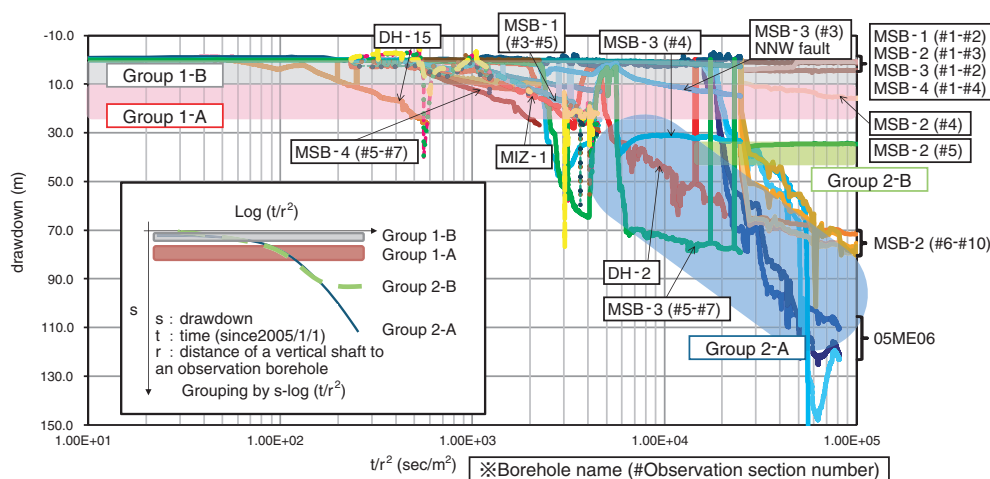


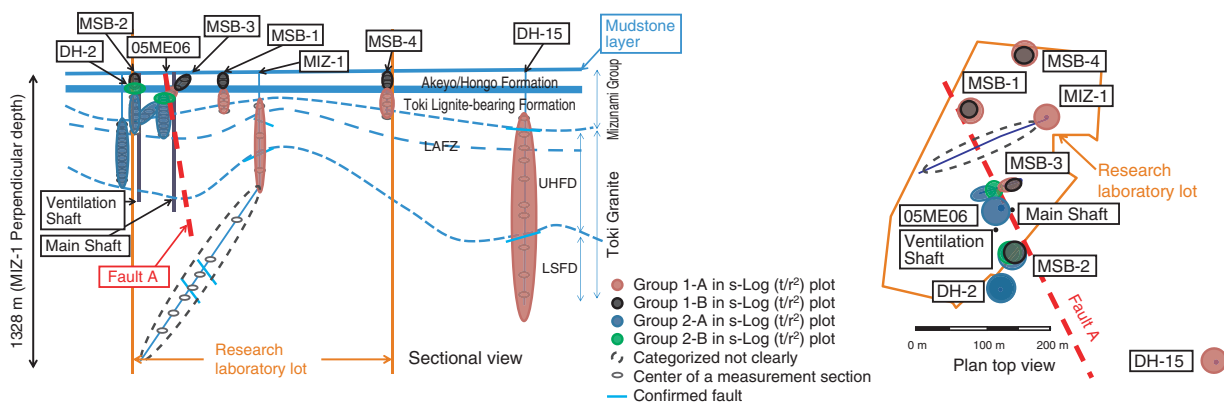
## 3-6 Technology for Estimating Hydrogeological Characteristics Deep Underground – Evaluation of Hydrogeological Characteristics Using Water Pressure Data –



**Fig.3-18**  $s(\text{drawdown})\text{-log}(t/r^2)$  plot

The x-axis is the logarithm of  $t/r^2$  and the y-axis shows the drawdown in each observation section.

Group 1-A exhibits a small amount of drawdown. Group 1-B does not exhibit obvious drawdown. Group 2-A exhibits a large amount of continuing drawdown. Group 2-B exhibits a large amount of drawdown, which has already been balanced.



**Fig.3-19** Borehole grouping based on  $s\text{-log}(t/r^2)$  plots (section view, plan top view)

Estimation of groundwater flow and hydrogeological characteristics deep underground is important for assessment of the safety of the geological disposal of high-level radioactive wastes (HLW).

For the Mizunami Underground Research Laboratory (MIU) project, we are constructing a scientific and technological basis for the geological disposal of HLW.

MIU is now under construction in Mizunami City, Gifu Prefecture. Long-term groundwater pressure monitoring is being conducted in and around the MIU construction site in order to observe the groundwater pressure changes due to shaft excavation.

Such changes in groundwater pressure are assumed to be an analogous to those caused by large-scale pumping tests. In this study, hydrogeological characteristics were estimated

using monitoring data and  $s\text{-log}(t/r^2)$  plots based on the Cooper-Jacob straight line method.

The groupings of the monitoring section, based on trends in groundwater pressure changes, are shown in Fig.3-18. Fig.3-19 illustrates the locations of the monitoring sections and the result of groupings in and around the MIU construction site. The results indicate that the groundwater flow field is separated into areas, which can be further subdivided into individual groups, bounded by low permeable structures such as Fault A and the mudstone layer in the Mizunami Group.

The study suggests that an evaluation method using  $s\text{-log}(t/r^2)$  plots is an effective method for hydrogeological characterization of heterogeneous fractured rock.

### Reference

Daimaru, S., Takeuchi, R. et al., Hydrogeological Characterization Based on Long Term Groundwater Pressure Monitoring, Proceedings of the 13th International Conference on Environmental Remediation and Radioactive Waste Management (ICEM2010), Tsukuba, Japan, 2010, ICEM2010-40064, 10p., in CD-ROM.