Verification of forest cover changes in China using multiple satellites

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The Earth’ s vegetation greenness has been increasing globally over the past few decades largely due to land-cover change, CO2 fertilization, and climate change. The forest area in China accounts for approximately 6% of the world’ s total, occupies the top ranks in terms of forest cover growth worldwide. For example, the latest national forest inventory (NFI), led by governmental organizations reported that the forest cover in China has increased from 18.21% to 22.96%, between 1999 and 2018. Even though many studies have reported that China plays a key role as dominant forest resources, there has been very little research reported on the forest cover changes except for the inventory as previously we stated. The method of this investigation has not been officially disclosed, and the reported numbers remain unclear.

In the present study, supported by the long-term datasets of land-cover and percent tree cover data from 2001-2018 based on multiple satellite datasets, we derived detailed information of the forest cover percentage over mainland China in the past 20 years. Furthermore, the validity of the data was demonstrated through intercomparing among those results with the NFI results.

Our results suggest that estimates of forest cover among five satellite datasets had their own characteristics respectively. In most datasets (expect for ESA/CCI) forest coverage increased, but the variation and distribution varied. Taken together, the results of C5 and PALSAR/PALSAR-2 are perceived to be suitable from various perspectives based on our results. However, there are several additional factors that could have contributed to the difficulties in forest cover estimates from these datasets. PALSAR/PALSAR-2, only data for 2007-2010 and 2015-2017 are available, which causes hard to estimates it continuously, even though MOIDS-derived datasets can provide data from the beginning of the 21st century. Further, regarding C5 and C6, the former is a previous version of later. As a result, C5 provides only information up to 2013 and cannot be verified in recent years. In this regard, it has been reported that a significant change in land cover classification was identified in the course of changing the algorithm from C5 to C6.

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