

The Environmental Problem of the Dead Sea – Jordan

Ahmad Al-Hanbali[1]; Akihiko Kondoh[2]

[1] Earth and Human Environment Sci.

, Chiba Univ.; [2] CEReS, Chiba Univ.

<http://dbx.cr.chiba-u.jp/>

Jordan is considered as one of the countries that is suffering from water scarcity. The rapid population growth rate accompanied with limited water resources makes Jordan to be classified in the absolute scarcity category according to the water stress index. The population of Jordan has been increased from 3.5 million in 1990 to about 4.5 million in 1999 with average annual growth rate 3.9%. As a result of being Jordan lays in arid and semiarid climate around 85% - 90% of the annual rainfall lost in the evaporation process, which forced the Jordanian government to depend on the groundwater for water supply.

Dead Sea is considered one of the most important hydrological areas in Jordan. The Dead Sea's water level has been declining every year from -397m in 1973 to about -417m in 2003, which cause a major environmental problem to the groundwater in Jordan. The slope map of the Dead Sea region which was derived from the DEM of the same area shows how the topography sloping towards the Dead Sea as it is considered the lowest point on earth, this forces the groundwater to flow toward the Dead Sea from the surrounding groundwater basins and consequently lost in evaporation from the Dead Sea which is the only outlet of water.

The Landsat satellite images acquired in 1/1/1973, 8/14/1987 and 3/8/2002 showed that there is a decreasing in the Dead Sea water level as well as changes in the land cover for the same region and other part of the country. The land cover maps shows that the expansion of the human activities on both sides - Jordan and Israel - represented by the potash companies has a major effect in increasing the evaporation process in the Dead Sea region. These companies derive the water from the Dead Sea to huge evaporation pans to extract different kinds of minerals such as the potassium (K) and sodium chloride (NaCl), and other companies that extract magnesium chloride, magnesium oxide and hydroxide from the Dead Sea water. All the previous factors can result into the acceleration of water level decreasing of the Dead Sea and also an increasing of groundwater flow to the Dead Sea.

Building a three dimensional steady-state groundwater flow model for the basins near the Dead Sea region is the main objective of this study which will be done in the near future in order to estimate how much water is discharging from the groundwater basins toward the Dead Sea or in other words how much Jordan loses water from its water resources.