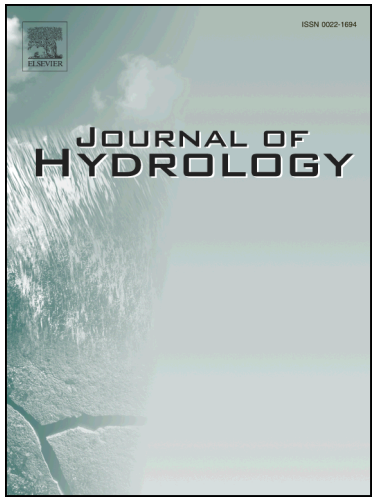

Research papers

Responses of retaining wall and surrounding ground to pre-excavation dewatering in an alternated multi-aquifer-aquitard system

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Responses of retaining wall and surrounding ground to pre-excavation dewatering in an alternated multi-aquifer-aquitard system

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Abstract: Pre-excavation dewatering (PED) is an important construction stage in deep excavation. Field measurements show that retaining walls can develop obvious deflections during PED, which has been rarely considered in the past. The characteristics of PED-induced wall deflection, and the relationship of this deflection to surrounding ground deformation are still unclear. In this study, a PED test is simulated by a numerical model. The model is verified by field observations and used to investigate the responses of retaining wall and surrounding ground to PED. Results indicate that the maximum wall defection (δ_{hm}) and surface settlement (δ_{vm}) can all reach centimeter level under common conditions of PED. The ratio of δ_{vm} to δ_{hm} varies at the range of 0.45-0.67. Wall and soil deformations will be more obvious if the soils within the dewatering depth (H_d) have better permeability. The relative positions between H_d and strata (i.e., aquifer or aquitard) have great influence on the PED-induced deformations. If an aquifer appears below H_d, further increasing H_d can induce a rapid growth of wall and soil deformations. If thick aquitard appears below H_d, the deformation increments by further increasing H_d are not apparent. However, once H_d exceeds the center of the thick aquitard and reaches a thick confined aquifer,

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