

Overall, the authors have done a good job of addressing my review comments. Figure 12 is a nice addition to better support the argument that induced polarization (IP) might be seeing biogeochemical hotspots. The major technical errors in the paper have been appropriately addressed. The paper is still not totally convincing, but others are sure to continue exploration of this potentially innovative use of IP. Furthermore, the authors have changed the wording to improve clarity and to be less definitive in some of their statements.

We would like to thank the Reviewer for the evaluation and for providing further constructive comments.

In re-reading the paper I caught some minor issues and I have one suggestion:

Line 82: Waxman and Smits (1968) is not a technically correct citation about induced polarization. This paper introduces a parallel conduction model to account for surface conductivity.

We considered the suggestion of the Reviewer and removed the reference, although the lines refer to the polarization of the EDL, and Waxman and Smits (1968) discuss the diffusion of the counterions and their relation to the clay content pore space and pore fluid salinity.

Lines 77-81. I read the comments from Reviewer 1 and the authors' reply with interest. To throw more wood on the fire regarding the IP mechanism in the presence of electronically conducting minerals, the authors might want to consider the following recent paper where polarization of the Stern layer of conductive grains is invoked to describe the salinity dependence of relaxation time: Feng, L., Li, Q., Cameron, S. D., He, K., Colby, R., Walker, K. M., Deckman, H. W. and Ertaş, D. (2020) 'Quantifying Induced Polarization of Conductive Inclusions in Porous Media and Implications for Geophysical Measurements', *Scientific Reports*, 10(1), pp. 7–11. doi: 10.1038/s41598-020-58390-z.

We thank the Reviewer for the suggested reference, which we included in the revised version of our manuscript. However, this new model does not change the discussion as it is also based on the assumption of perfectly conducting particles (just like the models based on the Wong model).

Line 126: 'double-bound' should be 'double-bond'

We corrected the spelling error.

Line 252 should read 'in the absence of electron conductors' not 'in the absence of electrical conductors'

We corrected the spelling error.

Line 495 – change 'adjective' transport to 'advective' transport. Check for other errors with this spelling in the document

We corrected the spelling error and reviewed the manuscript for other spelling errors.