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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Satellite measurements of the global mesospheric sodium layer" *by* Z. Y. Fan et al.

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General comments:

This paper describes results of global structure of sodium layer in two local time (06:00 and 18:00 LT) observed by the Odin satellite. The seasonal variations of the global sodium layer structure and the diurnal variation of Na layer modulated by diurnal tide are discussed. The comparison between the satellite observations and ground-based Lidar observations indicates that the satellite observations and the retrieval method of global Na layer are successful. The results of this paper are very useful for studying the dynamics and photochemistry in the mesosphere/lower thermosphere (MLT) region. So, the work is appropriate for ACP. I think this is a very good paper and recommends publication of this paper on ACP. There are two questions I want to discuss with authors as follows:

1. The discussions on Fig. 4:

From Fig.4, it seems that the full width at half maximum (FWHM) of Na layer near September in all latitude is smaller than it near March. But the total Na column density in Figure 1 has not the feature like this. If this is true, are there explanations on this asymmetry between the vernal equinox and the autumnal equinox?

I suggest that Fig. 4 also gives the distribution (a function of latitude and month) of the peak density of the sodium layer. And in Fig. 5, the zonally-averaged Na layer in March is also given. Maybe, they are helpful to make explanations.

2. The discussions on the modulation of Na layer by tide:

In section 3, the diurnal variation of the sodium layer is discussed. The times of the Odin satellite observation are at 06:00 and 18:00 in local time, they are 12 hours apart. So, the modulations on Na layer by diurnal tide and ter-diurnal tide can emerge. From the results of this paper, the modulation on Na layer is mainly by the diurnal tide. But the modulation by the semi-diurnal tide can't be exhibited in present mode of observations. And some times, the semidiurnal tide is very strong in the mesopause region. The paper should indicate this.

Typing errors:

In Figure 1 in Page 5430, the units of the color bar should be cm-2, not cm-3.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 5413, 2007.