

A MIDDLE ATMOSPHERE BACKGROUND WIND AND TEMPERATURE CLIMATOLOGY FROM A SIMPLE CIRCULATION MODEL

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Summary

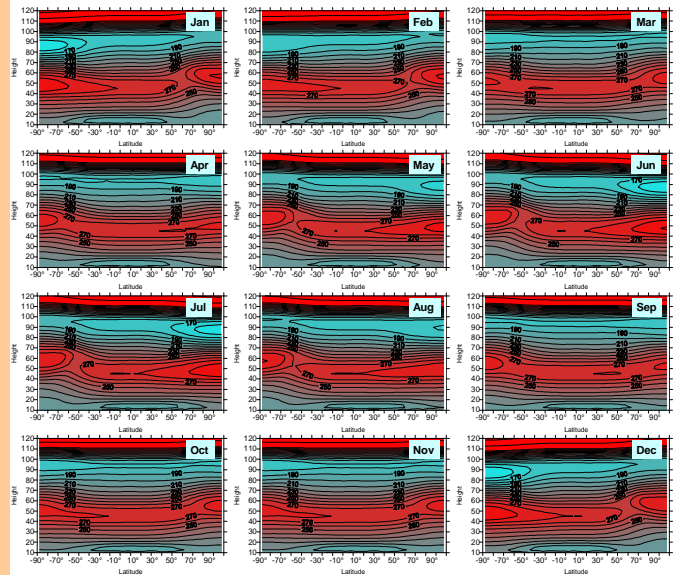
An updated mechanistic circulation model is used to calculate monthly tables of winds and temperatures in the middle atmosphere, including mean values, tides, and stationary planetary waves. The model includes realistic background ozone and water vapour climatologies and a long-term mean stationary planetary wave forcing from UKMO analyses. The results are compared with existing empirical climatologies. The model climatology may be used as reference values for measurements, or to complete empirical climatologies especially for the height regions not well covered with measurements.

Model description

COMMA-LIM is a primitive equation model from 0 - 135 km in logarithmic pressure coordinates in 48 layers with a horizontal resolution of 5° in latitude and 5.626° in longitude. The model contains an improved Lindzen-scheme based gravity wave drag parameterisation, which allows the formation of multiple breaking levels. Detailed radiation routines are included. Updated climatologies for ozone and water vapour distribution are prescribed. Stationary planetary waves with zonal wavenumber 1 and 2 can be included as lower boundary conditions using a mean climatology from an 11-year UKMO reanalyses climatology. Additional waves can be forced at the lower boundary. More details of the model are available from a separate poster (P0028 in session C2.1) or on the Internet at http://www.uni-leipzig.de/~jacobi/medec/2003_COMMA_LIM.pdf.

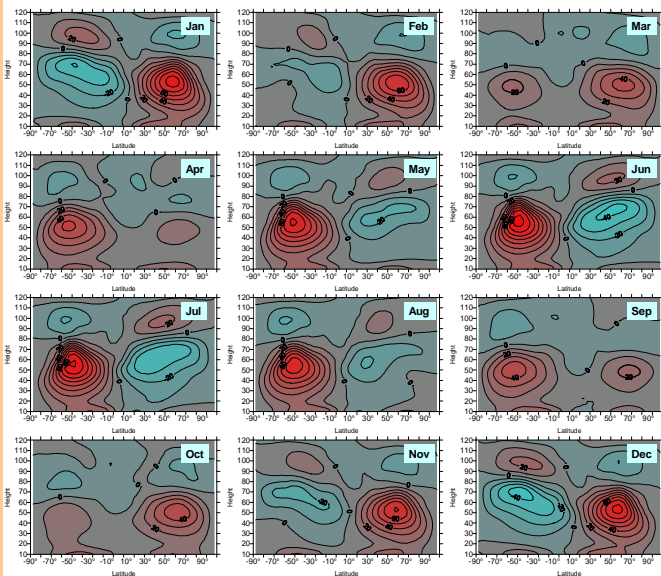
We present here standard runs for each month of the year, without additional forcing of planetary waves. The data are available from the project website on <http://www.uni-leipzig.de/~jacobi/intas03>.

Results – Temperatures



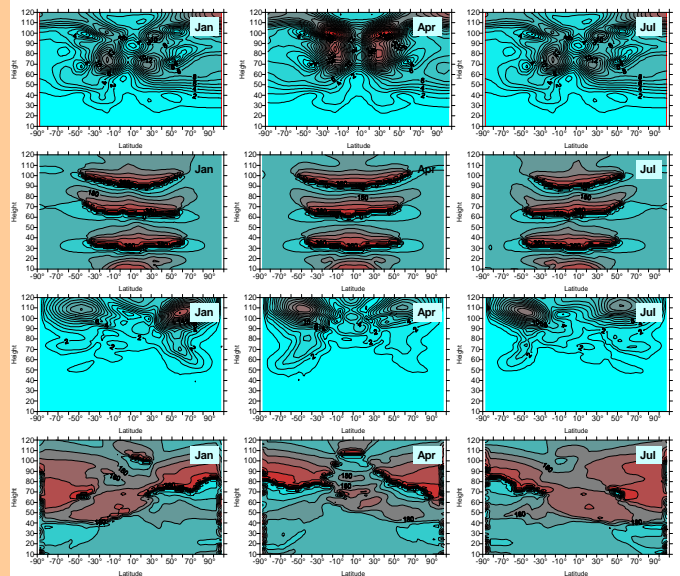
COMMA-LIM model zonal mean temperatures during each month of the year. No additional planetary waves except a mean stationary wave 1 are included, so that particular winter temperatures do not reflect the effect of wave-mean flow interaction during stratospheric warmings.

Results – zonal prevailing winds



COMMA-LIM model zonal mean zonal prevailing winds during each month of the year.

Results - Tides



Diurnal tidal amplitudes (upper row) and phases (second row), semidiurnal tidal amplitudes (3rd row) and phases (lowermost row) of the zonal wind.

Conclusions

With COMMA-LIM a background climatology of some key parameters describing atmospheric dynamics in the height region 10-120 km have been presented. Although the model physics is relatively simple, realistic distributions of winds and temperatures are obtained from the model.

Background climatologies of winds and temperatures sometimes suffer from less dense data coverage in some regions as is, e.g., in the mesosphere or lower thermosphere. Using the numerical model results there may fill these gaps and complete the empirical models.

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