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## Land Use Change Characteristics in the Pan-Pearl River Basin in China from 1985 to 2020

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The changes in land use/cover are essential aspects of studying the impact of human activities on the Earth's surface and global transformations. In this study, utilizing the ESRI Global Land Cover data (ESRI land cover 2020) and the China Land Cover Data (CLCD), along with historical imagery from Google Earth, a comparative analysis scheme for land use classification results was designed. The CLCD dataset was updated, leading to the creation of a land use dataset for the Pan-Pearl River Basin spanning from 1985 to 2020. This dataset was then employed for the analysis of land use changes in the Pan-Pearl River Basin over the past 35 years. The results indicate: (1) Among the seven land use types, the most significant changes in area occurred in the following order: build-up land, cropland, forest land, grassland, shrubland, waterbody, and barren. Notably, there was a substantial increase in the areas of build-up land and forest land, while cropland, grassland, and shrubland experienced significant decreases. The waterbody area showed a slight overall increase trend. (2) The major land use types undergoing changes varied among sub-basins, with the intensity of land use change ranked as follows: Pearl River Delta region (1.9%) > Coastal rivers in southern Guangdong and western Guangxi (0.20%) > Dongjiang River Basin (0.13%) > Hanjiang River Basin (0.12%) > Xijiang River Basin (0.10%) > Beijiang River Basin (0.08%) > Hainan Island region (0.02%). (3) Within the sub-basins of the Pan-Pearl River Basin, the most significant increase was observed in the area of built-up land, exhibiting a continuous expansion trend with a total increase of 12184 km<sup>2</sup>. This increase was primarily due to the conversion of cropland, forest land, and waterbody. The most significant decrease occurred in cropland, with a total reduction of 10435 km<sup>2</sup>, mainly transitioning to built-up land and forest land. The phenomenon of built-up land encroaching on cropland was particularly prominent, especially in the Pearl River Delta region. Forest land also showed a decreasing trend, mainly attributed to cultivation and the encroachment of built-up land. The reduction in grassland area was more pronounced in the Xijiang River Basin, primarily transforming into forest land, cropland, and built-up land. The study reveals that the rapid development of socio-economics and industry, coupled with an increase in residents' consumption levels, serves as the primary driving force behind land use changes in the Pan-Pearl River Basin. Additionally, land use and management policies play a crucial role as driving factors in the region's land use changes. This research aims to provide a scientific basis for formulating policies related to the region's land resources and land management, holding significant importance for preserving ecological balance and fostering sustainable development in the basin.

