File Revision Date:
August 26, 2025

This file to be modified as re-analysis or new analysis results are available

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NDACC METAFILE FOR JPL WATER VAPOR RAMAN LIDAR AT Table Mountain, Calif. (TMF)

- Applies to instrument and data history from 01-Jan-2003 to 11-Oct-2019
- PLEASE READ IMPORTANT 2019 UPDATE AT THE BOTTOM OF THIS FILE
- The above period covers analyzed and (re-)analyzed data sets available at this time
- Applies to TMF water vapor data processed with LidAna version v7.10 or later, and GLASS v1.0 or later
- Does NOT apply to TMF data processed with older program versions
- Does NOT apply to TMF stratospheric or tropospheric ozone data (see other meta data files for that)
- Applies to all HDF files cataloged on NDACC database with the following names: groundbased_lidar.h2o_nasa.jpl004_table.mountain.ca*.hdf
- Refer to "Reported Events" section for detailed report of unexpected problems
- This file to be modified as re-analysis or new analysis results are available
- ********** ATTENTION !! **********
  This is the first-ever NDACC archive of these profiles.
  Use with extreme caution for trends.
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- ***** See metafile "TMF_tropo3_ldr_jpl_2019.txt" for tropospheric ozone system and data *****
- ***** See metafile "TMF_aot_ldr_jpl_2019.txt" for stratospheric ozone system and data *****

Data Set Description:

PI:	T. Leblanc
Instrument:	Lidar
Site(s):	Table Mountain Observatory, CA, USA
Measurement Quantities:	Ozone
	Temperature
	(Aerosol)

Contact Information:

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Reference Articles:

Please refer to the file named "jpl_publications_2000.txt" for publications list prior to 2000.
Note: A 2019-updated list of publications will be posted here soon

Instrument Description:

- Water vapor Raman lidar, 3 pairs of Ramanchannels at 387/408 nm and later 3 additional Rayleigh and Raman channels for temperature and aerosol
- Water vapor profiles between 3-20 km
- Please refer to the publications list for more details

Description of Algorithms:

I - GLASS 1.xx (2009 - present)

Temperature/ozone/aerosol/water vapor lidar data analysis program GLASS v1.xx, by Thierry Leblanc (TL) first released in early 2017. This program overrides all previous analysis programs (LidAna, SO3ANL, see section I above)
New GLASS data processor does not require manual processing. Analysis is automated, using 100+ keywords tailored for a specific type of science application.
The results are quality-checked visually, manually, after analysis is completed.
This new automation capability allows for the re-analysis of a large number of measurements without user intervention.
- Data set from 2009 to present analyzed with versions 1.1x released in 2019.

An analysis overview is described below. Please refer to T. Leblanc for details.

a) Raw signals are corrected for saturation, background noise, solid angle, Rayleigh extinction, NO2 and SO2 absorption if applicable.
b) Water vapor profile calculation uses Raman technique. Ratio of 407.5 nm channel signals to 387 nm channel signals. Calibration performed 5 times per month by radiosoundings, Miloshevich-corrected RS92 until May 2014, and then RS41 since May 2014. Hybrid Lamp calibration technique ensures receiver calibration stability between radiosonde cal runs.
   Signal is smoothed to reduce statistical noise by applying a smoothing filter, degrading vertical resolution with altitude.
f) All results output in HDF-5 (native format), and HDF-4 (GEOMS template) following NDACC requirements
g) In the HDF files, the measured quantities are provided together with Relative Humidity. This product is obtained using ancillary density-pressure profiles coming from NCEP or radio-sounding.

Expected Precision/Accuracy of Instrument:

a) Water vapor overall precision is calculated and propagated throughout analysis and provided at 1-sigma in HDF files. The errors include the statistical error associated to photon counting, and systematic errors due to various corrections and to the calibration. The overall precision runs from 1% in the lower troposphere, to 20% at the top of the profiles (above 14 km). Calibration error is estimated to be 5-7%. Occasional contamination by fluorescence occur above 14 km.
b) Unexpected - but identified - errors are reported in this metafile in the "Reported Events" section.

HDF File description:

This section provides details on the HDF files content:

- Self-explanatory
- All units are MKSA except pressure (in hPa), and mixing ratio (in ppmv).

Instrument History:

- 2003	-	Start of program
- Oct 2006	-	MOHAVE-1 campaign
- Jul 2007	-	First system re-design to reduce fluorescence above 10 km
- Oct 2007	-	MOHAVE-2 campaign
- Jul 2009	-	Second system re-design to further remove fluorescence (fiber-free receiver)
- Oct 2009	-	MOHAVE-2009 campaign System design unchanged since then
- Sep 2012	-	Lightning strike causing massive failure of Licel system
- Mar 2013	-	Licel fixed, measurements resumed
- Oct 2018	-	New data acquisition program allowing remote automated operations
- Aug 2021	-	Filter wheel installed to separate actual Raman water vapor returns from fluorescence returns
- Feb 2025	-	Laser head failure. Two months data gap (March-April).

********** CURRENT END OF LOG OF EVENTS, PENDING UPDATES **********