GC31B-0465 Mapping post-disturbance stand age distribution in Siberian larch forest based on a novel method

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Wednesday, December 17, 2014 08:00 AM - 12:20 PM
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The Siberian larch forest, which accounts for nearly 20% of the global boreal forest biome, is unique, important, yet significantly understudied. These deciduous needleleaf forests with a single species dominance over a large continuous area are not found anywhere except the extreme continental zones of Siberia and the Russian Far East. Most of these forests are located in remote and sparsely populated areas and, therefore, little is known about spatial variability of their structure and dynamics. Wall-to-wall repeated observations of this area are available only since the 2000s. Previously, we developed methods for reconstruction of stand-age distribution from a sample of 1980-2000 disturbances in Landsat TM and ETM+ imagery. However, availability of those images in Siberian larch forests is particularly limited. Built upon the hypothesis that the spectral characteristics of the disturbed forest in the region change with time consistently, this paper proposes a novel method utilizing the newly released Global Forest Change (GFC) 2000-2012 dataset. We exploit the data-rich era of annual forest disturbance samples identified between 2000 and 2012 in the Siberian larch forest by the GFC dataset to build a robust training set of spectral signatures from regrowing larch forests as they appear in Landsat imagery in 2012. The extracted statistics are ingested into a random forest, which predicts the approximate stand age for every forested pixel in the circa 2000 composite. After merging the estimated stand age distribution for 1989-2000 with the observed disturbance records for 2001-2012, a gap-free 30 m resolution 24-year long record of stand age distribution is obtained. A preliminary accuracy assessment against the Advanced Very High Resolution Radiometer (AVHRR) burned area product suggested satisfactory performance of the proposed method.

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