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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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Most models of soil organic matter are compartmental models that correspond generally to linear differential systems. The well posedness of such dynamical systems is known by general results. The new feature in MOMOS-C is the choice of a quadratic mineralization term (term corresponding to microbial respiration). This makes of MOMOS-C a nonlinear differential system. There are no general results to prove existence of solution for long time of such systems (solution of such systems may blow up at a finite time because of this particularity, which can drop out the physical meaning of the system). Nevertheless we proved the existence of a unique solution for all time for MOMOS-C model, by using the theory of cooperative dynamical systems (Smith), a very useful theory for many biological applications. MOMOS-C is also a nonau-

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tonomous differential system (solutions of such system depend on the initial condition and on the initial time). For more consistency, we investigated the behaviour of the solution when the climate (moisture, temperature and necromass inputs) were considered periodic. We proved in this case the existence of an unique periodic solution which is attractive for any other solution (same long time behavior).

MOMOS-N is a linear differential system which depends explicitly on the solution of MOMOS-C. Existence and uniqueness of global solution of MOMOS-N follow by general theorems since the well posedness of MOMOS-C was proved.

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