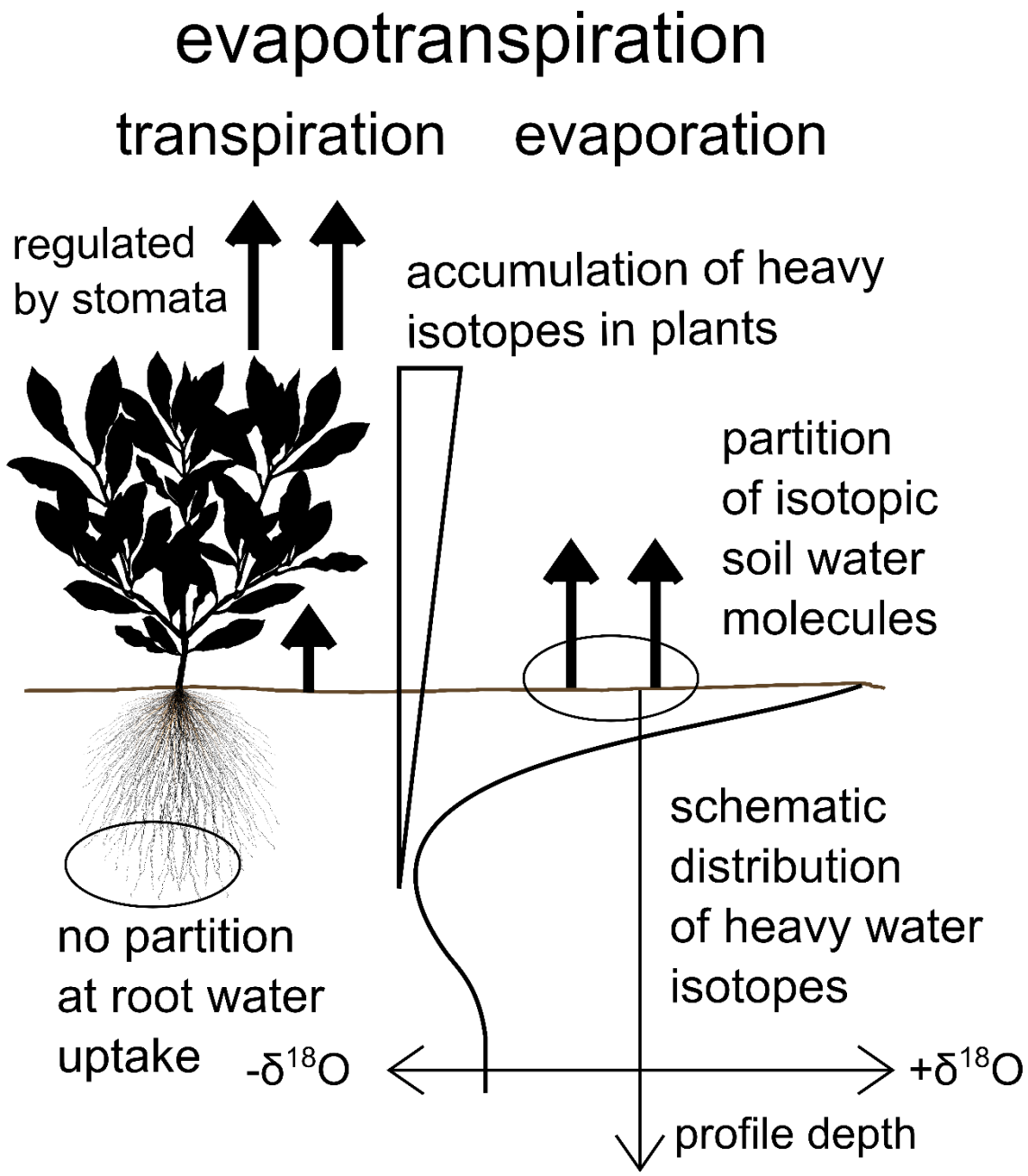


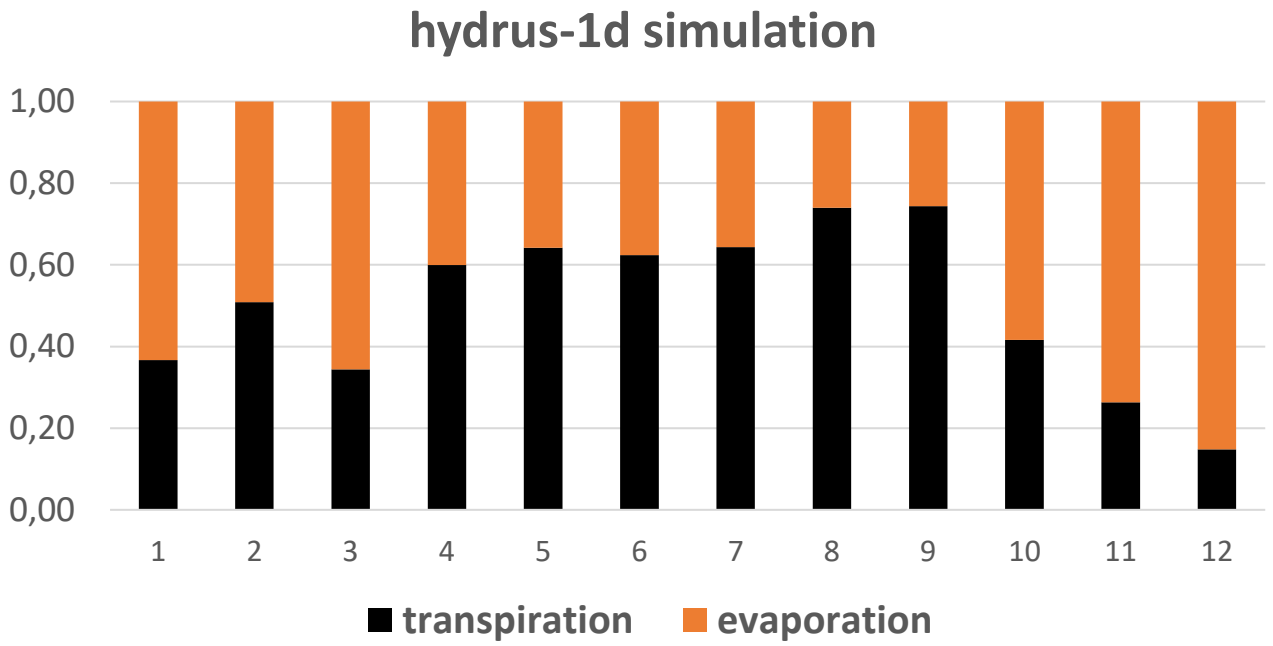
Different physical properties of naturally occurring stable isotopes in water can be used in this water balance method to partition evaporation and transpiration.

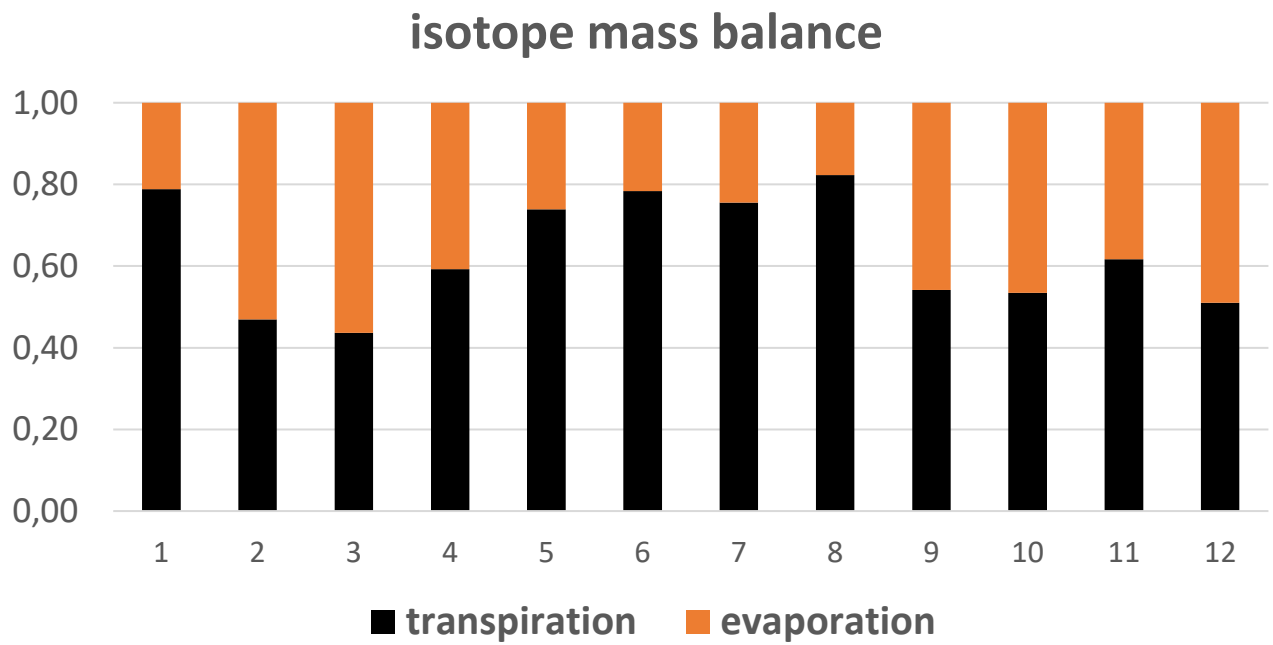
Water isotopes with a higher number of neutrons (e.g. $\delta^{18}O$, $\delta^{2}H$ resp.) are heavier and thus less likely to evaporate than isotopes with less neutrons.

At soil evaporation this means fractioning of water and accumulation of heavier isotopes in soil. Water uptake by plant roots however does not cause partitioning in soil water. This allows calculation of both fractions assumed all other water balance variables are determined.

The applied method for this study is based on a laboratory experiment and was adapted for a field set up to allow investigation of commodity crops at different soil tillage treatments under real-life conditions.

Adaptions comprise the soil water sampling method, an elaborated calculation of the evaporation fraction, and more applicable assumptions of individual balance components.





The two graphs on the left show a comparison of weekly relative transpiration and evaporation fractions determined with hydrus-1d simulation and isotope mass balance during summer weeks for soybean vegetation in Marchfeld, Austria.

Underlying data indicate both a difference of general quantification of evapotrans-piration fractions as well as of weighted impact of contributing conditions.

These different considerations of weight include factors such as actual hydrological conditions in different soil layers and vegetative parameters particularly decisive in simulation models.