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1. Data Set Description:

The **Golden Ears Provincial Park (GEP) site** was situated at 49.27783 N and -120.51544 W and at 220 m a.s.l., about 45 km east of Vancouver in the Coastal Mountains. The sampling site, located at the park ranger headquarters compound, was in a small forest clearing of about 65 x 130 m and was surrounded by tall coniferous trees (dominated by Western Hemlock, Western Red Cedar, and Douglas Fir, typically seen in the Coastal Mountains) with canopy heights about 10-15 m near the site but rising to over 30 m in the park in general. The temporary labs were about 10 m away from the closest trees. The closest urban area, Maple Ridge, is about 8 km to the south. The measurements were during August 6 to 11, 2001.

Different from the other sites, the Golden Ears Provincial Park site was dedicated to the question of secondary biogenic particles production from forestry precursors. The 1995 emission inventories for the LFV indicate strong monoterpene emissions from forests in the Coastal Mountains and the Cascade Ranges. A previous study here showed significant ambient concentrations of terpenes (Boudries and Bottenheim, 2001). Monoterpenes are converted into particles in the gas phase with high yields (Hoffmann et al., 1998). While the forests were known to release monoterpenes, the magnitude of the contribution to fine particles in the LFV was not clear. Measurements at the GEP site were designed to provide information on secondary biogenic particle production from forestry precursors, such as monoterpenes.

Table 1 shows the selected measurements at this site that are being archived. Overall measurements included, gas phase measurements that emphasized the biogenic VOCs, particularly monoterpenes such as α - and β -pinenes, along with SO₂, O₃, and some aromatic hydrocarbons (Shantz et al., 2004). OVOCs, including light molecular weight alcohols and carbonyls, were also measured. Particle chemical characterization included organic carbon speciation, such as terpene oxidation products (Cheng et al., 2004), inorganic composition, water soluble organic carbon, carbon isotope (Huang et al., 2002), and total organic/elemental carbon in bulk aerosol particles (2.5 μ m), on samples collected twice daily. Physical characterization of particles included total particle counts using a CPC, number size distribution from 5-3000 nm, cloud condensation nuclei, and hygroscopic properties (Prenni et al., 2002).

Table 1. Selected measurements at the Golden Ears Provincial Park site during the Pacific 2001 field study that are being archived. Time resolutions of the measurements are also listed.

Measurement	Instrument	Time Resolution	Frequency	PI	
Particle Conc. and Size	Total number >10 nm	3022	5-min	Continuous	Leitch - MSC
	3 nm to 200 nm	DMA (3025)	5-min	Continuous	Leitch - MSC
	0.12 μm to 3 μm	PCASP	5-min	Continuous	Leitch - MSC
Physical Characterization of Particles	Hygroscopicity and volatility	TDMA (7610 and 3010)	5-min	Continuous	Mozurkewich - York U.
	Hygroscopicity	TDMA (TSI 3071A DMA)	10-min	Continuous	Leitch - MSC
Trace Gases	VOCs	On-site GC/MS/FID	2-hr	Continuous	Brickell - MSC
	O₃	TECO 49	1-min	Continuous	GVRD
	SO₂	TECO 43S	1-min	Continuous	Leitch - MSC
Chemical Characterization of Particles	Inorganic ions	Lowvol Teflon filters	4-hrs	5/day	Leitch - MSC
	TOC, BC, WSI/OC	Lowvol Quartz filters	4-hrs	5/day	Leitch - MSC
	Ketones, oxi-products	Hivol FP - solvent extraction - GCMS/FID	10-hrs	2/day	Li - 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 Golden Ears Provincial Park Gaseous and Particle Data. Available on-line via [NARSTO Data and Information](#) 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 Golden Ears Provincial Park (GEPP) Site Data Files

Data File Names	Link to Time Series Plots of Reported Variables (PDF)
NARSTO_PAC2001_GEPP_M-M_HYGRO_20010807D5_V1.csv	View M-M_HYGRO_20010807D5
NARSTO_PAC2001_GEPP_PCB_OVOC_GC-FID_20010803D09_V1.csv	View PCB_OVOC_GC-FID_20010803D09
NARSTO_PAC2001_GEPP_S-L_PART-FATTY-ACIDS_20010806D05_V1.csv	View S-L_PART-FATTY-ACIDS_20010806D05
NARSTO_PAC2001_GEPP_S-L_PART-OHSSTEROLS_20010806D05_V1.csv	View S-L_PART-OHSSTEROLS_20010806D05
NARSTO_PAC2001_GEPP_WRL_GAS_INORG_IONS_20010806D06_V1.csv	View WRL_GAS_INORG_IONS_20010806D06
NARSTO_PAC2001_GEPP_WRL_GAS_SO2+O3_20010808D04_V1.csv	View WRL_GAS_SO2+O3_20010808D04
NARSTO_PAC2001_GEPP_WRL_HYGGRO_HTDMA_20010807D5_V1.csv	View WRL_HYGGRO_HTDMA_20010807D5
NARSTO_PAC2001_GEPP_WRL_PART_CPC_20010807D05_V1.csv	View WRL_PART_CPC_20010807D05
NARSTO_PAC2001_GEPP_WRL_PART_DMA_20010808D04_V1.csv	View WRL_PART_DMA_20010808D04
NARSTO_PAC2001_GEPP_WRL_PART_OC+EC+WSOC_20010806D06_V1.csv	View WRL_PART_OC+EC+WSOC_20010806D06
NARSTO_PAC2001_GEPP_WRL_PART_PCASP_20010806D06_V1.csv	View WRL_PART_PCASP_20010806D06

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
BNDDB	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 Leaitch	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:

- Boudries, H., Bottenheim, J.W., 2001. A scooping study of biogenic and oxygenated volatile organic compounds in the Lower Fraser Valley, B.C., during August-September 2000. Report ACSD-01-001, Environment Canada, 2001.
- 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.
- Hoffmann, T., Bandur, R., Marggraf, U., Linscheid, M., 1998. Molecular composition of organic aerosols formed in the α -pinene/O₃ reaction: implications for new particle formation processes. Journal of Geophysical Research 103, 25,569-25,578.
- 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.
- Prenni, A.J., Kreidenweis, S.M., DeMott, P.J., 2002. Hygroscopic growth measurements during PACIFIC 2001. Presentation at the Symposium on Atmospheric Aerosols and Pacific 2001 Field Study, 85th CSC Conference, Vancouver, Canada, June 1-5, 2002.
- Shantz, N.C., et al., 2004. Chemical and physical observations of particulate matter at Golden Ears Provincial Park. Atmospheric Environment, this issue, doi:10.1016/j.atmosenv.2004.01.050.

4. Contact Information:

Investigator(s) Name and Title:

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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.

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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.

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