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Drought effects on groundwater system over rural area in S. Korea

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Evaluation of drought effects on groundwater system is very difficult because groundwater level change after hydrological events happens to be delayed according to the aquifer characteristics. Therefore, to interpret them, it is common to analyze the time-series groundwater data from monitoring wells together with meteorological data.

Korea Rural Community Corporation (KRC) has managed rural groundwater monitoring network that is consists of rural groundwater management network (RGMN) and seawater intrusion monitoring network (SIMN) placed in inland areas since 1998 [1]. Currently, a total of 364 monitoring wells (210 wells for RGMN and 154 wells for SIMN) have been installed (Fig. 1). Meanwhile, Jeju Special Self-Governing Province (JSSGP) has operated 115 monitoring network (JJMN) in Jeju Volcanic Island which entirely rely on groundwater as water resources. These networks have monitored hydrological properties including groundwater level, temperature, and electric conductivity every hour and data are automatically transferred to the management center in KRC and JSSGP, respectively.

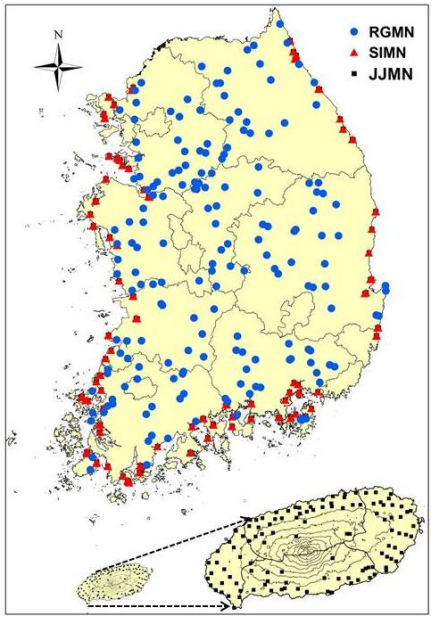

Figure 1: Groundwater monitoring networks in rural area, South Korea

To estimate the effect of precipitation on groundwater system, monthly mean groundwater level data from RGMN and SIMN in 2012, 2013 and 2014 ware compared to their past data, which were analyzed together with rainfall data from adjacent weather stations.

In 2012 and 2014, mean groundwater level data in the northern part of inland areas during irrigation season (April to June) recorded 10% and 30% of precipitation compared to those of past 30 years, decreased up to 1.32 m and 0.71 m compared to that of the normal year, respectively.

In addition, mean groundwater levels decreased from depth 2.63 m to depth 5.42 m in the southern area of Jeju Volcanic Island due to the extreme drought during the summer season (June to September) in 2013. Besides, groundwater level descent were recorded in western (from depth -1.21 m to depth -4.06 m), eastern (depth -0.91 m to depth -3.24 m), and northern area (from depth 0.58 m to depth -4.02 m), respectively. Moreover, the response of groundwater level from drought turned out to be shown after delaying about one month.

Consequently, amount of groundwater in aquifer system of S. Korea would be decreased due to the effect of periodic drought events occurred in every spring season.

References:

[1] Song SH and Zemansky G (2012) Environ Earth Sci 66(3): 1865-1876