

EGU21-11217

<https://doi.org/10.5194/egusphere-egu21-11217>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



New estimate of growing stock volume and carbon sequestration of Russian forests based on national forest inventory and remote sensing data

Dmitry Schepaschenko^{1,2}, Elena Moltchanova³, Stanislav Fedorov⁴, Victor Karminov², Petr Ontikov⁴, Maurizio Santoro⁵, Linda See¹, Vladimir Kositsyn⁶, Anatoly Shvidenko¹, Anna Romanovskaya⁷, Vladimir Korotkov⁷, Sergey Bartalev⁸, Steffen Fritz¹, Maria Shchepashchenko⁹, and Florian Kraxner¹

¹International Institute for Applied Systems Analysis, Laxenburg, Austria (schepd@iiasa.ac.at)

²Center for Forest Ecology and Productivity of the Russian Academy of Sciences, Moscow, Russia (vnk57@yandex.ru)

³School of Mathematics and Statistics, University of Canterbury, Christchurch, New Zealand (elena.moltchanova@canterbury.ac.nz)

⁴FSBI Roslesinforg, Federal Forestry Agency, Moscow, Russia (fedorov.sv@roslesinforg.ru)

⁵Gamma Remote Sensing, Gümliigen, Switzerland (santoro@gamma-rs.ch)

⁶Federal Forestry Agency, Moscow, Russia (lesoustr@rosleshoz.ru)

⁷Yu. A. Izrael Institute of Global Climate and Ecology, Moscow, Russia (an_roman@mail.ru)

⁸Space Research Institute of the Russian Academy of Sciences, Moscow, Russia (bartalev@d902.iki.rssi.ru)

⁹Russian Institute of Continuous Education in Forestry, Pushkino, Russia (mariaschep@gmail.com)

Since the collapse of the Soviet Union and transition to a new forest inventory system, Russia has reported (FAO, 2014) almost no changes in growing stock (+1.8%) and biomass (+0.6%). Yet remote sensing products indicate increased vegetation productivity (Guay et al., 2014), tree cover (Song et al., 2018) and above-ground biomass (Liu et al., 2015). Here, we challenge the official national statistics with a combination of recent National Forest Inventory and remote sensing data products to provide an alternative estimate of the growing stock of Russian forests and assess the relative changes in the post-Soviet era. Our estimate for the year 2014 is $118.29 \pm 1.3 \cdot 10^9 \text{ m}^3$, which is 48% higher than the official value reported for the same year in the State Forest Register. The difference is explained by increased biomass density in forested areas (+39%) and larger forest area estimates (+9%). Using the last Soviet Union report (1988) as a reference, Russian forests have accumulated $1163 \times 10^6 \text{ m}^3 \text{ yr}^{-1}$ of growing stock between 1988–2014, which compensates for forest growing stock losses in tropical countries (FAO FRA, 2015). Our estimate of the growing stock of managed forests is $94.2 \cdot 10^9 \text{ m}^3$, which corresponds to sequestration of 354 Tg C yr^{-1} in live biomass over 1988–2014, or 47% higher than reported in the National Greenhouse Gases Inventory (National Inventory Report, 2020).

Acknowledgement: The research plots data collection was performed within the framework of the state assignment of the Center for Forest Ecology and Productivity of the Russian Academy of Sciences (no. AAAA-A18-118052590019-7), and the ground data pre-processing were financially

supported by the Russian Science Foundation (project no. 19-77-30015).