

Application of RGB-synthesis for complex interpretation of geophysical data in the study of areas contaminated by oil products

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Abstract. The information on geological structure as well as on the degree of contamination and geometrical parameters of a pollutant in oil-contaminated areas is necessary for risk assessment, planning of oil products recovery and territory remediation. Geophysical methods are actively used for solving such problems. The work considers the site on the Volga River bank, where soils are contaminated with petroleum products. The aim of the work is to delineate the distribution area of petroleum products. In order to achieve the goal, the set of near-surface geophysical methods (vertical electric sounding, seismic survey) and gas geochemistry were implemented. The results of a new approach to characterization of contaminated sites by RGB-data synthesis have been demonstrated as one of the ways of data interpretation. The method is based on the generalization of the available materials by optically mixing of the data of three spatially distributed characteristics presented in the form of three channels – red, green, and blue – for the purpose of localizing the lenses of gravity-mobile and immobilized oil products. According to the results of the qualitative interpretation of geophysical information, the authors have built a scheme with the proposed contour of oil products distribution in the studied territory. The proposed method can be used for the delineation of oil spills along with the sufficient information obtained by geophysical or other methods (at least three) at the stage of determining the spread of contamination for the sites. This approach can speed up the interpretation process, as such maps overlaying sets the color distribution of different petrophysical characteristics of the soils for the selected depth level, and also eases the task of determination of coordinates when correlating various anomalies, identified by different methods.

Keywords:

RGB-synthesis, near-surface geophysics, oil products, multi-attribute classification, complex interpretation

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