

# **State Space Analysis of the Spatial Variability Field-Measured Infiltration: A Case Study from Saudi Arabia**

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**ABSTRACT.** The variability of infiltration rate within a field is expected to be correlated with that of soil physical and chemical properties. Observations of infiltration rate along two transects made in a field comprised of calcareous loamy soil (Torripasammments) were measured together with some parameters affecting infiltration rate (clay, sand and silt content; bulk density; and  $\text{CaCO}_3$ ). State space approach was used to identify which of these parameters most affecting final infiltration rate and to improve the interpolation of the infiltration rate along the transects. Variability of final infiltration rate along the transects could be explained by the variability of bulk density or clay content using state space model of infiltration-bulk density and clay content. The results also show that the model could be used to estimate final infiltration rate with values of final infiltration rate considered missing at every other location along the transect when all observations of bulk density and clay % included. Adding other properties such as silt, sand, and  $\text{CaCO}_3$  to the model did not improve the estimate of final infiltration rate.