

Scaling Effect Study on Land Surface Temperature Quantitative Inversion Using Remote Sensing

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Land surface temperature is one of most key parameters of surface energy exchange between land surface and atmosphere. It is uneasy to derive surface temperature using traditional methods. As the application of remote sensing technology, the problem has been resolved very well and there have been some successful case studies now. Most pixels are mixed pixel in the remote sensing image, which includes more than two kinds of land covers. Obviously, the internal composition and structure is different with different pixel size. As the size of pixel changes, the scale of research object is different using remote sensing technology. The information of one pixel will vary by all appearances, and the structure will change, too. Therefore, this article selects different spatial resolution remotely sensed data as data sources, MODIS and ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer), with the spatial resolution of one kilometer and ninety meter separately in the thermal infrared bands. The land surface temperature can be inversed quantitatively by means of split-window method using MODIS and ASTER data. After the land surface temperature is derived, this article carries on the following analysis. Firstly, the land surface temperature in the pixel scale is validated with measured data. It shows that the results for the inversed temperature are reasonable. Then the rule and character of land surface temperature in the pixel scale are analyzed from different spatial scale. Thereby the rule and character of land surface temperature in the pixel scale can be understood better. Thirdly, this article tries to discuss a new method for analyzing the scaling effect between the results derived from remotely sensed data with different spatial resolution and field data. At last, the effective scale for a material study area is determined. It can perfect the model of estimating the region scale land surface energy balance in this study. It is significant to improve the precision.

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