Distribution characteristics and policy implications of territorial development suitability of the Yangtze River Basin

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Abstract: Territorial development suitability (TDS) distribution and policy implications in the Yangtze River Basin are investigated through the use of statistical and spatial data, using the Delphi method, the analytic hierarchy process method and the comprehensive evaluation model. The distribution pattern and characteristics of TDS in the Yangtze River Basin are studied, providing a scientific basis and a decision-making reference for sustainable development of the whole basin, and promoting reasonable implementation of the Yangtze River economic belt development strategy. The results show that the overall level of development constraint is relatively high, and that high-value regions (grades $\text{V} - \text{VIII}$) are mainly distributed in the upper and middle reaches of the basin. The suitable development regions account for 22.95% of the total basin area, mainly including the Yangtze River Delta region, the provincial capitals, the urban agglomerations and most prefecture-level cities. The variation of TDS is significant among the upper, middle and lower reaches of the basin, and the high-value areas account for 8.24%, 35.70% and 82.97% of the total areas of the upper, middle and lower reaches, respectively. Three policy suggestions are proposed: (1) strict control of the basin development intensity, setting up an efficient and well-organized spatial development pattern, (2) implementation of different regional policies according to different functional orientations, and (3) strengthening of communication and cooperation between different regions, thus promoting integrated basin protection and development.

Keywords: territorial development suitability (TDS); distribution; policy; Yangtze River Basin

1 Introduction

With the emergence of increasingly prominent issues such as the out of control space de-
velopment and regional disorderly competition, the optimization of development patterns and development of coordinated regions are currently important scientific and practical propositions that need to be solved in China. Furthermore, evaluation of territorial development suitability (TDS) is an important basis that should be taken as a base to solve these propositions. TDS evaluation investigates the suitability of scheduled use and limited status based on the natural and socioeconomic attributes of the land space. In this paper, TDS refers to the suitable degree of the specific space carrying industrialization and urbanization.

International research has mainly focused on the application of geographic information system (GIS) technology and evaluation of model construction. At the end of the 19th century, landscape designers in the USA began to use hand-drawn engineering drawings and superimposed images to evaluate suitability. Since then, an evaluation method based on GIS technology has gradually become the main method of evaluation (He et al., 2009). GIS technology combined with computer-aided overlay graphics (Mac, 1975; Steinitz et al., 1976), multiple-criteria decision-making methods (Carver, 1991; Banai, 1993; Maleczewski, 1999; Openshaw and Abrahart, 2000), fuzzy logic (Wang et al., 1990; Burrough and McDonnell, 1998), neural networks (Sui, 1993), genetic algorithms (Krzanowski and Raper, 2001) and cellular automata methods (Batty and Xie, 1994) have gradually improved the evaluation method in terms of comprehensive degree and dynamic accuracy. At the same time, the fusion of GIS technology and another model has become a significant trend. For example, the laboratory at Harvard University etc. developed SYMAP and GRID system consisting of a series of spatial suitability evaluation modules (Murray et al., 1971). However, other researchers have paid more attention to application methods. Ding et al. (2008) divided typical areas of different development intensities according to an index of ecological and economic importance. Qi and Gu (2010) obtained a TDS classification through a comprehensive analysis of three elements and a two-dimensional matrix. Li (2009) demonstrated regionalization of spatial development suitability on a small scale based on a GIS spatial overlay analysis of ecological and economic factors. Sun and Chen (2009) partitioned six suitable development regions using matrix classification of natural ecological constraints and economic development demand analysis. Fan (2011) evaluated the development and construction suitability of a 20-km buffer zone of Xijiang River in China by studying single factor and conducting comprehensive evaluation of nine selected indicators. In practice, the evaluation mainly constituted three indexes: the support capacity of resources and environment, the existing development intensity and the development potential (Fan, 2007). The scale mainly concentrated on the city and the provincial administrative area, while research on interprovincial and basin area was relatively less. In order to widen the content and scale of the current research and deepen the science cognition and theory research of river basin rational development, this paper takes counties as the basic unit to conduct suitability evaluation of the Yangtze River Basin territorial development.

Research on river basin development strategy and policy has realized many achievements. For example, She (1994) studied the development mode and advantage complementary of different sections of the Yangtze River Basin; Wei and Jiang (2009) proposed strategic conception and policy measures of development planning of the Yangtze River Basin; and Chen et al. (2007) gave opinions on policy guidance, the management system and industry posi-