



Analysis of spatio-temporal dynamics of Arctic region vegetation based on integrated data processing

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Currently, there is a significant amount of in-situ data, airborne and satellite observations for the assessment of tundra vegetation. However, the issues of simultaneous analysis of these data remain topical, as well as the development of methods for integrated processing of heterogeneous (in-situ, airborne, space) and multi-temporal data for analyzing the spatio-temporal dynamics of vegetation across large regions and identifying relationships of occurring changes. The study was aimed to fill this gap on the territory of Russia's Far North. The objectives of the study were: 1/ mapping of vegetation types; 2/ assessing the territories which are suitable for grazing reindeers in winter and summer periods; 3/ substantiation of requirements to remote sensing data for vegetation mapping; and 4/ identification of the territories under anthropogenic disturbances.

The study area was located in the Nenets Autonomous Okrug of Russia. Time-series satellite Resurs-P, Kanopus-V and Sentinel-2 data, and geobotanical systematic description of study area were used for classification of vegetation types, identification of vegetation dynamic and disturbed territories. Territory for grazing reindeers were assessed based on map of vegetation types and thirty-year field monitoring of reindeers feed and habitats.

The integrated processing of data used in the study was implemented by a complex methodical scheme, which included algorithms and methods for processing of satellite data, requirement to remote sensing data, decision to reduce the cost of data collection and to provide the required level of results quality, and recommendations for management of industrial activity in the Nenets Autonomous Okrug of Russia.