Tupu methods of spatial-temporal pattern on land use change: a case study in the Yellow River Delta

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Comprehensive study on land-use change of spatial pattern and temporal process is the key component in LUCC study nowadays. Based on the theories and methods of Geo-information Tupu (Carto-methodology in Geo-information, CMGI), integration of spatial pattern and temporal processes of land-use change in the Yellow River Delta (YRD) are studied in the paper, which is supported by ERDAS and ARC/INFO software. The main contents include: (1) concept models of Tupu by spatial-temporal integration on land-use change, whose Tupu unit is synthesized by "Spatial· Attribute· Process" features and composed of relatively homogeneous geographical unit and temporal unit; (2) data sources and handling process, where four stages of spatial features in 1956, 1984, 1991, and 1996 are acquired; (3) integration of series of temporal-spatial Tupu, reconstruction series of "Arising" Tupu, spatial-temporal Process Tupu and the spatial temporal Pattern Tupu on land-use change by remap tables; (4) Pattern Tupu analysis on land-use change in YRD during 1956-1996; and (5) spatial difference of the Pattern Tupu analysis by dynamic Tupu units. The various landform units and seven sub-deltas generated by the Yellow River since 1855 are different. The Tupu analysis on land-use in the paper is a promising try on the comprehensive research of "spatial pattern of dynamic process" and "temporal process of spatial pattern" in LUCC research. The Tupu methodology would be a powerful and efficient tool on integrated studies of spatial pattern and temporal process in Geo-science.

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