Stratospheric zonal winds (ERA climatology Jan/Jul)

Westerlies in winter — stronger in southern hemisphere
Easterlies in summer above about 50hPa in middle latitudes
Figure 1. Zonal velocity. Range is from -100m/s to 100m/s with contour intervals of 10m/s. Vertical axis: pressure, ranging from 1000hPa to 1hPa. Horizontal axis: latitude, in degrees North.
Figure 2. Temperature. Range is from 160K to 300K with contour intervals of 10K. Vertical axis: pressure, ranging from 1000hPa to 1hPa. Horizontal axis: latitude, in degrees North.
Figure 6.2. As Figure 6-1 but for July.

Figure 6.30. Time-dependent “radiatively-determined” temperature $T_f$ for 15 January 1982 from the calculation of Fels and Schwarzkoopf (1985). The surface temperatures are prescribed at their seasonally-varying observed values. Cloudiness, and ozone below 35 km, are prescribed at annual-mean values, as in Fels et al. (1980); ozone above 35 km is allowed to “float”, in response to temperature variations, towards a crude photochemical equilibrium. Details of the water vapor prescription are relatively standard and are described in Fels and Schwarzkoopf (1985). [From Mahlman and Umscheid, 1984].
The stratosphere
Equatorial wind anomalies (m/s): the QBO
Impact of stratospheric perturbations on the troposphere (Baldwin & Dunkerton)

A

Composite of 18 Weak Vortex Events

B

Composite of 30 Strong Vortex Events
Meridional circulation

CH₄ dV Pressure vs Latitude
Sunset 31-AUG to 10-OCT-1993

HF Pressure vs Latitude
Sunset 31-AUG to 10-OCT-1993
Residual circulation streamfunction (logarithmic scale); climatology for January and July (MERRA data).
Fig. 5 Annual mean upward mass flux in the tropical lower stratosphere for each model at the levels indicated in Fig. 1. A time sequence is shown for the transient experiments (top panel) and the multi-annual mean for the equilibrium runs (lower two panels).