

Interactive comment on “Deep plant-derived carbon storage in Amazonian podzols” by C. R. Montes et al.

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Firstly, thanks to the reviewer for his positive and constructive comments.

Regarding the extrapolation of the carbon data, we actually used spatially weighted averages, this will be specified in the “Study site and methods” section, replacing lines 8–9, page 7612, by: “The average carbon content calculated for each identified group of horizons is a spatially weighted average calculated by linear interpolation between the observation points.”

The remark related to equilibrium was also raised by anonymous referee #2. We used this term in reference to the concept of “dynamic equilibrium” of soil minerals as explained in Lucas, 2001 (Annu. Rev. Earth Planet. Sci. 29:135–63) or Cornu et al. 1997

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(Pedobiologia, 41 (5): 456–471), which is based on thermodynamic considerations. However, as this concept is unfamiliar to many readers non-specialists of pedogenesis, the text will be modified in order to suppress any misinterpretation. Lines 4 to 10, page 7609, will be replaced by: “These systems have been reported on both crystalline or sedimentary rocks. They can develop when soil solutions turn hyper-acidic, due to very low alkali or alkaline-earth cations in the soil solution, turning negative the alkaline reserve (Grimaldi and Pedro, 1996) or when the soil material is sandy enough to allow the leaching of Al- and Fe-organic matter complexes, resulting in the dissolution of clay minerals, Al-hydroxides and Fe-oxides or Fe-oxyhydroxides (Lucas, 2001).”

Page 7613, line 14, the right figure is actually the figure 3, this will be corrected in the text.

Regarding the DOC concentrations in soil waters, they were of the same order of magnitude than in boreal or temperate podzol (page 7615 lines 19–21), so that the higher value for DOC transferred in depth is actually mainly due to higher rainfall. We will replace “clearly” by “mainly” on line 8, page 7616.

Page 7616 line 16 and further, the rdp ratio quantify the percentage of non-evapotranspired water which passes through the Bh and percolates in depth. It refers to the baseflow, this will be specified in the text on line 11, page 7616.

Page 7616 line 25 and further, the first order rate was calculated by considering 2800 y as the half-life of Bh organic matter. This last value was chosen in order to obtain an average age for the Bh organic-matter around 2000 y, in coherence with the few existing datations of Amazonian Bh (Bravard and Righi, 1990). This detail will be given in the text by replacing lines 1 to 3, page 7617, by: “...mineralization reaction and a rate constant equal to $2.5 \cdot 10^{-4} \text{ y}^{-1}$, calculated by considering 2800 y as the half-life of Bh organic matter. This half-life was chosen in order to obtain an average age for the Bh organic-matter around 2000 y, in coherence with the few existing Amazonian Bh datations (Bravard and Righi, 1990). Which such hypothesis, it would last 30 ky to

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accumulate 68 kgC m⁻² in a Bh under the present day conditions.”

Interactive comment on Biogeosciences Discuss., 7, 7607, 2010.

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