

Summer wave dynamics in middle and high latitudes of the Northern Hemisphere

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Medium-scale waves, which propagate eastward, frequently dominate in the Extratropical Southern Hemisphere (SH) summer circulation pattern. In the Northern Hemisphere (NH) wave dynamics are more complicated because of the large zonal asymmetries (thermal and topographic) present in the NH extratropics. Using wavenumber-frequency analysis, an investigation of the upper-tropospheric and lower-stratospheric summer circulations in the NH extratropics during 2000 was made. In the upper troposphere of the middle latitudes, a large part of variability in geopotential heights is accounted for by the eastward and westward medium-scale waves (wavenumbers 4-7). These waves dissipate near the tropopause and in the lower stratosphere only large-scale waves (1-2) are observed. The spectrum of total ozone content shows disturbances of both tropospheric (i. e. waves 4-7) and stratospheric (waves 1-2) origin. With increasing latitude (northward) the medium-scale waves disappear from the spectra of geopotential heights and total ozone content. At 70N only wave 1 is clearly seen in both spectra. The broader spectral content and the presence of the westward waves are the two main differences from analogous results for the SH summer circulation. One can suppose that there are several uncorrelated wave packets from different sources in the NH.