

Spatio-temporal changes of land use land cover of three nature reserves in the Dongting Lake area, China

(中国, 洞庭湖地域における3つの自然保護区の土地利用土地被覆の時空間変化)

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Three nature reserves, namely, East Dongting Lake National Nature Reserve (EDLNRR), West Dongting Lake National Nature Reserve (WDLNRR) and South Dongting Lake Provincial Nature Reserve (SDLPNR), are the only three wetlands, which are included in the Internationally Important Wetland List in Hunan province, China. Three nature reserves have adjusted their boundaries due to changes in their condition over time. Therefore, for effective protection, it is crucial to understand these changes and their spatio-temporal changes in land use land cover from the pre-establishment to now. The main objective of this study is to understand the spatio-temporal (dry season) dynamics of land use land cover changes of three Dongting Lake nature reserves as well as their three functional zones. Land use land cover maps were generated by applying the Support Vector Machine algorithm to remote sensing images and classified into seven land types: water, flat mudland, wet meadow, marsh, agriculture land, forest, and build-up. Land use land cover transition matrix and landscape metrics in the landscape level were used to figure out the land type dynamics and landscape fragmentation, respectively. The result of this study revealed that marsh expansion occurred in the three nature reserves. Build-up area was converted mainly from agriculture land in the EDLNRR and WDLNRR. The landscape metrics result suggested that the EDLNRR and SDLPNR have been less fragmented than before due to the exclusion of the area from the nature reserve in 2018 although the WDLNRR has become more complex. The total area of the three nature reserves has been changed by the adjustment of functional zoning. The EDLNRR excluded densely populated areas and surrounding agriculture land and woodland from the experimental zone. Similarly, in the SDLPNR, the land type of the excluded area was mainly woodland and agriculture land, while the expanded area was mainly covered by marsh and water. This study will be useful for management of different functional zones of the three Dongting Lake nature reserves.