

Interactive comment on “Latitudinal variation of Pc3-Pc5 geomagnetic pulsation amplitude across the dip equator in central South America” by Graziela Belmira Dias da Silva et al.

Anonymous Referee #2

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This manuscript statistically analyzes the latitudinal dependence of the wave characteristics of Pc3 and Pc5 pulsations using magnetic variation data from multiple equatorial stations. The authors newly indicate that attenuation in the Pc3 amplitude around noon, especially, at the dip equator and for wave periods shorter than ~ 35 S, and that Pc5 amplitude also shows a slight depression at the dip equator while Pc5 amplitude basically shows an enhancement at all equatorial stations. In addition, the authors indicate that the Pc3 amplitude shows an amplification at dawn sector in H component rather than D component.

These results of the analysis include some significant new findings. However, some ex-

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planations for these observational facts need more improvement. Thus, I suggest that this manuscript is fairly important, which can be published in Annales of Geophysicae after revision reflected following specific comments.

(1) Page 13, Line 3,

The authors explained the amplitude depression of Pc5 at equatorial region by the propagation model proposed by Chi et al. (2001). However, regarding this paper, there were some discussions between Chi et al. and Kikuchi and Araki, while the author's interpretation seems to be valid explanation. It would be better to refer the following papers to consider the adequacy of the explanations.

(a) Kikuchi, T., and T. Araki, Comment on “Propagation of the preliminary reverse impulse of sudden commencements to low latitudes” by P. J. Chi et al., *J. Geophys. Res.*, 107(A12), 1473, doi:10.1029/2001JA009220, 2002.

(b) Chi, P. J., et al., Reply to comment by T. Kikuchi and T. Araki on “Propagation of the preliminary reverse impulse of sudden commencements to low latitudes,” *J. Geophys. Res.*, 107(A12), 1474, doi:10.1029/2002JA009369, 2002.

(2) Page 18, Line 32.

The authors stated Pc5 amplitude depression and phase lag at the dip equator are not predicted by the horizontal transmission. However, these features well correspond with that of Pi2 pulsation which was indicated by Shinohara et al., (1997, and 1998). They explained that the transmitted electric fields from the polar ionosphere could cause the dayside Pi2 with amplitude depression and phase lag due to the high ionospheric conductivity at dip equator. It would be better to take account these previous studies in considering the interpretation of the observational facts of Pc5 pulsation.

(3) Page 18, Line 7; Figure 11 and Page 19, Line 5,

The authors suggest that the amplitude enhancement in H component of Pc3 at dawn terminator could be explained by the secondary electric field shown in Figure 11. How-

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ever, in this model, the secondary electric field is generated by the neutral thermospheric wind. In this scenario, the secondary electric field should be modulated by the temporal variation of the neutral wind, not by the electric field associated with the Pc3. It seems to be less convinced. The authors need to explain how the secondary electric field at the dawn terminator affect the amplitude enhancement of Pc3 which is imposed on the dawn ionosphere.

Minor comments:

Figure3, 4, 5(a), 9

It would be better to add local time on horizontal axis.

Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2019-73>, 2019.