

Numerical study on the deformation of freshwater-saltwater transition zone through geologic time.

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Coastal underground spaces are considered as one of the candidates for the geologic disposal of high level radioactive wastes. The groundwater flow field beneath a coastal area is believed to be affected mainly by both the existence of the freshwater-saltwater transition zone, and boundary fluctuations with respect to surface hydrological conditions and sea level change through geologic time.

In this paper, the author presents results of case studies, made by using a 2-D cross-sectional model, under static/dynamic boundary conditions and human disturbances related with constructing the disposal facilities.

The general summaries are : (a)the difference in initial conditions will not produce difference in the position and shape of freshwater-saltwater transition zone at static state. (b) subsurface formations saturated with saltwater might generally be washed out by rainfall during the Quaternary,(c)present shape of the freshwater-saltwater transition zone may not be in consistent with the Ghyben-Herzberg equilibrium shape because the effect of the last sea level regression still remains. (d)underground construction of repository may cause significant lowering of the groundwater level, and the time required for its recovering may be within a hundred years, although the fresh-salt transition zone pulled toward the caverns moves slowly back to the pre-position after the cavern backfilling.