

Table of Contents:

1. [Data Set Description](#)
2. [Sample Data Record/Data Format](#)
3. [References](#)
4. [Contact Information](#)
5. [Acknowledgement](#)

1. Data Set Description:

Measurements at the **Sumas Eagle Ridge (SER) site**. The SER site was located at 49.05166 N and -122.24666 W, at 300 m a.s.l. and approximately 250 m above the surrounding valley floor. The site was in a forest clearing of about 85 - 95m² on top of a concrete-covered reservoir, and surrounded by a mixture of coniferous and deciduous trees. The shortest distance from the site to residential area was about 1 km, and was about 3 km to the edge of city of Abbotsford and the nearby major traffic route of Highway 1 in the valley floor. About 3 km to the south of the site, where the elevation drops to about 50 m a.s.l. in the valley floor, NH₃ emissions are strong from agricultural sources, and their impact of particle formation and hence the visibility reduction is expected to be significant. Because the site was elevated, the boundary layer did not reach the site each day until midmorning, as indicated by NO and CO (Hayden et al., 2004). Hence, it was a unique site to study changes in gas and particle chemistry from light to dark hours, the nighttime chemistry and the interaction between biogenic emissions and urban pollution. The site was chosen also to characterize particles for optical, chemical and physical properties since PM in this area of the valley appears to be optically different from those typically observed over the urban areas in Vancouver. The main objectives were (1) to obtain mass and optical closure in order to better attribute aerosol types and sources to the issues of PM and visibility, and (2) to determine the contribution of non-volatile organic compounds, biogenic VOCs, and NH₃ to particle mass. Measurements at this site were from August 12th to 31st.

Table 1 lists the measurements made at this location and being archived. Overall measurements included gas phase measurements included oxidant related species: O₃, NO_x, total and speciated NO_y (Hayden et al., 2004), H₂O₂, CO, SO₂, VOCs, including terpenes and some of their oxidation products, carbonyls, and NH₃ (Pryor et al., 2004). Nighttime NO₃ was measured at a site near this main site by differential optical absorption spectroscopy (McLaren et al., 2003). Particle chemical characterization measurements include size-distributed mass, inorganic composition (Anlauf et al., 2002), and organic carbon and elemental carbon (using quartz filters and thermal optical transmittance measurements; Brook et al., 2004) from 0:05 to 18 mm AD. High-time resolution measurements using an AMS were carried out for the last 5 days during this period, covering the size distribution of inorganic and organic species from 0.06 to 0.7 mm AD (Boudries et al., 2004; Alfara et al., 2004). Carbon isotope and detailed speciation of organic carbon in particles 2:5 mm were done on high volume samples on quartz filters that were collected twice daily (Huang et al., 2002; Cheng et al., 2004; McCarry et al., 2002). Continuous mass measurements for particles 10 mm were made using a TEOM that operated at 50C. Particle physical measurements were made to characterize the particle evolution at this site. This includes concentration of particles 40:015 mm, number size distribution measurements from 0.003 to 0:20 mm using ultrafine DMAs (Chan and Mozurkewich, 2002). Standard meteorological measurements were carried out at this site during the measurement period.

Table 1. Measurements made at the Eagle Ridge site on Sumas Mountain and being archived.
Time resolutions of the measurements are also listed.

Measurement		Instrument	Time Resolution	Frequency	PI
Physical Size Distribution	Total number >15 nm	7610	5-min	Continuous	Mozurkewich - York
	0.12 μm to 3 μm	PCASP	5-min	Continuous	Leitch - MSC
Physical characterization	Hygroscopicity and volatility	TDMA (7610 and 3010)	5-min	Continuous	Mozurkewich - York
	Mass (<2.5 μm)	Regular FP - microbalance	4-hrs	5/day	Brook - MSC
	Mass (<2.5 μm)	FP - microbalance	24-hrs	One/day	Brook - MSC
Optical Measurements	Light absorption and BC	PSAP	30-min	Continuous	Sharma - MSC
	Solar radiation	Eppley 5-min	5-min	Continuous	Leitch - MSC



Measurement	Instrument	Time Resolution	Frequency	PI	
Trace Gases	VOCs	Canisters	integrated	To be decided	Rudolph - York
	CO, CO2, CH4	Canisters	Grab sampling	Grab, 1-hour	Rudolph - York
	NO, NO2, CO	Eco Physics	5-min	Continuous	Anlauf - MSC
	O3	TECO 49	5-min	Continuous	GVRD
	SO2	TECO 43S	5-min	Continuous	Leitch - MSC
	ROOH, H2O2	Coil-enzyme-fluorescence	5-min	Continuous	Anlauf - MSC
	Nitrate Radical	Research Instrument	Approx. 30-min	Continuous	McLaren - York
	NO, NO2, CO, O3, SO2	Various	1-min	Continuous	GVRD (submitted by McLaren - York)
	NH3	Coil-fluorescence	5-min	Continuous	Pryor - U. Indiana
	HCHO, GA ...	Automated HPLC	15-min	Continuous	McLaren - York
	PAN/PPN	GC-ECD	5-min	Continuous	Bottenheim - MSC
	PAN/PPN	GC-PDD	5-min	Continuous	Bottenheim - MSC
Chemical Characterization of Particles	Inorganic ions, HNO2, HNO3, NH3, SO2	Teflon filters downstream of NaCl, NaCO3 and CA denuders	4-hour	5/day	Wiebe - MSC
	Size distributed speciation	Aerosol mass spectrometer	10 seconds	Continuous	Worsnop - Aerodyne
	Size-segregated Inorganic Composition	MOUDI - Teflon	10 hour	2/day	Anlauf - MSC
	Trace organics species - carbonyls/ organic acids (<2.5 µm)	Hi-vol - GC-MS/FID	8-hour	2/day	McLaren - York
	Aromatics, PAHs	Hivol FP - solvent extraction - GCMS/FID	8-hour	2/day	Rudolph - York
	Ketones, oxi products	Hivol FP - solvent extraction - GCMS/FID	8-hour	2/day	Li - MSC
Met Measurements	Winds, T	Std met package	1-min	Continuous	Leitch - MSC

The **Pacific 2001 Air Quality Study (PAC2001)** was conducted from 1 August to 31 September, 2001 in the Lower Fraser Valley (LFV), British Columbia, Canada. The study consisted of individual research projects organized to address several issues on ambient particulate matter and ozone that are important to policy makers. A special issue of Atmospheric Environment [Vol. 38(34), Nov 2004] describes specific study objectives (Li, 2004) and presents a series of results papers from the field study. The ground sampling sites during the study were (1) Cassiar Tunnel, (2) Slokan Park, (3) Langley Ecole Lochiel, (4) Sumas Eagle Ridge, and (5) Golden Ears Provincial Park and aloft measurements were taken from a Convair 580 and a Cessna 188. Selected measurement data have been compiled for each site and aircraft and are archived as site-specific data sets.

The data set should be cited as follows:

Li, Shao-meng. 2004. NARSTO PAC2001 Sumas Eagle Ridge Gaseous, Particle, and Meteorological Data. Available on-line via [NARSTO Data and Informaton](#) at the Atmospheric Science Data Center at NASA Langley Research Center, Hampton, Virginia, U.S.A.

2. Sample Data Record/Data Format:

Data files are in the NARSTO Data Exchange Standard (DES) format that is described in detail on the [NARSTO Quality Systems Science Center \(QSSC\) web site](#). The files follow a tabular layout and are stored as ASCII comma-separated values files (.csv). The DES does not rely on row position to identify specific information, but uses a tag to describe the information contained in the row. The DES is a self-documenting format with three main sections: the header contains information about the contents of the file and the data originator; the middle section contains metadata tables that describe/define sites, flags, and other codified fields; and the final section is the main data table that contains key sampling and analysis information and the data values. Descriptions of the standardized metadata fields are also available on the QSSC web site.

Archived Sumas Eagle Ridge (SER) Site Data Files

Data File Names	Link to Time Series Plots of Reported Variables (PDF)
NARSTO_PAC2001_SMMT_HAB_GAS_PART_DENUD+FILTER_20010816D16_V1.csv	View HAB_GAS_PART_DENUD+FILTER_20010816D16
NARSTO_PAC2001_SMMT_J-R_AROM-ACIDS-CASCADE_20010825D6_V1.csv	View J-R_AROM-ACIDS-CASCADE_20010825D6
NARSTO_PAC2001_SMMT_J-R_AROM-ACIDS_HIVOL_20010815D17_V1.csv	View J-R_AROM-ACIDS_HIVOL_20010815D17
NARSTO_PAC2001_SMMT_JRB_PM25_ADS_20010813D20_V1.csv	View JRB_PM25_ADS_20010813D20
NARSTO_PAC2001_SMMT_JRB_PM25-OC+EC_FP-CYCLONE_20010817D15_V2.csv	View JRB_PM25-OC+EC_FP-CYCLONE_20010817D15
NARSTO_PAC2001_SMMT_J-R_CO-CO2-CH4_CANISTER_20010816D16_V1.csv	View J-R_CO-CO2-CH4_CANISTER_20010816D16
NARSTO_PAC2001_SMMT_J-R_PAH_HIVOL_20010815D17_V1.csv	View J-R_PAH_HIVOL_20010815D17
NARSTO_PAC2001_SMMT_J-R_PAH_HIVOL-CASCADE_20010825D5_V1.csv	View J-R_PAH_HIVOL-CASCADE_20010825D5
NARSTO_PAC2001_SMMT_J-R_VOC_CANISTER_20010816D16_V1.csv	View J-R_VOC_CANISTER_20010816D16
NARSTO_PAC2001_SMMT_JWB_PAN_GC-ECD_20010814D18_V1.csv	View JWB_PAN_GC-ECD_20010814D18
NARSTO_PAC2001_SMMT_JWB_PAN_GC-PDD_20010814D18_V1.csv	View JWB_PAN_GC-PDD_20010814D18
NARSTO_PAC2001_SMMT_KGA_GAS_PHASE_20010818D15_V1.csv	View KGA_GAS_PHASE_20010818D15
NARSTO_PAC2001_SMMT_KGA_PART-IONS_MOUDI_20010825D05_V1.csv	View KGA_PART-IONS_MOUDI_20010825D05
NARSTO_PAC2001_SMMT_M-M_HYGRO_20010814D18_V1.csv	View M-M_HYGRO_20010814D18
NARSTO_PAC2001_SMMT_M-M_NUMDIST_DMA_20010818D19_V1.csv	View R-M_GAS-CARBONYLS_HPLC_20010818D14
NARSTO_PAC2001_SMMT_R-M_GAS-CARBONYLS_HPLC_20010818D14_V1.csv	View R-M_GAS-CARBONYLS_HPLC_20010818D14
NARSTO_PAC2001_SMMT_R-M_GAS-MEAS_1-MIN_20010814D23_V1.csv	View R-M_GAS-MEAS_1-MIN_20010814D23
NARSTO_PAC2001_SMMT_R-M_MET-DATA_1-MIN_20010814D23_V1.csv	View R-M_MET-DATA_1-MIN_20010814D23
NARSTO_PAC2001_SMMT_R-M_NITRATE-RADICAL_DOAS_20010816D14_V1.csv	View R-M_NITRATE-RADICAL_DOAS_20010816D14
NARSTO_PAC2001_SMMT_R-M_PART-ORG_HIVOL_20010815D17_V1.csv	View R-M_PART-ORG_HIVOL_20010815D17
NARSTO_PAC2001_SMMT_SCP_GAS-NH3_20010814D18_V1.csv	View SCP_GAS-NH3_20010814D18
NARSTO_PAC2001_SMMT_S-L_PART-FATTY-ACIDS_20010815D17_V1.csv	View S-L_PART-FATTY-ACIDS_20010815D17
NARSTO_PAC2001_SMMT_S-L_PART-KETONES_20010815D17_V1.csv	View S-L_PART-KETONES_20010815D17
NARSTO_PAC2001_SMMT_S-L_PART-NALKANES_20010815D17_V1.csv	View S-L_PART-NALKANES_20010815D17
NARSTO_PAC2001_SMMT_S-L_PART-OHSSTEROLS_20010815D16_V1.csv	View S-L_PART-OHSSTEROLS_20010815D16
NARSTO_PAC2001_SMMT_S-S_BC_PSAP_20010817_D14_V1.csv	View S-S_BC_PSAP_20010817
NARSTO_PAC2001_SMMT_WOR_NITRATE-SIZE-DIST_AMS_20010826D6_V1.csv	View WOR_NITRATE-SIZE-DIST_AMS_20010826D6
NARSTO_PAC2001_SMMT_WOR_ORGANIC-SIZE-DIST_AMS_20010826D6_V1.csv	View WOR_ORGANIC-SIZE-DIST_AMS_20010826D6
NARSTO_PAC2001_SMMT_WOR_PM-LOADINGS_AMS_20010826D6_V1.csv	View WOR_PM-LOADINGS_AMS_20010826D6
NARSTO_PAC2001_SMMT_WOR_SULFATE-SIZE-DIST_AMS_20010826D6_V1.csv	View WOR_SULFATE-SIZE-DIST_AMS_20010826D6
NARSTO_PAC2001_SMMT_WRL_PART_PCASP_20010813D20_V1.csv	View WRL_PART_PCASP_20010813D20

NARSTO_PAC2001_SMMT_WRL_SO2_20010818D15_V1.csv	View WRL_SO2_20010818D15
NARSTO_PAC2001_SMMT_WRL_UV-RADIATION_20010818D15_V1.csv	View WRL_UV-RADIATION_20010818D15

Data File Name Syntax

Pacific 2001 data file names are comprised of nine sections, defined as follows:

Model file name: **NARSTO_PAC2001_SLPK_JRB_MET_TOWER_200108D75_V1.csv**

1. Archive project: **NARSTO**
2. Study acronym: **PAC2001**
3. Site ID / Aircraft ID: **4-character abbreviation**

Study site and aircraft abbreviations

Abbreviation	Site Name
BNDB	Boundary Bay
CSRT (CSTN, CSTS)	Cassiar Tunnel
GEPP	Golden Ears Provincial Park
LNEL	Langley Ecole Lochiel
LPHS	Langley Poppy High School
SLPK	Slocan Park
SLPS	Slope Study
SMMT	Sumas Mountain
CSNA	CFS Cessna 188
CNVR	NRC-IAR Convair 580

4. Principal Investigator ID: **Initials (3 characters)**

Principal Investigator's initials and affiliation

Initials	Name	Affiliation
AMM	Anne Marie Macdonald	Environment Canada
ANL	Anna Lise Norman	University of Calgary
C-M	Cris Mihele	Environment Canada
DKW	Danny Wang	Environment Canada
FAF	Frank Froude	Environment Canada
GVRD	Greater Vancouver Regional District	Greater Vancouver Regional District
HAB	H. A. Weibe	Environment Canada
J-R	Jochen Rudolph	York University
JRB	Jeff Brook	Environment Canada
JWB	Jan Bottenheim	Environment Canada
KGA	Kurt Anlauf	Environment Canada
LAG	Lisa Graham	Environment Canada
M-M	Mike Mozurkewich	York University
M-S	Mahiba Shoeib	Environment Canada
PCB	Peter Brickell	Environment Canada
R-M	Robert McLaren	York University
S-L	Shoa-meng Li	Environment Canada
S-P	Sara Pryor	University of Indiana
S-S	Sangeeta Sharma	Environment Canada
WOR	Douglas Worsnop	Aerodyne Research Inc.
WRL	Richard Leitch	Environment Canada

5. Measurement activity: **General measurement type**
6. Instrument name or analysis method: **General analysis method**



7. Sampling date with sampling days or flight number:

◦ **For Ground-based measurements:**

The first date in the data file (YYYYMMDD), followed by the letter "D" and the total number of sampling days.

▪ Examples:

- 20010801D1 (starting August 1, 2001, total of 1 day)
- 20010815D61 (starting August 15, 2001, total of 61 days)

◦ **For Aircraft measurements:**

The first date in the data file (YYYYMMDD), followed by the letter "F" and the flight number for the date.

▪ Examples:

- 20010815F1 (first flight on August 15, 2001)
- 20010815F2 (second flight on August 15, 2001)

8. Archive data file version number: The file version number starts at "**V1**". The version number is incremented if the archive data file is replaced.

9. Suffix: **.csv** (comma separated values)

3. References:

- Alfara, et al., 2004. Characterization of organic aerosols in the Lower Fraser Valley during the Pacific 2001 using two Aerodyne aerosol mass spectrometers. *Atmospheric Environment*, this issue, doi:10.1016/j.atmosenv.01.054.
- Anlauf, K.G., Li, S.-M., Leaitch, W.R., Brook, J., Hayden, K., Wiebe, A., 2002. Chemical and size characteristics of particles in the Lower Fraser Valley: Pacific 2001 Field Study, Presentation at the American Geophysical Union Fall Meeting, December 2002, San Francisco, CA, USA.
- Boudries, H., et al., 2004. Chemical and physical processes controlling the distribution of aerosols in the Lower Fraser Valley, Canada, during the PACIFIC 2001 field campaign. *Atmospheric Environment*, this issue, doi:10.1016/j.atmosenv.2004.01.057.
- Brook, J.R., Strawbridge, K., Snyder, B.J., Boudries, H., Worsnop, D., Anlauf, K., Sharma, S., Hayden, K., 2004. Towards an understanding of the fine particle variations in the LFV: integration of chemical, physical and meteorological observations. *Atmospheric Environment*, this issue, doi:10.1016/j.atmosenv.2004.01.056.
- Chan, T.W., Mozurkewich, M., 2002. Atmospheric aerosol size distribution at Sumas Mountain, Vancouver, BC. Presentation at the American Geophysical Union Fall Meeting, December 2002, San Francisco, CA, USA.
- Cheng, Y., Li, S.-M., Leithead, A., Leaitch, W.R., Brickell, P., 2004. Characterizations of cis-pinonic acid and n-fatty acids on fine aerosols in the Lower Fraser Valley during Pacific 2001 Air Quality Study. *Atmospheric Environment*, this issue, doi:10.1016/j.atmosenv.2004.01.051.
- Hayden, et al., 2004. Gaseous chemical characterization of the Lower Fraser Valley airshed during Pacific 2001. *Atmospheric Environment*, this issue, doi:10.1016/j.atmosenv. 2003.12.048.
- Huang, et al., 2002. Carbon isotope measurements of different carbon species (OC and EC) in aerosols; method development, application to Pacific 2001 campaign samples and its implications. Presentation at the American Geophysical Union Fall Meeting, December 2002, San Francisco, CA, USA.
- Li, Shao-Meng. 2004. A concerted effort to understand the ambient particulate matter in the Lower Fraser Valley: the Pacific 2001 Air Quality Study. *Atmospheric Environment*, Volume, 38(34), pp. 5719-5731. (Pacific 2001 Special Issue)
- McCarty, B.E., Rosati, M., Yang, R., 2002. PAH and nitro- PAH analyses of air particulate material collected during Pacific 2001 study. Presentation at the Symposium on Atmospheric Aerosols and Pacific 2001 Field Study, 85th CSC Conference, Vancouver, Canada, June 1-5, 2002.
- McLaren, et al., 2003. Presentation at the American Geophysical Union Fall Meeting, December 2002, San Francisco, CA, USA.
- Pryor, et al., 2004. Spatial and temporal variability of reduced nitrogen concentrations in the Fraser Valley. *Atmospheric Environment*, this issue, doi:10.1016/j.atmosenv.2003. 12.045.

4. Contact Information:

Investigator(s) Name and Title:

Name: Li, Shao-meng



Distributed by the Atmospheric Science Data Center
<http://eosweb.larc.nasa.gov>



E-mail: shao-meng.li@ec.gc.ca

Data Center:

The User and Data Services Office at the Langley Atmospheric Science Data Center is involved throughout the system to monitor the quality of data on ingest, to ensure prompt replies to user questions, to verify media orders prior to filling them, and to ensure that the needs of the users are being met.

If you have a problem finding what you need, trouble accessing the system, or need an answer to a question concerning the data or how to obtain data, please contact the Users and Data Services staff.

Telephone: (757) 864-8656

FAX: (757) 864-8807

E-mail: support-asdc@earthdata.nasa.gov

URL: <http://eosweb.larc.nasa.gov>

5. Acknowledgement:

When data from the Langley Atmospheric Science Data Center are used in a publication, we request the following acknowledgment be included: "These data were obtained from the NASA Langley Research Center Atmospheric Science Data Center".

The Langley Data Center requests a reprint of any published papers or reports or a brief description of other uses (e.g., posters, oral presentations, etc.) of data that we have distributed. This will help us determine the use of data that we distribute, which is helpful in optimizing product development. It also helps us to keep our product-related references current.

Please contact us at support-asdc@earthdata.nasa.gov for instructions on mailing reprints.

Document Information:

Document Creation Date: March 31, 2005

Review Date:

Last Date Modified:

Document ID: TBD

Author: Langley Data Center User and Data Services Office

Langley DAAC Help Desk: Phone (757) 864-8656; E-mail support-asdc@earthdata.nasa.gov

