EGUsphere, referee comment RC1
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Comment on egusphere-2022-708

Anonymous Referee #1

Referee comment on "Formation and geophysical character of transitional crust at the passive continental margin around Walvis Ridge, Namibia" by Gesa Franz et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-708-RC1, 2022

The authors in this manuscript presented an interesting study on link between multiparameter analysis and joint inversion for comprehensive evaluation of the geological layers. They took a passive margin from Namibia as a case-study and acquired electrical resistivity data to compute geophysical parameters and used clustering analysis to link these parameters with specific geological units which is quite interesting. They have made an attempt to differentiate near-shore, thick, clastic sediments, and offshore located, more biogenic, marine sediments. Overall, the study made has significance for international community but at presents it has number of ambiguities in terms of scientific judgement. Some of the notes below (not limited to, authors need to think wisely as well) are my concerns:

The introduction part is not well-appealing at present, several important references related to passive margin studies and related to geophysical investigation especially electrical resistivity are missing. Authors are advised to present the introduction part and make a connection.

What's the novelty of this work while already number of inversion techniques have been presented coupled with various modeling schemes?

The geology section can be briefly presented rather than defining several phases separately. Authors should focus on depositional history and the relevant tectonic episodes.

How does the authors justify the overlap in the electrical resistivity and density plots during clustering analysis in Figure 3? Have the authors considered standardized resitivity-lithology correlation? I guess NO. If yes, how? Also, it is very difficult to distinguish the symbols and colors presented, it can be further simplified for understanding, especially when compare these results to Figure 4.

The results presented in vertical section along Profile P100 and the cross-plots in Figure 3 are not strongly correlated, there exists overlap in the resistivity values for crustal sediments and others.

Also, these figures can be better presented.

Again, going back Figure 3, plus, this is too random to get useful conclusions about relationships of two variables.

Why the electrical resistivity and density values are lower in Cluster cru-A? the authors did not justify well. Please justify

Line 315: The cluster's cells are distributed in all model areas and summarize mostly shallow ranges above 10 km. In this case, 10 Km is not a shallow depth. Also, the authors stated that 189-210 Km on Profile P100, whereas the cross sections don't exceed 100 Km, how would the authors justify this depth contrast and the inferences made?

Lines 365-375, I would like to know the ranges defined for low, very low, high and very high etc?

100 km depth Aur 500 km k profiles using MT Data, are not authentic, please justify.

And there is no relationship between conductance and density (it should be a cross verification while resistivity to density relations is defined)?

Figure 7, I don't understand the smallest values (0.3-3 Ohm-m) in a depth range of 0-10 Km (even onwards). Can the author justify such an anomaly ?

There are several discrepancies in the results presented, I suggest authors first address the above concern then the manuscript can be further reviewed. At present, I can't

recommend this manuscript for consideration. Resubmission is encouraged. Also, there are several grammatical mistakes, and some sentences are very difficult to understand, please do a complete overhauling for the English write up.

In brief, the manuscript needs a major revision, if the above questions are not made clear, it is rejected.