GIS-BASED SUPPORT MODELS FOR THE DEVELOPMENT OF ERHAI LAKE WATERSHED MANAGEMENT INFORMATION SYSTEM

Junsan Zhao

(Faculty of Land and Resource Engineering, Kunming University of Science and Technology, Kunming, 650093, Yunnan, China)

Abstract

Digital lake (DL) or the implementation of the lake and watershed management information system (LWMIS) has been the major technological support for the practice of sustainable development. DL takes the information technology (IT), the GPS, RS, GIS (3S) and modern lake and watershed management theory and technology as the fundamentals. Many disciplines such as water resources management science, ecology, hydrometeorology and environmental protection science and technologies are involved in the establishment of DL to realize the comprehensive management and application of the geospatial information, water resource and ecological environmental information. The special analysis models are used for the monitoring, surveying and early warning of the environment, water quality and water yield of the lake and watershed dynamically and timely, by which the lake and watershed could be protected, developed and utilized in a scientific and sustainable way.

DL has the typical properties of the geospatial information system，it is related to many domains and disciplines of science and technology. This paper will mainly describe the geospatial data support models of the digital lake and watershed to establish a base for the research of the lake evolution, ecological environmental change, water resources management, and so forth. The key theoretical and technologic issues to be discussed in the paper includes:

The spatial analysis models and the algorithms for the lake and watershed are researched and described in the paper. The main contents include: (1)the basic functions and methods of the geospatial analysis; (2)the mathematics fundamentals of spatial analysis; (3)spatial imitating camber; (4) the measurement and the demonstration of the digital topography in multiple scales; (5) the submerge model of the lake；(6) the relationships between the water level and storage, as well as the area in Erhai Lake; (7)the application model and image identification of the remote sensing data.

According to the general requirement of the development of DL and the needs of the lake watershed management, the application support models are brought forward that are

based on the geospatial data, 3S technologies and water resource management processes. The models include water management support models, ecological environment models, etc. Meanwhile, the relationships between lands cover change and the water quality change is also outlined in this paper.

Key words: spatial analysis, lake watershed digital management, GIS, spatial imitating camber, support models, DEM