Comment on essd-2022-345
Anonymous Referee #2


General Comments

This paper submitted by Asif et al. describes a geophysically constrained subsurface resistivity model database for electromagnetic systems in a deep learning context. Such datasets and associated analyses are valuable in applying deep learning methods to geophysical applications. So the paper and associated database should be of interest to engineers and those interested in applying deep learning to electromagnetic methods. The manuscript is overall well organized and written, but there are still some shortcomings that need to be addressed before it can be accepted for publication.

Specific comments

- Please enhance the description of data processing in the revised manuscript. This will be important for a full understanding of this dataset.
- My main suggestion relates to Section 4 of this paper. As you stated, the deep learning resistivity model database (DL-RMD) presented in this paper can provide uniformity in benchmarking for DL methods in EM. But Section 4 doesn’t really provide a clear description of the great performance of this dataset. It would be better to compare it with other DL studies that have been published and listed in the Introduction.
- Table 1 – It needs to be greatly improved. The table caption is generally above the table. The references in the Table should be changed to "Wu et al. (2021a)". The table caption should be concise but descriptive.
- Equations – Please check the writing form (e.g. $C_0$). Equation 2 – Suggest revising “$\log_{10}$” to “$\lg$”.
- Figure 4 – Poor quality. It would be better to provide additional descriptions for the
figures rather than just summaries. For this figure, only one sentence was used to describe.

- There are lots of abbreviations used in this manuscript, it would be better to add an Appendix. Abbreviations in the title should be avoided. The phrase "depth of investigation" is abbreviated as the "DOI", this abbreviation is not recommended.