

Geoscientific Studies in Mizunami Underground Research Laboratory Project (MIU)

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Hydrochemical conditions up to depths of 1,000m below ground level around the Mizunami Underground Research Laboratory (MIU) were investigated to construct a 'baseline condition model' describing the undisturbed hydrochemical environment prior to excavation of the underground facilities at Mizunami, Gifu, Japan. Groundwater chemistry in this area was classified into a Si-Na-Ca-SO₄-HCO₃ type of groundwater and a Na-(Ca)-Cl type of groundwater. The evolution processes of these groundwaters were inferred to be water-rock interactions such as weathering of plagioclase, dissolution of marine sulphate / sulphide minerals and carbonate minerals in the Si-Na-Ca-SO₄-HCO₃ type of groundwater, and mixing between 'low-salinity water' in the shallow part and 'higher-salinity water' in the deeper part of the granite in the Na-(Ca)-Cl type of groundwater. The source of salinity in the deeper part of the granite was possibly a fossil seawater that recharged in the Miocene, subsequently being modified by long-term water-rock interaction. The remains of fossil seawater suggest low- or no-flow conditions in the deep granite in this area.