Selected issues of the first KP report and their fix in Hungary

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MgSzH

„LULUCF issues under the Kyoto Protocol”
EU DG JRC, Brussels, 10 November 2010

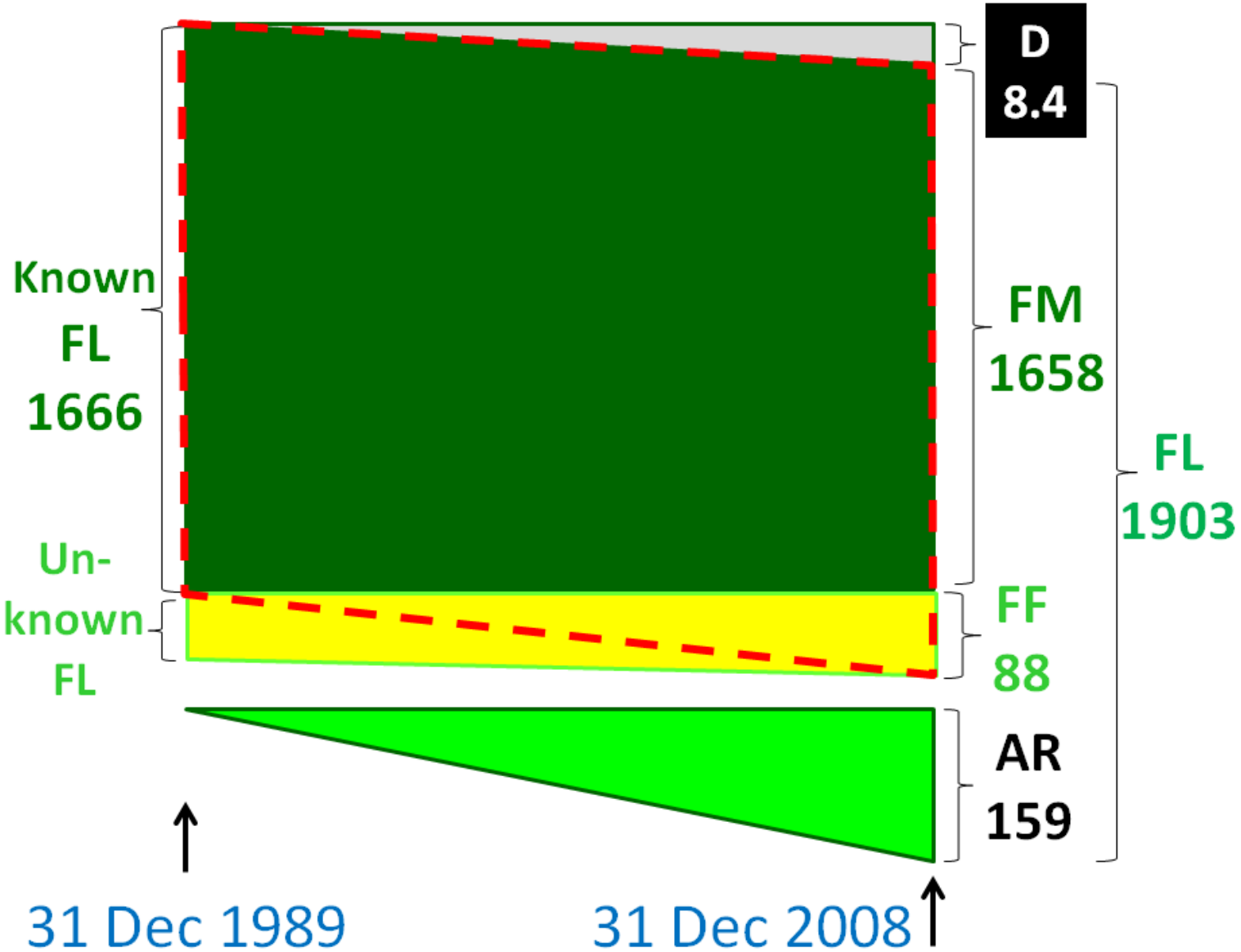
TOPICS

We found forests…

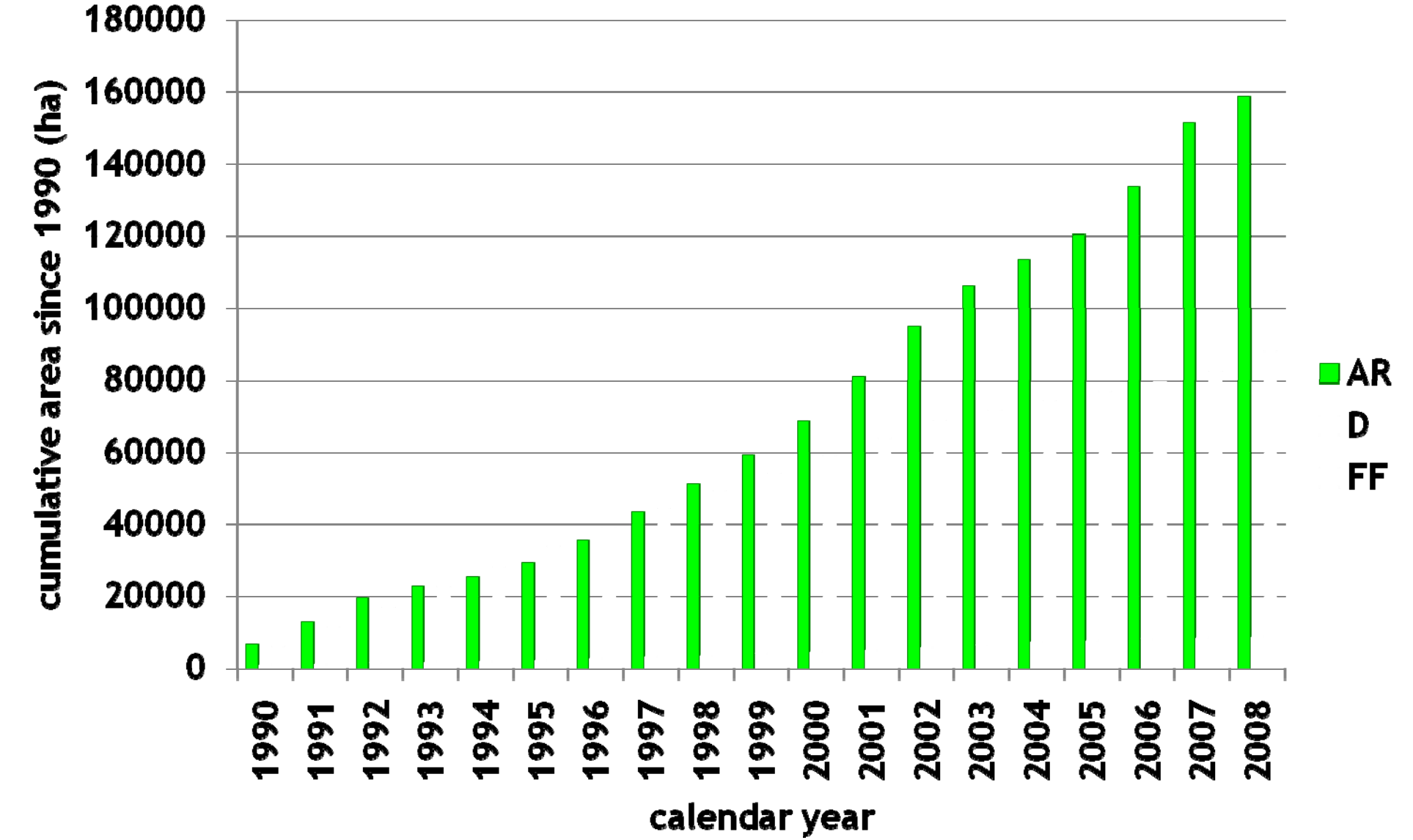
Soil demo v.2

Estimating uncertainty by MCA

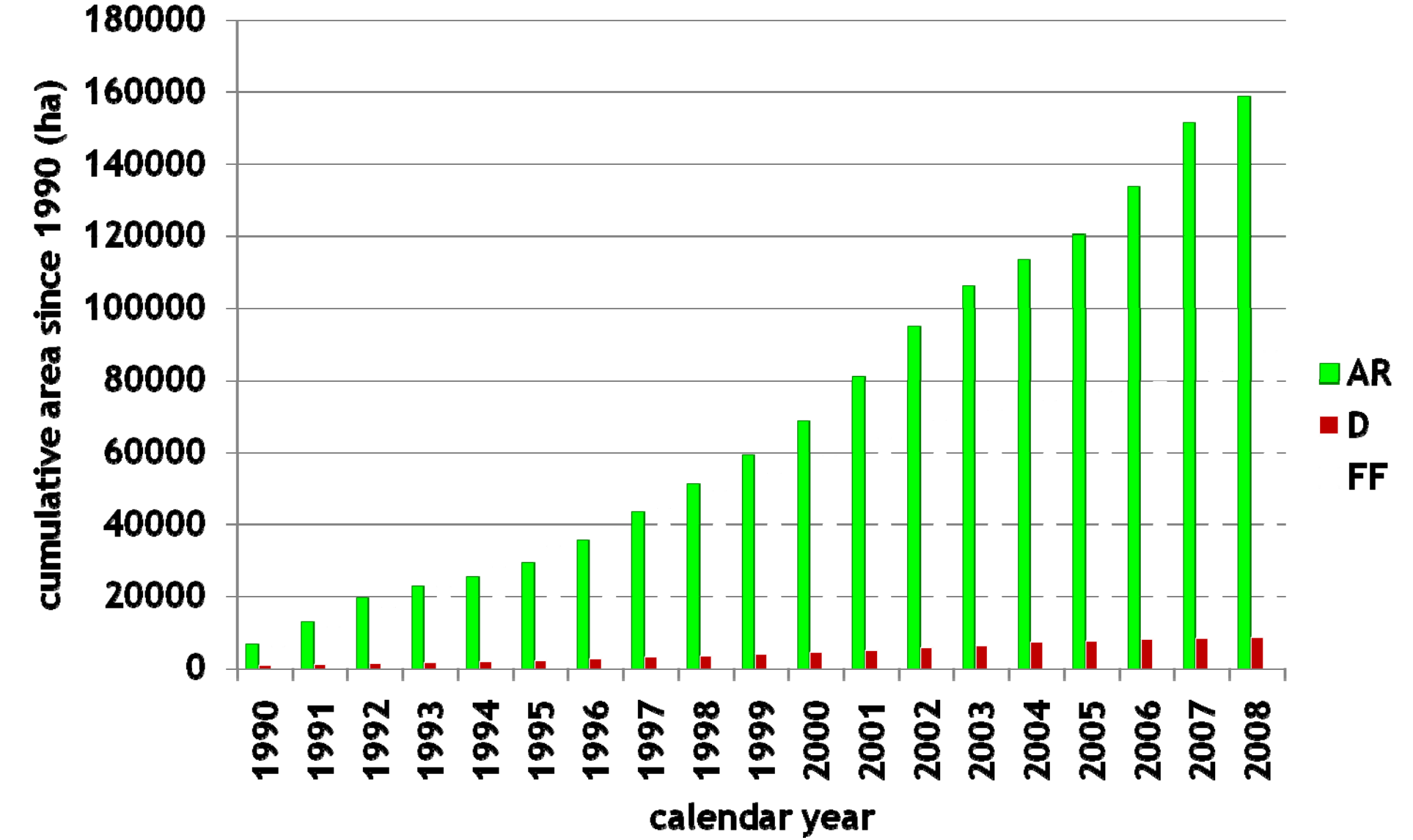
Evolution of known forest area



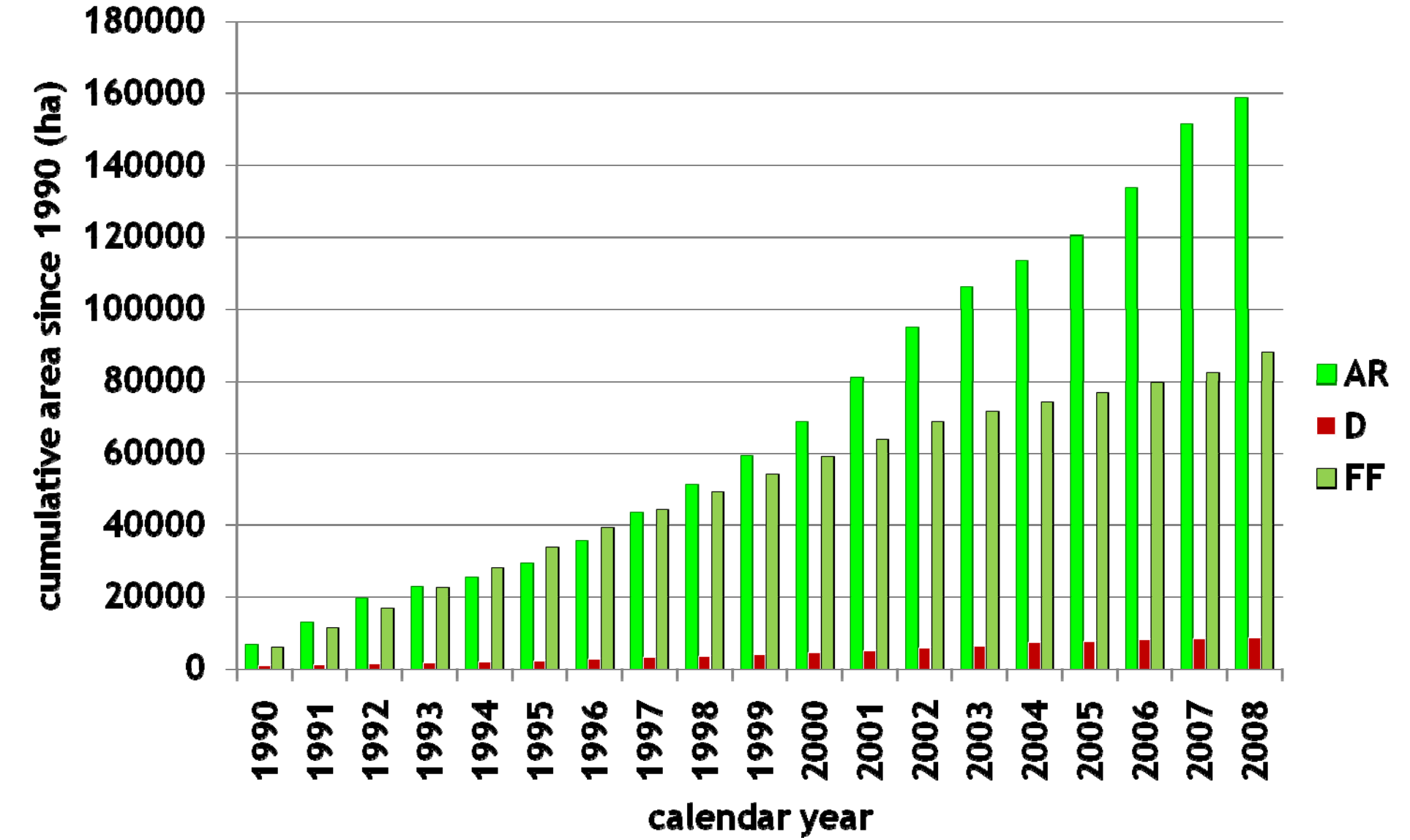
Evolution of forest area



Evolution of forest area



Evolution of forest area

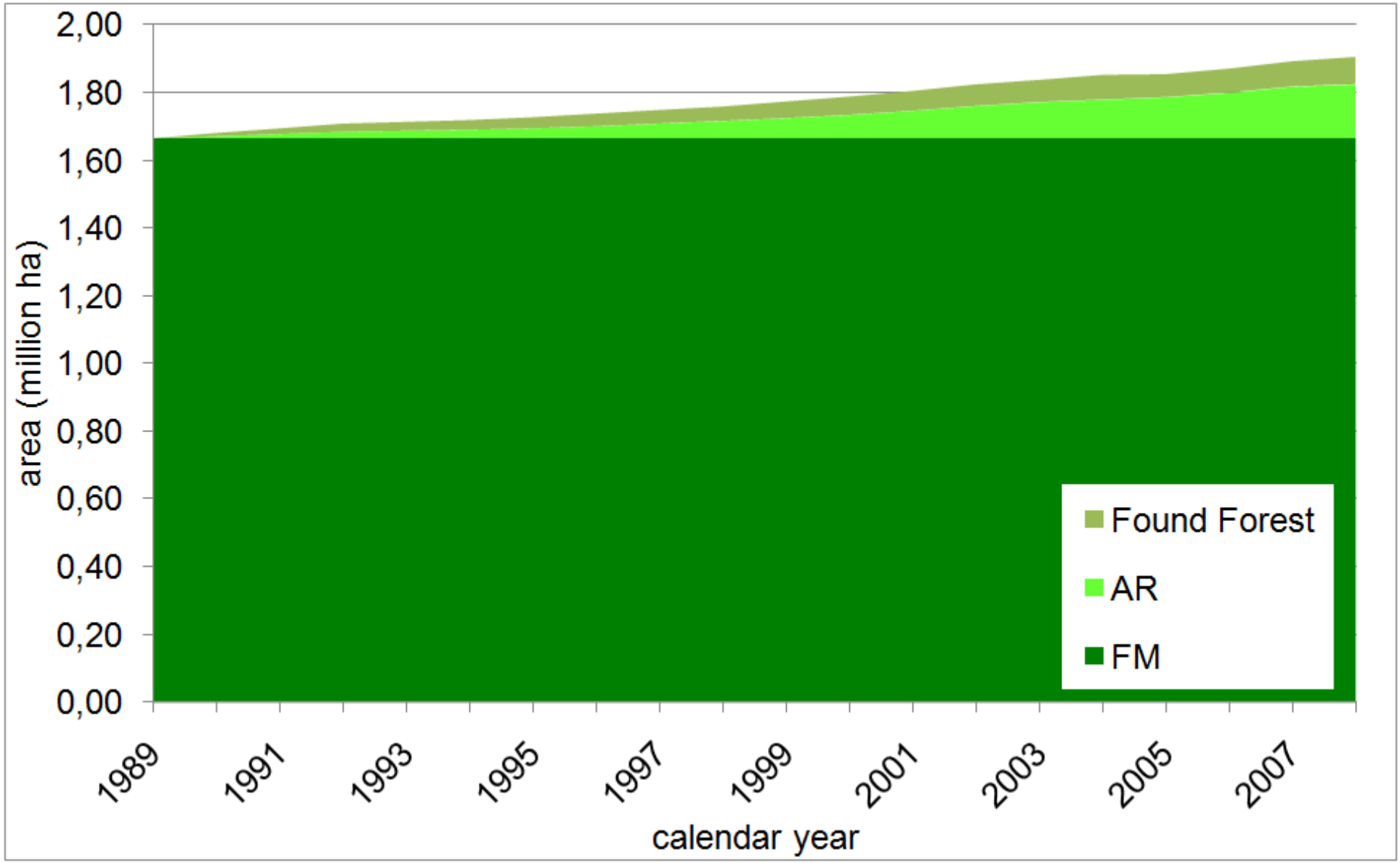


Guidance by IPCC 2006 GL

$\Delta_{FM} = f(FL_2, FL_1)$ but:

„When using the Stock-Difference Method…, it is important to ensure that the area of land in that category at times t_1 and t_2 is identical…”

IF FL = FM + AR + FF, ΔC_{FM} = ?



$FL_1 \longrightarrow FL_2$ balance

$FL_1 = D + FM_1$

$FL_2 = FL_1 - D$

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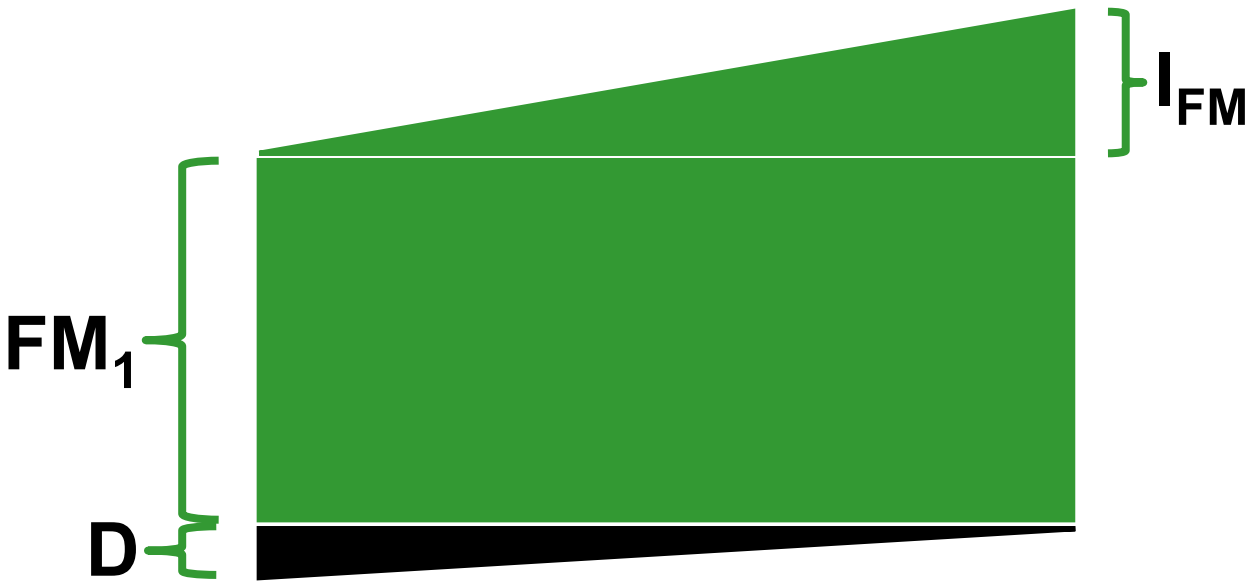
$FL_1 = D + FM_1$

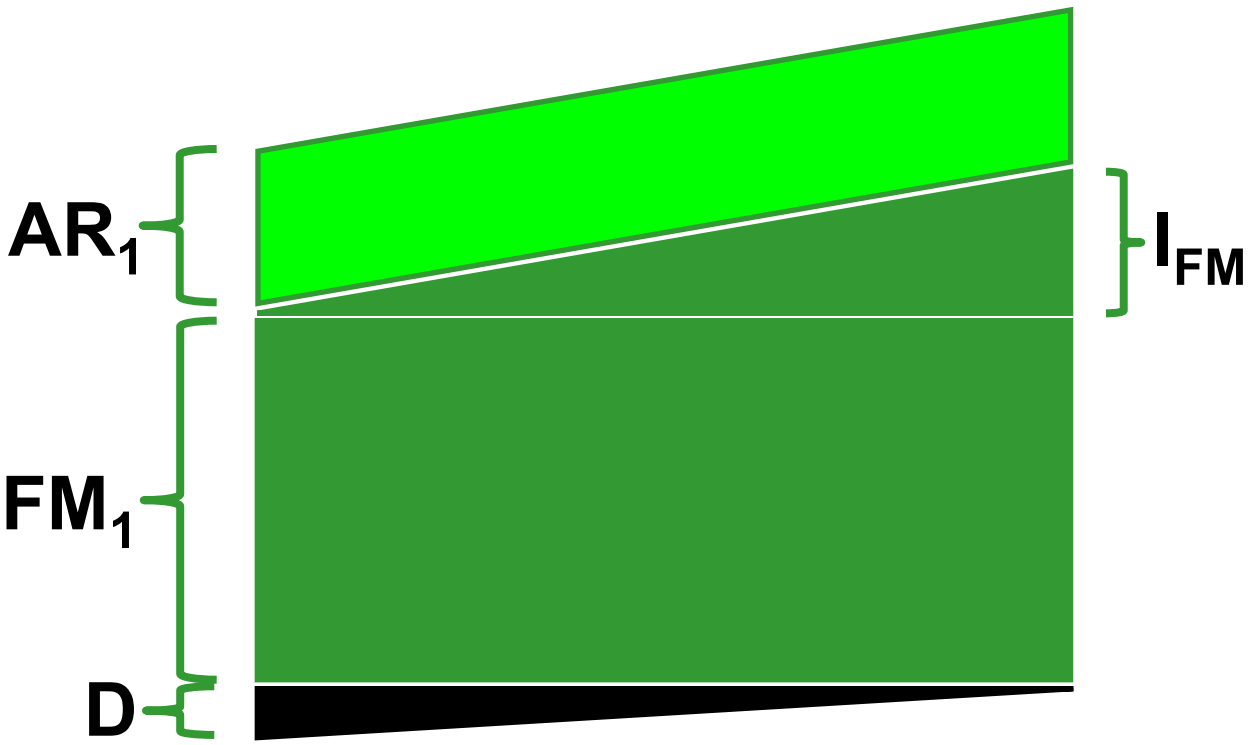
$FL_2 = FL_1 - D + I_{FM}$



$FL_1 \longrightarrow FL_2$ balance

$FL_1 = D + FM_1 + AR_1$

$FL_2 = FL_1 - D + I_{FM}$



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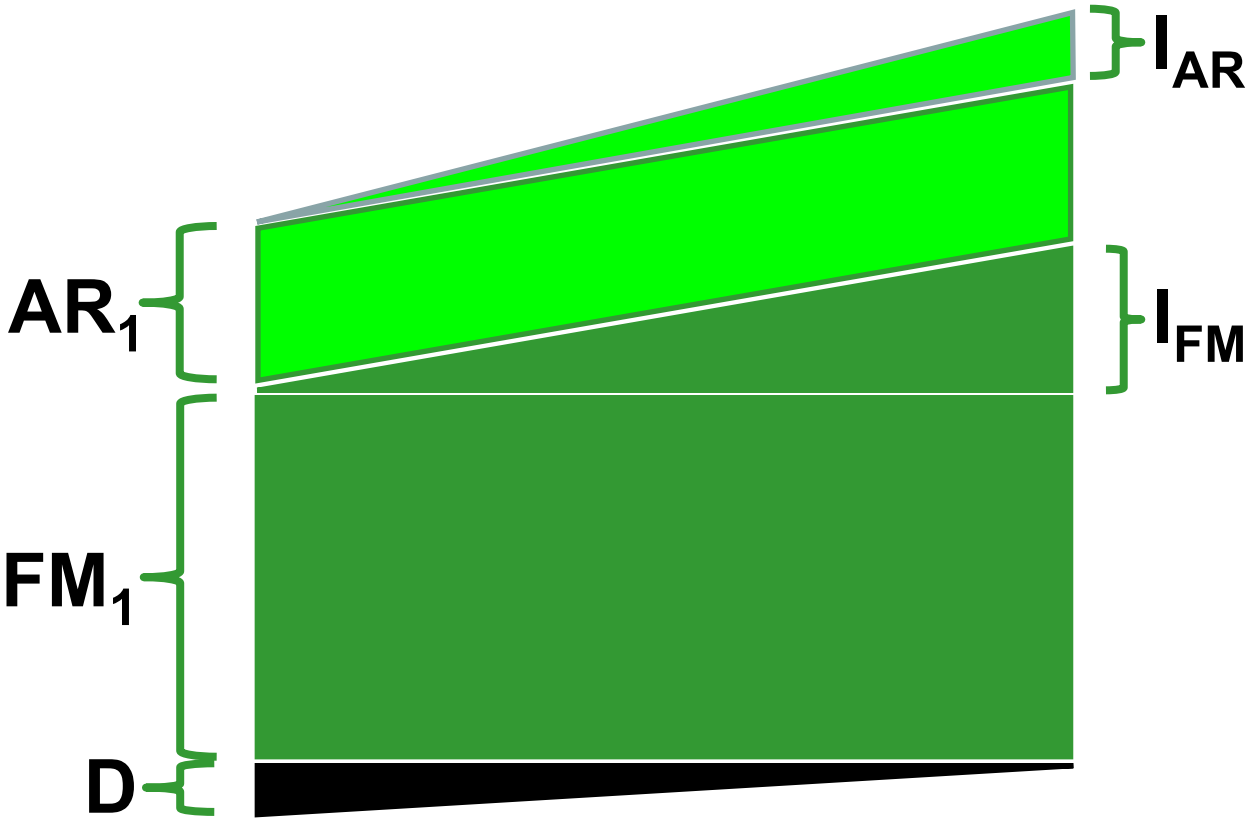
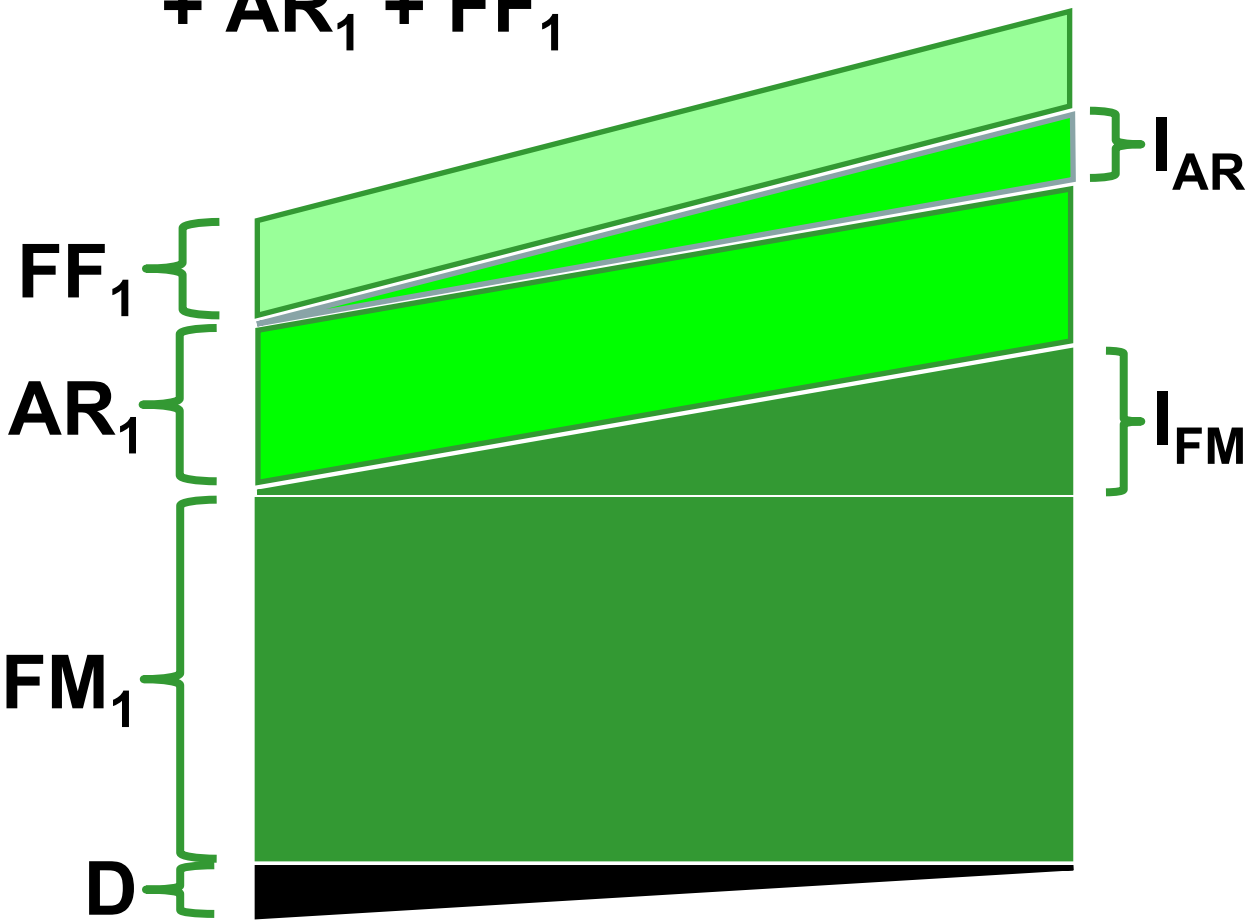
$FL_1 = D + FM_1 + AR_1$

$FL_2 = FL_1 - D + I_{FM} + I_{AR}$



$FL_1 \longrightarrow FL_2$ balance

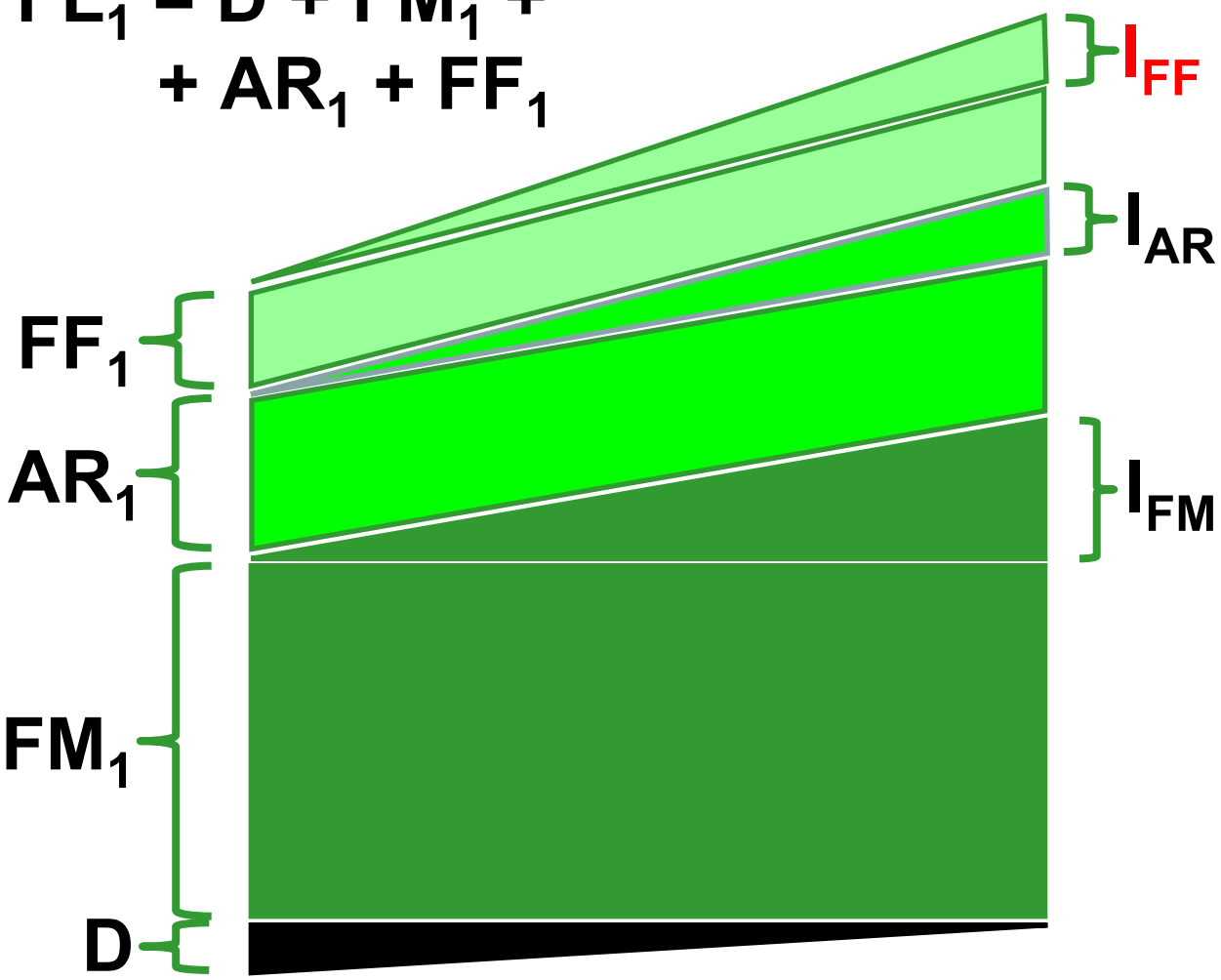
$FL_1 = D + FM_1 + AR_1 + FF_1$



$FL_2 = FL_1 - D + I_{FM} + I_{AR}$

$FL_1 \rightarrow FL_2$ balance

$FL_1 = D + FM_1 + AR_1 + FF_1$



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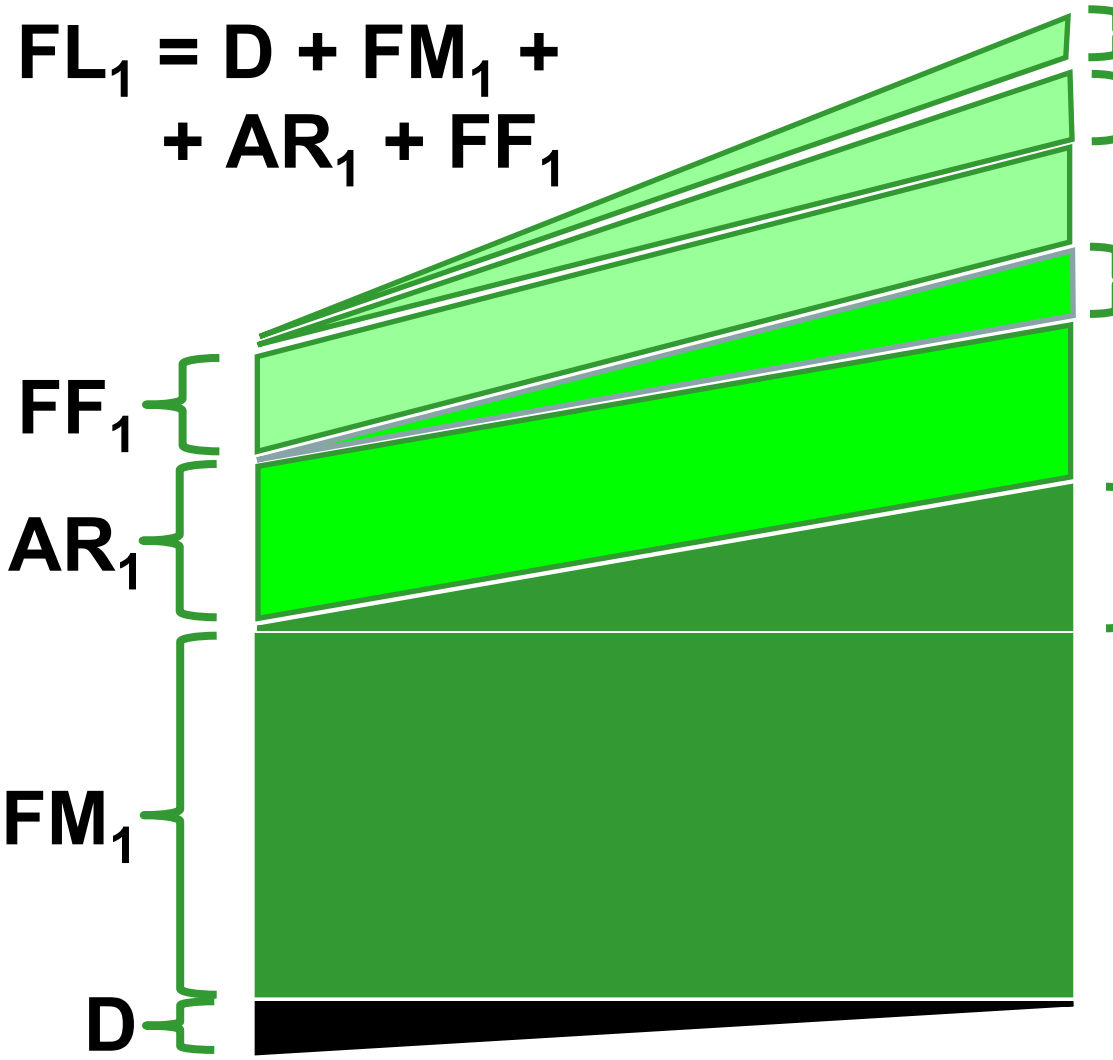

$FL_2 = FL_1 - D + I_{FM} + I_{AR} + I_{FF} + FF_{new}$

$FL_1 \rightarrow FL_2$ balance

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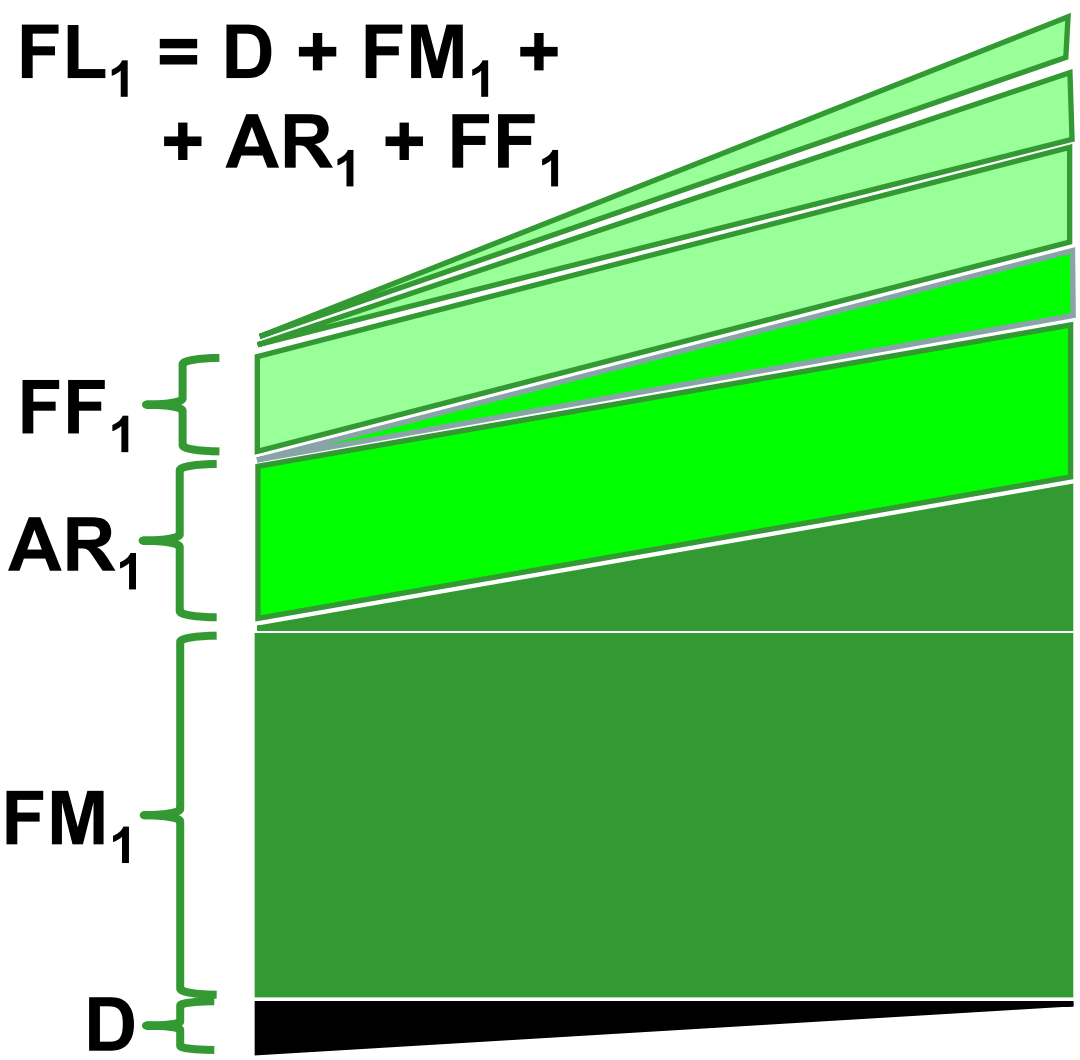


$FL_2 = FL_1 - D + I_{FM} + I_{AR} + I_{FF} + FF_{new}$

$\Delta_{FM} = FL_2 - FL_1 + D - I_{AR} - I_{FF} - FF_{new}$

Our soils
(except for D)

are not a source…

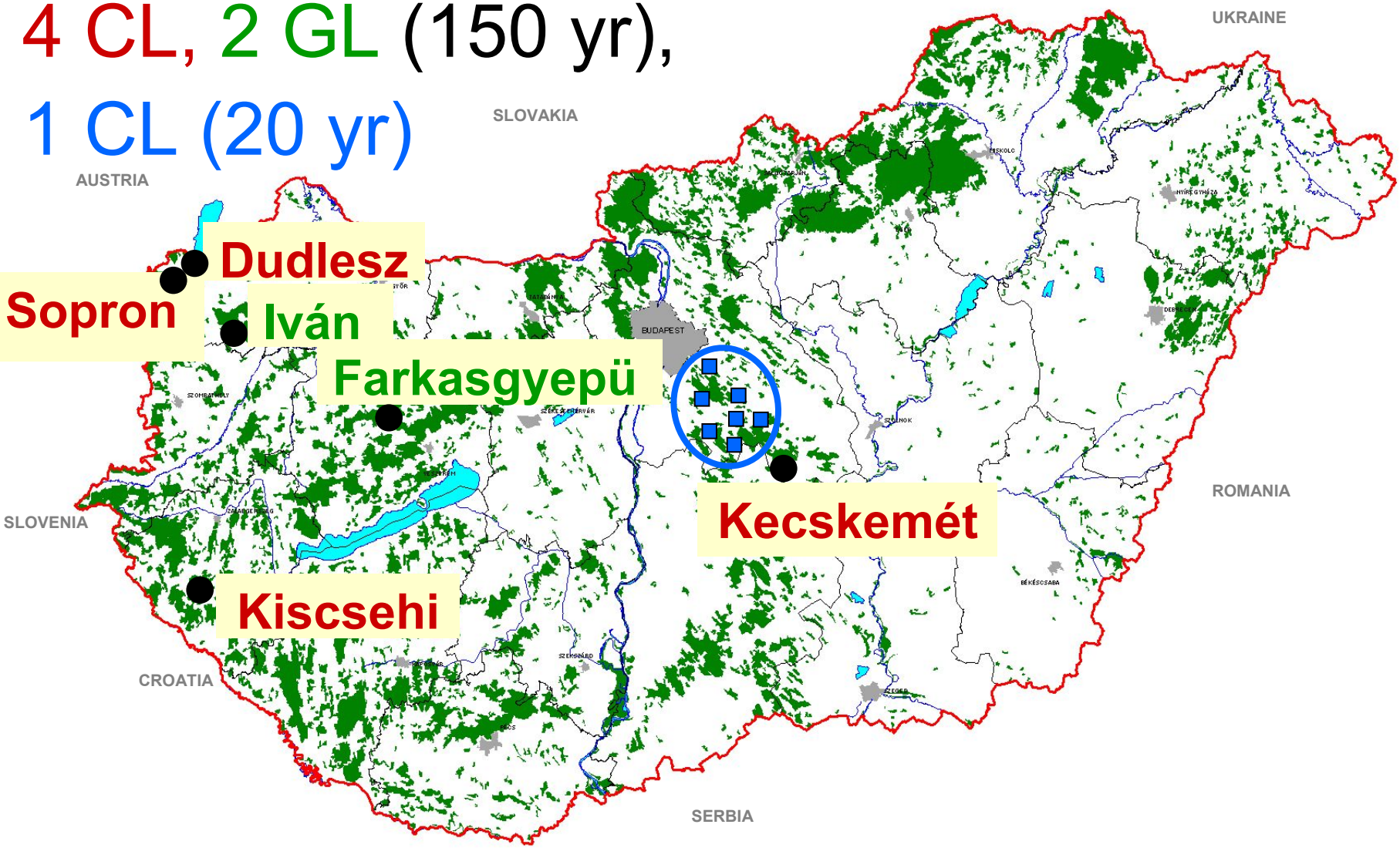
Demonstration principles

- Using very limited country-specific information
- Applying all methods suggested by GPG
- Relying also on data from other countries
- Applying a (highly) conservative approach

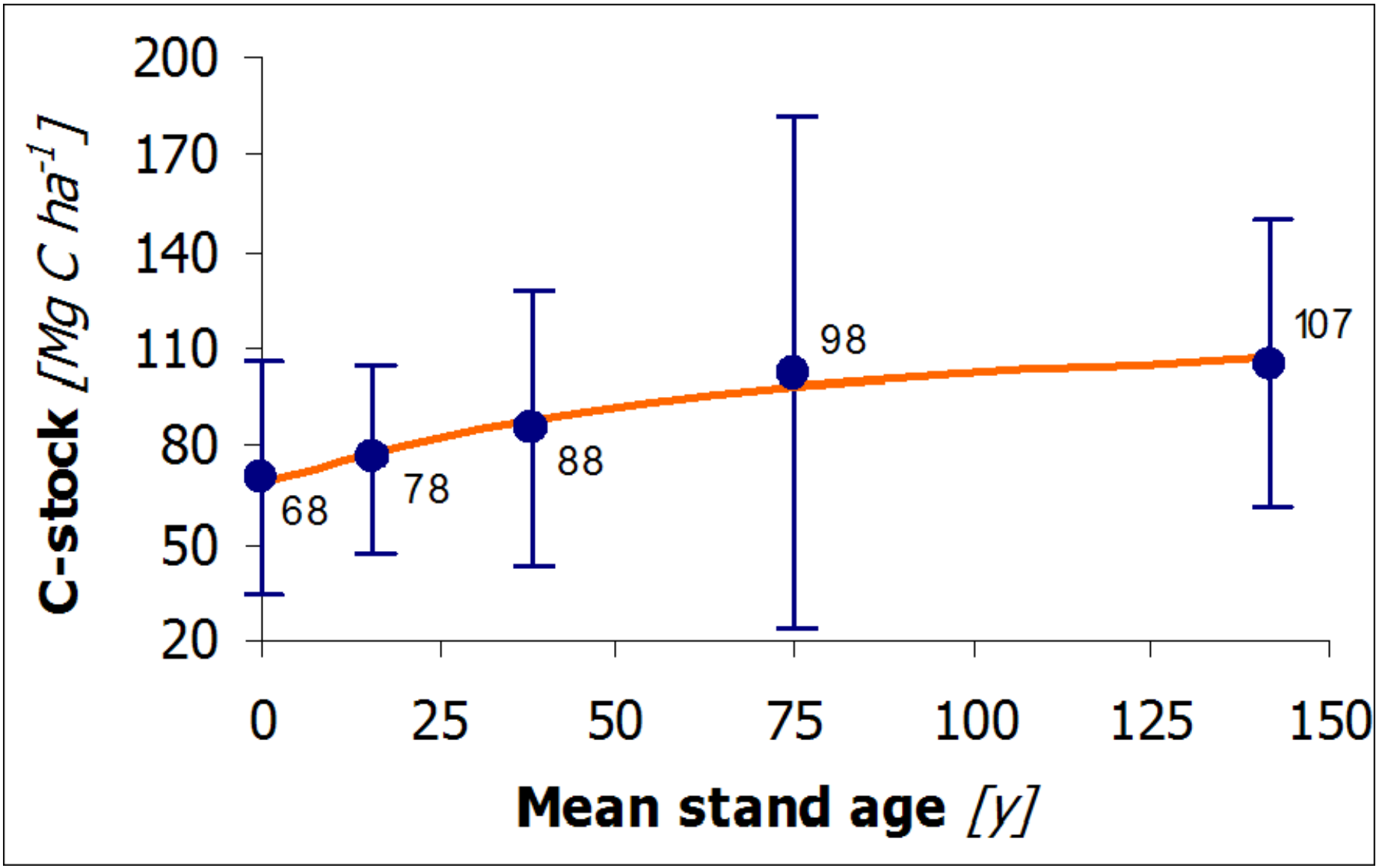
Local information base: chronosequences / case studies

4 CL, 2 GL (150 yr),

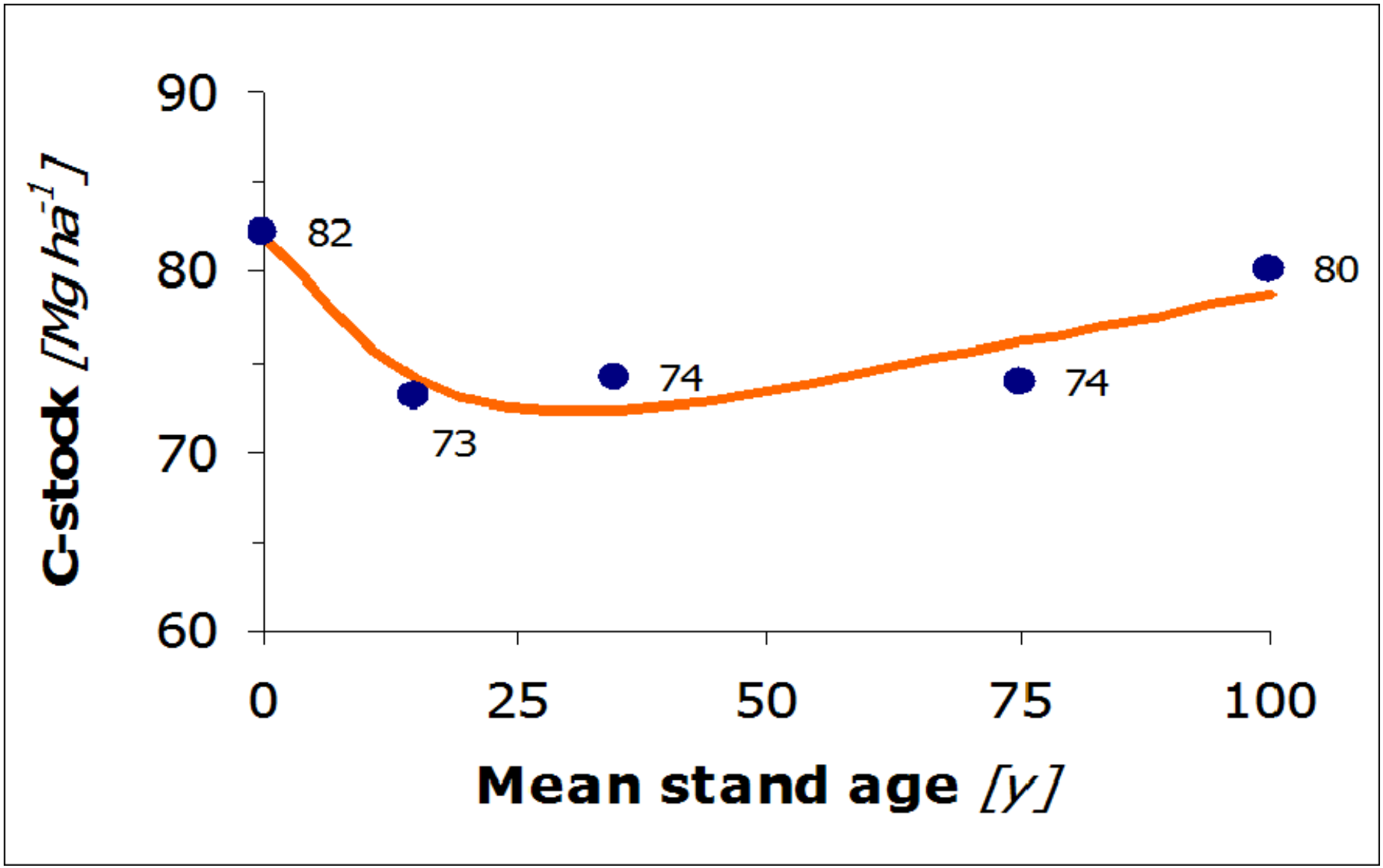
1 CL (20 yr)



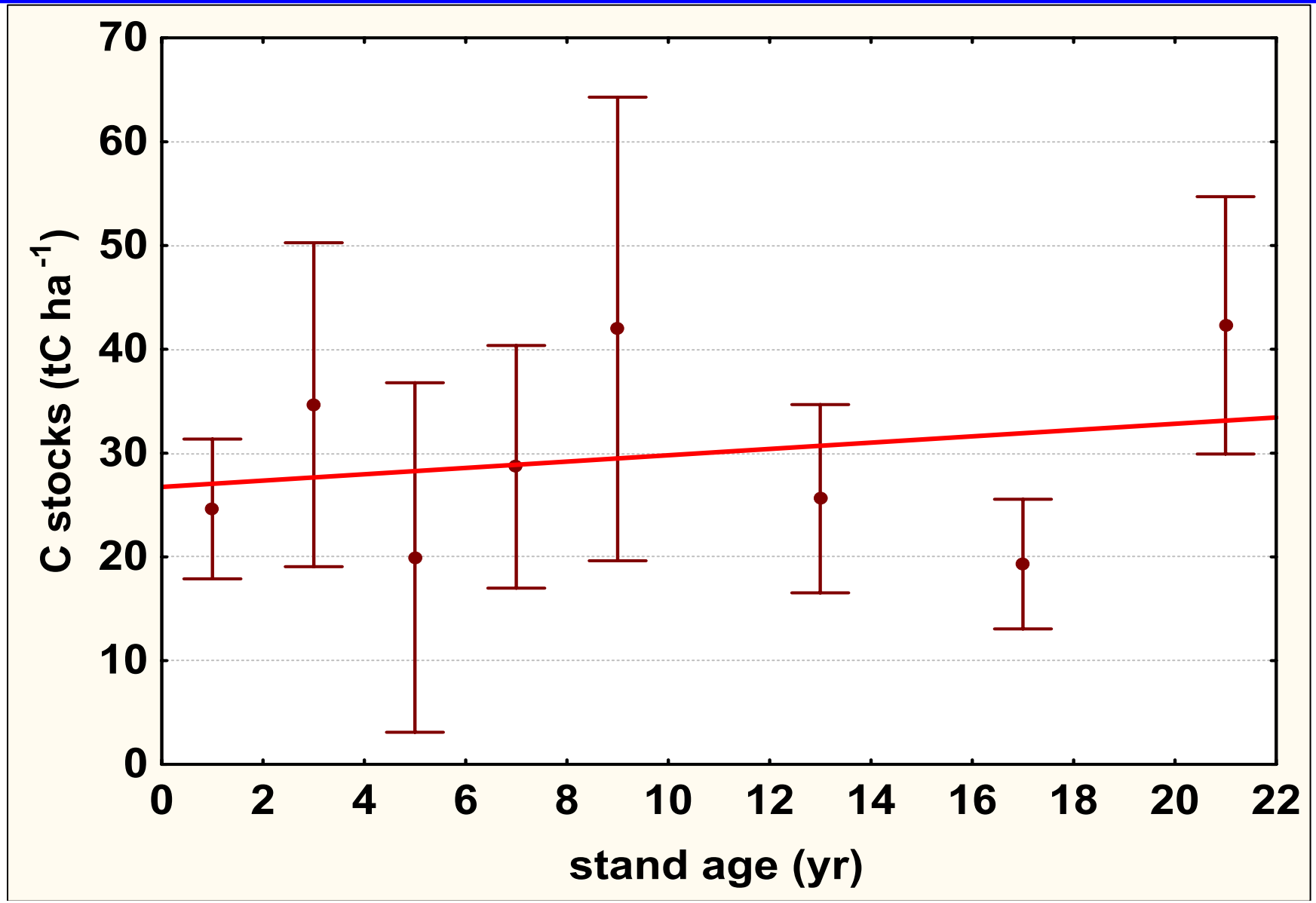
CL: $C=68.5+43.5*(1-e^{-0.016*t})$



GL: $C=82.0+32.9*(1-e^{-0.015*t})-29.0*(1-e^{-0.046*t})$



CL: C = 26,8+0,304*t



Strata and estimates

Forest Land Stratum under the KP	Estimated area in 2008 (kha)	Emission (+) and removal (-) factor (tC ha^{-1})	Total emissions (+) or removals (-) (ktC)
AR since 1990 from CL	127	(indirectly)	-48
AR since 1990 from GL	31		

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Total			***-33 < 0***

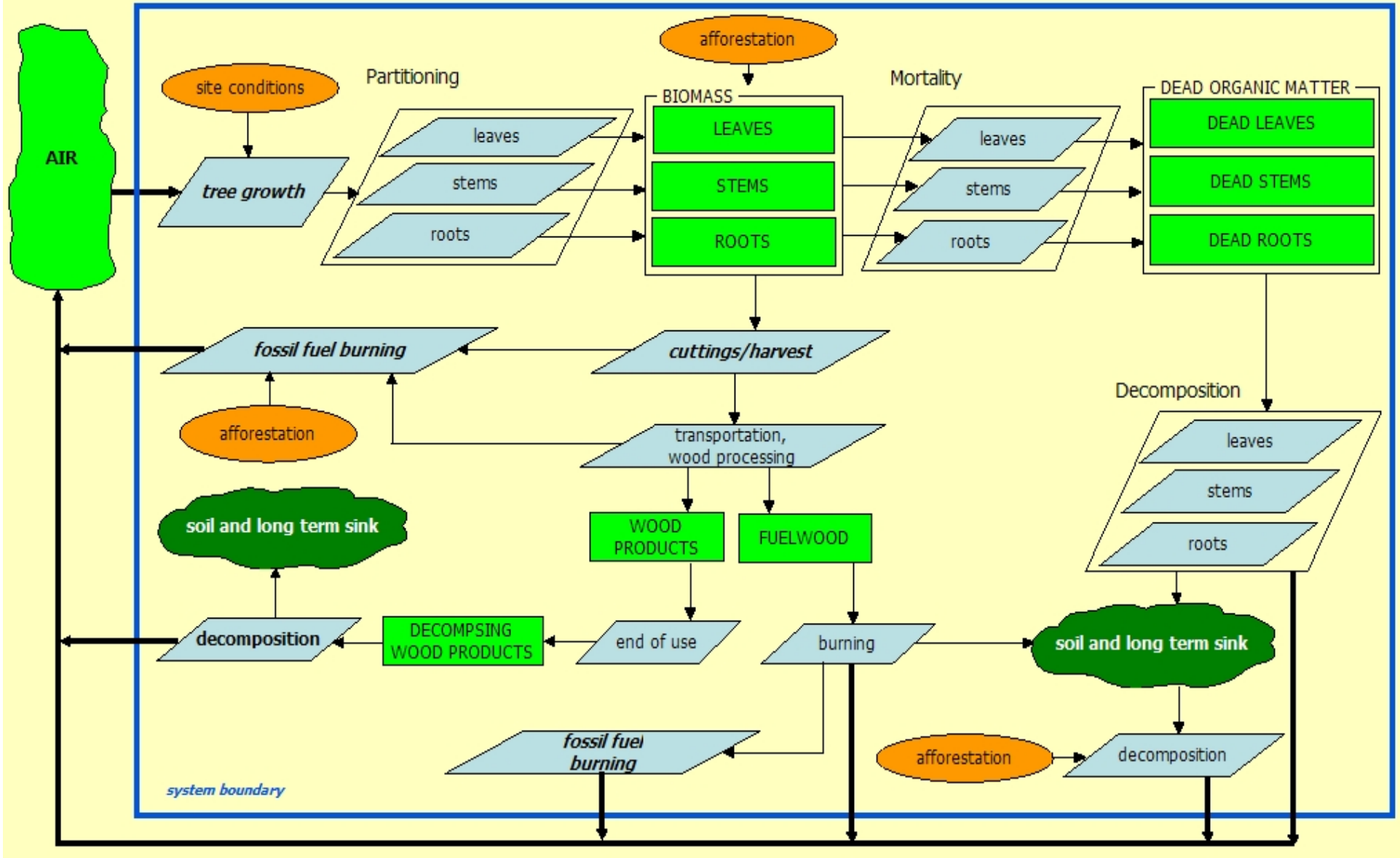
How certain are we on our uncertainties?

Uncertainty estimation

- Non-quantifiable elements
- Estimates for specific variables
- Expert judgments
- *Estimates of combined effects of several variables on the „system” using a model*

Modeling forest C dynamics:

www.scientia.hu/casmofor (4.0)



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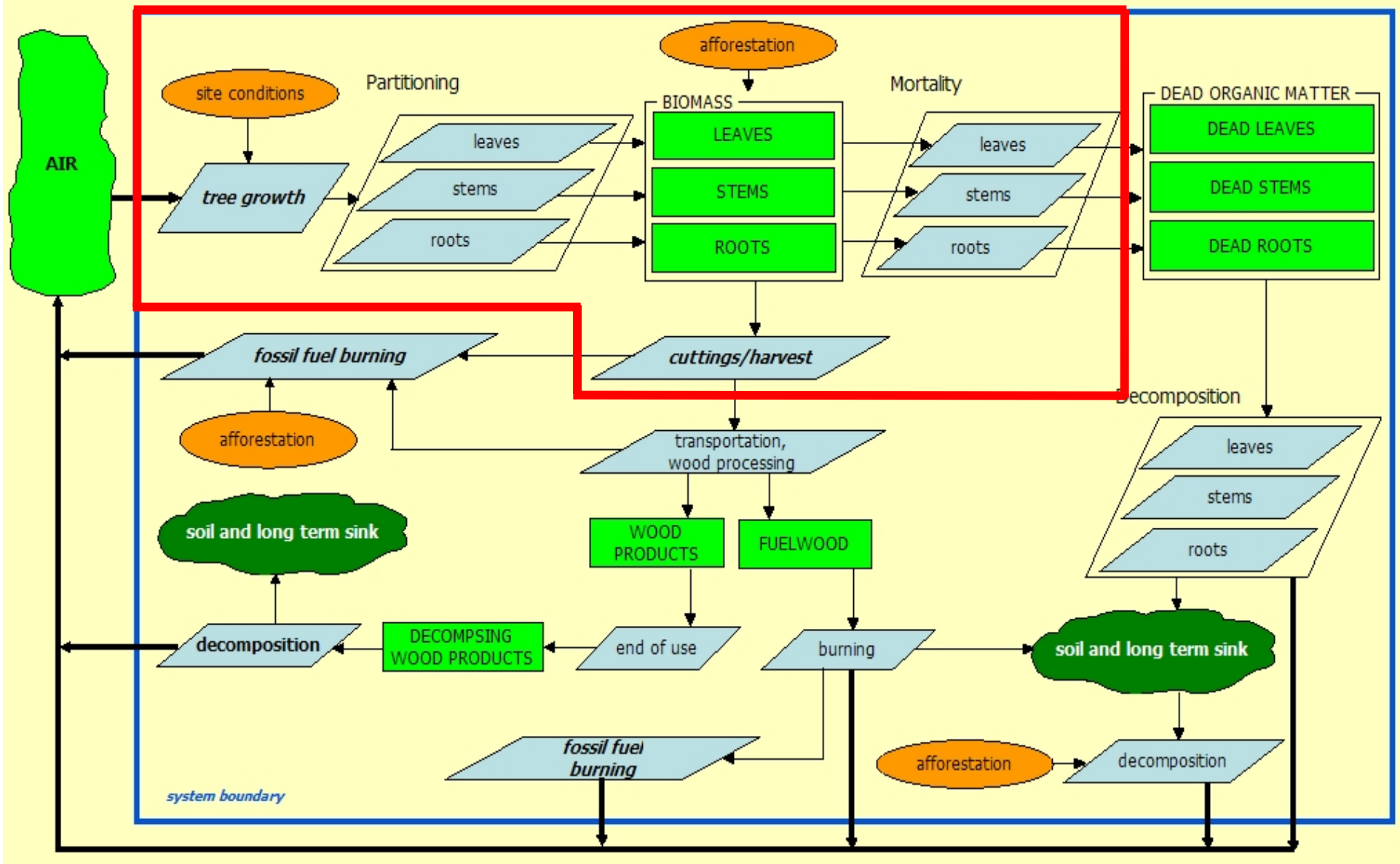

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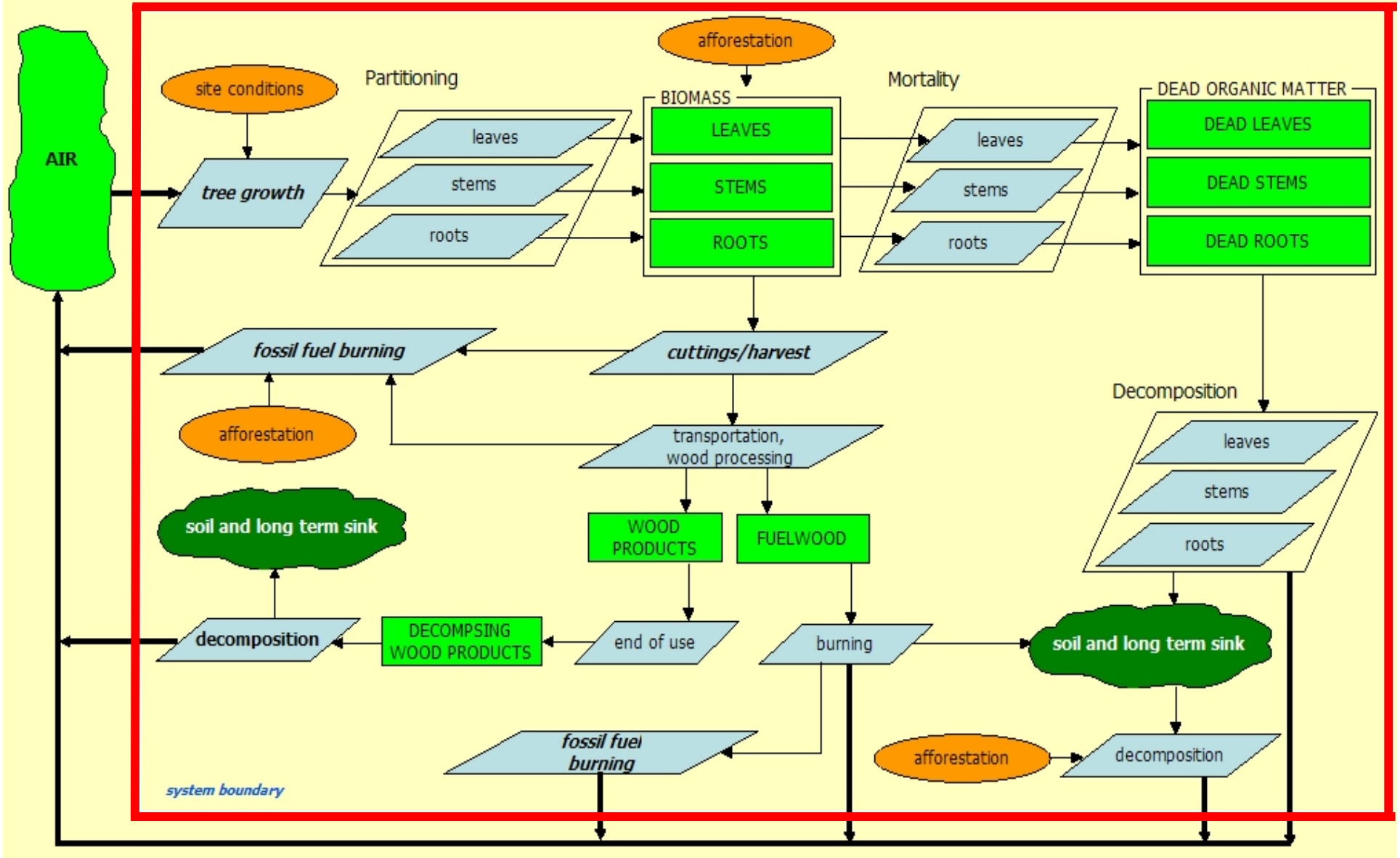
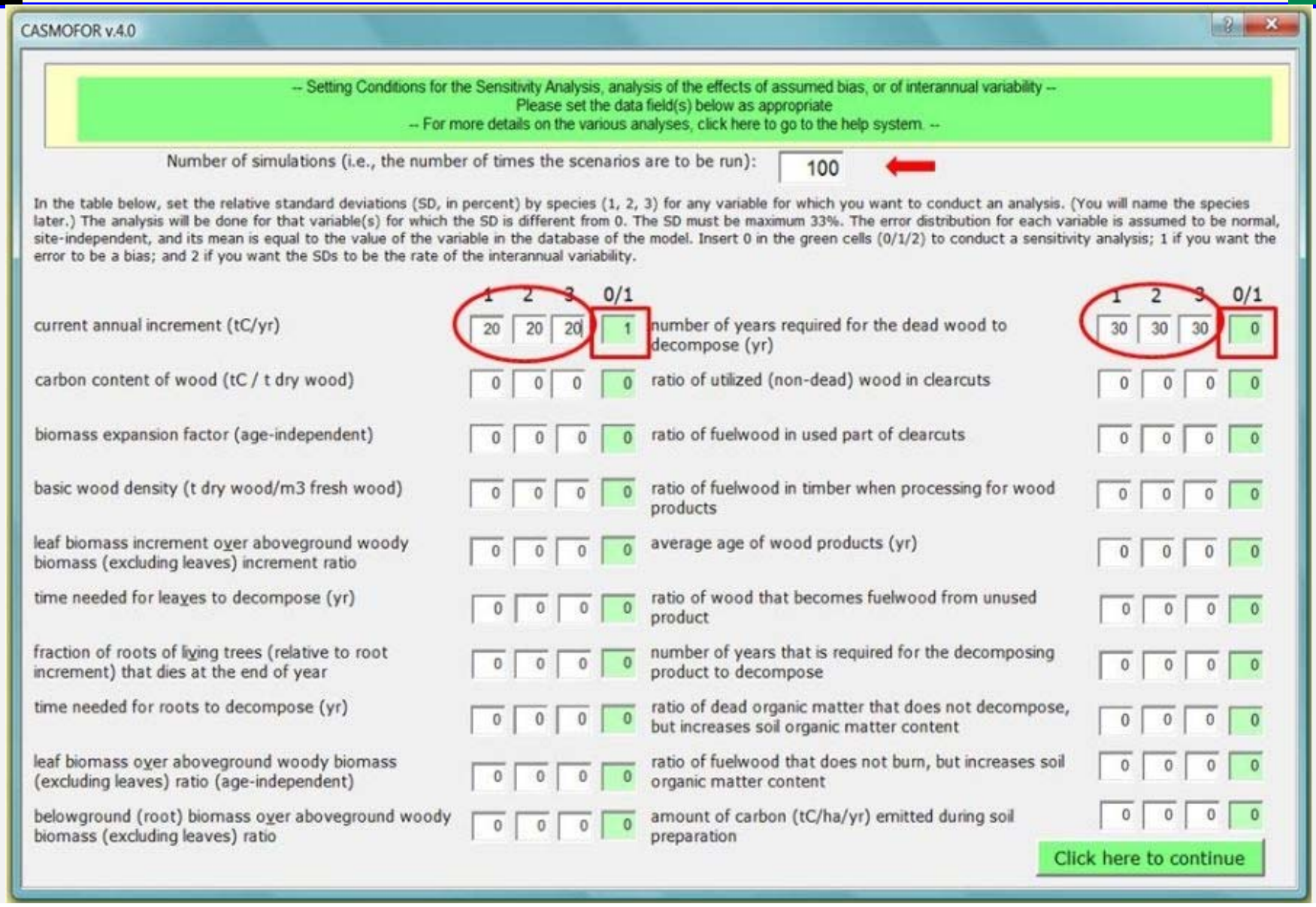


CASMOFOR 4.0: a framework

- *following IPCC methodology*
- 40 equations of C dynamics/economics
- standwise approach with annual steps
- forestry data warehouse for Hungary

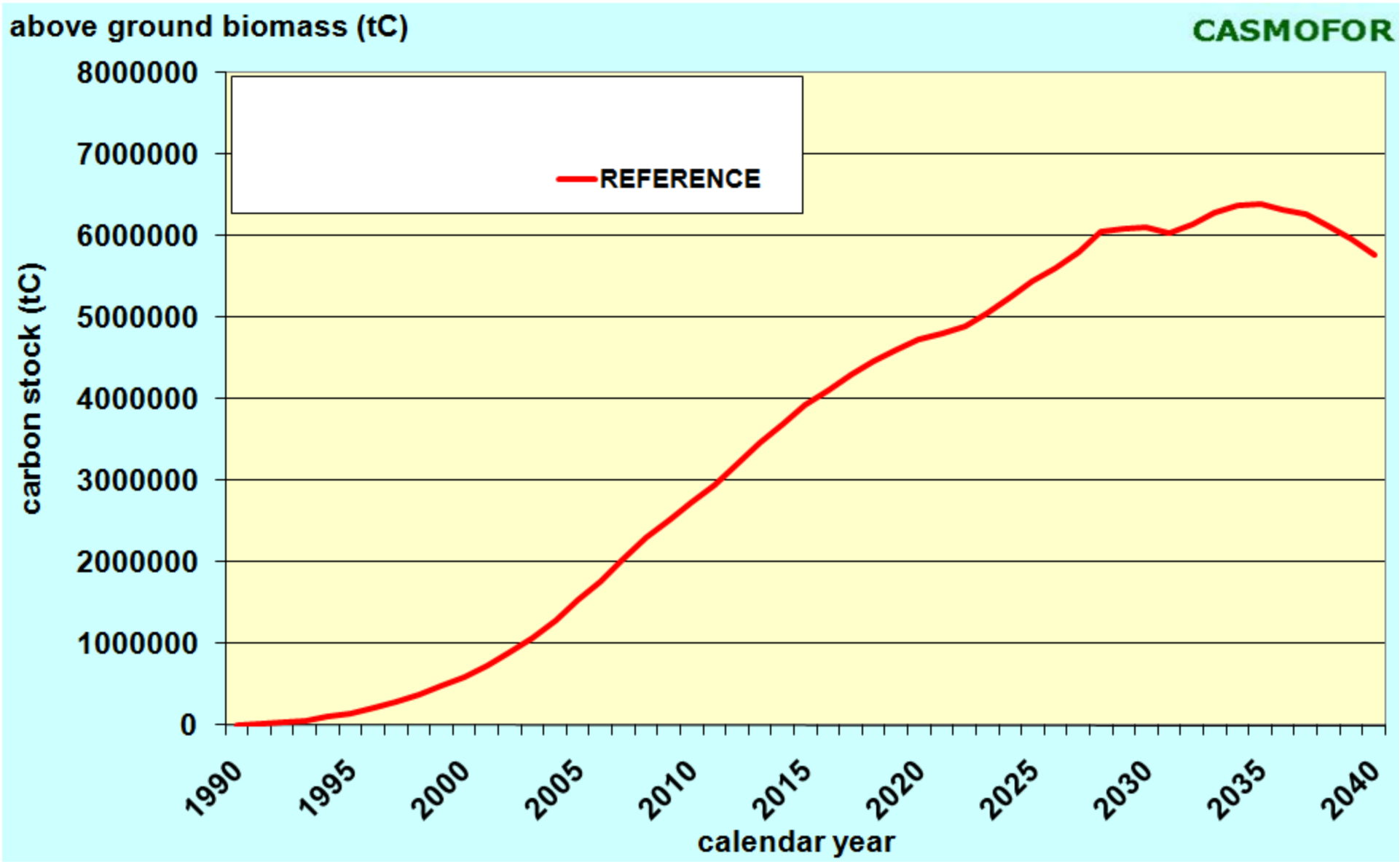
Full Monte-Carlo module



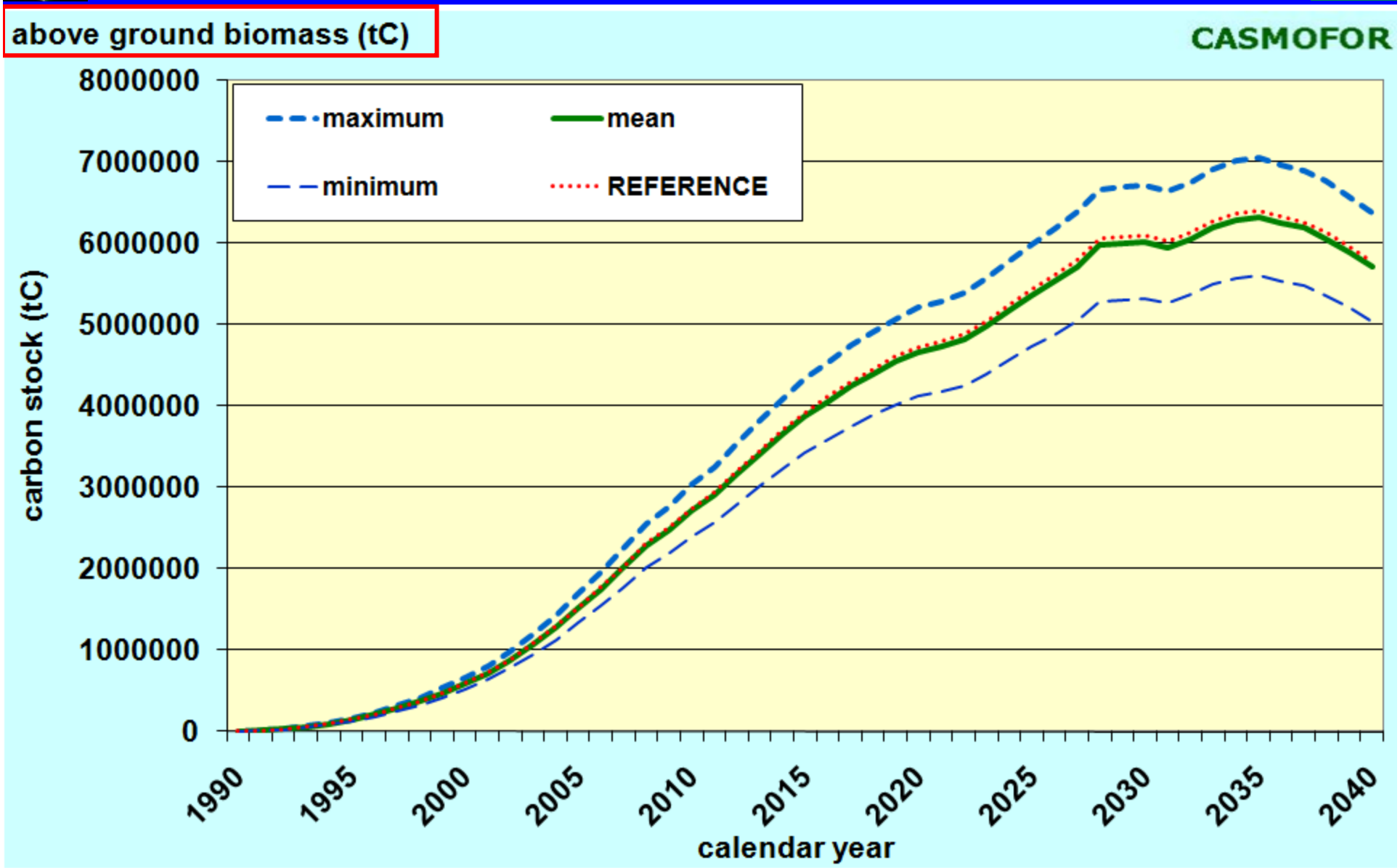
What if:

Variable	Assumed relative STD (%)
CAI	20 %
Basic wood density	10 %
Root-to-shoot ratio	30 %

Simulated AR



Simulated AR + absolute STD



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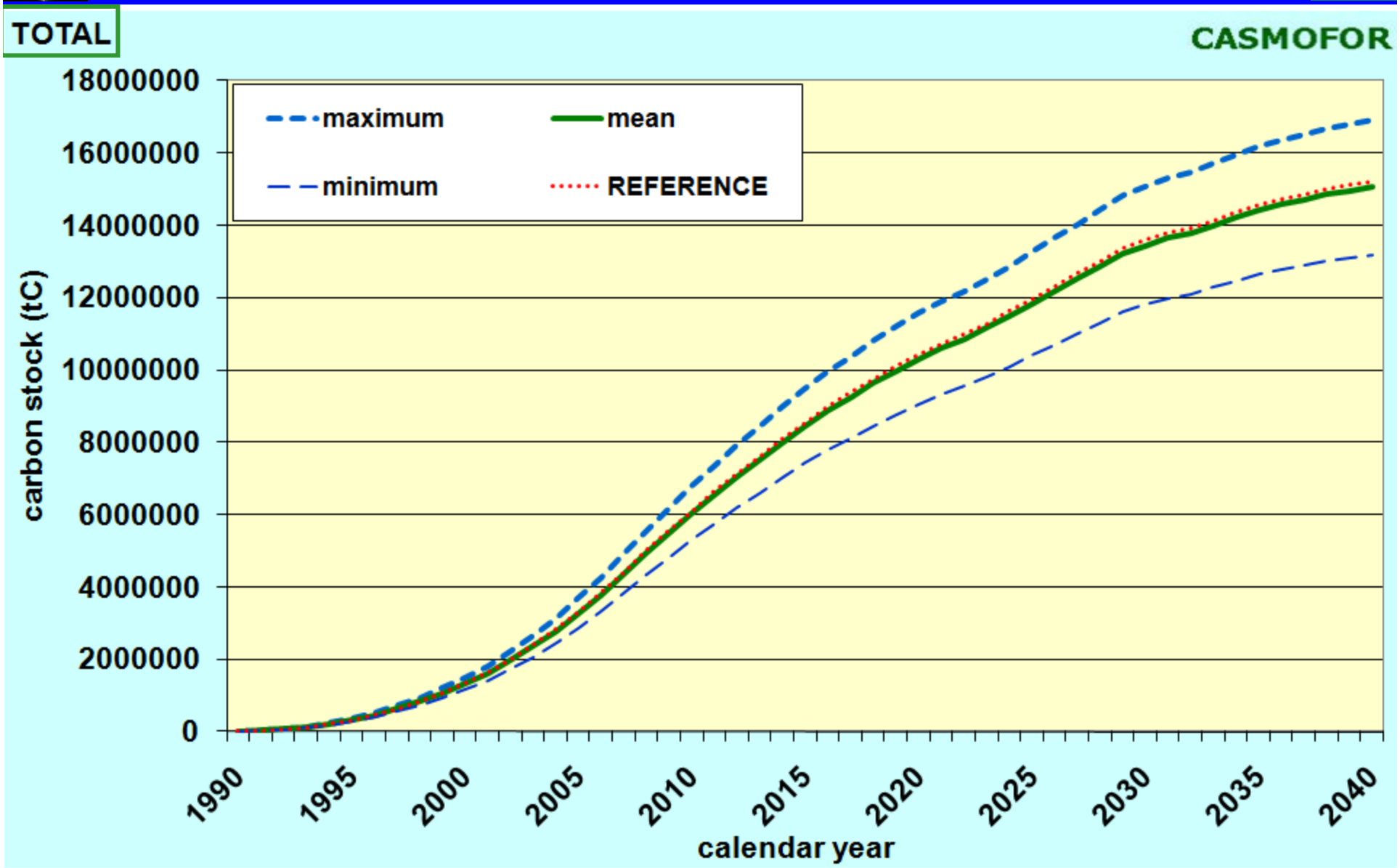
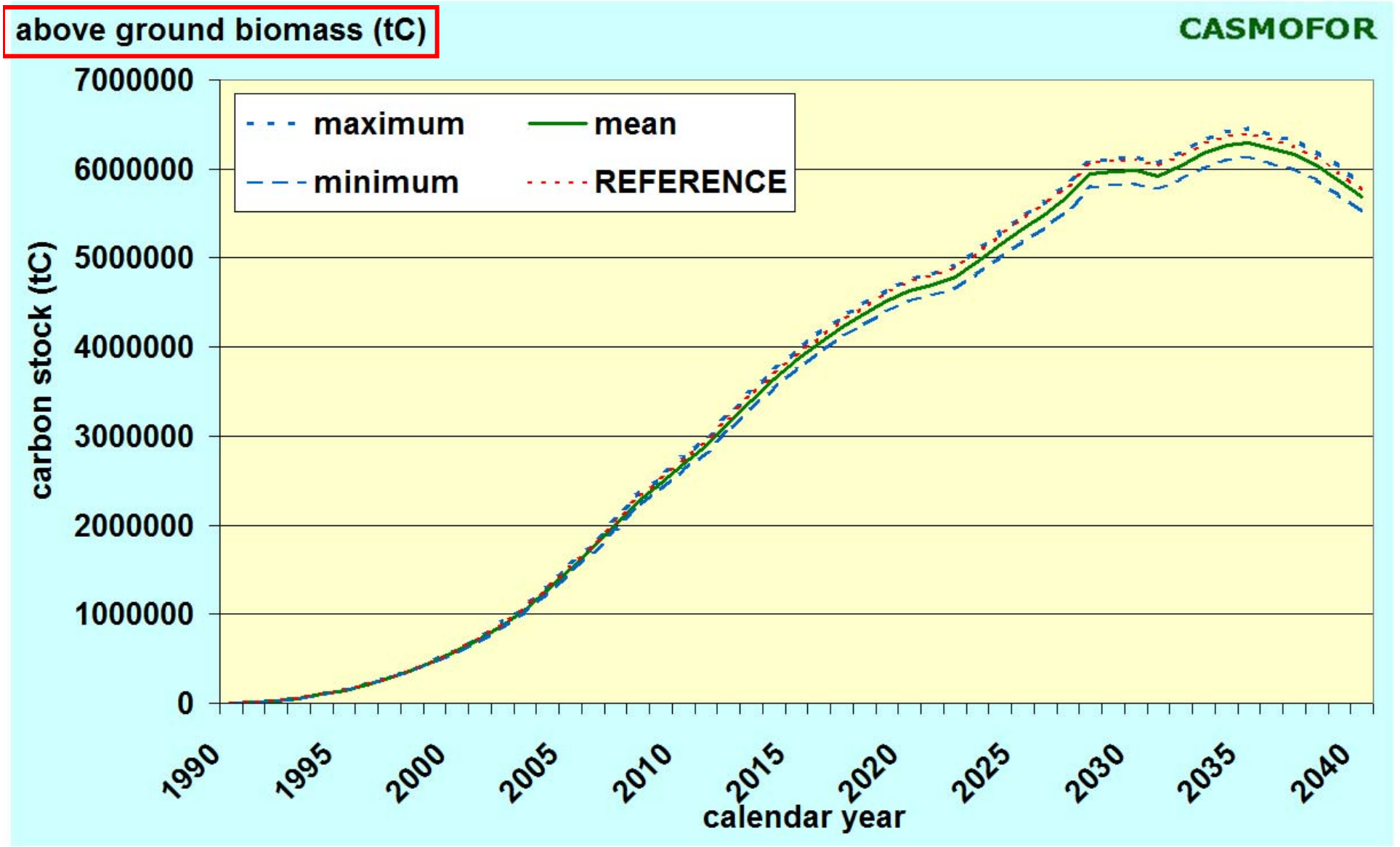
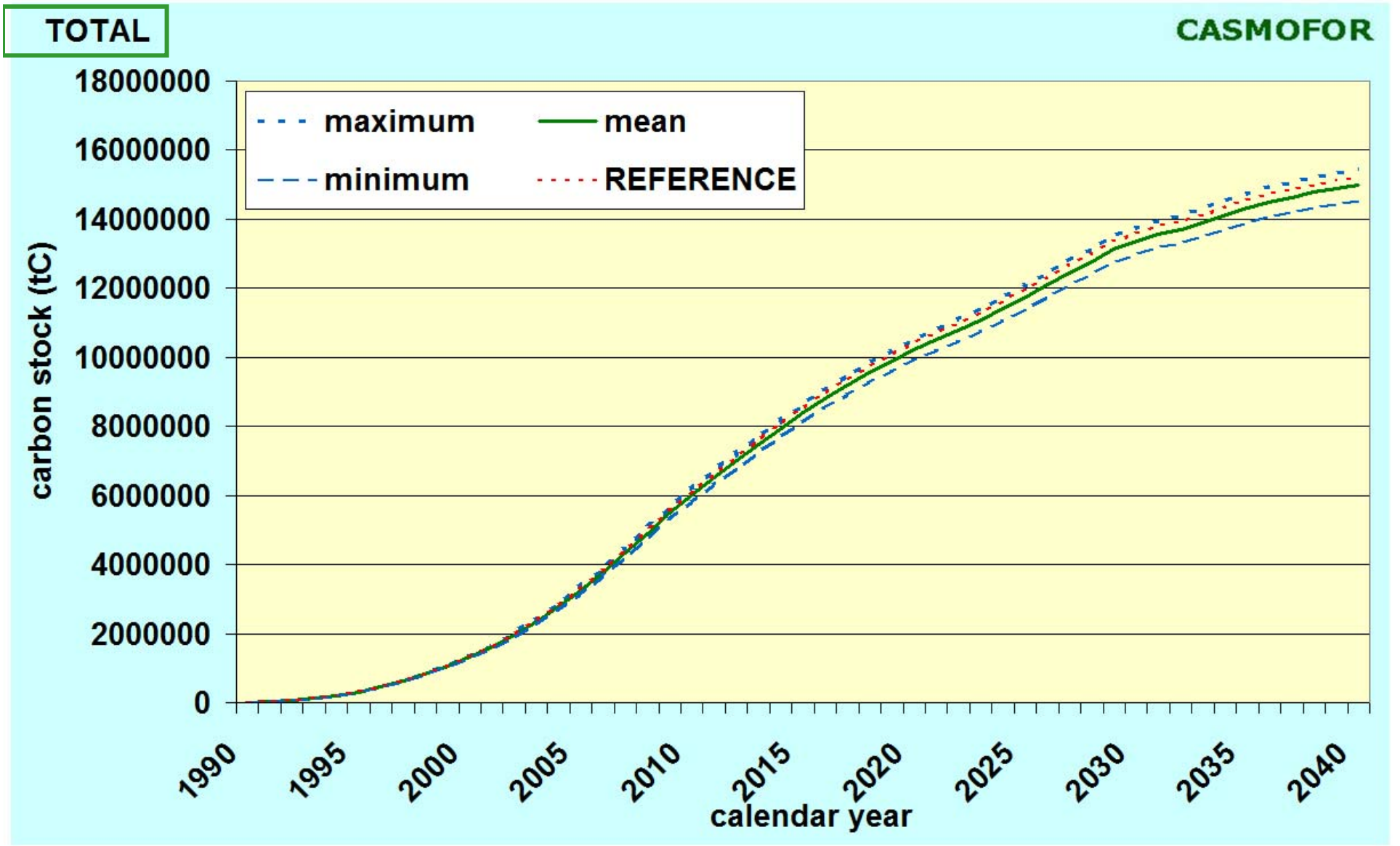


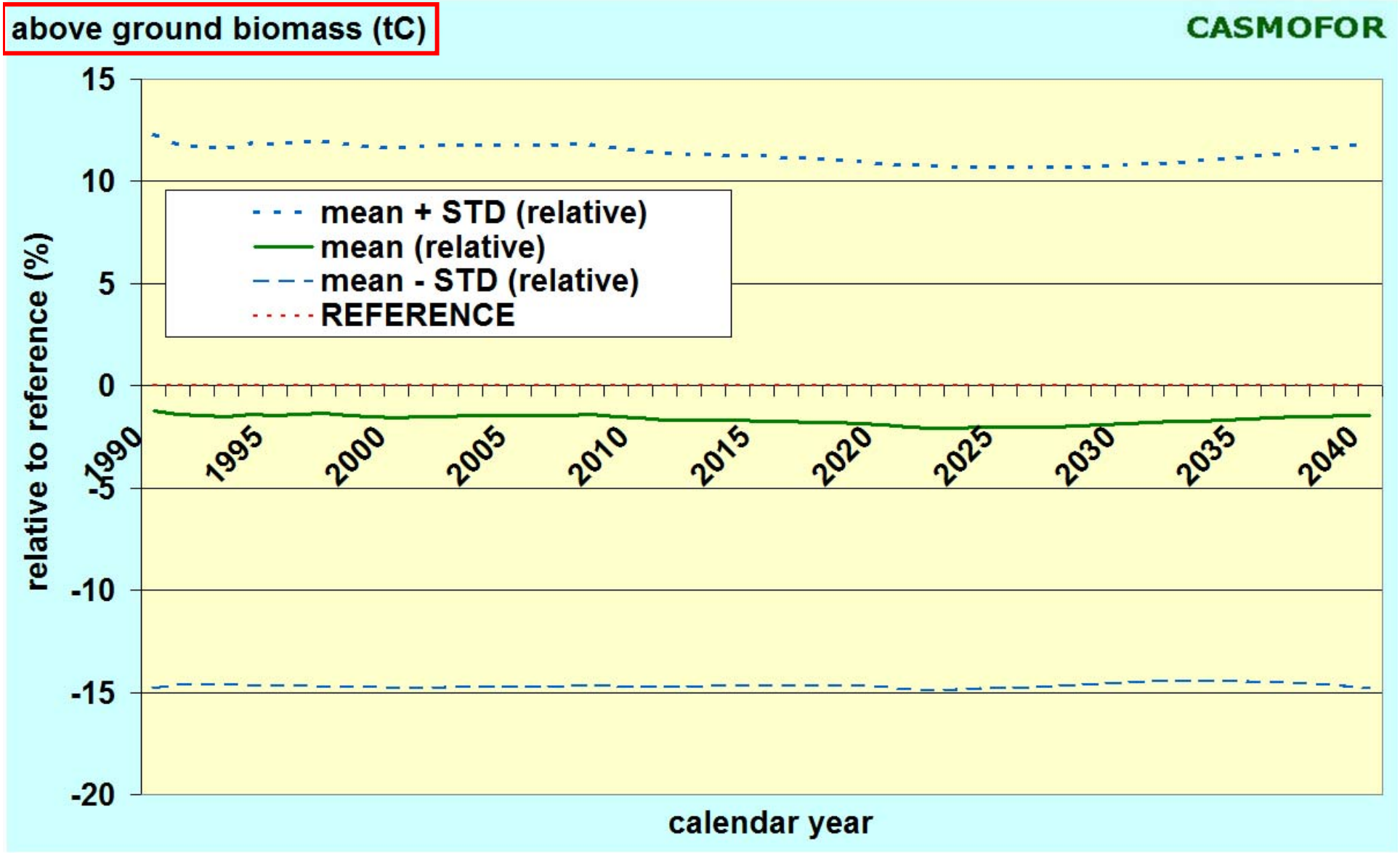
Simulated AR + absolute CI



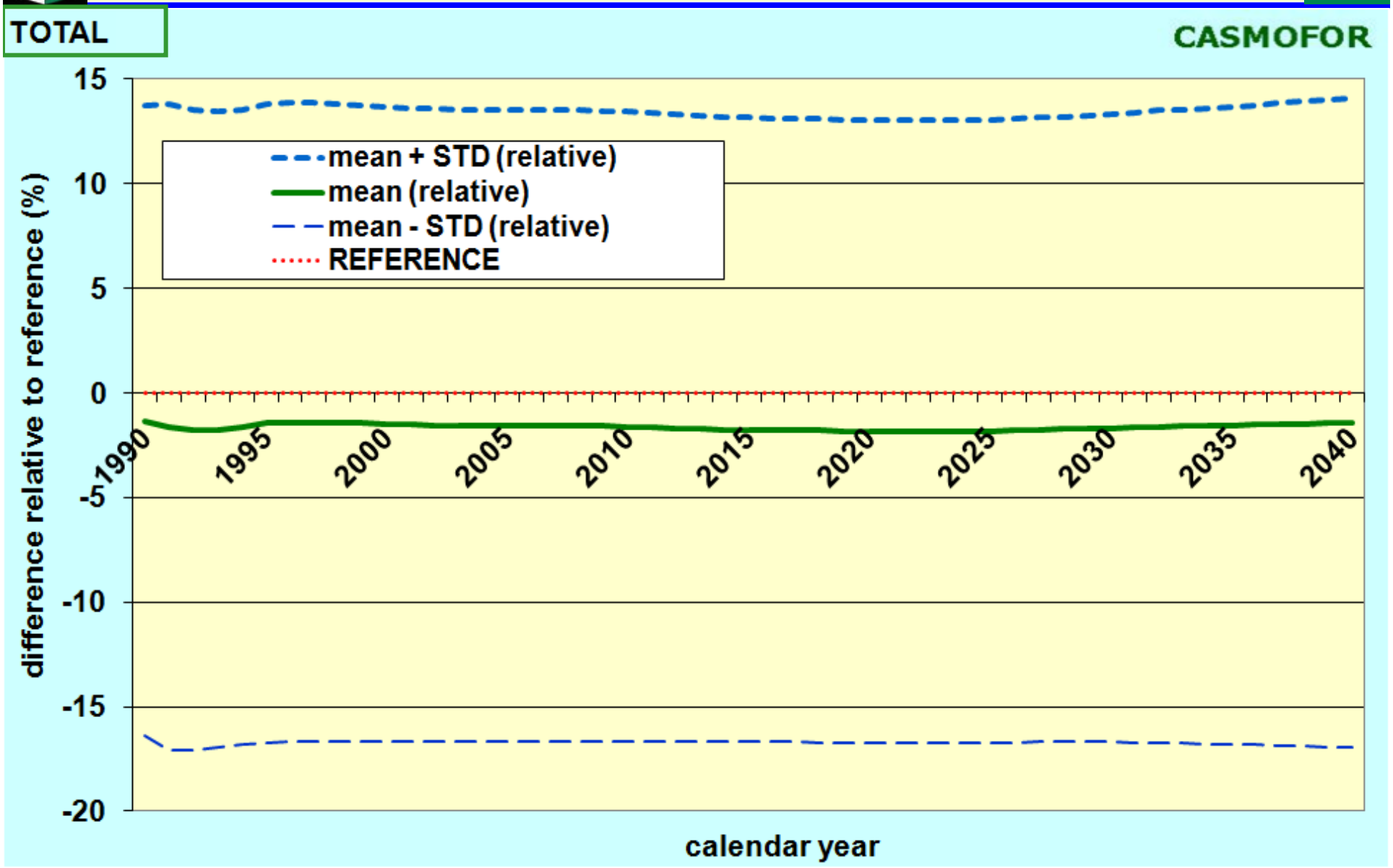
Simulated AR + absolute CI



Simulated AR + relative STD



Simulated AR + relative STD



Concerned with accuracy? Try the Monte-Carlo module

Variable	STD relative to the reference C stock change (%) in 2008		
	AB	BB	All carbon pools
CAI	11,8%	11,8%	12,3
Basic wood density	6,1%	6,1%	6,4
Root-to-shoot ratio	-	18,1%	3,6
Combined effect:	***13,5 %***	***25,1%***	***15,3%***

U_{AB} = 2 * STD * t(95%; DF=99) / sqrt(N) = **5.36%**