

Analysis of correlation between groundwater level decline and wetland area decrease

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Abstract

Groundwater is the main source of water on which relies many countries in case of emergency, this is the case of Japan in 2011 after the great Sendai Earthquake. This important resource is found to be heavily influenced by human induced factors such as wetland area reduction. For groundwater sustainable management in perfect cohesion with wetland it is important to understand the relationship between both resources. Wetlands have a strong interaction with both groundwater and surface water, influencing catchment hydrology and water quality. Quantifying groundwater-wetland interactions can help better identify locations for wetlands restoration and/or protection.

This study uses observation data from piezometers and wetland to study the qualitative and quantitative aspects of the correlation. Groundwater level, wetland area, chemical, organic and inorganic contaminants are the important parameters used. the results proved that few contaminants in the wetland are found in groundwater and in general the wetland quality does not affect that much groundwater quality. The strong linear relationship found between wetland water level and nearest groundwater level proved that, in term of quantity, groundwater and wetland are strongly correlated. While wetland becoming dry, groundwater level has dropped in the region about 0.52m. The area of wetland was found to be lightly correlated with groundwater level, proving that wetlands dry has contributed to groundwater level declining.

This study has showed that whilst rainfall variability contributed to the decline and loss of wetlands, the impacts from landuse changes and groundwater extraction were likely to be significant contributors to the observed losses.

Keywords : Wetland, groundwater, correlation, drought

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