Analyzing disaster-forming environments and the spatial distribution of flood disasters and snow disasters that occurred in China from 1949 to 2000

Wei Su [a], Xiaodong Zhang [a], Zhen Wang [c], Xiaohui Su [a], Jianxi Huang [a,*], Siquan Yang [b], Sanchao Liu [b]

[a] *College of Information and Electrical Engineering, China Agricultural University, Beijing, 100083, China*
[b] *National Disaster Reduction Center of China, Ministry of Civil Affairs, 100053, China*
[c] *East China Institute of Technology, 344000, China*

ABSTRACT

Flood disasters and snow disasters are frequent disasters in China, causing considerable economic loss and serious damage to towns and farms. The problems of how these two disaster types distribute and what disaster-forming environments are important to their occurrence are the most pressing problems in disaster risk assessment and salvage material arrangement. The present study aims to establish the regularity of flood/snow disaster outbreaks and the important disaster-forming environmental factors, and a spatial autocorrelation analysis method and a canonical correlation analysis method are used to answer these two questions separately. Experimental results indicate that serious flood disasters distribute mainly on the south area of China and snow disasters occur on the north area; those areas should be allocated correspondingly more salvage materials. And some disaster-forming environmental factors are important for the occurrence of flood/snow disasters, and can be used in disaster risk assessment.

Crown Copyright © 2010 Published by Elsevier Ltd. All rights reserved.

1. Introduction

Natural disasters have been increasing alarmingly worldwide in recent years [1], including floods, droughts, earthquakes, forest fires, snow, typhoons, and marine disasters [2], and there are millions of people killed in these disasters. Flooding is the most frequent natural disaster in China; it seriously affects people's lives and productivity, causing considerable economic loss and serious damage to towns and farms. Almost every year, China is affected by severe flooding. Statistics indicate that there are more than 1000 floods in the history of China, including the 1998 floods of the Yangtze River, Nenjiang (Nen River), and Songhua River [3]. The Central People's Government of the People's Republic of China report that there are 1.1 hundred million people affected by flood disasters in 2010 in China [4]. In addition, another natural disaster occurring frequently in China is snow disaster. Almost every year, there will be snow disasters in pastoral areas of China [5], especially in Inner Mongolia, Xinjiang, Qinghai and Tibet: four large pastoral areas. The snow disasters in pastoral areas result in a large number of livestock deaths [6]. Moreover, the heavy snow and the refreezing of melted snow will affect infrastructure and important lifelines such as transportation, communication, power lines, seriously threatening people's lives and their productivity and living. The snow disaster that occurred in the south area of China in 2008 illustrates the destructive nature

---

* Corresponding author. Tel.: +86 13691565698.
E-mail addresses: suwei@cau.edu.cn (W. Su), jxhuang@cau.edu.cn, jxhuang@tsinghua.edu.cn (J. Huang).