Forest Research

Improvements to the representation of forest land in the UK GHG inventory and implications for KP accounting

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What we will aim to cover

A description of improvements to the GHG calculations for forest land

- Input data on forests
- Modelling
- Representation of management
- How the results have changed
- Implications for KP accounting (CP1 and CP2).

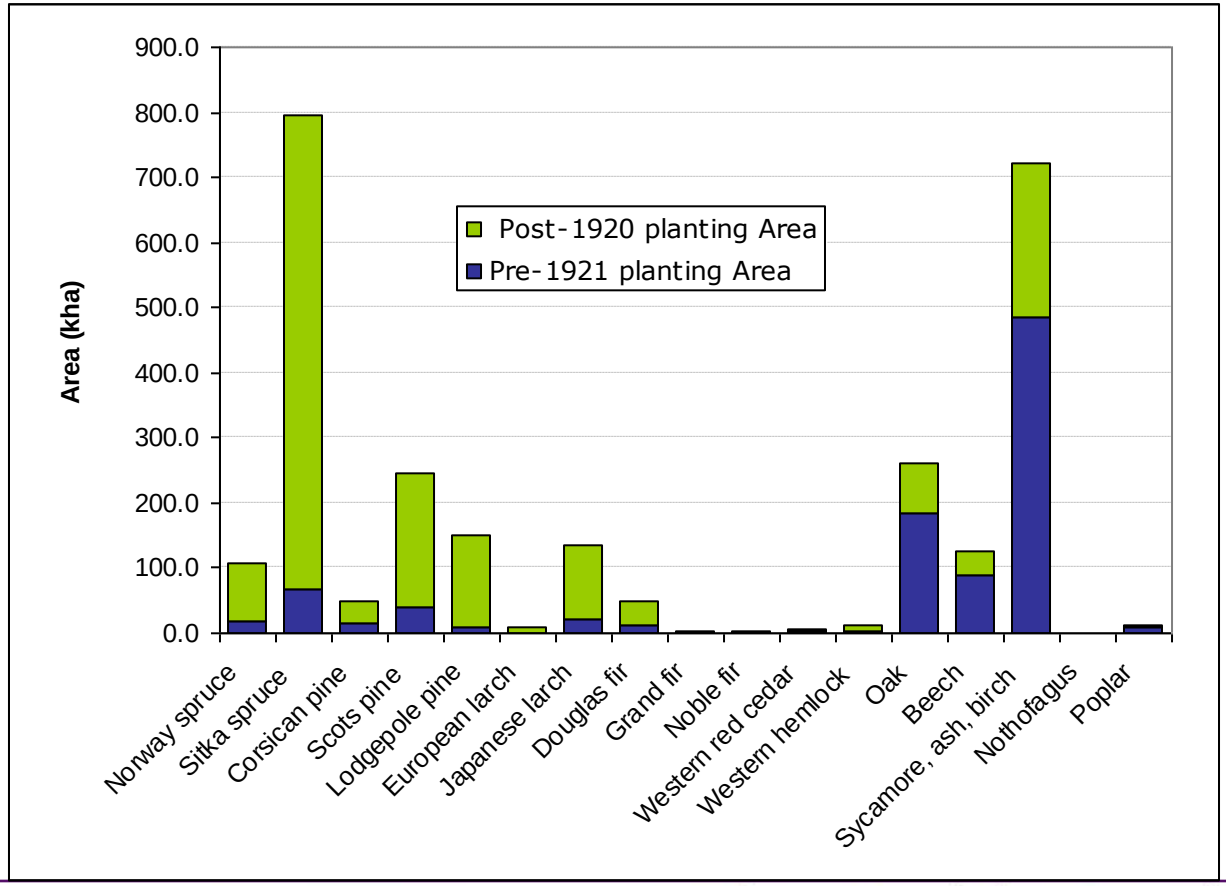
Input data: forest area and species

Previously:

- Post-1920 forest areas (pre-1921 areas assumed to be 'in balance')
- All conifer area represented by Sitka spruce
- All broadleaf area represented by beech.

Updated:

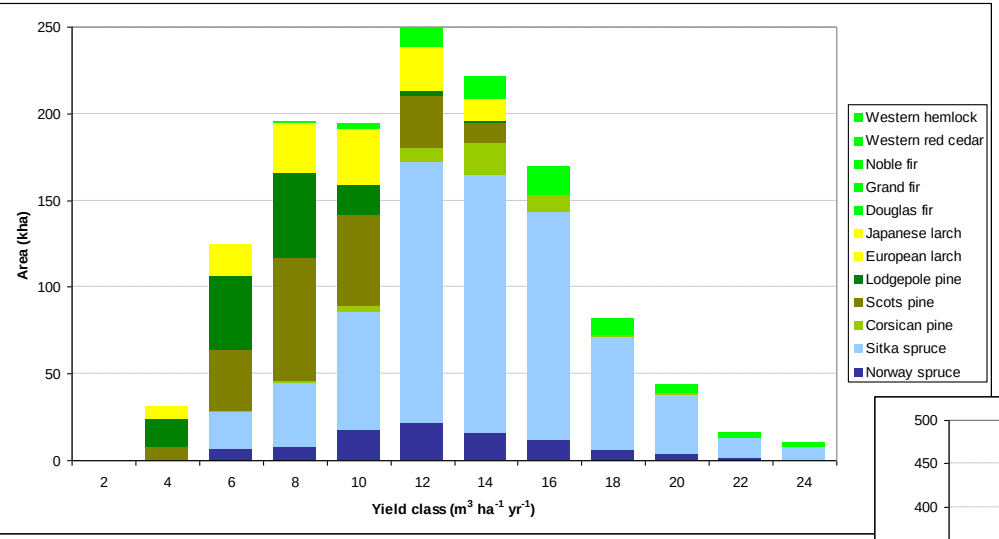
(based on NFI from 1990s)



Input data: growth rates

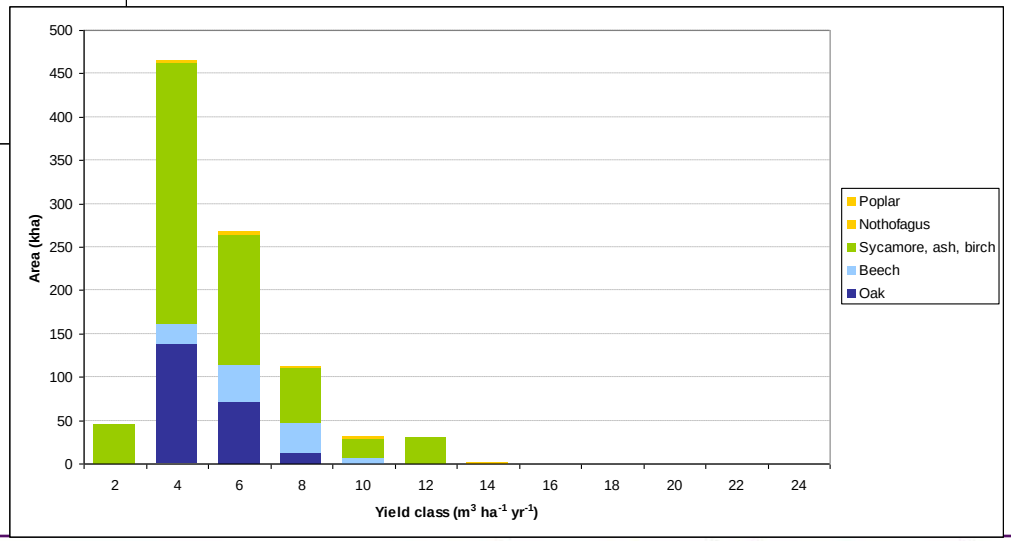
Previously:

- Sitka spruce all with average potential growth rate of 12 m^3 ha^{-1} yr^{-1} apart from Northern Ireland (14)
- Beech all with average potential growth rate of 6 m^3 ha^{-1} yr^{-1}.



Updated:

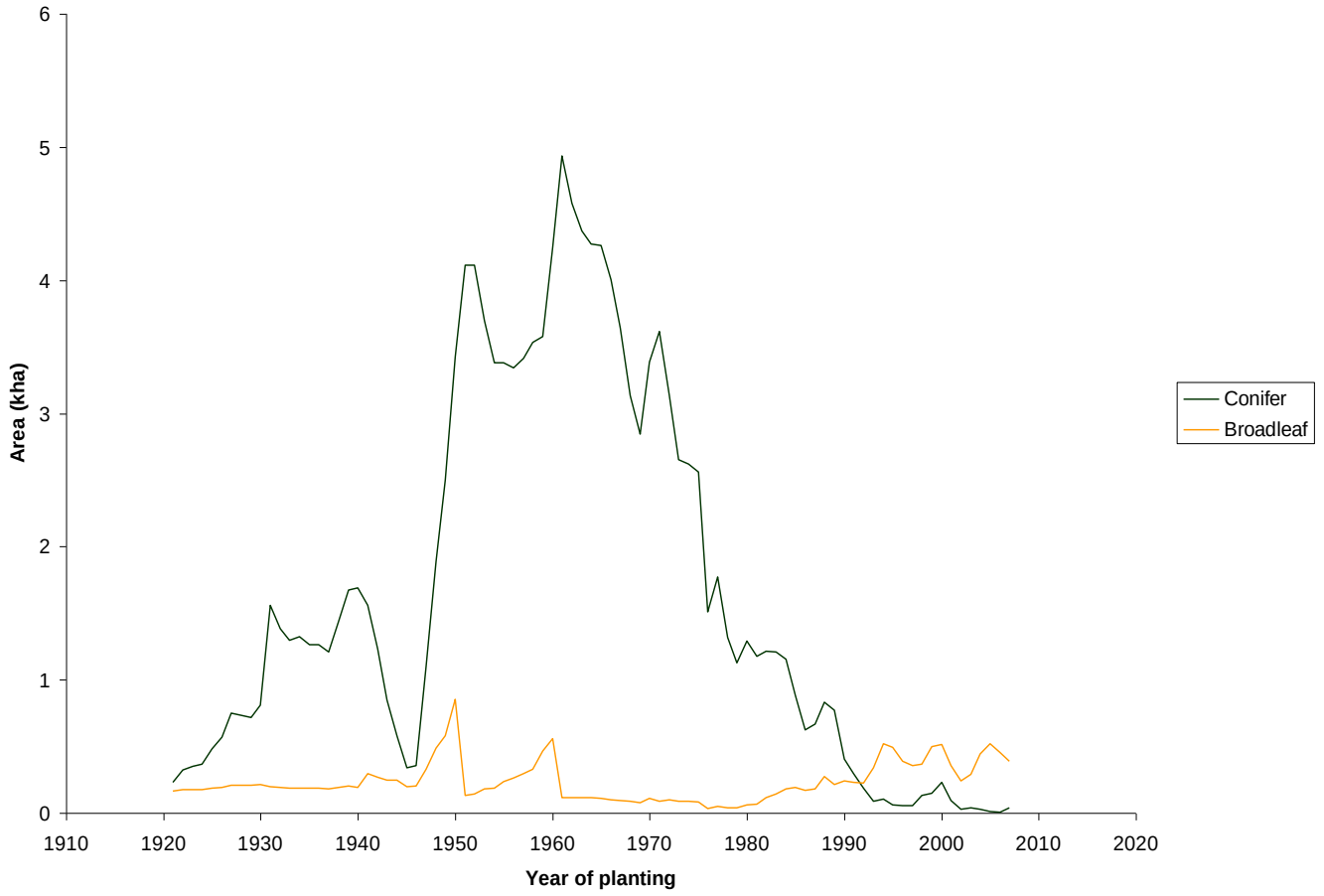
(based on records for Public Forest Estate)



Input data: age distribution

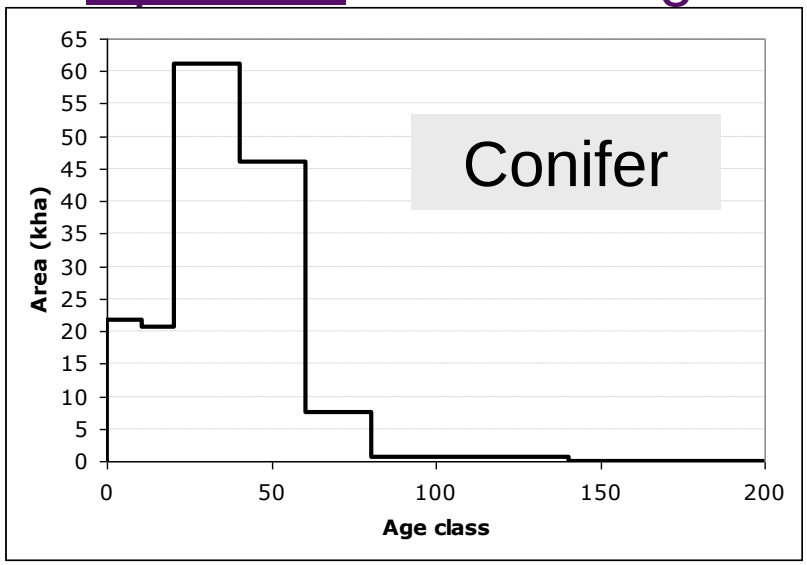
Previously:

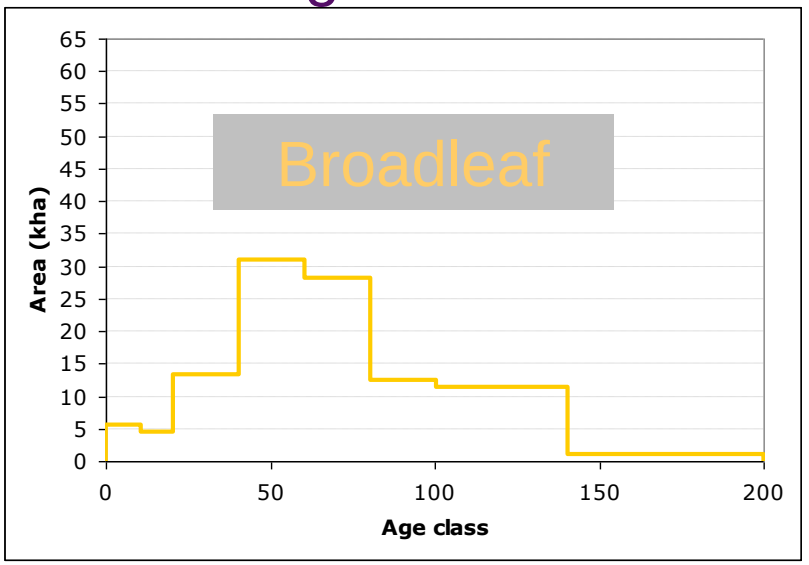
- Effectively the new planting projected forward (no independent data, example shown for Wales)



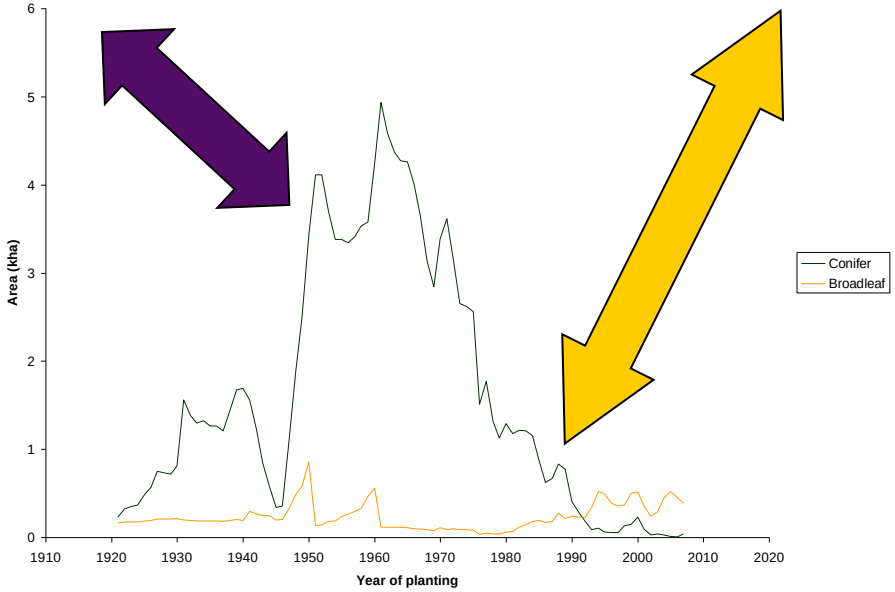
Analysis of forest age distribution

Updated: Reconciling new planting with NFI age distributions



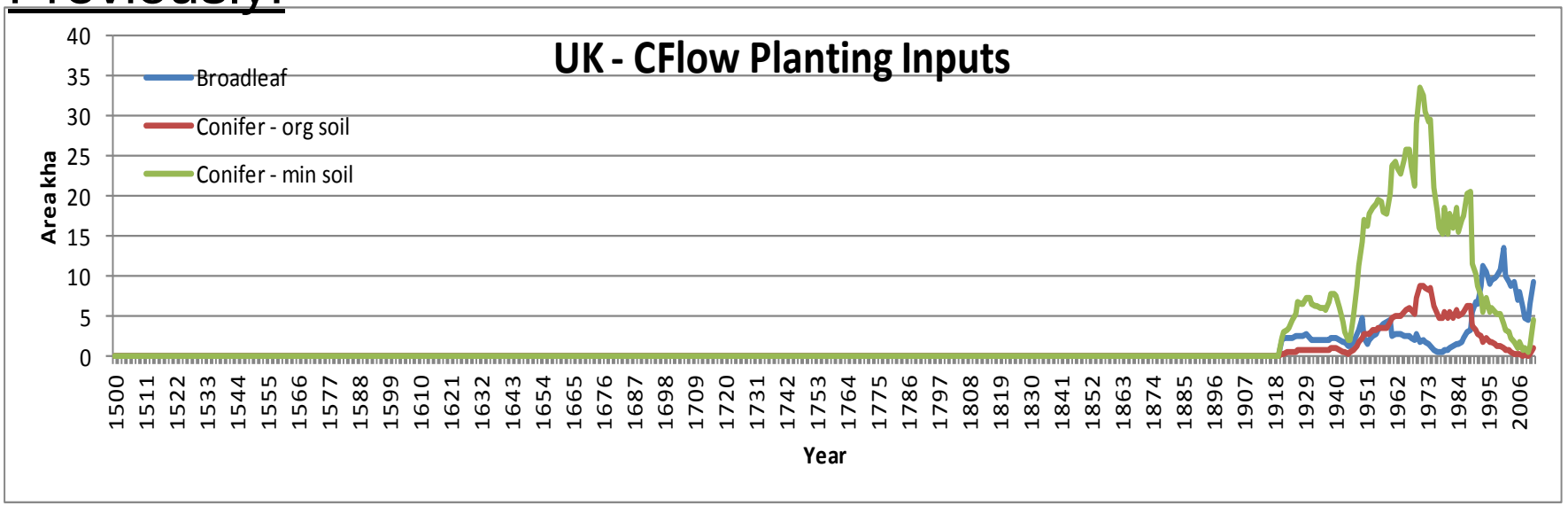


FC data on
“new planting”

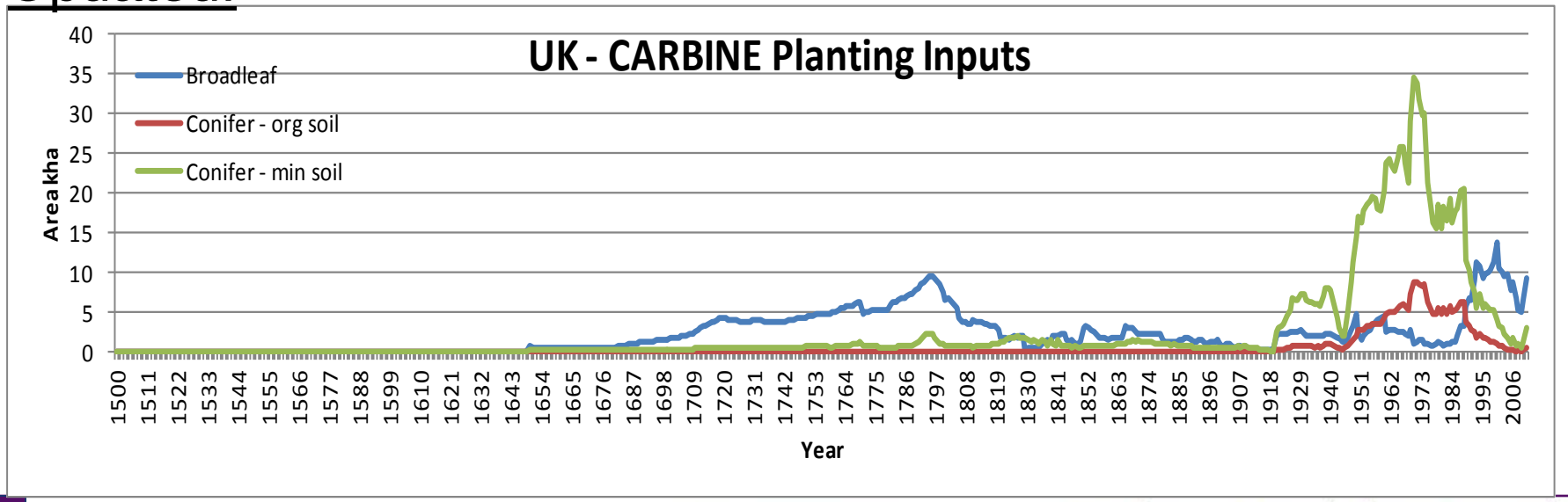


Which gives this profile for new planting …

Previously:



Updated:



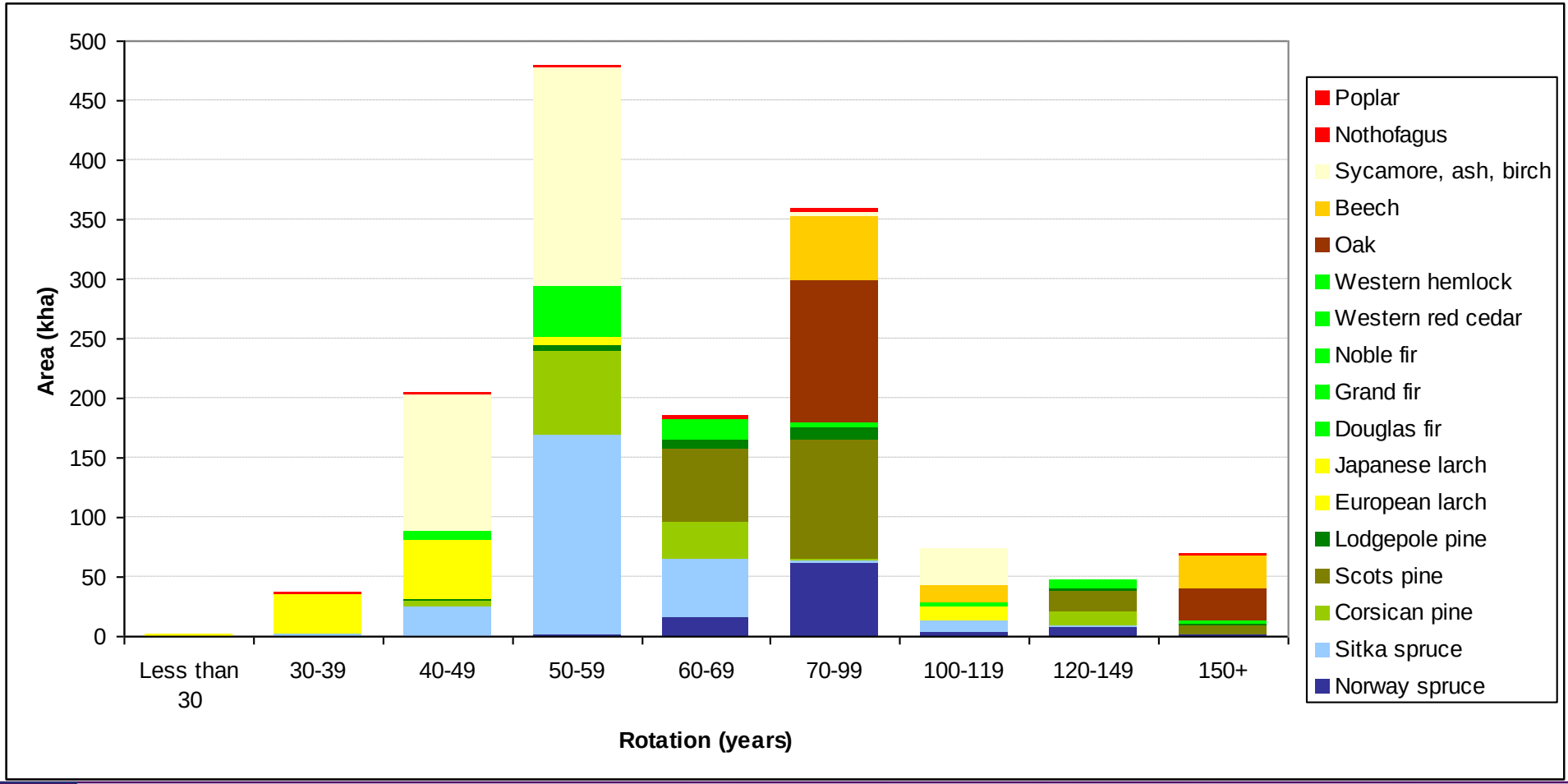
Input data: rotations

Previously:

- Sitka spruce all age 59 years (minor variations), all beech 91 years.

Updated:

- Based on growth rates and reconciliation of ages with new planting.



Refined modelling: CARBINE

Some examples …

- Species-specific:
  - Forest growth functions (published FC models)
  - Wood density estimates (published source)
  - Biomass expansion factors for branches, foliage and roots (new analysis of available data)
  - Allocation factors for harvested wood.

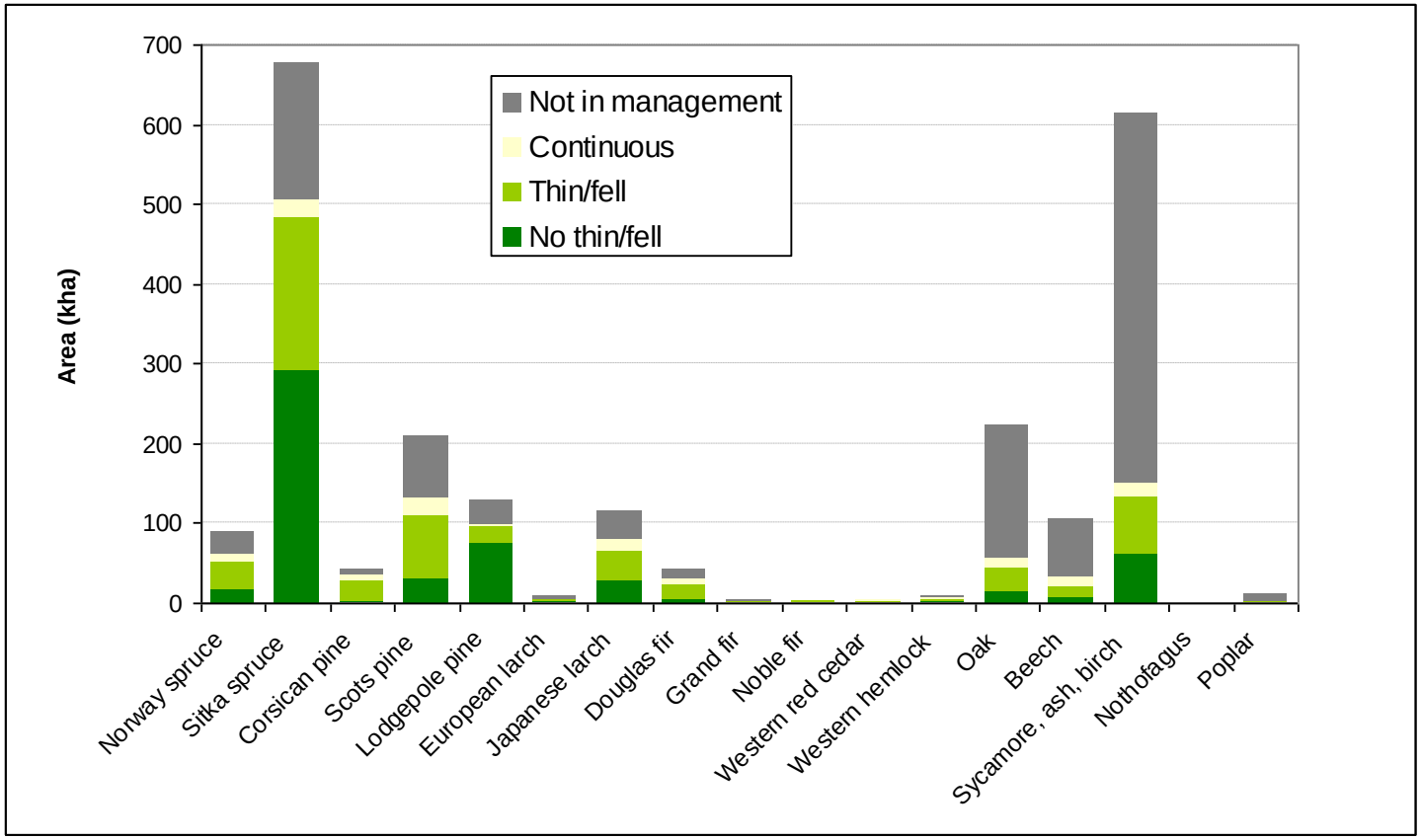
Assumptions about management

Previously:

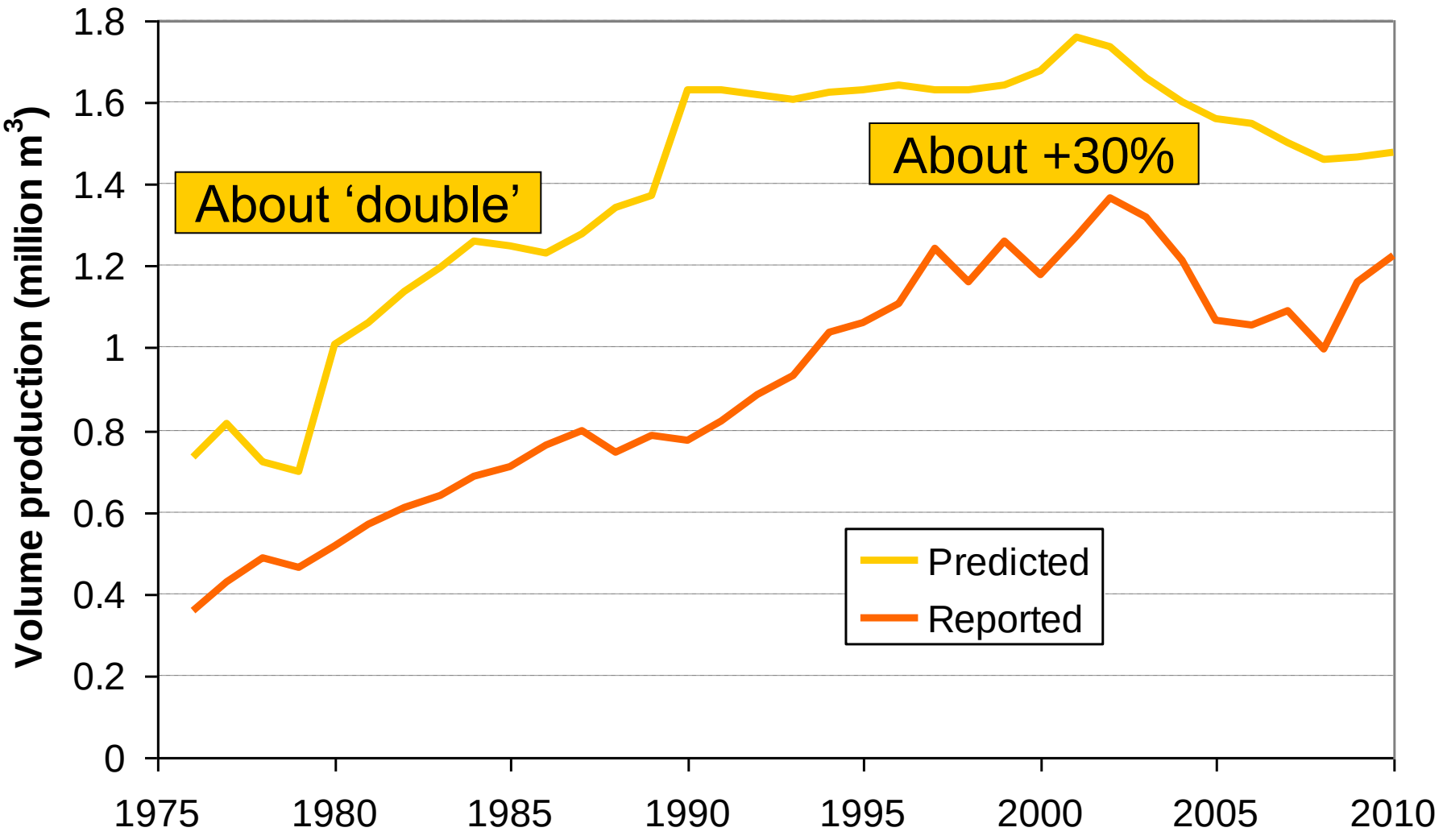
- All in management, thinned and clearfell.

Updated:

(based on records for Public Forest Estate and Woodland Grant Scheme records provided by country representatives)



Management/production 'reality check'



Example for Wales

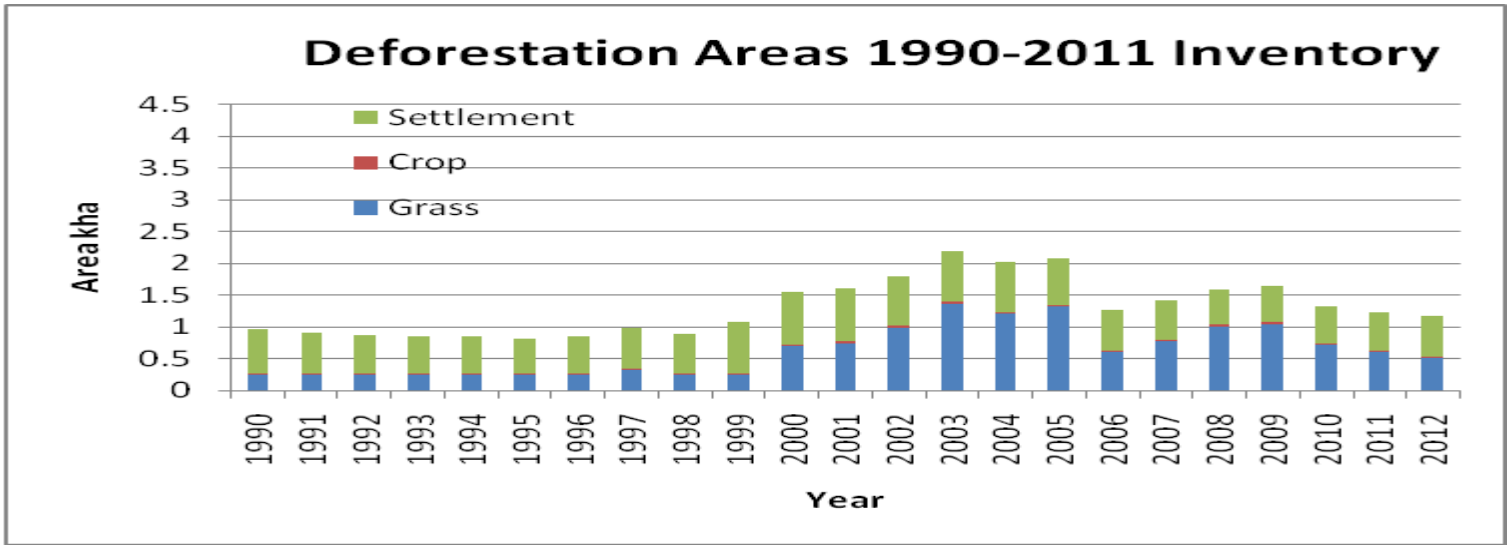
Management/production 'reality check'

Why is predicted production higher than reported?

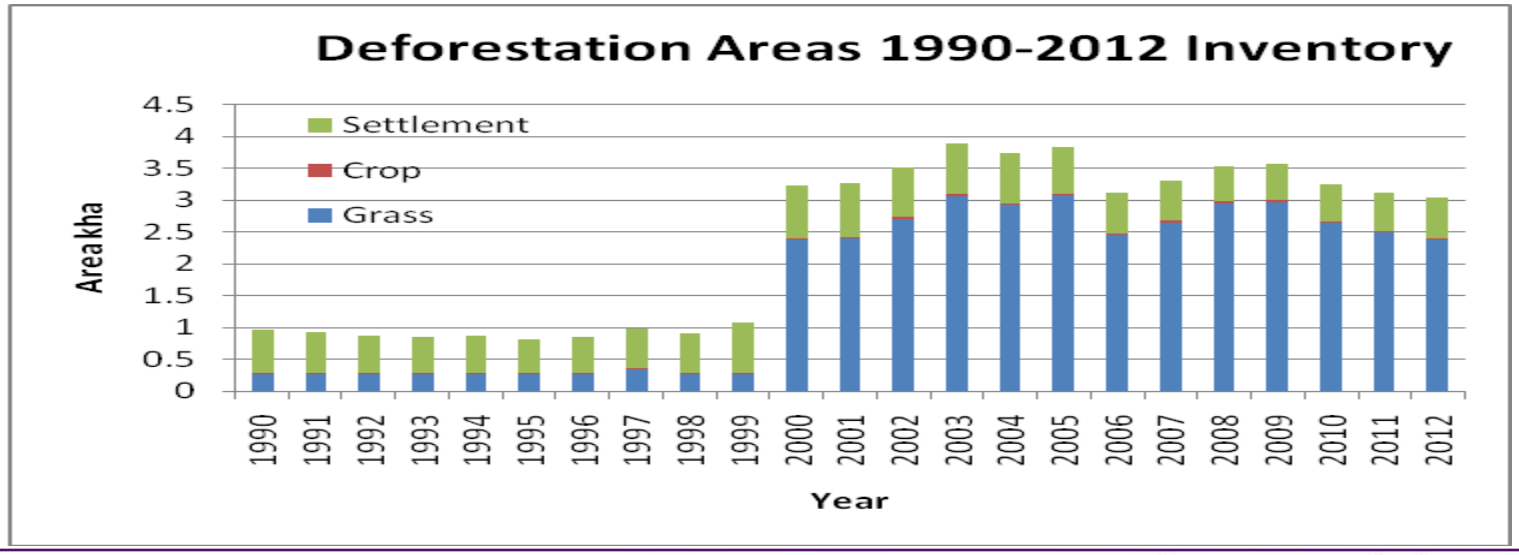
- Gross:net area
- In production:not in production (private sector)
- Thin:no-thin (private sector, historical for all)
  - Production 'held back' in private sector?
- Growth rate assumptions (private sector)
- New planting:pre-1920 forests (FC:private sector)
- Under-reporting in production statistics

Input data (again): deforestation

Previously:

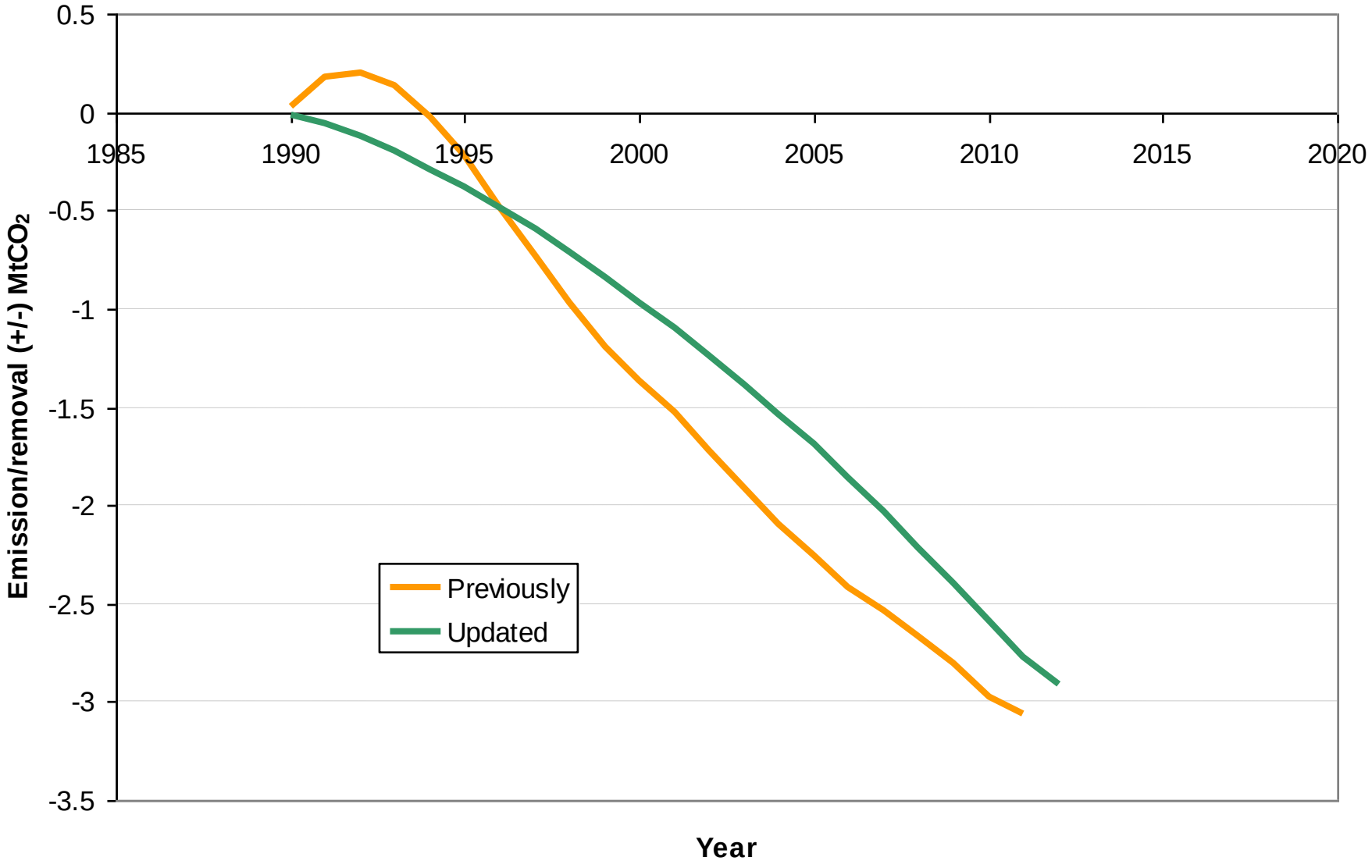


Updated:

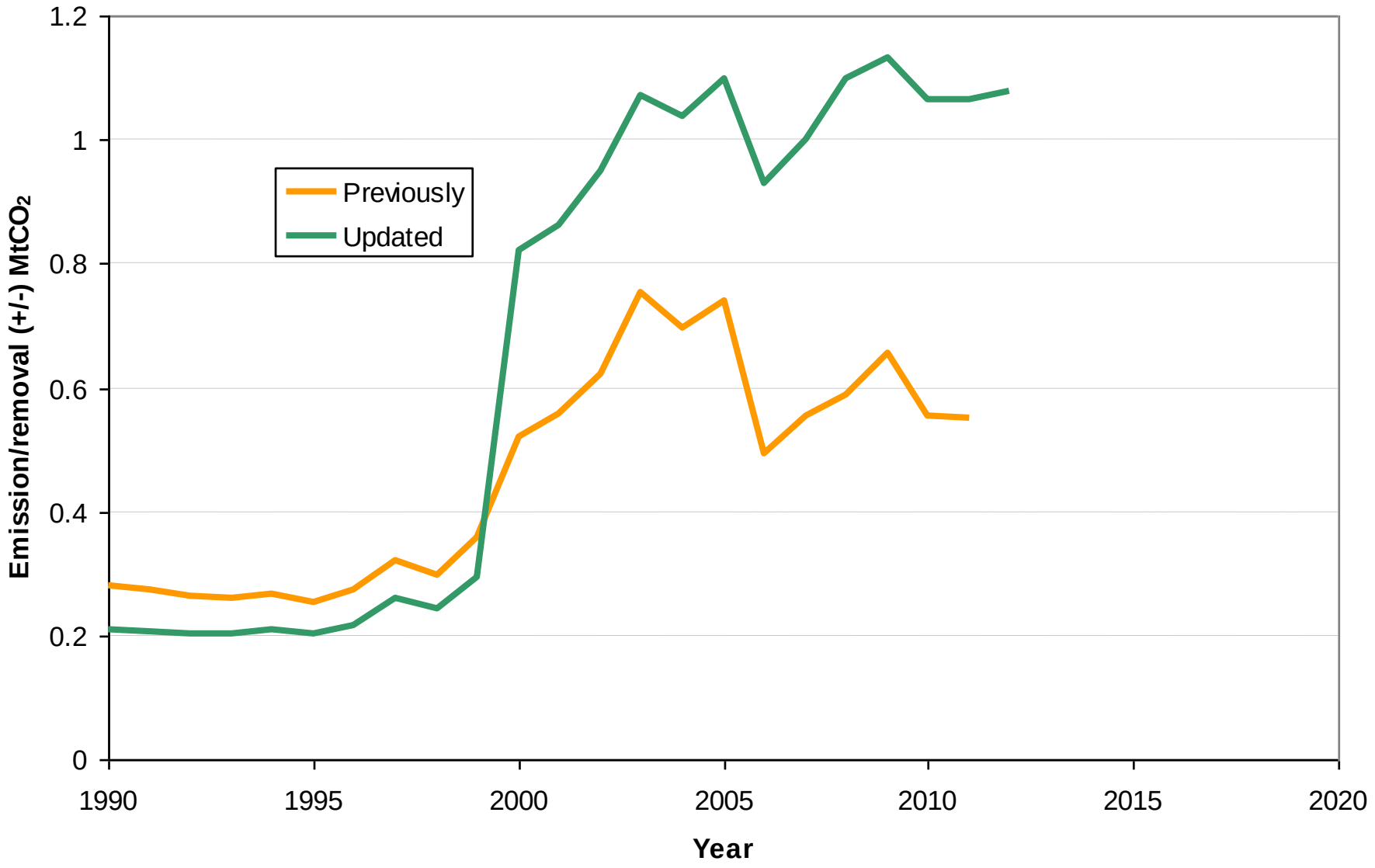


Results

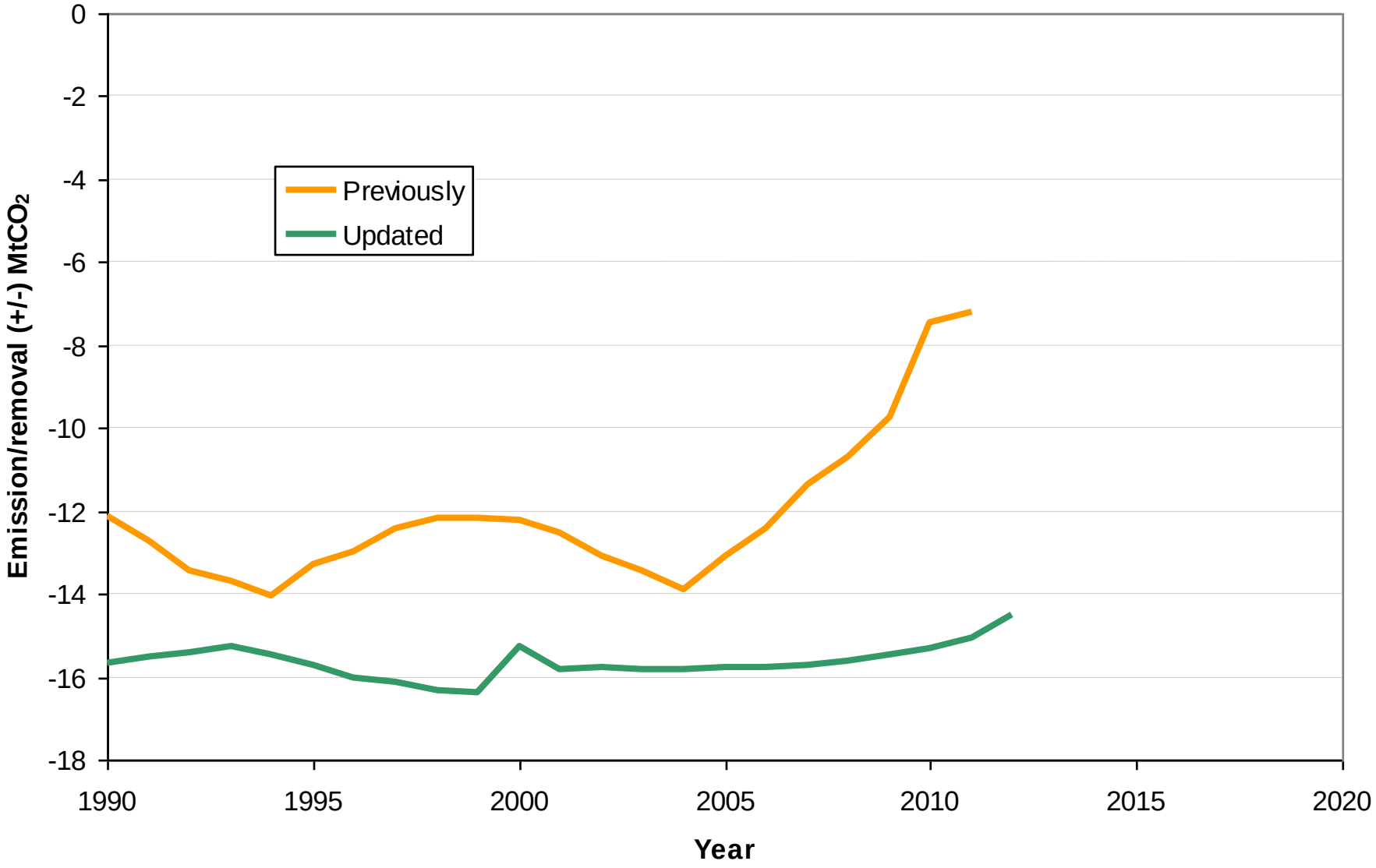
Afforestation



Deforestation



Forest Management



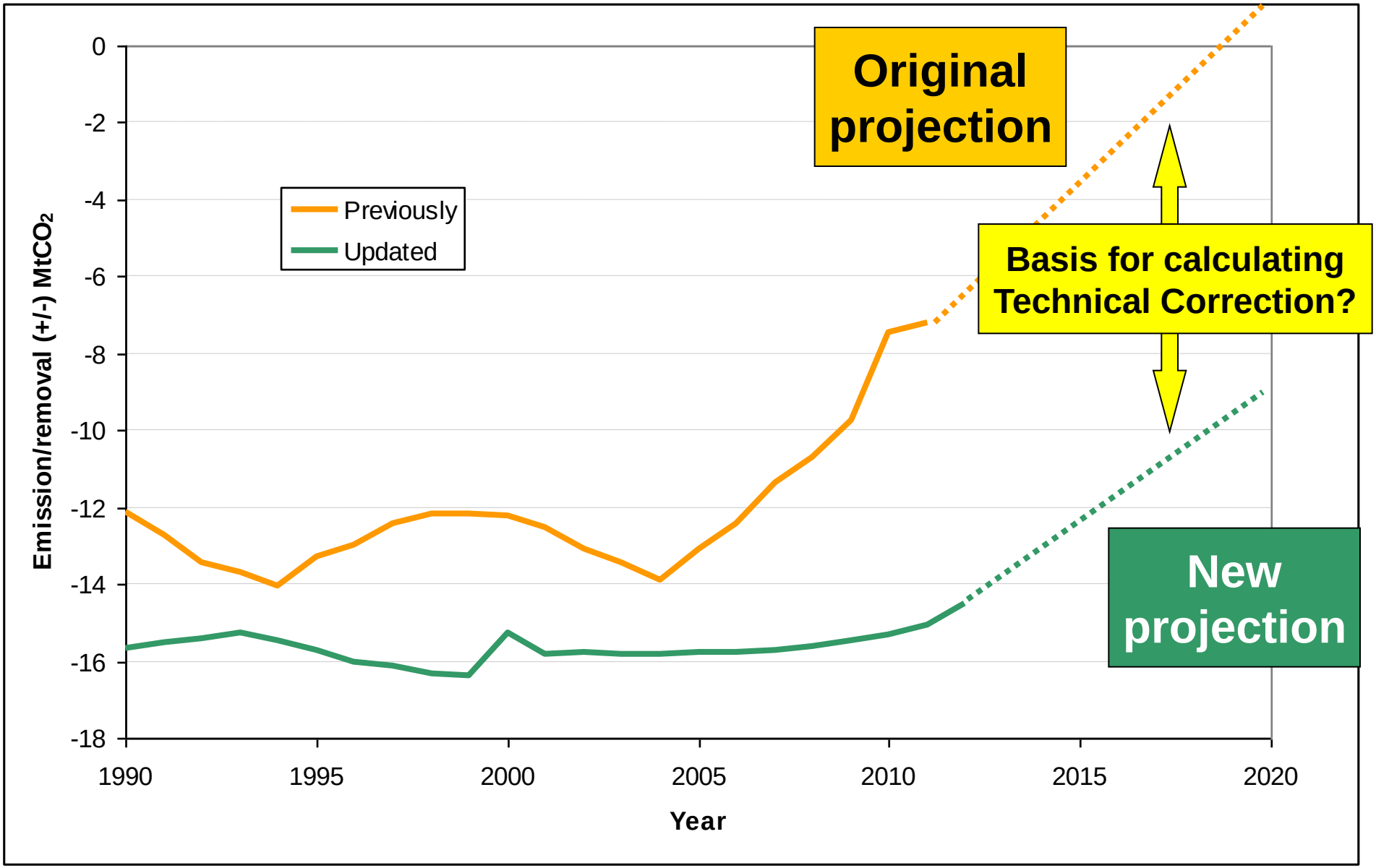
Implications for KP accounting

First commitment period

- FM removals now much bigger than previously reported
- However, FM removals are capped in CP1.
  - The cap is related to the level of FM removals in the base year, but was fixed at that level at the time the details were negotiated, and doesn't get changed now
- Therefore, removals accounted due to FM will not change in CP1
- Accounted removals due to afforestation lower than previously suggested (down by about 10% or 300 $ktCO_2$, yr^{-1})
- Accounted emissions due to deforestation higher than previously suggested (up by about 85% or 500 k tCO_2, yr^{-1}).

Second commitment period

- At present, the main issue is the implication of the changed FM results for the FMRL.
- FM removals now much bigger than previously reported, and projected level now very likely to be significantly different to when the FMRL was originally set.
- It is likely that a Technical Correction to the FMRL will be required…



Future challenges

- Main challenge: There is a new National Forest Inventory (NFI) for GB
- The base year for the new NFI is ~2013
- This NFI includes directly and transparently-calculated estimates of tree carbon stocks
- We will need to decide whether to refer directly to these carbon stock estimates or use them for validation of model results
- There could be implications for back-calculation (i.e. for period 1990 to 2012)
- Several other challenges: Integrating calculations for non-CO_2 GHGs; soil GHG emissions/removals related to AR and particularly D; better reconciliation with actual wood production?

Thank you