Article:
Liu, B, Fan, J, Siu, YL orcid.org/0000-0003-3585-5861 et al. (1 more author) (2019) A multi-hazard map of China. Environment and Planning A, 51 (1). pp. 8-10. ISSN 0308-518X

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Featured graphic. A multi-hazard map of China

Since 1900, 35,000 natural hazard events have resulted in about 8 million deaths worldwide, with about US$7 trillion in economic losses (Daniell et al., 2016). Conventional assessment focuses on individual hazards (see e.g. Wei et al., 2015) but natural hazards do not exist in isolation. They may occur together, following a common cause (as in the case of heavy rain in northern Pakistan (2016) which produced both flood and landslide), or one hazard may induce another (as with the 2010 Tohoku Earthquake, Japan, which triggered a major Tsunami). The high frequency and intensity of such multiple hazards means that attention should be given to multi-hazard assessment.

China experiences many types of natural hazard and also has a highly uneven distribution of population and economic activity. It is therefore critical that its natural hazard risk managers better understand the spatial distribution of multi-hazard. Therefore, nine natural hazards (comprising flood, drought, heat wave, cold wave, earthquake, landslide, storm, wildfire and avalanche) were addressed to draw a multi-hazard distribution map of China. The number of hazard occurrences from 1981 to 2016 was selected as the hazard indicator. The multi-hazard index was the sum of each hazard indicator multiplied by its weight, calculated according to the average human life loss associated with this hazard. And the population of each province in 2016 was queried from the provincial statistical yearbook of China. In the map, the size of each polygon stands for the mass of population for each province in China, and the pie chart in each polygon shows the contribution of each single hazard to multi-hazard index within each province.

The map shows that flood is the most dangerous hazard in most provinces, especially in the more densely populated area in east China. And less populated provinces in west China are influenced by earthquake most seriously, such as Tibet and Qinghai. In addition, densely populated provinces in southeast coastal areas are at highest multihazard index with storm as the most common hazard, such as Guangdong, Zhejiang and Fujian. Understanding the potential multi-hazard distribution in certain provinces in China is a critical step toward effective, integrated

risk management and disaster recovery planning. The map can be used as a basis for strategic regional planning to ensure resilience in communities and economies, and adds a critical dimension to single hazard risk maps.

Software: ArcGIS 10.0

Data sources: Historic disaster (type, magnitude, location, timing, loss) data is from EMDAT (http://www.emdat.be/database) the OFDA/CRED international disaster database.

References

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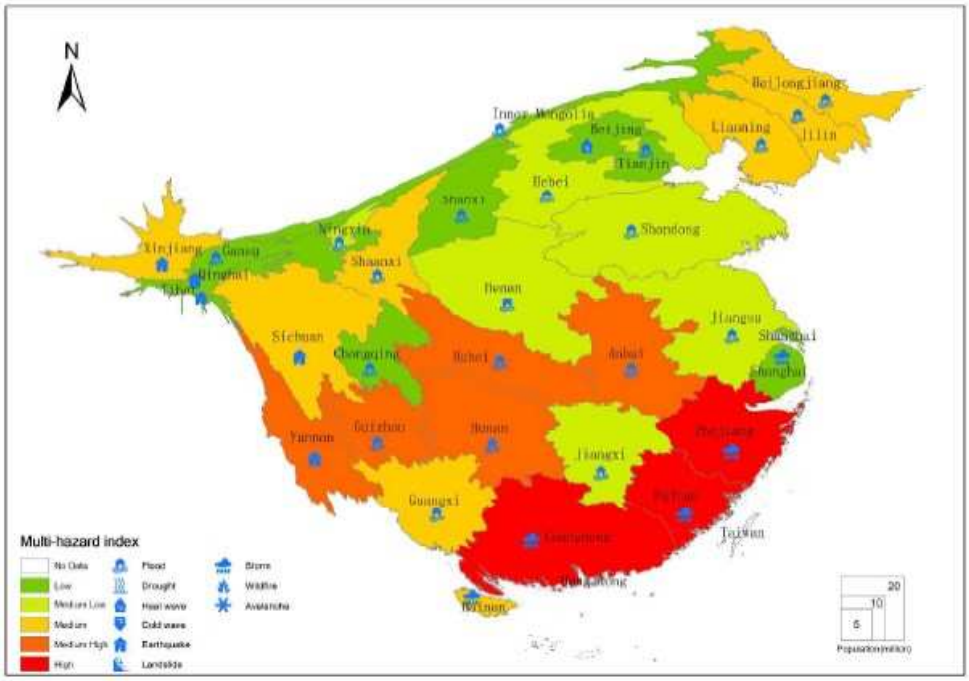

Multi-hazard map of China. Area of each province is proportional to its population on the cartogram. Colour system refers to the distribution of multi-hazard index. Hazard symbol represents the dominant hazard within each province.