

农学—研究报告

长武塬区土壤热状况变化特征

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摘要:

通过分析长武塬区农田生态系统内的土壤热状况来探讨该系统地气界面的能量传递的过程和特征, 为陆面过程及大气边界层的研究提供参考。根据2008年气象观测资料, 本研究从反照率、温度梯度、土壤热通量及其与辐射的相互关系等方面进行研究, 从而分析土壤热状况月变化特征及其影响因素。研究结果表明: (1) 除10~20 cm层外, 各层月变化在5月份及6月上旬最小, 11月份下旬到次年2月上旬一直维持在较高水平, 且变化不大; (2) 土壤热通量月变化趋势与土壤温度表现负相关; (3) 反照率在1月份达到年最大值0.66, 3—9月份变化不大, 在9月份达到最低值0.14; 从10月份开始, 上升趋势明显, 直到次年1月份; (4) 在日变化中净辐射持续增强和减弱两个时间段内, 同一辐射强度对应的热通量值相差较大, 土壤热通量延迟不明显。增强时段的相关性

($R_{12}=0.766$) 小于减弱时段的相关性 ($R_{22}=0.799$)。农田生态系统中土壤热通量和净辐射的相关性远远高于林地, 低于草地和稀疏灌层生态系统。

关键词: 净辐射

Variation Characteristics of Soil Thermal Regime over Changwu Tableland Region

Abstract:

This article had discussed the process and characteristics of energy delivering in the interface of surface and atmospheres in farmland ecosystem through analyzing the soil thermal regime, which would provide the reference to the study of land surface process and atmospheric boundary. Based on the meteorological observation data on 2008, we studied the monthly variable characteristics from surface albedo, soil temperature gradient, and soil heat flux, the relations between soil heat flux and the net radiation. The results showed that: (1) The changes of both temperature gradient and its amplitude were not obvious with the days strengthened. The monthly changes of every layer but 10-20 cm was declined to the minimum value in May and the first ten days of June, and increased to the maximum value in November and the last ten days of next February. (2) With respected to changes on soil heat flux, monthly variation was opposite to the changes of soil temperature gradient. (3) In the months of scales, the climax point of the albedo was shown in January, and changed smaller from March to September among the other period. It declined to the lowest point 0.14 in September. It significantly increased from October to December until maximum 0.66 shown in January. (4) It was not simple linear relationship between net radiation and soil heat flux. The radiation intensity of 1 day was consistent with difference heat flux, and the delaying of soil heat flux was not obvious. When radiation increase, the fitted curve between net radiation and heat flux, $R_{12}=0.766$ less than $R_{22}=0.799$ when radiation continuous reduction. The correlation of farmland ecosystem between net radiation and soil heat flux is much higher than that of forest land and is lower than that of grassland and sparse shrubs.

Keywords: net radiation

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