

## 利用环境一号卫星热红外通道反演太湖流域地表温度的3种方法比较

孙俊, 张慧, 王桥, 沈渭寿, 孙明

南京信息工程大学遥感学院

## Three Methods for Inverting Land Surface Temperature of the Taihu Lake Basin Using HJ-1 Satellite Thermal Infrared Channel

SUN Jun, ZHANG Hui, WANG Qiao, SHEN Wei-Shou, SUN Ming

School of Remote Sensing, Nanjing University of Information Science &amp; Technology

摘要

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摘要 利用太湖流域2010年3月26日过境的1景环境一号卫星热红外数据(轨道号为451/77), 根据同步modis数据反演大气水汽含量参数, 分别利用覃志豪单窗算法、普适性单通道算法、基于影像的Artis反演算法反演太湖流域地表温度, 通过与同期的MOD11\_L2级modis温度产品进行对比分析, 探寻适合于环境卫星热红外通道反演地表温度的方法, 以达到对环境一号卫星热红外数据定量化应用示范的目的。结果表明: 相比其他算法, 普适性单通道算法精度较高, 与modis温度产品温差较小, 为+1.23 K, 而环境一号卫星过境时间与modis温度产品时差为39 min, 因此该方法的反演精度可以接受。

关键词: 环境一号卫星 地表温度 单窗算法 太湖流域

Abstract: Based on the thermal infrared images of the Taihu Lake Basin taken by the HJ-1 satellite on March 26, 2010, atmospheric moisture content was inverted using the synchronous modis data and land surface temperature (LST) was inverted with mono-window algorithm (Qin, 2001), generalized single-channel algorithm (Jimenez-Munoz & Sobrino, 2003) and image-based Artis inversion algorithm (Artis & Carnahan, 1982), separately for comparison with the temperature product of modis of Grade MOD11\_L2, so as to explore suitable method for inversion of surface temperature using the HJ-1 satellite thermal infrared channel. Results show that the generalized single-channel algorithm is more precise than the others and its results differ slightly from the modis temperature product, being 1.23 K on average. Moreover, the overhead time of the satellite is only 39 minutes different from the time of the modis LST product. Therefore, the use of the generalized single-channel algorithm for inversion is acceptable in accuracy.

Keywords: HJ-1 satellite land surface temperature (LST) mono-window algorithm Taihu Lake Basin

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Corresponding Authors: 张慧 环境保护部南京环境科学研究所 Email: zhnies@126.com

About author: 孙俊(1986—), 男, 江苏盐城人, 硕士生, 主要研究方向为遥感和地理信息系统在生态保护与环境管理中的应用。E-mail: 584845197@qq.com

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