Biogeosciences Discuss., 12, C568–C569, 2015
www.biogeosciences-discuss.net/12/C568/2015/

Biogeosciences
Discussions
Open Access

Interactive comment on "Positive trends in organic carbon storage in Swedish agricultural soils due to unexpected socio-economic drivers" *by* C. Poeplau et al.

Anonymous Referee #1

Received and published: 10 March 2015

General comments: The manuscript presents soil carbon stocks and changes based on the extensive national soil monitoring network of Sweden. Very valuable dataset, fresh idea to link soil C changes with changes in socio-economy and generally nicely written text. I liked it.

Specific comments: Although I'm not expert on statistics, I got bit concern about statistical methods used in the study. Points that raised my concerns: 1. Authors used county means to determine the nationwide changes in the C content and to study factors affecting it. In northern counties the agricultural land area is, to my understanding, extremely small compared to southern part of Sweden. Therefore it is likely that northern counties are overrepresented in the results. 2. Nationwide trend in soil C. Soil

sampling was done in three different time periods. Still authors made pair-wise comparison with t-test using data from two inventory rounds. I would suggest utilizing the whole dataset (all three inventories) to determine the trend in soil C (=slope (if change is linear) between sampling time and C content). And possibly analyzing the data using original measurements instead of county means. But as said I'm not statistician.

Some minor points: 3999-9: How soil texture was determined? Soil samples or geospatial datasets 4000-12, 4003-16: There is high correlation between ley area and C content/change in it, but that does not necessarily mean that ley area has really quantitatively caused the increase in soil. If there is 94MgCha (20cm) (Andren et al. 2008) in Swedish arable soils, 0.38% annual increase means about 0.35Mg increase in C per hectare. In the manuscript there was reference showing that ley can results 0.52Mghayr higher increase in soil C compared to annual crops, so in that sense it looks like ley could really be potential driver for changes in soil C. Quantitative aspect could, however, be considered more closely in the manuscript. 4001-21: Are there areas of limestones in southern Sweden, that have naturally high pH and could be linked with observed SOC 4006-11: Can ley area in Sweden (regularly tilled, crop rotation) be considered to behave similarly as real grassland? 4006-21: ESM vs. FD: Not exactly. e.g. soil compaction, adding manure. Maybe authors could add few words how FD-method used in the study might impact results. Which direction?

Technical corrections: 3992-23: Reference? 3995-7: remove "as soon as possible"

Interactive comment on Biogeosciences Discuss., 12, 3991, 2015.