

The use of Support Vector Machine technique to evaluate groundwater contamination by poultry burial

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In recent years, there were controversies about groundwater contamination by leachate around livestock burial sites in rural areas of South Korea, because it is difficult to identify suitable parameters which can be successfully used to discriminate different coexisting pollution sources (i.e., animal leachate, agrochemicals, etc.). Both dilution of leachate and the complex mixing between diverse contamination sources also make it difficult to identify the contamination. To discriminate the impacted groundwater by poultry burial, hydrochemical data of a total of 51 groundwater samples (32 domestic wells and 19 monitoring wells) from Youngam, southwest of South Korea, were interpreted by the Support Vector Machine (SVM) technique. A lot of poultry burial pits in the study area were constructed during the avian influenza infection between 2003 and 2008. Using the Robust Principal Component Analysis, three outlier samples were selected to be pre-excluded from successive analyses. The factor scores of factor 1 and 2 were used as input parameters for SVM. 80% of samples in each group (i.e., affected or unaffected) were randomly selected to construct the SVM model; the remainder (20%) were used to validate the suggested model. The results show that the accuracy of the prediction of contamination is about 85% for each group, indicating the better classification performance of SVM than discriminant analysis. This study shows that complex hydrochemical datasets can be successfully evaluated by SVM.