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Interactive comment on "Modeling microbial exchanges between forms of soil nitrogen in contrasting ecosystems" *by* M. Pansu et al.

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Thanks to Mr Hammoudi and Pr Iosifescu of the Mathematic and Modelling Institute (UMR 5149, CNRS France) for their deep analysis of the MOMOS equation system. Indeed from Corstanje et al. Eur.J.Soil Sci. 2008, very few, if any, interesting soil processes are strictly linear. Most of the 200 models initially proposed to describe soil organic matter dynamics (Manzoni and Porporato Soil, Biol. Biochem., 2009) could be classified into linear (decrease proportional to the content of a given compartment) and no linear (decrease proportional to the compartment content and amount of decomposers or enzymes). Our proposition was in a 3rd way, by introducing a quadratic function only for microbial respiration, all other processes remaining linear. Quadratic function was the simplest we could introduce. It means that activity of microorganisms

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increases simultaneously with their growth when a substrate is available. It enabled to model only one way of C output by microbial respiration when the previous C models used generally one CO2-C output by compartment often called efficiency factor (C energy for synthesis of a given compartment), which induced over parameterizations with parameters not often linked to environmental conditions, as in MOMOS. But the no-linearity is very much complex in terms of mathematical properties, thanks again Mr Hammoudi and Pr Iosifescu, your result is very encouraging for agro-ecology and geoscience.

Interactive comment on Biogeosciences Discuss., 10, 5749, 2013.

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