

August 11, 2023

To  
Prof. Norbert Marwan  
Handling Editor  
Nonlinear processes in geophysics

**Sub:** Reply to Referees comments of manuscript (npg-2023-8)

Dear Sir

With reference to manuscript (npg-2023-8), first of all we would like to thank you for your dedication to reviewing our manuscript and providing valuable suggestions/comments from your side, which are very beneficial to enhance our knowledge as well for improving the manuscript. Here we have tried to furnish all those comments raised by Referees regarding the reflection of our innovative finding and structure modification in our manuscript. We realized these mistakes and try to incorporate all those comments point wise and update thoroughly in our revised manuscript. If still you wish some improvement/modification in the revised manuscript, we are heartily accept to incorporate in our manuscript accordingly. Therefore, we are eagerly waiting your kind response.

Thanking you

Yours sincerely

(Mukesh Mukesh)

## Reply to referees comment

### Reply to Referee #1

First of all we would like to thank to Referee #1 for encouraging words as quoted “the manuscript is well-constructed and informative.” in the submitted manuscript entitled “The joint application of metaheuristic algorithm and Bayesian Statistics approach for uncertainty and stability assessment of nonlinear Magnetotelluric data”. Here, we are trying to give the answer to each comment raised by your side. We are always ready to receive your valuable and useful the comments for incorporation in the revised manuscript.

**Comment 1.** There are several applications for these different algorithms (I give you such updated examples) such as:

(1) PSO: <https://doi.org/10.1007/s12040-023-02075-4>

(2) Bat algorithm: <https://doi.org/10.1016/j.jog.2022.101953>

(3) Barnacles mating: <https://doi.org/10.1038/s41598-022-26265-0>

(4) Three algorithms compared for Magnetotelluric data: <https://doi.org/10.1007/s00024-022-03166-x>

**Reply:** The above suggested research articles are very helpful to understand the insight of the algorithm’s application in various fields and enhance the quality of the manuscript. So, we have incorporated it in the final manuscript on page number 3 and 4, line number 71, 72, 75-76 and 88-90. Also highlighted in the References section on page number 42, 42, 42, and 44 (line number 743-745, 758-760, 761-763, and 799-801).

### Reply to Referee #2

Thank you for giving your valuable time to reviewing our manuscript (npg-2023-8). Your thoughtful feedback has been immensely valuable in refining our research. We acknowledge the areas of improvement you highlighted. Your suggestions will undoubtedly improve the manuscript's overall impact and contribute to the advancement of the field. We are grateful for your expertise and constructive criticism, which will undoubtedly enhance the quality of our work. Should you have any further insights, please feel free to share them. Once again, thank you for your invaluable contribution.

**Comment 1.** The current manuscript structure is not conducive to reading, and it is suggested to modify the manuscript structure into five parts: introduction, data and methods, results and analysis, discussion, and conclusion

**Reply:** The structure of the manuscript has been modified into five parts: introduction on page number 3-4 (line number 53-101), data and methodology on page number 5-14 (line number 105-331), results and analysis on page number 14-37 (line number 333-648), discussion on page number 38-39 (line number 649-682), and conclusion on page number 40 (line number 690-706). The necessary corrections required to modify the manuscript are incorporated in the revised manuscript thoroughly.

**Comment 2.** It is recommended to remove the black outer borders of all figures. There may be editing errors in some places, such as missing half of the brackets in the title of Figure 2.

**Reply:** Thank you for your suggestion. The black outer borders of all figures has been removed on page number 8, 12, 15, 16, 17, 19, 20, 22, 22, 23, 25, 28, 29, 30, 32, 33, 34, 36, and 37 and the editing error in title of Figure 2 has been corrected on page number 12 (line number 291) in the revised manuscript.

**Comment 3.** The discussion part should be compared with the previous work from the perspective of data, methods, results, etc., to show the progressiveness and limitations of this work. However, there is almost no previous reference in the discussion section of this manuscript.

**Reply:** Thank you for your feedback. We acknowledge the importance of comparing our work with previous studies to highlight its progressiveness and limitations. In our revision, we have thoroughly address this concern by incorporating relevant references and discussing how our research builds upon existing knowledge, on page number 38-39 (line number 649-682). We appreciate your valuable input and are committed to improving the manuscript accordingly.

Other relevant corrections that has been incorporated in the revised manuscript, are given below:

1. In the revised manuscript, we compared our inverted results with published results obtained by Monte- Carlo technique as shown in Table 6 (page 37).
2. Some necessary correction in the conclusion has been made on page number 40 (line number 696-706).