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Review and comparison of compensatory root water uptake models

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Root water uptake by plants is one of the major components of the terrestrial water balance and transpiration is one of the most critical processes controlling energy exchange between the land surface and the atmosphere. Accurate sub-models of root water uptake are therefore important building blocks in a wider context, for example in models of contaminant transport in the unsaturated zone or in global climate change models. One especially important and difficult task is to reflect the dynamic response of plant uptake to water stress in the root zone, in which uptake increases in well-watered parts of the root zone to compensate for stress in other parts. Several different models of so-called 'compensatory' or dynamic uptake have been proposed, and it is not yet clear which, if any, should be preferred. In this presentation, several approaches to modeling compensatory root water uptake are compared from a conceptual point-of-view and also in terms of their performance against field measurements made at one site in Sweden.