ISARD-2025-satellite017

Comparison of vegetation distribution maps of the Sverdlovsk region using the MCD12C1 and VEGA SCIENCE databases

Gregory A. Sukhikh[1]

[1] Ural Federal University named after the First President of Russia B.N. Yeltsin

augustmilosskiy@gmail.com

The relevance of comparing maps from different databases is due to the need to obtain the most accurate and up-to-date information about the territory, since there are many sources of cartographic information in the modern world, and differences in the classification of objects and vegetation types between databases can significantly affect research results, while the accuracy of data may vary depending on the source used and methods of information collection. The resolution of images and data processing methods significantly affect the detail of maps, and the relevance of information may vary depending on the frequency of database updates, which is of practical importance for scientific research that requires the most accurate data for a correct analysis of the territory, environmental monitoring, depending on the reliability of information about vegetation types and changes in ecosystems. The methodological value of the comparison lies in identifying discrepancies in the classification of objects, determining the most accurate data sources, and creating methods for combining information from different databases. Comparison of cartographic data is becoming an increasingly important tool for creating complex digital maps, forecasting changes in the natural environment, planning economic activities, and solving urban and regional planning problems.

The MCD12C1 product is based on MODIS data collected in a pixel size of 0.05°x 0.05° (5600m) [1]. To create the VEGA map, data from the MODIS spectroradiometer with a resolution of 230m was used [2]. When analyzing vegetation classes based on their names alone, there are significant discrepancies in the area estimates. However, if you combine the types into basic classes, you can identify similar patterns in the distribution of areas [3].

Also, the unification of the vegetation types of the Vega map is due to the criteria of the MCD classes from the MCD12Q1 Version 6 operating manual, which consist in sparseness of vegetation of different heights [4].

As a result of the comparison, it is shown that the vegetation maps of the Sverdlovsk region obtained from data from the Vega-Science product and the MCD12C1 product match with an accuracy of up to several percent.The area of woody vegetation differs by 1.37%, shrubs by 6.76%, herbaceous vegetation by 0.25%, croplands by 0.12% and water bodies by 3.73%.

The list of the used literature

1. URL: http://iki-z.ru/default.aspx?id=3 (date of request: 03/02/25).
2. URL: https://lpdaac.usgs.gov/products/mcd12c1v006/ (date of request: 03/02/25).
3. E. A. Kurbanov, O. N. Vorobyov, A.V. Gubaev, S. A. Lezhnin, Yu. A. Polevshchikova Assessment of the accuracy and comparability of thematic maps of forest cover of different spatial resolution using the example of the Middle Volga region // Modern problems of remote sensing of the Earth from space. 2016. Vol. 13. No. 1. pp. 36-48.
4. User Guide to Collection 6 MODIS Land Cover (MCD12Q1 and MCD12C1) Product. URL: http://d33.infospace.ru/d33_conf/sb2016t1/36-48.pdf (date of request: 03/02/25).