Integrated Approach for Transmission Losses Analysis Using Hydro-BEAM, Remote Sensing and GIS at Wadi El-Assiuti, Egypt

Ahmed Sefelnasr*, Adel Bakheet, Mohamed Saber

Geology Department, Faculty of Science, Assiut University, 71516 Assiut, Egypt
*Corresponding author

Email: ahmed.sefelnasr@science.au.edu.eg

Keywords: Transmission Losses, Hydro-BEAM, Surface Water, Groundwater Recharge

The transmission losses from the surface water system are an essential source of groundwater recharge. The interaction between surface water and subsurface water are mainly represented by the transmission losses throughout the wadi channels. The present study aims to use the physical hydrological model of Hydro-BEAM (Hydrological River Basin Environmental Assessment Model) to simulate the surface water flow and subsurface water flow as well as the interaction between both of them throughout the estimation of initial and transmission losses. Wadi El-Assiuti in Egypt has been selected as case study for this application. It is located between Longitudes 32°30′ E & 31°12′ W and Latitudes 27°48′ N & 27°00′ S. Geographic Information System (GIS) and Remote Sensing have been used to delineate the drainage system and watershed from the Digital Elevation Model (DEM). The field work for estimating Transmission losses was performed at several sites within the study area. The results show that the infiltration rates are variable form one point to the others, due to the effect of soil types, wadi channel slope, and rainfall rate. The results indicate also that the transmission losses are considered a significant groundwater recharge from ephemeral wadi flows. The proposed approach can be used by hydrologists to estimate wadi channel-transmission losses at any other arid regions in the world.