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Interpolation or aggregation of
periodic forest data for carbon
reporting: Does it matter?



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Why this presentation

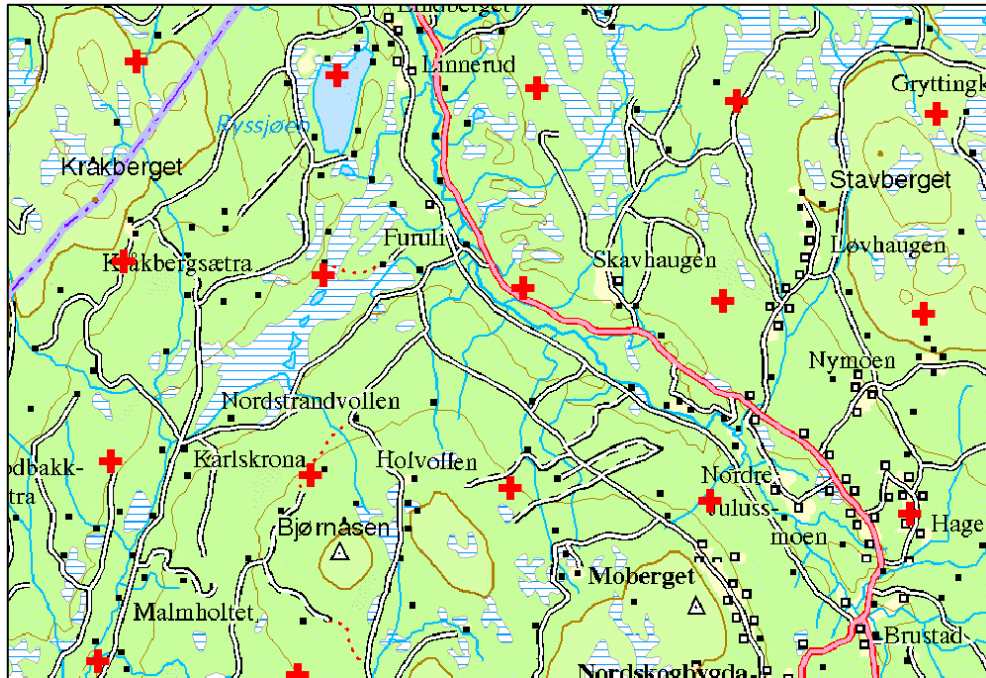
- > Results are important due to needs for Climate convention and Kyoto protocol LULUCF reporting
- > Discussed with our customers in 2006 how to calculate and present the annual C stock change
- > little information about interpolation and extrapolation in the Good Practice Guidance (IPCC 2003)
- > many countries plan to make extensive use of NFI:s for the LULUCF sector reporting (Cienciala et al. 2008)
- > Forthcoming paper in Forest Science – WG2 Cost Action E43
 - > analyse different approaches to interpolating information from NFI:s and propose 'best practices' for different NFI cases.
 - > Authors from: Austria, Finland, Germany, Netherland, Norway, Slovenia and Sweden.

National Forest Inventory - Norway



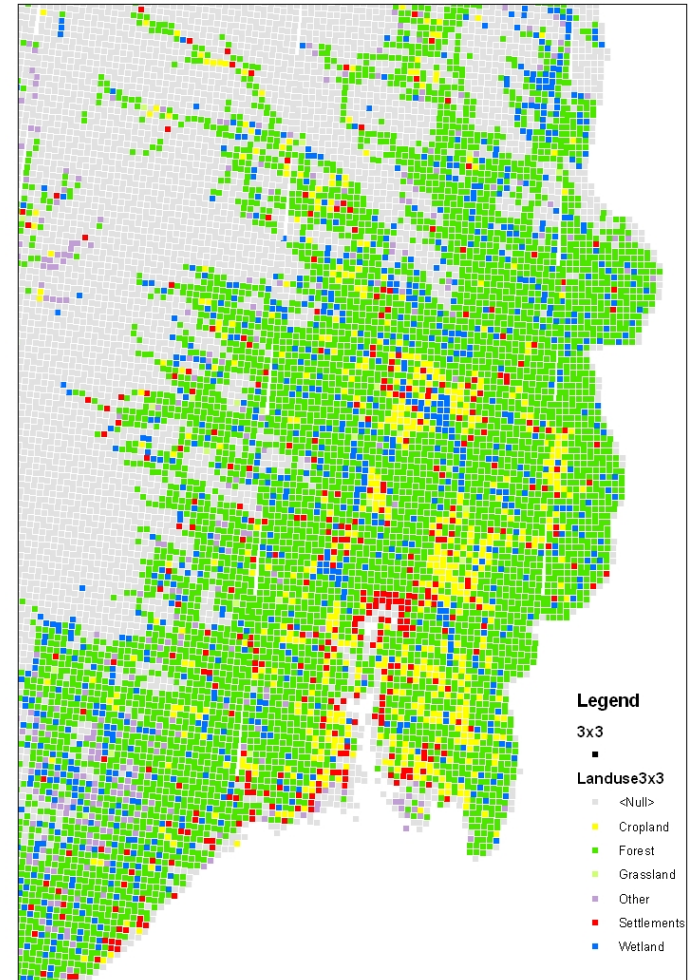
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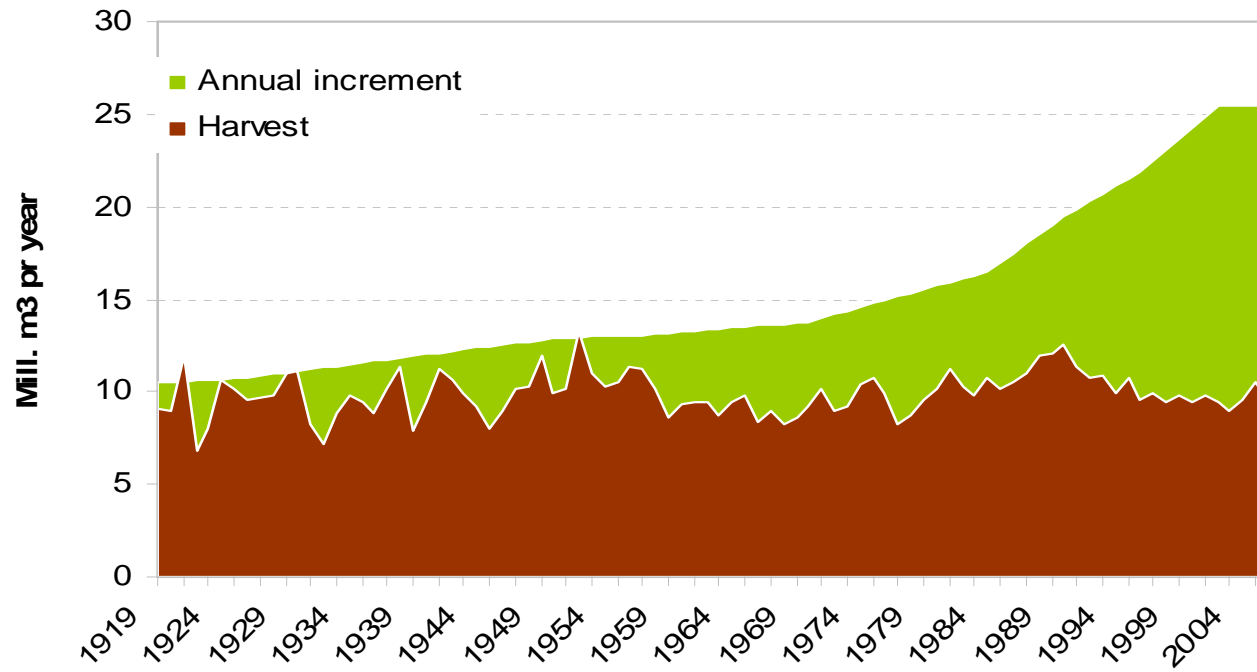


- 3x3 km grid for permanent plot
 - 1986-1993 – (1990) Established regionally
- 5-year-cycle covering almost the entire country
 - 1994-1998 – (1996) 20% assessed each year
 - 1995-1999 – (1997)
 - 1996-2000 – (1998)
 - etc

Land use



Annual increment and harvest



Interpolation or aggregation of periodic forest data for carbon reporting: Does it matter?

Following methods – using Norwegian NFI data

- Linear interpolation between NFI cycles
- Moving average using mid-year of the 5-year cycle
- Moving average using end-year of the 5-year cycle
- Annual measurements – representative sample

Assumptions

- Common sample: same plots used throughout the period
- Total carbon stock – above and below ground
- Biomass functions: Marklund 1988 and Petersson and Ståhl 2006

Implication for reporting of

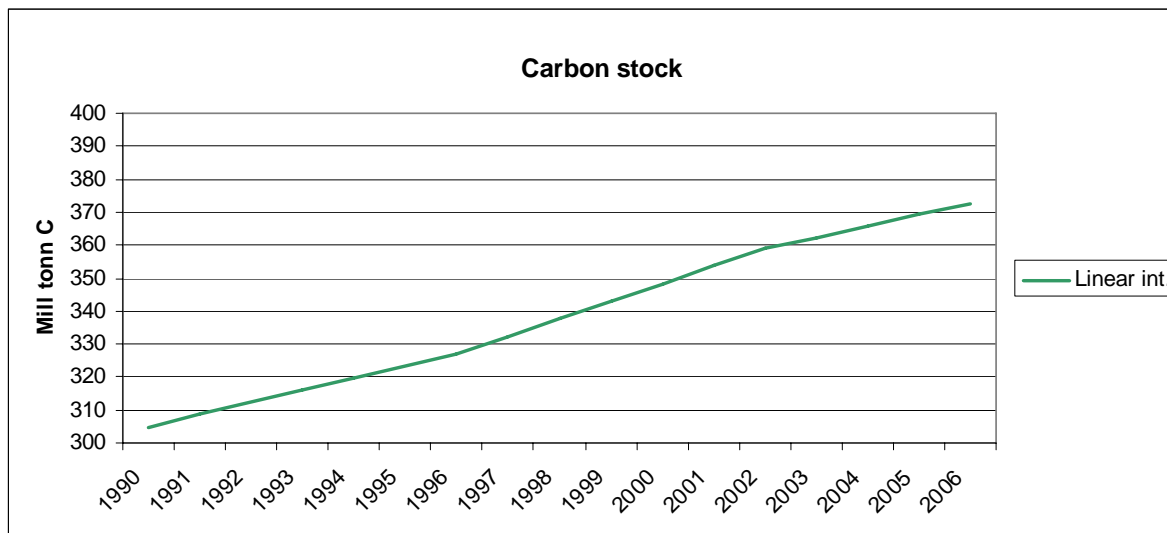
- Annual Carbon stock change
- Land use change

Method: Linear interpolation



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Official NFI periods

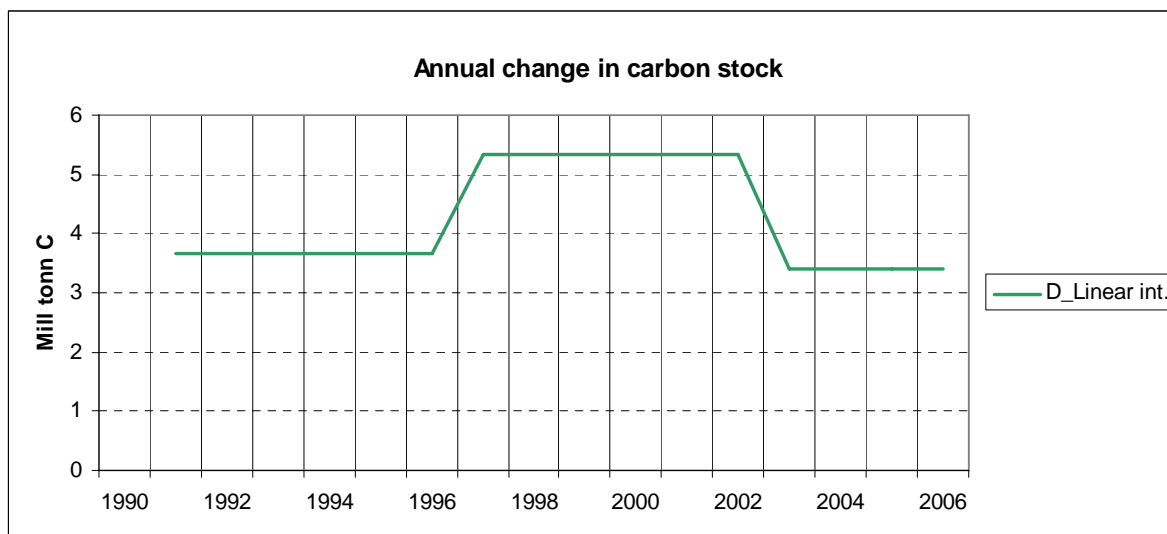
1986-1993 - (1990) 6th

1994-1998 - (1996) 7th

2000-2004 - (2002) 8th

2005-2009 - (2007) 9th

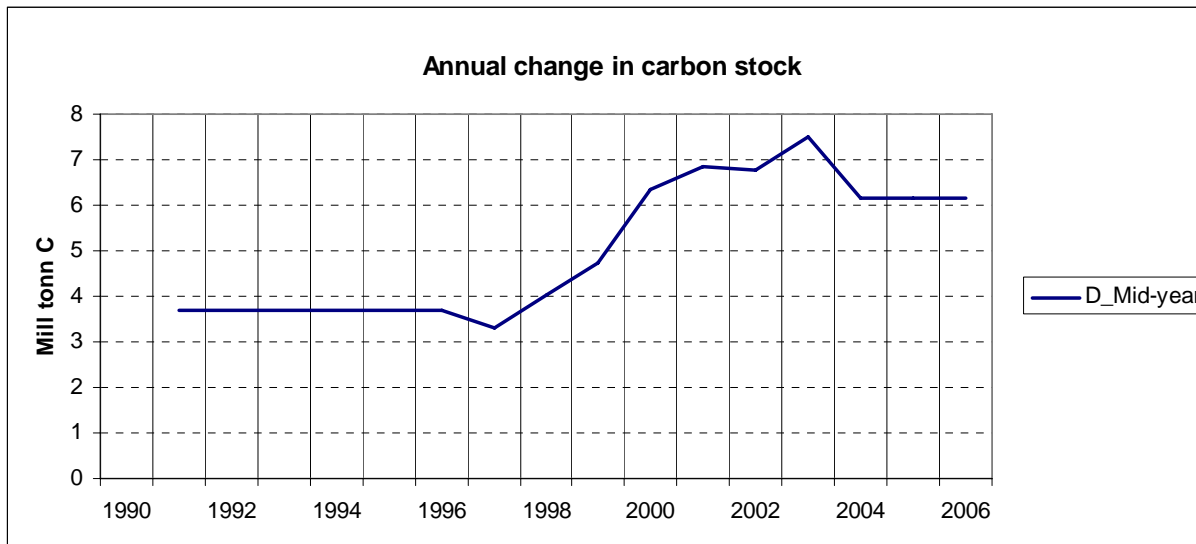
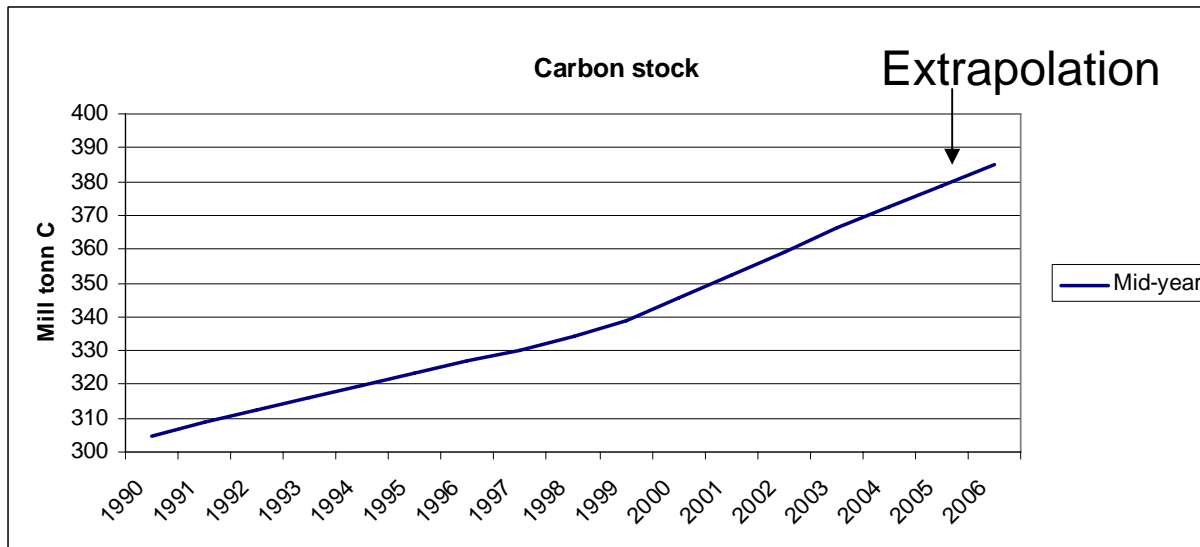
2002-2006 - (2004)



Results

Same value for each
year within a NFI
cycle

Method 2: Mid year moving average



- Linear Interpolation 1990-1996

- 5 year moving average from 1996

- Mid-year 1994-1998 - 1996, 1995-1999 - 1997, 1996-2000 - 1998 etc

Results:

- Extrapolation for 2005 and 2006

- Recalculate reported value. The value will be different when adding 2007 and 2008 data

- Land use change must be extrapolated as well (how?)

Method: End-year

- Linear Interpolation 1990-1996

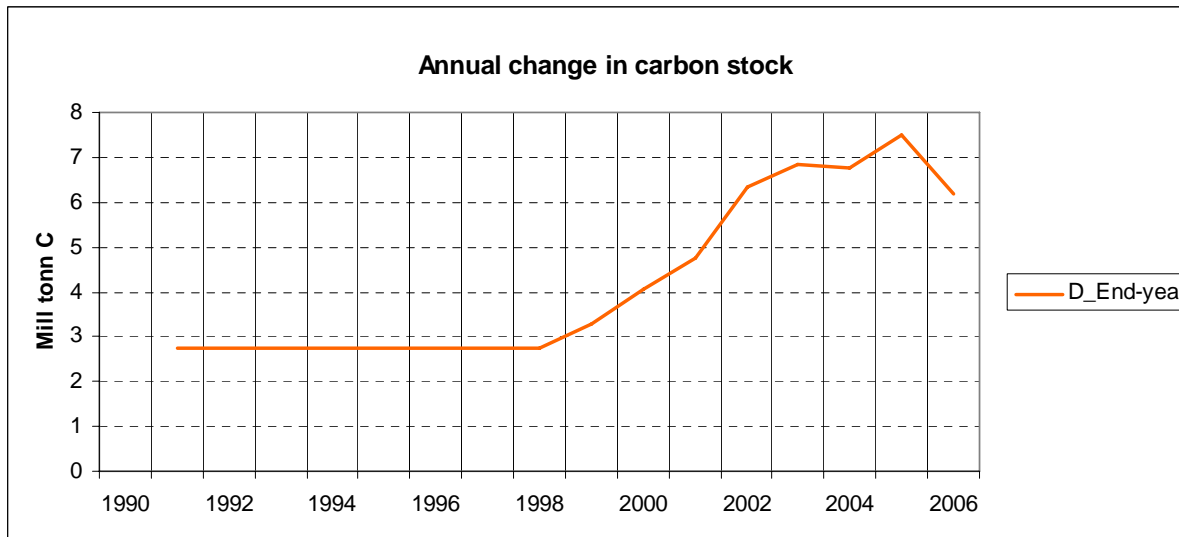
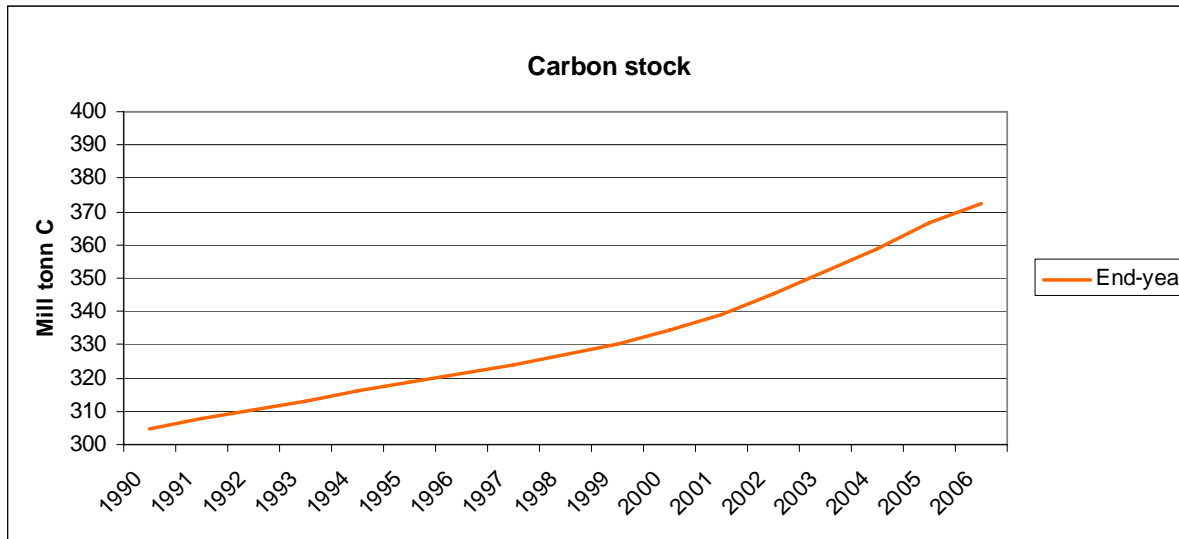
- 5 year moving average from 1996

- End-year 1994-1998 - 1998, 1995-1999 - 1999, 1996-2000 - 2000 etc

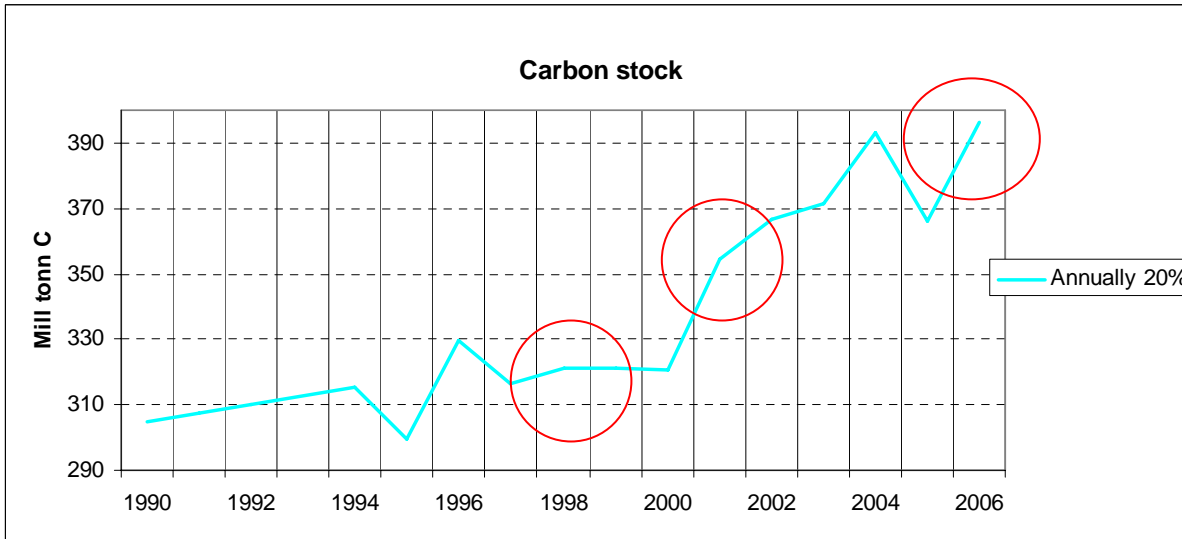
Results:

- The reported value for 2005 and 2006 will be the same in the future when adding data from 2007 and 2008.

- Land use changes are reported the same years as it is surveyed

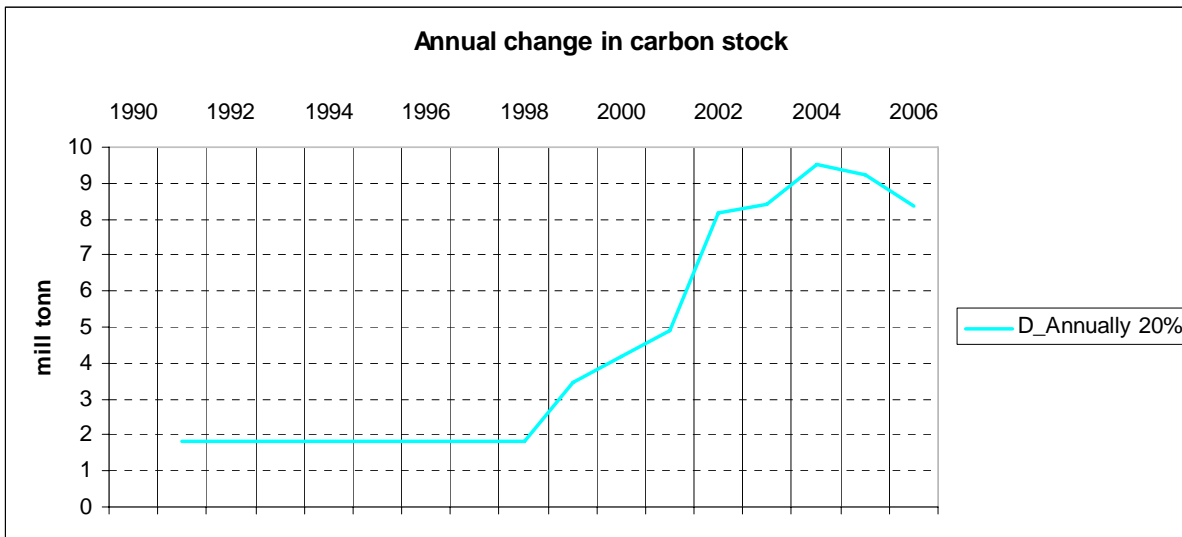


Annual measurements – representative sample – 20% of the plot



Linear Interpolation
1990-1996

Annually carbon stock based on 20% of the plot each year



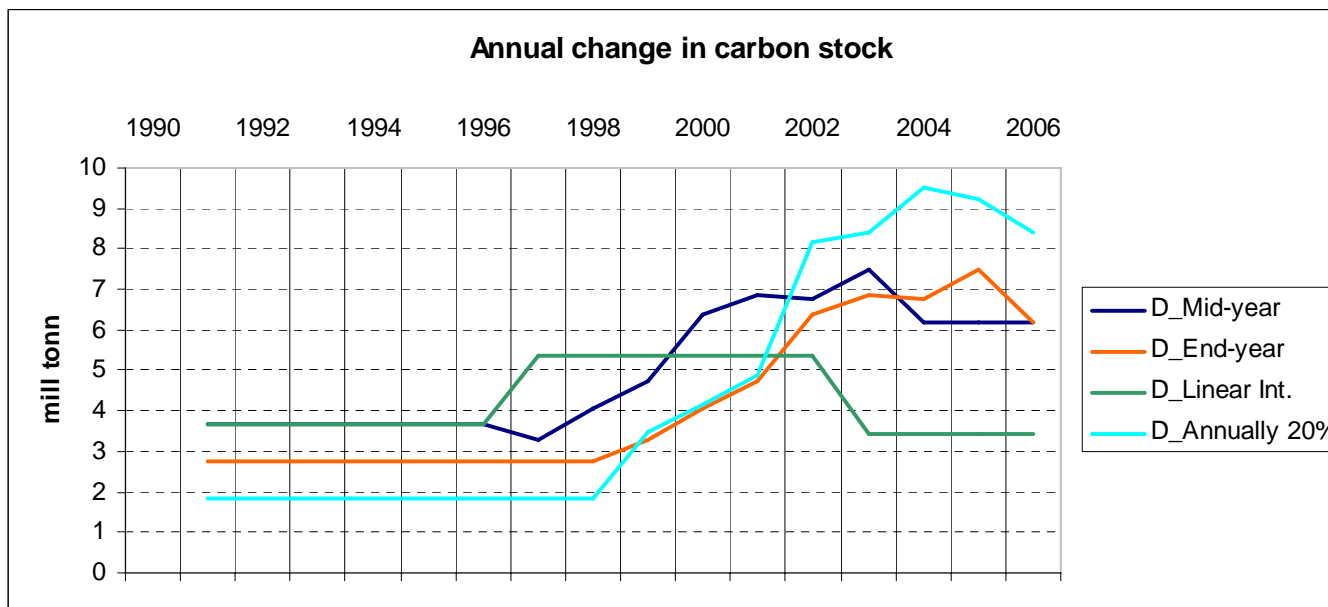
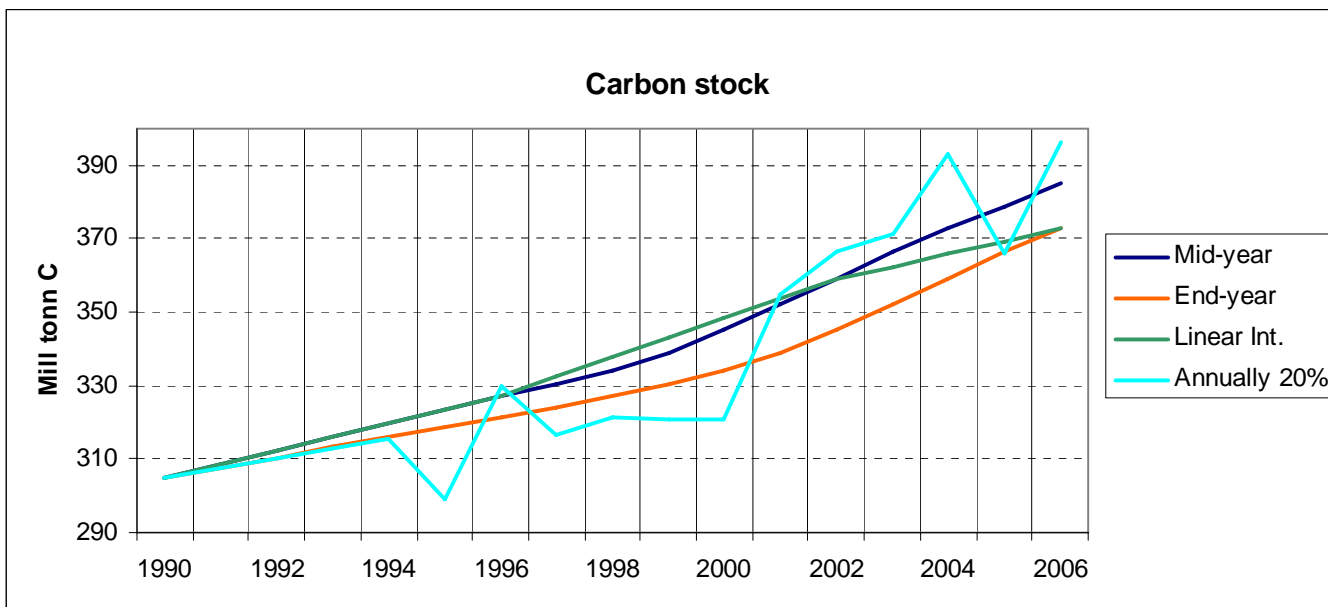
Changes between the same plots assessed five years ago

Method: All together



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Conclusion

The question was:

Interpolation or aggregation of periodic forest data for carbon reporting: Does it matter?

The answer (?):

Depends on the context

For LULUCF/Kyoto reporting the end-year is preferable (or most convenient).



Photo: John Y. Larsson

THANKS FOR YOUR ATTENTION!

