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ORDERED TEST SITE METHOD FOR VALIDATION OF THE RESULTS OF ONBOARD MEASUREMENTS OF MEDIUM RESOLUTION SPECTRORADIOMETERS

Abstract

One of the main tasks solved in the analysis of remote sensing data is the reduction or elimination of uncertainties. For this purpose, operations such as upscaling and downscaling of spectroradiometric data are widely used. The downscaling operation is particularly used to validate medium resolution spectroradiometer data. Validation of onboard measurement data is a complex task and includes the solution of such important subtasks as (a) selection of the type of test site; (b) determining the size of the site; (c) determining the order in which sampling is to be carried out. At the same time, after carrying out selective measurements, the question arises of scaling up (upscaling or generalization) of the obtained ground data, the purpose of which is to carry out validation of satellite data with low spatial resolution. When solving the problem of validating remote sensing data, terrestrial test sites are often used, the heterogeneity of which must always be taken into account. This problem is usually solved by applying special weighting coefficients and performing temporary periodic measurements, then using the regularization procedure for the averaged results of iterative calculations. In the absence of temporary changes, the need for regularization is eliminated. In this case, as an alternative, the method of an ordered test section can be proposed, which allows to determine the weight coefficients of the results of ground validation measurements, providing a minimum of the newly proposed quadrature cost function. To solve the problem of achieving the minimum of the proposed cost function, a method of ordered subsections as part of a single heterogeneous test section is proposed, the measurements in which are carried out by a sensor mounted on a low-flying carrier. An optimization problem has been formulated for calculating the coefficients that correct the measurement results, at which the sum of the squares of the difference between the corrected data and the known representative estimate is minimized. The optimization problem is solved using a certain restrictive condition imposed on the sum of the correction factors.