

## Accepted Manuscript

Thermal interaction between a thermokarst lake and a nearby embankment in permafrost regions

Zhi Wen, Mikhail Zhelezniak, Dayan Wang, Wei Ma, Qingbai Wu, Zhen Yang, Alexander Zhirkov, Qiang Gao



PII: S0165-232X(17)30204-5  
DOI: doi:[10.1016/j.coldregions.2018.08.010](https://doi.org/10.1016/j.coldregions.2018.08.010)  
Reference: COLTEC 2639  
To appear in: *Cold Regions Science and Technology*  
Received date: 3 May 2017  
Revised date: 27 March 2018  
Accepted date: 10 August 2018

Please cite this article as: Zhi Wen, Mikhail Zhelezniak, Dayan Wang, Wei Ma, Qingbai Wu, Zhen Yang, Alexander Zhirkov, Qiang Gao , Thermal interaction between a thermokarst lake and a nearby embankment in permafrost regions. Coltec (2018), doi:[10.1016/j.coldregions.2018.08.010](https://doi.org/10.1016/j.coldregions.2018.08.010)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

**Thermal interaction between a thermokarst lake and a nearby embankment in  
permafrost regions**

Zhi Wen<sup>1\*</sup>, Mikhail Zhelezniak<sup>2</sup>, Dayan Wang<sup>1</sup>, Wei Ma<sup>1</sup>, Qingbai Wu<sup>1</sup>, Zhen Yang<sup>1</sup>, Alexander  
Zhirkov<sup>2</sup>, Qiang Gao<sup>2</sup>

(1. State Key Laboratory of Frozen Soil Engineering, Northwest Institute of  
Eco-Environment and Resources, Chinese Academy of Sciences, Lanzhou Gansu  
730000, China; 2. Melnikov Permafrost Institute, Siberian Branch of Russian  
Academy of Sciences, Merzlotnaya St., 36 Yakutsk, Republic of Sakha, Russia)

**Abstract:** Linear engineering construction and changed climate on the Qinghai-Tibet Plateau have initiated significant thermokarst processes, which seriously deteriorates the thermal stability of nearby engineering infrastructure. The existence of embankments also has a potential thermal effect on nearby thermokarst lakes. However, this thermal interaction between an embankment and a thermokarst lake has not been fully understood. A series of numerical simulations were conducted to study the thermal interaction of thermokarst lake-embankment system in 50 years by a dynamic heat transfer model with phase change. Our simulated results indicate that the existence of the thermokarst lake has a significant thermal effect on nearby embankment, while the existence of the embankment has a slight thermal effect on nearby thermokarst lake. The influences of lake-bottom temperature, the distance between the lake and the embankment, the ground temperature and the ice content of permafrost on the thermal interaction were discussed.

---

\*Corresponding author (Z. Wen): Tel.: +0086-931-496-7299.  
E-mail address: [wenzhi@lzb.ac.cn](mailto:wenzhi@lzb.ac.cn)

Download English Version:

<https://daneshyari.com/en/article/8906361>

Download Persian Version:

<https://daneshyari.com/article/8906361>

[Daneshyari.com](https://daneshyari.com)