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## An 3D analysis of spatial relationship between fault systems and groundwater profile around Kobe using GIS.

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Kobe city is located on the northern side of Osaka sedimentary basin. Around Kobe city, high-temperature anomaly of groundwater accompanied with high Cl concentration was detected along fault systems. In addition, dissolved He in groundwater showed nearly upper mantle-like  $3\text{He}/4\text{He}$  ratio. Some recent studies have assumed that these groundwater profiles are related with geological structure because some faults and joints can act 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 reflection profile, 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 reflection profile into three dimensional space and calculated distance between faults and sampling points. As a result, several sampling points showed spatial relationships with concealed faults inferred from seismic reflection profile around the northern side of Wadamisaki.

This year, reanalysis of the seismic reflection profile was conducted around the northern side of Wadamisaki. As a result, refractive tomography clearly defines the low-velocity zone around concealed faults together with the disturbance of Osaka Group.

Keywords: A geographic information system (GIS), Groundwater, Kobe, Fault