Geophysical Research Abstracts
Vol. 15, EGU2013-9515, 2013
EGU General Assembly 2013

Assessment of natural recharges of the Plio-Plistocene shallow aquifer system in Al Uja area /Lower Jordan Valley / Occupied Palestinian Territories

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Al Uja area locates in the Lower Jordan Valley/West Bank at 250 m below sea level. The availability of ground water, fertile soil, and warm climate during winter months make it remarkable for its agricultural activities where 600 hectares are under irrigation. Al Uja karstic spring that drain water from the Mountain carbonate aquifer system with a discharge rate between 0.5 and 8 MCM/a , and nine groundwater boreholes that tape water from the shallow Plio-Plistocene aquifer system, with an annual abstraction of 3.5 MCM are the water sources. The south-north fault system of the Jordan Rift Valley separates the two aquifer system. The shallow aquifer system locates to the east of the fault, where the Mountain aquifer system locates to the west. The Mountain aquifer consists of high fractured and karstified limestone and dolomite of Upper Cretaceous age, and the shallow aquifer system consists of gravel, sand, silt, and clay layers of the Dead Sea group.

Groundwater recharge of the Mountain aquifer system takes place in the highland area in the West with an annual precipitation of about 550 mm. Formations of the shallow aquifer system crop out in the Jordan Valley where rainfall does not exceed 250 mm/a . Due to the high evaporation rate, direct recharge is neglected. Only small portion of flooding water about 0.4MCM/a infiltrate through wadi Al Uja drainage system in to the Alluvial deposits to the shallow aquifer system. In the other hand, and since more than 40 years, the nine groundwater boreholes are taping about 3 MCM/a, water table decline of about 5 m. Currently, water table locates between -290 m in the west and decrease to – 311 m in the east. Groundwater flows from the Mountain aquifer in the west to the Shallow aquifer in the east through the major fault system. The permeability of the Mountain carbonate layers is 2.49E-1 m/min and decrease to 1.6 E-2 m/min in the layers of the Shallow aquifer system, this decrease of Kf-value east wards cause a semi-barrier for groundwater flow regime, also water salinity increase from 1500 μS/cm in Mountain aquifer to 3000 few hundred m to the east of the fault and rise to 6000 μS/cm in the eastern part. The groundwater flows east wards through a corridor of 1500 meter length along the fault system.