Using the carbon accounting model CASMOFOR to separate the effect of disturbances („mortality”), age class distribution and site distribution: need and feasibility

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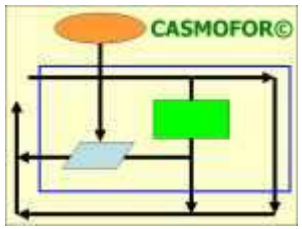
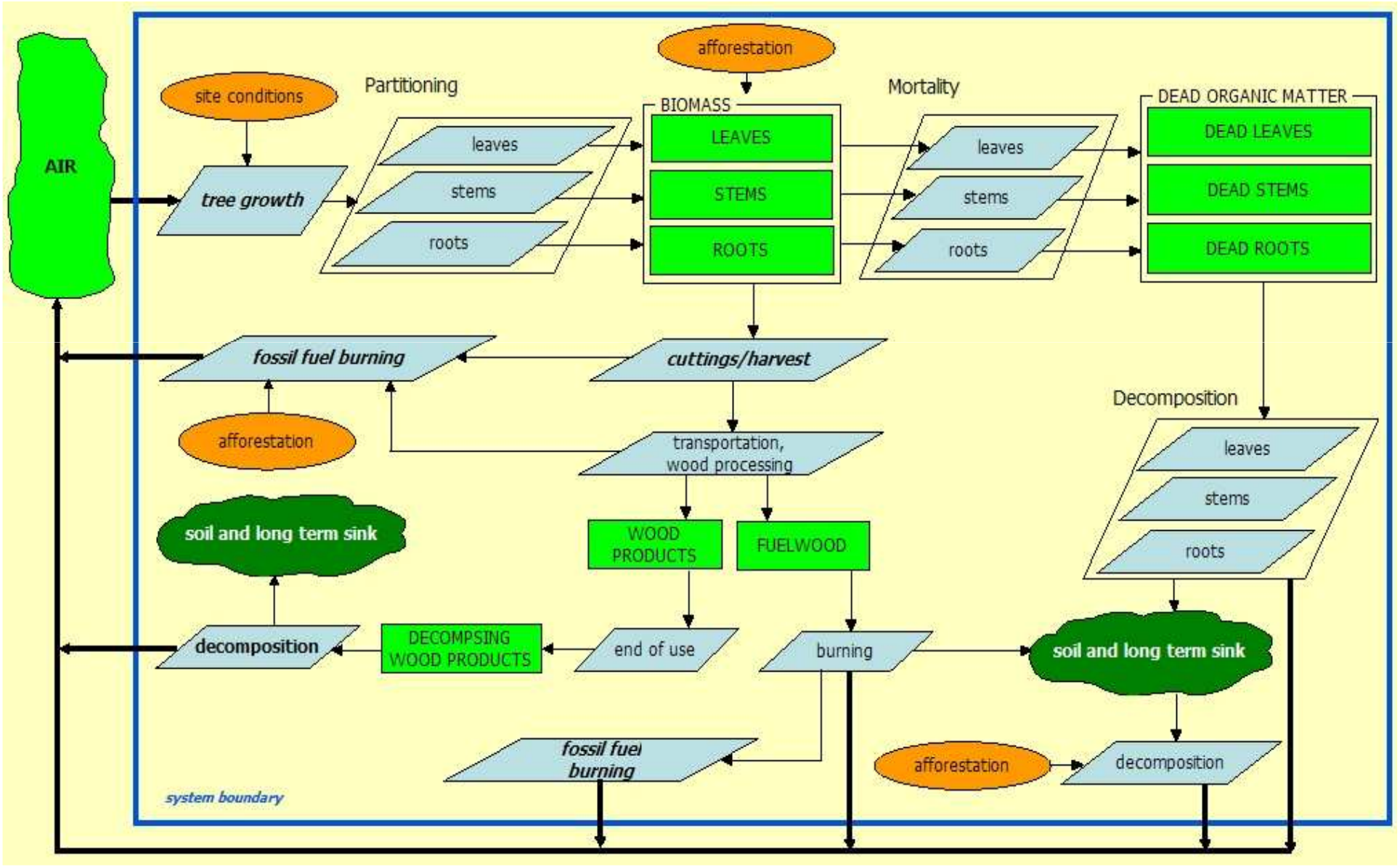


IPCC NGGIP Expert Meeting INPE Saõ José dos Campos, Brazil, 5-7 May 2009
„Revisiting the Managed Land Proxy”

Modeling forest carbon dynamics:

www.scientia.hu/CASMOFOR (v.3.1)



CASMOFOR v.3.1:
a forestry data warehouse for Hungary

- yield tables
- silvicultural models
- economic model of costs and revenues
- 22 factors of carbon dynamics

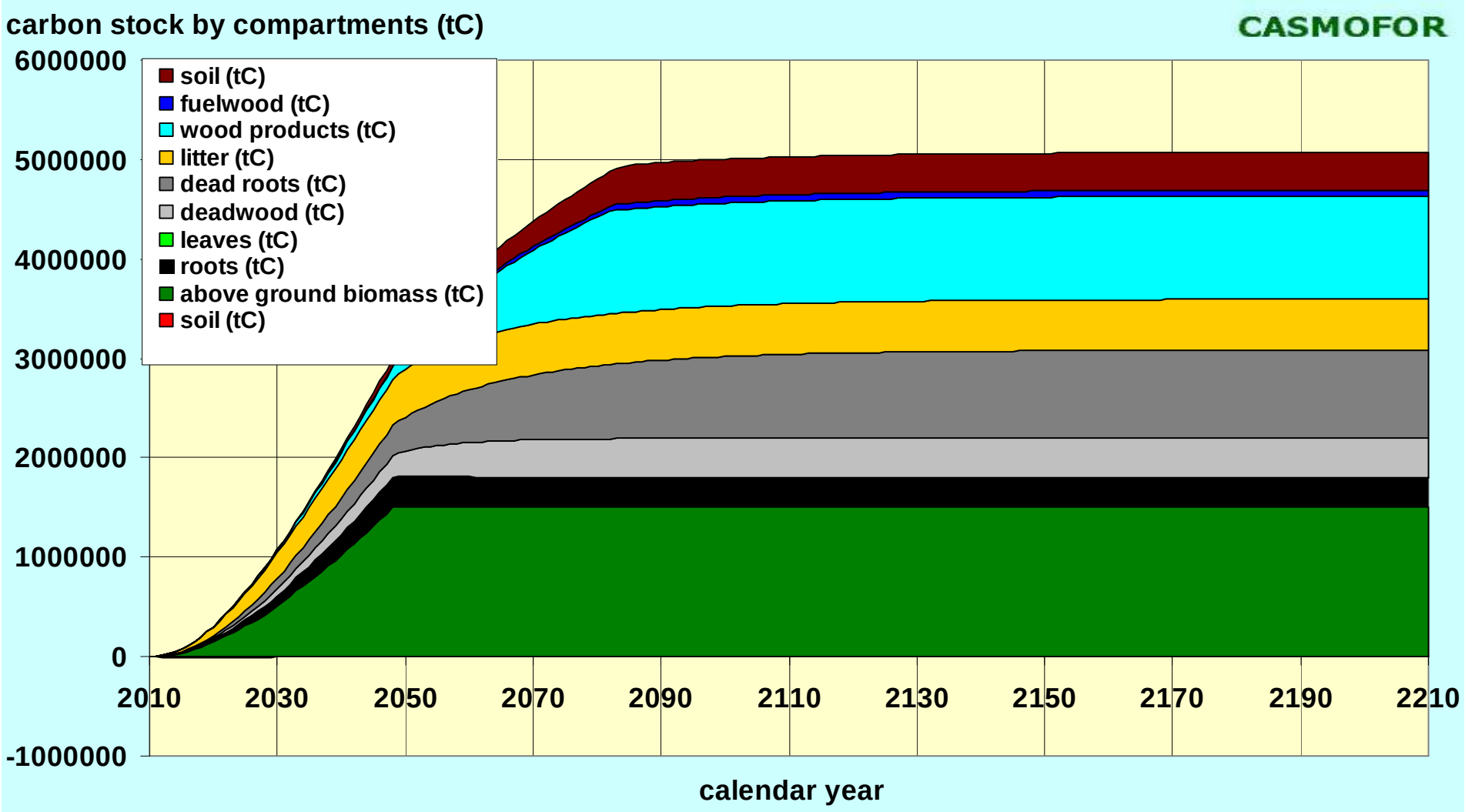
by 18 species/species group, and often by yield group

0. Setting up a reference scenario

What you need:

- A forest in „balance”:
  - One species
  - Balanced age class distribution
  - Invariant site distribution
  - Normal silvicultural regime
  - No disturbances

Carbon stock by pool: *no* disturbance



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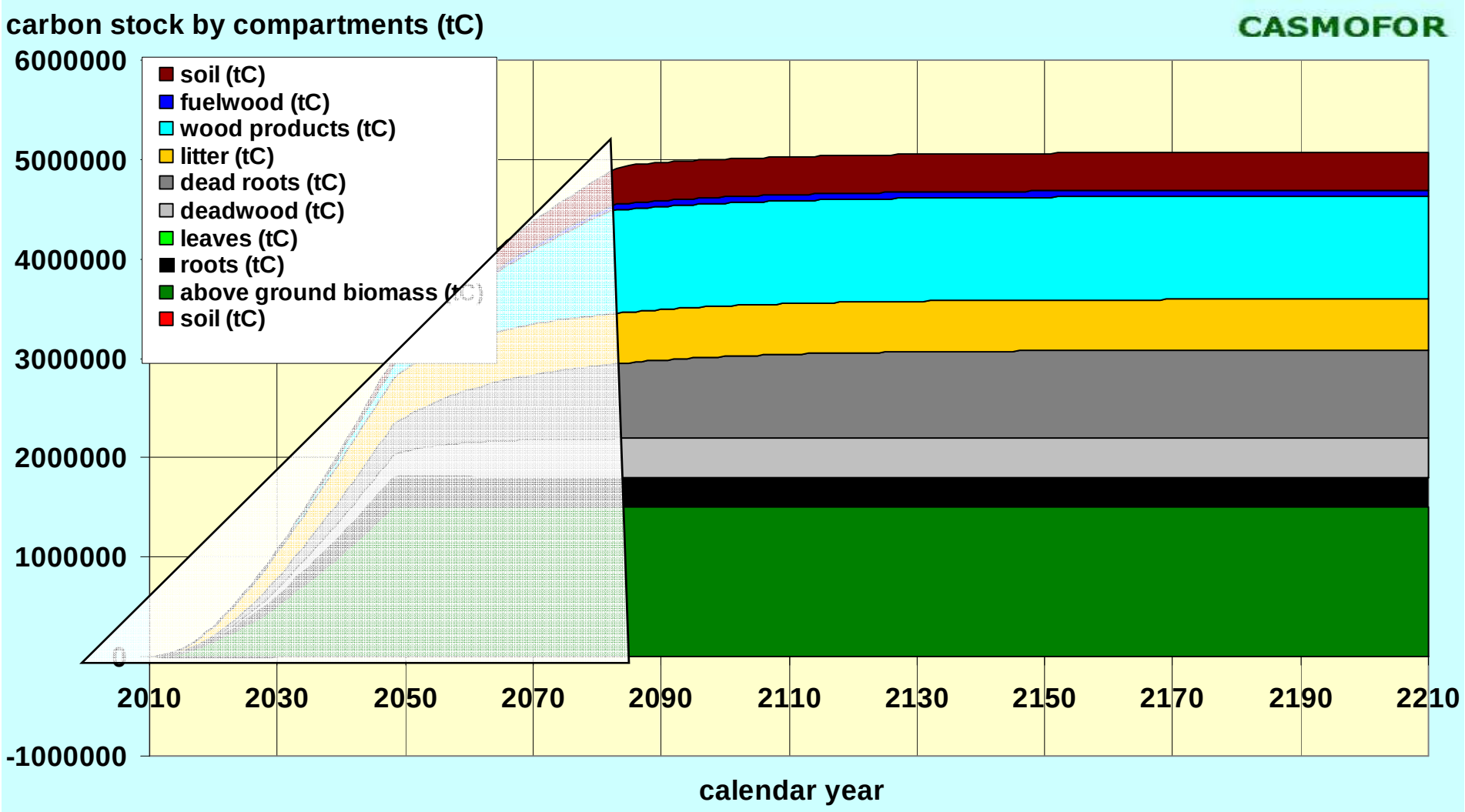
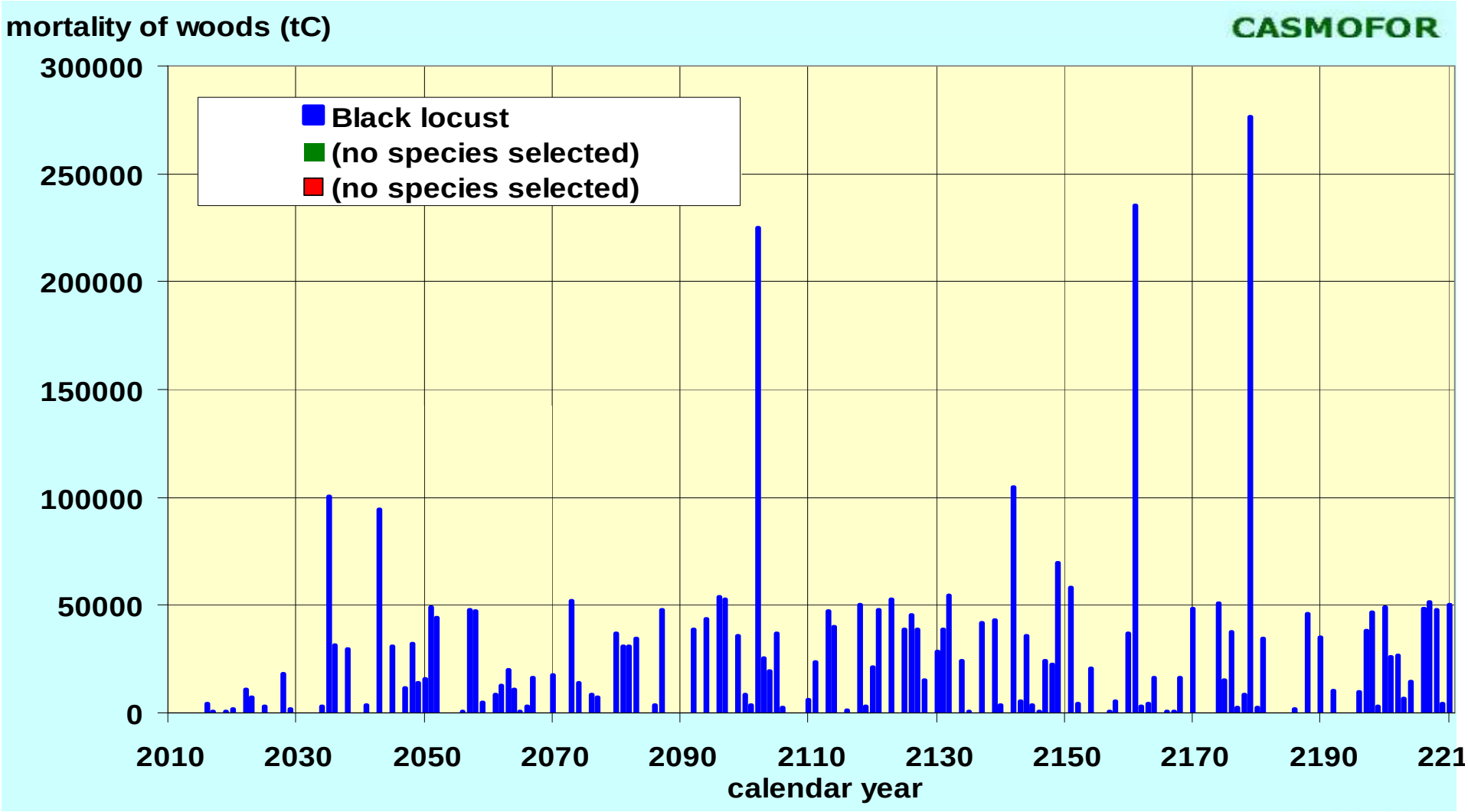


I. The effects of mortality on the biomass and other C pools

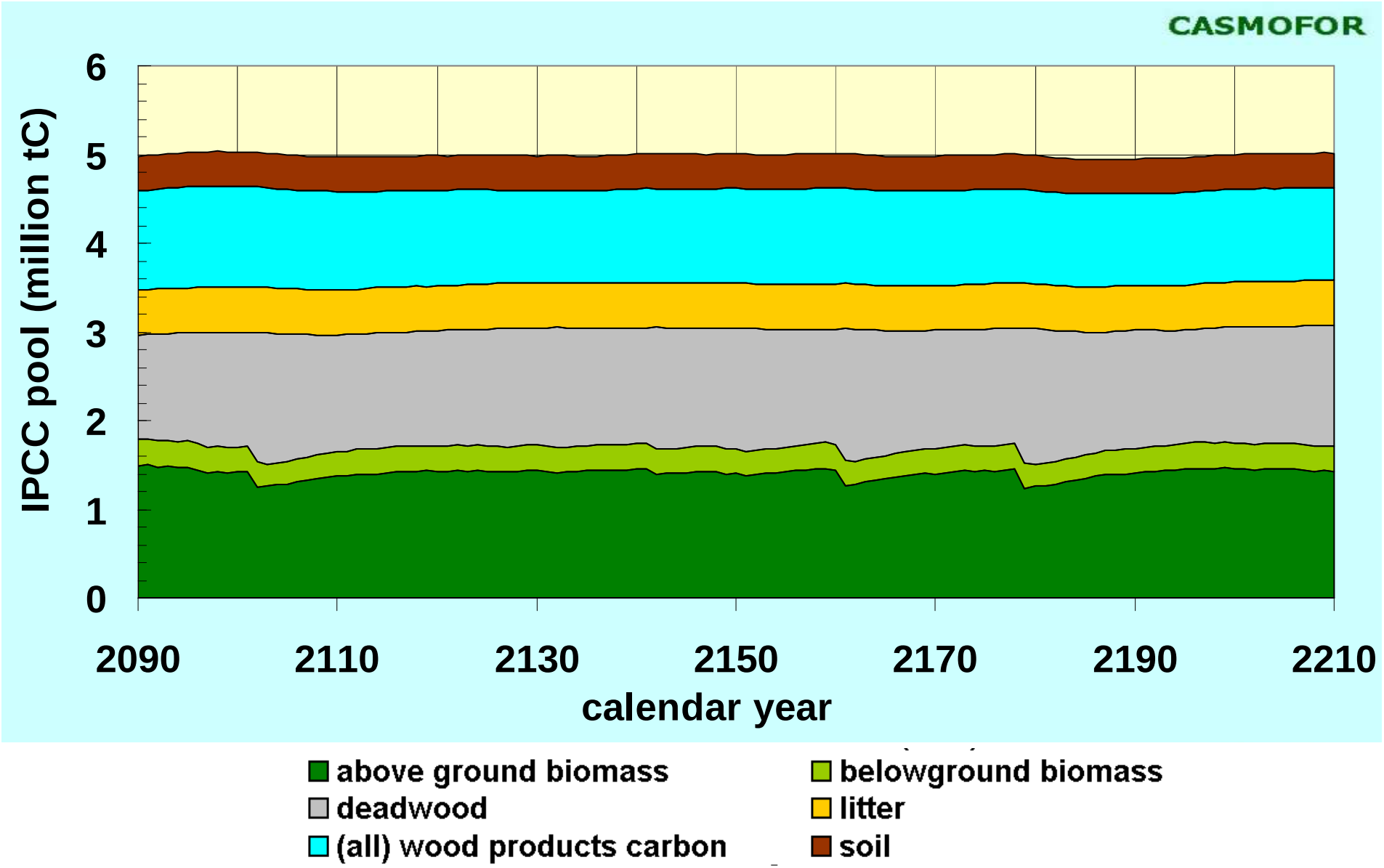
What you need for assessment:

- **Mortality rate over time by volume**
- **For non-biomass pools, conversion of volume to these pools, or stock changes *due to mortality***

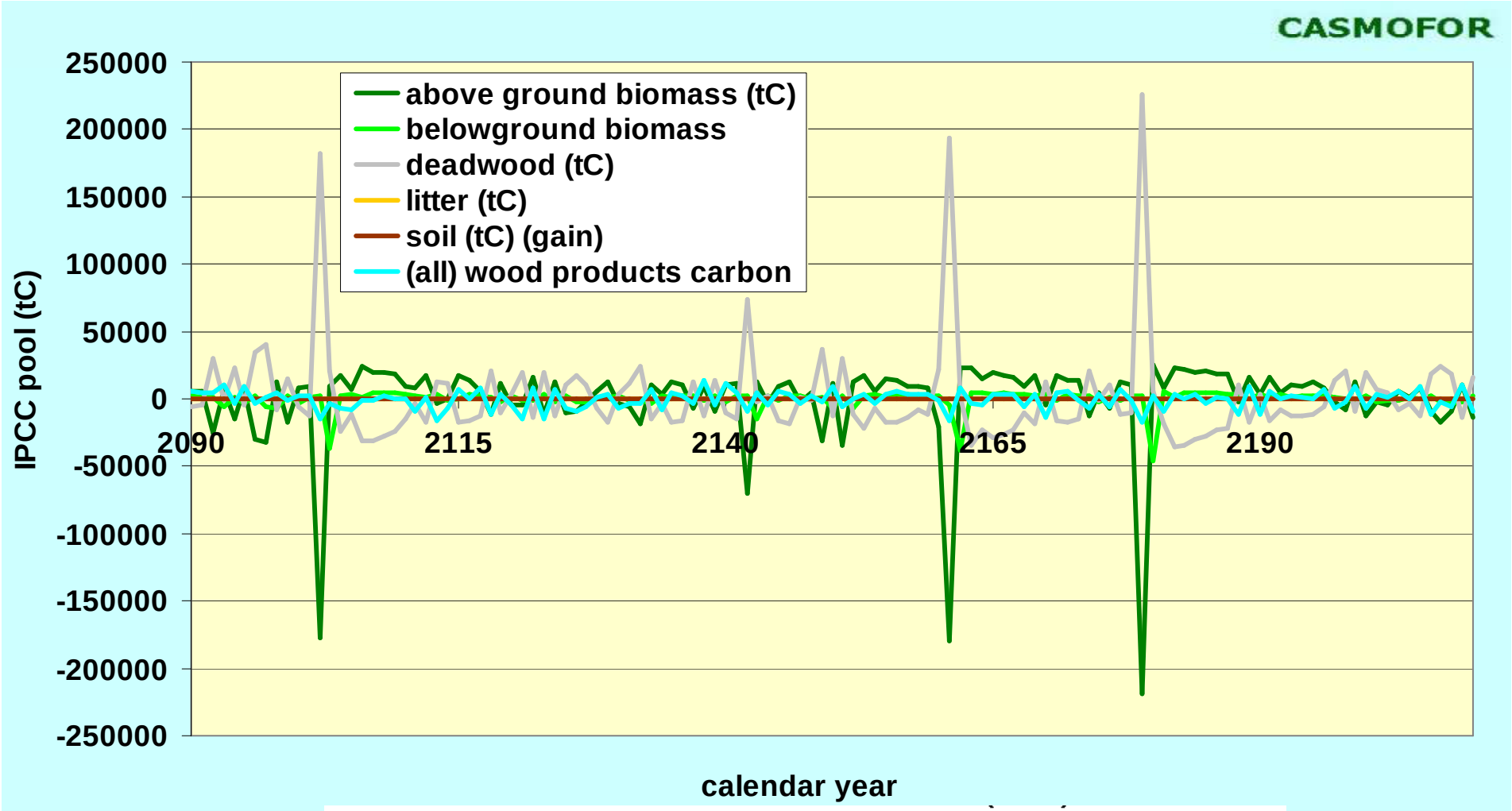
Assuming randomly generated disturbances



Carbon stock by pool: *with* disturbance



Annual carbon stock changes in Kyoto pools



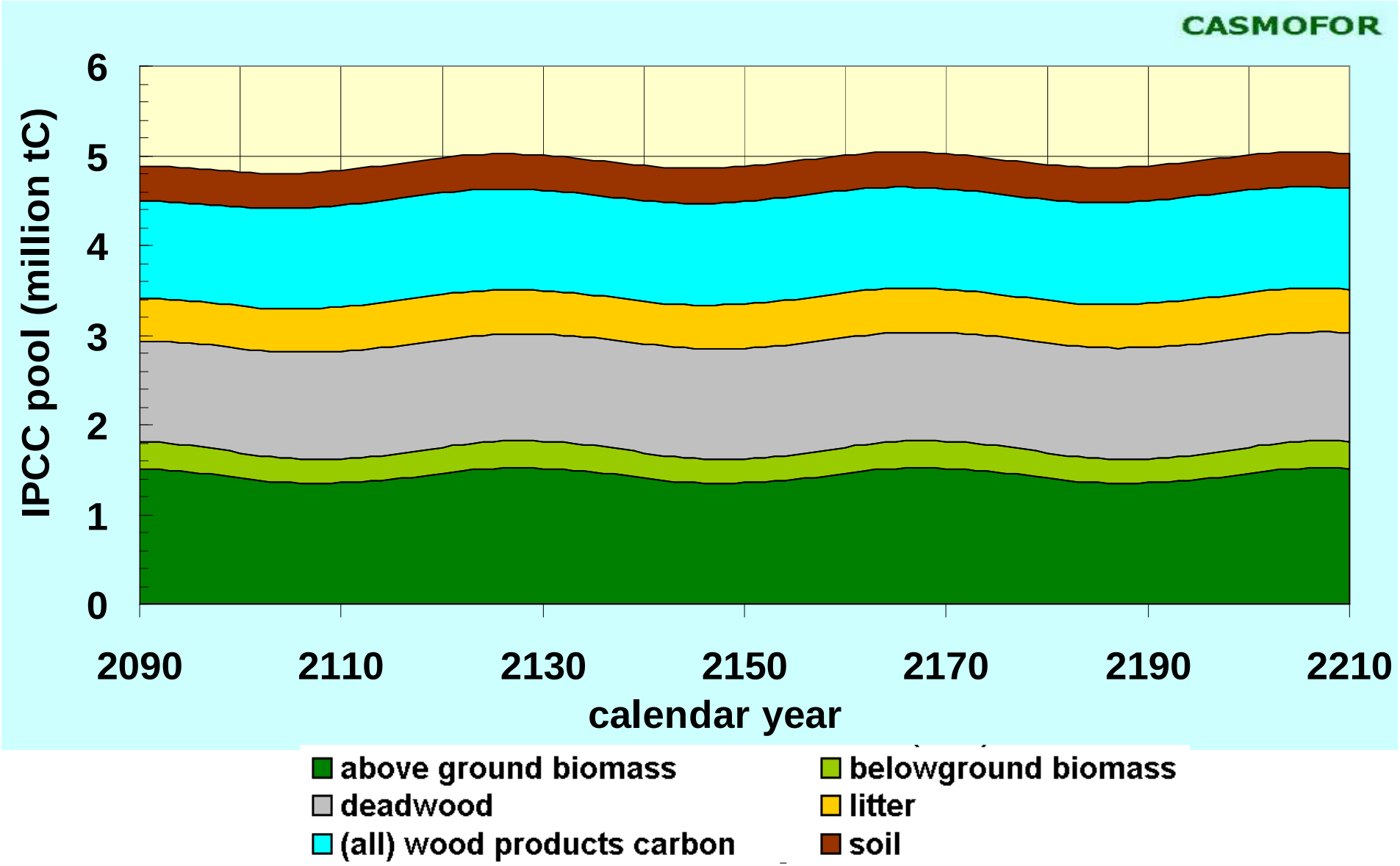
II. The effects of age class distribution on the biomass pool

What you need:

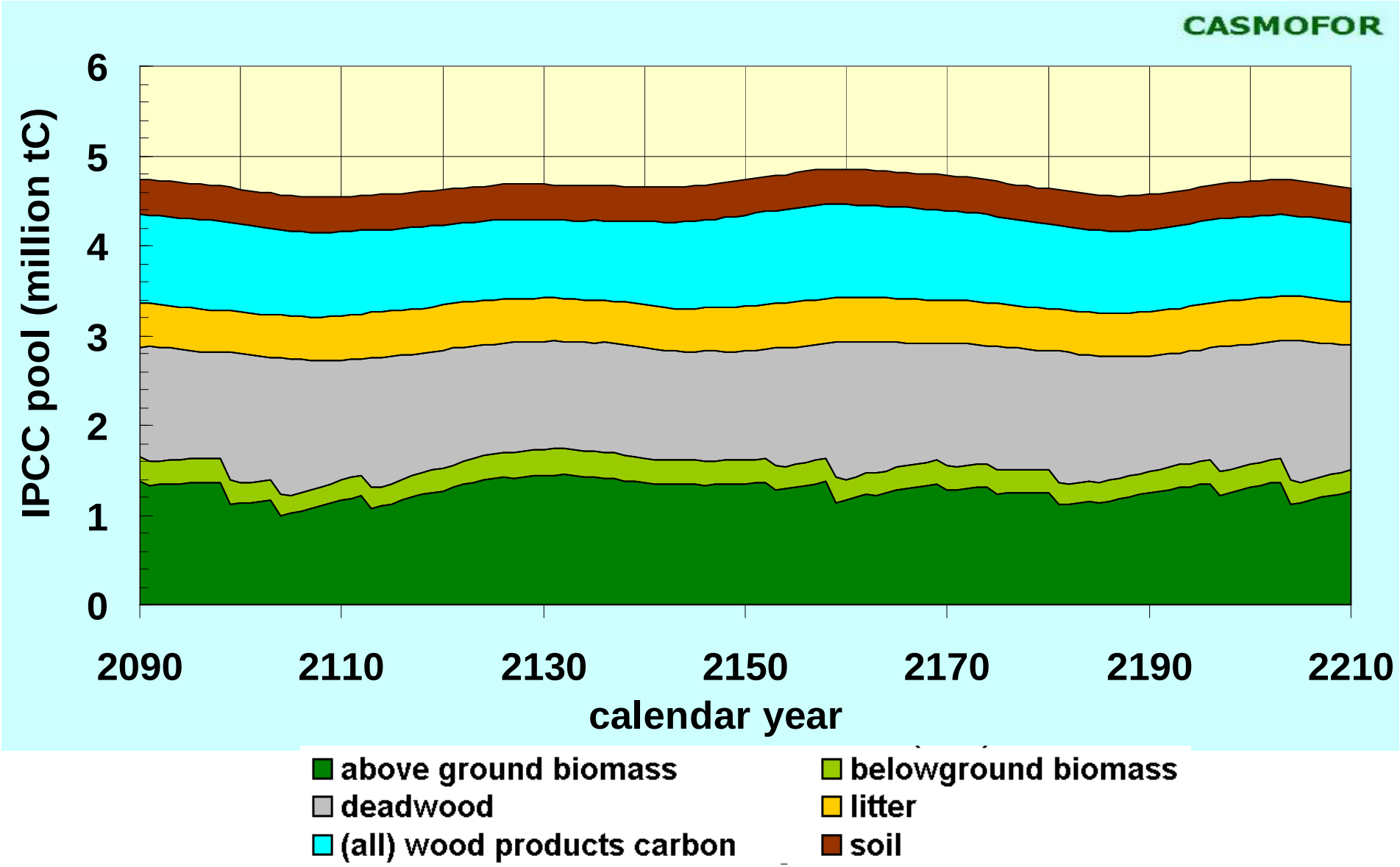
- Age class distribution by area
- Growth models, removals and other emissions by age class
- Or: stock changes by age class

Imbalanced age-class distribution type I

Imbalanced age-class distribution, *no* disturbances



Imbalanced age-class distribution with disturbances



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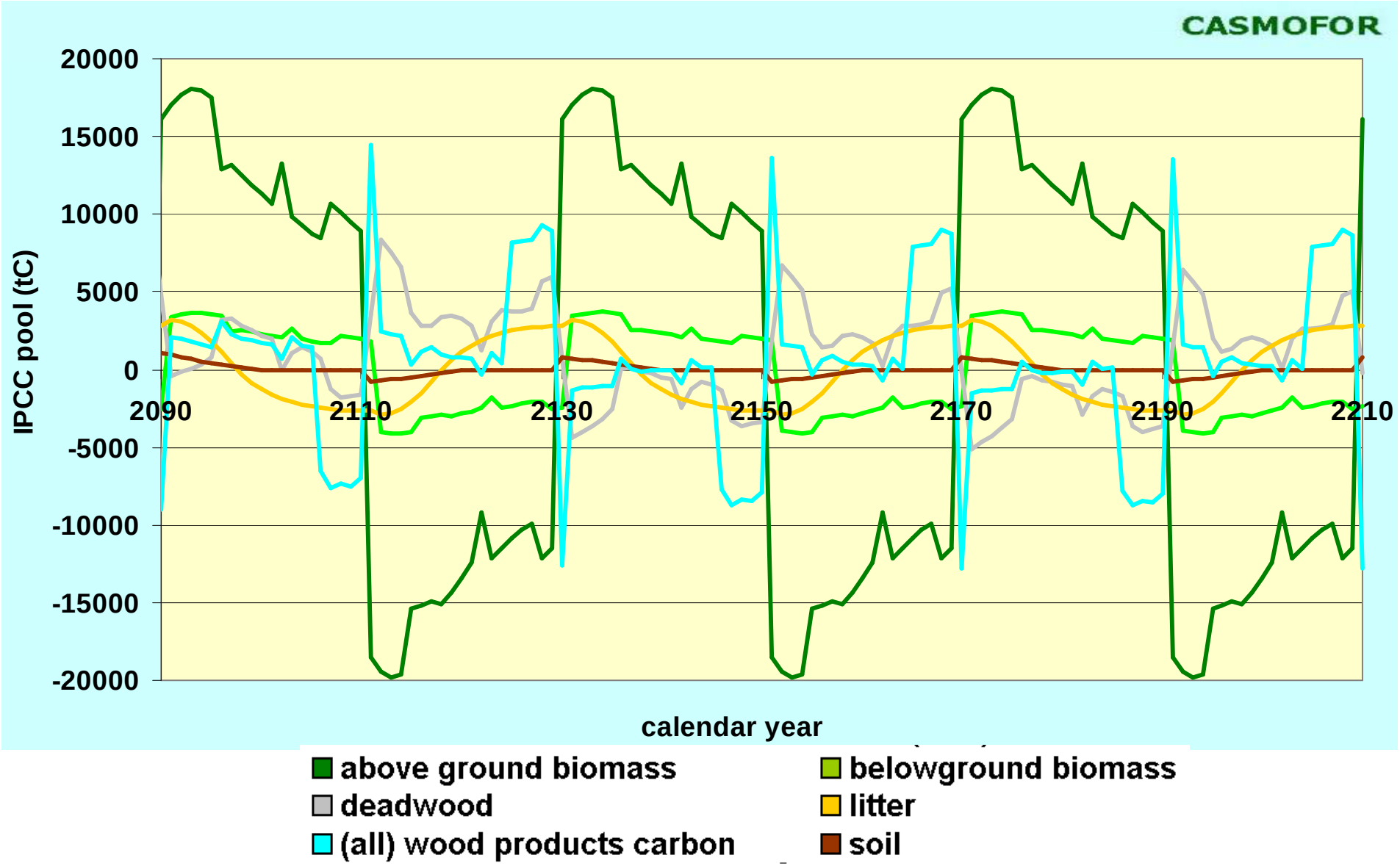
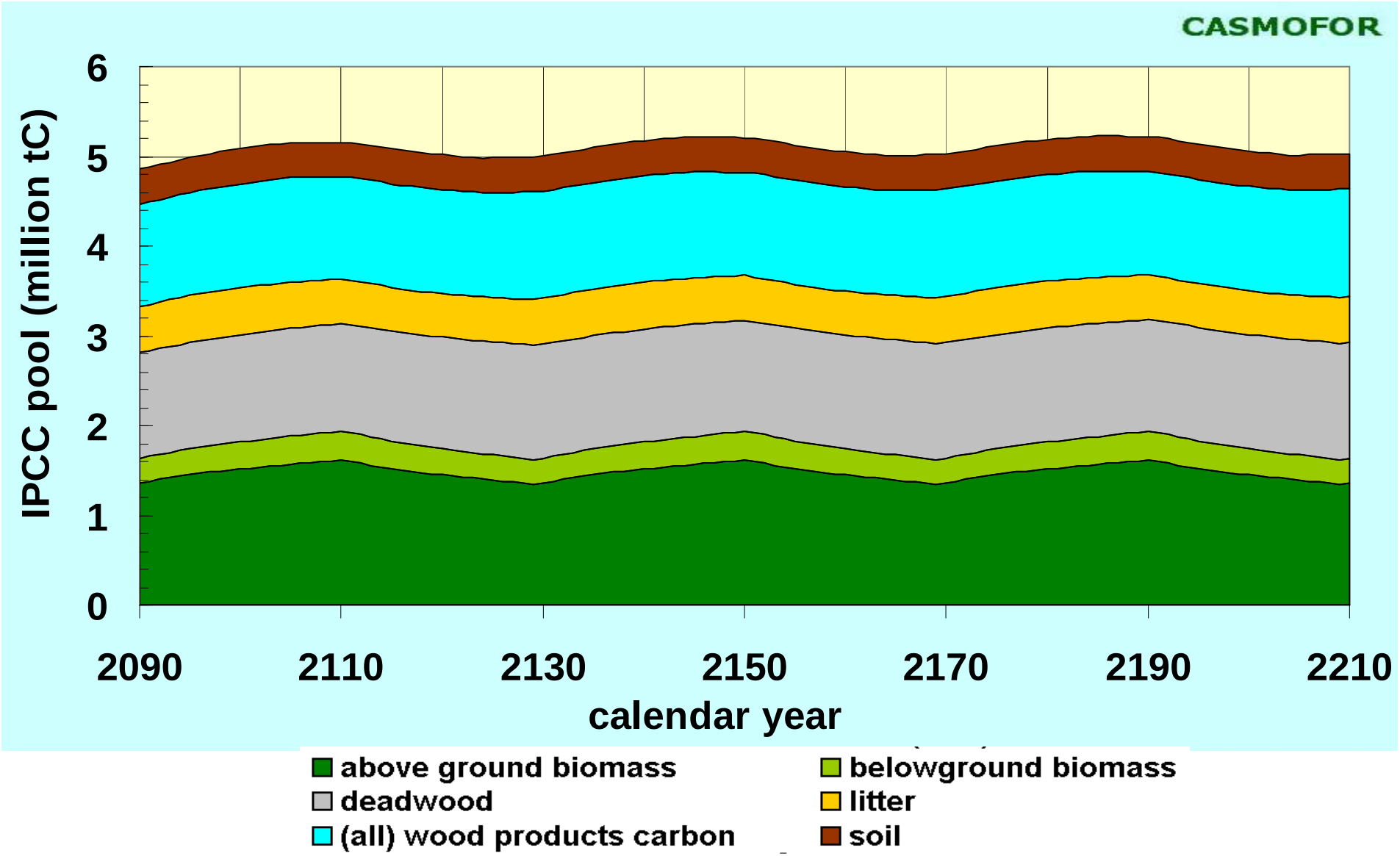
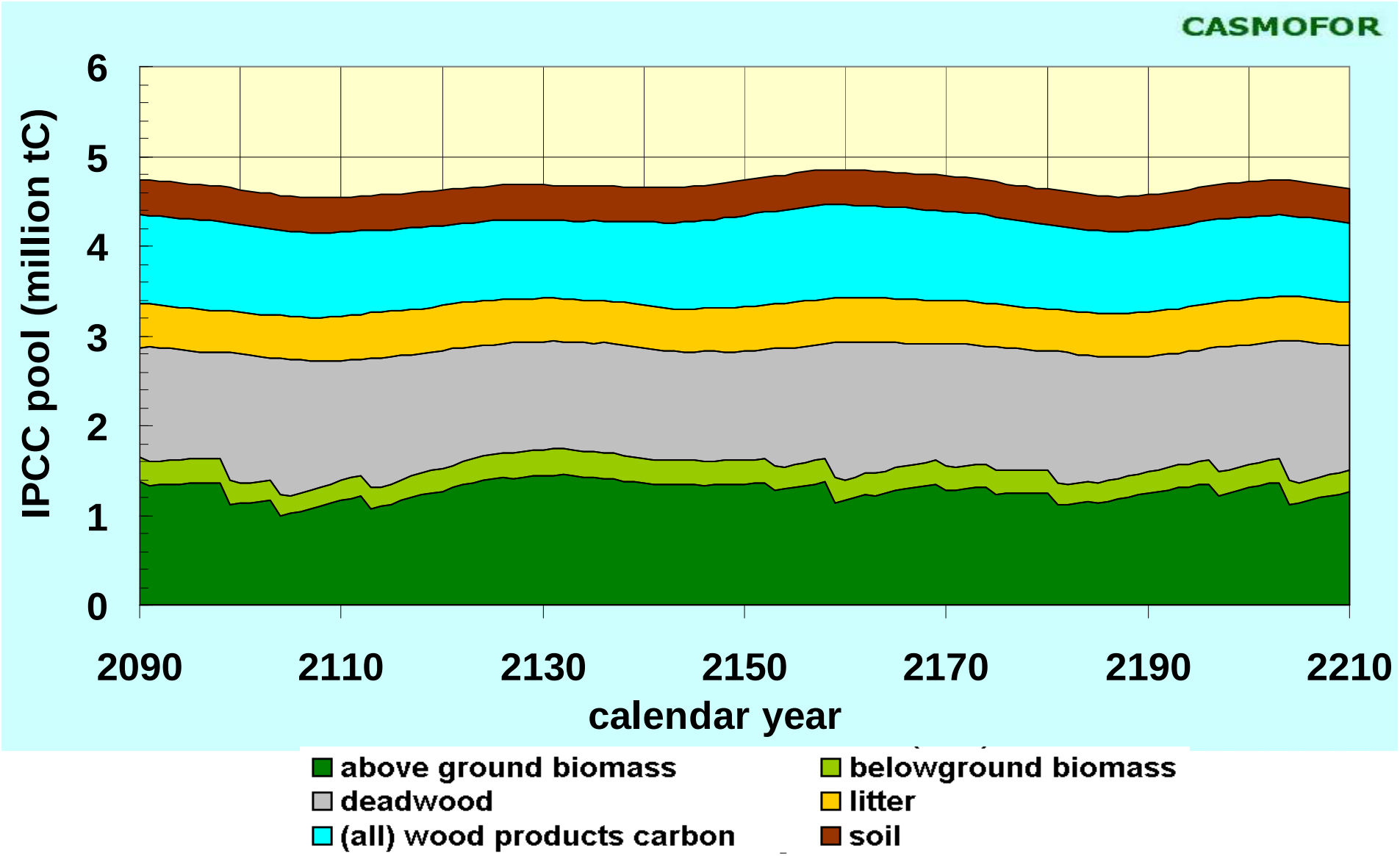


Imbalanced age-class distribution type II

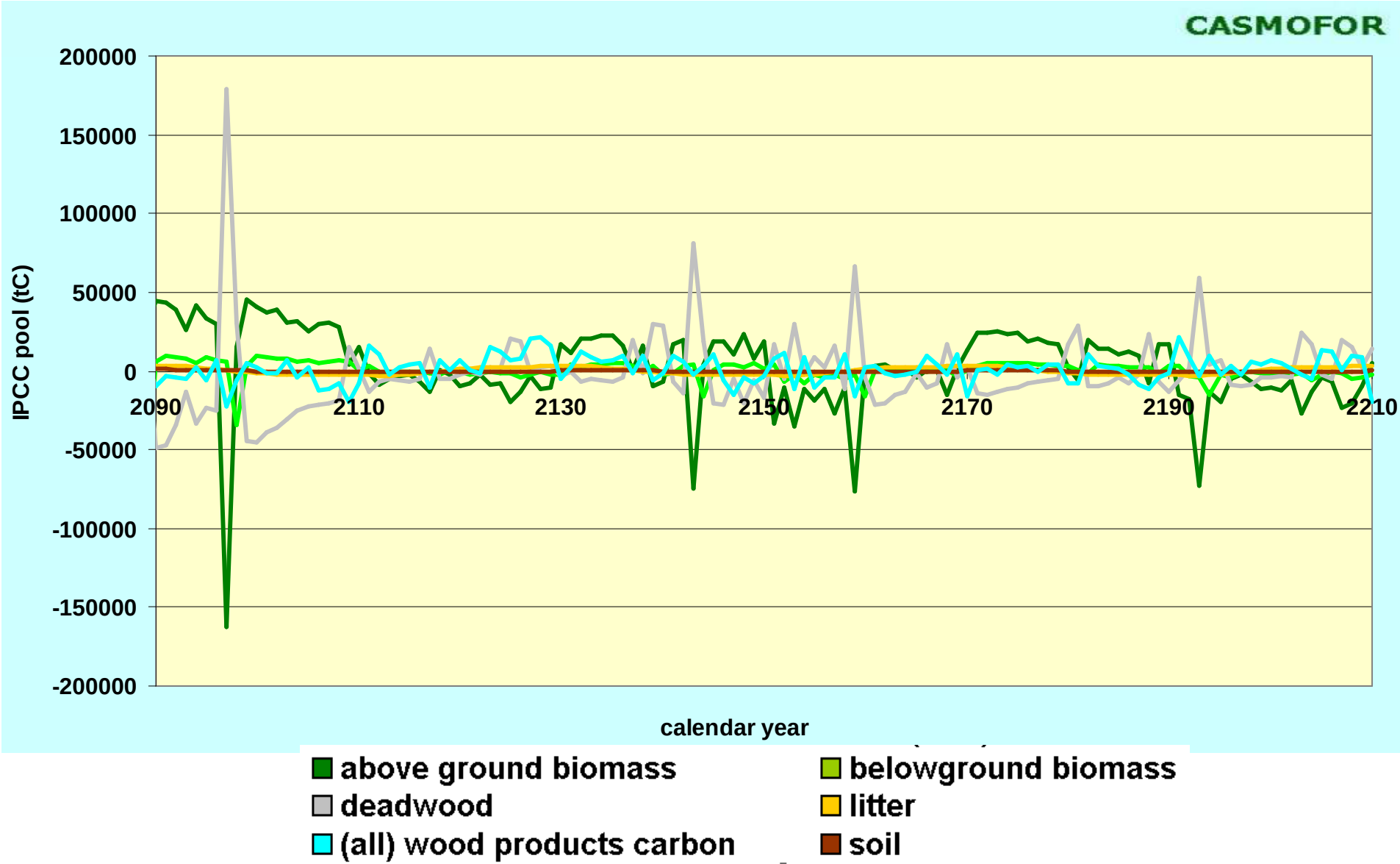
Imbalanced age-class distribution, *no* disturbances



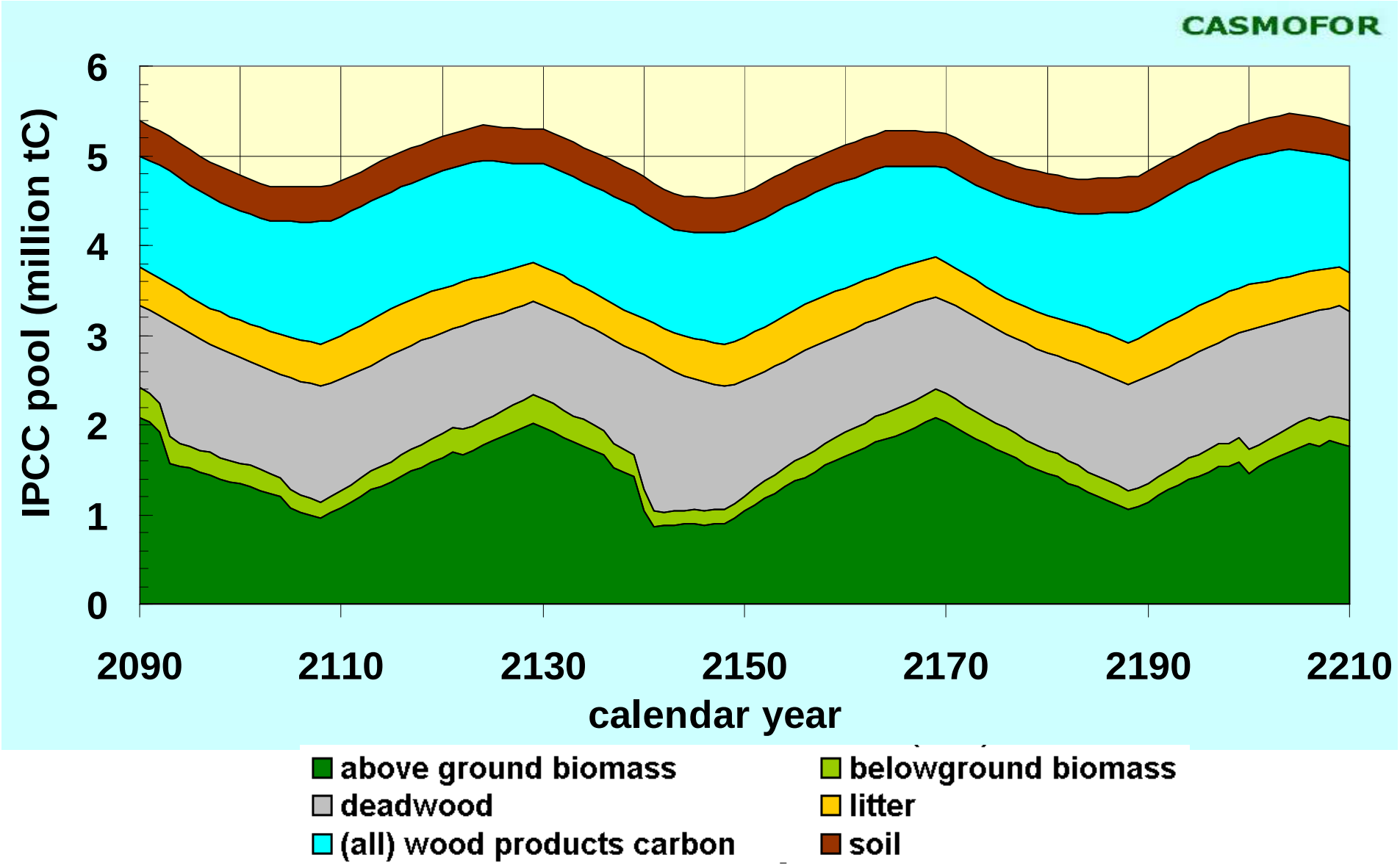
Imbalanced age-class distribution *with* disturbances



Annual carbon stock changes in Kyoto pools



Extremely imbalanced age-class and *site distribution (yield class I vs. VI)* *with* disturbances



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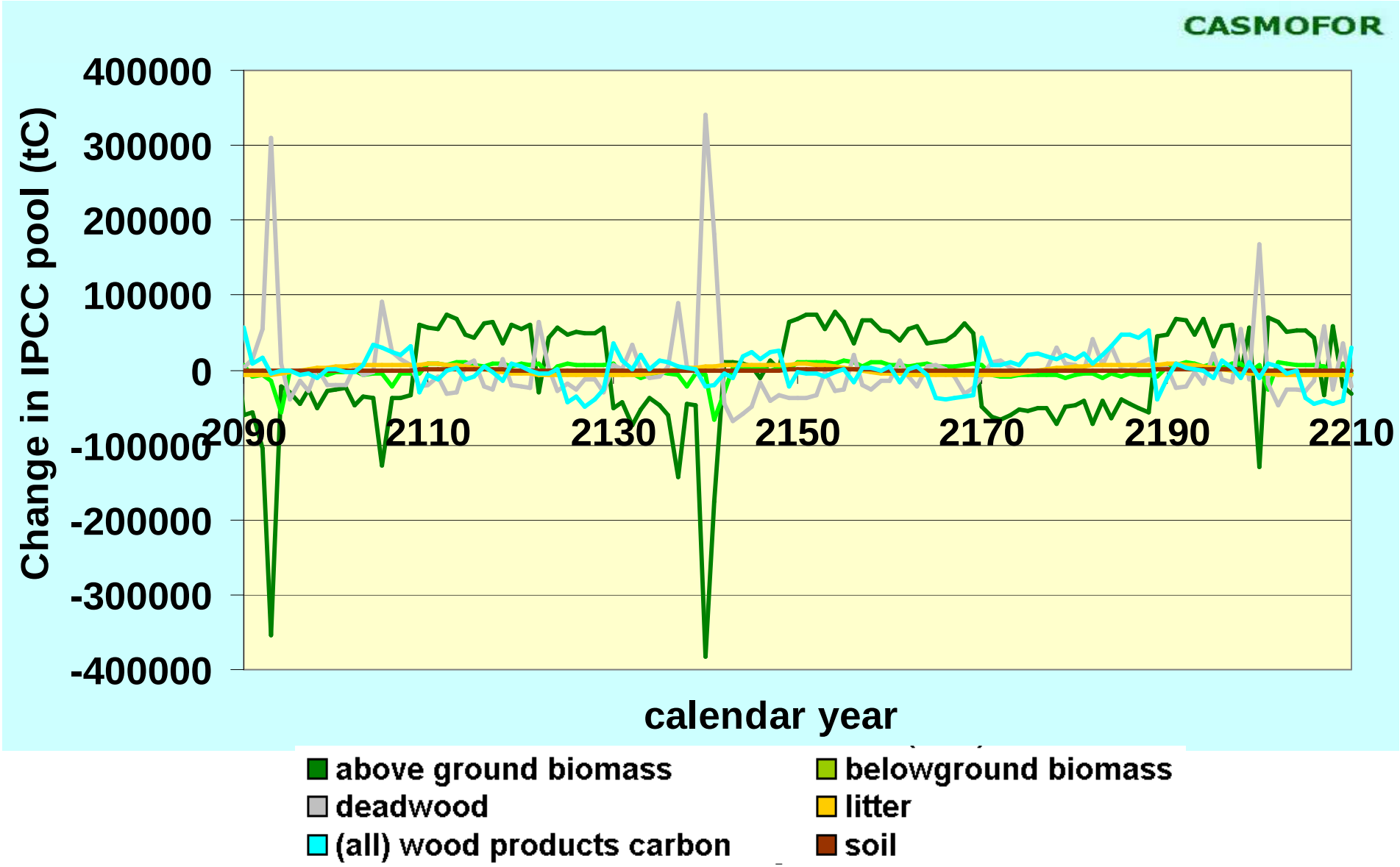

Some conclusions

- Both age class distribution, as well as disturbances can lead to high variation of carbon stocks
- Site and species distribution may also matter a lot
- Simultaneous assessment of the above factors is necessary to separate combined effects
- However, such an analysis may require lots of data!
- Modelling could be useful to separate effects

Definition of „anthropogenic" is needed

Process/effect		Natural Indirect H. I. Direct H. I.	Managed	Unmanaged
Tree growth (climate dependent)		N / I	Yes	Yes
Natural disturbance		N / I	Yes	Yes
Planting/regeneration		D	Yes	No
Harvesting	Removals	D	Yes	No
	Transfer from pool to pool	D / N	Yes	No
Age class distribution		I	Yes	Yes
Weather (bringing about interannual variability		N (I)	Yes	Yes
Suppressing natural disturbances		D	Yes	No
Current direct effects of past interventions on the same land		D (I)	Yes	No
Current indirect effects of past human interventions elsewhere		I	Yes	Yes
Species distribution, decomposition….				