

Ann. Geophys. Discuss., referee comment RC2
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Comment on angeo-2021-16

Allison Jaynes (Referee)

Referee comment on "Types of pulsating aurora: comparison of model and EISCAT electron density observations" by Fasil Tesema et al., Ann. Geophys. Discuss.,
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This manuscript examines three pulsating aurora events by using electron density from the incoherent scatter radar, precipitating electron fluxes from the LEO POES satellite, and modeled electron density profiles. They compare the model outputs (based on data inputs) among the events, and conclude that the model matches well for the patchy pulsating aurora events, but not well for the amorphous pulsating aurora events. The paper has very interesting results, but I recommend moderate revisions before acceptance. The suggestions below are mostly clarifications to make the conclusions more compelling.

Figures 2, 4, 6: Recommend putting vertical lines overlaid on these plots and indicating the regions of APA vs. PPA. It is hard to refer back and forth to the text to see when one type transitions to the other.

Throughout: Several times the ionization layer is referred to as expanding or increasing, but it would be worth the time to put this in more quantitative terms. Perhaps if you use a set density threshold, you can note when the threshold exceeded that density at various altitudes (e.g. the density increased above the threshold at 80 km after XX:XX UT) to give a better picture of exactly what altitude ranges these features span.

Line 213-214: Related to the last two comments, this line describes "an enhancement" at the time of "optical transition between the two categories." It would be much more clear if that transition time were defined clearly in the figure and a more precise measure of the enhancement was given.

Line 224: "undergo <<an>> increase <<in>> patch sizes during the event evolution..."