Stochastic and deterministic models of soil salinity in the root zone

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Salinization is a significant cause of land degradation and nutrient deficiency. Understanding and predicting soil salinity is important for optimizing and scheduling irrigation in order to maintain sustainable agriculture. The aim of this work is to develop and apply time series analysis to measured water and salinity dynamics in soils for a prediction of salinity with limited information. Therefore, volumetric water content, soil temperature, and bulk electrical conductivity will be measured in situ by capacitance sensors at various depths within a laboratory soil column. Time series analysis will be applied to predict water and salinity dynamics on basis of data taken at one or two depth. Prediction of soil salinity obtained by time series will be compared with the measured data at other depths as well as to results obtained by numerical simulation of water and salt dynamics for variably saturated flow with HYDRUS 1D.