Journal of Environmental Hydrology
ISSN 1058-3912
Electronic Journal of the International Association for Environmental Hydrology

JEH Volume 14 (2006), Paper 24 Posted November 30, 2006

CLUSTER ANALYSIS CLASSIFICATION OF GROUNDWATER QUALITY IN WELLS WITHIN AND AROUND MOSUL CITY, IRAQ

***Abdulmuhsin S. Shihab*[1]**
***Abeer Hashim*[2]**

[1]*Environmental Research Centre and Pollution Control, Mosul Univ., Mosul, Iraq*
[2]*Civil Engineering Dept., College of Engineering, Mosul Univ., Mosul, Iraq*

ABSTRACT
Cluster analysis was used to classify 66 wells within and around Mosul city according to groundwater quality. This classification may provide useful results in the planning for groundwater use in this area. Water samples were collected and analyzed for pH, total dissolved solids, conductivity, calcium, magnesium, chloride, sulfate and bicarbonate using standard methods. The data were analyzed statistically using factor and cluster analysis. The results of factor analysis extracted four factors. Conductivity, total dissolved solids, sulfate and calcium represents the first factor with the highest percent of variation (30.55%) between wells. Cluster analysis divided the wells into four homogenous clusters. The first cluster represents 15(22.7%) of the wells, most of the wells of this cluster are distributed along Tigris river with lowest pH, highest sulfate and bicarbonate concentration. The second cluster includes the largest number of wells 33(50%) with the lowest salinity since it had the lowest conductivity, total dissolved solids, calcium, magnesium and chloride. The third cluster with 4(6.1%) wells, had the highest salinity since it had the highest conductivity, total dissolved solids, calcium, magnesium and chloride. The fourth cluster included 14(21.2%) of less acidity wells with highest pH and lowest bicarbonate concentration. The research concluded that cluster analysis can provide useful information in water quality management as it is an efficient statistical grouping tool for water quality parameters. Additionally, factor analysis can be used to analyze a large number of data and study variations in water quality.

Reference: *Shihab, S.A., and A. Hashim. 2006. Cluster analysis classification of groundwater quality in wells within and around Mosul City, Iraq. Journal of Environmental Hydrology, Vol. 14, Paper 24.*

CONTACT:
Abdulmuhsin S. Shihab
Environmental Research Centre and Pollution Control
Mosul University
Mosul, Iraq

E-mail: *muhsin_shehab@yahoo.com*

Return to JEH 2006 Papers

Return to HydroWeb Homepage