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Annual and inter-annual variations of 6.5-day-planetary-waves in MLT observed by TIMED/SABER

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Annual and inter-annual variations of 6.5DWs in 20-110 km, 52°S-52°N, 2002-2016 are studied by using v2.0 TIMED/SABER kinetic temperature data. Firstly, global annual variations of 6.5DW's spectral power and amplitudes are obtained. Strong wave amplitudes emerge in 30°S/N-50°S/N, and peaks in altitude separate in stratosphere (40-50 km), mesosphere (80-90 km) and the lower thermosphere (100-110 km), respectively. Their annual variations are similar in both hemispheres, but different in altitude. In 40-50 km, the annual maximums emerge mostly in winters: Dec.-Jan. in the NH and Jul.-Aug. in the SH. In MLT, annual peaks arise twice in each half of year. In 80-90 km, they're mainly in equinoctial seasons and winters: May, Aug.-Sep. and Jan. in the NH and Feb., Nov. and May in the SH. In 100-110 km, they emerge mainly in equinoctial seasons: Apr.-May and Aug.-Sep. in the NH and Feb.-Mar. and Oct.-Nov. in the SH. Then, inter-annual variations of 6.5DW amplitudes during the 14-year period are studied. Frequency spectra of monthly-mean amplitudes show that, main dynamics in long-term variations of 6.5DWs are AO and SAO in both hemispheres. Besides, QBO are visible in both hemispheres and 4-month period signals are noticed in the NH in MLT. Amplitudes of SAO, AO and QBO are obtained by band-pass filter. Their amplitudes are comparable in stratosphere and mesosphere, and QBO signals are weaker than the others in the LT. Vertical variations both of SAO and AO amplitudes are very stable. AO structures have little inter-annual changes, while inter-annual variations of SAO are significant and are related with 6.5DW. It means that annual and inter-annual variations of 6.5DW are mainly controlled by AO and SAO, respectively. Although QBO signals are weaker and their variations are less regular than AO and SAO, their phases seems to relate with inter-annual variations of 6.5DW as well.