

The Theory and Application of Regional Natural Disaster Risk Assessment --the case analysis of Hunan Province agriculture nature disaster

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Risk assessment of the natural disaster is an important part of disaster reduction. Many international object of disaster reduction have involved this research.. It is the synthetically analysis on the basis of risk influence of regional hazard to the disaster. The direct expression is the loss probability distribution at the effect of each kind of hazard of different intensity and different appearance probability .In fact, the loss probability distribution has involved the profound effect of hazard-effected bodies to the disaster. So the risk assessment is the synthetically analysis on the basis of the intensity and probability distribution of hazard, vulnerability analysis of hazard-effected bodies and the loss analysis of disaster.

In the thesis we give the definition of risk at first. Risk is the future safety. Risk of natural disaster is the appearance probability of some kind of disaster during a certain period. On the other word, it is a function of disaster intensity and the appearance(probability).Then we compare the conception of risk and danger. Risk is the change from the forecast to the fact in a certain range of time and space. Danger is a function of the level of disaster intensity and the level of relevant loss during some period, it is a related with probability.

At the second part of thesis, we synthesis the research of risk assessment in China .Especially, taking the risk assessment of earthquake and flood as the example we summarize the shortage of the research and give two kind of study in China. One is danger analysis, another is loss distribution at a certain level of hazard intensity. We also show the new Chinese seismic intensity zoning map and the flood risk map to illustrate it.

According to the definition of risk, we assess the natural disaster risk of Hunan Province at the third part of the paper. The historic disaster data-of Hunan Province agriculture natural disaster is incomplete. If we use the traditional probability and statistics method, it will give a big error. In this paper we put forward the mathematics model of natural disaster risk assessment, which use the theory of information diffusion .With the model we assess the risk of five agriculture natural disasters of Hunan Province. They are flood, drought, wind, frost and insect pest .The basic unit of analysis is county. The result has been drawn to some thematic maps which express the risk distribution and their space change tendency with the aggravation of the disaster effects.

KEY WORDS: Regional natural disaster, Risk, Risk assessment, Information diffusion

区域自然灾害风险评估研究的理论与实践——以湖南省农业自然灾害风险评估研究为例

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自然灾害的风险评估是减灾研究中重要的一部分。国际上许多减灾项目中都涉及这个问题。它是在区域致灾因子对灾情影响的风险测定的基础上进行的综合分析。直接的表现是在各致灾因子不同强度等级及出现频率的作用下出现的损失概率分布, 实质上其中已掺杂了承灾体对灾情形成的深刻影响。因此, 从本质上来说, 灾害的风险分析是建立在致灾因子的强度和频率分布、承灾体的脆弱性分析以及灾情损失分析基础上的综合分析。

要进行灾害的风险评估, 必须明确什么是自然灾害的风险。本文首先给出风险的定义。风险是指未来的安全性, 自然灾害的风险是指在特定期间内, 某种程度的灾情出现的概率,

即火灾强度（作用力、速度、发生发展面积）与发生（概率）的函数。本文着重辨析了风险与危险这两个不同的概念，指出危险是某一时期内灾害水平与其相应的易损度水平的函数，不涉及概率，或称概率为 1。危险性分析是针对某一风险水平的。

本文第二部分在综述国内目前风险评估研究的基础上，特别以地震与洪水这两个在中国频发且研究较集中的灾害为例，总结了风险评估的工作与不足，指出国内风险评估主要分为三种类型：危险性分析；没有考虑承灾体类型，或称没有考虑损失暴露单位的易损性的风险分析；将某一致灾因子强度下的损失作为风险的风险分析。以上分析配有国内已有的地震烈度图、洪水风险图等图件来直观说明。

在全面综述的基础上，根据自然灾害风险的定义，本文第三部分以湖南省农业自然灾害为例进行了风险评估。首先说明的是，随着历史数据资料在时间、空间上的完备程度不同，应该采用不同的评估方法，以保证分析的精度。湖南省农业自然灾害历史火情数据资料是不完备的，此时采用传统的概率统计方法将会产生很大的误差，本文应用了信息扩散原理建立自然灾害风险评估的数学模型，对湖南省水、旱、冰冻、风、病虫害八种主要农业自然灾害进行了以县市为基本单元的风险评估，对五个灾种分别绘制了全省各个损失水平的风险等值线图，并进行了比较分析。

关键词：区域自然灾害，风险，风险评估，信息扩散