



Multi-channel monitoring of electrical conductivity for the characterization of the zone of fresh-salt water in the eastern coastal area of Jeju Island, Korea

Seho Hwang and Jehyun Shin

Korea Institute of Geoscience and Mineral Resources, Geologic Environment Division, Daejeon, Korea, Republic Of
(hwangse@kigam.re.kr)

In eastern Jeju Island, seawater intrusion occurs up to several kilometers inland. This area mainly uses a large amount of salt groundwater for the production of high value-added products of salt groundwater, and fish farm operation. The test-bed was selected and nine test boreholes were drilled for effective use and management of coastal groundwater with high salinity. Temperature, electrical conductivity, natural gamma ray, and optical televiewer loggings were performed in these test boreholes to understand the characteristics of the fresh-saltwater interface. The fresh-saltwater interface was mainly formed near the mean sea level, and most of fresh-saltwater interface was formed sharply after a certain period of time after drilling. Generally, a water level sensor and a temperature / electric conductivity sensor are installed and operated to monitor the characteristics of the fresh-saltwater interface at the borehole. The fresh-saltwater interface shows mostly sharply, but may also show moderate changes. Therefore, in order to accurately monitor the boundary zone of the fresh-saltwater, it is necessary to install a large number of sensors, but it is not easy in terms of cost. To solve this problem, we developed a multi-channel electrical conductivity monitoring system using the cost effective Arduino device. By using the developed conductivity monitoring system, it was possible to precisely understand the characteristics of the fresh-saltwater zone by monitoring the electrical conductivity at a very small interval (ex. 1 m) in the fresh-saltwater zone.