

METHODOLOGICAL ASPECTS OF GEOINFORMATION MAPPING OF FORESTRY USING MOBILE TECHNOLOGIES

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The article is devoted to the development of a methodology for geoinformation mapping of forestry, designed, to ensure the elimination of paper cartographic materials at the stage of field contour identification during forest management work. The purpose of the study is to develop methodological foundations of geoinformation mapping of forestry using mobile technologies. The article provides an analysis of current methods of mapping products during forest management, as well as a study of domestic and foreign experience in the introduction of mobile technologies in forestry. The probable factors constraining the rejection of paper cartographic materials at the stage of field contour identification were found. The developed scheme for creating cartographic products during forest management using mobile technologies is presented. The main stages of the developed methodology are described, which is designed to ensure the rejection of paper materials at the stage of field contour decryption and collection of thematic information in the field, which will significantly reduce financial, labor and time costs.

Keywords: forestry mapping, forest map, forest cartography, forest management, forestry, geoinformation mapping, thematic cartography

REFERENCES

1. Kresnov, V. G. (2005). Application of GIS in forest management and forestry. *Interexpo Geo-Sibir [Interexpo Geo- Siberia]*. Retrieved from <https://cyberleninka.ru/article/n/primeneniye-gis-v-lesoustroystve-i-lesnom-hozyaystve> [in Russian] (accessed October 01, 2021).
2. Pilipko, E. N. (2018). *Geoinformacionnye sistemy v lesnom dele [Geoinformation systems in forestry]*. Vologda: VGMHA Publ., 104 p. [in Russian].
3. Pakhuchy, V. V. (2013). *Vedenie lesnogo hozyajstva na baze GIS [Forest management on the basis of GIS]*. Syktyvkar: SLI Publ., 56 p. [in Russian].
4. Chernikhovskiy, D. M. (2003). *Sozdanie lesnykh kart s pomoshch'yu GIS-tekhnologij [Creation of forest maps using GIS technologies]*. Saint Petersburg: Saint Petersburg State Forestry Academy Publ., 57 p. [in Russian].
5. Malysheva, N. V., & Zolina, T. A. (2014). GIS toolkit for cartographic support of forestry management at the federal level. *Lesohozyajstvennaya informaciya [Forestry Information]*, 2. Retrieved from <https://cyberleninka.ru/article/n/instrumentariy-gis-dlya-kartograficheskogo-soprovozhdeniya-upravleniya-lesnym-hozyaystvom-na-federalnom-urovne> [in Russian] (accessed October 05, 2021).
6. Blokhin, D. Yu. (2006). GIS-technologies in forestry and forest industry. *Aktual'nye problemy lesnogo kompleksa [Actual Problems of the Forest Complex]*, 13. Retrieved from <https://cyberleninka.ru/article/n/gis-tehnologii-v-lesnom-hozyaystve-i-lesnoy-promyshlennosti> [in Russian] (accessed September 11, 2021).
7. Nikolaeva, O. N., Trubina, L. K., Mullayarova, P. I., & Tatarenko, V. I. (2019). Digital cartographic support for the management of urban green spaces. *Vestnik SGUGiT [Vestnik SSUGT]*, 24(4), 132–141. doi: 10.33764/2411-1759-2019-24-4-132-141 [in Russian].
8. Mohirev, A. P., Rezinkin, S. Yu., Medvedev, S. O., & Bragina, N. A. (2020). The use of geographical information systems in assessing the density of roads in logging areas. *Vestnik SGUGiT [Vestnik SSUGT]*, 25(3), 181–191. doi: 10.33764/2411-1759-2020-25-3-181-191 [in Russian].
9. Instructions on how to create and reproduce forest maps. Retrieved from http://www.libussr.ru/doc_ussr/usr_13663.htm [in Russian] (accessed September 28, 2021).

10. Arkhipov, V. I., Chernikhovskiy, D. M., Berezin, V. I., & Belov, V. A. (2014). Modern technology of forest taxation by decoding method "From shooting to project". *Izvestiya Sankt-Peterburgskoy lesotekhnicheskoy akademii [Izvestia of the St. Petersburg Forestry Academy]*, 208, 22-42 [in Russian].

11. Arbutov, S. A., Khlebnikova, E. P., & Nikitin, V. N. (2020). Automated identification and determination of the species composition of woody plants based on the materials of digital multi-zone aerial survey of woodlands. *Vestnik SGUGiT [Vestnik SSUGT]*, 25(4), 68–76. doi: 10.33764/2411-1759-2020-25-4-68-76 [in Russian].

12. Zablotskiy, V. R. (2014). Mobile GIS – a new direction in the development of geoinformation systems. *Mezhdunarodnyy zhurnal eksperimental'nogo obrazovaniya [International Journal of Experimental Education]*, 1(11), 22–23. Retrieved from <http://www.expeducation.ru/ru/article/view?id=6200> [in Russian] (accessed September 11, 2021).

13. Zablotskiy, A. M., Shoshina, K. V., & Aleshko, R. A. (2015). Development of a mobile application for a taxi driver. *Molodoy uchenyj [Young scientist]*, 1(13), 12–15. Retrieved from <https://moluch.ru/archive/93/20827/> (accessed: 26.09.2021) [in Russian].

14. Buksha, I. F., & Buksha, M. I. (2013). Application of mobile GIS technology Field-Map in Forest and garden and parking facilities. *Naukovij visnik NLTU Ukraïni [Scientific Bulletin of NLTU of Ukraine]*, 5. Retrieved from <https://cyberleninka.ru/article/n/primeneniye-mobilnoy-gis-tehnologii-field-map-v-lesnom-i-sadovo-parkovom-hozyaystve> [in Russian] (accessed October 07, 2021).

15. de Abreu Freire, & C. E., Painhoa, M. (2014). Development of a Mobile Mapping Solution for Spatial Data Collection using Open-Source Technologies. *Procedia Technology*, 16, 481–490.

16. Kraxnera, F., Schepaschenko, D., & Fuss, S. (2017). Mapping certified forests for sustainable management - A global tool for information improvement through participatory and collaborative mapping. *Forest Policy and Economics [Forest Policy and Economics]*, 83, 10–18.

17. Zorin, V. P. (2016). System and methods of forest inventory based on information technologies that ensure sustainable forest management. *Trudy BGTU [Works of BSTU]*, 1(183). Retrieved from <https://cyberleninka.ru/article/n/sistema-i-metody-inventarizatsii-lesnogo-fonda-na-osnove-informatsionnyh-tehnologiy-obespechivayuschih-ustoychivoe-upravlenie-lesami> [in Russian] (accessed October 07, 2021).

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