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The variability of SE2 tide extracted from TIMED/SABER observations

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Based on the temperature observations of the SABER/TIMED, the variability of the non-migrating tide SE2 with high resolution (one-day) is analyzed, using the method from Li et al., [2015]. From the temperature observation data measured in the mesosphere and lower atmosphere region (MLT, 70-110 km altitudes) and at the low- and mid -latitudes (45[U+F0B0]S - 45[U+F0B0]N) from2002 to 2012), we obtained the non-migrating tide SE2 and further studied it in detail. It is found that the climatological features (large time scale variability and spatial distribution) of the SE2 tidal component are similar with the results from the previous researches, which are picked up from the interpolated data with 60-day resolution. The climatological features are that the SE2 tidal component manifests mainly at the low-mid latitudes around [U+F0B1]30[U+F0B0]. The northern hemisphere tidal amplitudes below 110 km are larger than the southern hemisphere tide, at the same time, its peaks below 110 km mainly present between 100 and 110 km altitude; the tidal amplitudes below 110 km occur a north-south asymmetry about the equator in the annual variation: in the southern hemisphere, SE2 occurs with an obvious annual variation with a maximum of tidal amplitudes in December; while, in the northern one, the semi-annual variations with maximum at the equinoxes are stronger than that in the southern one. Herein, owing to the high-resolution tidal data (one day), we could research the short term (day-to-day) variations of the SE2 tide. We found that: (1) the day-to-day variations manifests mainly at the altitudes range between 100 and 110 km; (2) it increases gradually with latitudes and it is stronger at the low-mid latitudes; (3) it is relatively slightly stronger around solstices than equinoxes; (4) it does not present a remarkably inter-annual variation. Finally, the SE2 day-to-day variations may be composed by the absolute amplitudes' variance and the impact of the wave phases. In addition, the variations of variance are more important.