

Separation of evapotranspiration into soil evaporation and transpiration over three maize fields of different irrigation

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The amount of evapotranspiration was measured by the eddy correlation method at three maize fields under different irrigation system of Nile delta; this was separated into its component of transpiration and soil evaporation by using the chamber method and oxygen and hydrogen stable isotope ratios, respectively over three maize fields of different irrigation systems of the Nile delta. The ratios of soil evaporation to evapotranspiration (E/ET) during daytime are nearly 100% in wet soil condition immediately after surface irrigation. As soil dries condition, E/ET became smaller with LAI. E/ET of the drip irrigation is almost 60%. Moreover, E/ET is 40% in surface irrigation with mulching when soil moisture condition is dry. Finally, E/ET is nearly 100% when soil moisture condition is wet immediately after narrow furrows irrigation. To assess controlling evaporation effect, we estimated E/ET by using previous works (Kang, 2003) without LAI effect about transpiration. E/ET for LAI=1 is found to be 79%, 57%, 41% in surface irrigation and 40-50% in drip irrigation and 64% in wide furrows irrigation and 81% with mulching.

Keywords: Eddy correlation method, Chamber measurements, Oxygen and hydrogen stable isotope ratio, LAI, Soil moisture content