



Original paper

## Disaster Insurance against Secondary Mountain Hazards in 32 Counties Severely Affected by the 2008 Wenchuan Earthquake

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Received: 23/11/2012 / Accepted: 20/12/2013 / Published online: 30/12/2013

**Abstract** China experiences the most frequent and serious mountain hazards in the world. Households, enterprises and local governments do not have the economic ability to recover and reconstruct following a catastrophic mountain hazard. Disaster insurance is an important way to raise relief funds and share the risk and loss of mountain hazards in countries worldwide, although disaster insurance and loss rate calculations are still at an early stage. In this study, 32 counties severely affected by the 2008 Wenchuan Earthquake were selected as the study area with a township used as the basic unit of assessment. On the basis of extensive field investigations, the interpretation of remote sensing data and the results of previous studies, four methods were proposed to assess the risk of secondary mountain hazards and to calculate the premium rate for disaster insurance. Approaches for the regionalization and realization of disaster insurance were explored according to a risk assessment of secondary mountain hazards through the use of 3S techniques and established methods. The results were as follows: a) With 4154 collapses and landslides, over 1000 debris flows and 257 dammed lakes, secondary mountain hazards in the study area were controlled by active faults, seismic intensity, strata, lithology, slope and rainfall. Results showed they have become more frequent and serious; b) Disaster prevention and mitigation should be based on a vulnerability assessment. The study results allowed a classification into four zones: very high and high vulnerability zones, which accounted for 45.5% of the study area, moderate vulnerability zone (33.9% of the study area), and a low vulnerability zone (20.6% of the study area); c) Almost 80% of the study area was dominated by very high, high and moderate risk zones, accounting for 11.9%, 31.1% and 37.1% of the study area, respectively, and most of these zones were also categorized as very high, high, and moderate hazard and vulnerability zones. These zones are the key areas for secondary mountain hazard prevention and mitigation; d) Based on a quantitative risk assessment and the loss due to damages among affected entities, an insurance rate model was established and the average insurance rates in different risk zones was calculated and classified. This revealed large differences in average insurance rates among different risk zones. This is not favorable for the market operation and practice of mountain hazards insurance providers; and e) Based on townships as an administrative unit and an analysis of the ratio of contributions from different formation factors, the proposed methodologies solve such technical problems

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