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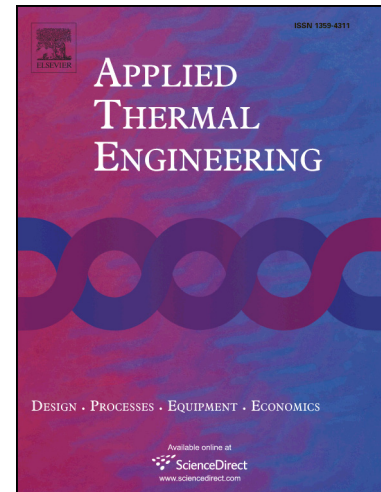
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Crack formation of a highway embankment installed with two-phase closed thermosyphons in permafrost regions: field experiment and geothermal modelling

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Abstract

Two-phase closed thermosyphon (TPCT) is proved to be an effective countermeasure to thaw-induced problems for engineering constructions in permafrost regions. However, cracks often occur on the road surfaces of the embankments installed with TPCTs, which are supposed to be closely associated with the unstable thermal states of the underlying soil layers. The crack is a potential danger to the embankment stability, and thus a better understanding of the crack formation is urgently needed. In this paper, in order to address the problem, 5-year ground temperatures and embankment deformations at different soil layers were monitored at a road section with TPCTs and its neighboring road section without TPCTs. The ground temperatures were mainly employed to verify an air-TPCT-soil coupled model, and then the model was used to

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