Biogeosciences Discuss., 11, C329–C330, 2014
www.biogeosciences-discuss.net/11/C329/2014/

Biogeosciences
Discussions
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Interactive comment on "Future climate variability impacts on potential erosion and soil organic carbon in European croplands" *by* M. van der Velde et al.

Anonymous Referee #2

Received and published: 13 March 2014

This study used the EPIC agroecosystem model to make predictions on soil C erosion losses in European cropland. The study is limiting in its potential for a number of reasons:

1) There is no discussion of the uncertainties in the variables and inputs used in the model, nor the uncertainties in the overall model itself. To state for example in L7-1o Pg 1571 that from 1981 to 2010 there was an estimate of 769 TgC lost due to erosion, has limited usefulness unless there is a sense of how uncertain that estimate is.

2) Fate of eroded soil C: To determine rates of soil C loss is of limited usefulness since there is little understanding of the fate of that C under dynamic geomorphic conditions

that occur in European cropland. Recent work has shown that most C that is eroded in croplands is simply redistributed within the landscape (eg. Berhe 2012; VandenBygaart et al. 2012) and not lost at all. Furthermore C that is buried within the landscape alters the overall budget of C since burial results in removal of C that can be replaced at the source of the original C in the eroded landscape position (dynamic replacement)(see Van Oost et al. 2005; Wang et al. 2014).

3) Extreme climate events may not the most important factor affecting C loss due to erosion. Other critical factors are soil management such as tillage and cropping. For example (not all inclusive) tillage erosion is highly variable due to implement type, while cropping practices such as providing cover crops are highly influential on soil erodibility.

The authors do discuss some of these limitations in a partial manner but anyone evaluating the usefulness of the model results will have little confidence in the accuracy of the outputs, even considering that it is a broad-scale attempt.

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Interactive comment on Biogeosciences Discuss., 11, 1561, 2014.