

Abstract Template

Can advected energy affect the water use efficiency in sprinkler irrigation?

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Competing demands for water with increasing population calls for developing strategies for increasing the crop water use efficiency (WUE) of irrigated crops, especially in the arid and semiarid regions of the world. In this context, it is important to quantify the various factors that control the WUE of irrigated crops in these regions. Advection is an important factor that can have significant effects on the energy exchange especially in sprinkler irrigated fields of arid regions, and hence control the crop canopy water use efficiency. An eddy covariance system with meteorological measurements was used to quantify the advection over a small scale irrigated cotton field at Agricultural Experimental Station at the University of Southern Queensland, Australia.

The impact of advection on evapotranspiration during sprinkler irrigation was found significant over a range of microclimate conditions that varied from moderate vapour pressure deficit and wind speed to extreme events with large VPD and wind speed. The values of advected energy varied from 0.12 mm hr^{-1} to a maximum of 0.6 mm hr^{-1} with an average value of 0.2 mm hr^{-1} . Due to advection, the percentage of latent and sensible heat flux exchange contribution to the total water loss from wet canopy through evapotranspiration can exceed up to 40% which decreased CWUE remarkably.