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Estimation of Groundwater Recharge of the Western Aquifer Basin Using Water Level Fluctuation Approach

Muath Abu Saada (1) and Sauter Martin (2)

(1) Palestinian Hydrology Group, P.O.Box 565, Al Masyoun, Ramallah, West Bank. Palestinian Authority [muath@phg.org], (2) Geoscientific Centre, University of Gottingen, Goldschmidtstr. 3, D-37077 Gottingen, Germany [Martin.Sauter@geo.uni-goettingen.de]

Quantifying groundwater recharge is sensitive for water resources management particularly in the arid and semi-arid areas. This paper presents an alternative technique for estimating annual groundwater recharge using the fluctuation of water level within an aquifer during a specific time interval as a result of the water balance of inflows and outflows. The Western Aquifer Basin (WAB), West Bank and Israel, was depicted for a case study. The estimated amount of annual recharge was also correlated with monthly rainfall rates to study the effect of rainfall variation on the generated recharge. The results confirm that the high variations of annual recharge volumes are directly linked to monthly rainfall variation. For the WAB, the annual recharge is mainly dominated by the amounts of rainfall accumulated during the four wet months i.e. November, December, January and February. On the basis of these results a multi-regression equation has been developed to consider monthly distribution of rainfall as a chief factor in forecasting annual recharge within the aquifer. This equation can be applied in the future to generate any synthetic rainfall scenarios. The average annual recharge for WAB for the period 1970-2006 was estimated at 385 million cubic meters per year (Mm3/yr).