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## Spatial-Temporal Landscape Dynamics in the Hulunbeir Forest-Steppe Ecotone

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## Spatial-temporal landscape dynamics in the Hulunbeir forest-steppe ecotone

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**Key words :** forest-steppe ecotone, landscape pattern, landscape heterogeneity

**Introduction** The forest-steppe ecotone with alkali grassland is in Hulunbeir, which borders the Great Xing'an forest region, is one of the most significant ecological barriers in North China. In the last decades, due to the changes of global climate and the general impacts from human activities, timberline in the transition region moved up, grassland changed into desert and the water and soil lost drastically. All these factors, in combination, severely hamper the sustainable development of local resource, environment, economy and society. Nowadays, researches on dynamic changes of landscape structure and function characteristics are still few.

**Material and methods** By integrating Remote Sensing and Geographic Information System, the spatial information of landscape pattern of ecotone between forest and grass in Hulunbeir during three periods of 1995, 2000 and 2005 was explained and extracted. This paper explores how and why the landscape pattern changed, based on the basic theory and method of landscape ecology, taking number of patches, fragmentation and division as indexes to analyze the spatial-temporal dynamic changes of the landscape pattern.

**Conclusions** It is remarkable to interchange between different landscapes, especially among forest land, grassland, cropland and unused land. The area of forest land has decreased sharply by 7858 km<sup>2</sup>, while the unused land increased 4087 km<sup>2</sup>. The indices of landscape characteristics have changed significantly from 1995 to 2005, with the landscape diversity index and fragmentation index increasing and the landscape dominance index decreasing. Main landscape types including forest, grassland, and cropland, unused land show that their patches quantity increased and patch shape changed more and more complexly (Table 1). This study revealed the intensities, directions, and rates of landscape pattern changes, and the relationships among landscape pattern, ecological processes, and human activities.

**Table 1** Analysis of landscape index in main landscape pattern from 1995 to 2005.

Year	Forest			Grassland			Cropland			Unused land		
	1995	2000	2005	1995	2000	2005	1995	2000	2005	1995	2000	2005
NP	1392	1359	1008	3817	4007	4666	3817	4007	4666	3817	4007	4666
F	0.024	0.0233	0.0166	0.0812	0.089	0.1165	0.2699	0.2288	0.2211	0.1459	0.1569	0.1647
D	0.869	0.8744	0.8655	0.9039	0.9184	0.987	0.9488	0.9742	0.9921	0.9584	0.9677	0.9994

NP : Number of Patches, F : Fragmentation index, D : Division index

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