anthropogenically perturbed

The ocean carbon sink in the Global Carbon Budget

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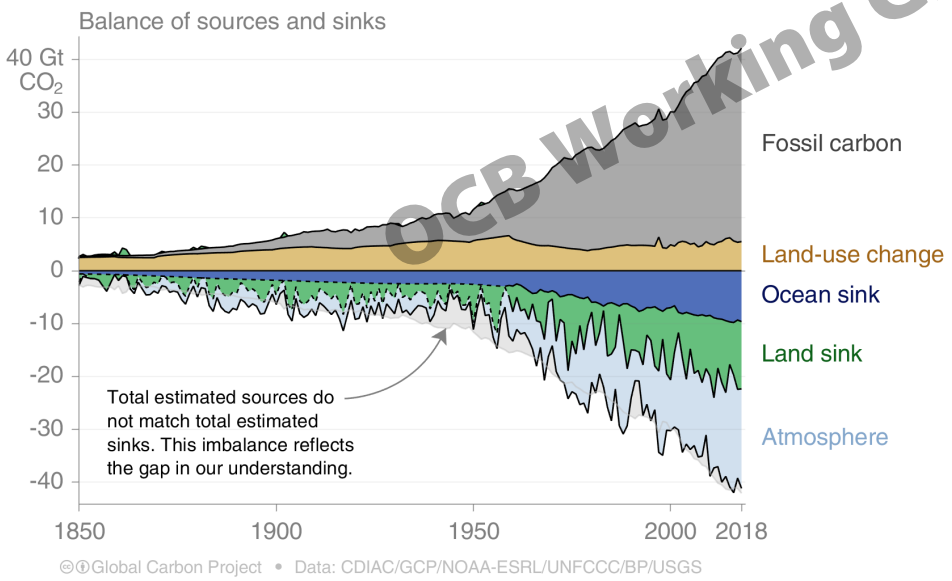
OCB Working Group on Carbon Gaps



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Open Access Earth System Science Data

Global Carbon Budget 2019

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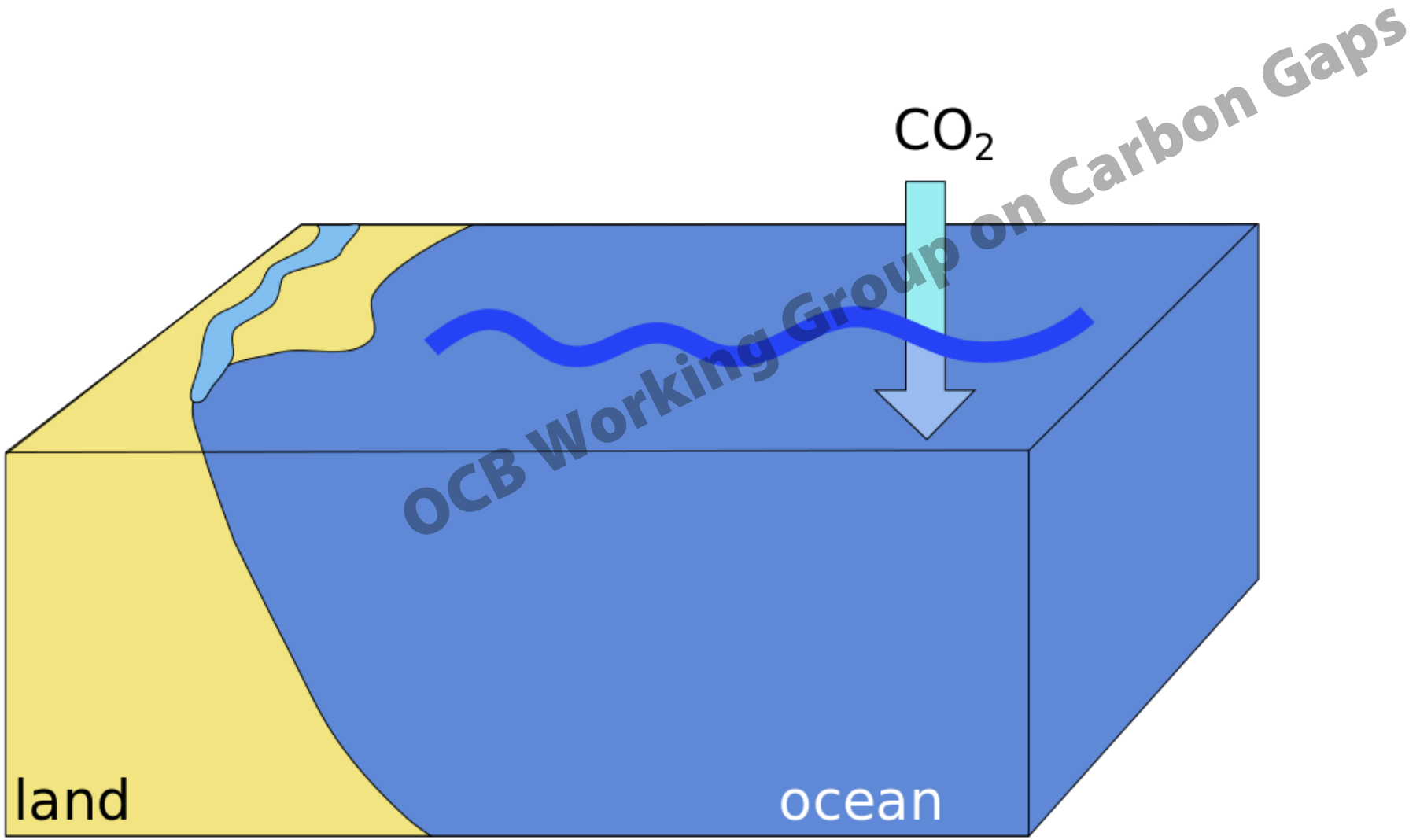
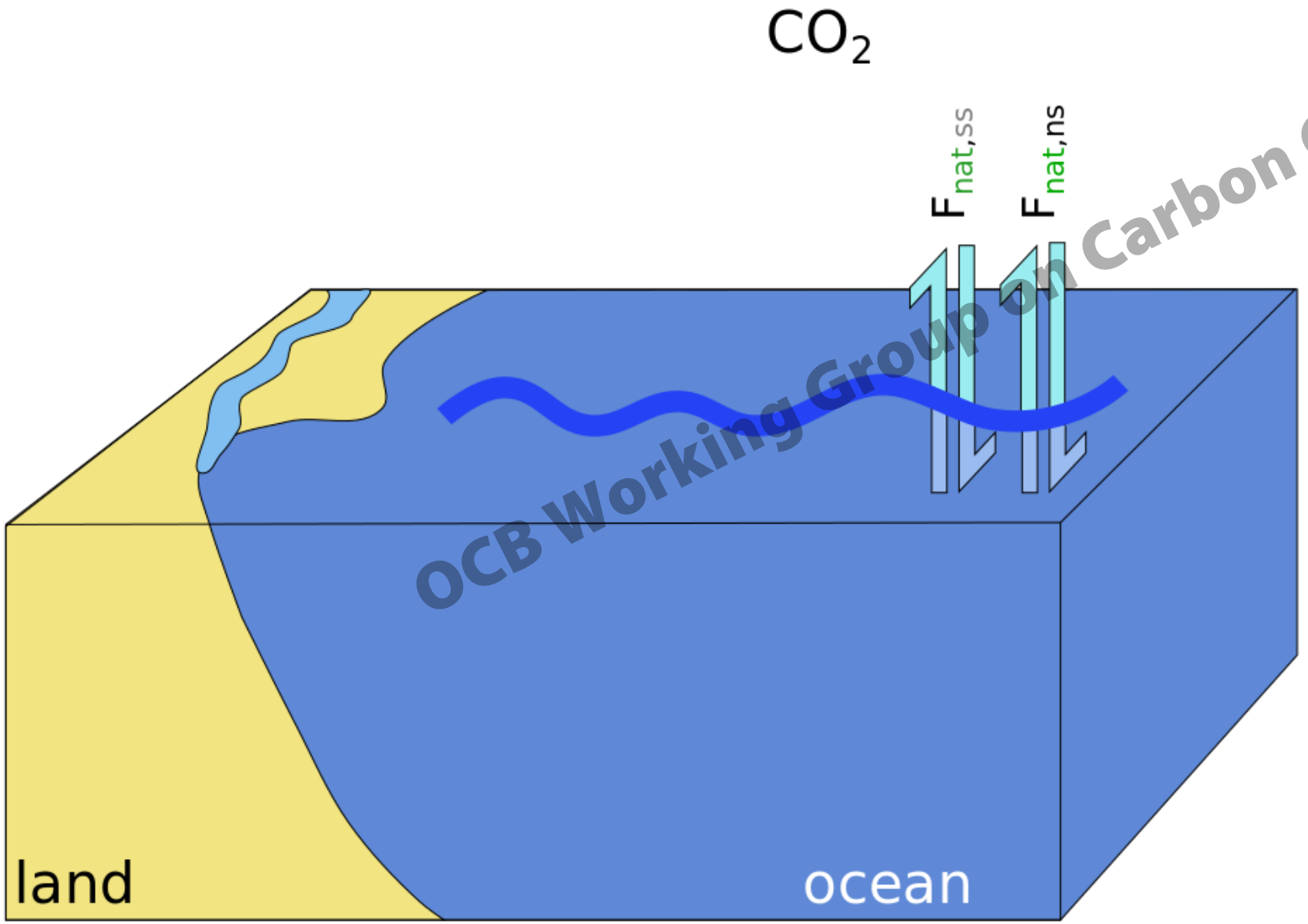
HELMHOLTZ

Components of the ocean carbon sink



Components of the ocean carbon sink

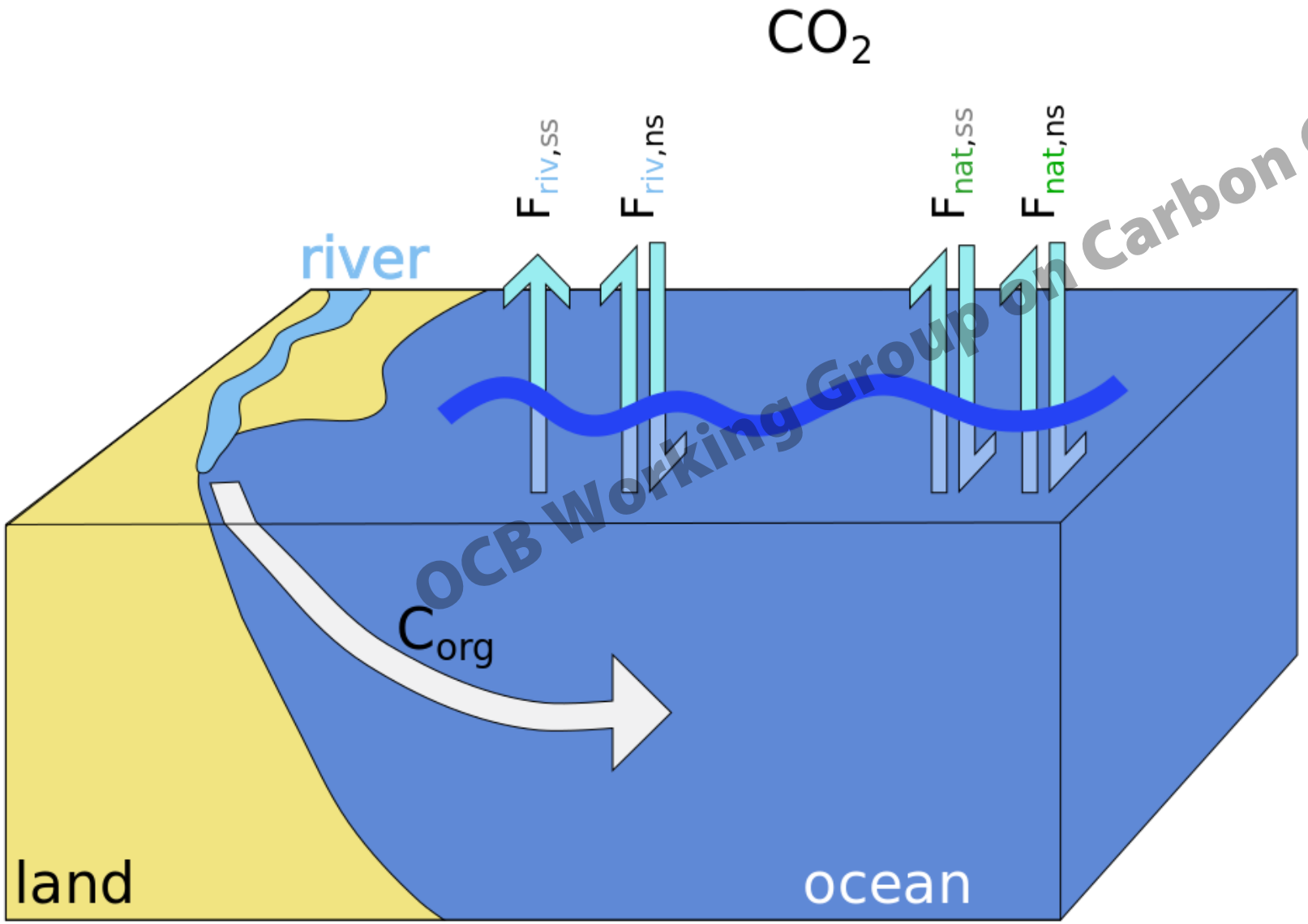


Natural CO_2 flux

ss: steady state

ns: non steady state

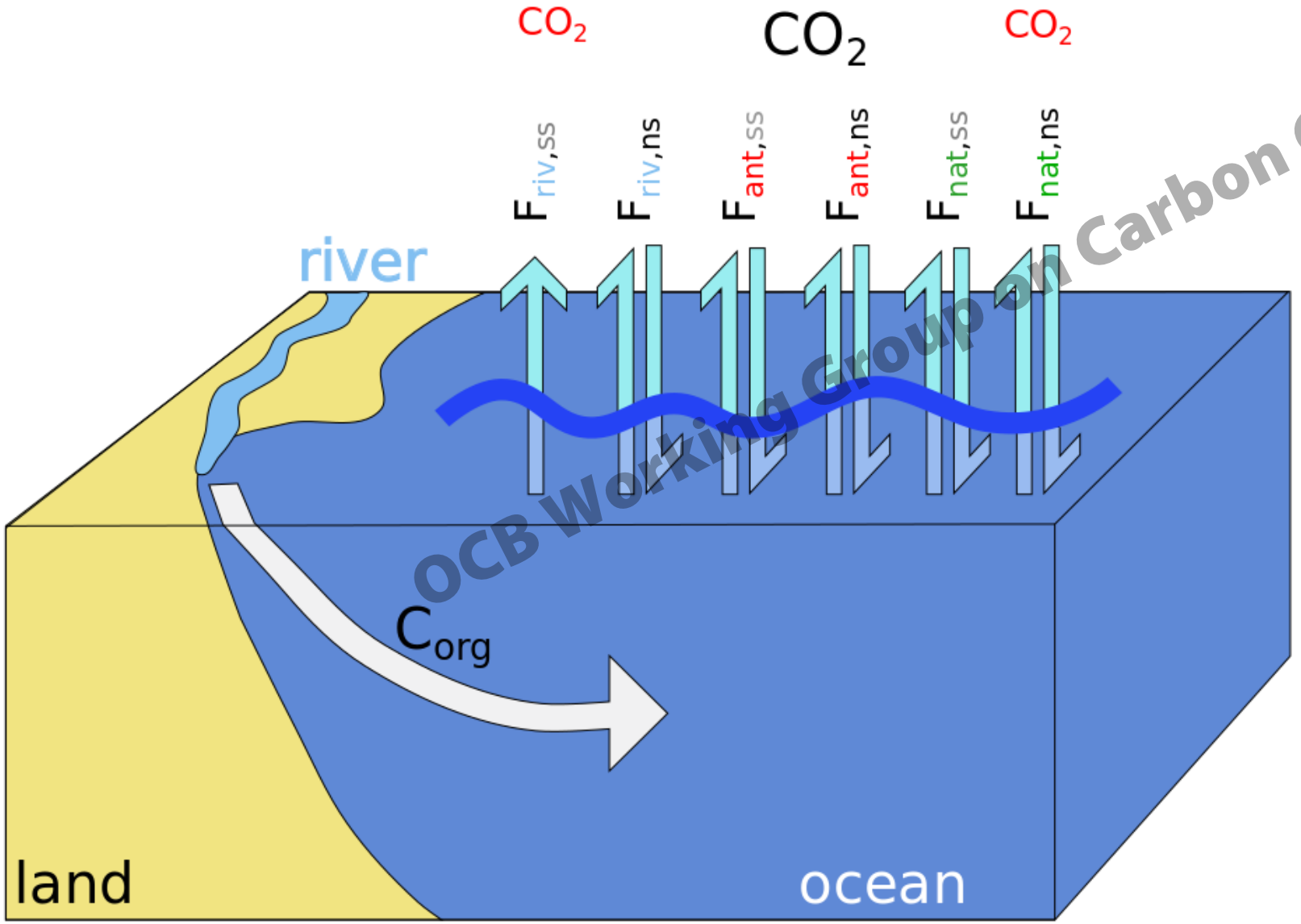
Components of the ocean carbon sink



Natural CO_2 flux
Riverine CO_2 flux

ss: steady state
ns: non steady state

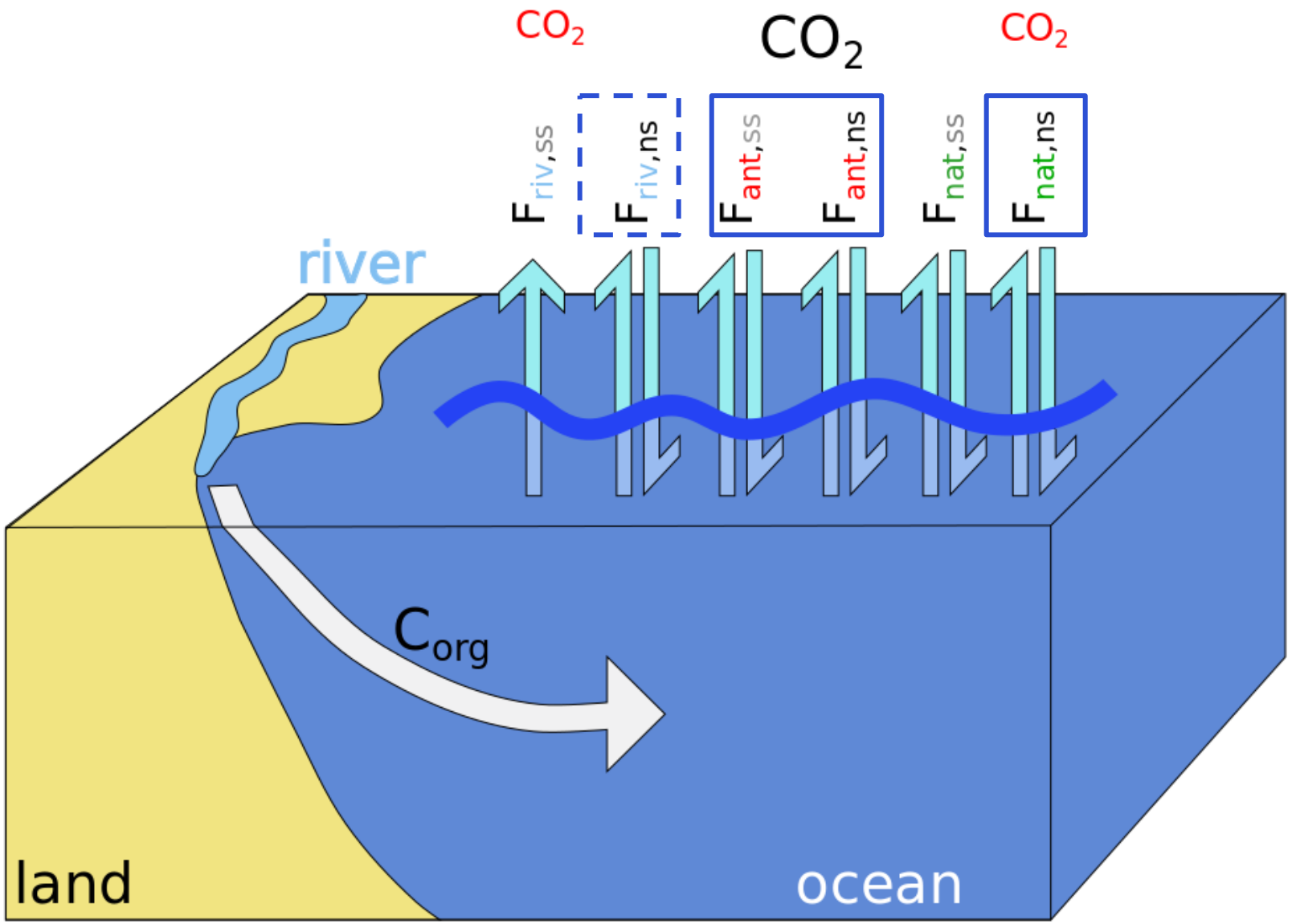
Components of the ocean carbon sink



Natural CO_2 flux
Riverine CO_2 flux
Anthropogenic CO_2 flux

ss: steady state
ns: non steady state

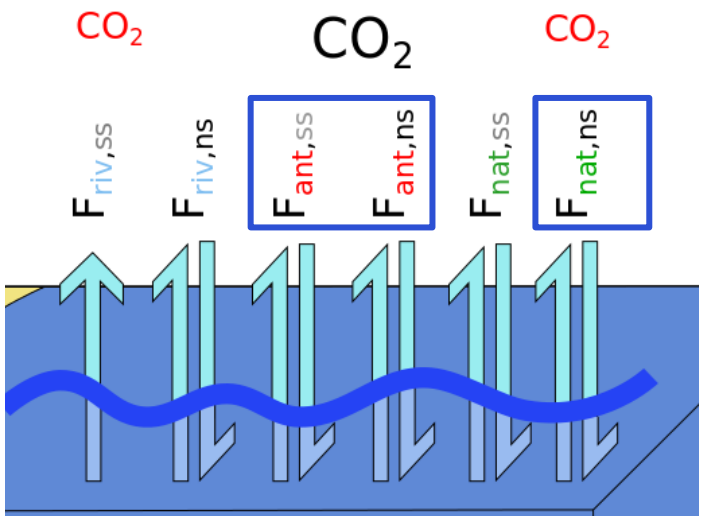
Components of the ocean carbon sink



Global Carbon Budget:

$$S_{OCEAN} = F_{ant,\,ss} + F_{ant,\,ns} + F_{nat,\,ns}$$

GCB estimate agrees with ocean interior data

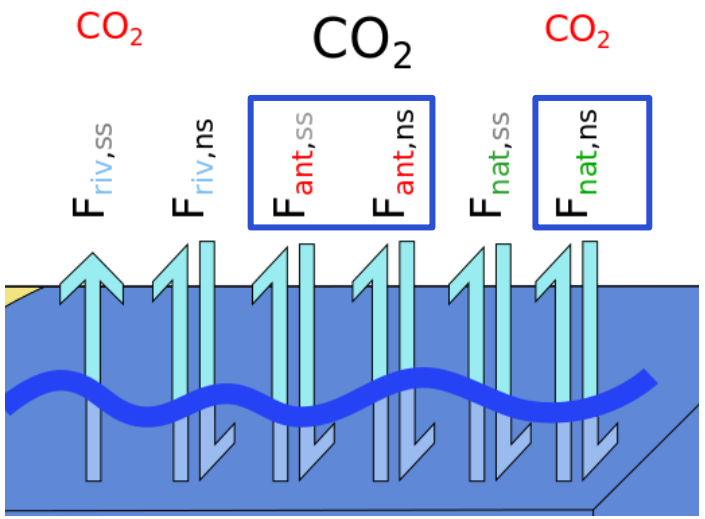


1994-2007:

GCB S_{OCEAN} = 2.1 ± 0.5 PgC yr^{-1}

Friedlingstein et al. 2019

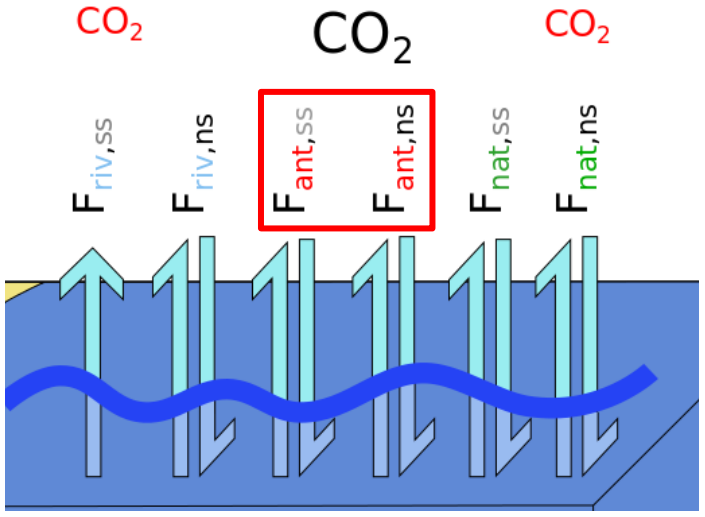
GCB estimate agrees with ocean interior data



1994-2007:

GCB $S_{OCEAN} = 2.1 \pm 0.5$ PgC yr^{-1}

Friedlingstein et al. 2019

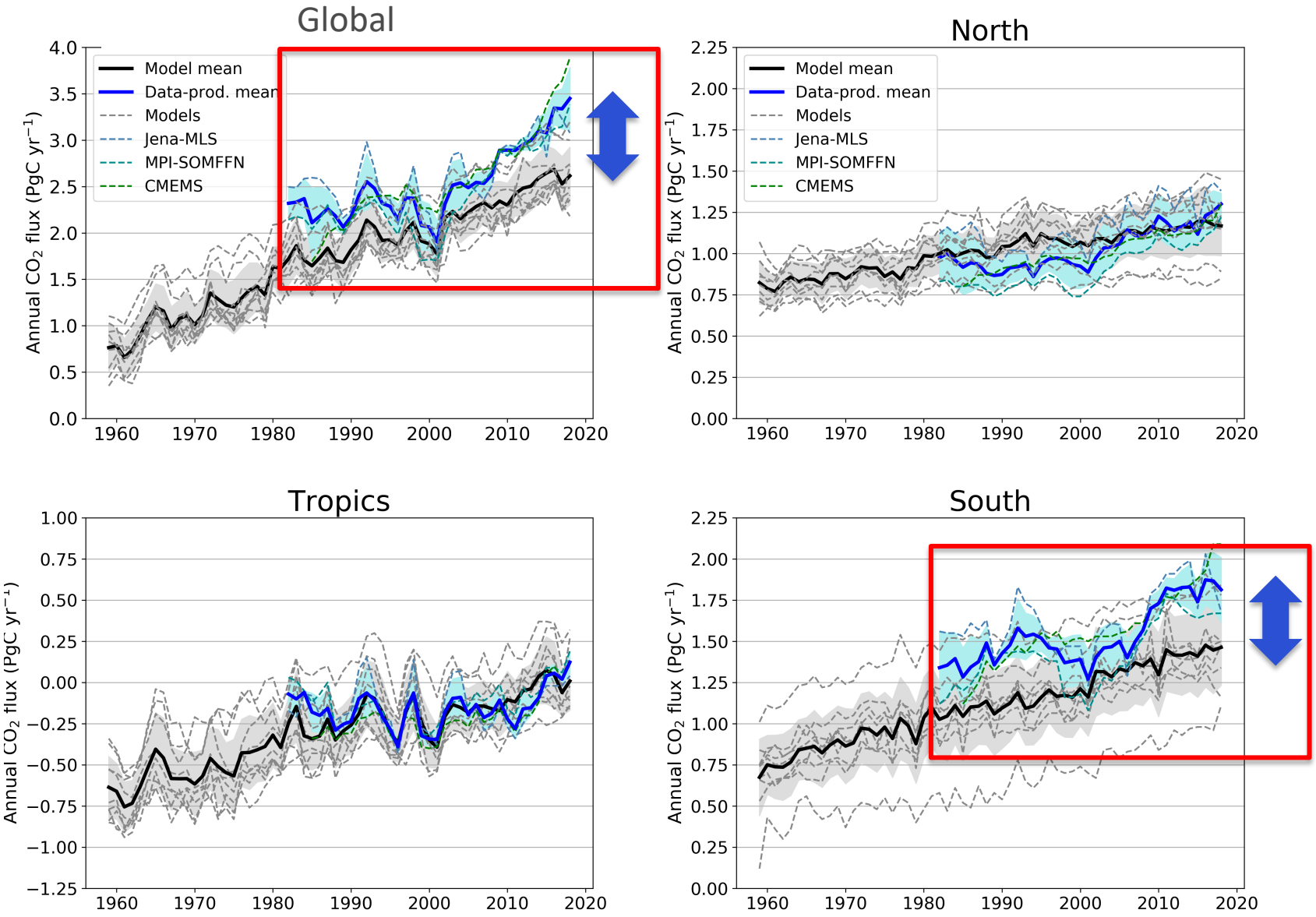


$F_{ant} = 2.6 \pm 0.3$ PgC yr^{-1}

$S_{OCEAN} = F_{ant} - F_{nat} = 2.2 \pm 0.4$ PgC yr^{-1}

Gruber et al. 2019

Consistency and uncertainties



- Discrepancies on mean and multi-year variability largest in **Southern Ocean**

→ river adjustment?

→ overestimate of uptake by missing winter data in data-products?

- Multi model mean **insensitive** to model bias and drift correction