

## ***Interactive comment on “An explanation of large-scale coal and gas outbursts in underground coal mines: the effect of low-permeability zones on abnormally abundant gas” by F. H. An and Y. P. Cheng***

### **Anonymous Referee #1**

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I am not convinced that the paper is suited for this journal. Clearly, explosive outbursts of gas and coal in coalmines are a serious problem, in China and in other areas of the World. However the paper does not explain how the research conducted in this study can reduce the risk posed by the outbursts.

Some of the findings described in the paper are (or at least appear to me) rather basic, and not particularly new or innovative. Indeed, it is well known that the local and the regional geological structures (e.g., the presence of folds and faults) condition the

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location and the abundance of coal, and of volumes of gas in the coal seams. It is also obvious that the presence / absence of sealing around a coal seam controls the presence of pockets of gas in the coal, that can produce destructive gas outbursts. The authors should explain better what is the innovative contribution of their work.

The paper is reasonably well written, but there are a few typos that should be corrected [see below]. In places the language is a bit too technical, and difficult to understand for a reader not familiar with the coal mining literature. I will make a few examples of words that needs clarification: (i) page 4752, “coalification”, “work face”, page 4756, “Langmuir pressure”, page 4757, “tectogenesis”, page 4759 “Kronecker symbol”. The authors should make an effort to simplify the language, as much as possible.

Below I list a few specific comments, keyed to page and line numbers.

- There is a typo in the first line of the Abstract. “gas outbursts post a risk” should be “gas outbursts pose a risk”
- There is a typo in the line 4 of page 4753. “outburst” should be “outbursts”.
- page 4753, line 11, “has been”? Does it mean that now it is not lacking anymore?
- Page 4753. Here and in other places the authors use the word “abnormal”, but they do not define what is “normal”. This should be clarified.
- Page 4753, line 20. Language of the first sentence of the paragraph does not make sense.
- Page 4753, and Table 1. How the volumes of coal and gas given in the text and listed in Table 1 were measured, and what level of accuracy?
- Page 4754, please explain what a “tectonic zone” is, in the context of the work. What is the geographical, geological, or geometrical scale of such zone?
- Page 4754, lines 26-28. It is not really new, or surprising that “in the past years, it was found that the distribution of gas is nonuniform due to tectogenesis, and certain tec-

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tonic structures promote certain patterns of gas distribution". What are these "certain patterns"?

- Page 4755, line 13. Quantify "enormous".
- Page 4756, various places. When explaining symbols in the equations there is no need of repeating the word "represents".
- Page 4757, lines 18 and 24. Delete "clearly".
- Page 4757, line 25. Why "more than a million years"? Clarify.
- Page 4758, lines 15-20. This conclusion is not really surprising, or new.
- Page 4759, lines 6 and 9. Explain "Kronecker symbol" and "DP".
- Page 4760, line 6. Why  $10^5$  years, and not a different period? Explain.
- Table 1, page 4764. How the quantities were measured, and with what level of accuracy? It would be better to list the events by date. Can you provide a map showing where the mining accidents occurred?
- Figure 1. I understand this is a sketch, but providing a scale for the sketch will help the reader understand the problem.
- Figure 2. Same comment as for Figure 1.

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