



The characteristics of land surface heat fluxes over degraded grassland and cropland in the semi-arid area of China

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Using the long-term intensified observation data collected over 2003 to 2005 at Tongyu (44°25'N 122°52'E), one of the reference sites of Coordinated Energy and water-cycle Observations Project (CEOP), known as the typical semi-arid area of China, the characteristics of land surface latent and sensible heat fluxes over the degraded grassland and the cropland have been analyzed systematically. The results show that the surface heat fluxes over the two different underlying surfaces have obvious diurnal and seasonal cycles and have similar variations. It is also identified that the inter-annual variability of the surface heat fluxes is mainly influenced by meteorological conditions of the year, especially by the precipitation during the growing season. Concerning the seasonal cycle, the latent/sensible heat fluxes over the cropland shows higher range than that over the degraded grassland during spring/summer respectively, which is consistent with the variation of the normalized difference vegetation index (NDVI) over two land surfaces. The allocation of net radiation to latent/sensible heat fluxes shows an opposite phase change both over the two types of land surfaces, and the ratio of the latent heat flux is only higher than that of the sensible heat flux in summer. The differences of the allocation of net radiation over the different underlying surfaces are mainly determined by the vegetation type. The trends of monthly-average Bowen ratio over the two land surfaces are almost same as each other, including the magnitudes. The Bowen ratio in summer is less than 1.0 both over the degraded grass-

land and the cropland surfaces.

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