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# Parameterization of SoilClim software using Monte Carlo approach

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The SoilClim model enables to estimate water balance components such as reference and actual evapotranspiration, presence of snow cover, soil water content within two defined layers or soil temperature in 0.50 m depth. Finaly, it could be used for soil climate regimes identification anccording to USDA classification (both Hydric and Thermic). The SoilClim works in daily step and needs six meteorological parameters as input (daily maximum and minimum air temperature, global radiation, precipitation, air humidity and wind speed). The information about soil and vegetation cover are also necessary. The basic algorithm for reference evapotranspiration is based on Penman-Monteith method.
The SoilClim was tested through various soil and climate conditions under different vegetation covers with rather good results. For example SoilClim provided quite satisfactory accuracy of estimated soil moisture content in comparison with lysimetric measurements at Hirschstetten (Vienna, Austria) during the period 1999-2004. The data for three different soil profiles and for various crop covers were included. Agreement between measured and estimated water content (30 days averages) could be described by coefficient of determination (R2) which varied from 0.45 to 0.75. The Mean Bias Error (MBE) for values in daily step was from -12.87 % to 20.66 % and Root Mean Square Error (RMSE) varied from 14.49 % to 34.76 %.
On the other hand there are some parameters within SoilClim model which are more difficult to determine through measurements. It is e.g. case of macropore water flow (within root channels, earthworm holes etc). Also fraction of total awailable water that a crop can extract from the appropriate soil layer without suffering water stress is almost impossible to measure in field conditions.
The main aim of submitted study was to use the Monte Carlo approach in order to improve calibration process of selected submodels within SoilClim software and to aid selection of key paremeters affecting the model performance under various environmental conditons. For this purpose the data from two siteswere included: data from lysimetric station Hirschstetten (Austria) observed during the period 1999-2004 (three soil types and several crops were included) and Domanínek station (Czech Republic), where measurements of water balance for grass cover (for the period 2008-2010) were conducted.

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