

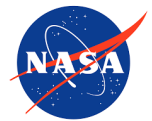
Linking regional to global greenhouse gas budgets in RECCAP2

4th Carbon from Space, ESA-ESRIN Frascati, Italy

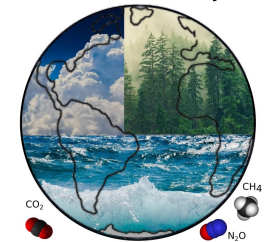
Benjamin Poulter, Ana Bastos, Josep G. Canadell, Philippe Ciais, Nicolas Gruber, Judith Hauck, Rob B. Jackson, Masao Ishii, Jens D. Müller, Prabir K. Patra, Stephen Sitch, Hanqin Tian
and the RECCAP2 Chapter teams



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Global Carbon Project



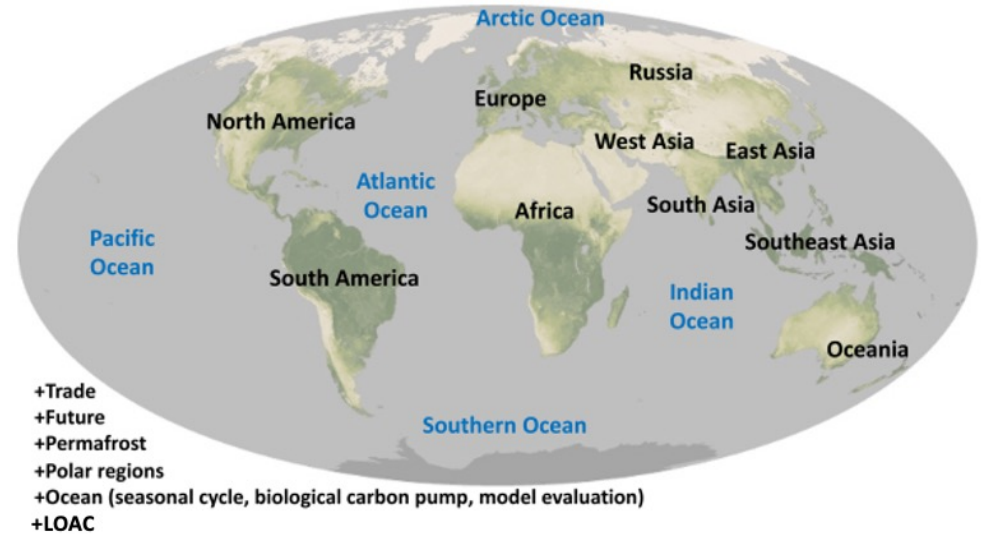
REgional Carbon Cycle Assessment and Processes
Phase 2

RECCAP2



REgional Carbon Cycle Assessment and Processes - 2

- RECCAP – P for Processes
- Proposed at ICDC in 2018
 - 3-GHGs (CO₂, CH₄, N₂O)
 - 2000-2019/2020
 - Top down, bottom-up, data-driven approaches
 - New data products
 - Land – Coastal – Ocean transfers (including blue carbon)
 - Uncertainty treatment via ensembles & methods
 - Regions/Themes of special interest
 - Future Component
- Products for the Global Stocktake process of the Paris Agreement with some annual/biannual updates



United Nations Climate Change

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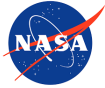
Documents > Observations to assess the regional carbon cycle...

Observations to assess the regional carbon cycle: RECCAP-2

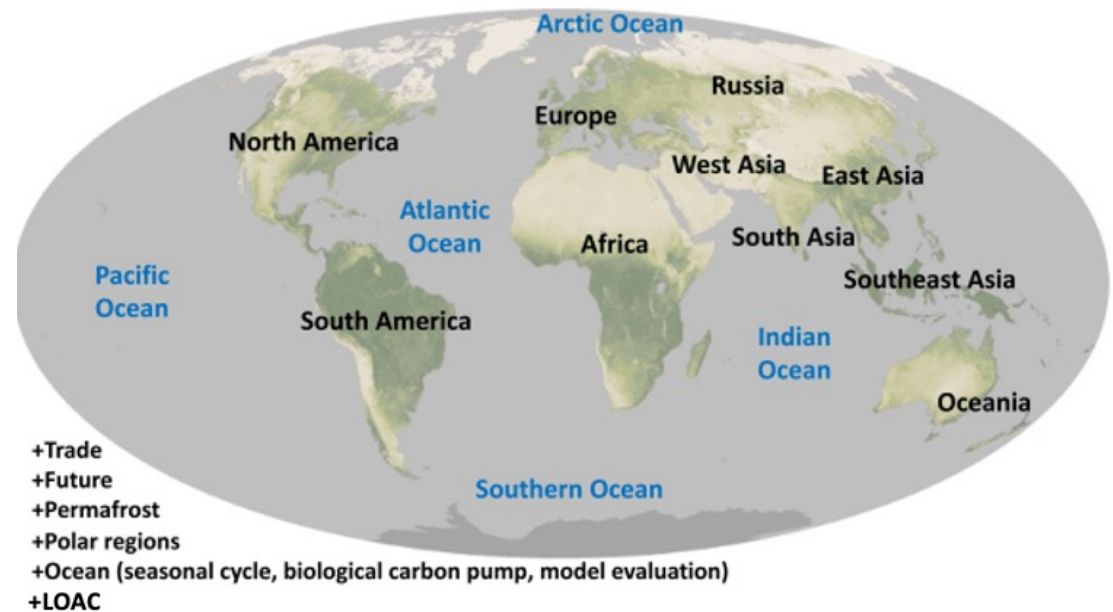
Open [English PDF 0.98 MB](#)



REgional Carbon Cycle Assessment and Processes - 2

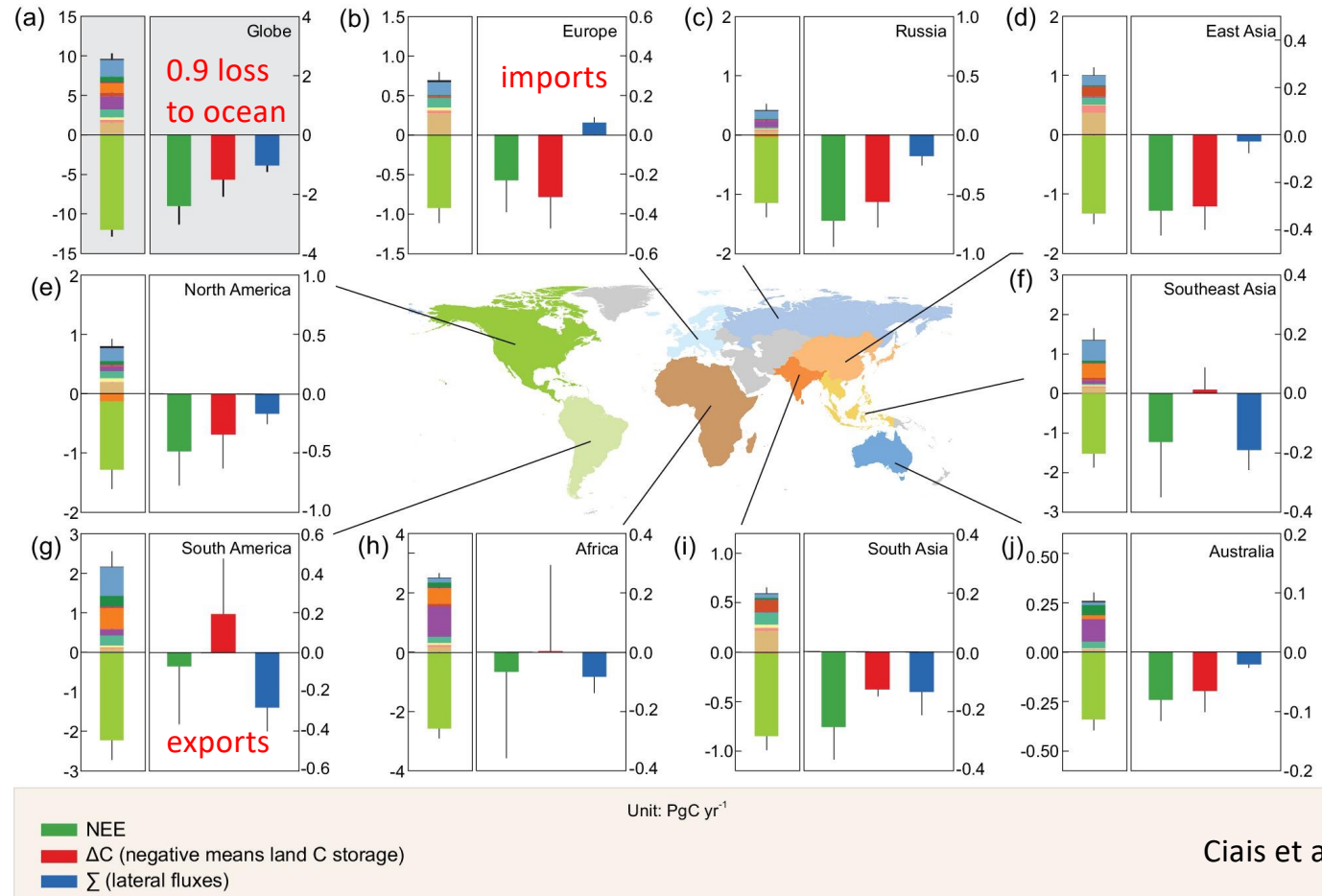


1. Europe : Ronny Lauerwald
2. Africa : Yolandi Ernst
3. North America : Ben Poulter
4. South America : Celso von Randow
5. West Asia : Hanqin Tian
6. East Asia : Xuhui Wang
7. South Asia : Atul Jain
8. Southeast Asia : Masa Kondo
9. Russia : Anatoly Shvidenko
10. Oceania : Yohanna Villalobos
11. Permafrost : Gustaf Hugelius
12. Polar regions : Gemma Wadham
13. Trade : Chaopeng Hong
14. LOAC (inland waters) : Ronny Lauerwald
15. LOAC (estuaries/coastal) : Judith Rosentreter
16. LOAC (continental shelves) : Laure Resplandy
17. LOAC (lateral carbon) : Pierre Regnier
18. Future : Chris Jones



RECCAP1 lateral fluxes drive differences

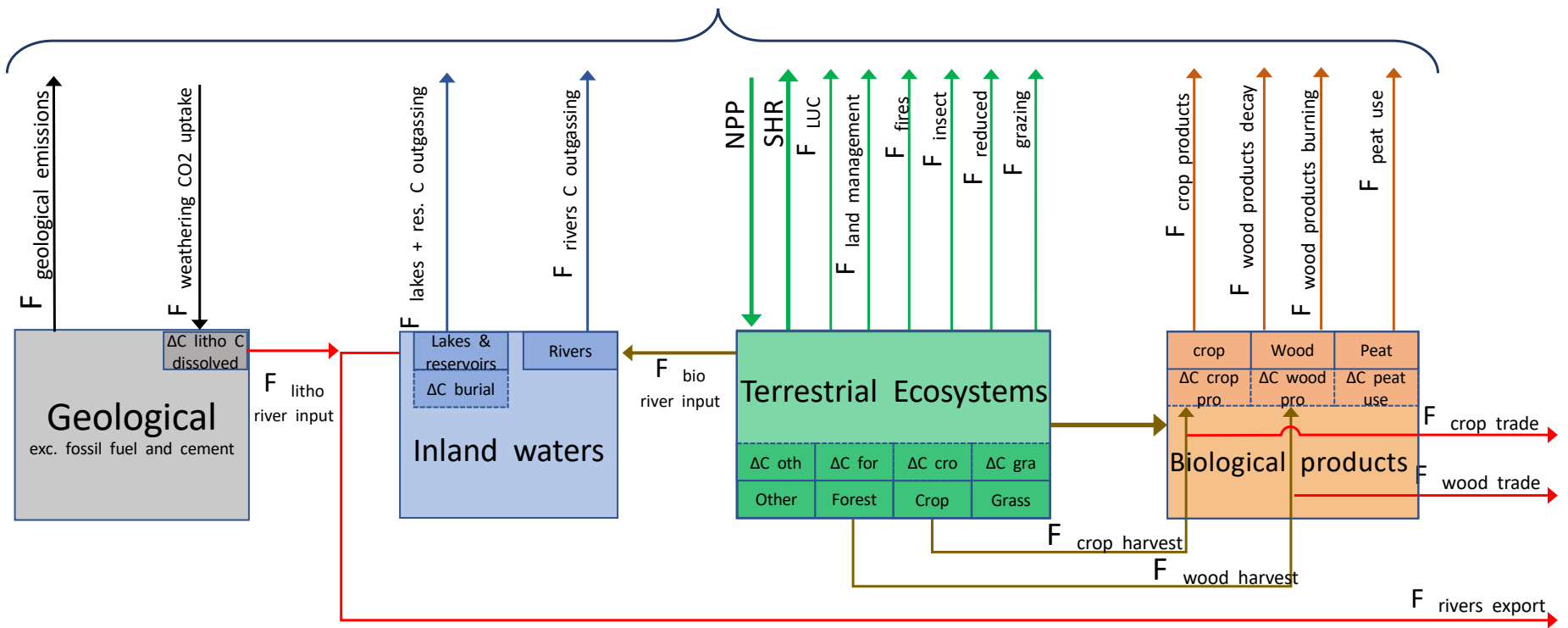
Stock change approach does not equal flux-based approach because of imports and exports





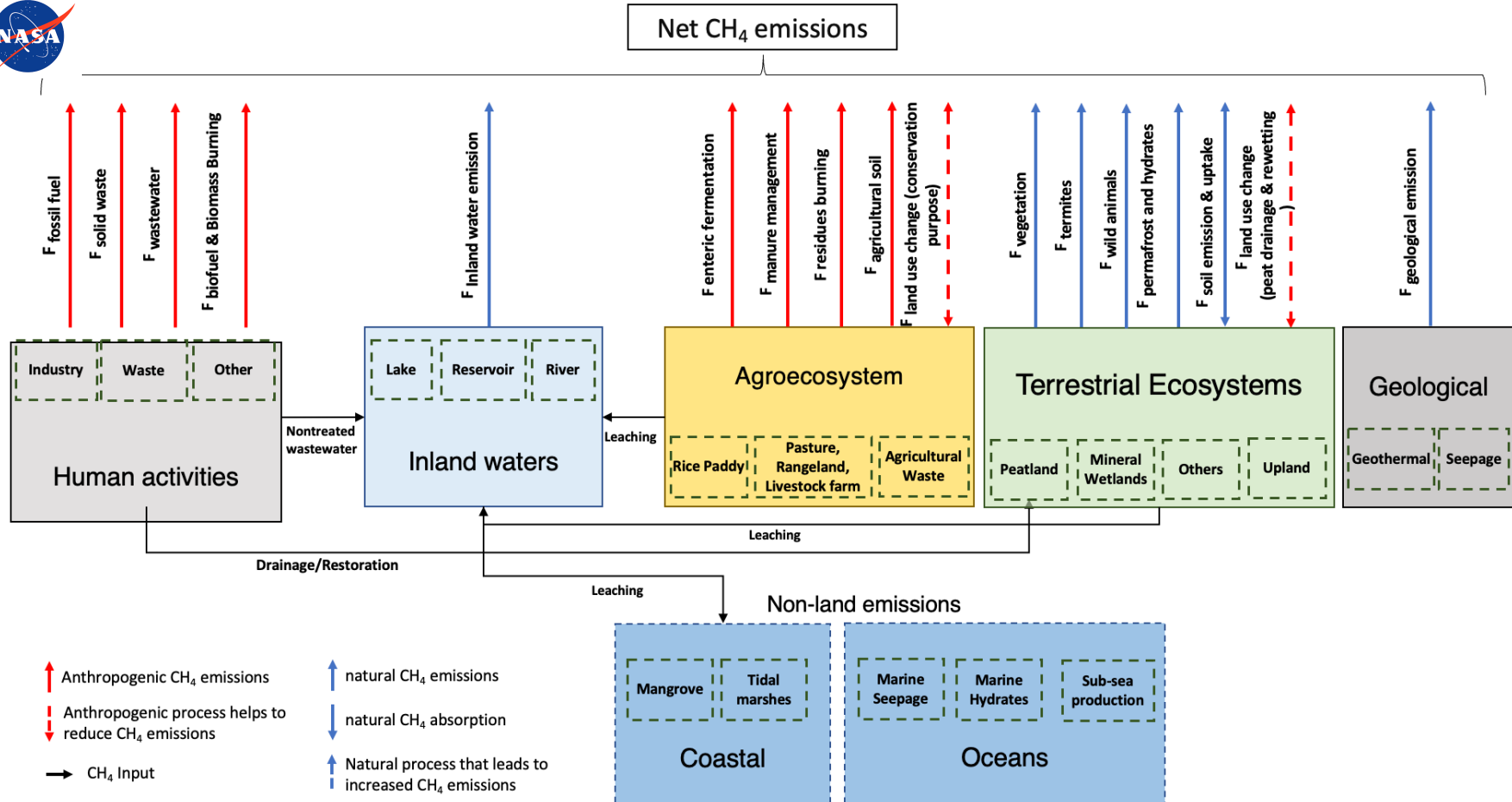
RECCAP2 Guidance: Carbon dioxide budgeting framework

Net Ecosystem Exchange NEE_C

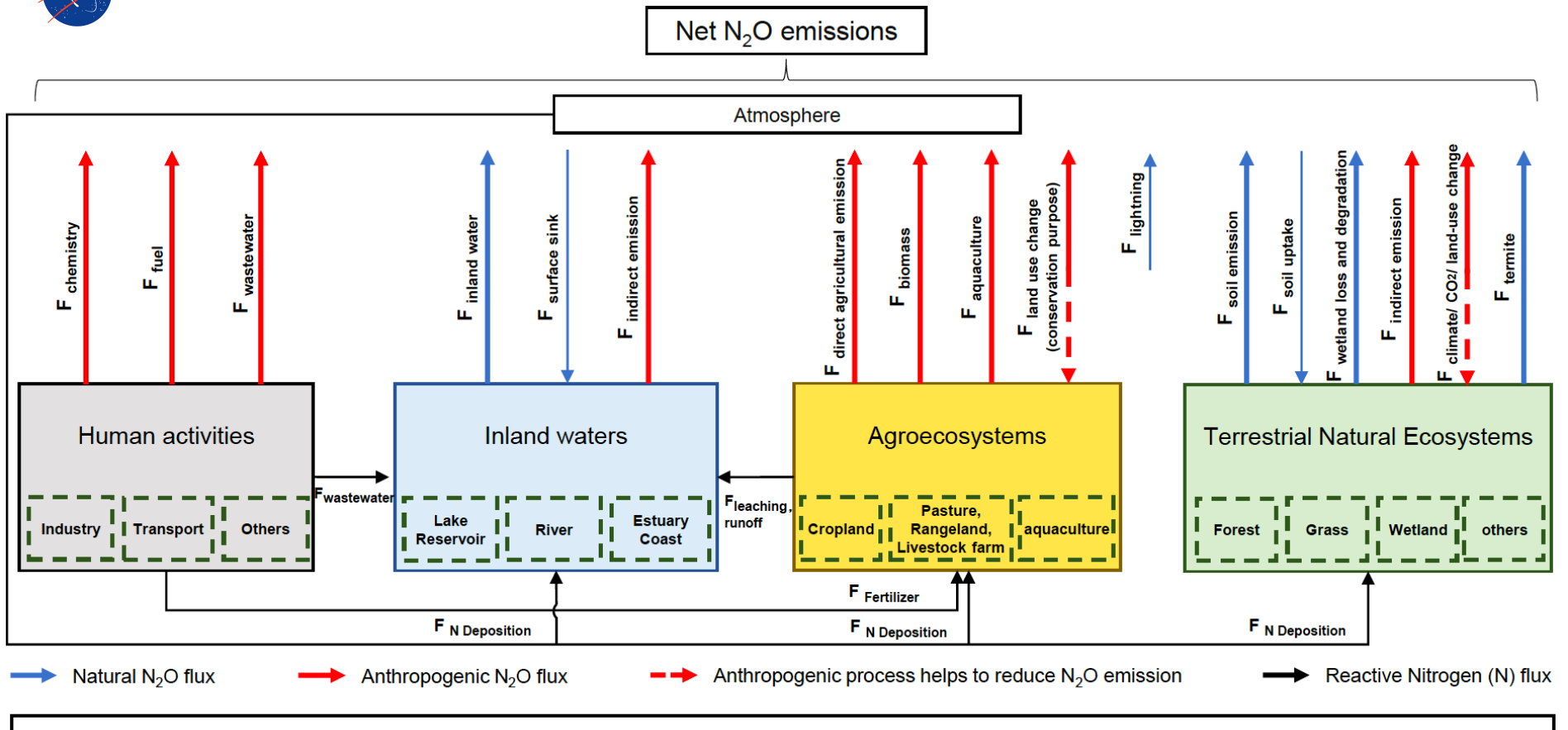


Ciais et al., 2022

RECCAP2: Guidance for methane budgeting



RECCAP2: Guidance for nitrous oxide budgeting





RECCAP2: Data generation and distribution

Global datasets

- TRENDY DGVMs v10
- CO₂ inversions w LOAC correction
- Methane budget (2000-2019)
- N₂O budget (2000-2016)

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Home Download Upload Registration Administration

Data Exchange Portal

This is the data exchange portal for the following projects:

- BACI
- BGI
- CARBO-Extreme
- DEHESHyrE (EUFAR)
- FluxCom
- GEOCARBON
- RECCAP-2
- SoMo.ml

Please select a project from the dropdown menu above the Home button in the menu before trying to download data.

This site allows project related data **downloads** and **uploads**.

Everyone including project members must **register** in order to download or upload files. One benefit of the registration is that users will be notified in case one of the files they have downloaded is updated.
Project members are automatically recognized after registration.

Public files are **freely** available for everyone.
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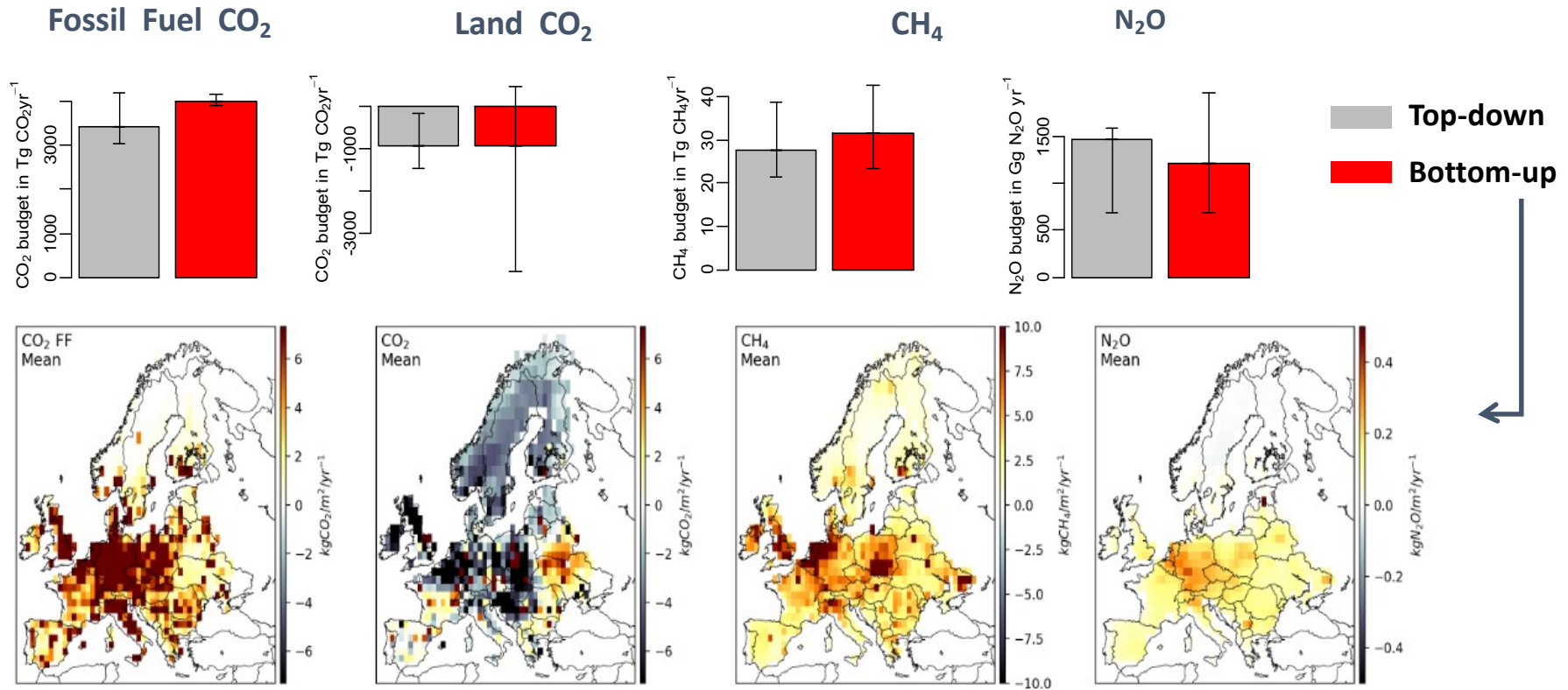
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[Disclaimer](#) Page calls: 87429 Gerhard Boenisch, created 2012-10-09, modified 2013-04-18



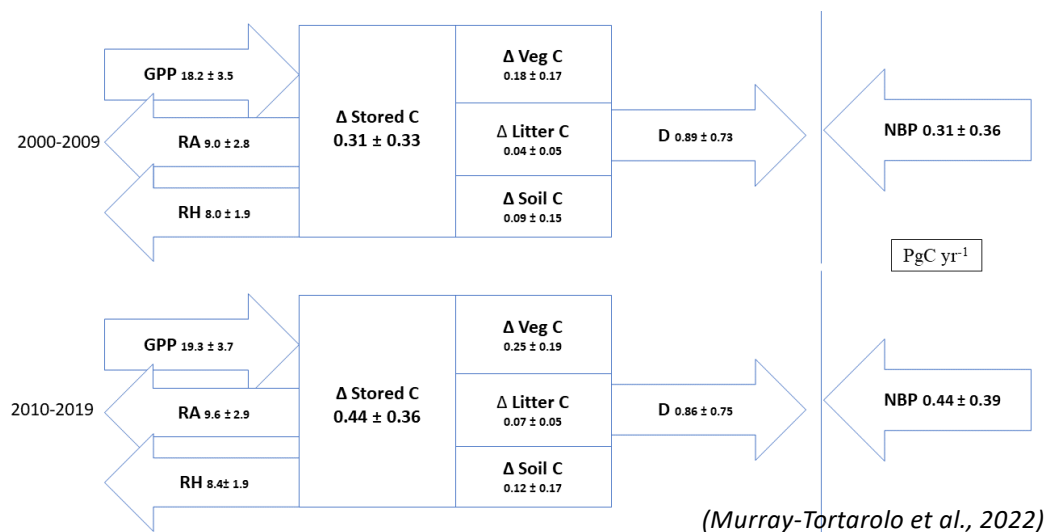
RECCAP2: European GHG budgets 2010-2019: bottom-up vs. top-down



Ronny Lauerwald et al.

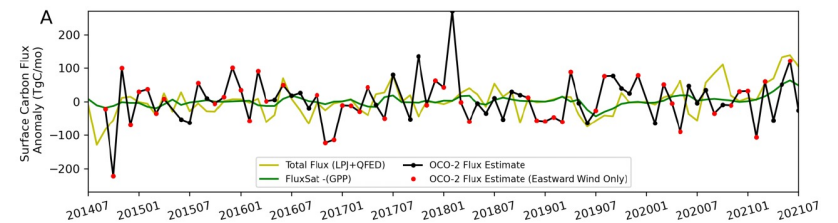
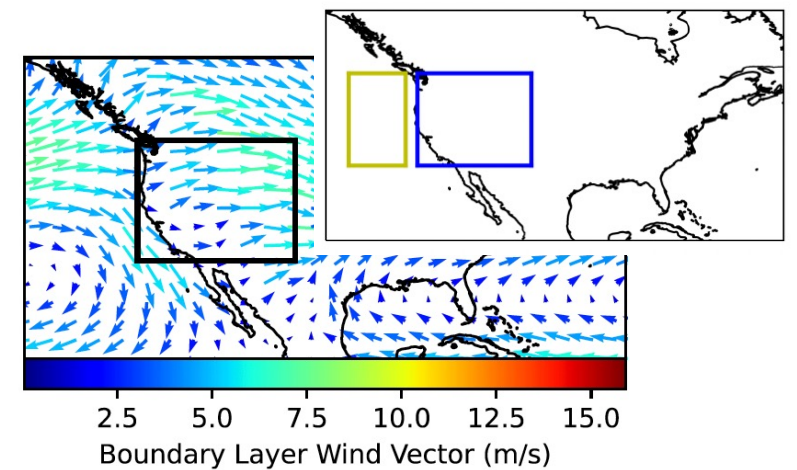
RECCAP2: North America carbon budget

Carbon budget for North America : DGVM perspective



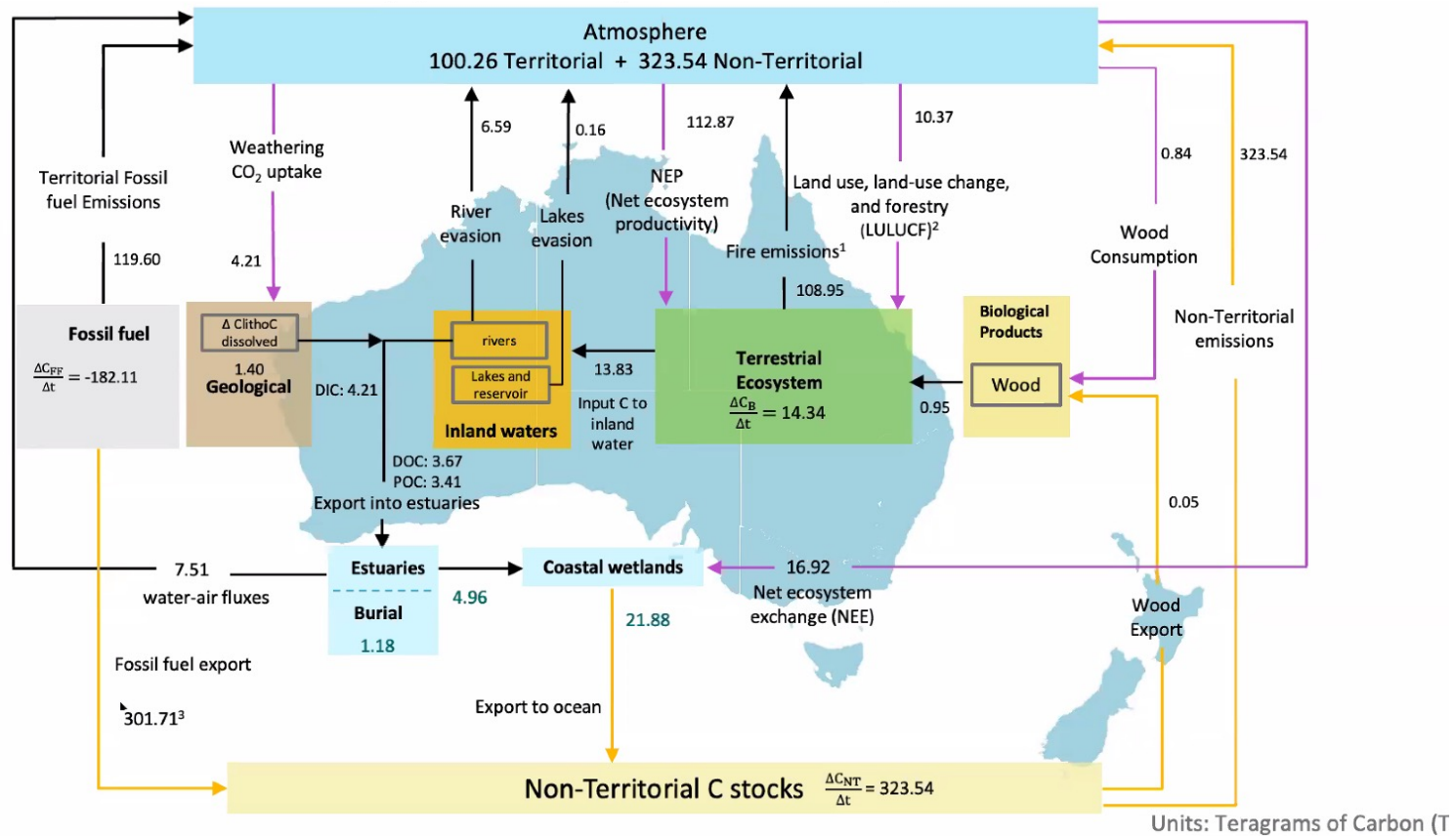
- Increase in N America carbon uptake to ~0.45 Pg C yr⁻¹
- Smaller carbon sink than inversions, ~0.7 Pg C yr⁻¹
- NGHGI LULUCF, ~0.3 Pg C yr⁻¹
- Lateral transport (0.13 PgC yr⁻¹) & managed land proxy reconcile differences

CO2 anomalies : OCO-2 perspective

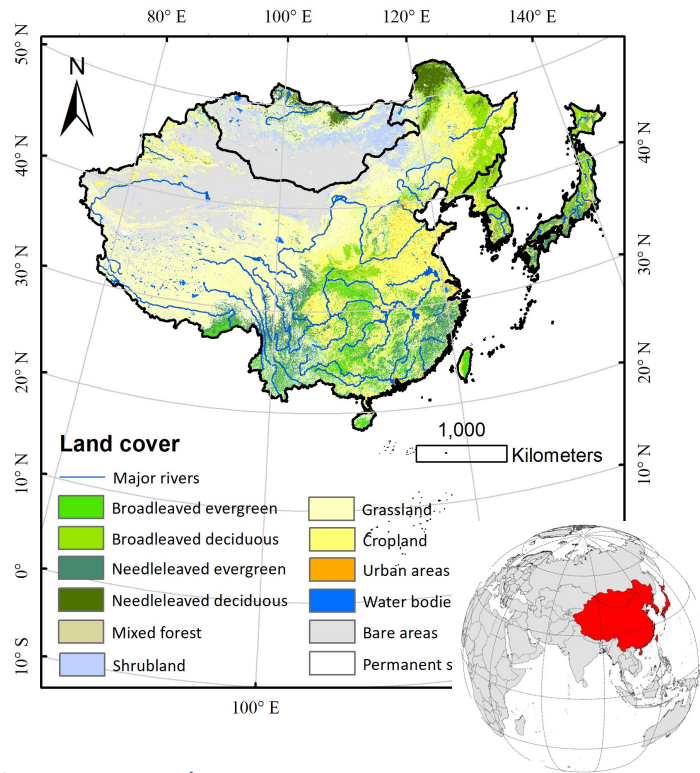


(Feldman et al., 2022)

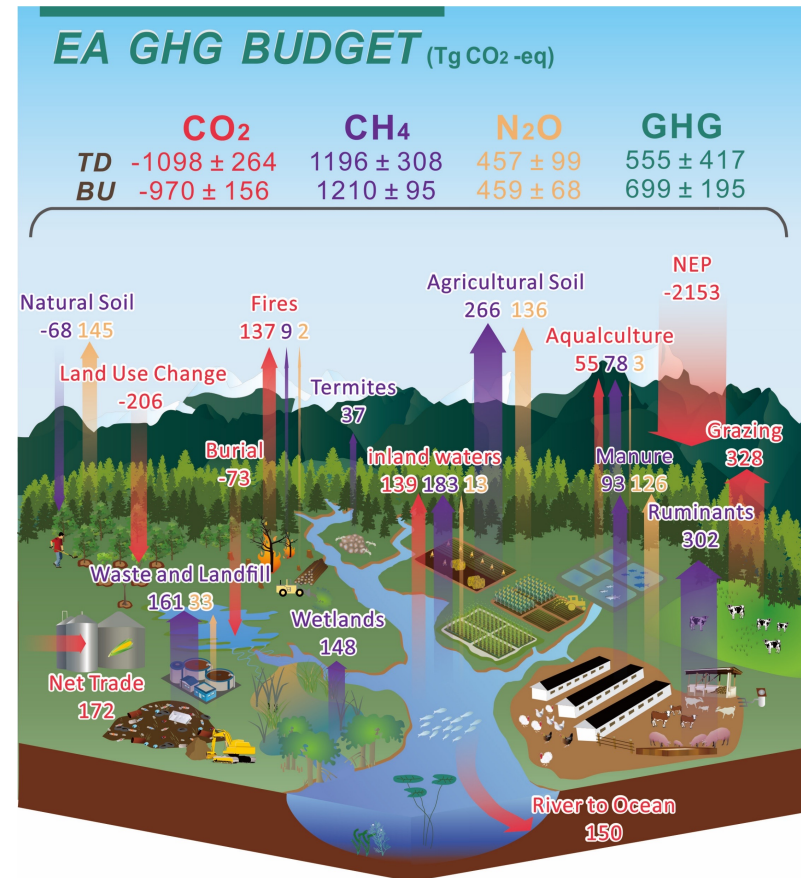
RECCAP2: Australia carbon budget



RECCAP2: East Asia GHG budget



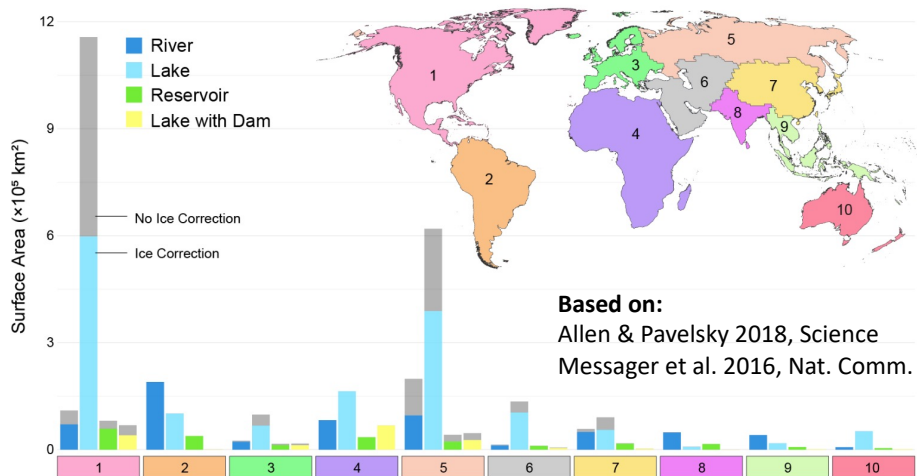
Xuhui Wang et al.



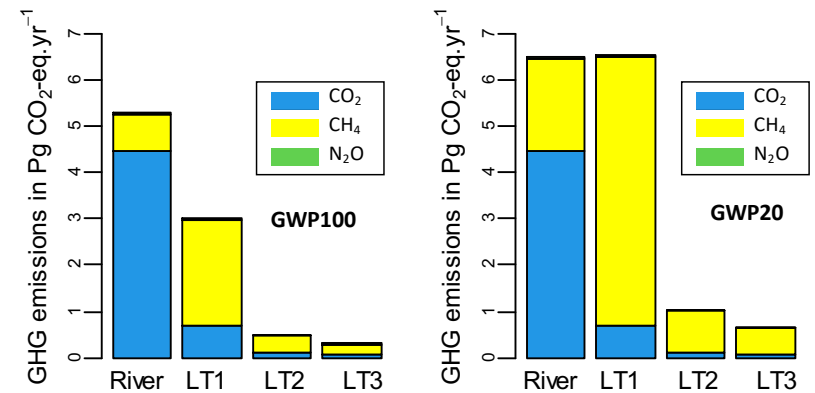


LOAC-1: Inland water greenhouse gas emissions

Inland water surface areas and seasonal ice cover



Global emissions per type of water body



LT1: Natural lakes
 LT2: Reservoirs
 LT3: Lakes regulated by a dam



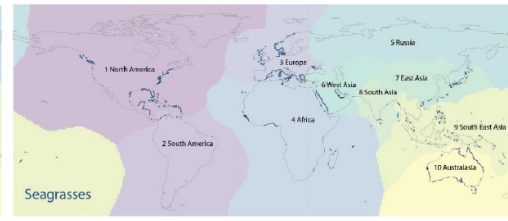
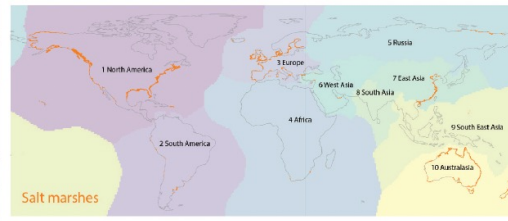
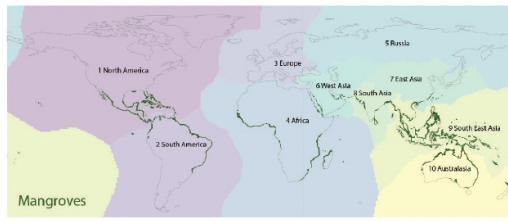
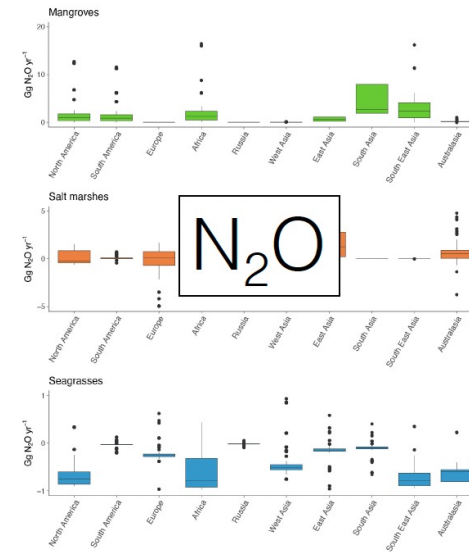
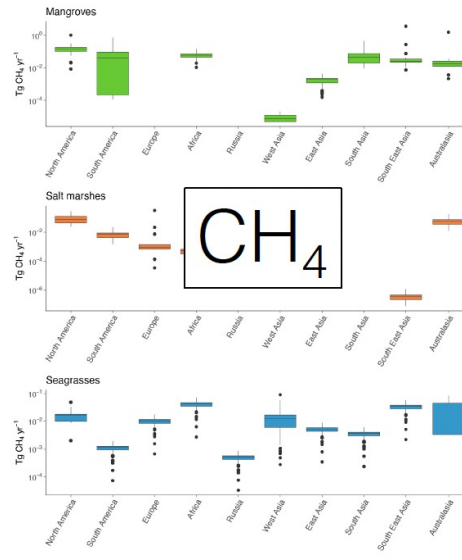
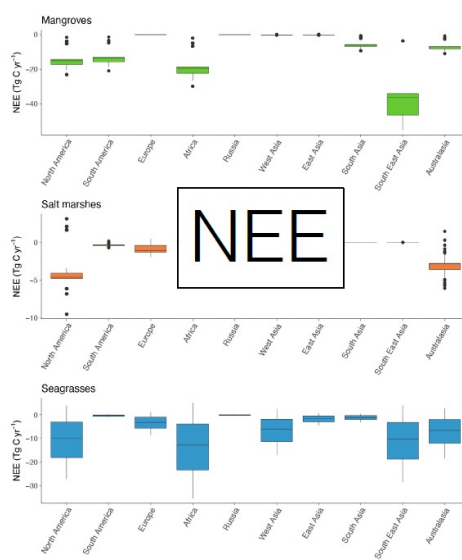
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LOAC-2: Estuaries and coastal zone

Coastal wetlands: mangroves, salt marshes, seagrasses

Contact: Judith Rosentreter

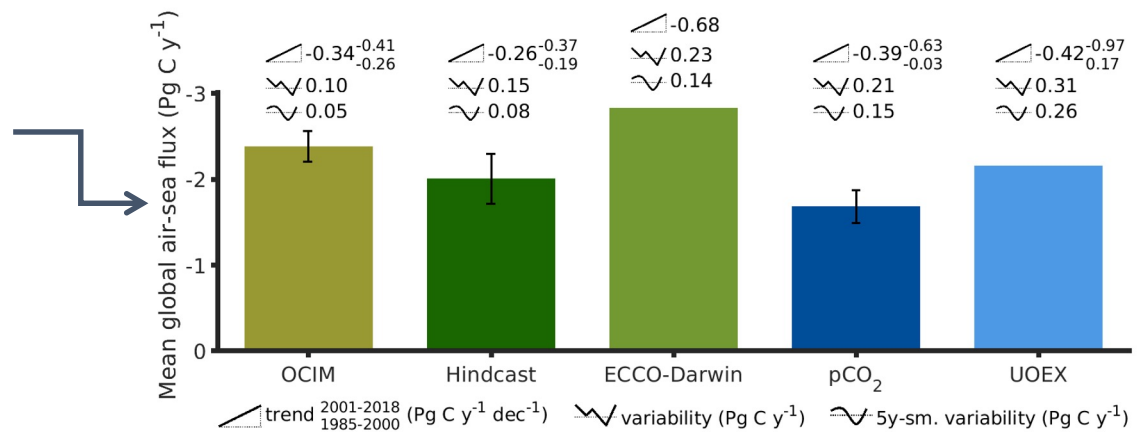
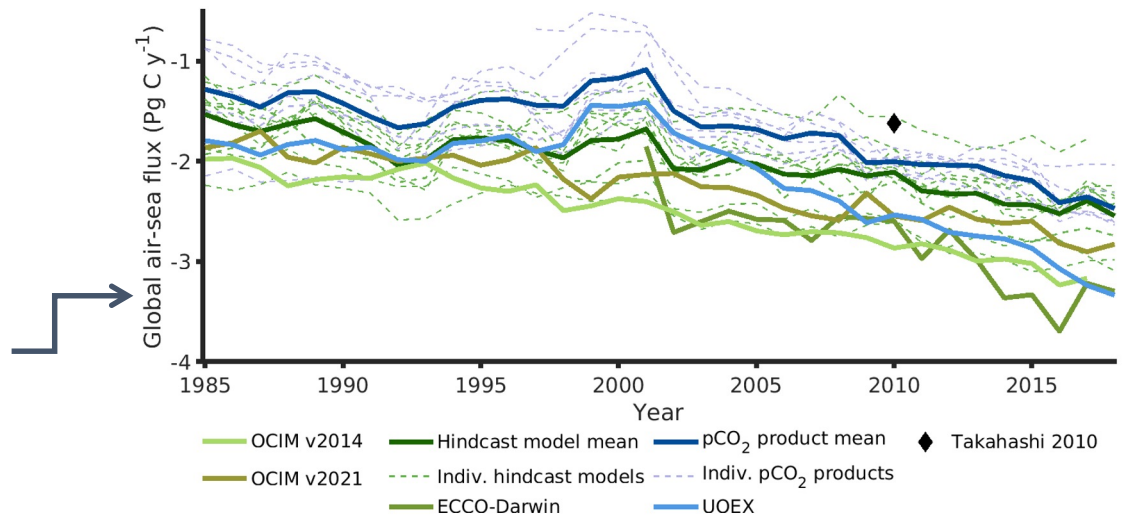




Global Ocean

Globally integrated air-sea CO₂ fluxes from all the RECCAP2 ocean products over the period 1985-2018. Ocean biogeochemical models are colored in shades of yellow/green, while products based on pCO₂ observations are colored shades of blue.

Summary statistics for global air-sea CO₂ flux averaged over 1985-2018 from RECCAP2 ocean models and pCO₂ products for each model type or product.





RECCAP2: Publications and products



- AGU Special Collection for land/ocean
- Balancing GHG Budget edited book (May 2022)
- RECCAP2 contribution to Global Stocktake
- ESA RECCAP2 project website w video outreach

Bastos et al.
Carbon Balance and Management (2022) 17:15
<https://doi.org/10.1186/s13021-022-00214-w>

Carbon Balance and Management

COMMENT

Open Access

On the use of Earth Observation to support estimates of national greenhouse gas emissions and sinks for the Global stocktake process: lessons learned from ESA-CCI RECCAP2

Ana Bastos^{1*}, Philippe Ciais², Stephen Sitch³, Luiz E. O. C. Aragão^{3,4,5}, Frédéric Chevallier⁷, Dominic Fawcett³, Thais M. Rosan³, Marielle Saunois², Dirk Günther⁶, Lucia Perugini⁷, Colas Robert⁸, Zhu Deng⁹, Julia Pongratz^{10,11}, Raphael Ganzenmüller¹⁰, Richard Fuchs¹², Karina Winkler^{12,13}, Sönke Zaehle¹ and Clément Albergel¹⁴

Eos Science News by AGU

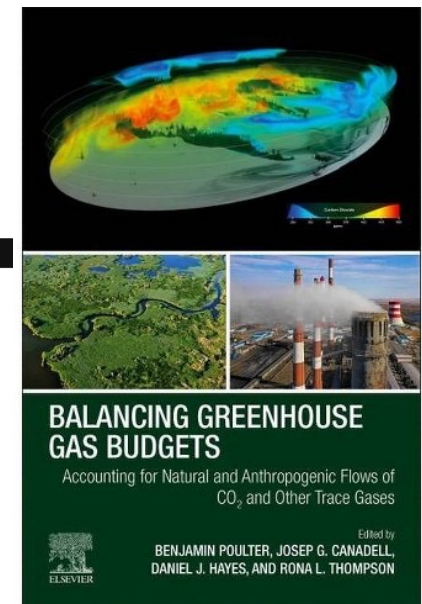
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ABOUT SPECIAL REPORTS TOPICS PROJECTS NEWSLETTER SUBMIT TO EOS

Inventorying Earth's Land and Ocean Greenhouse Gases

A new special collection in AGU journals will present findings from the Second REgional Carbon Cycle Assessment and Processes (RECCAP2) study with a decade of data on greenhouse gas growth.

By Benjamin Poulter, Ana Bastos, Josep G. Canadell, Philippe Ciais, Nicolas Gruber, Judith Hauck, Robert B. Jackson, Masao Ishii, Jens Daniel Müller, Prabir K. Patra, and Hangqin Tian
17 February 2022





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RECCAP2: Recommendations

- Over 200 people involved from around the world
- Recommendations related to coordination
 - Science data system needs
 - Agency support for joint programs like AMPAC
 - Involvement from African scientists
 - Sustaining activities like RECCAP3, 4, 5...
- Engagement with policy experts to policy-ready data (PRD)
- Science recommendations
 - Lower latency, wetlands and methane, LOAC, managed land proxy

