The Method and Key Technology of Dynamic RS-GIS Environment Monitoring

Jianping Chen (1,2), Jie Xiang (1,2), Paolo Tarolli (3), Zili Lai (1,2)

(1) School of Earth Sciences and Resources, China University of Geosciences, Beijing, China (3s@cugb.edu.cn), (2) Land Resources Information Development and Research Key Laboratory of Beijing, China, (3) Department of Land, Environment, Agriculture and Forestry University of Padova, Italy, (paolo.tarolli@unipd.it)

Demographic growth, socio-economic development and urbanization have resulted in excessive exploitation and exerted increasing pressure on limited resources and the fragile ecological environment in China. There is an urgent need for theory and technology to achieve the comprehensive evaluation of environment. Remote sensing is one of the most important technology to monitor and evaluate environment. This study summed up dynamic RS (Remote Sensing)-GIS (Geographic Information System) environment monitoring theory, and established a dynamic monitoring system, adopting comprehensive methods of multi-source, multi-scale and multi-temporal remote sensing data acquisition. A software system is developed based on RS-GIS analysis method to support the whole dynamic monitoring and evaluation theory.

The main work and results obtained are as follows: 1)Summarized the evaluation theory of dynamic RS-GIS environment monitoring, using remote sensing technology as the main method to monitor environment; 2) established an advanced space-air-ground digital terrain data acquisition and processing technology (advanced satellite constellations, airborne and terrestrial laser scanner, low-cost Structure from Motion (SfM), photogrammetry, Unmanned Aerial Vehicle (UAV) and ground camera surveys); 3) Deeply study the application of quantitative digital terrain analysis in the assessment of environment, which successfully position geological disaster information and automatically extracted information; 4) Developed the RESEE software to support the whole dynamic monitoring and evaluation theory based on 4D-GIS; 5) A demonstration study of the dynamic monitoring environment is carried out in Beijing Miyun Iron Mine. Results show that the space-air-ground integrated and dynamic RS-GIS environment monitoring method and key technology can realize the positioning and quantitative monitoring the environment problem, and realize the risk assessment of the geological hazard.