

Abstract

A hydrogeological and hydrochemical studies were conducted for the north western of the Auja Tamaseeh basin (Tulkarm Area) which represents a highly sensitive area to pollution in the West Bank. Most of the groundwater wells are located within the upper aquifer with (Hebron, Bethlehem, Jerusalem) geological formations. The results act as assessment study to evaluate the effect of human activities on groundwater quality.

The hydrochemical study was conducted to define water types as well as water geneses of the aquifer system. A graphical representation of hydrochemical data and saturation indices analyses were interpreted to investigate whether the pollution is natural occurring or man-made. The dominant water type of most of the wells is of earth alkaline type with increased portion of alkalis and with prevailing bicarbonate. Water genesis of the groundwater wells in the study area is affected mainly by water rock interaction between water and the mineral phases of calcite, dolomite and aragonite, which are the main constituents of the lithological formations of the recharge area.

The state of pollution and trend analyses for groundwater in terms of nitrate and chloride concentrations were determined in Tulkarm Area. A spatial analyses was performed to interrelate the polluted groundwater wells with the natural and anthropological activities using the Geographical Information System (GIS) as a tool in performing such analysis and results presentation. The polluted wells are mostly located within high to moderate sensitive areas and within populated areas and close to agricultural activities.

Finally, a steady state flow and solute transport model for the western part of the Iskandaron drainage – north western Auja Tamaseeh basin - (a highly sensitive area of Tulkarm Area) was built using the visual Modflow software. A stress period of 10 years (2005-2015) was assigned to study the tendency of contamination. The aquifer system was represented by two layers. The model was simulated for the stress period and the results of the model showed that there is a pollution risk due to human activities and the situation will be harmful if there is no action done by the decision makers with the public to preserve the water resources from deterioration and contamination.