



Sensitivity of soil water fluxes to changes in vegetation and root parameters

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Climate change will cause changes in soil water fluxes, on the one hand, because of the direct effect of changing precipitation and evaporative demand; on the other hand, climate change is expected to alter the vegetation cover and the plant roots, thus causing indirect effects on root water uptake and transpiration.

In this work, the sensitivity of soil water fluxes to changes in vegetation and root parameters are examined using model scenarios implemented in Hydrus 1D. Reasonable ranges of Leaf Area Index, crop coefficient and root distribution parameters for Alpine grasslands affected by rising temperature and increasing carbon dioxide concentration of the atmosphere are derived from a literature review and from observations at the experimental Clim-Grass site (Herndl and Pötsch, 2013), where 54 plots equipped with the free-air carbon dioxide enrichment technique and infrared heaters (T-FACE technique) represent various combinations of increased carbon dioxide concentration and increased temperature.

The results from this sensitivity study serve to identify the most influential vegetation and root parameters, thus supporting both the design of a monitoring strategy for the experimental site and future inverse modelling efforts aimed at identifying the effects of carbon dioxide enrichment and increasing temperature on the effective soil hydraulic and root distribution parameters.