

An analysis of spatial relationship between fault systems and groundwater profile around Kobe city and western side of Osaka.

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Kobe city is located on the northern side of Osaka sedimentary basin, Japan, containing 1,000-2,000 m thick Quaternary sediments. After the Hanshin-Awaji Earthquake (January 17, 1995), a number of geological and geophysical surveys were conducted in this region. Then high-temperature anomaly of groundwater accompanied with high Cl concentration was detected along fault systems in this area. In addition, dissolved He in groundwater showed nearly upper mantle-like $^3\text{He}/^4\text{He}$ ratio, although there were no Quaternary volcanic activities in this region. Some recent studies have assumed that these groundwater profiles are related with geological structure because some faults and joints can function as pathways for groundwater flow, and mantle-derived water can upwell through the fault system to the ground surface.

To verify these hypotheses, we established 3D geological and hydrological model around Osaka sedimentary basin. Our primary goal is to analyze spatial relationship between geological structure and groundwater profile. In the study region, a number of geological and hydrological datasets, such as boring log data, seismic profiling data, groundwater chemical profile, were reported. We converted these datasets to meshed data on the GIS, and plotted in the three dimensional space to visualize spatial distribution. Furthermore, we projected seismic profiling data into three dimensional space and calculated distance between faults and sampling points. As a result, several sampling points showed spatial relationships with concealed faults around Kobe City.