

## **Deficit Irrigation Toolbox: A new tool to improve crop water productivity and food security under limited water resources**

Niels Schuetze and Oleksandr Mialyk

TU Dresden, Institute of Hydrology and Meteorology, Dresden, Germany (niels.schuetze@tu-dresden.de)

In this contribution, the suitability of different control strategies for the operation of irrigation systems under limited water and different climate conditions is evaluated. To treat climate and soil variability within one simulation optimization framework for irrigation scheduling we formulated a probabilistic framework that is based on Monte Carlo simulations. The framework can support decisions when full, deficit and supplemental irrigation strategies are applied. It provides a valuable tool for estimating minimum water demands which ensure a target yield when a higher food security (90% and above) is of interest. For more general applications a new Deficit Irrigation Toolbox (DIT) is provided which allows for different stochastic scheduling methods for (i) different crop models, (ii) the consideration of climate variability using recent and future climate scenarios and (iii) the consideration of soil variability. For the demonstration of the capabilities of DIT real case examples for different climate conditions using the AquaCropOS model are presented.