

# Review of A New Method for Calculating Highway Blocking due to High Impact Weather Conditions

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## General comments

In this study, the authors present a methodology to evaluate the effects of different weather-related events on the Chinese highway network. While the statistical and geographical description of weather events and its effect on road impact is very interesting and well presented, several concepts that seem fundamental to understand the results, such as highway load and losses, are not clear and can be misleading. Better care should be given to clearly explain these concepts and separate them from their usual denominations for traffic demands and direct economic impacts.

Overall, the value proposition (why this study and its results are important) is not clear. The study should be reevaluated to clearly provide a valuable discussion of its results, considering the strengths and limitations of the methodology. Large revisioning for the English language and grammar is required throughout the manuscript, which is beyond the scope of the present review.

## Specific comments

### Abstract

The text in the abstract needs revision, I recommend to reorganize it considering a “why, how and what” storyline. “Why” focuses on the problem, “How” on the methodology and how it can help the problem, “What” focuses on the work done and the results. Currently, the Why is presented in a trivial way, the How is barely present and the What is too focused on the methods and not enough on the results and what they mean (the reference of 43% is not clear).

### Introduction

The use of “high-impact weather conditions” is not ideal, it makes reference to impact and it is not clearly defined. I recommend focusing on the event and not the impact, adopting something similar to “adverse weather conditions”. Also, it is best to not say “**the** high-impact weather conditions”, just “high-impact weather conditions”.

Line 37	I recommend the following change: “Therefore, driving in foggy weather is a potentially dangerous activity <b>for users, which increases the potential for road blocks</b> <del>ing conditions</del> (Yan et al. 2014).”
Line 54	the term HIW is used before it is described in line 57. Also, the study is not improving the effects on road blocking, but helping to better characterize and predict the impact. Please change the text to reflect that.
Line 55	Statistics of China’s road length and ranking needs a reference
Line 56	“The ability to estimate highway traffic demand caused by the highway blocking during adverse weather events; therefore, it is critically needed.” needs to be rewritten to clarify. I recommend: “Therefore, there is a critical need to improve the ability to estimate highway traffic impact, caused by highway blocking during adverse weather events”
Line 57	Replace “factors” with “components” or “contributors”
Line 58	Replace “affected” with “caused”

### Data and methods

- Please include a reference on where the authors are obtaining the data about the geometry and characteristics of the highway network.
- In Section 2.3.3, it is unclear to me how the K-means algorithm is applied to the methodology proposed.
- Please provide some lines into what is the physical meaning of the CRITIC weights in this context. This will help clarify the percentages reported in the results section.

### Results

- The bar plots in Figure 3.b need to be clarified to give a reference of what does the height of the bars represent.
- Given the type of events considered (fog, rain, snow and ice) it is not clear to me why so many instances of road blocking are happening in the summer. Please include some lines to acknowledge and clarify this.
- The way that the severity of the blocking is defined needs to be further clarified. It is not clear to me what “blocking mileage” (L) is. Maybe including a couple of illustrative examples would help.

## Discussions

- The way that the concept of “highway load” is being treated in this section is not clear to me, or how it relates to losses. While the idea of using a “highway load” as a proxy for economic impact potential is clear, it is misleading to say they directly relate to economic losses. There are many other factors that come into play when evaluating economic losses. It is advised to clarify this concept, to assure the reader what the methodology is actually capturing and what the results mean potentially.
- The results presented in Figure 8 should be first presented in the Results section, clearly explaining how they were derived and only then can they be discussed in this section. In the current format it is not clear where these values are coming from.
- Overall, this section lacks transparency about the strengths and limitations of the methodology.

## Conclusions

- The final parts of this section makes reference to natural disasters, which have not been clearly discussed previously. I suggest this is removed to avoid misleading the readers into thinking that these events were accounted for in this study.
- There is a mention to direct and indirect losses, though their difference has not been discussed or defined in the paper, I suggest to remove it.