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Fractal Features of the Boundary Dynamic Evolution of the Dry Valley in the Upper Reaches of Min River

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The Upper Reaches of Min River Basin is located in the transition between the Sichuan Basin and the Northwest Sichuan Plateau, with a length of 355.07km and a basin area of 2.24×10^4 km². It has 1667 mountainous settlements, including 834 settlements of Tivetan nationality and 667 settlements of Qiang nationality, which has made it a typical multi-ethnic area with diversified economies and cultures.

At the same time, under the background of cultural diversities of settlements, the frequent and significant interferences of human activities on the mountain ecological environment have made the Upper Reaches of Min River Basin become one of the typical fragile ecological environment areas in the Upper Yangtze River.

The Dry Valley, which is the main carrier of human productions and life activities, has characteristics like steep slopes, rock joint and crack developments, rock broken, sparse vegetations, exposed rocks, severe physical weathering, and landslide, collapse and debris flow developments.

Based on Erdas8.5 and Arcgis9.3, this paper quantitatively analyst four sessions of the Upper Reaches of Min River Basin in 1974, 1974, 1995, 2000, and 2010 by using fractal theory, which could reveal the dynamic

evolution characteristics of its border area and provide references for intensive study of the regional climate changes responding to global climate changes.

The results showed that: The areas and boundaries in 1974-2000 were sustainable growth and the fractal dimension values were also gradually increasing. But the expansion modes in different periods had significant differences, which showed that slow expansion in 1974-1986, rapid spread period in 1986-1995 and slow spread period in 1995-2000. The growth of the Dry Valley mainly showed the trend of moving outward, and the river valley landscape the fragmentation of landscapes in river valley also increased.

In 2000-2010, the areas and boundaries of the Dry Valley reduced in a certain degree and the fractal dimension values were also reduced, which were in consistent with the rules showed by the landscape representations, and these phenomena were closely related to the grain for green project and ecological immigrant project in the region.

Key words: the Upper Reaches of Min River, the Dry Valley, 3S technology, fractal, fractal dimension

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