Geophysical Research Abstracts
Vol. 16, EGU2014-6580, 2014
EGU General Assembly 2014

The Research of Quantitative Retrieval of Dust Storm Using FY3 Thermal Infrared Channels

Hui Xu (1), Tao Yu (2), and Tianhai Cheng (3)

(1) Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, Beijing, China (xuhui@irsa.ac.cn), (2) Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, Beijing, China (yutao@irsa.ac.cn), (3) Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, Beijing, China (cthy@irsa.ac.cn)

In spring, the northern part of China is dry and often windy, providing the favorable conditions for the development of dust storms. The aloft mineral dust which mainly distributed in the troposphere can affect climate on various spatial and temporal scales by a series of complex direct and indirect radiative forcing. Therefore, it is necessary to monitor its distribution and study how it changes. Since the advent of satellite technology, today we have been able to routinely and continually monitor the dust from space, so satellite measurement is very suitable for large scale dust weather monitoring.

Firstly, based on the analysis of microscopic properties of dust aerosols and its extinction ability over thermal infrared window bands, this paper develops a new dust storm optical depth retrieval algorithm by using the thermal infrared channels of China's new generation polar orbit meteorological satellite - FY3 VIRR sensor. As the description of dust optical properties and the accuracy of radiative transfer model is particular important for dust retrieval, the DISORT (Discrete Ordinates Radiative Transfer) model combined with new optical properties of Asia dust is implemented. Secondly, two dust storm events that observed in the northwestern region of China are analyzed based on above method. At last, the value of retrieved dust optical depth is evaluated by the product of OMI and MODIS level2. Through the analysis we found that the retrieved dust optical depth has a high correlation with OMI and MODIS level2 data which indicates that the infrared measurements of FY3 VIRR are efficient for the monitor of dust storms.