

Relationship between temporal variation of self-potential distribution and groundwater flow around a tidal flat

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Self-potential (SP), nearly static electrical potential on and in the earth, is mainly generated by pressure gradient of pore water, especially in no volcanic and mine area, so that SP can be a useful tool to constrain and monitor groundwater flow. We adopted SP observations in a tidal flat to investigate the spatial and temporal variation of the groundwater flow near the fresh and sea water boundary. A spatial and temporal variation of observed SP is visible in the tidal flat. Comparing the observed SP variations with tide, the SP is not related not with movement of sea-water but possibly related with groundwater variation controlled by tide. Recently, we also developed newly developed calculation codes to interpret observed SP features and constrain groundwater flow. A simultaneous simulation of both groundwater flow and resultant SP distribution can be done. The groundwater calculation is done by MODFLOW, a well-known groundwater simulator. We show the simulation on the tidal flat with several simple models, and demonstrate qualitatively whether the observed SP variation is generated by the groundwater flow variation or not.