



Assessment of climate change impact on SOM balance with the Austrian Carbon Calculator

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Soil organic matter (SOM) balance depends on climate and climate change due to the impact on SOM turnover conditions as well as on cropping and crop yields.

The Austrian Carbon calculator (ACC) is a tool for the comparison of future land use scenarios with the current agriculture in order to identify opportunities to sustain the SOM balance. The ACC can be used in a regional mode as well as in local mode for the assessment of single farm fields. The assessment is based on the concept of Biologic Active Time (BAT). BAT is calculated based on soil data from the Austrian eBod map and climate data for past and future on a 1 km grid.

The ACC was implemented for the regions Mühlviertel and Marchfeld. Crop yields are calculated based on statistics from the Austrian agricultural sub regions "Kleinproduktionsgebiet" for the most common crops. The regional scenarios consist of the abundance of crops, the part of nitrogen added as mineral fertilizer and the part of irrigation. The local soil management is calculated based on crop rotations with yields, organic amendments, irrigation and the tillage system (ploughed or not ploughed). The SOM balance is assessed with the reproduction index (REP_IX) that is calculated as the quotient from carbon reproduction (Carbon flux into SOM) and the BAT value. This way REP_IX includes the impact from management as well as from climate. If the future management will not change REP_IX the SOM balance will be the same as well. This methodology helps to adapt the management to future conditions to sustain the current SOM conditions without an absolute assessment if the current SOM state is optimal or not.

The regional results of ACC will be made available as thematic maps on the project web site. For local applications farmer can use the tool to analyze their special site conditions and management plans to assess the management options under climate change conditions.

The described concept can be improved if reliable information about the current SOM storage is available. In this case the quantitative change of SOM amount can be predicted as well.