

Interactive comment on “Benchmark study using a multi-scale, multi-methodological approach for the petrophysical characterization of reservoir sandstones” by Peleg Haruzi et al.

Anonymous Referee #2

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General Comments

This paper has made commendable efforts to using a multi-scale, multi-methodological approach for the petrophysical characterization of reservoir sandstones. The strength of the study lies in its multiple datasets generated and used. However, the paper requires improvements before it can be ready for publication.

The main aims/objectives of this study should be made very clear from the start. Are you proposing multi-methodological approach for the petrophysical characterization of reservoir sandstones as the best or only method? Or what exactly are you aiming for?

How the achievement of these aims/objectives contribute to the current knowledge

gaps should be clearly discussed in the relevant section of the paper.

The methods need to be clearly discussed.

Many figures require attention.

I do feel that testing all the proposed conclusions made from this study with sandstones from other places will make these conclusions stronger. If it is possible to have sandstones from other places to test your conclusions, this will be very good. However, if the aims/objectives of the study do not require/permit this, then no problem.

Specific Comments

Title

Why is there 'benchmark' in the title? Depending on the revised aims/objectives of the study, the title may require revision.

Introduction

An extended literature review is required. This may be part of the introduction or may be a separate section. This is important to discuss the state of the subject matter and to present a framework and context for which current study fits into. The current introduction is short while the aim of this study does not seem to address some of the issues raised (lines 66-67) in previous studies.

Geological Setting

Abbreviation in line 98 needs to be written in full at first time.

Fig. 1 needs to be increased in size to make it legible. The quality of 1d needs to be improved. 1 a needs lines of latitude and longitude.

Appendix A. It is a bit strange that important geological information is put in an appendix. The key geological information in the appendix needs to be summarised and placed under geological setting. The information presented in this section is too shal-

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low and only focused on a formation. Every relevant geological information about the whole basin and other formations should be included here to give a very good context for the current study.

Methods

3.1. How many samples were collected? Is it possible to state the size of these samples and large block samples or show their photos so that readers can have an idea of how big/small they are. There needs to be proper descriptions of all these samples: how can a reader identify/differentiate a sample from large block samples and from a sub-sample?

Table 1. 3.7 should be 'Optical microscopy'

3.2 The laboratory methods are not properly discussed and this is not good enough. More than just mentioning the names of equipment used, the procedure needs to be properly discussed or appropriate references provided.

If the methods are properly discussed, I do not see any need for Table 1

Only the relevant information needed to understand the procedure for the workflow method should be provided. The current format appears to be excessive.

Results Line 269, 314, -what heavy minerals?

268, 270. . .referencing methods using 'according to', 'following' should be amended using journal style

276; Mn-Ox. . .what is this? Please explain?

317-include reference

318. . .result is mixed with interpretation. Only the results should be presented in the result section in this place and throughout the manuscript.

Fig 4d-scale is missing

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347-349 should be moved to the methods section

Fig 6 and 7, 9, 11, 12 should be increased

480-485: more or less a repetition. Any new information here should be moved to methods section. The results of the modelling should be presented here.

509-511: needs to be in the methods section

513-514: is this result or interpretation?

545: if the information in appendix C is important for the discussion, why is it not included in the main body of the manuscript?

560: gravity-dominated ?, capillary-dominated ?

601: use 'study' instead of paper. . . here and throughout the manuscript

603: 'very heterogeneous in nature' ?

References

I have not bothered to check the references at this stage. The author needs to ensure that all cited references are in the bibliography and vice. For example, I am not sure if I encountered Akinlotan 2018 in the text but it is in the bibliography. Please look into this and others and ensure referencing is accurate.

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2020-47>, 2020.

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