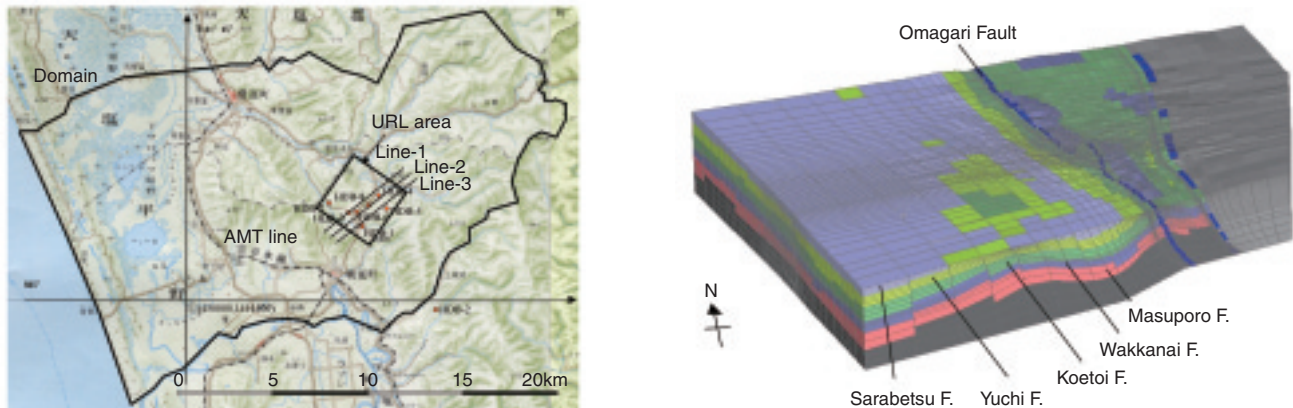


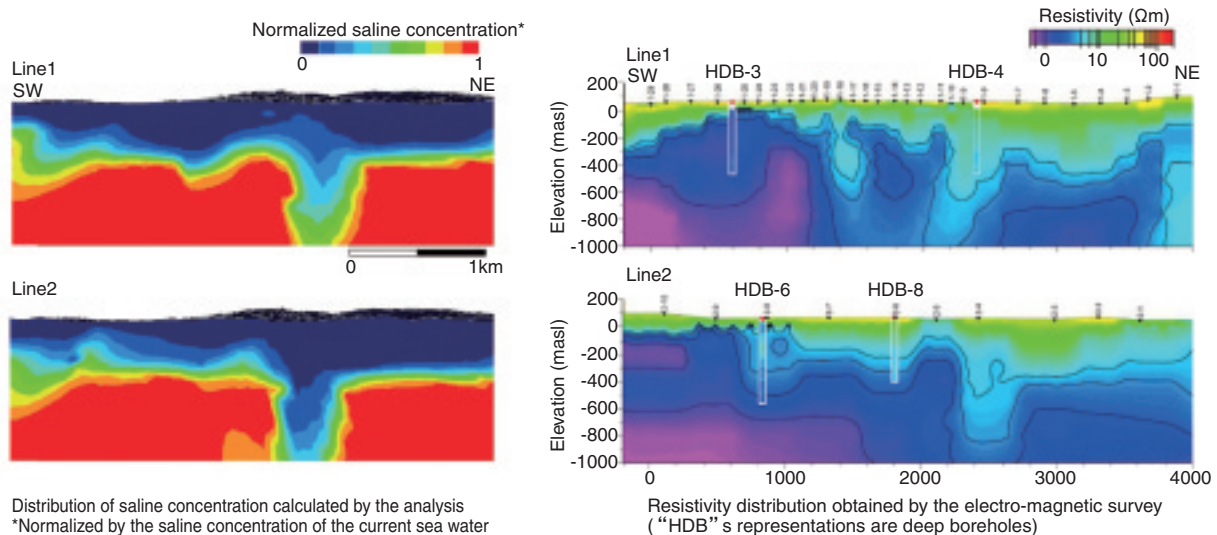
## 2-11 Saline Concentration Indicates Groundwater Flow

— Relationship between Saline Concentration Distribution and Groundwater Flow in Sedimentary Rock —



**Fig.2-19 Analyzed area(left) and the finite element (FE) mesh (right)**

To understand the groundwater (GW) flow system and distribution of saline concentration in and around the Horonobe URL area, GW flow and saline transport analysis by the FE method was carried out. Surrounding mountains and valleys were assumed to be impermeable boundaries and hydraulic conductivities obtained by the borehole investigations were applied to the FE mesh.



**Fig.2-20 Distribution of saline concentration calculated by the GW flow and saline transport analysis (left) and resistivity distribution obtained by the electro-magnetic (EM) survey (right)**

Highly concentrated saline GW is considered to be replaced with the infiltrating water from precipitation. This occurs especially at high permeable zones (near a permeable fault) according to the analysis. Resistivity distribution obtained by the EM survey which reflects the distribution of saline concentration correlates with the results of this analysis.

In order to understand a deep groundwater (GW) flow system, a GW flow analysis is often performed based on investigations providing the distribution of hydraulic parameters and boundary conditions. The result of this analysis is generally evaluated by comparison with measured hydraulic pressures. However, it is not effective in an area where the range of distribution of hydraulic pressure is small like Horonobe area.

Deep GW in Horonobe area has high salinity which indicates that it is old seawater confined during

sedimentation. Therefore, GW flow and saline transport analysis was performed and the result was compared with measured saline concentration and distribution of resistivity which is considered to reflect the distribution of saline concentration.

In a geological environment such as this, where GW highly influences distribution of saline concentration, this analytical method focusing on the saline concentration is effective in evaluating the GW flow system.

### Reference

Kurikami, H. et al., Groundwater Flow Analysis of Horonobe Underground Research Laboratory Project, 2005, JNC TN5400 2005-003, 97p. (in Japanese).