

Special Studies of Atmospheric Gases, Particles and Precipitation Chemistry

Pacific 2001 Air Quality Study - Metadata and Description

The **Pacific 2001 Air Quality Study (PAC2001)** was conducted from 10 August to 20 September 2001 in the Lower Fraser Valley (LFV), British Columbia, Canada. Data from measurements of ozone, particulate matter, reactive trace gases and meteorology are available.



1. Description

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 a number of research projects organized to address several issues related to ambient particulate matter and ozone. A [special issue](#) of Atmospheric Environment [Vol. 38(34), Nov 2004] describes the study objectives (Li, 2004) and the study results.

2. Site Information

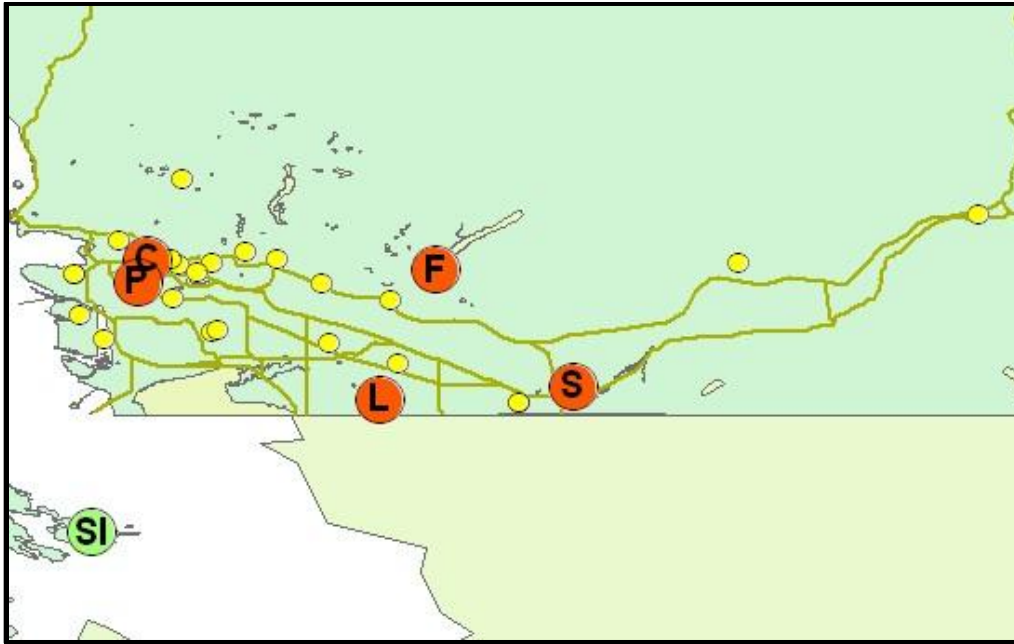
Chemical and physical measurements were made at five locations in the Lower Fraser Valley area. The measurement data from the five locations are supplemented by data from the Greater Vancouver Regional District (GVRD) monitoring sites and from the existing Saturna Island site of the Canadian Air and Precipitation Monitoring Network (CAPMoN). The measurement sites are described and shown in the figure below:

- The Cassier Tunnel site (marked C on the figure). Measurements from this site represent the emissions from the light-duty transportation sector;
- The Slocan Park site (B). This site represents an urban/suburban setting in the Vancouver urban center where a mixture of primary particles and secondary particulate matter occurs.;
- Langley Ecole Lochiel site (L). This site represents an area where the transition from an urban to rural setting takes place and where the formation of particulate matter from agricultural practices in the valley is expected.;
- The Eagle Ridge site (S) on the Sumas Mountain. This site is located on the eastern part of the valley and was located to address the impact of agricultural ammonia emissions, the visibility reduction issue, and the interaction between urban pollution and biogenic emissions.
- The Golden Ears Park site (F). This site addresses the formation of biogenic particulate matter from precursors such as monoterpenes.
- The air monitoring sites of the Greater Vancouver Regional District (GVRD) are labelled as Tn.

- The Saturna Island monitoring site of the Canadian Air and Precipitation Monitoring Network (CAPMoN) is labelled as SI.

The vertical distribution of certain parameters, such as ozone and meteorological variables, in the lower part of the atmosphere were measured by tethered balloons located at both the Slovan Park and the Langley Ecole Lochiel sites. The data were supplemented by measurements made by a scanning LIDAR that was based at the Langley site (LIDAR data not provided). To address the spatial and temporal variability of parameters related to PM, airborne measurements were carried out by a Convair 580 and a smaller Cessna 188 aircraft. The airborne platforms were used to map the spatial PM distributions in the valley in both the horizontal and vertical directions.

Pacific 2001 station location map



3. Datasets

Pacific 2001 Air Quality Study Datasets (Spatial Coverage: Lower Fraser Valley, British Columbia, Canada)

GOLDEN_EARS_GAS_PM_DATA

- **Parameter:** Pressure, Temperature, Humidity, Aerosol Particle Properties, Wind, Ozone, Nitrogen Oxides, Sulfur Dioxide, Volatile Organic Compounds, Carbonaceous Aerosols, Nitrate Particles
- **Temporal Coverage:** 08/03/2001 - 08/11/2001
- **Source/Platform:** Meteorological Station, Ground Station
- **Sensor:** Pressure Sensor, Temperature Probe, Humidity Sensor, Wind Sensor, UV Ozone Detector, Chemiluminescence, DMA, GC-MS, Ion Chromatograph, Aethelometer, Fluorescence Spectroscopy

CASSIAR_TUNNEL_GAS_PM

- **Parameter:** Aerosol Particle Properties, Nitrogen Oxides, Carbonaceous Aerosols, Particulate Matter, Volatile Organic Compounds
- **Temporal Coverage:** 08/08/2001 - 08/15/2001
- **Source/Platform:** Field Investigation, Laboratory
- **Sensor:** Chemiluminescence, DMA, GC, Ion Chromatograph, XRF

LANGLEY_GAS_PM_MET

- **Parameter:** Pressure, Temperature, Humidity, Aerosol Particle Properties, Wind, Ozone, Nitrogen Oxides, Sulfur Dioxide, Volatile Organic Compounds, Carbonaceous Aerosols, Nitrate Particles
- **Temporal Coverage:** 08/08/2001 - 09/02/2001
- **Source/Platform:** Meteorological Station, Ground Station, Tethered Balloon
- **Sensor:** Chemiluminescence, GC-MS, Ion Chromatograph, Pressure Sensor, Temperature Probe, Humidity Sensor, Wind Sensor, UV Ozone Detector, TEOM, IR CO2 Analyzer, Fluorescence Spectroscopy, Aethalometer

SLOCAN_PARK_GAS_PM_MET

- **Parameter:** Pressure, Temperature, Humidity, Wind, Ozone, Aerosol Particle Properties, Sulfur Dioxide, Nitrogen Oxides, Carbon Monoxide, Non-Methane Hydrocarbons, Carbonaceous Aerosols, Nitrate Particles
- **Temporal Coverage:** 08/11/2001 - 09/01/2001
- **Source/Platform:** Meteorological Station, Ground Station, Tethered Balloon
- **Sensor:** Chemiluminescence, DMA, GC, Ion Chromatograph, XRF

SUMAS_MTN_GAS_PM_MET

- **Parameter:** Pressure, Temperature, Humidity, Wind, Aerosol Particle Properties, Ozone, Volatile Organic Compounds, Sulfur Dioxide, Nitrogen Oxides, Carbonaceous Aerosols, Nitrate Particles, Carbon Monoxide, Aerosol Optical Depth/Thickness
- **Temporal Coverage:** 08/13/2001 - 09/05/2001
- **Source/Platform:** Meteorological Station, Ground Station, Tethered Balloon
- **Sensor:** Temperature Probe, Humidity Sensor, Wind Sensor, UV Ozone Detector, Chemiluminescence, TEOM, GC-MS, Ion Chromatograph, Pressure Sensor, Aethalometer, Fluorescence Spectroscopy, IR CO2 Analyzer, Nephelometer

CESSNA_VOC_PM_OZONE_MET

- **Parameter:** Pressure, Temperature, Humidity, Upper Level Winds, Ozone, Aerosol Particle Properties, Volatile Organic Compounds
- **Temporal Coverage:** 08/14/2001 - 08/31/2001
- **Source/Platform:** Cessna Single-Engine Aircraft
- **Sensor:** Pressure Sensor, Temperature Probe, Humidity Probe, Wind Sensor, UV Ozone Detector, Optical Counter, GC

CONVAIR_PM_OZONE_MET

- **Parameter:** Pressure, Temperature, Humidity, Upper Level Winds, Ozone, Aerosol Particle Properties
- **Temporal Coverage:** 8/14/2001 - 8/30/2001
- **Source/Platform:** CV-580
- **Sensor:** Pressure Sensor, Temperature Probe, Humidity Probe, Wind Sensor, UV Ozone Detector, Optical Counter

GVRD_AIR_QUAL

- **Parameter:** Temperature, Humidity, Upper Level Winds, Ozone, Aerosol Particle Properties, Volatile Organic Compounds, Sulfur Dioxide, Nitrogen Dioxide, Ions
- **Temporal Coverage:** 01/01/2001 - 01/01/2002
- **Source/Platform:** Meteorological Station, Ground Station, Laboratory
- **Sensor:** Temperature Probe, Humidity Probe, Wind Sensor, UV Ozone Detector, Chemiluminescence, TEOM, GC-MS, Ion Chromatograph

CAPMON_AIR_QUAL

- **Parameter:** Temperature, Humidity, Upper Level Winds, Ozone, Aerosol Particle Properties, Volatile Organic Compounds, Sulfur Dioxide, Nitrogen Dioxide, Ions
- **Temporal Coverage:** 01/01/2001 - 01/01/2002
- **Source/Platform:** Meteorological Station, Ground Station, Laboratory
- **Sensor:** Temperature Probe, Humidity Probe, Wind Sensor, UV Ozone Detector, Chemiluminescence, TEOM, GC-MS, Ion Chromatograph

4. References

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Shao-Meng Li

Meteorological analysis of the Pacific 2001 air quality field study

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M. Rami Alfarra, Hugh Coe, James D. Allan, Keith N. Bower, Hacene Boudries, Manjula R. Canagaratna, Jose L. Jimenez, John T. Jayne, Arthur A. Garforth, Shao-Meng Li, Douglas R. Worsnop

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Yu Cheng, Shao-Meng Li, Amy Leithead, Peter C. Brickell, W. Richard Leitch

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études spéciales : atmosphériques gaz, particules et chimie des précipitations

L'étude sur la qualité de l'air Pacifique 2001 - Métadonnées et Descriptions

L'étude sur la qualité de l'air Pacifique 2001 (PAC2001) a été effectuée du 1^{er} août au 31 septembre 2001 dans la vallée du Bas Fraser (VBF) en Colombie-Britannique au Canada.



1. Description

L'étude sur la qualité de l'air Pacifique 2001 (PAC2001) a été effectuée du 1^{er} août au 31 septembre 2001 dans la vallée du Bas Fraser (VBF) en Colombie-Britannique au Canada. L'étude englobait un certain nombre de projets de recherche ayant pour but d'examiner plusieurs questions concernant les particules et l'ozone de l'air ambiant. Un [numéro spécial](#) de la revue *Atmospheric Environment* [vol. 38, n° 34, novembre 2004] présente les objectifs de l'étude (Li, 2004) et ses résultats.

2. Information sur les stations

Des mesures chimiques et physiques ont été effectuées à cinq endroits dans la région de la vallée du Bas Fraser. Les données de ces mesures sont complétées par des données obtenues aux stations de surveillance du district régional du Grand Vancouver (DRGV) et à la station du Réseau canadien d'échantillonnage des précipitations et de l'air (RCEPA) située dans l'île Saturna. Une description des stations de mesure ainsi qu'une figure indiquant leur emplacement sont présentées ci-après :

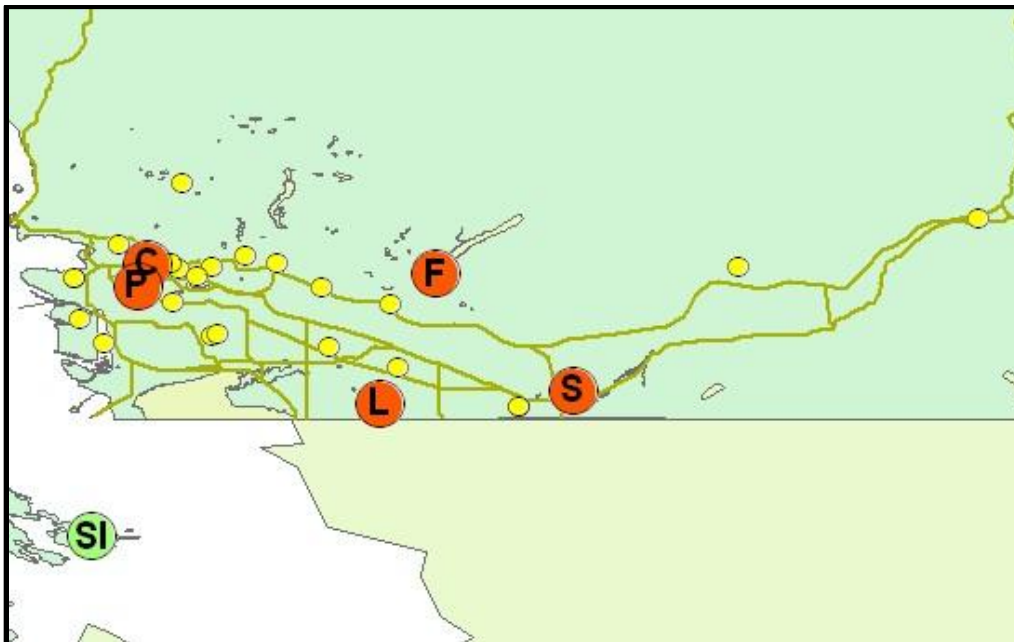
- Station du tunnel Cassier (C sur la figure) – station fournissant des mesures représentatives des émissions du secteur des transports légers.
- Station du parc Slocan (B) – site représentatif de conditions urbaines/suburbaines qui existent dans le centre urbain de Vancouver où un mélange de particules primaires et secondaires est présent.
- Station de l'école Lochiel à Langley (L) – site représentatif d'une zone de transition entre milieu urbain et milieu rural où l'on s'attend à la formation de matières particulaires en raison des pratiques agricoles dans la vallée.

- Station de Eagle Ridge (S) du mont Sumas – site situé du côté est de la vallée, choisi pour étudier l'impact des émissions agricoles d'ammoniac, le problème de réduction de la visibilité et l'interaction entre la pollution urbaine et les émissions biogènes.
- Station du parc Golden Ears (F) – site devant permettre de mesurer la formation de matières particulaires biogènes à partir de précurseurs tels que les monoterpènes.
- Stations de surveillance du DRGV (Tn).
- Station de surveillance de l'île Saturna qui fait partie du RCEPA (SI).

Les distributions verticales de certains paramètres, tels que l'ozone et les variables météorologiques, dans la partie inférieure de l'atmosphère ont été déterminées à l'aide de ballons captifs aux sites du parc Slocan et de l'école Lochiel de Langley. Les données ont été complétées par des mesures effectuées par un LIDAR à balayage au site de Langley (données LIDAR non fournies). Pour étudier la variabilité spatiale et temporelle des paramètres liés aux particules, des mesures aériennes ont été effectuées à l'aide d'un Convair 580 et d'un plus petit aéronef, un Cessna 188. Les plateformes aériennes ont été utilisées pour cartographier les distributions des particules dans la vallée, dans les directions horizontale et verticale.

Il s'agit de la carte de localisation de la station Pacifique 2001. Consultez le texte ci dessus pour une description complète.

Carte indiquant l'emplacement des stations de Pacifique 2001



3. Données

Ensembles de données de l'étude sur la qualité de l'air Pacifique 2001 (couverture spatiale.vallée du Bas Fraser, Colombie-Britannique, Canada)

GOLDEN_EARS_GAS_PM_DATA

- **Paramètres** :Pression, température, humidité, propriétés des particules d'aérosol, vent, ozone, oxydes d'azote, dioxyde de soufre, composé organique volatil, aérosols carbonés, particules de nitrate
- **Champ d'application temporel** : 08/03/2001 - 08/11/2001
- **Source/Plate-forme** : **Station météorologique, station au sol**
- **Capteur** : Capteur de pression, sonde de température, dispositif de mesure de l'humidité, capteur de mesure du vent, détecteur ultra-violet d'ozone, chimiluminescence, diméthylamine, couplage CG-SM, chromatographe d'échange d'ions, aethaelomètre, spectroscopie par fluorescence

CASSIAR_TUNNEL_GAS_PM

- **Paramètres** : Propriétés des particules d'aérosol, oxydes d'azote, aérosols carbonés, matière particulaire, composé organique volatil
- **Champ d'application temporel** : 08/08/2001 - 08/15/2001
- **Source/Plate-forme** : Enquête sur le terrain, laboratoire
- **Capteur** : Chimiluminescence, diméthylamine, CPG, chromatographe d'échange d'ions, fluorescence X

LANGLEY_GAS_PM_MET

- **Paramètres** : Pression, température, humidité, propriétés des particules d'aérosol, vent, ozone, oxydes d'azote, dioxyde de soufre, composé organique volatil, aérosols carbonés, particules de nitrate
- **Champ d'application temporel** : 08/08/2001 - 09/02/2001
- **Source/Plate-forme** : Station météorologique, station au sol, ballon captif
- **Capteur** : Chimiluminescence, couplage CG-SM, chromatographe d'échange d'ions, capteur de pression, sonde de température, dispositif de mesure de l'humidité, capteur de mesure du vent, détecteur ultra-violet d'ozone, TEOM, analyseur IR de dioxyde de carbone, spectroscopie par fluorescence, aethaelomètre

SLOCAN_PARK_GAS_PM_MET

- **Paramètres** : Pression, température, humidité, vent, ozone, propriétés des particules d'aérosol, dioxyde de soufre, oxydes d'azote, monoxyde de carbone, hydrocarbures non méthaniques, aérosols carbonés, particules de nitrate
- **Champ d'application temporel** : 08/11/2001 - 09/01/2001
- **Source/Plate-forme** : Station météorologique, station au sol, ballon captif
- **Capteur** : Chimiluminescence, diméthylamine, CPG, chromatographe d'échange d'ions, fluorescence X

SUMAS_MTN_GAS_PM_MET

- **Paramètres** : Pression, température, humidité, vent, propriétés des particules d'aérosol, ozone, composé organique volatil, dioxyde de soufre, oxydes d'azote, aérosols carbonés, particules de nitrate, monoxyde de carbone, épaisseur optique de l'aérosol
- **Champ d'application temporel** : 08/13/2001 - 09/05/2001
- **Source/Plate-forme** : Station météorologique, station au sol, ballon captif
- **Capteur** : Sonde de température, dispositif de mesure de l'humidité, capteur de mesure du vent, détecteur ultra-violet d'ozone, chimiluminescence, TEOM, couplage CG-SM, chromatographe d'échange d'ions, capteur de pression, aethaelomètre, spectroscopie par fluorescence, analyseur IR de dioxyde de carbone, néphélomètre

CESSNA_VOC_PM_OZONE_MET

- **Paramètres** : Pression, température, humidité, vents en altitude, ozone, propriétés des particules d'aérosol, composé organique volatil
- **Champ d'application temporel** : 08/14/2001 - 08/31/2001
- **Source/Plate-forme** : Cessna Single-Engine Aircraft
- **Capteur** : Capteur de pression, sonde de température, sonde d'humidité, capteur de mesure du vent, détecteur ultra-violet d'ozone, compteur optique, CPG

CONVAIR_PM_OZONE_MET

- **Paramètres** : Pression, température, humidité, vents en altitude, ozone, propriétés des particules d'aérosol
- **Champ d'application temporel** : 8/14/2001 - 8/30/2001
- **Source/Plate-forme** : CV-580

- **Capteur** : Capteur de pression, sonde de température, sonde d'humidité, capteur de mesure du vent, détecteur ultra-violet d'ozone, compteur optique

GVRD_AIR_QUAL

- **Paramètres** : Température, humidité, vents en altitude, ozone, propriétés des particules d'aérosol, composé organique volatil, dioxyde de soufre, dioxyde d'azote, ions
- **Champ d'application temporel** : 01/01/2001 - 01/01/2002
- **Source/Plate-forme** : Station météorologique, station au sol, laboratoire
- **Capteur** : Sonde de température, sonde d'humidité, capteur de mesure du vent, détecteur ultra-violet d'ozone, chimiluminescence, TEOM, couplage CG-SM, chromatographe d'échange d'ions

CAPMON_AIR_QUAL

- **Paramètres** : Température, humidité, vents en altitude, ozone, propriétés des particules d'aérosol, composé organique volatil, dioxyde de soufre, dioxyde d'azote, ions
- **Champ d'application temporel** : 01/01/2001 - 01/01/2002
- **Source/Plate-forme** : Station météorologique, station au sol, laboratoire
- **Capteur** : Sonde de température, sonde d'humidité, capteur de mesure du vent, détecteur ultra-violet d'ozone, chimiluminescence, TEOM, couplage CG-SM, chromatographe d'échange d'ions

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