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Solid Earth Discussions

Interactive comment on "Petrographic and Petrophysical Characteristics of Lower Cretaceous Sandstones from northern Israel, determined by micro-CT imaging and analytical techniques" *by* Peleg Haruzi et al.

Anonymous Referee #2

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Review of

Petrographic and Petrophysical Characteristics of Lower Cretaceous Sandstones from northern Israel, determined by micro-CT imaging and analytical techniques

Haruzi et al. present detailed descriptions and analyses of sandstones from northern Israel. They synthesize several analyses from the lab, including microtomography, and from fluid flow modelling. However, the motivation and resulting implications of their exhaustive characterizations are not at all clear from the abstract, introduction

or discussion. Presumably, they chose to focus on these rocks because they can be reservoir rocks. If this is the central motivation, then the abstract should state this point, and the discussion should describe how their analyses inform the potential productivity of these lower Cretaceous sandstones. Then, the organization of the paper should follow from this motivation and determine which figures remain in the main text, or are moved to the appendix. In its present form, the paper is very long, and so does not focus in sufficient detail on the significant contributions of this work. I recommend changing the organization of the paper to focus on conclusions #6-8, and keeping only the highlights from conclusions #1-5 in the main text. If as the abstract states, "core part of the study is the investigation of macroscopic permeability, upscaled from pore-scale velocity field" then the bulk of the main text should focus on presenting these results, rather than describing the potential depositional environment of each sample, for example.

Determining appropriate representative elemental volumes, and how to upscale porosity and permeability measurements in the lab to crustal scales are important questions that should be explored in more depth here. The general conclusion that larger models are needed to capture features at scales larger than the pore scale is obvious. The more relevant question is how large is "sufficiently large" (line 49)?

On a technical note, several sections of the paper seemed misplaced, including aspects of the results that are presently in the discussion. Some sections of the paper are written clearly, while others have serious grammatical errors, such as sentences and phrases that lack verbs. In several places there are bolded phrases that I suppose the authors intend to be headings, but they lack the typical notation for sections, i.e., 1.1.

I would not recommend publishing this work in its present form. I suggest reorganizing this work after deciding on the main motivation of the study, and focusing in detail on the points that answer this motivation. The comparing the significant contributions of this work to previous studies on sandstone reservoirs would also help this paper have

relevance.

I list more detailed points below:

1. Abstract: Motivate studying the characteristics in abstract. As mentioned above, be clear about the central motivation for this work.

2. Section 1: Rearrange the sections to make 1.1 only part of intro, and make 1.2 background as new section 2.

3. Line 107: overly should probably be overlie

4. Methods: Remove list with roman numerals, organize into true sections that align with the journals' format.

5. Line 272, line 632, and probably several other places: parentheses should be put around (Fig. X)

6. Line 308: Describe what the Euler characteristic shows

7. Line 314: There is a strange green box around a bullet point.

8. Section 4.1-4.2 should be in the results, not the discussion

9. Line 678: "post_depositional " seems to have an underscore

10. Line 833: rewrite with verb "mean porosity lower than the median one "

11. Paragraph at line 841: rewrite this paragraph. There are many grammatical errors

12. Line 899: "In contrast the," change position of comma

13. In the discussion, it would be useful to compare your porosity and permeability measurements to measurements from similar potential reservoir rocks. This comparison will help make this work relevant to the broader community.

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