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BoBB, software to assess soil erosion risk – introduction of the tool and its use to evaluate appropriate crops and farming practices on endangered field plots

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BoBB (Bodenerosion, Beratung, Berechnung) is simple software to support instant assessment of soil erosion hazard on agricultural fields. The program is profile-oriented, implementing the RUSLE model with slight changes allowing it to assess and compare different farming practices especially the soil-conservation field management. The input parameters datasets are supplied with necessary data for territory and natural conditions of Upper Austria but are generally usable for Central Europe. The software was developed on Federal Agency for Water Management, Petzenkirchen, Austria in 2011 – 2012. BAW and CTU in Prague are recently cooperating on validation and practical applicability approval of the model. Basic validation was done by comparing the outputs of the BoBB software with outputs of the original RUSLE model calculated by the RUSLE1 (USDA, 1998) and RUSLE2 (USDA, 2005) softwares.

Further evaluation was performed to test the possibilities of BoBB to reveal field plots endangered by soil erosion. First, testing areas were selected out of a map of soil erosion risk, which had been calculated for the whole territory of the Czech Republic using a combination of the USLE approach and a GIS approach referring to the best available data set. This map in 10x10 meters resolution is used as basic source for assessment of soil erosion hazard and for necessity of GAEC requirements (Good agricultural practices assessment for agricultural subsidy policy) and is therefore accepted as standard at state level. Characteristic profiles were selected within defined testing areas and soil erosion hazard, determined by the USLE approach and BoBB have then been compared.

Second, a comparison of BoBB outputs and database of soil erosion events (http://me.vumop.cz) was carried out. The database is created and maintained by the Czech Institute of Soil Conservation as a unique tool for soil erosion mapping and documentation. It was launched in 2010 and recently contains approximately 200 records of soil erosion events. Because direct comparison between long-term average soil loss values and event-related damages is not possible a presumption has been used that causal storm event hits area approximately 1 km in diameter around the spot where damages were recorded and that the spot (field) with recorded erosion damage should always be evaluated as the most endangered one within its surroundings by different mathematical methods, if they operate properly. Characteristic slope profiles of all fields within the affected area were defined and soil erosion risk was determined using BoBB. Recent local conditions at the moment of event were defined using the database information for crop and management practices. Most endangered profiles locations were then compared with the actual damage record from the database.

The presentation brings a schematic description of the BoBB principles itself, its GUI, input data and results of validation. Database of soil erosion damages is introduced and the summary of the comparison between the database, the soil-loss map and BoBB software outputs are presented.

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