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Interactive comment on "Climatology of intermediate descending layers (150 km) over the equatorial and low latitude regions of Brazil during the deep solar minimum of 2009" *by* Ângela M. Santos et al.

Anonymous Referee #2

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Dear Editor,

The paper titled "Climatology of intermediate descending layers (150 km) over the equatorial and low latitude regions of Brazil during the deep solar minimum of 2009" presents a statistical study of intermediate layers (IL's) using digisondes observations. The statistical results are new, interesting and can be helpful to understand the formation and dynamics of the IL's. Therefore, the paper should be considered for publication after revision. This way, I have listed below some comments/questions/suggestions.

1. P20, L1-3: I cannot see a relation between the day-to-day variability shown in Figures 10a and 10b and gravity waves. Figures 10a and 10b show a wave like perturbation with a periodicity of some days. Gravity waves periodicity varies from some minutes to few hours. It is not possible to affirm the influence of gravity waves with one point per day. This discussion needs some improvements.

2. P29, Figure 14 and its discussion: a) In the label of Figure 14, h'F line is yellow and h'IL line is blue; b) How can h'IL be higher than hmF2? c) hmF2 is not intensified at 1115 UT, it has a smooth upward movement starting at around 0930 UT. Apparently, not related with h'IL intensification; d) It is not possible to observe gravity wave activity in the F layer true height at fixed plasma frequencies. Characteristics of gravity waves as downward phase propagation cannot be seen, only a modulation that could be related to prompt penetration electric field. Would be helpful if the authors presented others plasma frequencies, e. g., 5, 6, 7, 8 MHz, in order to see a vertical propagation of gravity waves in the ionosphere. 4.1, 4.2, 4.3, 4.4 MHz represent basically the same ionospheric height, which makes difficult to see any gravity wave propagation; e) It is also difficult to address a possible cause to gravity wave when we have a magnetic disturbance. The author should choose a case without any magnetic disturbance and try to improve this discussion, even the authors do not believing that the uplifting of the layer was caused by a penetration of electric field.

3. a) P1, L12: "São Luís (2 ° S; 44 ° W, I: -5.7°)" should be "São Luís (2° S; 44° W, I: -5.7°)"; b) P3, Methodology and data presentation: Some details about the digisonde used could be helpful for those who don't know about it (e. g., model, time resolution, etc) or, at least, some references; c) P5, Figure 1: Would be nice know the time of occurrence of the ionogram, even in an example; d) P5, L10: What "60%" means? 60% of the days analyzed for each month or 60% of the ionograms? General information about the statistic (e.g., number of day with data and number of day with IL's), as did in Table 1, could be summarized in this section; e) P6, Figure 2: What kind of mean have done in Figure 2? Does it actually a monthly mean? f) P8, Figure 3: Standardize (0 to

24h) both x-axis (São Luis and Cachoeira); g) P8, L6: It is not possible to distinguish the days in this plot. We cannot check the number of days with or without IL's; h) P9, L1: Why have you not seen IL's in March, April, and September (very small occurrence) around 15 UT? i) P20, L11-12: "SL/CP" should be "CP/SL"; j) P24, Figure 12: The number of IL's doesn't match with the information given in Table 1.

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