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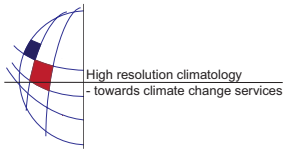

A modified soil water based Richards equation for layered soils

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Most Soil-Vegetation-Atmosphere-Transfer (SVAT) models like TERRA-ML (implemented e.g. in the CCLM model (www.clm-community.eu)) use the soil moisture based Richards equation to simulate vertical water fluxes in soils, assuming a homogeneous soil type. Recently, high-resolution soil type datasets (e.g. BüK 1000, only for Germany (Federal Institute for Geosciences and Natural Resources, BGR, www.bgr.bund.de) or Harmonized World Soil Database (HWSD, version 1.1, FAO/IIASA/ISRIC/ISSCAS/JRC, March 2009)) have been developed. Deficiencies in the numerical solution of the soil moisture based Richards equation may occur if inhomogeneous soil type data is implemented, because there are possibly discontinuities in soil moisture due to various soil type characteristics.
One way to fix this problem is to use the potential based Richards equation, but this may lead to problems in conservation of mass.
This presentation will suggest a possible numerical solution of the soil moisture based Richards equation for inhomogeneous soils. The basic idea is to subtract the equilibrium state of it from soil moisture fluxes. This should reduce discontinuities because each soil layer aspires the equilibrium state and therefore differences might be of the same order. First sensitivity studies have been done for the Main river basin, Germany.