

Interactive comment on “Variations of the 630.0 nm airglow emission with meridional neutral wind and neutral temperature around midnight” by Chih-Yu Chiang et al.

Anonymous Referee #1

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In this paper, volume emission rate of the 630-nm airglow is calculated using the SAMI2 model, which is a numerical model of the ionosphere. The authors investigate effects of the neutral winds and temperatures on the volume emission rate, but their argument is still only qualitative. This reviewer considers that quantitative investigation is needed. Therefore, major revision is needed before its publication.

Although the authors describe that effect of the meridional neutral wind is dominant, it is obvious from the equation of the volume emission rate because the volume emission rate is proportional to a product of the plasma and atomic oxygen densities. Meridional neutral winds move the plasma along the magnetic field line and modify plasma density

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distribution. Consequently, effects of the neutral winds is dominant.

This reviewer recommends the author to calculate the 630-nm airglow intensity by integrating the volume emission rate along the altitude, and show it as a function of the neutral temperature and meridional neutral winds. The, the authors should argue quantitatively how much the neutral temperature affect the 630-nm airglow intensity compared to the effects of the neutral winds.

Minor comments:

- Figure 1: Arrows representing wind velocity is not seen clearly. - L. 916, Figure 2 → Figure 3

Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2018-5>, 2018.

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