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Land-atmospheric water and energy cycle of the winter wheat field in the Loess Plateau, China

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The Chinese Loess Plateau is a critical region in the research of land-atmospheric water and energy cycle on both regional and global scales due to its complex terrain, relief and its relation to East Asian summer monsoon. The unique environment of surface energy partitioning and the characteristic of water and energy cycle are very important information for improving the simulation ability of land surface model and weather forecast model over the Chinese Loess Plateau. In this study, Land - atmospheric water and energy cycle of the winter wheat field in the Chinese Loess Plateau was investigated by the eddy covariance technique, soil water content, soil heat flux and four components radiation measurements. Results show that all four radiation components changed diurnally and daily, resulting in diurnally and daily variation in net radiation. Latent heat flux is the main consumer of available energy for entire experimental period. The energy partitioning of and is 45% and 34% respectively, is 10%, and Bowen ratio is 0.90. Surface albedo is 0.19 averaged in total period, and surface albedo in heading of winter was lower than other growing season surface albedo because vegetation cover fraction declined the surface albedo. The common standard for representing the accuracy of measurement of the energy budget is defined by the degree of closure(C), and the C is applied to evaluate the accuracy of measurement, which shows there is a gap 82 %, and through a thermal storage term of soil correction, the energy balance closure is up to 90%, the energy imbalance problem was encountered and the causes are analyzed. Then, the daily variations of water and energy fluxes were analyzed, and the diurnal variations of water and energy fluxes were also analyzed in cloudy and clear sky day. Results show that the water the available of sensible heat flux and latent heat flux changed daily, but latent heat flux was mainly controlled by the rain fall event, a relative much rain fall day occurred correspondences to following a few high latent heat flux days, while the sensible heat flux was mainly controlled by the net radiation, a relative high or low net radiation day correspondences a high or low sensible heat flux day.