



## **Investigation of origin for seawater intrusion using geophysical well logs and absolute ages of volcanic cores in the eastern part of Jeju Island**

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Jeju located in the southern extremity of Korea is volcanic island, one of best-known tourist attractions in Korea. Jeju Province operates the monitoring boreholes for the evaluation of groundwater resources in coastal area. Major rock types identified from drill cores are trachybasalt, acicular basalt, scoria, hyalocastite, tuff, unconsolidated U formation, and seoguipo formation and so on. Various conventional geophysical well loggings including radioactive logs (natural gamma log, dual neutron log, and gamma-gamma log), electrical log (or electromagnetic induction log), caliper log, fluid temperature/ conductivity log, and televiewer logs have been conducted to identify basalt sequences and permeable zone, and verify seawater intrusion in monitoring boreholes. The conductivity logs clearly show the fresh water-saline water boundaries, but we find it hard to identify the permeable zones because of the mixed groundwater within the boreholes. Temperature gradient logs are mostly related with lithologic boundaries and permeable zones intersected by boreholes of eastern coasts. The wide range of periodic electrical conductivity logging in the deeper depth of monitoring boreholes indicates the possibility of submarine groundwater discharge. However we did not clearly understand the origin of seawater intrusion in the eastern coast until now. So we analysis the electrical conductivity profiles, record of sea-level change and  $^{40}\text{Ar}/^{39}\text{Ar}$  absolute ages of volcanic rock cores from twenty boreholes in east coast. From comparing absolute ages of volcanic rock cores and sea-level of their ages, we find that the almost ages of depth showing high salinity groundwater are about 100 Ka, and from 130Ka to about 180Ka. The former is after the interglacial period and the latter is illinoian. These results indicate that the abrupt raising of sea level after illinoian formed the regional coast, and the zone of present seawater intrusion also are above the depth of illinoian period. So we conclude that the origin of seawater intrusion in eastern coast is caused mainly by the sea-level change.