

# Commentary to Stephen Ogle's presentation

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# General framework

- Seems that lots of very good job has been made to build up this modelling system.
  - Combination of several relevant data sources
    - eg. edaphic factors, climate, management
    - Remote sensing for upscaling
  - Input and model runs on representative number of sites (NRI)
    - Potentially biased estimates due to nonlinear effects in the model avoided (aggregation error)
  - Uncertainty
    - Aggregated information (tillage) implemented with PDFs
    - No complete Monte Carlo analysis
    - Was the empirically-based uc estimator derived on "interpolated" area?
  - Validations independently (some done, more in future)
- Collaboration with other sectors?
  - Forest sector carbon accounting (e.g LU change)

# Processes in soil

- Top soil vs deep soil
  - Input and decomposition conditions differ by depth
  - To which depth simulations extend?
  - Tilled and non-tilled fraction of soil?
  - Danger for aggregation error
- Vertical DOC fluxes missing
- Horizontal DOC and out flux to rivers/lakes/ocean missing
  - Out flux may be small but so are the total changes
  - To complete the conception of a process
  - Geo-referenced system would allow integration of this process
- Chemical stabilization could be included

# Modelling of soil carbon

- General problem: Soil is a black box
  - Yes, there are kinetic pools with differing turnover times
    - but they are not measurable
  - Complete understanding of soil processes is needed for reliable predictions

# Modelling of soil carbon

- Water saturation
  - Not explicitly mentioned how (partly/occasionally) water saturated soils are treated?
  - Process is certainly different
- Other GHG gases
  - No mention of these gases
  - Agricultural soils are also important sources of other greenhouse gases than CO<sub>2</sub>
  - N<sub>2</sub>O emissions especially high at (partly/occasionally) water saturated soils
  - Methane (CH<sub>4</sub>)
    - e.g from flooded rice cultivation (to my understanding some rice cultivation is practiced in US).

# Parameter space vs. experiments

- All combinations of input (treatments, climate, land-use, etc) cannot be tested
- --> Extrapolation necessary

