Classification of Rangeland Resource Types Based on Multi-Source Remote Sensing Data

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Key words: northern slope of Tianshan Mountains, rangeland resources, classification, multi-source remote sensing data, 3S" technologies

Introduction The sustainable utilization of rangeland resources and the maintenance of ecological balance works on the premise that the information about changing rangeland resources is obtained rapidly. In China, the studies of classification and mapping of rangeland resources can be traced back to the 1960's (LI Jianlong *et al*., 1996), at that time interpretation was conducted using large-scale aerial photos, later they began to adopt satellite photos with the development of space-flight technology. So far researchers of this field mostly use remote sensing data as a reference (ZHEN Shoulin et al., 1990; LIU Fuyuan et al., 1991). In this study, multi-source remote sensing data were applied to investigate and classify rangeland resource types based on the 3S" technical platform.

Materials and methods The site was on the northern slope of Tianshan Mountains in Xinjiang province, China (86°05′~87°05′ E, 43°~43°08′N), the total area is about 5443 km^2. Three kinds of remote sensing data(Landsat-7/ETM+, CBERS, MODIS) were selected to execute supervised classification after a series of technical processes including image registering, format conversion, image enhancement and optimized band combination. With the support of Windows XP and GIS software (ENVI4.0, ArcView3.2, MapInfo 7.0), precision analysis and verification of the multi-source remote sensing data were conducted, combined with on-site square check, digital elevation model (DEM) and experts analysis, respectively.

Results ETM+ can discern and classify well whether in plain, partly mid-mountain, sub-alp or alp region; the accuracy rate was about 73.79% ~86.43%, but in low-mountain (1000-1600 m) and mostly mid-mountain it is difficult to classify the rangeland resources types. For CBERS, the accuracy rate decreased 51.12% ~83.67% from plain to alp region, and the accuracy rate was higher in low-mountain and mid-mountain than that of ETM+. MODIS could only classify the first units of the rangeland resources types because of its lower spectral resolution.

Conclusions It is most effective to adopt digital elevation model (DEM) to improve the accuracy rate of classification. Both ETM+ and CBERS are suitable for classification in rangeland resources, they can discern types of the first units except for plain and partly mid-mountain which had lower accuracy, but there were mixed types in the second unit; MODIS is not suitable for the application in classifying, however, it can be used for carrying out dynamic monitoring and biomass estimating in rangeland resources.

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