

**Yao, Deliang; Zhang, Qiang; Li, Jiachun; Xie, Zhengtong; Shen, Zhenxi**  
**Observation and modeling for terrestrial processes in alpine meadow.** (English)

Zbl 1070.86003

Appl. Math. Mech., Engl. Ed. 25, No. 5, 488-498 (2004).

Summary: The water-heat transfer process between land and atmosphere in Haibei alpine meadow area has been systematically observed. A multi-layer coupling model for land-atmosphere interaction was presented with special attention paid to the moisture transfer in leaf stomata under unsaturated condition. A profound investigation on the physical process of turbulent transfer inside the vegetation has been performed with a revised formula of water absorption for root system. The present model facilitates the study of vertically distributed physical variables in detail. Numerical simulation was conducted according to the transfer process of Kinesia humility meadow in the area of Haibei Alpine Meadow Ecosystem Station, CAS. The calculated results agree well with observation.

**MSC:**

86A05 Hydrology, hydrography, oceanography

Cited in 1 Document

**Keywords:**

land-atmosphere coupling model; turbulence transfer; numerical simulation; field observation

**Full Text:** [DOI](#)

**References:**

- [1] XIA Wu-ping. Alpine Meadow Ecosystem [M]. Lanzhou: Gansu Publishing House of People, 1981. (in Chinese)
- [2] Deardorff I W. Efficient prediction of ground surface temperature and moisture with inclusion of a layer vegetation[J]. J Geophys Res 1978,83:1889–1903. · doi:10.1029/JC083iC04p01889
- [3] Dickinson R W. Biosphere-atmosphere transfer scheme(BATS) for NCAR community model[R]. NCAR, Boulder Co, TN-275+STE, 1986.
- [4] Sellar P J, Mintz Y. A simple biosphere model(SiB) for use within general circulation models[J]. J Atmos Sci, 1986,43:505–531. · doi:10.1175/1520-0469(1986)043<0505:ASBMFU>2.0.CO;2
- [5] Naot O, Mahrer Y. Modelling microclimate environments: a verification study[J]. Boundary Layer Meteorology, 1989,46:333–354. · doi:10.1007/BF00172240
- [6] Ten Terge H F M. Heat and Water Transfer in Bare Topsoil and the Lower Atmosphere[M]. Netherlands: Pudoc Wageningen, 1990.
- [7] HU Yin-qiao, Gao You-xi, WANG Jie-min, et al. Some results of Heihe field observation [J]. Plateau Meteorology, 1994,13(3):225–236. (in Chinese)
- [8] JI Guo-liang. Advanced in energy budget observation experiment over the Qinghai Xizang Plateau [J]. Plateau Meteorology, 1999,18(3):333–340. (in Chinese)
- [9] YAO De-liang, SHEN Wei-ming, XIE Zheng-tong, et al. Study on growth yield of forage grass in high cold meadow[J]. Acta Agrestia Sinica, 1996,4(4):274–280. (in Chinese)
- [10] YAO De-liang, SHEN Wei-main, ZHANG Qing, et al. A model of the land biosphere about alpine meadow ecosystem and its application[J]. Plateau Meteorology, 2002,21(4):389–394. (in Chinese)
- [11] XIE Zheng-tong, LI Jia-chun, Yao De-liang. A coupling model of the land-atmosphere interaction with canopy influence[J]. Acta Mechanica Sinica, 1998,30(3):267–276. (in Chinese)
- [12] LI Jia-chun, YAO De-liang, SHEN Wei-ming, et al. A coupling model for terrestrial processes in arid areas and its application[J]. Applied Mathematics and Mechanics (English Edition) 1999,20 (1):1–11. · Zbl 0933.74523 · doi:10.1007/BF02459267
- [13] YAO De-liang, XIE Zheng-tong, LI Jia-chun. Land-atmosphere interaction model and observation in Yucheng County[J]. Acta Ecologica Sinica, 2000,20(6):1076–1082 (in Chinese)
- [14] PAN Lin-lin, CHEN Jia-yi, ZHANG Hong-shen, et al. A one-dimensional coupling model for land-atmosphere interaction and its application in Inner Mongolia grassland[J]. Atmosphere Sciences, 1996,20(3):267–277 (in Chinese)
- [15] Molz F J. Models of water transport in the soil-plant system: A review[J]. Water Resour, Res, 1981,17(5):1245–1260. · doi:10.1029/WR017i005p01245

- [16] KANG Shao-zhong, LIU Xiao-ming, XIONG Yun-zhang. The Soil-Vegetation-Land-Atmosphere Continuous Water Transfer Theory and Its Application [M]. Beijing: Hydro-Electric Publishing House, 1994. (in Chinese)
- [17] CHENG Qun-shu, FENG Xiu-zao, LIU Xiu-miao. China Agriculture Encyclopedia, Volume of Agriculture Meteorology [M]. Beijing: Agriculture Press, 1986. (in Chinese)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.