

Interactive comment on “Forest conversion to poplar plantation in a Lombardy floodplain (Italy): effects on soil organic carbon stock” by C. Ferré et al.

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The authors thank Anonymous Referee #2 for careful reading and for providing useful comments which will certainly help to improve the paper.

Author responses and explanations (ACn) are given with referee comments (RCn).

R2C1: The abundance of big stones (exceeding the volume of the core cylinder). Nothing is written of how they were estimated, or if they were present at all, while they are a typical problem in floodplains close to steep slopes. They might however be quite important for SOC stocks, but were not part of the SOC stock calculation as far as I understood. Authors should find a clear statement here, even two profile pictures (NF

C3731

vs. PP) could help.

AC1: see our reply to Ref1: With an elevation of 65m a.s.l. and a distance to sea of 250km, the PP and NF sites are already in the center of the Po-valley, the nearest steep slopes of prealpine hills are observed only 70 km upstream at the outlet of the Ticino river from the more than 300m deep Lago Maggiore, where stones are effectively retained. Consequently, the river deposits in the study area are mainly consisted of sand, gravel is observed only locally (presumably linked to historical river beds), and stones bigger than the coring device could not be observed at all. At the NF site we could not find any rock fragments in five soil profiles and in soil corings; rock fragments were absent also in most part of the PP site with the exception of one corner of the survey area represented by the Haplic Arenosol of profile 4 (see Table S1), where stone content ranged between 1 and 7%. Anyhow, the volumetric stone content was considered both for calculating the SOC stock and the bulk density. Correspondingly, the SOC stock of the abovementioned profile 4 decreased from 4.9 to 4.7 kg m⁻² (4%) after stone volume correction for the 0-55cm layer. We will introduce this important detail in the method description. In addition we propose a couple of profile photos for the supplementary material

R2C2: The influence of texture as shown in Fig. 3 is discussed weakly. I would like to see some more process related discussion here.

AC2: We will broaden the discussion of relationships between soil texture and SOC stock and the effects of land use conversion on SOC stock for equal classes of soil texture.

R2C3: In the introduction the authors mention UNFCCC and reporting. But instead of pointing out that short rotation coppices are not yet part of the good practice guidance for reporting (a major justification for this study in my view), they claim that “few data are available” on SOC stocks and their changes (after land use change, or whatever is meant here). This, however, is a very weak formulation and in my view not justified.

C3732

I think there is a huge amount of data available, dozens of reviews have been published. Instead, authors should highlight that the specific land use change (forest to SRC) is poorly quantified. In the discussion, this should come back with a conclusion like "SRC could be treated as cropland. The whole section 4.3 needs to improve, and should stand out as a core section of the manuscript (with sentences in the abstract and conclusions). Right now, the last sentences in the abstract are very poor- "ploughing destroys the stratification of a forest soil", this is not a very surprising observation and does not match the scientific level of the journal. No need to mention that in the abstract!

AC3: We fully agree and will modify the text accordingly, especially with regard to section 4.3. and the abstract and the overall conclusion. Just one point we disagree: our poplar plantation can not be considered a short rotation coppice, but a short rotation plantation forest growing to a 25-30m high canopy; the replacement after about 10 years includes full harvest of stems and branches and eradicating the stump/root system before deep plowing and replanting

R2C4: I miss some more recent literature on SOC stocks under SRC (as compared e.g. to croplands), which would lead, when discussed together with the results observed here, to such conclusions as suggested in point 3. It is only a case-study, but I feel that it is a high-quality one and it deserves to be discussed in the larger picture.

AC4: we fully agree, but see our AC3 statement above on coppice. Anyhow we will make it more clear that our PP type of land use is of increasing importance in context of current biomass/biofuel policies; it should better be considered cropland, as Italy does in context of national law but is not allowed in context of KYOTO/IPCC reporting

R2C5 (Specific comments) You mix up SOC stock and content very often. Please use only one expression, or think twice what you mean. 9603, l. 5: delete "by man". Who else should "use land"? 9603, l. 25: delete "thick", use "dense" 9610, l. 3: change "humus layer" into "litter layer". 9612: Section title: "methodology comparison" 9612,

C3733

l.21: change "amount" into "stocks" 9614, l. 2: "Poeplau" 9616: Please rename section title, suggestion: "Further changes in soil properties due to land use change"

AC5: We agree and will modify text as proposed

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C3734