# CHANGES IN DANISH AGRICULTURAL SOIL SOC INVENTORY BETWEEN 2008 AND 2018

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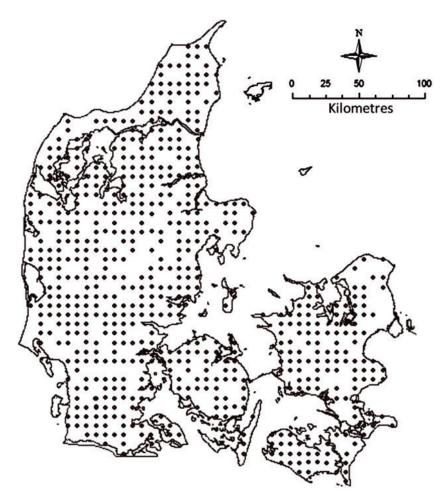
> Jørgen E. Olesen Lars Elsgaard Zhi Liang





# THE DANISH SOIL MONITORING NETWORK

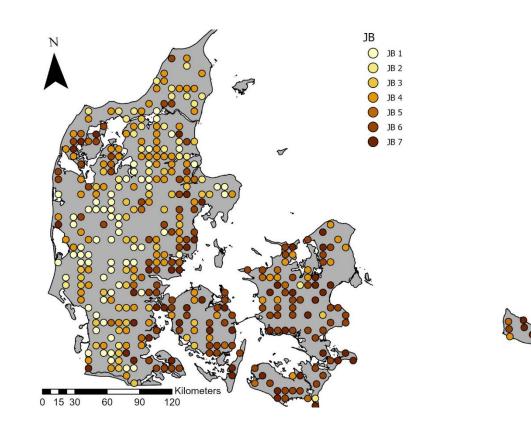
- Established in 1986
- Sampling approx. every 10 years
  - 1986, 1997, 2008, 2018
- 7 km x 7 km grid
- Initially approximately 600 sites
- New sampling procedure introduced in 2008
  - 395 sites present in both 2008 and 2018





# DANISH SOIL CATEGORIZATION

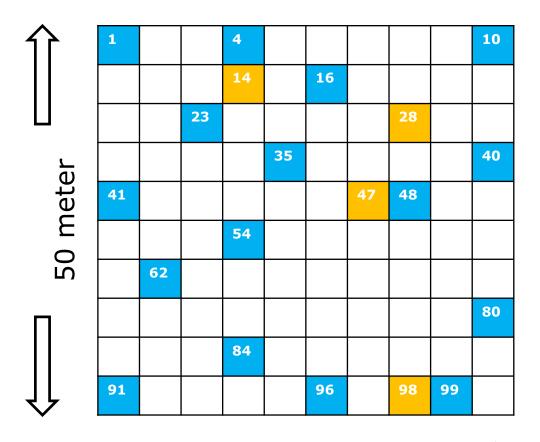
- Soil in Denmark is generally low in C, and quite sandy.
- National categorization: JB 1 (0 5 % clay) – JB 7 (15 – 25% clay)
  - JB 10 is 45 100% clay, but very rare, and not included
- Soil is more sandy in the western parts of Denmark, and becomes more clayey in the Eastern part of Denmark.

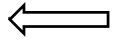




# SAMPLING METHOD

SOC = OrgC% \* bulk density \* depth \* (1 - stone fraction)





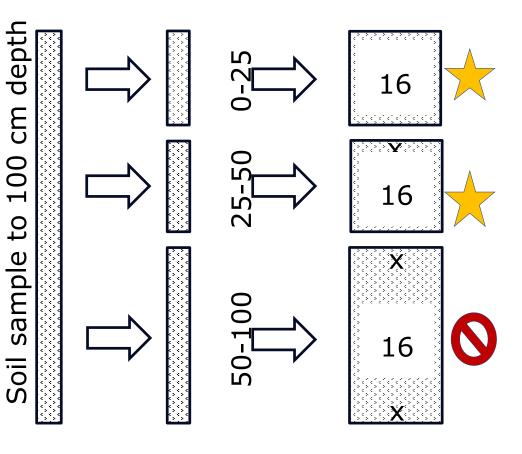






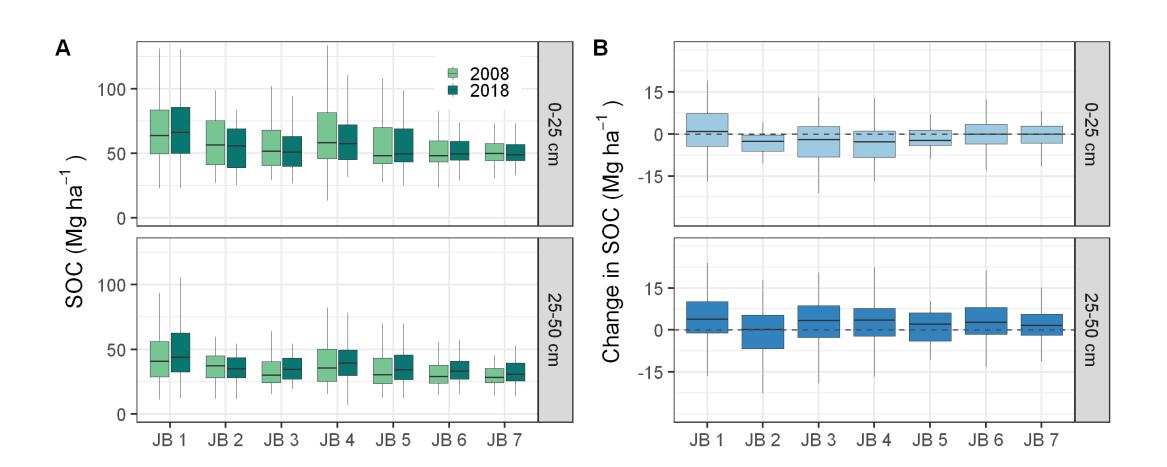
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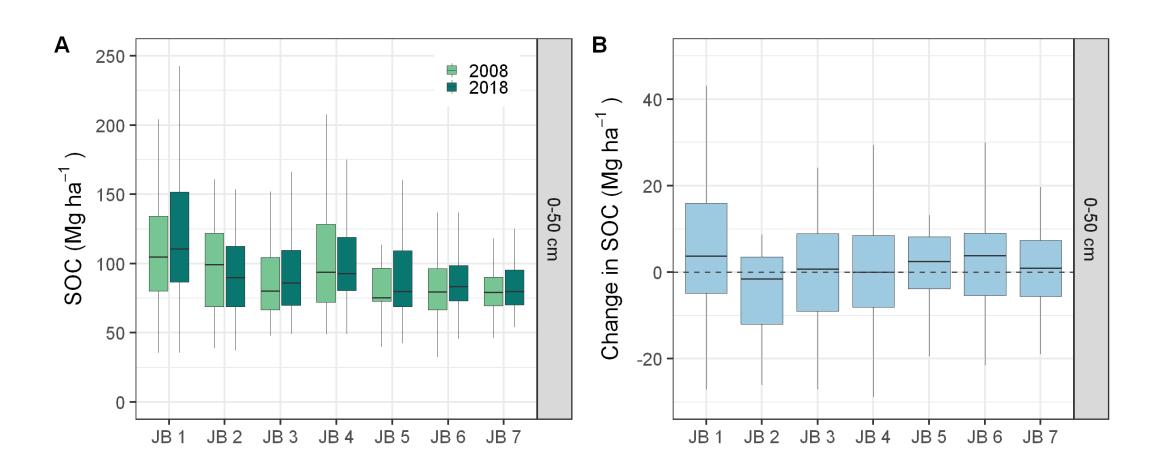
#### CHANGES IN SOC 2008-2018 BY LAYER







#### CHANGES IN SOC 2008-2018 IN TOTAL







### **GEOGRAPHIC DISTRIBUTION**

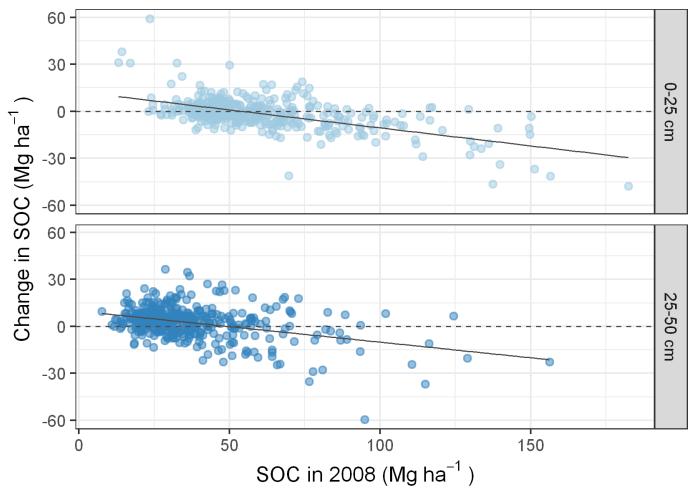
Maps has been removed.





# POOL SIZE AND POTENTIAL CHANGES

- Smaller SOC pools have greater potential for carbon sequestration
- The larger the SOC pool, the greater the potential for future SOC loss
- Larger SOC pools require larger inputs to maintain their size, let alone further sequestration.







## **EFFECT OF LAND USE**

- Previous research in the Danish national soil monitoring network shows positive effects of :
  - Grass / ley
  - Cattle manure
  - Autumn/winter crops with straw incorporation
- Red thread: addition of organic material, longer time, depth
- Analyses of most recent data is under way

Maps has been removed.





## CONCLUSION

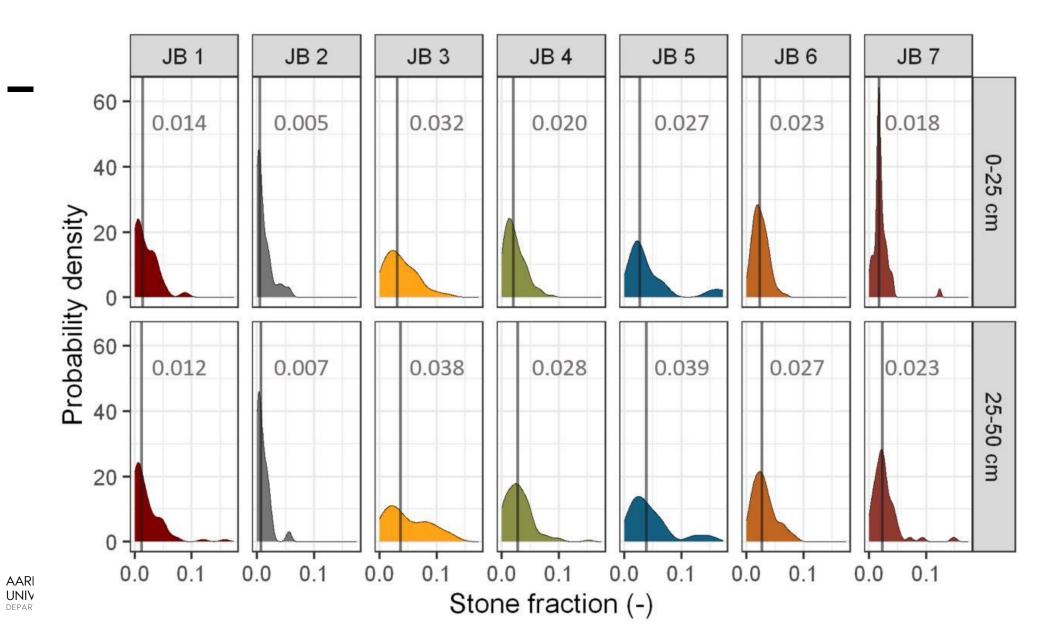
- Overall, a gain in SOC for 0-50 cm for Danish agricultural soils
- Losses in 0-25 cm outweighed by gains in 25-50 cm
- Relationship between soil texture and SOC pool overshadowed by management effects
- Large SOC pools are more vulnerable to losses





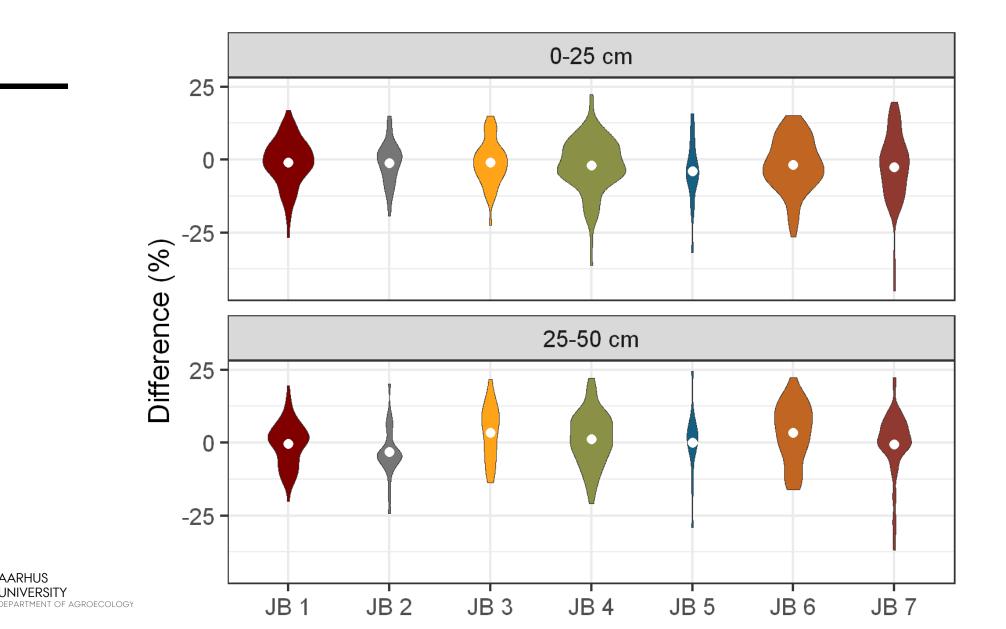


#### Median stone fraction varies between 0,5 - 3,9 percent





#### Site specific bulk density varies from the mean value



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