

T1. Ecological assessment of waste fields with Principal Component Analysis — feasibility study

Evgeniy Michailov¹, O.V. Tupicina¹, O.Ye. Rodionova²

¹ Samara State Technical University, Samara, Russia

² Semenov Institute of Chemical Physics of Russian Academy of Sciences

This work is an attempt to apply the methods of multivariate data analysis for the ecological monitoring of the man-caused formations. Conventional approach often fails in revealing of specific areas within the whole formation due to complexity of geometrical configuration and variety of degradation processes.

Chemometric methods give possibility to explore the structure of such objects. They also help to reveal the stable areas and to estimate their influence on the whole formation.

Investigation was conducted on the base of three different man-caused formations in Samara region: legal dump Otradniy, illegal dump Bezenchuk, purpose-designed ground Kinel.

Waste ground specimens were obtained with step-by-step dump drilling. Each object is characterized by the depth, temperature, and physical-chemical features such as humidity, ash content, volumetric weight, pH. Collected data sets were subjected to PCA and PLS analysis. Plots of scores and loadings help to reveal important patterns and interesting structures in data. Particularly the sample stability or maturity has been predicted by PLS regression.