

LIMS VERSION 6 FOURIER COEFFICIENT DATA ON DVD

DATA

- o LIMS Version 6 Fourier coefficients, generated using a sequential estimation algorithm (See Remsberg et al., 1990.), written to formatted files as a function of latitude and pressure, per day per species per node.
- o Files stored in day directories - 17 files per day (1 file per species per node).
- o 216 days: October 25, 1978 - May 28, 1979 (directories day298 - day365 & day001 - day148).
- o 6 species and associated units: temperature (K), ozone (ppmv), nitrogen dioxide (ppbv), water vapor (ppmv), nitric acid (ppbv), geopotential height (km).
- o 3 nodes: ascending, descending, combined.
Note: There are no combined node data/files for NO2.
- o 75 latitudes: southern hemisphere to northern hemisphere, -64 to 84 every 2 degrees.
- o 28 pressure levels: top to bottom of atmosphere, 0.0100 to 316.2280 mb -
6 levels per decade of pressure, equally spaced in log pressure.
- o bad/fill value: 0.0.
Note: Not all species have data at all pressures and latitudes and fill value = 0.0.

FORMAT

- o Data information character records separate coefficient records by pressure level.
Total length of the data information record is 75 characters and includes:
species/units (21 characters), pressure level (13 characters), date (13 characters),
node (12 characters), and number of coefficients (16 characters).
- o Coefficient records [e.g., format(1x,i3,1x,15(f9.3))] follow a data information record and include for the combined nodes:
latitude, zonal mean, cosine wave 1, ..., cosine wave 6,
sine wave 6,
rms difference, uncertainty in coefficients;
and for ascending and descending nodes:
latitude, zonal mean, cosine wave 1, ..., cosine wave 4,
sine wave 4,
rms difference, uncertainty in coefficients.
Note: The spectral coefficients for each day and latitude were used to calculate

the rms difference for each day and latitude. This difference was calculated from the difference between the observed LIMS data and the estimate obtained using the spectral coefficients at the same longitude for that day and latitude. If there were not enough data to calculate a rms difference, the value was set to -1.

- o To read all the data in a file, loop over 28 pressure levels to read 1 data information record then 75 coefficient records (1 record per latitude).

PLOTS

- o Color polar stereographic contour maps are included in a postscript file, named jan1_10mb.ps, to facilitate data verification. This file contains 8 plots on January 1, 1979 at 10 mb for:

temperature	combined node	northern hemisphere,
ozone	combined node	northern hemisphere,
ozone	combined node	southern hemisphere,
geopotential height	combined node	northern hemisphere,
water vapor	combined node	southern hemisphere,
nitric acid	combined node	northern hemisphere,
nitrogen dioxide	ascending node	southern hemisphere,
nitrogen dioxide	descending node	southern hemisphere.
- o The plots were created using grid point values calculated from the Fourier coefficients using a latitude spacing of 2 degrees (-64 to 0 degrees for southern hemisphere and 84 to 0 degrees for northern hemisphere) and a longitude spacing of 5.625 degrees (0 to 360 degrees east).

NOMENCLATURE

asc - ascending node
comb - combined node
desc - descending node
gpht - geopotential height
hno3 - nitric acid
h2o - water vapor
no2 - nitrogen dioxide
o3 - ozone
temp - temperature

REFERENCES

- o Remsberg, E.E., K.V. Haggard, and J.M. Russell III, Estimation of synoptic fields of middle atmosphere parameters from Nimbus-7 LIMS profile data, J. Atmos. Ocean. Tech., 7, 689-705, 1990.
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- o Remsberg, E., G. Lingenfelser, M. Natarajan, L. Gordley, B.T. Marshall, and E. Thompson, On the quality of the Nimbus 7 LIMS version 6 ozone for studies of the middle atmosphere, J. Quant. Spectrosc. Rad. Trans., 105, 492-518, doi:10.1016/j.jqsrt.2006.12.005, 2007.
- o Remsberg, E.E., M. Natarajan, G.S. Lingenfelser, R.E. Thompson, B.T. Marshall, and L.L. Gordley, On the quality of the Nimbus 7 LIMS Version 6 water vapor profiles and distributions, Atmos. Chem. Phys. Discuss., www.atmos-chem-phys-discuss.net/9/17903/2009/acpd-9-17903-2009.pdf

Note: A paper is currently being prepared for submission to the Journal of Atmospheric Chemistry and Physics by Ellis Remsberg that documents the improvements and initial scientific implications for the LIMS version 6 nitric acid and nitrogen dioxide.

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