Abstract

This study proposes a new approach to establish a multi-parameter risk mapping method by employing the K-Means clustering technique. Accordingly, spatial assessment of arsenic (As), nitrate (NO_3) and total dissolved solids (TDS) were carried out based on the type of land use to estimate contamination potential in an aquifer. Since risk mapping is always associated with the occurrence probability of a phenomenon, pollution occurrence probability was then obtained using the fuzzy C-means clustering. The results reveal that NO_3 and As contamination levels increase from the first cluster (C1), covers 22.3% of the aquifer, to C5 encompassing 35.1% of the aquifer devoted to extensive industrial and agricultural activities. Fuzzy clustering results show that the pollution occurrence probability in each aquifer cell varied from less than 30 to more than 90%. Moreover, the results show, industrial and agricultural land uses cover about 70% of the areas with high risk of contamination.