



Spatiotemporal Distribution Characteristics and Prevention Efficiency Assessment of Geologic Hazards in Anhui Province

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Abstract: The occurrence of geologic hazards is becoming more and more normalized in China, and disaster prevention has gradually stepped into the routine task scope. The evaluation of prevention efficiency has an important reference value for the public disaster adaptation and the later work being carried out. Taking geologic hazards in Anhui Province from 2004 to 2017 as the research object, on the basis of spatial and temporal distribution characteristics analysis, this study used DEA (Data Envelopment Analysis) model to conduct quantitative evaluation on input and output of geologic hazards prevention. The results show that the geologic hazards in Anhui Province in 2005 were the most serious from 2004 to 2017, with 8,320 geologic

hazards, 44 casualties and 948.64 million of economic losses. Geologic hazards in Anhui Province are mainly concentrated in mountainous and hilly areas in the southwest, while relatively low in the northern plain. The prevention of geologic hazards in Anhui Province has achieved remarkable results. With the increase of capital investment and prevention projects in recent years, the number of casualties shows a downward trend, among which zero casualty has been achieved in 2014, 2016 and 2017. According to the evaluation results of geologic hazards prevention based on DEA, 16 cities in Anhui Province are divided into four levels. Level 1, the prevention efficiency value is between 0.955 and 1, showing significant prevention effect, mainly including Hefei, Huaibei, Bozhou, Suzhou, Bengbu, Fuyang, Huainan and Chuzhou. Level 2, the prevention efficiency is between 0.717 and 0.878, suggesting a relatively obvious prevention effect, mainly including Ma'anshan, Wuhu and Xuancheng. Level 3, the prevention efficiency is between 0.413 and 0.416, indicating relatively inapparent effect, mainly including Tongling and Chizhou. Level 4, the prevention efficiency value is between 0.053 and 0.195, implying an insignificant prevention effect, including Lu'an, Anqing and Huangshan.

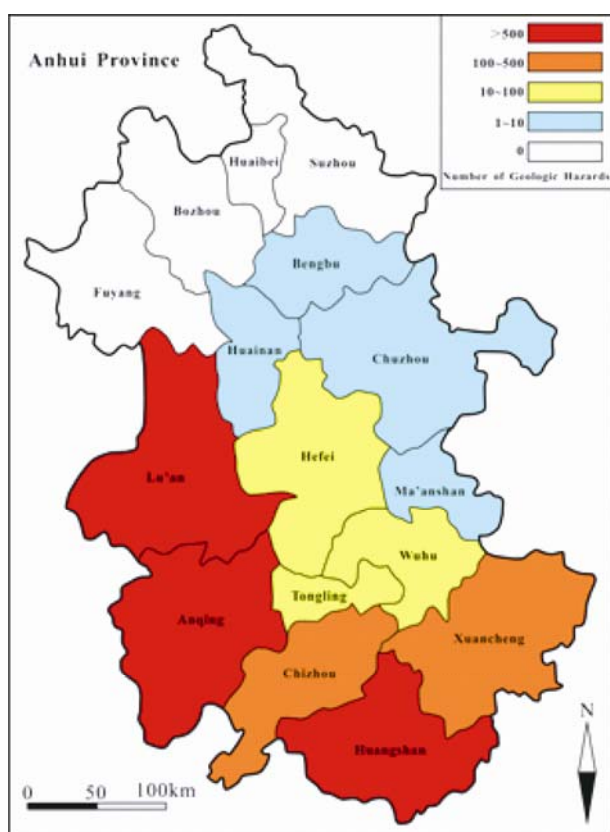


Fig. 1. Hazard level zoning map of geological disasters in Anhui Province (according to the geologic hazards data from 2011 to 2017).

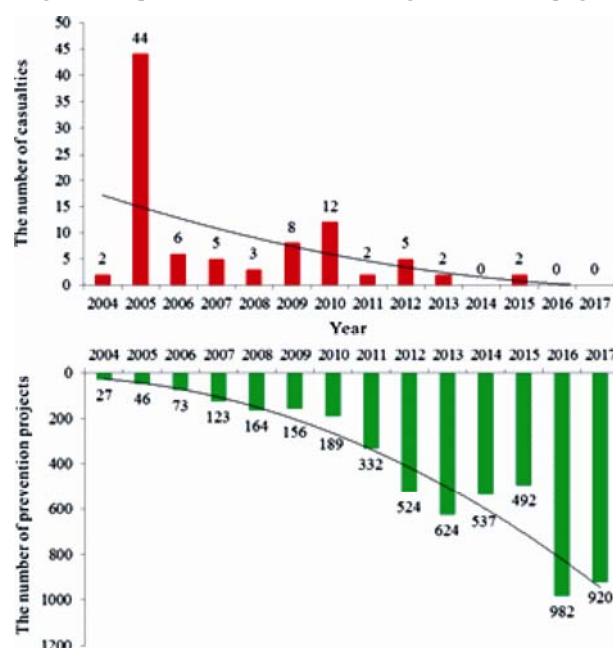


Fig. 2. The correlation between the casualties and prevention projects input in Anhui Province from 2004 to 2017.

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Table 1 DEA efficiency statistical table of geologic hazards prevention and input of Anhui Province in 2017

City	Geologic hazards	Number of casualties	Economic losses(Yuan)	Prevention projects	Funding input(Million)	Crste	Vrste	Scale	Scale effeiciency
Hefei	0	0	0	8	14.275	0.955	0.955	1	-
Huaipei	0	0	0	0	0.200	1	1	1	-
Bozhou	0	0	0	0	0.386	1	1	1	-
Suzhou	0	0	0	6	1.343	0.967	0.967	1	-
Bengbu	0	0	0	0	0.410	1	1	1	-
Fuyang	0	0	0	1	0.160	1	1	1	-
Huainan	0	0	0	0	4.634	1	1	1	-
Chuzhou	0	0	0	1	9.592	0.993	0.993	1	-
Lu'an	1	0	10	272	53.593	0.195	0.216	0.902	irs
Ma'anshan	0	0	0	59	16.437	0.717	0.717	1	-
Wuhu	0	0	0	23	22.825	0.878	0.878	1	-
Xuancheng	2	0	25000	23	46.913	0.817	0.878	0.93	irs
Tongling	10	0	220000	14	24.387	0.416	0.923	0.45	irs
Chizhou	8	0	348000	11	18.629	0.413	0.939	0.44	irs
Anqing	14	0	585000	445	41.765	0.053	0.222	0.238	irs
Huangshan	23	0	474000	57	49.515	0.132	0.725	0.182	irs

Note: crste = technical efficiency from CRS DEA, vrste = technical efficiency from VRS DEA, scale = scale efficiency = crste/vrste.

Huangshan.

Key words: geologic hazards, spatiotemporal distribution, prevention efficiency, DEA, Anhui Province

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