

The Relationship between Drought Indices and Changes in Groundwater Level in Sari, Iran

Kharazi Pouria^{a}, Foruzanfar Milad^b, Kaveh Alireza^b*

^a, *MSC student, Department of combat desertification, Semnan University Iran-*

^b, *MSC student, Department of Natural resource, Sari University Iran-*

pouriakharazi@gmail.com

Abstract

Long-term climate data of thirty stations in Sari County were analyzed in combination with information from local stations. For investigated drought indices include Standardized Precipitation Index (SPI), China Z-Index (CZI) and Z-Score Index (ZSI) to compare their resultant with water table variations. In this study we used the DIP (Drought Index Package) software for investigating drought indices. The precipitation records were used from January 1985 to December 2005. We compared drought value with water table variation to find best index for investigate and predict water table variation.

Keywords: Drought Indices, DIP, Groundwater Level, Monitoring, Sari

1. Introduction

Regional scale hydrogeologic characterization of the subsurface is essential for the sustainable development and efficient management of groundwater resources. Conventional hydraulic tests and their subsidiary modifications have served as useful tools for subsurface hydraulic characterizations for several decades (e.g., Theis, 1935; Hantush, 1964; Boulton and Streltsova, 1975; Bear, 1979; Butler, 1990; Ramey, 1992). Among the existing methods, pumping tests (e.g., Theis, 1935; Cooper and Jacob, 1946; Neuman, 1972, 1974; Schad and Teutsch, 1994; Moench, 1995; Sa´nchez-Vila et al., 1999) and slug tests (e.g., Hvorslev, 1951; Cooper et al., 1967; Bouwer and Rice, 1976; Zlotnik and McGuire, 1998; Audouin and Bodin, 2007) are most frequently applied for these purposes. Several authors have analyzed groundwater levels measurements in response to precipitation, especially Rasmussen and Andreasen (1959) who presented a simple model relating water table fluctuations in response to precipitation events. The target of many of these authors was to provide a practical mean of estimating groundwater recharge rates (Rasmussen and Andreasen, 1959; Sophocleous, 1991; Rai and Singh, 1995; Bierkens, 1998; Knotters and Bierkens, 2000; Coulibaly et al., 2001; Healy and Cook, 2002; among others). The groundwater is the invisible and ultimate indicator