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Quantifying surface water runoff from Wadi Arogut towards the Dead Sea

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The surrounded area of the Dead Sea, especially the west side suffers from many hydrological problems. While the Dead Sea level drop considered a major problem that affect the quality of the surrounded freshwater resources, a lot of the surface water flood from the adjacent Wadi are lost through direct run off without any exploitation. Therefore, it is necessary to maintain a type of balance between surface water exploitation through the Wadi and at the same time allow a sufficient amount of flow to the Dead Sea to ensure its sustainability. In this study, we choose one of the larger tributaries in the western side of the Dead Sea basin. The stream was modelled for runoff response to different rainfall amount and climate conditions (dry, normal, and wet seasons) which were chosen from the rainy seasons in the previous 30 years. Finally, the amount of surface water contribution from each of the three seasons of the Dead Sea was quantified. The outcome of the model shows the results from the normal rainy season, which is frequently reoccurs and common in the region. The model data show that such events normally contribute with about 18–22 MCM annually to the Dead Sea. The problem is with the recurrence of dry season such as 2005/2006, by which the amount of the surface water decrease and consequently has adverse effect on the Dead Sea. However, the presence of less frequent thunder storm season such as that one in 1991/1992 has also a positive effect on the Dead Sea level. In the rainy season 1991/1992 there was a higher amount of rainfall over the study area that reaches around 155 MCM. Despite the presence of this high amount most of the recharge lost to the ground as groundwater recharge. The high amount of rain increases the amount of inundated surface water out of the Wadi banks and covers more surfaces all over the study area, which in role promote more water loss to the ground. That is why the total loss (rather than surface runoff) was much higher (77%). Moreover, 50% less precipitation in 2006 decrease the Dead Sea five metres within five years, and 60% 1992 increase of precipitation raise the water level two metre only for two to three next years. How can we balance the groundwater needs and the Dead Sea survival with those 40% surface water? By no mean: preventing the Dead Sea decline by increasing runoff will not only preventing the fresh water deterioration, but also it will be in the account of groundwater recharge in the surrounding aquifers of the Dead Sea. These conclusions suggest strongly the need of an integrated groundwater model, in order to quantify all scenarios.