Responses to Referee 2.

Thank you for your kind words about our manuscript and for the errors you pointed out. Please find our responses to your questions/suggestions below.

Specific Comments

page 24810, line 15: "greatest impact". Need to clarify what this means. Is this the time period when the greatest number of trajectories arrive at the ULAC?

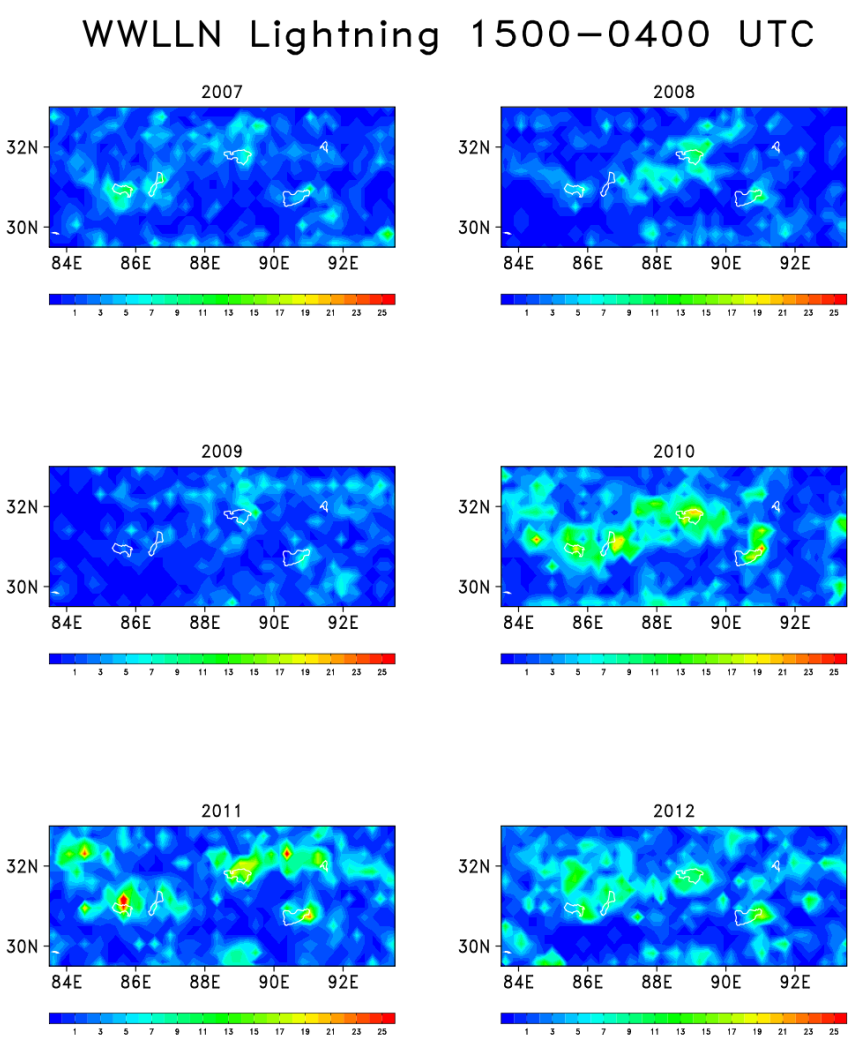
Thank you for pointing out how poorly worded this is. This is the time at which the convective trajectories cross the PBLH. The sentence has been reworded to clarify this.

Lines 33-34: "*A distinct diurnal cycle is seen in the convective trajectories, with a majority of them crossing the boundary layer between 1600–2300 local solar time.*"

page 24818, line 13: There are large changes (generally improvement) in detection efficiency for WWLLN over the 2007 to 2012 period. Lumping all years together in a single climatology can create some geographic biases. Might be better to treat the years individually.

Great suggestion. The figure below shows each year individually. The signal is still apparent in earlier years (2007, 2008, 2009), but changes in the detection efficiency clearly can be seen in 2010, 2011, and 2012. We have added this caveat into the results section:

Lines 539-542: "*Because the detection efficiency of WWLLN improved from 2007 to 2012, we also examined each year individually. This revealed that the signal seen in Fig. 13b was dominated by the most recent three years (2010, 2011, 2012). The signal still was apparent in the earlier years (2007, 2008, 2009), just not as strong.*"



page 24819, line 23: The MERRA low pressure extends farther south over India than in WRF. Please note this in the manuscript.

This has been noted in WRF evaluation section.

Lines 268-270: *"Additionally, MERRA shows the low pressure extending farther south over India when compared to WRF (Fig. 4e versus 4f)."*

page 24824, line 11: The mean vertical velocity of each trajectory....

This correction has been made. In fact, we have clarified this in several places in the paragraph on lines 404-420. Thank you for pointing this out.

page 24824, line 13: An updraft from near the surface to 150 hPa averaging 23 m/s over this vertical distance and over a 16 kmˆ2 area seems unrealistically large to me. Are there such updrafts documented in the literature?

Updrafts of this strength have been documented, but not over such a large horizontal area. This caveat was mentioned in section 2.1, where we discussed the limitations of convective modeling at 4 km grid spacing. Also, keep in mind that the average could be dominated by the value at one particular level…e.g., the updraft could have been ~30 m/s at 500 hPa, but much smaller everywhere else. However, your comment points out that this needs to be stated again when mentioning the updraft results. Thank you for pointing this out. The below statement has been added to the Results section:

Lines 415-420: "*Although these vertical velocities are realistic for an isolated updraft, note that they represent a 16 km^2 horizontal average because of the grid spacing of the WRF simulation. Updrafts of this strength are not expected to exist over such large horizontal areas in nature. Also, the average could be dominated by the value at a particular level, e.g., the updraft could have been ~30 m s^{-1} at 500 hPa, but much smaller at other levels.* "