Geophysical Research Abstracts
Vol. 19, EGU2017-3124, 2017
EGU General Assembly 2017

Characterization of energy exchange parameters in the Himalayan foothills Pakistan

Bushra Khalid (1,2,3), Mukul Kumar (4), Bueh Cholaw (1), Junaid Aziz Khan (5), and Azmat Hayat Khan (6)

(1) Institute of Atmospheric Physics, University of Chinese Academy of Sciences, Beijing 100029, China (kh_bushra@yahoo.com), (2) Department of Environmental Sciences, International Islamic University, Islamabad, Pakistan, (3) International Institute for Applied Systems Analysis, Laxenburg, Austria, (4) National Space Science Center, University of Chinese Academy of Sciences, Beijing 100029, China, (5) Institute of Geographical Information System (IGIS), National University of Science and Technology (NUST), Islamabad, Pakistan, (6) National Drought Monitoring Center, Pakistan Meteorological Department, Islamabad, Pakistan

The characterization of energy exchange parameters for spring season (April-May) has been done for Margalla hills national park (MHNP) Islamabad, Pakistan. It is important because Islamabad city lies in the foothills of Himalayas and micro meteorological activity makes the climate of surrounding areas. The activity on Himalaya's foothills (i.e. Margalla hills) regulate weather and also provide fresh water to the lakes and ponds by late afternoon thunder showers. This research is also important from the perspective of rain water harvesting in Islamabad, Pakistan. The objective of this study is to characterize the energy exchange parameters in the foothills of great Himalayas particularly on MHNP. Landsat ETM+ imageries have been used for calculating the land surface temperature (LST), normalized difference vegetation index (NDVI), and normalized difference moisture index (NDMI). SPOT 5 image has been used for land use/land cover classification over MHNP. The turbulent fluxes have been calculated by computing the values acquired from the processing of satellite imageries and real time observation data sets. The comparisons have been made between the land and atmospheric temperature and moisture to see the difference and its impacts on weather of twin cities i.e. Islamabad and Rawalpindi. The energy exchange parameters have been characterized by analyzing the impacts of weather parameters and turbulent fluxes on MHNP and surrounding cities. The potential rain water harvesting sites have been marked in the foothills. Weather and surface conditions become more favorable for the growth of vegetation by the end of April as the spring season reaches at its peak. There is the start of growing season in the month of April whereas the vegetation becomes thick over time during the month of May over Margalla hills however, the energy exchange parameters follow the same pattern in May as in April. The relative humidity remains between 18 - 55 % and the atmospheric temperature variations are between 19 to 35 0C during the studied period. As the atmospheric temperature and RH fluctuate, it effects the soil moisture and land surface temperature. Even if the atmospheric temperature rise or fall, the evergreen vegetation is found throughout the year on Margalla hills maintains/regulates the land surface temperature and soil moisture. The latent heat flux cause an increase in the noon temperature and RH levels. It further increases the moisture level in the atmosphere that is greatly supported by sensible heat flux to drive the moisture to the higher vertical levels and cause late afternoon thunder showers on the foothills and surrounding areas. The thundershowers are usually intense that cause light or heavy hail and changes the atmospheric temperature around 20 degrees Celsius in the evening time.