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Interactive comment on "Water- and land-borne geophysical surveys before and after the sudden water-level decrease of two large karst lakes in southern Mexico" *by* Matthias Bücker et al.

Anonymous Referee #1

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1 General comments

The present manuscript is a solid compilation of results of geophysical measurements of two karst lakes in Mexico. The paper is well structured and the reader gets detailed insights into the extensive measurements with different geophysical methods. However, the paper strongly reminds of a project report. In my opinion a scientific paper in SE should go beyond a case study (maybe even with a more interesting title?). First, I would like to know more about the authors' motivation why this kind of lakes should be studied. In the introduction it is mentioned that it could be about choosing a suitable drilling location. This is not further discussed in the paper. I lack the approach how

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these results can be transferred to other locations / problems. On the other hand, the fact that these karst lakes are falling dry is an extremely interesting point. Finally, this offers the geophysicists the possibility to repeat the measurements with a "covered" layer and to verify the results. This could be emphasized much more in the paper. The topic has much more potential to serve not only as a method comparison or case study.

2 Specific comments

- Chapter 3 deals in great detail with data acquisition and processing. All measurements of the applied wave and potential methods are clearly explained. In this as well as in the chapters 4 and 5 the insufficient signal-to-noise ratio is pointed out for some configurations. However, when evaluating the results, the reader is left in the dark when it comes to quantifying the error influences. This is an issue that urgently needs to be addressed - how much data could be included into the inversion process compared to the amount of measured data. How can the errors of the obtained models be estimated? (Example in line 182 - mean picking percents is ...)
- Is it possible that sample TSI19-A is influenced by higher limestone content? This would support the latter interpretation of field measurement results.
- In Line 214 ff. you mentioned underlain collapsed blocks - did you see some hints after the lakes are fallen dry?
- Line 229 and Fig. 4f: you do not interpret phase values for depth gt 50 m (due to insufficient data quality, ok - see first comment in list!), but than you should avoid to show this part of inversion model - it is more than the half of the picture!
- I am amazed by the variety of methods and the integrative approach for this survey. Only the complementary methods produce a comprehensive geological

model. I would not use chapter 5.3 as a confrontation of methods (title: seismic vs electrical methods) but rather promote these complementary techniques as a great advantage, the usage of the methods depends on the given situation and problem!

- Chapter conclusion should pick up some information from the introduction and give a broader (more general) summary at the end - how about the drilling, what is the take home message?

3 Technical Corrections

The pictures are generally of very good quality. Sometimes it is a bit confusing to recognize the correct position of the subprofiles (There are also different names for one and the same profile - to much information: example profile 1 aka L4NS aka MET19-1 MET19-2). Especially in Figure 5 it would help to use the same coordinates as in figure 4 (even if the profiles have an 10 m offset in EW direction). In Figure 4 the TDEM is slightly shifted in comparison to SBP.

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