



The study of the turbulent characteristics of water, heat, carbon dioxide and methane transport over winter wheat field of North China

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Based on the turbulent observations obtained from North China during April and May 2012, the statistical atmospheric turbulence characteristics and the behaviors of water, heat, carbon dioxide (CO₂) and methane (CH₄) transport were investigated, the empirical coefficient used to calculate the flux of CH₄ in Relaxed Eddy Accumulation (REA) method was simulated. The results show that, in unstable conditions, the normalized standard deviations of temperature, humidity, CO₂ and CH₄ are related to z/L following the “1/3 power law”. The ratios between horizontal transport and vertical transport of heat, water vapor and CO₂ are related to z/L , but CH₄ do not show similar relation. Sensible heat flux is quite low while latent heat flux is relatively high. CO₂ flux is slightly above zero during nighttime and below zero during daytime, indicating that the observed area is a carbon sink. CH₄ flux is mainly below zero, indicating that the observed area is a methane sink. The values of the empirical coefficients used to calculate the flux of CO₂ and CH₄ in relaxed eddy-accumulation method are 0.61 and 0.30.