

SOILPAR2.00, Program for Estimation and Validation of Soil Hydrological Parameters



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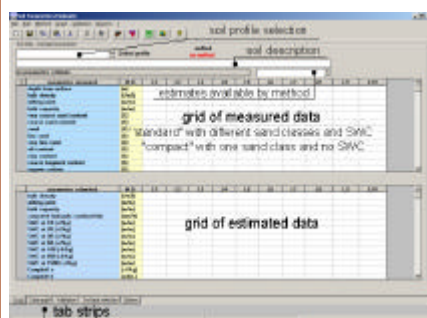
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Introduction

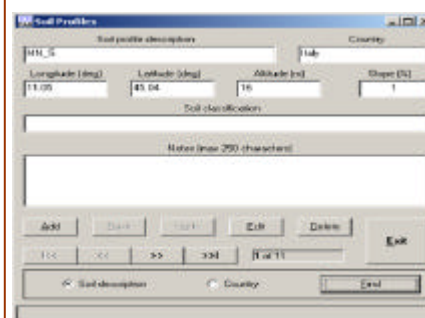
Crop/cropping systems simulation models are effective tools to evaluate the impact of agricultural management. However, their use is often limited because they need a large number of input parameters, required to model processes relevant to the plant-soil system. Input parameter values are generally known in the conditions of research stations, whereas some parameters must often be estimated when simulation models are run over a large areas. Soil hydrological parameters are required by most simulation models. Methods to estimate soil parameters (pedotransfer functions) has been proposed by many authors. However, their applicability may be limited to restricted data sets (given the empiricism of the methods) and comparisons among different methods is seldom made. SOILPAR2.00 provides different methods that allow estimating soil parameters, and it includes tools for method evaluation.

Main Form



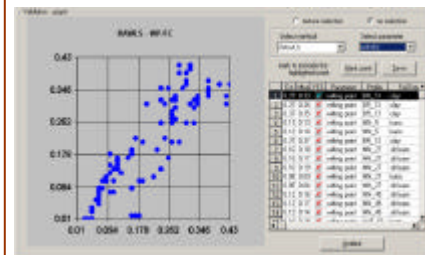
The tab **Data** allows entering/loading data. The tab **Data graph** contains data which populate graphs and a data grid when a method is applied to the current data. The tab **Validation** allows evaluating methods. The tab **Soil type selection** allows selecting subset of soil types to be analyzed during method validation. The tab **Options** allows converting particle size distribution to the USDA 3/7 classes.

Soil Profile



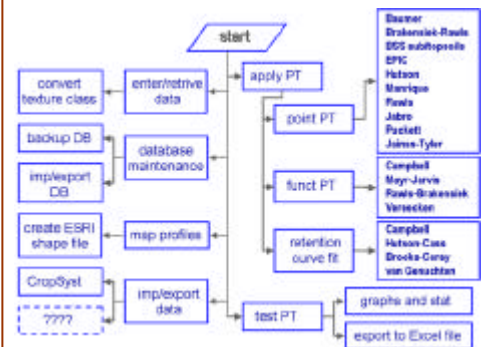
Soil profile information can be maintained using the form shown above. To retrieve a specific soil profile, the utility **Find** can be used.

Method Evaluation



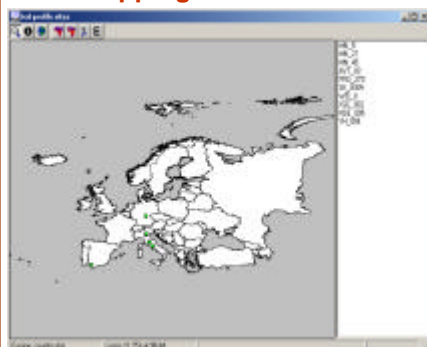
Evaluation is done after querying the data set by method, then by parameter. A subset of data can be created by selecting textural classes. Outliers can be excluded from the analysis. Statistics can be produced and exported to multi-sheet Excel files.

Flowchart



The diagram shows the tasks which can be performed using SOILPAR. For each soil profile, data can be entered for up to 10 layers. It is possible to input 3 or 7 classes of particle size distribution data according to USDA specification. Different methods allow estimating hydrological parameters, using either point or function pedotransfers. The characteristic matrix potential/soil water content curve is also estimated. The records matching the selection criteria are analysed and both data and analysis results can be exported to an MS Excel spreadsheet. Reporting utilities allow viewing/printing data, and the export in a variety of formats (CSV, MS Excel, HTML, TXT, etc.).

Mapping Soil Profiles



Geo-referenced soil profiles can be shown overlaying on a user chosen map. This is done by loading soil profiles from the SOILPAR database and creating an ESRI shape file, which is overlaid on a country/regions etc. polygons map. A zoom tool allows selecting areas in a map, and the soil profiles included in the rectangle zoomed can be shown and exported both as shape file and as SOILPAR database. Other tasks are allowed, e.g., get information on the active layer (either polygons or points), export MS Access database of points, etc.

Method	Parameter	Sub-Method	Mean	Std. Dev.	Min	Max
Sum	measured	measured	1.204	1.251	0.000	3.000
Sum	estimated	estimated	1.204	1.251	0.000	3.000
Mean	measured	measured	1.204	1.251	0.000	3.000
Mean	estimated	estimated	1.204	1.251	0.000	3.000



SOILPAR2.00 is a freeware. The installation file is available in the Symposium CD-ROM. Updated versions can be downloaded from: <http://www.isci.it/tools>