

Hydrogeology and groundwater flow system in the Mitaki river basin, Mie prefecture

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Groundwater is mainly used as a water resource in Yokkaichi city. Mitaki river basin is one of the most significant area to collect a good groundwater for water supply. But, recently, land use condition changes agricultural field to residential or commercial area. So, it is concerned the groundwater quality will change worse and the amount of groundwater reserves will decrease. It is necessary to make clear the actual condition of effect of land surface conditions to the shallow groundwater, to preserve a good aquifer for sustainable shallow groundwater resource supply.

The purposes of this study are to analyze the physical and chemical characteristics of shallow groundwater quality related to geomorphology, geology and land use. Water samples are collected at 85 measurement points of river and groundwater in the irrigation season (August, 2010) and the not irrigation season (December, 2010), and analyzed dissolved major ions and oxygen and hydro-stable isotope compositions.

There are some groundwater flow systems and these water qualities are different in each area. Water quality composition of groundwater flow system in the upstream area is similar to Mitaki river water. But, isotopic composition showed two types. There are different groundwater flow systems, one is local groundwater flow system which the recharge area is the foot of Suzuka mountains, another has relatively long residence time. In the downstream area, recharge area is on the hills which are distributed at northern and southern hills. In this area, Shallow groundwater is mixed with river water and hills water. These showed that Mitaki river water is recharge to the portion of shallow groundwater in the downstream area, but chemical characteristics is not affected to the shallow groundwater. So, chemical characteristics of shallow groundwater are closely related to geomorphological, geological and land use conditions. Land use is crops, paddy field and residential area in the basin, so it is possible that this water quality type is effect by any human activities. Seasonal change of groundwater qualities is different in each area. It was summarized that shallow groundwater quality is affected by land surface conditions which is different in each area.

Keywords: Mitaki river, groundwater flow system, hydrogeology, recharge area, drinking water source well