

Original article

DOI 10.24419/LHI.2304-3083.2022.2.01

Possibilities of Using the Meteor-M Satellite Images for Determining Quantitative and Qualitative Forests Characteristics

Victor M. Sidorenkov¹

Candidate of Agricultural Sciences

Daniil O. Astapov²

Evgenii S. Rybkin³

Iuliia S. Achikolova⁴

Oleg V. Ryabtsev⁵

Candidate of Agricultural Sciences

Abstract. The paper highlights opportunities of Meteor-M satellite survey data application to identify quantitative and qualitative characteristics of forests. The studies are based on a great amount of fieldwork material – data of 419 sample plots established in Arkhangelsk, Vologda, Kostroma, Moscow, and Novosibirsk regions, the Republic of Udmurtia and Altay territory. Sample plots (SP) are survey interpretation plots (SIP) with coordinate reference where forest characteristics were determined using relascope plot and fixed radius circular plot methods. Thereafter, for each SIP forest spectral characteristics data base was shaped and served as a background to identify correlations of tree species pattern, standing volume, relative forest density, and number of trees with spectral reflective characteristics.

The study findings showed an opportunity of applying Meteor-M winter survey data to recognize forest species, standing volume, forest density, and tree quantity within the accuracy range according to the 3rd forest management category. Considering the above, the methods used in this research may be recommended for evaluating qualitative and quantitative forest characteristics in remote and hard-to-reach areas.

Key words: forest stands, satellite imagery interpretation, quantitative and qualitative characteristics, standing volume, forest density, number of trees, Meteor-M

For citation: Sidorenkov V., Astapov D., Rybkin E., Achikolova I., Ryabtsev O. Possibilities of Using the Meteor-M Satellite Images for Determining Quantitative and Qualitative Forests Characteristics // Forestry information. 2022. № 2. P. 5–12. DOI 10.24419 / LHI.2304-3083.2022.2.01

¹ Russian Research Institute for Silviculture and Mechanization of Forestry, Deputy Director (Pushkino, Moscow region, Russian Federation), lesvn@yandex.ru

² Russian Research Institute for Silviculture and Mechanization of Forestry, Head of Laboratory for Forest Inventory and Management (Pushkino, Moscow region, Russian Federation), astdann09@yandex.ru

³ Russian Space Systems, Lead Engineer of Department for Operational Monitoring and Remote Sensing Data Analysis (Moscow, Russian Federation), evgenii_r@mail.ru

⁴ Russian Research Institute for Silviculture and Mechanization of Forestry, Lead Engineer of Department for Silviculture and Forest Management (Pushkino, Moscow region, Russian Federation), pipintook@yandex.ru

⁵ Russian Research Institute for Silviculture and Mechanization of Forestry, Head of Department for Innovative Technologies, Introduction, and Forest Design (Pushkino, Moscow region, Russian Federation), sektorles@yandex.ru