Hydrogeology and groundwater quaility formation process in the Kannagawa-river alluvial fan, Saitama Prefecture, Japan

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Hydrogeology and groundwater quality formation process was investigated in Kamisato Town in the Kannagawa-river alluvial fan, Saitama Prefecture, central Japan. Groundwater samples from 40 bores of depth in the range between 7 m and 170 m were analyzed for water quality and hydrogen-oxygen isotopes. As the result of research, groundwater in the alluvial fan proved to be highly polluted with nitrate and sulfate ions up to as deep as 100m below the ground surface. Groundwater was also characterized with high hardness ranging from 90 to 280 mg/L. These are estimated to result from excessive application of fertilizer for the intensive vegetable and wheat cultivation. A two end-member mixing analysis made it clear that infiltrating river water from Kannagawa river make a considerable contribution to the formation of shallow groundwater. Two tongue-shaped zones indicating more than 50% contribution of river water extend northeasterly from the right bank of the river, which is consistent with spatial distribution of ground water quality.

Keywords: Kannagawa-river alluvial fan, groundwater-river water interaction, groundwater quality, hardness in groundwater, fertilization

