

## ***Interactive comment on “Soil carbon stocks in ecoregions of Africa” by M. Henry et al.***

### **Anonymous Referee #2**

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General comments: This paper quantifies the storage of organic carbon in African soils using five soil databases and four large-scale soil maps. The total carbon stocks are analyzed for different soil depths and geographic regions (country- and eco-region level) and are discussed in relation to other published estimates. The authors present an analysis of the uncertainty of these estimates using the available soil and spatial databases for Africa and report an uncertainty of 30% for both sources. Although this work can be considered as a substantial contribution to our understanding of the current status of soil carbon storage in Africa and its uncertainty, there are several issues that could further improve this work and make it more valuable to the broad readership of Biogeosciences. These mainly focus upon identification of the major sources of uncertainty and implications for both current database use and future database improvements.

Specific comments: The main issue is that the current analysis only presents the possi-

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ble range of total C stocks using different databases which differ mainly in the number of soil profiles and spatial resolution and detail of the map units. In my opinion, an in depth analysis of the within-map unit (soil type) variability in carbon concentration, gravel content and bulk density should be performed on all databases. This should highlight the differences between the databases (eg how does the increased number of map units of the ISRIC-WISE or HSWD databases affect the variances?) but also indicate which specific soil types and geographic regions are the main source of uncertainty and should therefore be considered as high-priority areas for further improvements. The motivation of this work was our poor understanding of the size and distribution of soil carbon in Africa. At the same time, table 1 indicates that Africa is well characterized as more than 40% of the profiles in the global databases are situated in this continent although it covers only 20% of the land area. Does this imply that our carbon stock estimates for Africa are less uncertain than estimates for other continents? Finally, the introduction and discussion are mainly focusing on C sequestration issues but the linkages with the main text and objectives are unclear to me.

Detailed comments:

Page 799 line 20: soil Line 25: half as large when compared to? Page 803 Line 6: More details are needed that describe in detail how this linkage and aggregation was done Page 804 line 17: variable n is not used in the equation Page 808 line 2: Amundson Line 16: these values do not correspond with the values given in Table 4 Line 17: Pg vs Tg: the use of different units is confusing; use the same unit throughout the manuscript Line 28: I don't fully understand how this should increase the SOC stock. Do you mean improve? Page 811 line 23: I assume this should be 0-100 cm? Table 1: add fraction of profiles in Africa Table 2: Specify which datasets were used and add uncertainties Table 3: Specify which datasets were used Table 4: the layout of the SOC (Tg) column could be improved Fig 1: add units and data sources

Interactive comment on Biogeosciences Discuss., 6, 797, 2009.

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