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Land-cover change detection in Siberia using Landsat

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Siberia is well known one of the most vulnerable ares for climate change. As a result of climatic change, large areas have undergone land cover change (e.g., ecological succession after forest fire and permafrost degradation), and the change affects ecological functions. It is important to monitor the process of the land cover change for understanding the role of terrestrial ecosystems in the carbon and water cycles, the frequency of natural disasters, and the impact of ecosystem services. Land cover map is used as the basis for ecosystem management, conservation and restoration activities. Therefore, timely and accurate land cover map is needed at the regional scale. In order to produce land cover map, remote sensing is a very useful tool for repetitive sampling over large areas. A method to produce the land cover map based on high temporal frequency sensors, such as MODIS and SPOT VGT, has already been established. However, the spatial resolution of 1 km limits the performance of land cover map. The land cover maps includes a potential source of error because of the heterogeneity of the landscape at the subpixel scale. According to a comparative study, the pixel-level classification accuracy is not high, ranging between 50 and 58%. Medium spatial resolution sensors, such as Landsat TM/ETM+, allows the direct comparison of the field plot with a 30 m image pixel. The objectives of this study is to produce accurate land cover map using Landsat, and to better understand the relation between climate change and land cover change.

Keywords: land cover change, climate change, Siberia, Landsat