



Uncertainty and verification of soil organic carbon change estimates

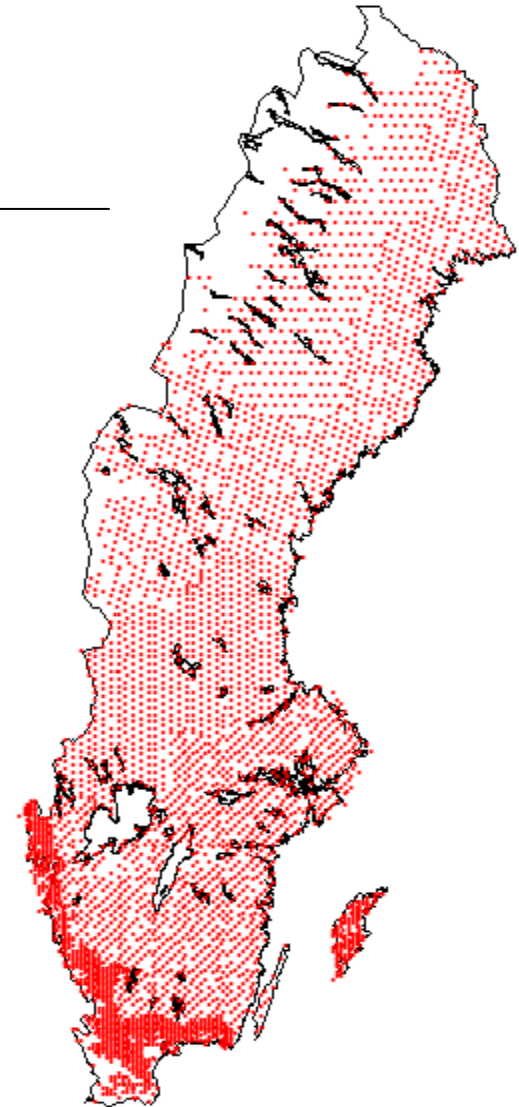
Erik Karlton and Carina Ortiz
Swedish University of Agricultural Sciences

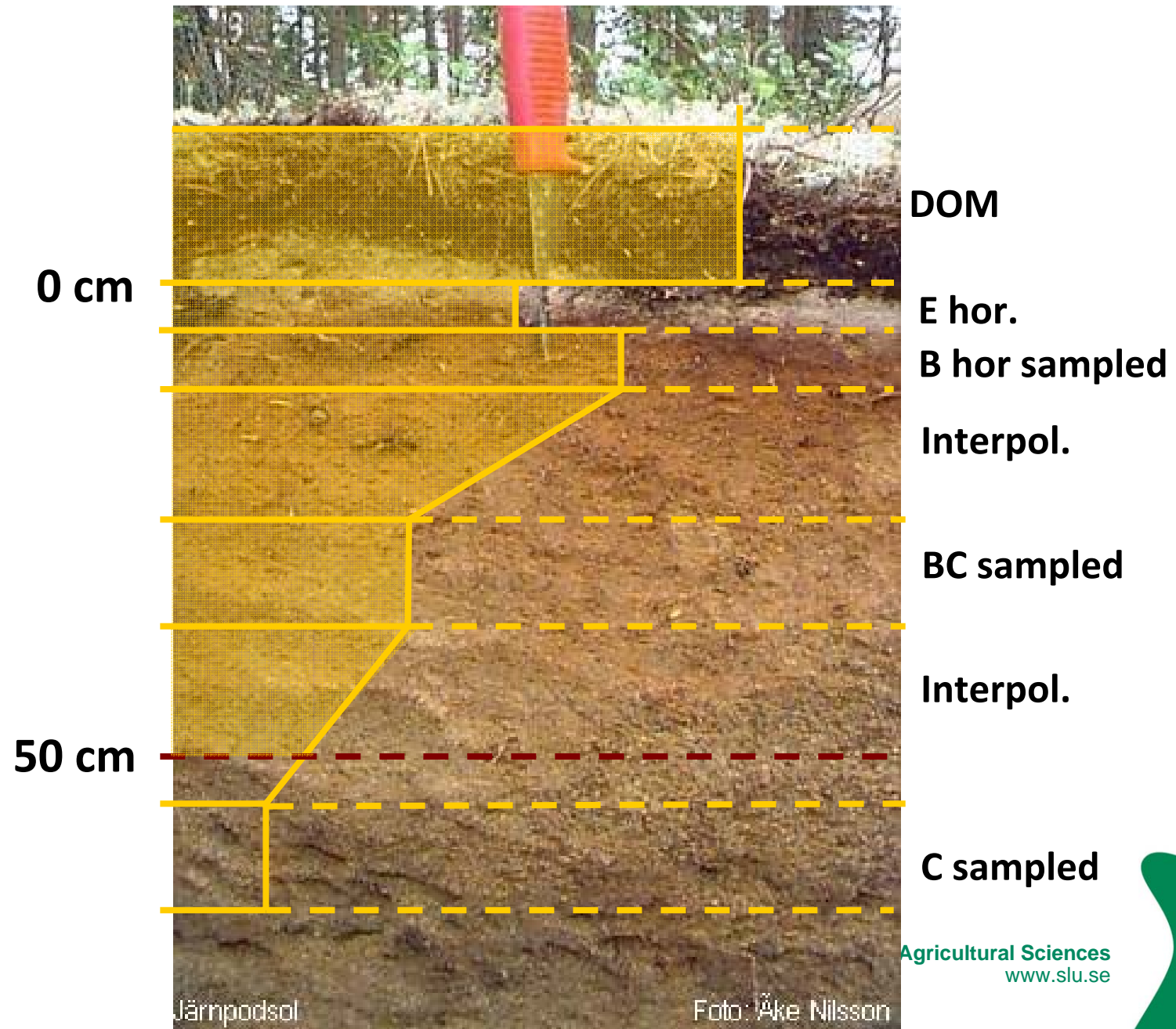
Carbon in Swedish soils

- The carbon stock of Swedish forest soils estimated at 2000 Mton carbon (DOM and SOC)
- An annual change of 1 ‰ equates to 2 Mton C or 7 Mton CO₂, i.e. > 10% of Swedish national GHG emissions
- Soils are both sinks and sources
- Reporting needs monitoring and verification – do we have appropriate tools?

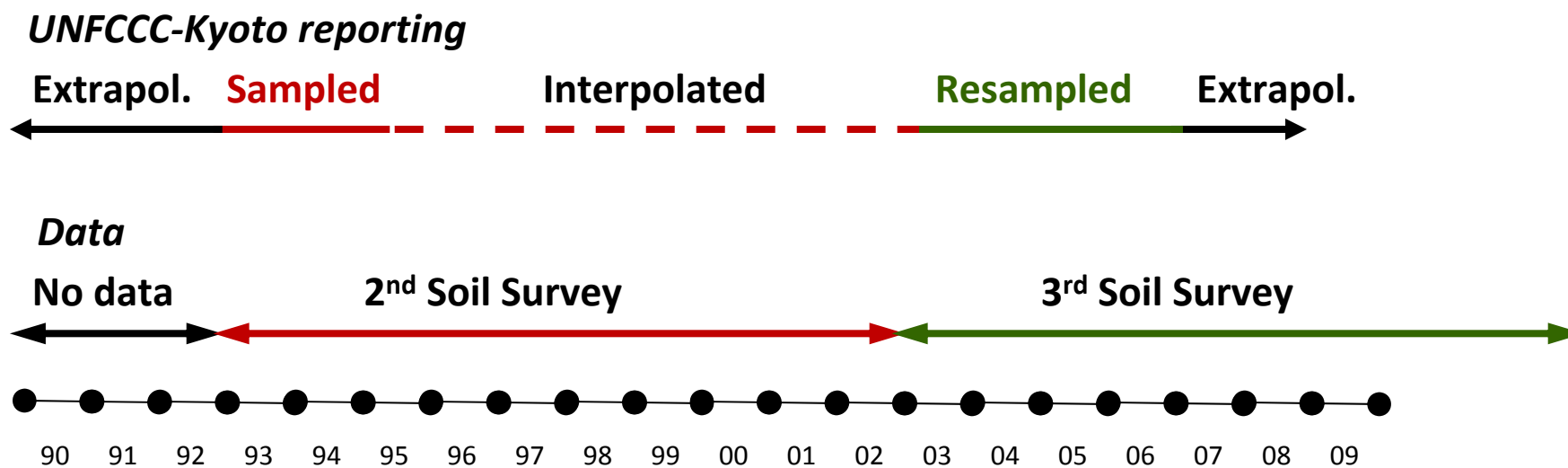
Forest Soil Inventory

- Integrated with the NFI
- Total number of sampled plots c.4500
- DOM and SOC sampled separately
- Soil type according to World Reference Base
- Organic soil=Histosols

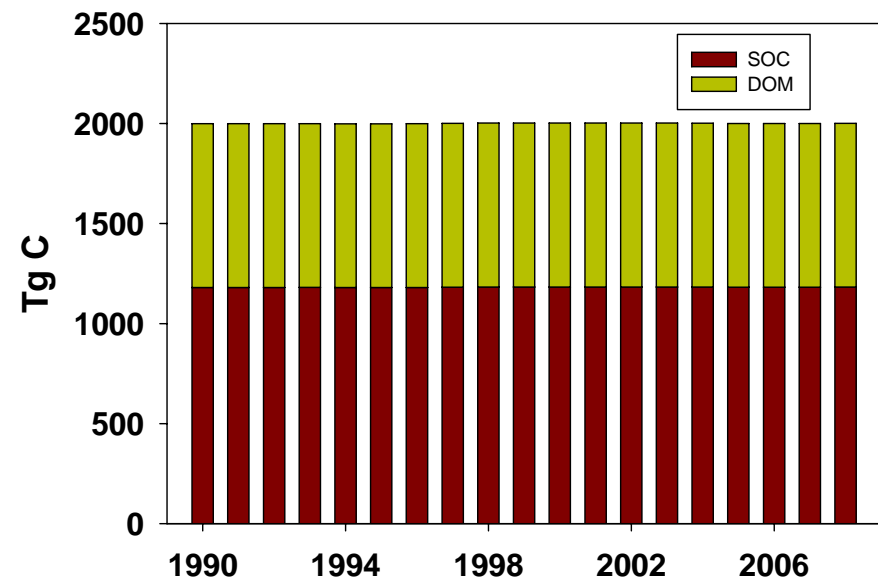
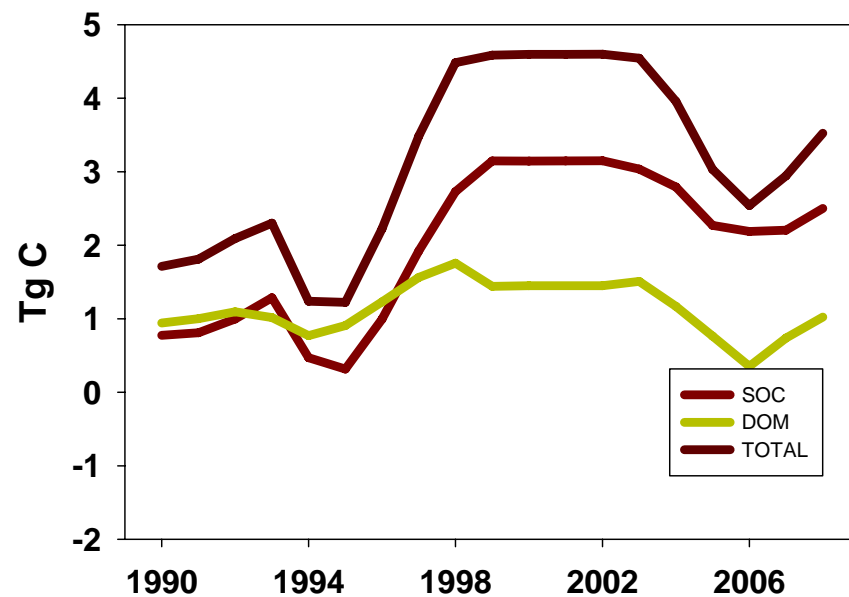




Reporting timeline



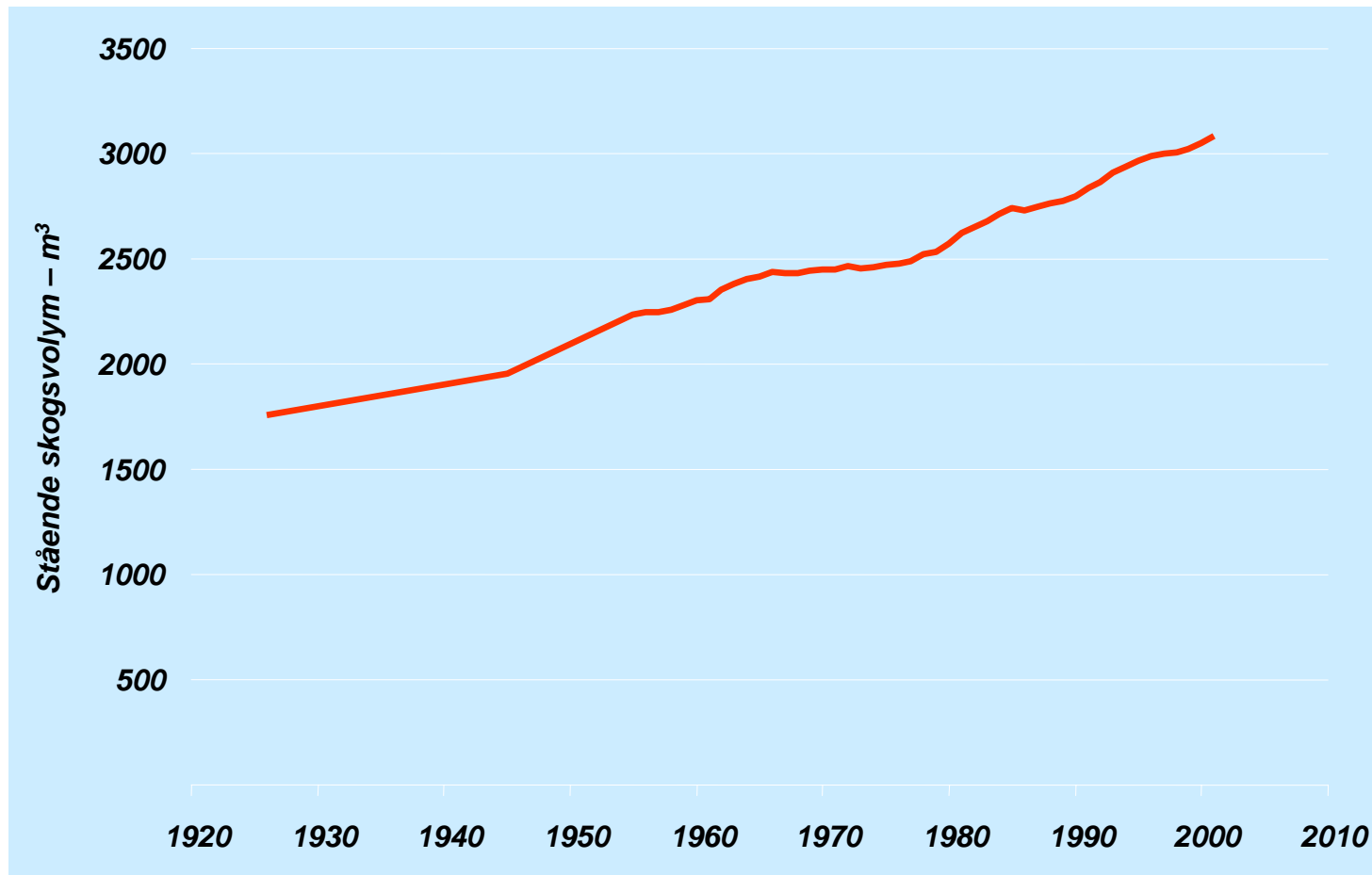
Two views on soil carbon change



Models – an alternative way

- Carbon pools and carbon pool changes was estimated using to conceptually different dynamic carbon models, Q and Yasso07
- Carbon pool development simulated from 1926 using climate and litter input data
- Uncertainty of model output determined by parameter uncertainty analysis and Monte Carlo simulation methodology

Standing forest volume

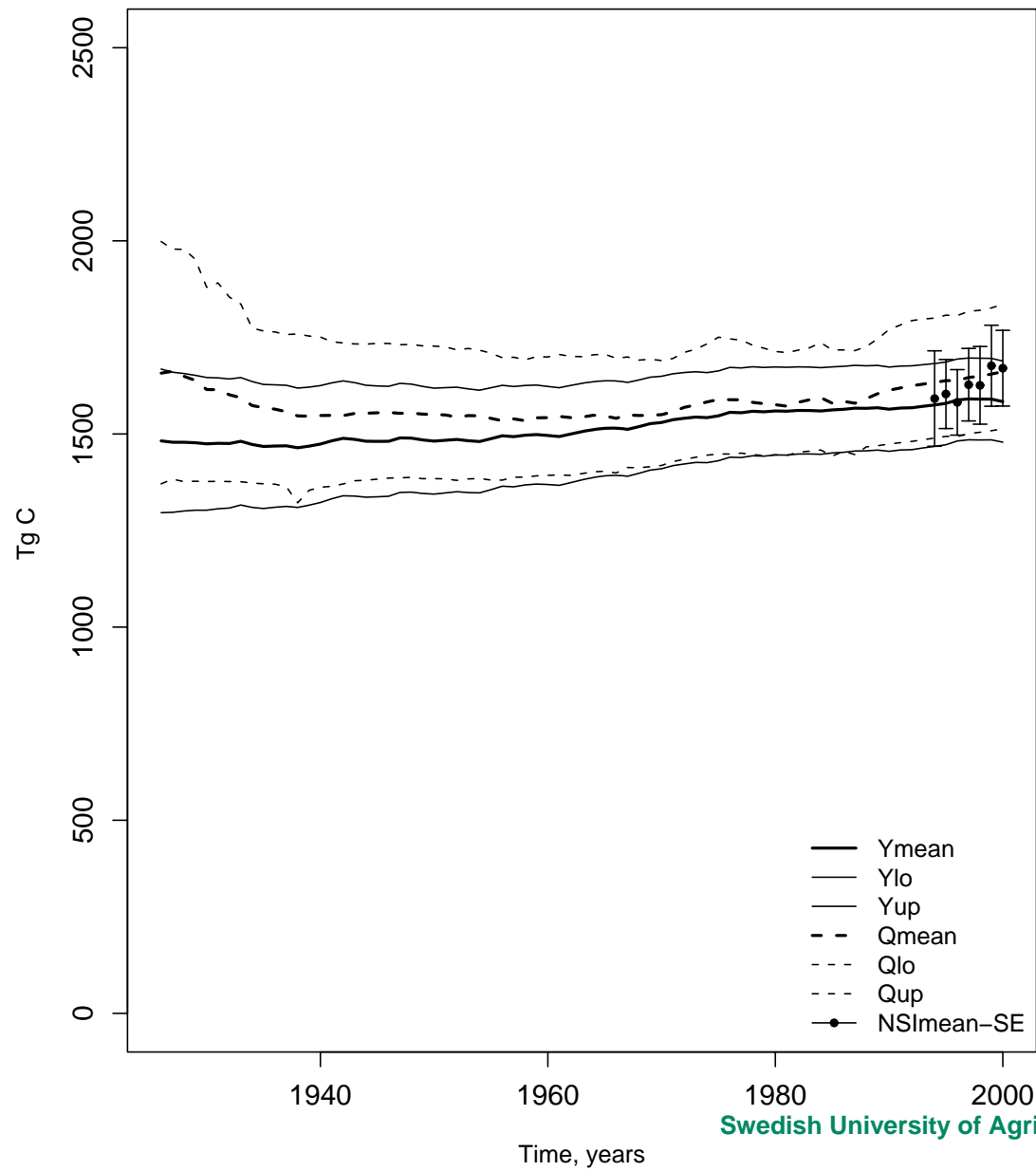


Källa: Riksskogstaxeringen, SLU

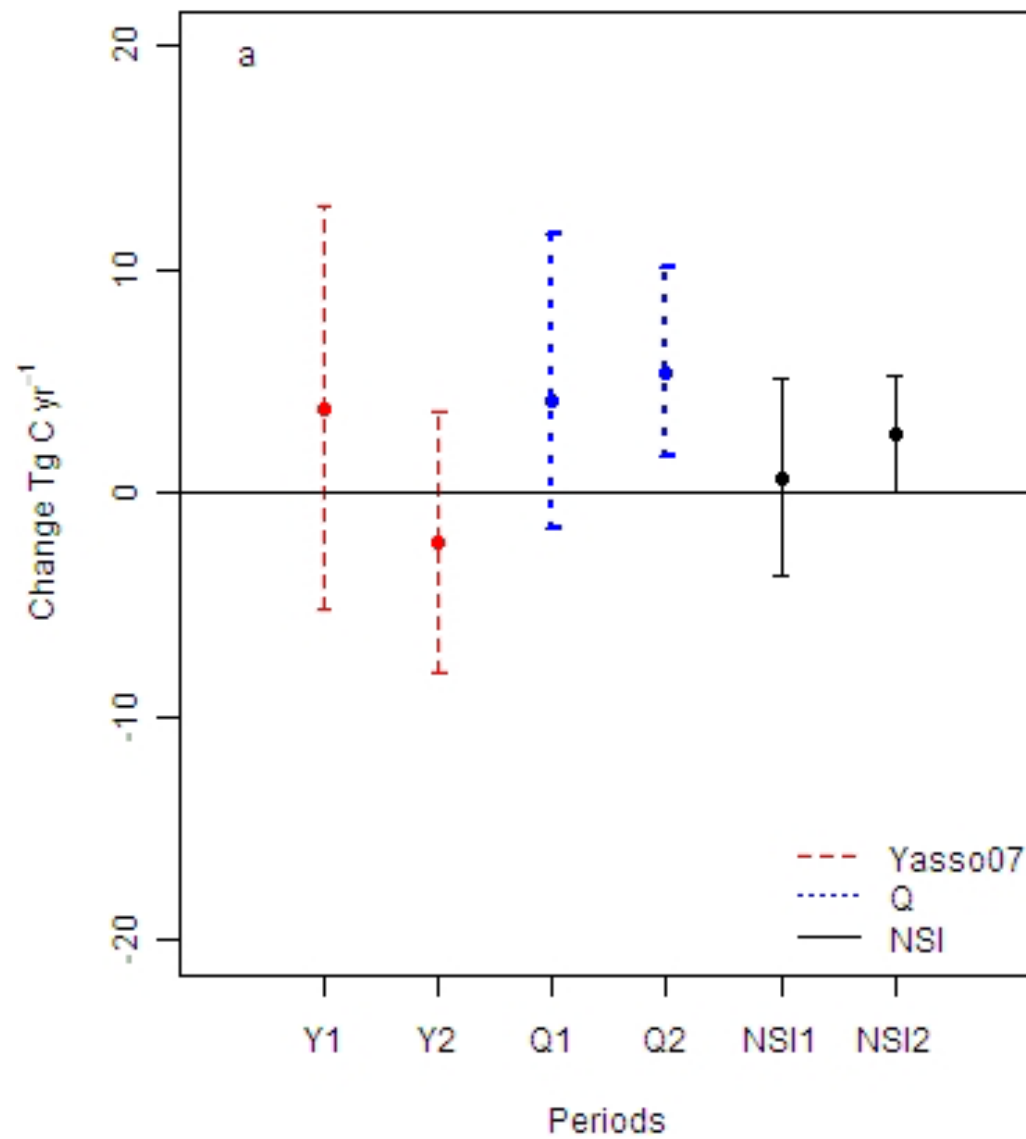
Swedish University of Agricultural Sciences
www.slu.se



SOC Stocks



SOC Changes Periods



Conclusions

- Small changes in the soil pool can have a considerable impact on the national GHG balance
- Over a timeperiod of more than 10 years both models and measurement indicate that mineral soil is a sink but uncertainty is high
- The possibility to monitor and verify small changes is limited due to method uncertainty
- Soils seem to respond slowly to increase in forest biomass
- Combination of various approaches (measurements, models valuable)
- Uncertainty reporting must be improved – today's reporting of uncertainty is not relevant to LULUCF