

Interactive comment on “Evaluation of Possible Corrosion Enhancement Due to Telluric Currents: Case Study for Brazilian Pipeline” by Joyrles Fernandes de Moraes et al.

Anonymous Referee #1

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Title: Evaluation of Possible Corrosion Enhancement Due to Telluric Currents: Case Study for Brazilian Pipeline

Authors: Joyrles Fernandes de Moraes et al.

General Comments

The manuscript examines the impact of geomagnetically induced currents (GICs) on the corrosion rates of the Brazil-Bolivia pipeline, which is located in the equatorial to low latitude region of South America. Using the March 17, 2015 geomagnetic storm

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data, the case study results show that the largest pipe-soil potential variations are obtained at the ends of the pipeline. I find that the results are very interesting for the space weather/science community and have strong implications for pipelines in the equatorial to low latitude regions. I recommend that the authors undertake major revisions outlined below before the manuscript can be accepted for publication:

Specific Comments

Page 2, Line 1: “Previous works on this topic ...” Which topic? GICs in general or GICs flowing on pipelines. Its important for the authors to specific exactly which topic the mean because this sets a stage for what follows.

Page 3, Figure 1: It would be of great benefit to add the geomagnetic equator and the +/-10 or 15 degrees lines in this map. This will help readers to easily see if the pipeline is within the equatorial electrojet region or not.

Page 3, Figure 1: I was wondering, apart from Sao Jose Dos Campos site, is there no other nearby magnetometers? If there is (I know Brazil has its own network of magnetometers or check SuperMAG collection), it would be interesting to see if the results differ or agree using another magnetometer site.

Page 4, Line 14: Please explain how these values were obtained? Did you use values from previous works, or did you come up with own values?

Page 5, lines 6-8: Perhaps the authors could elaborate further on how precipitation will cause larger amplitudes of magnetic fields. This will be of benefit to the readers.

Page 6, Lines 4-5: A list of the storms and some characteristics like Kp and Dst index would be helpful here.

Page 6, Line 10: “. . . to terminate impedances greater than 1 ohm for both cases.” It is not very clear how this connects to the first part of the sentence. Please rephrase for better reading and understanding.

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Page 10, Figure 6: I don't see the dashed line in this figure. Also, please make the font of labels inside the plot same size as font on the axes.

Page 10, Figure 6: In the text you say the 7 November storm reached greater values than 2×10^{-5} mm for impedances equal and greater than 1 ohm/km but there is no way of telling which marker represents which storm. Perhaps you should add the labels to indicate the specific storms. Same for Figure 7.

Technical Comments

Please refer to the annotated manuscript attached for the list of "Technical Corrections" to implement. In General, the manuscript would greatly benefit to have it read and corrected by someone with better command of English language.

Please also note the supplement to this comment:

<https://www.ann-geophys-discuss.net/angeo-2019-132/angeo-2019-132-RC1-supplement.pdf>

Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2019-132>, 2019.