Dear Editor and Referees,

Thank you very much for evaluating our manuscript and helpful suggestions. Please find below our responses to all the comments. Our responses are written in bold font. We refer to line numbers in the revised manuscript where changes are highlighted (annotated version of the manuscript). We have also made some corrections to English use and typos throughout the whole text. We think that we have addressed all of your comments, and we hope that the new version might be considered suitable for publication.

On behalf of the authors,

Quang Nguyen

Reviewer #2:

Main comments

1. The first part of the work describes the application of a specific workflow to the BalTec data acquired in 2016, but it does not provide new information on the processing compared to the report published in 2020 (Nguyen Q, 2020, Seismic Data Processing Report (BALTEC / MSM52). Institute of Geophysics PAS. https://dspace.igf.edu.pl/xmlui/handle/123456789/112). Perhaps the authors could add more details about the processing in this work. For instance, velocity models used for pre-stack migration are not displayed, and it would be helpful to show them alongside the seismic sections. In the description of the re-processing of PG197 profiles, the authors explain the need for a new velocity analysis compared to the original processing and that this new velocity analysis is picked on cleaner CDPs gathers (L251-252); I suggest showing an example of CDPs gather with its corresponding velocity analysis. The authors could also add these figures in a supplementary material.

We would like to note that our processing work for the new BalTec data is the first and only existing that produced final PSTM results, there was no processing work on this dataset before. The cited processing report is published just internally at IG PAS. We thought some of the developments for processing shallow water seismic data (especially the demultiple strategy) deserve a proper journal publication. Reviewer 1 requested us to remove details on seismic processing, as they were somehow diluting the main focus of the paper (seismic interpretation). We therefore decided to move a detailed description of data processing to Supplementary Material.

Following your comments on the velocity models, we included RMS velocity models of two BalTec profiles (lines BGR16-212 and BGR16-258) in Supplementary Figures S4 and S5. Additionally, a figure including velocity analysis and velocity model for one of the PGI97 profiles has been added (Fig. S6).

2. I would suggest a reorganization of some sections of the paper:

In my opinion, a "results" paragraph is missing, where the outcomes of the processing are illustrated, including a description of seismic sections in terms of reflectivity and characteristics of the reflectors (e.g., amplitudes, frequencies, geometries, continuity, etc.). Additionally, in this paragraph, it would be useful to discuss an estimate of the difference in vertical resolution between the BalTec and PG197 data.

There are several repetitions between paragraphs 4.1 and 6.1; please check.

The "discussion" paragraph could incorporate the geological interpretation of the seismic sections, by merging the content of the current paragraphs 5 and 6.3.

In response to the above recommendations, we have reorganized the structure of the manuscript by adding a new "Result" section (Section 5 in the revised manuscript). This section comprises information on reflection patterns, characteristics of the reflectors, and resolution as an introduction to the subsequent interpretation section. Moreover, we added a new figure (Figure 3 in the revised manuscript) to illustrate the efficiency of our in-house processing of the BalTec data compared to the onboard processing.

Further details requested by the Reviewer, are now included in Supplementary Material. We moved processing details there to avoid repetitions between Sections 4 and 6.

We would like to keep the "Discussion" and "Interpretation" sections separate as they serve different functions in the manuscript.

3. The authors point out that data interpretation poses a challenge due to the limited well control in the area (L265). In their interpretation, they rely on well L2/1-87 situated at the southwest edge of profile BGR16-258. The horizon interpretation is then expanded from other wells using cross-sections, which are not shown in the manuscript. To enhance their approach, the authors might consider utilizing the boreholes intersected by the other BalTec lines to establish a correlation between stratigraphic markers and seismic facies. Subsequently, they could use the seismic facies to extend the interpretation. This "seismic facies table", together with the description of the seismic facies could represent the new paragraph 5 "seismic interpretation".

We have added a new figure (Figure 5 in the revised manuscript) that shows 3 wells with stratigraphic markers associated with the seismic sections. We also added a description of the reflection patterns (Section 5 of the revised manuscript) for each geologic formation imaged.

We believe that the term "seismic facies" is not appropriate for our study because "seismic facies" is often associated with depositional environments in sequence stratigraphy studies. Instead, we use the term "reflection patterns" to describe reflectivity characteristics.

4. I would like to preface by stating that seismic interpretation is not my primary expertise, and I hope that other reviewers can provide insights on this matter. I found the interpretation of the seismic sections to be insufficiently detailed, often overlooking clear structures and containing some errors. I recommend that the authors revisit the interpretation, aiming to better follow the main reflectors indicated by the seismic imaging and interpreting details that, in my opinion, could support the tectonic conceptual model. Furthermore, I recommend enhancing the line drawing by following the geometries of the reflectors. I have highlighted some examples in the attached PDF.

Following the Reviewer's recommendations, we have made the seismic interpretation more detailed to some extent, as much as the data allowed. In many cases, however, the change is not significant. We also checked all the elements specifically indicated by the reviewer in the annotated manuscript. Additionally, we have slightly updated the range of seismic profiles presented to avoid unclear

locations that are not sufficiently documented in the data (see revised seismic profiles in Figures 6 and 7). We believe that our interpretation effectively substantiates the main findings of our research.

5. The authors have reprocessed the PG197-13 and PG197-202 profiles, demonstrating the enhancement between the original processing flow and the reprocessing flow in Figure 7. I agree with the improvement in data quality. However, the interpretation of these reprocessed profiles is less detailed compared to the interpretation of the original profiles proposed by Krzywiec et al. 2003. Improving vintage data should aim to achieve a more detailed interpretation of the data. Therefore, I suggest that the authors also reconsider the interpretation of the reprocessed PG197 profiles.

We would like to note that the interpretation part of the manuscript focuses on the Koszalin Fault zone. The interpretation from Krzywiec et al. (2003) shows a completely different story and is unrelated to the Koszalin Fault. We mentioned this study in the manuscript because this is the only peer-reviewed paper in which PGI97 data were used.

We do admit that the PGI97 data do not play an important role in the Koszalin Fault area interpretation due to the associated acquisition limitations. Nevertheless, we would still like to present the improvement in the quality of the data from this survey obtained by reprocessing using modern tools.

6. Specific comments and minor suggestions are provided in the attached PDF file.

Thank you for these comments. We took them into account when revising our manuscript. The changes introduced are visible in the tracked version of the manuscript.