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Seasonal change characteristics in water discharge and quality of flowing wells in the Kurobe River alluvial fan, Japan

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The overall goal of this study is to promote sustainable groundwater use in the Kurobe River alluvial fan (KRAF), Japan. To do so, the present condition of groundwater in the KRAF must be understood. To clarify the characteristics and seasonal changes of flowing wells in the KRAF, regular field observations were undertaken for 18 months from March 2011. The results regarding seasonal changes in flowing water discharges, water quality, and isotope ratios have been reported in this paper.

This paper newly reports the monthly discharge and water quality of flowing wells in the KRAF. Discharge flow was observed at 10-minute intervals to clarify the variability. Moreover, seasonal changes and spatial characteristics of discharge were clarified for the whole study area.

The analyses showed no spatial differences in water quality, in agreement with previous research. Furthermore, fundamental water quality variables (Na, K, Mg, Ca, Cl, and SO4) had not changed substantially from values reported in 1989.

Isotope ratio analysis indicated that 3 observation wells had difference sources of recharge than the other wells that were recharged by the Kurobe River. This pattern also agrees with results published 10 years ago. Spatial characteristics also had the same patterns as previously reported.

Finally, as mentioned above, although there are many published reports of water quality in flowing wells in the KRAF, few studies have examined water discharge. To accurately estimate the groundwater conditions in the KRAF, continued, long-term monitoring of water flow in wells is needed.