Estimating and verifying of the land surface temperature retrieved from Modis data in Heihe area

Kai Wang [1,2], *Qiang Liu* [1], *Qinhuo Liu* [1], *Chunyan Zhou* [1,2], *Hua Li** [1,2]

([1] State Key Laboratory of Remote Sensing Science, Jointly Sponsored by the Institute of Remote Sensing Applications of Chinese Academy of Sciences and Beijing Normal University, Beijing 100101, China;
[2] Graduate University of Chinese Academy of Sciences, Beijing 100049, China;

Abstract:

Simultaneous Remote Sensing and Ground-based experiment in the Heihe River Basin was carried out in 2008, various data including remote sensing data and field measurements were acquired. Based on these data, the land surface temperature in Heihe area is retrieved by using a local split window method, and verified by the temperature product of Aster.

The land surface temperature is retrieved by a split window method proposed by Dr. Mao Kebiao, which requires land surface emissivity and atmosphere transmittance. First, using emissivity of wheat, crop and soil measured by 102F and Modis band filter response function, emissivity of these land covers in Modis band31 and band32 are simulated, and then the land surface emissivity can be retrieved by NDVI threshold method. Second, by deriving the total column water vapor amount from the near-IR “water vapor” channel (band2) and “window” channel (band19), in addition to view zenith angle obtained from Modis image, the atmosphere transmittance is estimated by Modtran. Finally, the land surface temperature is retrieved by this split window method.

To verify the accuracy of the retrieved land surface temperature, the temperature product of Aster with a resolution of 90 meters is then applied to simulate Modis imaging through a geometrical processing method, which takes in account the geometrical information such as observing zenith angle, observing azimuth angle, longitude and latitude of Level-1B MODIS products.

Corresponding author: Qinhuo Liu

Wangkai
E-mail: onecat@163.com
Qiang Liu
E-mail: liuqiang@irsa.ac.cn

Qinhuo Liu
Mailing address: State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing Application, Chinese Academy of Sciences, Datun Road, Chaoyang District, Beijing, China. Zip: 100101
E-mail: qhliu@irsa.ac.cn
Chunyan Zhou
E-mail: mezhouchunyan@126.com
Hua Li
E-mail: lihua6644@yahoo.com.cn