



Investigating Remediation Reagents Injection and Rainfall Effect by using Self-Potential Method in a Soil and Groundwater Contamination Site located in Yung Kang, Taiwan

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In this study, we have proposed the use of time-lapse SP (self-potential) monitoring system to investigate a remediation reagents injection and rainfall effect in the soil and groundwater contamination site which was located in Yung Kang, Taiwan. We set up two mutually perpendicular survey lines to continuously record the SP data at a sampling rate of 25 Hz. One extended in N-S direction for a total length of 85 m with 17 potential electrodes and 1 common reference electrode. Another extended in E-W direction for a total length of 35 m with 7 potential electrodes and 1 common reference electrode. By averaging 1 day hourly SP median data, we calculated the time-lapse SPT (self-potential tomography) with a published code SP2DINV, and got the following results. First and foremost, from the daily SPTs, we found some artificial structures at a depth of circa 5 m. Then, by observing the positive and negative electric potential distributions in both N-S and E-W SPTs, we determined that the regional groundwater flow direction was in NE. Besides, making use of interpolation scheme, we filtered the rainfall effect out of the raw SP data. Then from the SPTs within the rainy days, we successfully demonstrated the SP response to the precipitation. And this phenomenon was interpreted as streaming potential which was caused from the enhancement of groundwater pressure. In addition, we correlated the charge density variation above 5m from SPTs with daily rainfall from August to September, to evaluate the Streaming Potential Coupling Coefficient. Last but not the least, by analyzing the SPTs variation from 13th to 18th October 2015 and from 23th to 25th November 2015, we compared the SPTs difference between two remediation reagents injection periods. And we also computed the passing time of the equal-potential lines between two fixed points, to evaluate the apparent hydraulic conductivities in this study area.