Land cover classification of the Mongolian Plateau using multi-temporal MODIS data

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The Mongolian Plateau is part of the Central Asian Plateau and it mainly consists of Inner Mongolia of China and Republic of Mongolia. Previous studies have shown that this region has been experiencing rapid land cover and land use change such as lake shrinkage and land degradation due to human activities and climate change. In this study, we aimed to produce high reliable regional land cover map of the Mongolian Plateau using 500 m resolution multi-temporal MODIS data of 2016. The classification method is as below: First, we implement classification to each scene of the MODIS data of different seasons in year 2016. Second, we integrate these multi-temporal classification results. In the per-scene classification, we conduct a kernel density estimation (KDE), and then use the densities in a Bayesian inference to obtain the class posterior probability. After the multi-temporal per-scene classification, we calculate the classification score by integrating class posterior probabilities in multi-temporal scenes. In addition, we applied night light data such as SUOMI NPP to correctly estimate urban area. Also, digital elevation model data was used for detecting the wrong estimation of water or paddy class which located on the slope of mountain. For validation of the map, we mainly relied on the ground truth photo database which named SACLAJ (Site-based dataset for Assessment of Changing Landcover by JAXA) as well as higher resolution satellite images from ALOS and Landsat-8. Our studies demonstrated that combining such variety of satellite data and ground truth data, we can produce a high reliable regional land cover map which can be used as base input data for other researchers.

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