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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 #3 for his/her helpful comments and suggestions. Our responses and explanations (ACn) are given below each referee comment (RCn).

R3C1: Why bulk density from deeper layers was estimated by a regression if 4-5 profiles were opened in each sites? Obviously the number of profiles is much smaller than sampling point in each sites but BD deriving from subsoil of the profiles could have allowed for a comparison with estimate BD trough the regression.

AC1: with regard to BD we repeat our reply to R1C2: "For the upper two layers consid-

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ered in the land use comparison of the SOC stock we carried out direct measurements of BD; the deepest layer we considered as relevant mainly as an indicator for the soil conditions before the land use change. In this sense we found a clear difference of C-horizon bulk densities both from pedotransfer estimates (NF = 1,51 and PP = 1.33 g cm-3 for the 55-100 cm layer) and from averaging the measurements taken at the NF(5) and PP(4) soil profiles (NF = 1,55 and PP = 1.37 g cm-3 for the C-horizon). The variability of values within a site was high, however the difference between sites appears to be clear, but we consider of minor relevance for the overall finding of the paper: we have good reason to assume that the negative correlation between BD and SOC was valid also before land use change, then the PP area would have contained a higher SOC stock compared to NF, resulting in even higher SOC losses. We will compare in the results section the BD-data measured at soil profiles and BD-data estimated from pedotransfer functions, providing also details of the regressions and of the pedofunctions like determination coefficients and statistical significance values. If the editor agrees, we may also provide as supplementary information the correlation matrix included in a previous version of the paper.

R3C2: The problem of the stones exceeding the volume of the cylinder used for BD should be better addressed due to its importance for SOC stock determination.

AC2: see AC1 to comments of Referees 1 & 2: In methods description we will provide more detail on stone content observations; if editor agrees, we may also provide of couple of profile photos in supplementary material.

R3C3: Why you collected only fresh leaves from the forest floor? It seems from table 1 that the C concentration of the organic horizon is derived from those measurements. This is not the standard methodology for determining the C concentration on the organic horizon. Why you did not determine the C stock also in the organic horizon collecting samples from a known area? The poplar had no organic horizon during the sampling campaign but this does not means that litter from trees does not accumulate on the soil. This occur only some months per year.

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AC3: The SOC stock calculation at NF considered the litter layer sampled at 90 sampling points with frames 35x35cm, as described in the methods chapter 2.2. Instead, at the PP site a litter layer accumulated only for a short period due to regular harrowing; in addition, newly fallen leaves disappeared rapidly because of a high biological activity mainly of earthworms. We will describe this feature more precisely in a revised manuscript. Newly fallen leaves were instead sampled at NF and PP for the comparison of litter type between the two land uses. C and N contents were determined on both litter and newly fallen leaf samples.

R3C4: The literature cited should be increased. Especially in the introduction is often cited the IPCC reports while some more scientific peer reviewed publication could be added.

AC4: We agree with you and with Referee 1 that some referencing of scientific papers should be added in the introduction, but we think it is positive to place a scientific exercise into the relevant political context, in our case the Kyoto Protocol and related IPCC Actions. We have seen and analyzed hundreds of papers dealing with effects of LUC on SOC, but only few were dealing with a transition from native forest to high stem poplar plantation, which is clearly distinct from a SRF coppice type of plantation, and is not primarily linked to the bioenergy context. This is why we consider the two references proposed by Ref3 of limited relevance to our situation.

R3C5: The discussion of the results and the Conclusions of the paper should be improved. Especially the conclusions. At the moment the results seems quite obvious and not so surprising. Since this work is probably one of the first investigating the conversion of natural vegetation to another land use (SRf in this case) a bigger effort should be done in discussing the data.

AC5: ok, we will expand the discussion and conclusion with focus on the future role of plantation forests for bioenergy, implications for IPCC reporting, and on the value of mature native ecosystems for assessing policy impacts.

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Interactive comment on Biogeosciences Discuss., 11, 9601, 2014.