This version has been much improved than the previous one, and the authors gave a more reasonable analysis of the Nas layer enhancement in MLT region generated by lower atmospheric electric field. However, there are still some issues that need to be improved, which are listed as below:

1. Figure 1: Although the author provided inverting method of sodium density from two different kinds of lidar data in detail, the differences of sodium density between Figure 1a and Figure 1b are still quite large. The density of Figure 1a is almost double sizes of that of Figure 1b. And it is impossible to have such a big different result for two lidars which are almost in the same area (maybe less than 1km). Even though the author believes that this was the result of lidar noise affecting the density, but from Figure 3 in the "response to review2" provided by author, the sodium layer peak signal 107 is more than ten times than the noise (7). Although the count rate of this lidar is relatively lower, the density error is equal to the reciprocal of the square root of the signal minus the noise, which is about 1/10. So it is impossible for the signal-to-noise ratio to produce a double error consequently. The author should carefully consider about it, whether the inverted parameters (for example, the scattering cross section) were wrong processed? In addition, in "response to review2", as shown in Figure 2b "east density". Did that mean the density in Figure 1b is not vertical? This really makes me puzzled, I recommend the author to provide the density of the wind lidar in the vertical direction. The sodium densities detected by the oblique direction laser and the vertical direction laser are likely to be much different, as the distance between these two lasers is 40-50km in the height of the sodium layer, which has already been found in other sodium wind lidar data.

2. In my last review comment, I wrote: "it can be seen from Fig.2a: there is an enhancement in the Es layer from 13:20 to 14:20, and the origin of this enhancement was not explained or discussed in the manuscript. Is it caused by lightning as proposed by Johnson and Davis (GRL, 2006) ? I suggest that Authors could explain or discuss the enhancement in the Es layer from 13:20 to 14:20."

In this revised manuscript, the author believes that: electrons will follow the northward electric field and accumulate, but the ions still move in the same direction due to the difference in collision frequency (At the moment when the electric field reverses, electrons will be rapidly accelerated by the northward electric field, and ions would be regarded as essentially remaining northward or unchanged). This explanation is a little bit vague. The author also said in the previous paragraph: "Since metal ions are much heavier than electrons, the ions would drag electrons in order to move/drift together". Then why the electrons in this place can break away from the bondage of the deionization and accumulation

with the movement of the ions? The point that reversal of electric field leads the enhancement of Es was not the crucial work of this article (The idea that the electric field reversal leads to the enhancement of Es has already been proposed by other authors, and the main contribution of this article is to discover and explain the generation of Nas). But I still hope that the author can provide a deeper explanation on this issue according to the previous research.

3. Referring to the generation of Nas at 14:20, the author believes that if the electron concentration in Es increased a lot, it can speed up the neutralization of sodium ions, and leading to the appearance of a new Nas peak. This explanation does really make sense. Since the reactants increase, the products must also increase. But I still stick to that there could be another possible contribution to the formation of Nas: the reversal of the electric field caused the nearby metal ions (including sodium ions) to join into Es, also resulting the increase of Es. And then the sodium ions in Es were neutralized to produce sodium atoms (at the same time Es was weakened). Anyway, though Plane's theory (Cox and Plane, 1998, JGR) indicates that metal ions have a very short lifetime below 100km, actually many calcium ions appeared below 100km and last several hours, which were already reported (Gerding et al., 2001, Annales Geophysicae; Raizada et al., 2012, JGR; Raizada et al., 2020 GRL). Therefore, the metal ions actually exist below 100km in my opinion.

4. Page 5 Line 24: The formula is wrong. Authors double check their calculating results here and elsewhere. The critical frequency f_oEs should be given by

$$f_oEs = f_{pe} = \frac{\omega_{pe}}{2\pi} = \left(\frac{n_e e^2}{4\pi^2 m_e \varepsilon_0}\right)^{1/2}.$$