

3D ERT monitoring during dyke overtopping experiment using multi-current transmission technique

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We conducted a field experiment to simulate dyke overtopping using a model bank. We built a small scale model bank and water pool for simulating water level rising at river levee. We also set equipment for artificial rainfall above the model bank. As one of monitoring measurements of model bank while rising water level and raining artificially, we conducted time-lapse ERT survey on this model bank for the purpose of capturing water infiltration inside the model bank. To realize fine time resolution of ERT measurement for capturing water infiltration through high permeable material, we applied multi-current transmission technique, which has 8 transmitters and 8 receivers. In this technique, we can inject current at plural current electrodes simultaneously. By using our instrument based on this technique, we can improve measurement efficiency. We conducted a set of measurement which has 3072 data at the interval of 20 minutes. We performed 2D and 3D resistivity inversion. ERT measurement captured the water infiltration into the model bank by fine time resolution. The brackish saline water worked as a good tracer of ERT measurement in this case. 3D inversion using 2D survey lines data contributed to understand the spatial distribution of resistivity time variation.

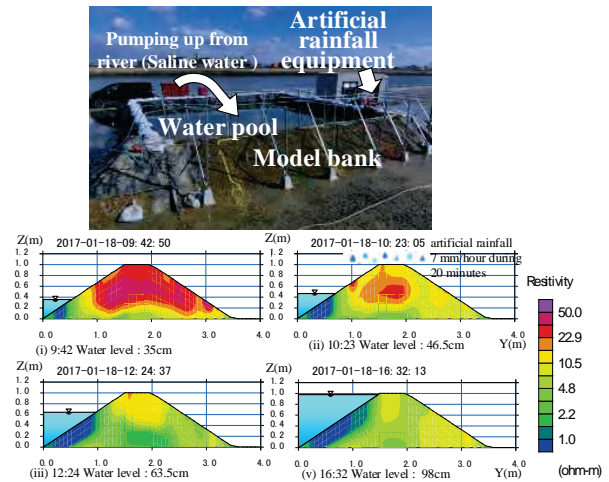


Figure: Overview of dyke overtopping experiment and an example of the result of 2D resistivity time variation of model bank