Attempt to identify the origin of deep-seated fluids in terms of hydrogeochemical characteristics

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For the safety assessment of the HLW geological disposal, it is necessary to evaluate the groundwater chemical and physical stability and inflowing of deep-seated fluids which is idiomatically classified as slab-derived fluid, fossil seawater, and oil-field brine. Among them, the slab-derived fluid, known as non-volcanogenic spring water, found in some areas in Japan which is recently elucidate their origin and behavior, they often have high temperature, high CO_2 gas, and high salinity sometimes over seawater. The features may have adverse impact for geological disposal systems. So, consolidation of the methodology for finding the fluid is required.
According to previous studies, typical features of slab-derived fluids show hydrothermal isotope shift of water, dissolved Li/Cl (w/w) tends to be exceeded 0.001, and isotope ratio of dissolved He gas is higher than the air. Fossil seawaters and oil-field brines have basically opposite features in slab-derived fluids, although some of them have high Li/Cl and hydrothermal shift of water isotopes. Identifying the origin of groundwaters is complicated problem. In this presentation, the authors show the results of sorting out the features of deep-seated fluids based on previous studies adding our field sampling results collected from over 40 of springs and boreholes to identify the origin of deep-seated fluids in terms of hydrogeochemical characteristics.

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