



The soil-plant-atmosphere model system Expert-N

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Expert-N is a program package for the simulation of water, heat, carbon and nitrogen dynamics in soil-plant-atmosphere systems. It comprises a number of modules that provide different approaches to simulate vertical one-dimensional soil water flow, soil heat transfer and solute transport, soil carbon and nitrogen turnover, crop processes and soil management. Each module is made up of different sub-modules, which themselves are composed by different process models that can be selected to simulate each of the important basic processes. The process models currently available in Expert-N have either been taken from published models such as LEACHN, HYDRUS, DAISY, SOILN and CERES, SUCROS, TREEDYN3 and FAGUS or have been developed by the Expert-N team including the nitrogen model N-SIM and the crop growth model SPASS.

The possibility to choose between different process models allows the user to better adapt the model to the specific purpose of his study and to the availability and quality of input data. Comparison of different process models for one basic process without changing the others can be helpful to find the process model responsible for differences in simulation results and thus can facilitate the comparison of different approaches to model soil-plant-atmosphere systems.

Examples for soil water flow simulations including preferential flow, crop growth and evapotranspiration as well as simulations of soil nitrogen turnover and nitrous oxide emissions from soils will be presented. Furthermore, examples for data input and data management will be demonstrated.