

Interactive comment on “Mid/Late Devonian-Carboniferous collapse basins on the Finnmark Platform and in the southwesternmost Nordkapp basin, SW Barents Sea” by Jean-Baptiste Koehl et al.

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This manuscript presents an interesting interpretation and discussion about the Sørøya-Ingøya Shear Zone and its contribution to the evolution of the basins and fault complexes in the SW Barents Sea during the late Paleozoic. It also discusses the interaction of the different fault complexes in the area. The authors make an extensive review of the literature and use seismic data, published aeromagnetic data and the few wells available to support their interpretations. The English is in general fine, with few spelling mistakes. However, the paper needs to be more concise and organized. The

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manuscript and some of the figures need major corrections before it can be published.

Specific comments:

1) Although the manuscript is a good contribution to the understanding of the geology of the SW Barents Sea, it lacks a more global impact. Why should researchers that do not work in the SW Barents Sea read this paper? You can include a paragraph that highlights this issue. But please be concise, as the paper is already very long.

2) The length of the paper should be substantially reduced. Very few people will read the entire paper with such length. In order to do this, I have the following suggestions: -Avoid repetition: you mention three times that the easternmost Hammerfest Basin should be renamed southwesternmost Nordkapp basin, and at least three times you discuss the origin of the Serpukhovian unconformity. Just mention these things once and proceed to the point. -Geological setting: You can reduce this section considerably if you only include what is relevant for your study. A figure with a stratigraphic column could probably help you summarize sections 2.1 and 2.3 into a single paragraph. The geological setting is a little unorganized. For example, in section 2.1.1 you are writing about Precambrian rocks, but suddenly you start describing faults (Lines 155–166, page 6). I suggest that you divide the geological setting in section 2.1, where you only write about lithology, and section 2.2 where you can write about the structural geology. Lines 199–200, page 7 do not belong to the geological setting, it is part of the results. Lines 233–236, page 8; 273–278, pages 9–10 do not belong to geological setting. - Section 5.6 is a summary of what you already have said. You can consider removing this section.

3) Methods: be more specific about the description of your well-seismic tie. Did you make a synthetic seismogram? Which parameters did you use?

4) You need to clarify the meaning of your seismic unit's tops: are they sequence boundaries (if so, what type?), formations tops or just key reflectors with stratigraphic meaning? Because in your results you sometimes write about groups, sequences or

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ages. Be consistent and do not mix nomenclatures. In the figure of the stratigraphic column, you can also add your seismic unit's tops.

5) Results: descriptions and interpretations are mixed. You can split each section of the results into a description and an interpretation part, in order to make the results chapter easier to read. And please try also to summarize this section.

6) Discussion: I have a problem with your alternative interpretation of the TKFZ. First you said that the TKFZ dies out before the Finnmark Platform (page 1 line 27; page 37, line 1128; page 38, line 1144), but in your alternative (contradictory) interpretation you suggest that the TKFZ could have been partially eroded in the Finnmark Platform, but it might be possible to find its prolongation in the Loppa or even in the Veslemøy High. To support your interpretation, you mention some WNW–ESE faults in Veslemøy High, referring to Kairanov et al., 2016. First, the figures of this reference are not easy to find for the readers (since this was a conference presentation). Second, what is the timing of the faults in the Veslemøy High compared to the TKFZ? Are they even the same type of faults? You are not showing data that supports your alternative interpretation of the propagation of the TKFZ to the W.

7) Figure 1: the font size of your abbreviations is different. Why do the BSFC and BKFC have a bigger font? Why are the TKFZ and TFFC abbreviations bold?

8) Figure 2: some of your fonts are bold. Why?

9) Figure 3: this figure does not have scale or coordinates. It does not have a color scale. What is the meaning of the red dotted line?

10) Figure 4: seismic sections are very small, and it is very difficult to see any details (e.g seismic character, amplitude, geometries). You need to make them bigger. It is difficult to agree with your descriptions and interpretations if I can not properly see the data. The sections do not have horizontal scale. You should provide the uninterpreted seismic lines (this can be in supplementary material, if there are any restriction on the

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number of figures). Sometimes you do not interpret the tops in the entire seismic line. Why? Is it because there is a lot of uncertainty (in that case you could use question marks).

11) Figure 5: fix the order of the figures. After A comes B, not D. Add horizontal scales.

12) Figure 7: it shows a time slice near the mid-Carboniferous. That applies probably only for the hanging wall. Add scale.

13) Figure 8a shows a thickness map of the Devonian–lower Carboniferous, including areas as the sNB. In the seismic lines 4c, d neither the base of the Devonian or the basement are interpreted. How did you make this thickness map? Which reflectors did you use? The Mid- Carboniferous and the SISZ? Also try to make these maps bigger.

14) There are many paragraphs that need a figure as a reference. If not, they are difficult to understand or visualize, ex: page 3, line 69; page 9, line 250; page 10, line 301; page 38, line 1159.

15) Some sentences are very long, for example: page 3, lines 67–73; page 12, lines 360–364; pages 16–17, lines 490–498. Try to split them to make the paper easier to read.

16) Be consistent between the names that you use in the text and the figures. Is the Senje fracture zone in line 285, the same as the Senje Shear Zone in figure 1? Page 19, line 576 says basement highs, but in figure 1 it says basement ridges.

Good luck with the revision.

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