



Assessing Groundwater Level Response to Drought on Pingtung Plain Using Standardized Groundwater Index

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Taiwan has been confronted with severe water shortage crises in recent years owing to the effects of extreme weather conditions. Changes in precipitation patterns have also led the insufficient groundwater recharge, and frequency increase of drought. Hence, further studies the historical groundwater data can be used to understand the distribution characteristics and correlation of the groundwater drought state in the study area, which can be used as a reference for future groundwater resources planning. In the present study, select Pingtung Plain as study area. Daily groundwater level monitoring records during 2000 and 2016 from 53 stations on this area are investigated in order to assess the overall groundwater level response to natural drought phenomena. Firstly, the long-term groundwater level records at each station are analyzed using the Standardized Groundwater Index (SGI) method to detect groundwater drought events at half-year and one-year timescales. The two SGI indicators, SGI180 and SGI360, are time-series data consisting of the cumulative total of daily groundwater levels, with a cumulative period of 180 days and 360 days, respectively. The criteria for groundwater drought intensity ranks associated with the cumulative distribution function estimated by SGI is also presented. Second, according to the trend of groundwater level records assessed by the Mann-Kendall test, 53 sites were divided into three categories and planning appropriate groundwater management strategies. Finally, develop groundwater level recession models of prediction that can assess the future drought state of groundwater based on current groundwater level conditions. In conclusion, understanding the interaction between drought and groundwater resources is very helpful for the development and management of water resources, and the results can be used as reference for the government's overall planning of future groundwater resources.

Key Words: Pingtung, Standardized Groundwater Index, Mann-Kendall Test, Daily Groundwater Level Records, Groundwater Management