

THE ROLE OF FORESTS IN CLIMATE TODAY AND TOMORROW

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Outline

The need for large-scale removal of CO₂ from the atmosphere.

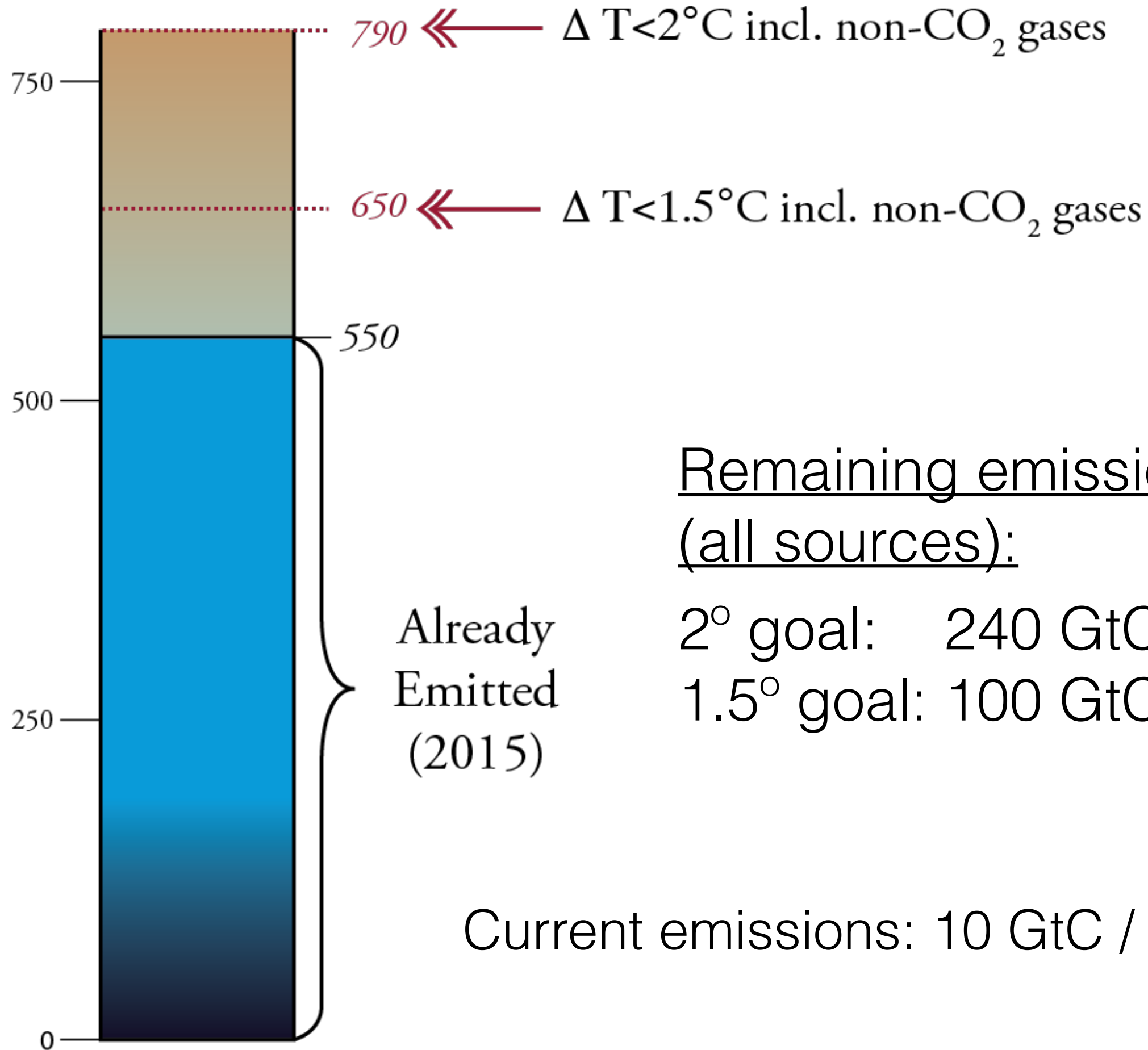
The potential for biological storage of CO₂: more than you might think.

Effects of healthy forests on regional climate.

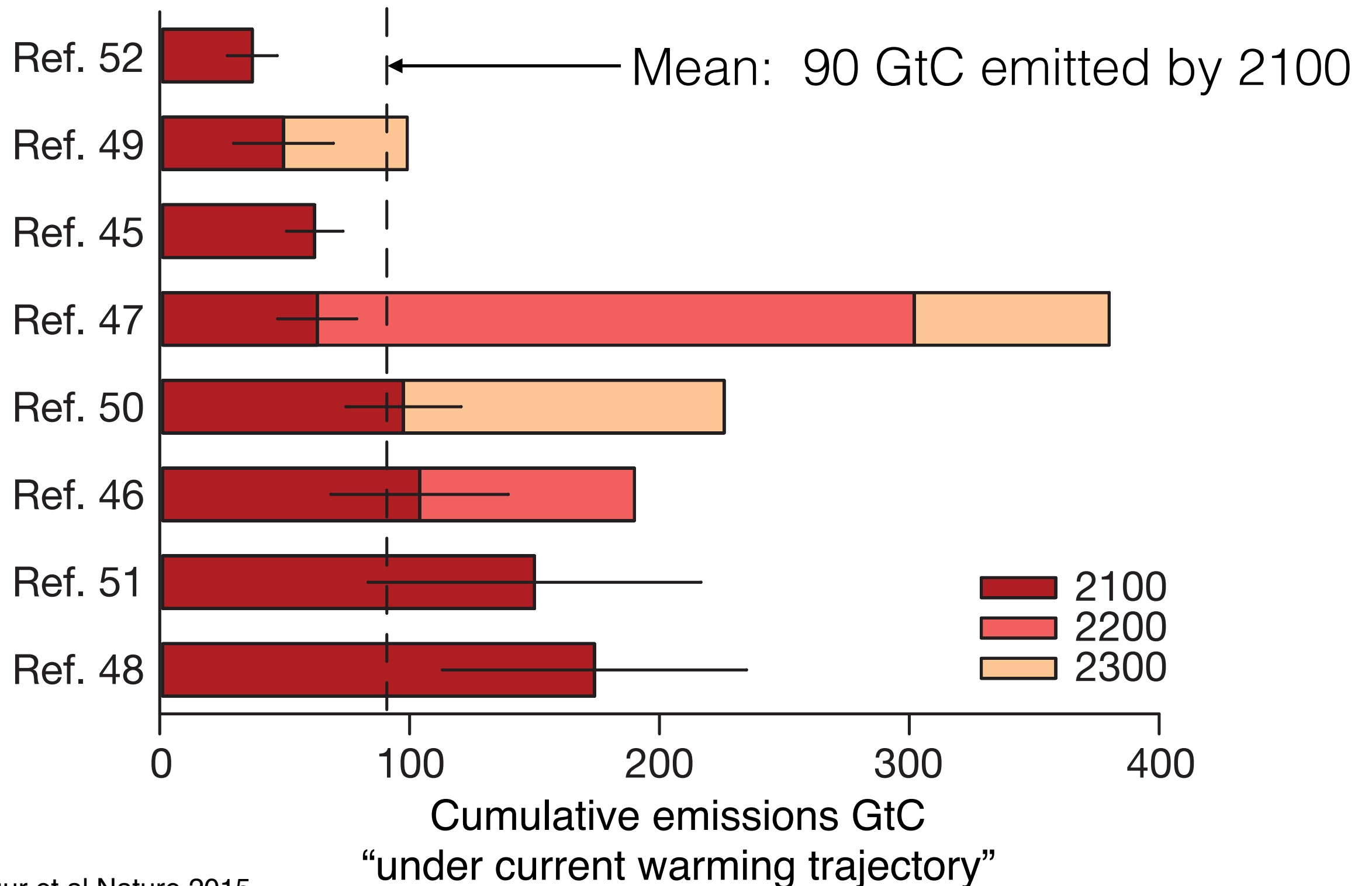
GHG emissions from Arctic permafrost
motivate biological sequestration of carbon



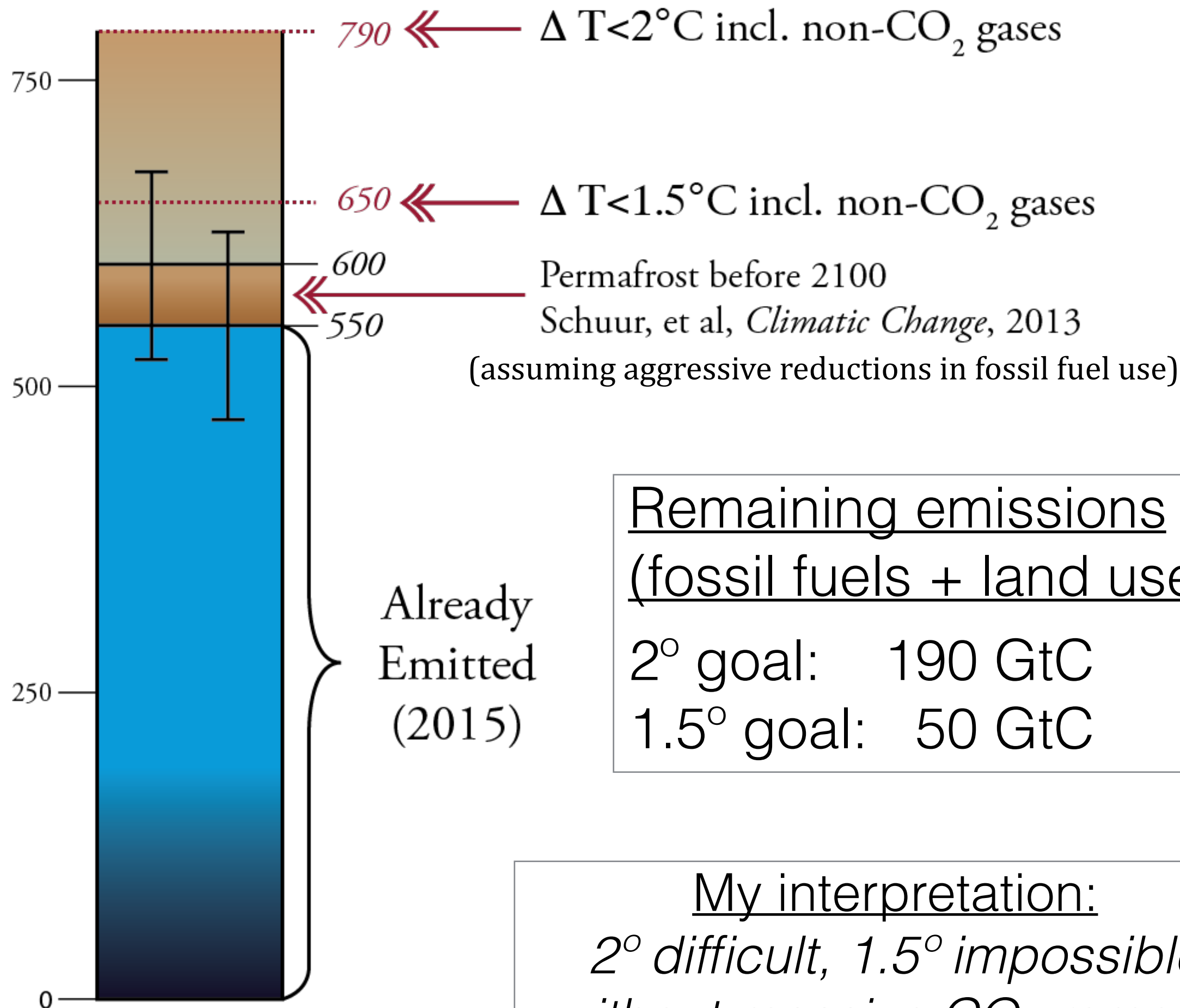
Cumulative Emissions (GtC)



GHG emissions from Arctic permafrost motivate biological sequestration carbon

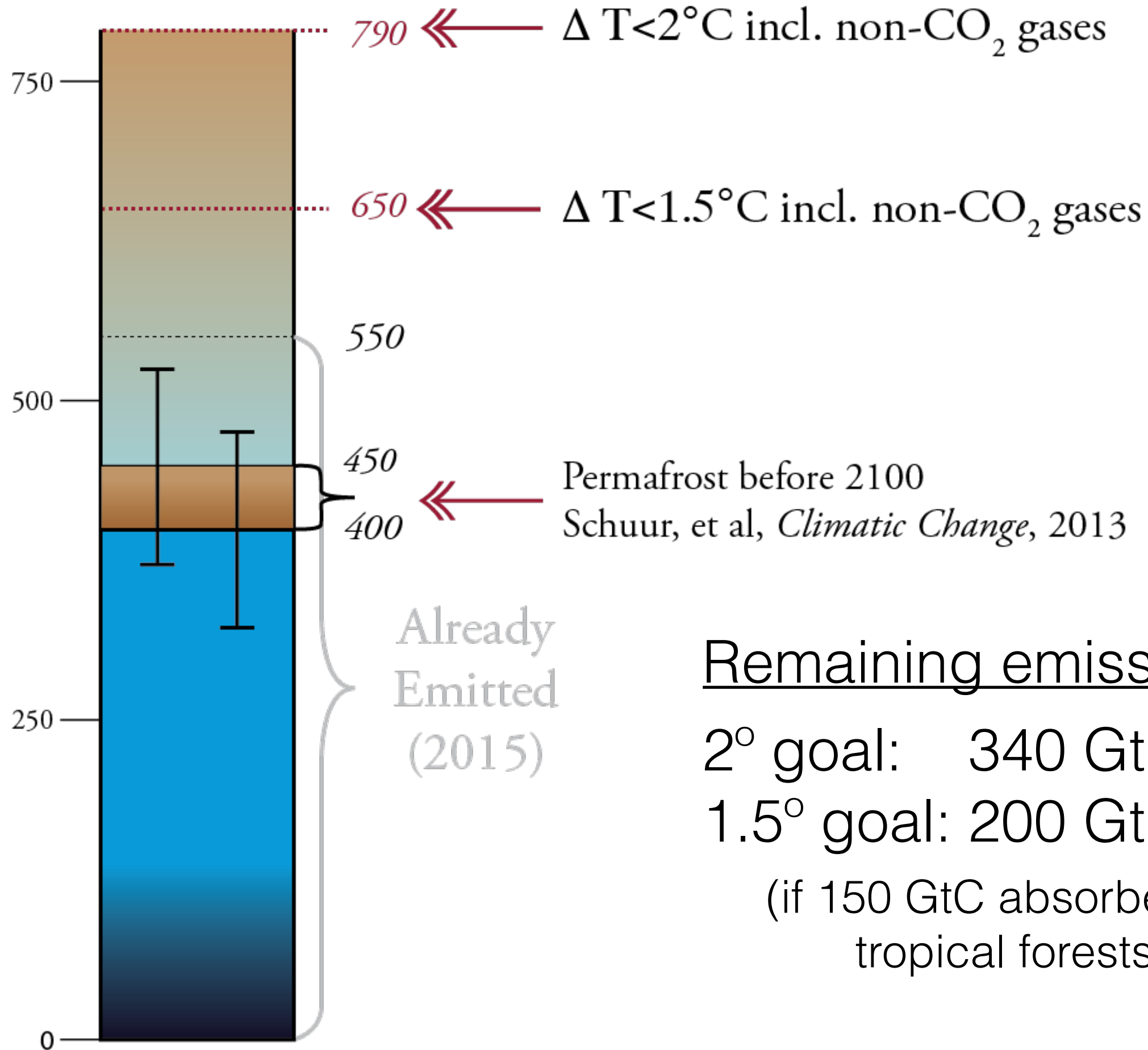


Cumulative Emissions (GtC)



What if we could remove
150 GtC from the atmosphere?

Cumulative Emissions (GtC)



Remaining emissions:

2° goal: 340 GtC

1.5° goal: 200 GtC

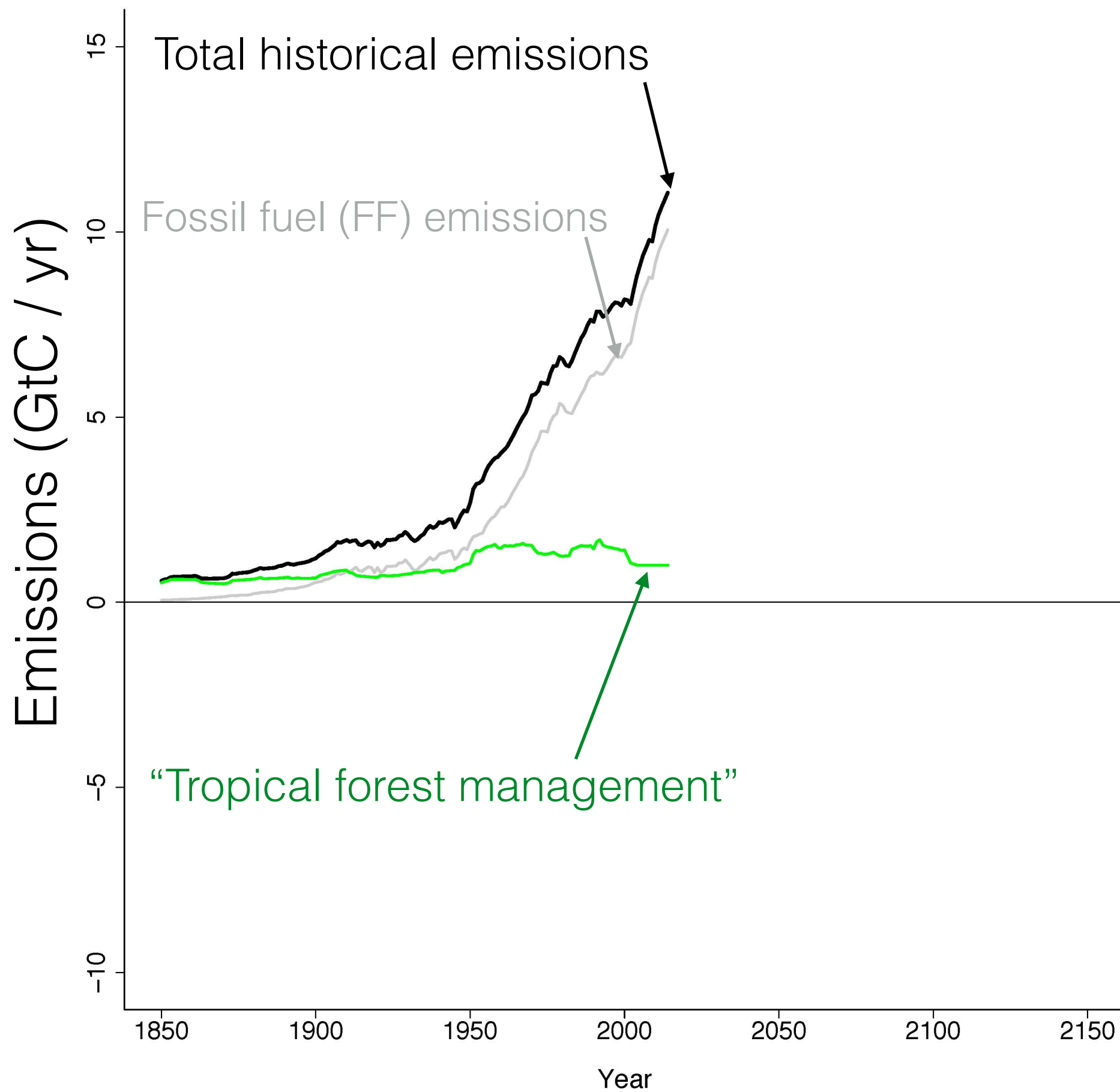
(if 150 GtC absorbed by
tropical forests)

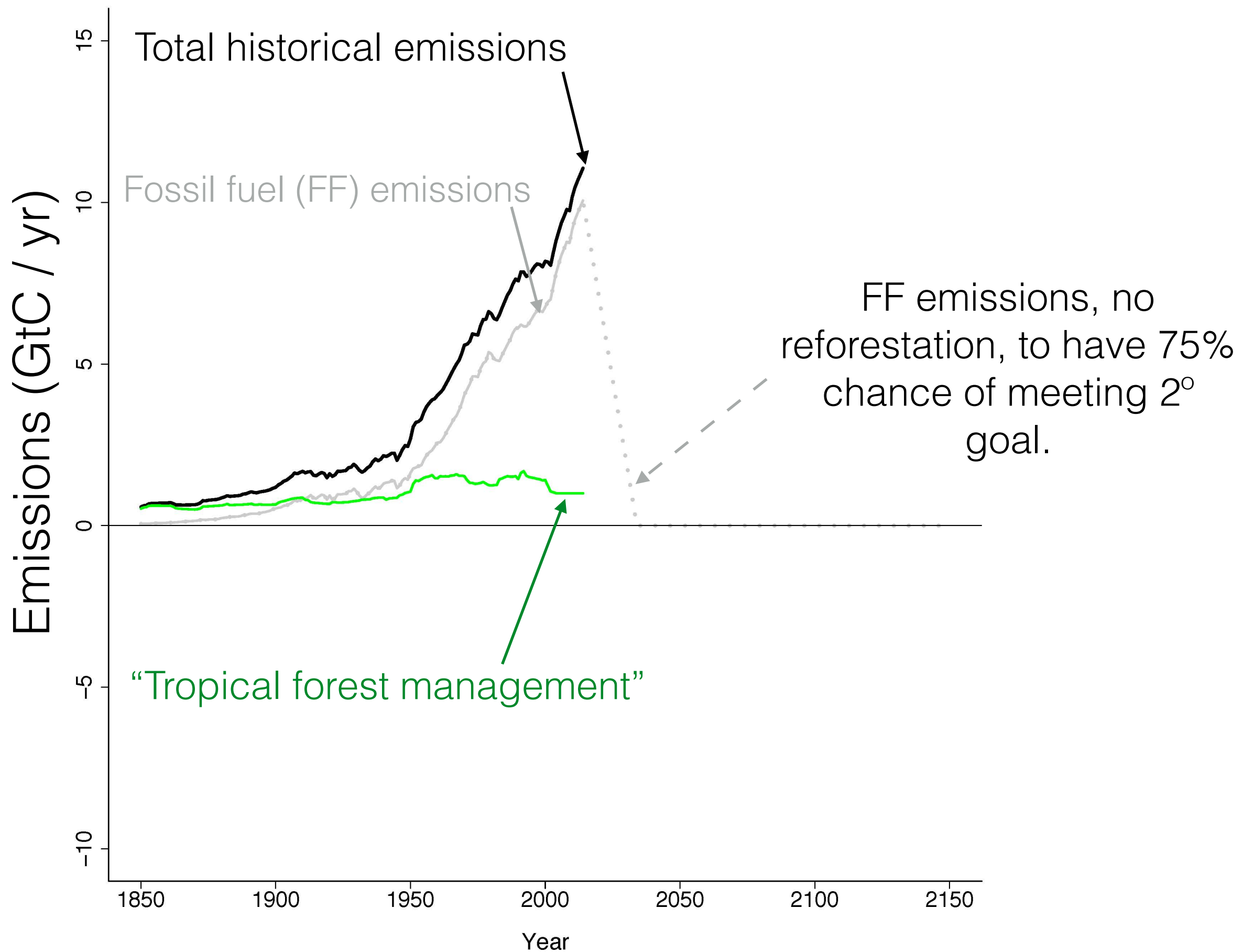
COMMENTARY:

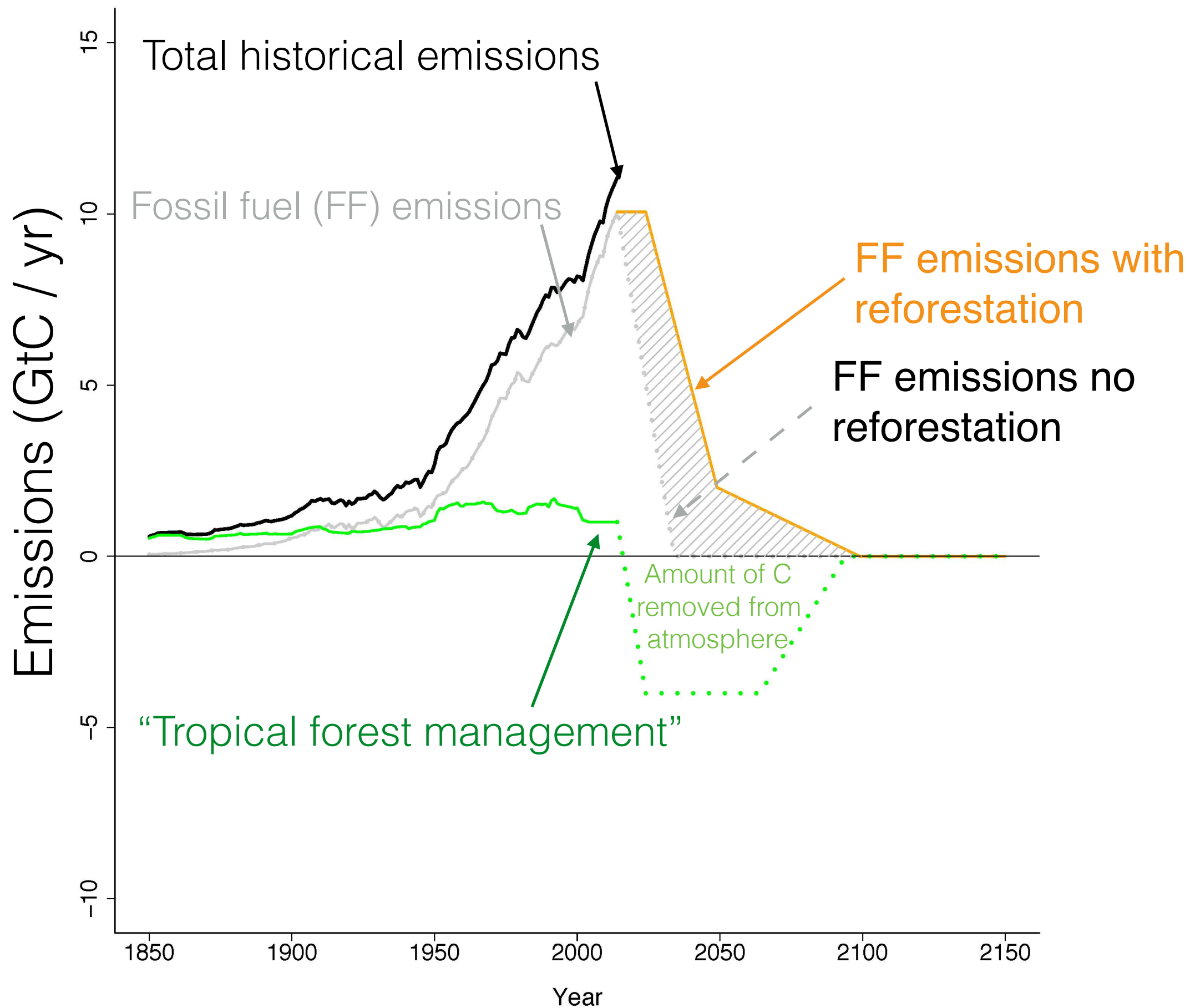
A role for tropical forests in stabilizing atmospheric CO₂

R. A. Houghton, Brett Byers and Alexander A. Nassikas

Nature Climate Change Dec., 2015
Peer-reviewed commentary







Caveats

- This makes idealized assumptions:
 - no more deforestation
 - aggressive reforestation
- There are massive economic barriers to actually achieving this.
- The ability of forests to soak up carbon declines quickly (decades), and then stops.

*Even so, the potential gain is enough that
this should be a tool in the toolkit*

Forests stabilize regional climate



A healthy tropical forest



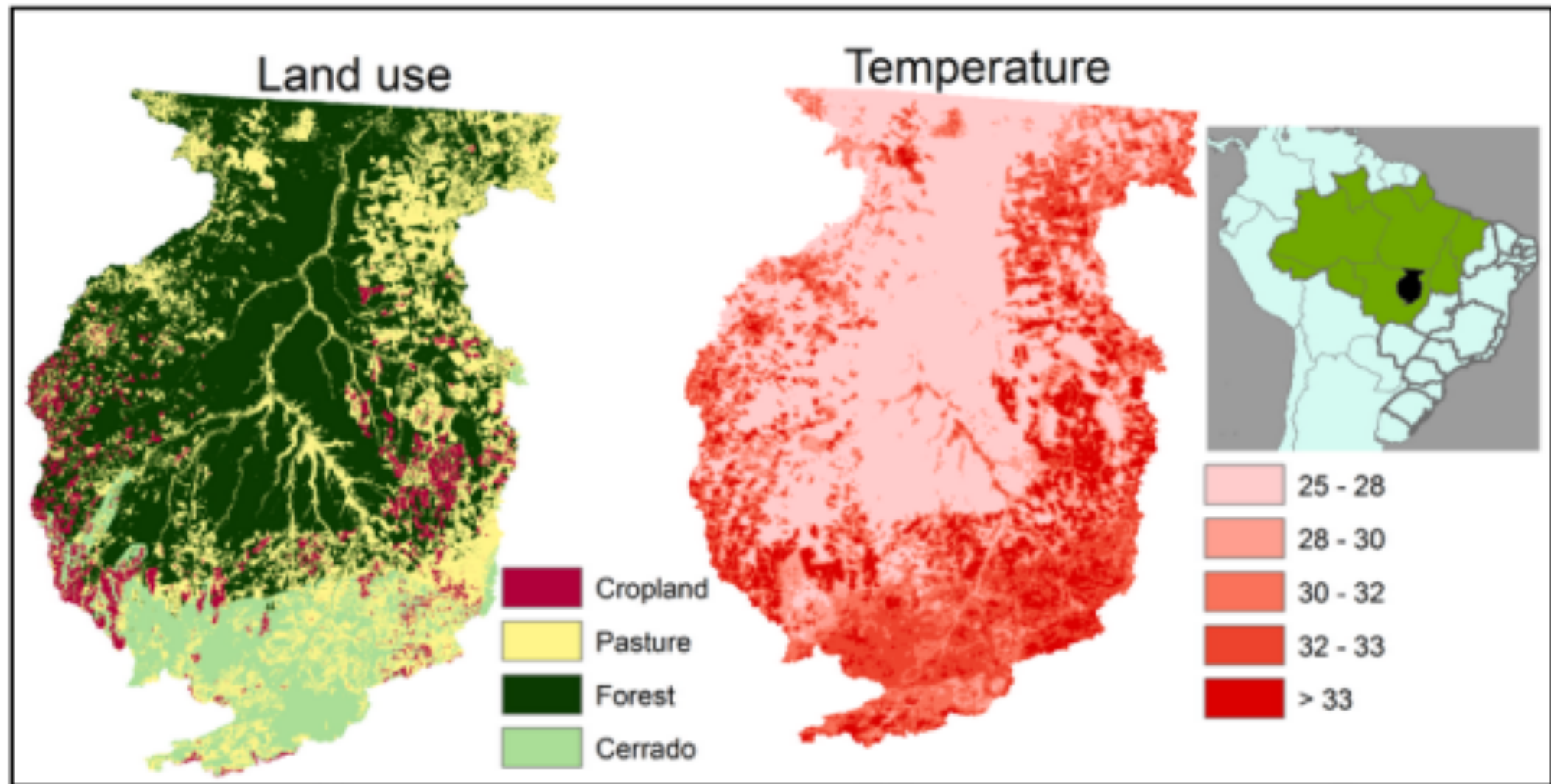
Site of a former healthy tropical forest



The edge of a tropical forest

- Deforested areas have:
- higher temperatures
 - less precipitation
 - higher proportion of runoff

Deforestation increases regional temperature

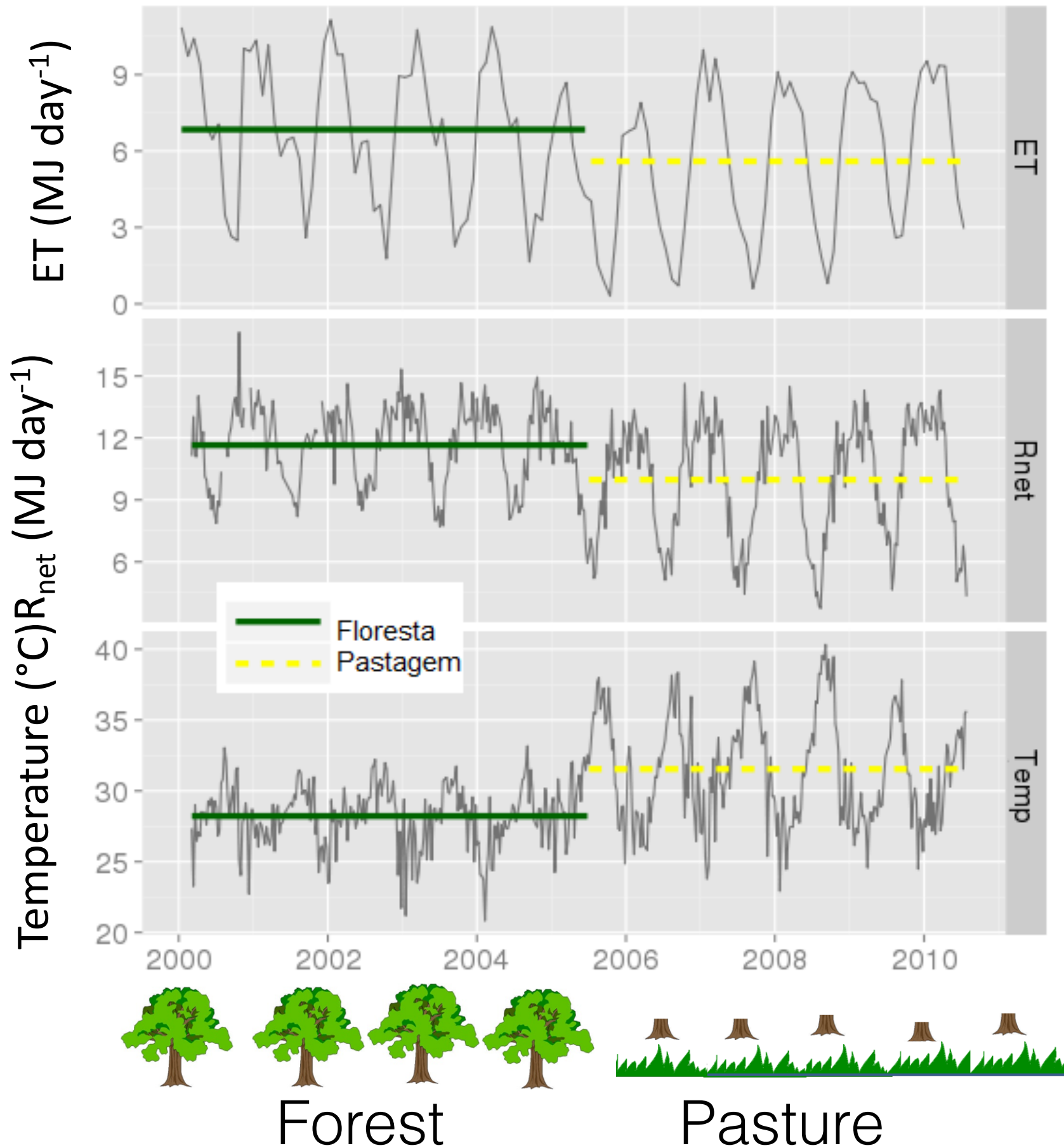


Janeiro 2015

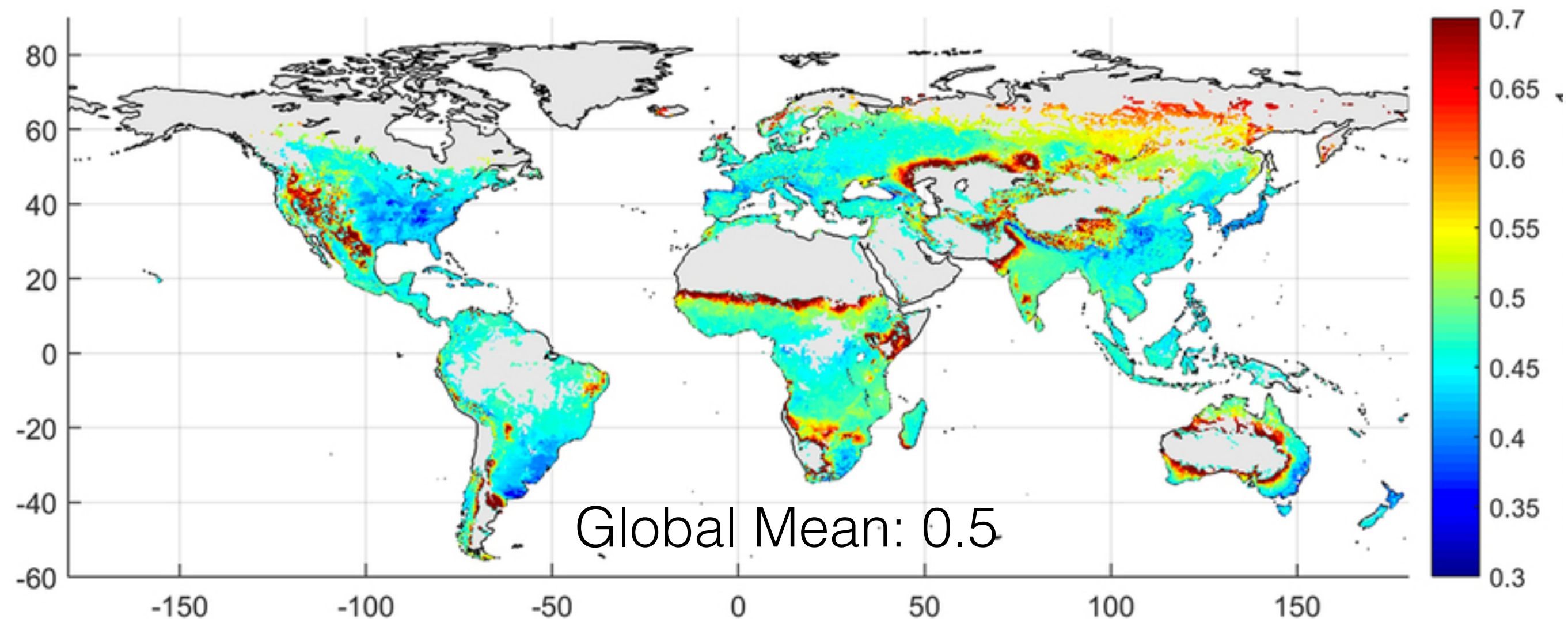
Evapotranspiration

Surface energy
exchange

Temperature



Parting shot: Forest biofuels aren't "carbon-neutral"



Climate influence of forest biofuel compared to that of CO₂
(Would be zero if carbon neutral)

“Policy decisions made in the next few years to decades will have profound impacts on global climate, ecosystems and human societies — not just for this century, but for the next ten millennia and beyond.”

P. Clark et al. *Nature Climate Change*, Feb. 8, 2016

That's all Folks!