Geophysical Research Abstracts,
Vol. 11, EGU2009-1674, 2009
EGU General Assembly 2009

Recent advances on the study of land-atmospheric interaction on the Tibetan Plateau

Y. Ma

Laboratory of Tibetan Environment Changes and Land Surface Processes, Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing 100085, China (ymma@itpcas.ac.cn, +86 10 6284-9886)

As a unique geological and geographical unit, the Tibetan Plateau dramatically impacts the world's environment and especially controls climatic and environmental changes in China, Asia and even in the Northern Hemisphere. Tibetan Plateau, therefore, provides a field laboratory for studying global change. With support from various agencies in the People's Republic of China, a Tibetan Observation and Research Platform (TORP) is now implementing. Firstly the background of the establishment of the TORP, the establishing and monitoring plan of long-term scale (5-10 years) of the TORP has been introduced. Then the preliminary observational analysis results, such as the characteristics of land surface heat fluxes and CO2 flux partitioning (diurnal variation, inter-monthly variation and vertical variation etc), the characteristics of atmospheric and soil variables, the structure of the Atmospheric Boundary Layer (ABL) and the turbulent characteristics have also been shown in this paper.
The study on the regional distribution of land surface heat fluxes of paramount importance over heterogeneous landscape of the Tibetan Plateau. Therefore, here the parameterization methods based on satellite data (NOAA/AVHRR, Landsat-7 ETM, ASTER and MODIS) and Atmospheric Boundary Layer (ABL) observations have been proposed and tested for deriving surface reflectance, surface temperature, NDVI, MSAVI, vegetation coverage, LAI, net radiation flux, soil heat flux, sensible heat flux and latent heat flux over heterogeneous landscape. As cases study, the methods were applied to the experimental area of the CAMP/Tibet (CEOP (Coordinated Enhanced Observing Period) Asia-Australia Monsoon Project (CAMP) on the Tibetan Plateau), which located at the central Tibetan Plateau and the whole Tibetan Plateau area. Five scenes of Landsat-7 ETM data, four scenes of NOAA/AVHRR data, three scenes of ASTER data and four MODIS data were used in this study. To validate the proposed methods, the ground-measured surface reflectance, surface temperature, net radiation flux, soil heat flux, sensible heat flux and latent heat flux are compared to satellite derived values. The results show that the derived surface variables and land surface heat fluxes over the study area are in good accordance with the land surface status. These parameters show a wide range due to the strong contrast of surface features. And the estimated land surface variables and land surface heat fluxes are in good agreement with ground measurements, and all their absolute percent difference is less than 10% in the validation sites. It is therefore concluded that the proposed methods are successful for the retrieval of land surface variables and land surface heat fluxes over heterogeneous landscape of the Tibetan Plateau area. Further improvement of the methods and its applying field were also discussed.