Nat. Hazards Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/nhess-2018-213-AC1, 2018

Natural Hazards and Earth System Sciences
Open Access
Discussions

Interactive comment on "Seismic Indirect Economic Loss Assessment and Recovery Evaluation Using Night-time Light Images – Application for Wenchuan Earthquake" *by* Jianfei Wang et al.

Jianfei Wang et al.

jeffrey1991@sina.com

Received and published: 11 September 2018

Thanks for your contribution to this paper. I have read your comments very seriously and responded as follows:

Reply to the Comment 1: The relationship between night-time light and economic statistics was given in Figure 5. We have a brief discussion of this issue on the page 6 paragraph 1:" Second, the largest value of Chengdu was removed from the sample, and then, the scatter plots of the two sets of data samples, which are pre-earthquake

Printer-friendly version

Discussion paper

data and post-earthquake data, were compared (Figure 5). It is obtained that the correlation between the two parameters is strong in pre-earthquake data and poor in post-earthquake data." In the next revision, we will further supplement the description of the issue based on your comments.

Reply to the Comment 2: The 2008 Wenchuan earthquake(Mw8.0) is the biggest earthquake event in China since 1970s. This earthquake struck Sichuan Province, China on May 12, 2008. It killed nearly 70,000 people, 18,000 people were missing, and more than 370,000 people were injured. Millions of people were made homeless by the quake, the cost of which was estimated at $86 billion (Kenneth et al.,2013). In the three years after the disaster, Chinese government spent 865.8 billion yuan to complete 29,692 aid projects, which has brought Chinese Power to the attention of the world(Gu, 2018).

Reply to the Comment 3: In order to ensure the fairness of disaster relief assistance, government should avoid the problem that the benefits of developed regions will cover up the economic difficulties of backward regions by transfer payment system. This paper defines the light recovery and lighting expansion in the disaster area as two different processes. The 3.2 Economic recovery evaluation model only take increasing light intensity of the disaster area with light before the earthquake (Eq.6 & Eq.7). And the 3.3 Economic expansion evaluation model only take increasing light intensity of the disaster area without light before the earthquake (Eq.8)

Reply to the Comment 4: Our results indicate that the economic recovery in Sichuan Province took more than 5 years, which is far more than the time spent on reconstruction (Yang,2012).

Reply to the Comment 5:Compared with statistical data, night-time light can not only reflect the spatial difference of economic expansion and recovery but also guarantee the accuracy of assessment. In terms of short-term economic loss, the economic loss of this model in 2008 is 95.7 billion yuan, which is closer to Sun's results (100.8

billion yuan), but lower than Lu's results (168 billion yuan). The reason for this difference is that although these models taken into account the capacity reduction caused by earthquake, Lu's model (2008) assumed that the affected department was completely shut down during a period of time, while this paper's model and Sun's model (2011) assumed that the production capacity was gradually restored. In terms of mid-long term economic loss, the economic loss of this model from 2008 to 2011 is 596.8 billion yuan, which is more than Wu's results (463.4 billion yuan), and the economic loss of this model from 2008 to 2012 is 709.6 billion yuan, which is closer to Sun's results (645.4 billion yuan).The reason for this difference is that although both models measured the impact of input changes on output after earthquake, Wu's ARIO model (2012) and Sun's Harrod-Domar model (2011) predicted the output based on government public expenditure, while this paper's model measured the output based on the total investment in society which could be reflected by night lights. Generally, the indirect economic losses assessment results in this paper are close to most of the evaluation results in other papers (Figure 13).

References

Kenneth P., John P. R.: Sichuan earthquake of 2008 [EB/OL],available at: https://www.britannica.com/event/Sichuan-earthquake-of-2008,last access:10 September 2018.

Gu L.S.: Ten Years of Wenchuan Earthquake: China's "Reconstruction Better" Program [N].South review weekly,2018-05-13(A13).

Yang S.J., The Basic Completion of Reconstruction Tasks [EB/OL],available at: http://www.gov.cn/jrzg/2010-10/25/content_1729845.htm, last access:10 September 2018

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2018-213, 2018.

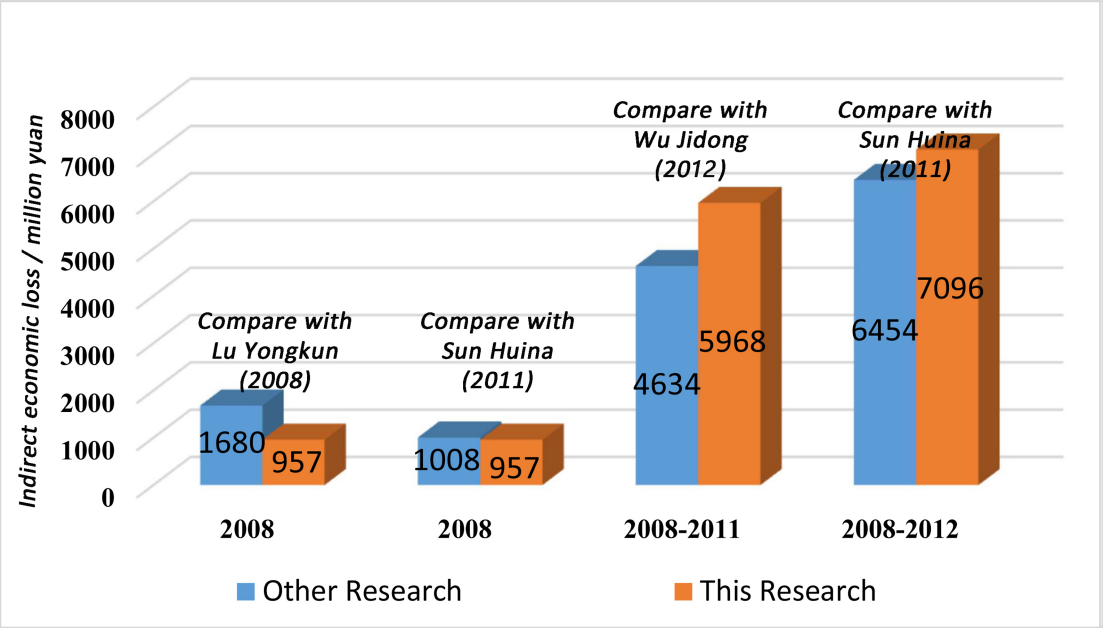

Fig. 1.

Printer-friendly version

Discussion paper

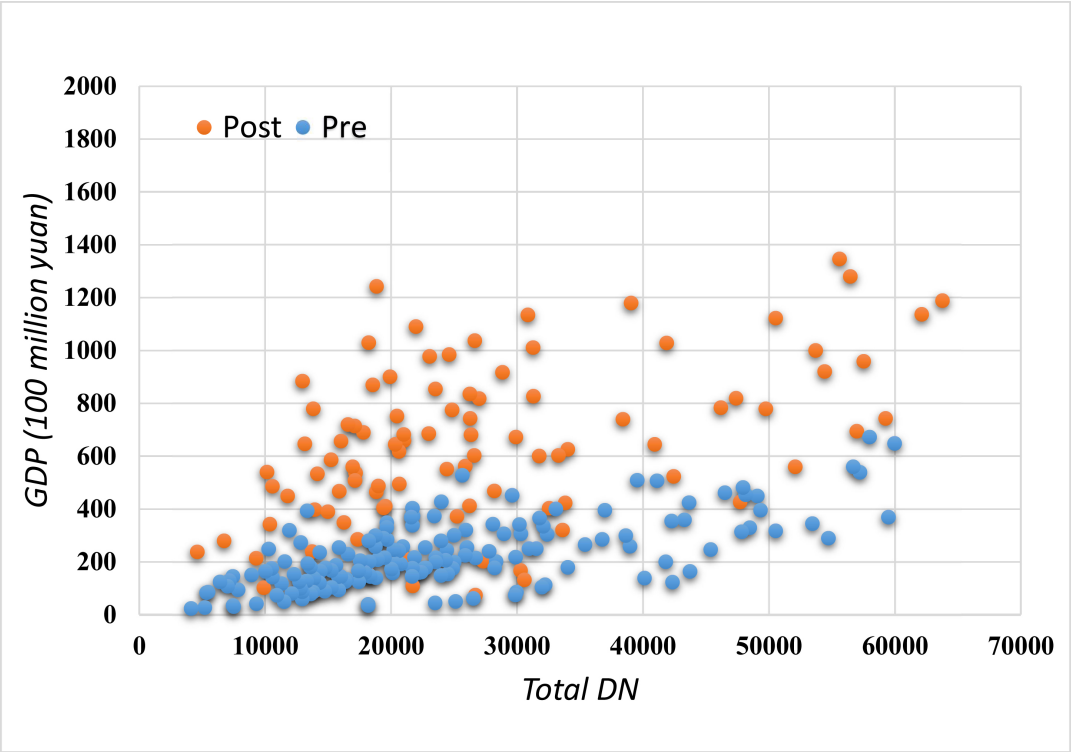
Post
Pre
GDP (100 million yuan)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
10000
20000
30000
40000
50000
60000
70000
Total DN

Fig. 2.