**Reviewer 2**

**Chi-Yuen Wang’s review of BSSA-D-10-00009, “Intermediate Field Water Level Changes Observed From the Wenchuan Earthquake,” by Zhang and Huang**

We appreciate having your answers to the following questions.  At the end of the list, please include any comments for the Editor that should not go to the authors.

Select the statement that best describes the paper (replace the \_\_ with an X):

It is suitable for publication in BSSA in its present form  \_\_

The conclusions are likely correct, but it requires revision primarily to the presentation (writing, figures)  \_\_

The conclusions are likely correct, but it requires additional research or tests to support them  \_\_

The validity of the conclusions cannot be judged without additional research or tests \_X\_

It cannot be made suitable for publication in BSSA \_\_

For the following questions, delete the Yes or No to leave your desired response.

Does the paper contain new and interesting results?   No, unless the questions raised can be addressed.

Did you check the mathematics?   Yes

Would you be willing to review a major revision of this manuscript?  Not until there is more research.

If you answer yes to any of the following block of questions, please explain in your commentary:

   Does the manuscript contain technical errors?   Yes

   Do the title or abstract need changes to make them representative of the contents of the paper?  Yes, but needs modification.

   Does the paper need improvements in grammar?   Yes

   Could the paper be shortened without loss of information and clarity?   Yes in some section, but needs a great deal more information in others.

   Does the paper use SI units unless common practice dictates an exception? Yes

   Is the citation list incomplete and/or does it contain inappropriate entries?   Yes

   Are there irrelevant or unnecessary figures?   No

   Does the artwork need improvements to make it well designed, clear, and understandable?  No

   Could the paper benefit from having electronic supplements?   Yes

   If the paper has an electronic supplement, is it required to understand the paper? Yes

   If the paper has an electronic supplement, does it have any technical problems? Yes

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Please give a frank account of the strengths and weaknesses of the article:

Strength: The paper is an attempt to include rock physics in interpreting water-level response to earthquakes.

Major weaknesses:

1. The authors used a relation between water-level changes and tidal strain to determine Skempton's coefficient and showed that a correlation exists between the values of Skempton's coefficient and the coseismic water-level changes at the studied wells. However, they did not discuss how the tidal strains at the wells were determined. In their earlier study (Zhang et al., 2009) of the tidal response of the Changping well, the tidal strain was measured by using a strain meter at the bottom of the well. Given that the measurement of tidal strains in wells is a relatively rare undertaking, I would be surprised if all the wells in the present study are equipped with strain gages. If they are indeed, the authors should give a full account of all the gages, such as their sentitivity, etc. If they are not, then how did the authors determine the tidal strains at the wells?

2. In determining the value of Skempton's coefficient, the authors arbitrarily chose a shear modulus of 6 GPa for all the wells. Considering that the wells likely tap different aquifers, the shear moduli must be different from well to well. This is important for the determination of the Skempton's coefficient and must be measured individually by independent field experiment. The suggestion that the authors' choice of a shear modulus of 6 GPa was 'arbitrary' is supported by the fact that they used a different modulus in their previous paper (Zhang et al., 2009) which is smaller by a factor of 2 than the present value. Thus the uncertainties in the Skempton coefficients they 'estimated' for the aquifers must be at least 100%, and the correlation they claimed would break down. Given these observations, I cannot trust the results in this paper and cannot recommend its publication in BSSA.

There are many other weaknesses in the paper, but the above two major problems must be addressed before the paper worth further examination.

Even though I do not recommend the publication of this paper in its present state, I must say that the authors' work is in the right direction. In order to make their results believable, however, the authors must measure tidal strain and shear modulus at each of their wells. This additional work, though laborious, would make their paper the first in the field that ties rock physics to coseismic water-level changes.