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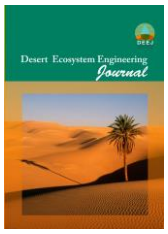

Relationship between meteorological and hydrogeological drought in an arid area:(a case study of Sheshdeh and Gharebolagh plains)

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Abstract

Groundwater is a major source of water for agriculture in Sheshdeh and Gharebolagh plain. In recent years increasing drought and excessive exploitation of these resources has increased the pressure on groundwater. The aim of this study was to investigate the relationship between meteorological and hydrogeological drought using the SPI and GRI indices. Eight rain gauges stations were used to calculate the SPI index. The GRI index was calculated using 14 piezometric water table wells over a common 21-year period (1993-2014). A unit hydrograph of the study area shows that groundwater levels dropped continuously. The annual average drop was 1.76 m. Pearson correlation analysis between meteorological and hydrogeological drought with a coefficient of determination of 49% and a confidence level of 1% indicates that meteorological drought has a time delay of 24 to 48 months on groundwater resources. The results of zoning for hydrogeological drought showed that the initial condition was extended wet, but from 2007 to 2008, the extremely wet periods had decreased and the aquifer was status was normal. From 2008 – 2009 to end of the period, the severity of drought (average drought) increased until 2011 to 2014, when drought extended to most of the aquifer area. In such a critical situation, it is necessary to maintain the level of the aquifer.

Keywords: Hydrogeological Drought, Meteorological Drought, Unit of Hydrograph, GIS, Sheshdeh and Gharebolagh Plain.

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