



Assessment of WRF-based rainfall ensemble forecast for field crop fertigation decision-making

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A reliable rainfall forecast can improve fertigation management of field crops, by meeting the plant demands while minimizing excess water and solute leaching. We used the weather research and forecasting (WRF) model to run a 20-members ensemble forecast of two rain events (winter and spring 2016) over Israel, where rainfall is characterized by high spatial and temporal variability, because it is strongly affected by local meteorological conditions and land use, together with changing synoptic regime. The ensemble was comprised of five cumulus and four microphysics parameterizations. In each case the ensemble quality was tested against weather station measurements and radar-based nowcasting. Several fertigation test cases for different crops, soil type and geographic locations were modeled using the HYDRUS 1D numerical model which accounts for water flow, solute transport and root water and solute uptake. The rainfall ensemble output by WRF was used as boundary conditions for the crop model and results were analyzed based on environmental and economic considerations. The benefits of using ensemble forecasts over one optimal setup are discussed using comparisons between the two rain events and the different crop model test cases.