

## Accepted Manuscript

Experimental study on the effect of freezing-thawing cycles on wind erosion of black soil in Northeast China

Tiejun Liu, Xiangtian Xu, Jie Yang

PII: S0165-232X(17)30015-0  
DOI: doi:[10.1016/j.coldregions.2017.01.002](https://doi.org/10.1016/j.coldregions.2017.01.002)  
Reference: COLTEC 2350

To appear in: *Cold Regions Science and Technology*

Received date: 24 August 2015  
Revised date: 11 August 2016  
Accepted date: 16 January 2017



Please cite this article as: Liu, Tiejun, Xu, Xiangtian, Yang, Jie, Experimental study on the effect of freezing-thawing cycles on wind erosion of black soil in Northeast China, *Cold Regions Science and Technology* (2017), doi:[10.1016/j.coldregions.2017.01.002](https://doi.org/10.1016/j.coldregions.2017.01.002)

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.

## Experimental study on the effect of freezing-thawing cycles on wind erosion of black soil in Northeast China

Tiejun Liu<sup>1,2</sup>, Xiangtian Xu<sup>1,\*</sup>, Jie Yang<sup>1</sup>

1. Inner Mongolia University, Hohhot 010002, China;

2. Institute of Water Resources for Pastoral Areas, Ministry of Water Resources, Hohhot010020, China.

**Abstract:** The black soil region in Northeast China suffers from the dual effects of freezing-thawing process and wind erosion in winter. We studied the influence of freezing-thawing cycles on wind erosion strength of black soil by simulating the conditions of the black soil region in Northeast China. An increase in the porosity on surface of soil specimens was correlated with the number of freezing-thawing cycles, such that soils with a surface moisture content of 5%, 7% and 8% increased porosity after 3, 6 and 9 freezing-thawing cycles. Freezing-thawing cycles induced increases in porosity lead to weakened cohesive forces within the topsoil. The net result was an increase in the sand transport rate of unit width within the height interval of 0 to 40 cm above the ground and an increase in the wind-sand flow structure height of 1-3 cm. In addition, after 6-9 freezing-thawing cycles, wind erosion strength increased by 1.2 and 2.0 times, when soil moisture contents were 5% and 7%, respectively. However, soil samples with a moisture content of 8% were not susceptible to freezing-thawing cycles enhanced wind erosion. The simulation experiment of freezing-thawing process induced wind erosion of black soil using a wind tunnel provided a theoretical basis for preventing freezing-thawing cycles induced wind erosion in black soil.

---

\* Corresponding author. Tel: +86 471 4996009  
E-mail address: xuxt999@sina.com (X. Xu)

Download English Version:

<https://daneshyari.com/en/article/5779440>

Download Persian Version:

<https://daneshyari.com/article/5779440>

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