonbudget2023/

Forest carbon sink

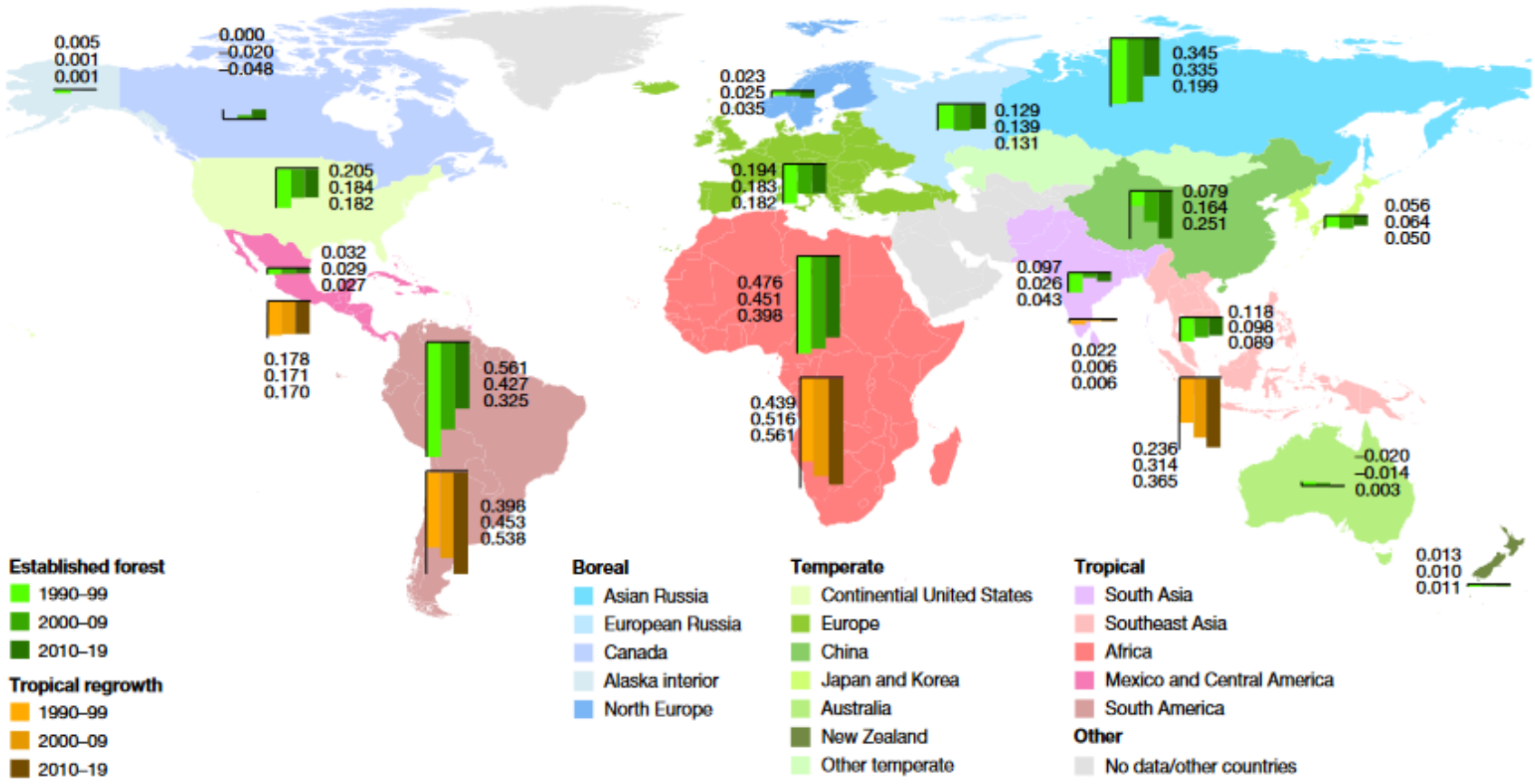


Fig. 1 | Carbon sinks and sources in the world's forests through the decades. Green bars represent established forests (boreal, temperate and tropical intact forests) and brown bars represent tropical regrowth forests. All values are in Pg C yr^{-1}. Positive values (with downward bars) indicate carbon sinks and negative values (upward bars) show carbon sources. Detailed uncertainties of sinks and sources are shown in Extended Data Table 3. We grouped a few regions and countries together so there are fewer categories to prevent the graphic getting too cluttered. These include: Europe (Europe temperate and other Europe); Japan and Korea; South Asia (India and other South Asia); and Mexico and Central America (Extended Data Table 3).

We found that the carbon sink in global forests was steady, at 3.6 ± 0.4 Pg C yr −1 in the 1990s and 2000s, and 3.5 ± 0.4 Pg C yr −1 in the 2010s. Despite this global stability, our analysis revealed some major biome-level changes. Carbon sinks have increased in temperate (+30 ± 5%) and tropical regrowth (+29 ± 8%) forests owing to increases in forest area, but they decreased in boreal (−36 ± 6%) and tropical intact (−31 ± 7%) forests, as a result of intensified disturbances and losses in intact forest area, respectively. he global forest sink is equivalent to almost half of fossil-fuel emissions (7.8 ± 0.4 Pg C yr −1 in 1990–2019). However, two-thirds of the benefit from the sink has been negated by tropical deforestation (2.2 ± 0.5 Pg C yr −1 in 1990–2019). Although the global forest sink has endured undiminished for three decades, despite regional variations, it could be weakened by ageing forests, continuing deforestation and further intensification of disturbance regimes1

https://www.nature.com/articles/s41586-024-07602-x

Different types of COPs

- **UN Convention on Climate Change** – meets annually - https://unfccc.int/
- **UN Convention on Biological Diversity** – meets every 2nd year
  The Convention on Biological Diversity (CBD) is the international legal instrument for "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources" that has been ratified by 196 nations. The Convention was opened for signature at the Earth Summit in Rio de Janeiro on 5 June 1992 and entered into force on 29 December 1993.
  https://www.cbd.int/
- **UN Convention to Combat Desertification** – meets every 2nd year
  The United Nations Convention to Combat Desertification (UNCCD) was established in 1994 to protect and restore our land and ensure a safer, just, and more sustainable future. The UNCCD is the only legally binding framework set up to address desertification and the effects of drought.
  UNCCD COP16 | Riyadh, Saudi Arabia | 2-13 December 2024