From branch to forest to globe

How do tree choices regarding growth affect forest response to elevated CO_2 levels?

Klaske van Wijngaarden, Joshua Larsen, Thomas Pugh, Benjamin Smith, Belinda Medlyn

Read the abstract here:

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EGU22 – Session BG3.2 – 23/05/2022

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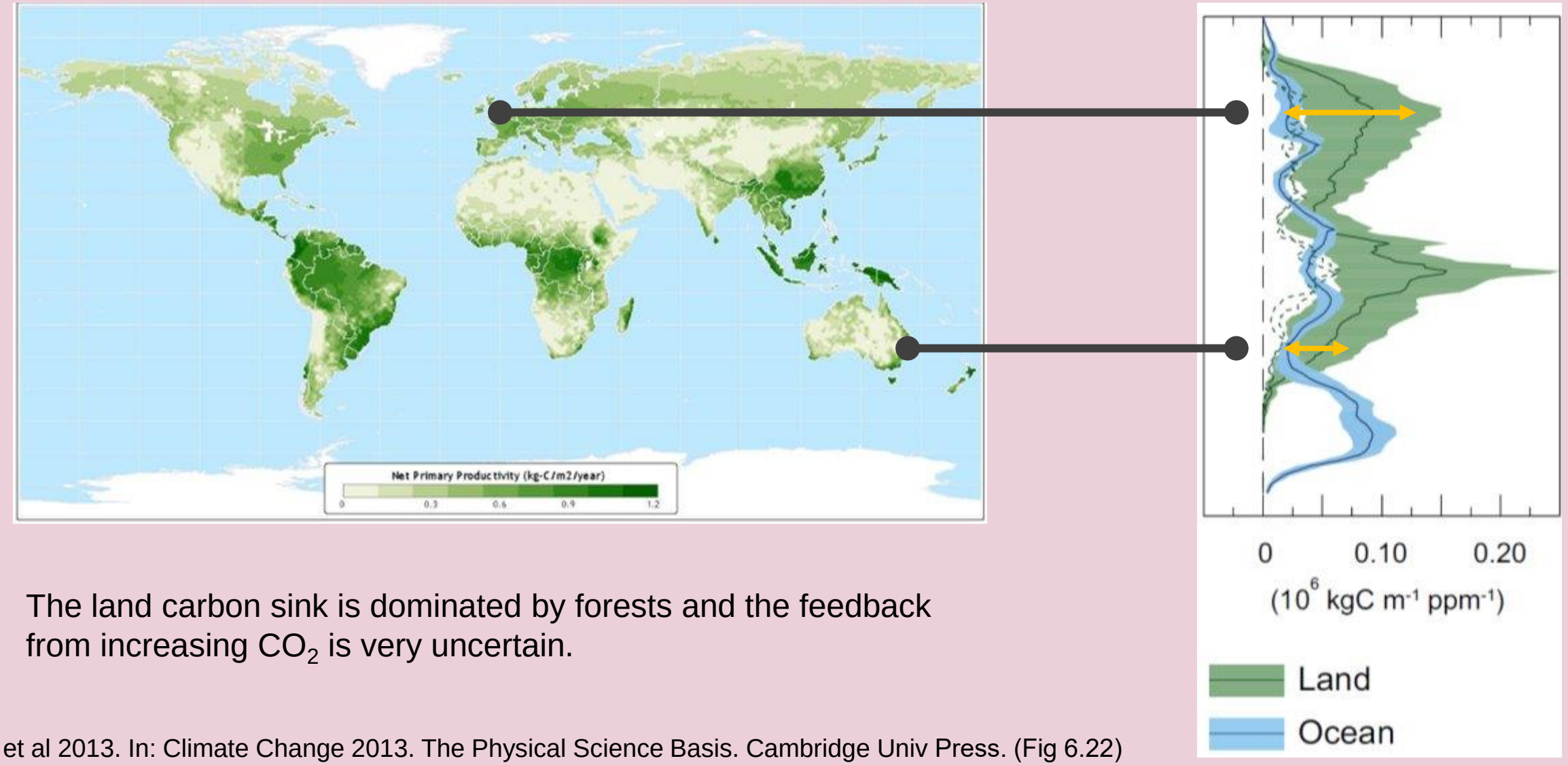
Forests and the carbon sink



The land carbon sink is dominated by forests and the feedback from increasing CO_2 is very uncertain.

Ciais et al 2013. In: Climate Change 2013. The Physical Science Basis. Cambridge Univ Press. (Fig 6.22)

Free Air Carbon Enrichment 2.0 times 2

BIFoR FACE – United Kingdom

3 rings + 0 ppm & 3 rings + 150 ppm

Treatment start 2017

Temperate

Oak woodland

EucFACE – Australia

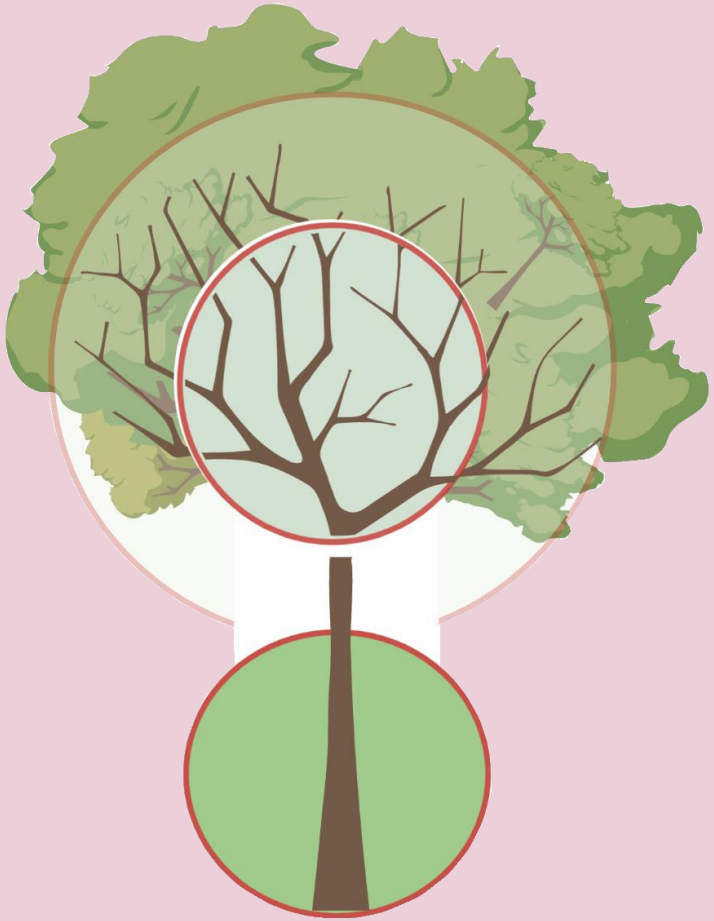
3 rings + 0 ppm & 3 rings + 150 ppm

Treatment start 2012

Subtropical

Dry *Eucalyptus* forest

Breaking the black box of woody carbon



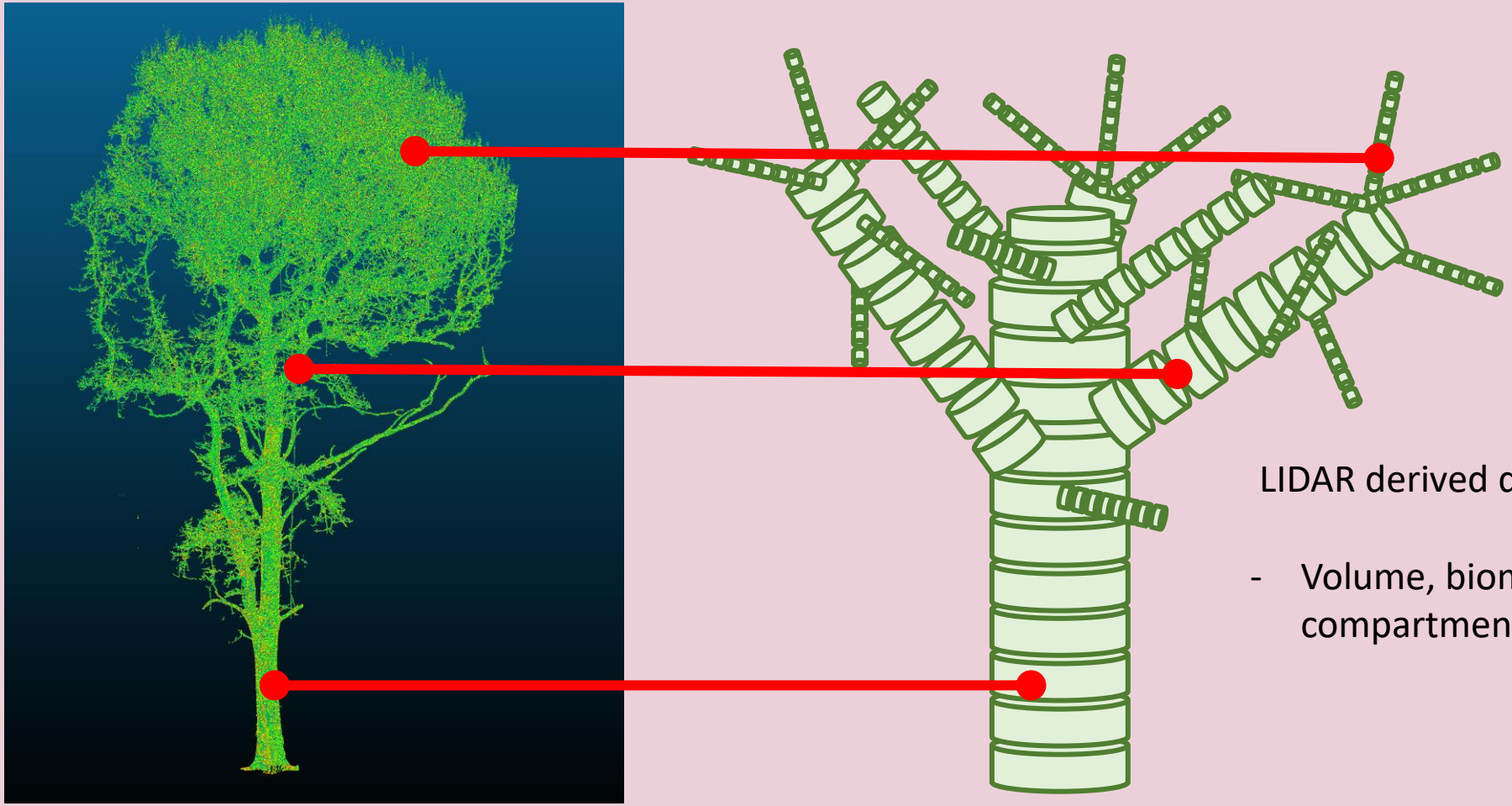
Gathering observation data on:

- Woody tissue distribution under eCO_2
  Especially smaller diameter compartments.
- Woody tissue turn over under eCO_2
- An eCO_2 response under different environmental factors

Figure made in Biorender.com

Quantifying wood volume in the canopy

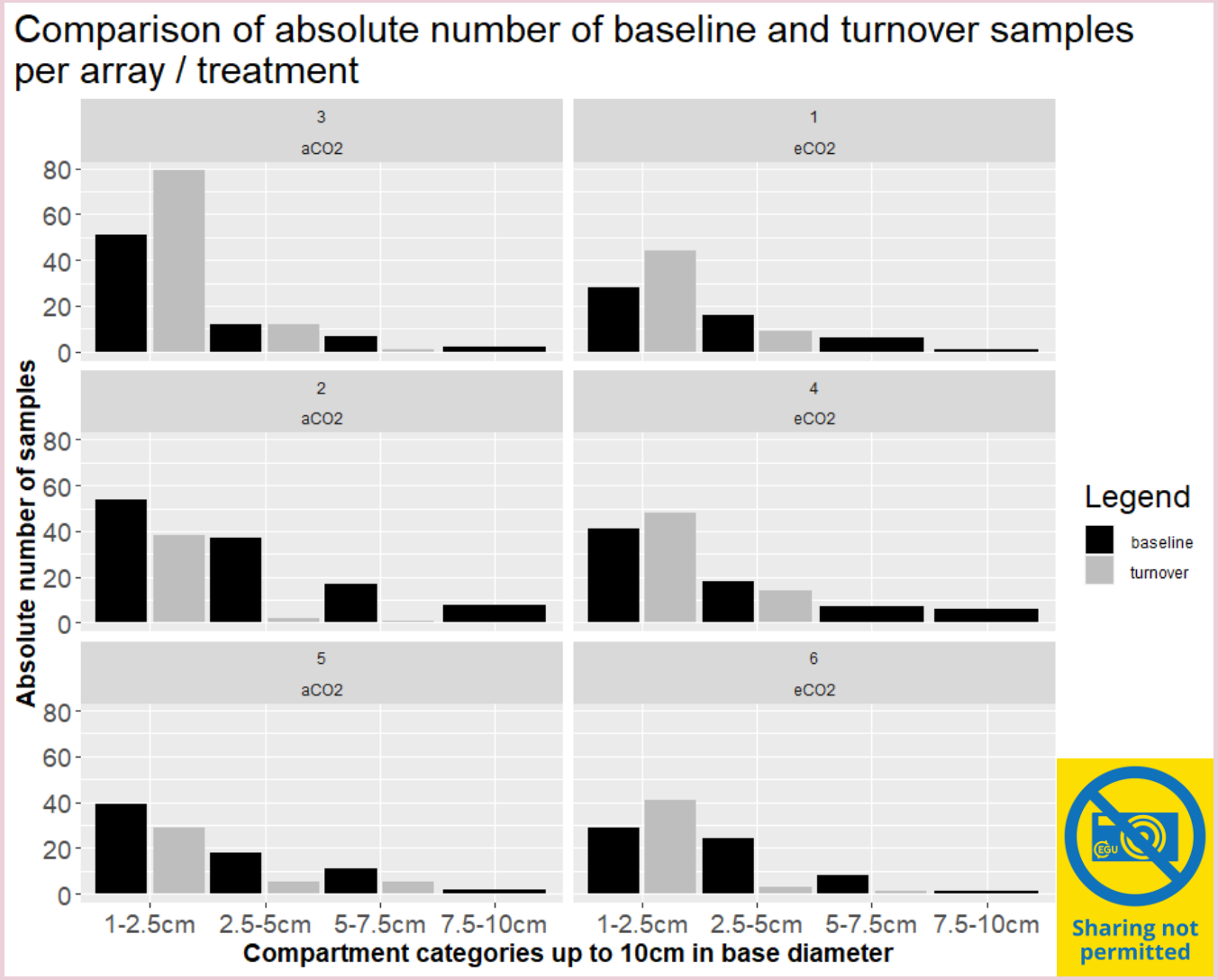
BIFoR FACE and EucFACE terrestrial laser scans done in 2022.

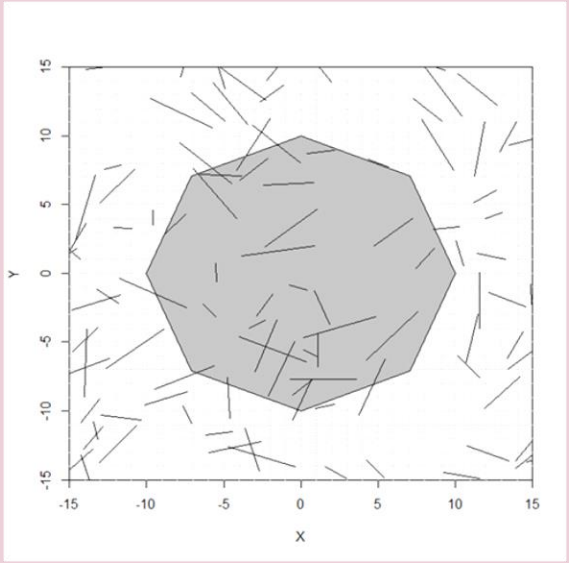


LIDAR derived data will provide:

- Volume, biomass and ratio of compartments > 2.50 cm Ø

Quantifying wood compartment turn over





Line transect data will provide:

- Volume and ratio of > 1.00 cm Ø samples over time + years of litter data
- Base for expanding subsample to stand wide number

Comparing the two FACE sites

BIFoR FACE – United Kingdom

EucFACE – Australia

Wind
Precipitation
Temperature
Disturbances
…

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