Total Report Section on the
Boreal Ecosystem-Atmosphere Study (BOREAS)

 Adopted by Bill and Sara K. Conrad, Editors

NAS TGB-7 Rainwater Herbicide
Concentration


Goddard Space Flight Center
Greenbelt, Maryland 20771

November 2000
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Technical Report Series on the
Boreal Ecosystem-Atmosphere Study (BOREAS)

Forrest G. Hall and Sara K. Conrad, Editors

Volume 236

BOREAS TGB-7 Rainwater Herbicide and Organochlorine Concentration Data

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Environment Canada, Regina, Saskatchewan

National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

November 2000
BOREAS TGB-7 Rainwater Herbicide and Organochlorine Concentration Data

Don Waite

Summary

The BOREAS TGB-7 team measured the concentration and flux of several agricultural pesticides in air and rainwater samples in order to determine the associated yearly deposition rates. This data set contains information on the rainwater concentration of seven herbicides [2,4-dichlorophenoxyacetic acid (2,4-D), bromoxynil, dicamba, 2-methyl-4-chlorophenoxyacetic acid (MCPA), triallate, trifluralin, and diclofop-methyl] known to appear in the atmosphere of the Canadian prairies. Also, the concentration of three herbicides (atrazine, alachlor, and metolachlor), two groups of insecticides (lindane and breakdown products and dichloro-diphenyl-trichloroethane (DDT) and breakdown products), and several polychlorinated biphenyls commonly used in the central United States was measured. All of these chemicals are reported, in the literature, to be transported in the atmosphere. Many have been reported to occur in boreal and arctic food chains. The sampling was carried out from 16-Jun to 13-Aug-1993 and 04-May to 20-Jul-1994 at the BOREAS site in the Prince Albert National Park (Waskesiu). The data are stored in tabular ASCII files.

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1. Data Set Overview

1.1 Data Set Identification
BOREAS TGB-07 Rainwater Herbicide and Organochlorine Concentration Data

1.2 Data Set Introduction
This data set contains herbicide concentrations in rainwater collected from Waskesiu.
1.3 Objective/Purpose
The objective of this study was to measure the wet deposition (in rainfall) of herbicides in the boreal forest at Waskesiu.

1.4 Summary of Parameters and Variables
This data set contains herbicide concentrations in rainwater collected from Waskesiu.

1.5 Discussion
The deposition into the boreal forest of seven herbicides [2,4-dichlorophenoxyacidic acid (2,4-D), bromoxynil, dicamba, 2-methyl-4-chlorophenoxyacetic acid (MCPA), triallate, trifluralin, and diclopin-methyl] known to appear in the atmosphere of the Canadian prairies, three herbicides (atrazine, alachlor, and metolachlor) commonly used in the central United States, two groups of insecticides (lindane and breakdown products and dichloro-diphenyl-trichloroethane (DDT) and breakdown products), plus several polychlorinated biphenyls was measured. All of these chemicals are reported, in the literature, to be transported in the atmosphere. Many have been reported to occur in boreal and arctic food chains. The sampling was carried out at the BOREal Ecosystem-Atmosphere Study (BOREAS) site in the Prince Albert National Park (PANP) (Waskesiu).

1.6 Related Data Sets
BOREAS TGB-07 Ambient Air Herbicide and Organochlorine Concentration Data
BOREAS TGB-07 Dry Deposition Herbicide and Organochlorine Flux Data
BOREAS TGB-09 Above-Canopy NMHC at SSA-OBS, SSA-OJP, and SSA-OA Sites
BOREAS TGB-10 Volatile Organic Carbon Data over the SSA
BOREAS TGB-10 Oxidant Concentration Data over the SSA
BOREAS TGB-10 Oxidant Flux Data over the SSA

2. Investigator(s)

2.1 Investigator(s) Name and Title
Don Waite
Environment Canada

Allan Cessna
Agriculture and Agri-Foods Canada

Narine Gurprasad
Environment Canada

2.2 Title of Investigation
Atmospheric Transport of Agricultural Pesticides into the Boreal Ecosystem

2.3 Contact Information

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Regina, Saskatchewan
S4P 4K1 Canada
(306) 780-6438
(306) 780-7614 (fax)
Don.Waite@EC.GC.CA
3. Theory of Measurements

Rain samples are collected by the dry deposition sampler (dust collector), which consists of a 1-m x 0.5-m, stainless steel (316-grade) tray, with 5-cm-high sides. When rainfall is detected on the conductivity-type rain detector, the dust collector pump shuts down and two valves operate to divert rainwater into an exterior, stainless steel container. When the rainfall stops, the rain detector dries with the help of a built-in heater. The pump restarts and dry deposition sampling is resumed. Rain time is recorded on an integrated timer. Rain volume is measured separately with a standard rain gauge. The rainwater is solvent extracted, following published procedures, and the extracts analyzed for target chemicals. Rain samples were collected as 7-day composite samples.

4. Equipment

4.1 Sensor/Instrument Description

4.1.1 Collection Environment
The data were collected under all environmental conditions.

4.1.2 Source/Platform
Ground.

4.1.3 Source/Platform Mission Objectives
None given.

4.1.4 Key Variables
The key variable is herbicide concentration in composite rainwater samples.

4.1.5 Principles of Operation
Rain was sampled by the dust collector, a sampler designed to collect dry and wet atmospheric deposits of trace organics. The collecting surface is a 0.5- x 1.0-m\(^2\) stainless tray. During dry conditions, acidified water was constantly circulated across this surface, collecting dry deposits. Rainfall triggers a sensor, stopping the water flow. Rain falling on the clean collecting tray is diverted into a stainless steel container that is emptied, manually, at the end of the sampling period (7 days). At the end of the rainfall, the sampler reverts to dry deposition sampling. Rain duration is recorded by a timer in the sampler and rain volume by a standard rain gauge.

4.1.6 Sensor/Instrument Measurement Geometry
Dust Collector: A newly designed sampler employing an XAD-2 resin column to extract dry deposits from a continuously flowing sheet of water and collecting separate rain samples.
4.1.7 Manufacturer of Sensor/Instrument
None given.

4.2 Calibration
None given.

4.2.1 Specifications
None given.

4.2.1.1 Tolerance
None given.

4.2.2 Frequency of Calibration
None given.

4.2.3 Other Calibration Information
None given.

5. Data Acquisition Methods
The herbicide analyses were carried out at the Agriculture and Agri-Food Canada Research Station at Regina, Saskatchewan, whereas insecticide and organochlorine analysis was carried out by the Environment Canada laboratory in Edmonton, Alberta. All residues were quantified and confirmed using a Hewlett-Packard gas chromatograph equipped with a mass selective detector (GC-MSD).

Rain samples (500 mL each) were acidified to pH 2 with dilute H2SO4 solution, extracted with dichloromethane and the extract methylated with diazomethane and subjected to Florisil column prior to GC-MSD analysis for extracted herbicides (Cessna et al., 1985). A second 500-mL aliquot was extracted with dichloromethane, subjected to Florisil column, and analyzed for insecticides and organochlorines by GC-MSD (Cessna et al., 1985).

Depending on the compound, from two to four ions were monitored on the MSD. The presence of each compound was considered to be confirmed if all ions monitored were present, a peak appeared at the retention time (± 0.02 min) obtained for a standard solution of the pesticide in the reconstructed chromatograms of all ions, and the peak area ratio was within 30% of the ratio obtained using a standard solution of the pesticide.

6. Observations

6.1 Data Notes
None.

6.2 Field Notes
None.
7. Data Description

7.1 Spatial Characteristics

7.1.1 Spatial Coverage
The North American Datum of 1983 (NAD83) coordinates for the Southern Study Area (SSA) measurement site are:

<table>
<thead>
<tr>
<th>Longitude</th>
<th>Latitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waskesiu</td>
<td>106.067° W</td>
</tr>
</tbody>
</table>

7.1.2 Spatial Coverage Map
None given.

7.1.3 Spatial Resolution
The measurements were made at a single location in the SSA.

7.1.4 Projection
Not applicable.

7.1.5 Grid Description
Not applicable.

7.2 Temporal Characteristics

7.2.1 Temporal Coverage
The data were collected from 16-Jun to 13-Aug-1993 and 04-May to 20-Jul-1994.

7.2.2 Temporal Coverage Map
All the data were collected at the same location.

7.2.3 Temporal Resolution
The samplers operated 24 hours per day over each 7-day sampling period.

7.3 Data Characteristics

7.3.1 Parameter/Variable
The parameters contained in the data files on the CD-ROM are:

<table>
<thead>
<tr>
<th>Column Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE_NAME</td>
</tr>
<tr>
<td>SUB_SITE</td>
</tr>
<tr>
<td>START_DATE</td>
</tr>
<tr>
<td>END_DATE</td>
</tr>
<tr>
<td>PRECIP</td>
</tr>
<tr>
<td>BROMOXYNIL_CONC</td>
</tr>
<tr>
<td>DICAMBA_CONC</td>
</tr>
<tr>
<td>2,4-D_CONC</td>
</tr>
<tr>
<td>MCPA_CONC</td>
</tr>
<tr>
<td>DICLOFOP_CONC</td>
</tr>
<tr>
<td>TRIALLATE_CONC</td>
</tr>
<tr>
<td>TRIPLURALIN_CONC</td>
</tr>
</tbody>
</table>
### 7.3.2 Variable Description/Definition

The descriptions of the parameters contained in the data files on the CD-ROM are:

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE_NAME</td>
<td>The identifier assigned to the site by BOREAS, in the format SSS-TTT-CCCCC, where SSS identifies the portion of the study area: NSA, SSA, REG, TRN, and TTT identifies the cover type for the site, 999 if unknown, and CCCCC is the identifier for site, exactly what it means will vary with site type.</td>
</tr>
<tr>
<td>SUB_SITE</td>
<td>The identifier assigned to the sub-site by BOREAS, in the format GGGGG-IIIII, where GGGGG is the group associated with the sub-site instrument, e.g. HYD06 or STAFF, and IIIII is the identifier for sub-site, often this will refer to an instrument.</td>
</tr>
<tr>
<td>START_DATE</td>
<td>The date on which the collection of data commenced.</td>
</tr>
<tr>
<td>END_DATE</td>
<td>The date on which the collection of the data was terminated.</td>
</tr>
<tr>
<td>PRECIP</td>
<td>Amount of precipitation during the sample period.</td>
</tr>
<tr>
<td>BROMOXYNIL_CONC</td>
<td>Concentration of bromoxynil.</td>
</tr>
<tr>
<td>DICAMBA_CONC</td>
<td>Concentration of dacamba.</td>
</tr>
<tr>
<td>2,4-D_CONC</td>
<td>Concentration of 2,4-DICHLOROPHENOXYACIDIC_ACID.</td>
</tr>
<tr>
<td>MCPA_CONC</td>
<td>Concentration of MCPA.</td>
</tr>
<tr>
<td>DICLOROP_F_CONC</td>
<td>Concentration of diclofop.</td>
</tr>
<tr>
<td>TRIALLATE_CONC</td>
<td>Concentration of triallate.</td>
</tr>
<tr>
<td>TRIFLURALIN_CONC</td>
<td>Concentration of trifluralin.</td>
</tr>
<tr>
<td>ALACHLOR_CONC</td>
<td>Concentration of alachlor.</td>
</tr>
<tr>
<td>ATRAZINE_CONC</td>
<td>Concentration of atrazine.</td>
</tr>
<tr>
<td>METOLACHLOR_CONC</td>
<td>Concentration of metolachlor.</td>
</tr>
<tr>
<td>CRTFCN_CODE</td>
<td>The BOREAS certification level of the data. Examples are CPI (Checked by PI), CGR (Certified by Group), PRE (Preliminary), and CPI-??? (CPI but questionable).</td>
</tr>
<tr>
<td>REVISION_DATE</td>
<td>The most recent date when the information in the referenced data base table record was revised.</td>
</tr>
</tbody>
</table>
### 7.3.3 Unit of Measurement

The measurement units for the parameters contained in the data files on the CD-ROM are:

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE_NAME</td>
<td>[none]</td>
</tr>
<tr>
<td>SUB_SITE</td>
<td>[none]</td>
</tr>
<tr>
<td>START_DATE</td>
<td>[DD-MON-YY]</td>
</tr>
<tr>
<td>END_DATE</td>
<td>[DD-MON-YY]</td>
</tr>
<tr>
<td>PRECIP</td>
<td>[millimeters]</td>
</tr>
<tr>
<td>BROMOXYNIL_CONC</td>
<td>[picograms][meter^-3]</td>
</tr>
<tr>
<td>DICAMBA_CONC</td>
<td>[picograms][meter^-3]</td>
</tr>
<tr>
<td>2,4-D_CONC</td>
<td>[picograms][meter^-3]</td>
</tr>
<tr>
<td>MCPA_CONC</td>
<td>[picograms][meter^-3]</td>
</tr>
<tr>
<td>DICLOFOP_CONC</td>
<td>[picograms][meter^-3]</td>
</tr>
<tr>
<td>TRIALLATE_CONC</td>
<td>[picograms][meter^-3]</td>
</tr>
<tr>
<td>TRIFLURALIN_CONC</td>
<td>[picograms][meter^-3]</td>
</tr>
<tr>
<td>ALACHLOR_CONC</td>
<td>[picograms][meter^-3]</td>
</tr>
<tr>
<td>ATRAZINE_CONC</td>
<td>[picograms][meter^-3]</td>
</tr>
<tr>
<td>METOLACHLOR_CONC</td>
<td>[picograms][meter^-3]</td>
</tr>
<tr>
<td>CRTFCN_CODE</td>
<td>[none]</td>
</tr>
<tr>
<td>REVISION_DATE</td>
<td>[DD-MON-YY]</td>
</tr>
</tbody>
</table>

### 7.3.4 Data Source

The source of the parameter values contained in the data files on the CD-ROM are:

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE_NAME</td>
<td>[Assigned by BORIS Staff]</td>
</tr>
<tr>
<td>SUB_SITE</td>
<td>[Assigned by BORIS Staff]</td>
</tr>
<tr>
<td>START_DATE</td>
<td>Investigator</td>
</tr>
<tr>
<td>END_DATE</td>
<td>Investigator</td>
</tr>
<tr>
<td>PRECIP</td>
<td>dust collector</td>
</tr>
<tr>
<td>BROMOXYNIL_CONC</td>
<td>GC-MSD</td>
</tr>
<tr>
<td>DICAMBA_CONC</td>
<td>GC-MSD</td>
</tr>
<tr>
<td>2,4-D_CONC</td>
<td>GC-MSD</td>
</tr>
<tr>
<td>MCPA_CONC</td>
<td>GC-MSD</td>
</tr>
<tr>
<td>DICLOFOP_CONC</td>
<td>GC-MSD</td>
</tr>
<tr>
<td>TRIALLATE_CONC</td>
<td>GC-MSD</td>
</tr>
<tr>
<td>TRIFLURALIN_CONC</td>
<td>GC-MSD</td>
</tr>
<tr>
<td>ALACHLOR_CONC</td>
<td>GC-MSD</td>
</tr>
<tr>
<td>ATRAZINE_CONC</td>
<td>GC-MSD</td>
</tr>
<tr>
<td>METOLACHLOR_CONC</td>
<td>GC-MSD</td>
</tr>
<tr>
<td>CRTFCN_CODE</td>
<td>[Assigned by BORIS Staff]</td>
</tr>
<tr>
<td>REVISION_DATE</td>
<td>[Assigned by BORIS Staff]</td>
</tr>
</tbody>
</table>
### 7.3.5 Data Range

The following table gives information about the parameter values found in the data files on the CD-ROM.

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Minimum Data Value</th>
<th>Maximum Data Value</th>
<th>Missng Data Value</th>
<th>Unrel Data Value</th>
<th>Below Detect Limit</th>
<th>Data Not Collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE_NAME</td>
<td>SSA-999-WSK05</td>
<td>SSA-999-WSK05</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>SUB_SITE</td>
<td>TGB07-CON01</td>
<td>TGB07-CON01</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>START_DATE</td>
<td>16-JUN-93</td>
<td>13-JUL-94</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>END_DATE</td>
<td>21-JUN-93</td>
<td>20-JUL-94</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>PRECIP</td>
<td>0</td>
<td>56.7</td>
<td>None</td>
<td>None</td>
<td>-999</td>
<td>None</td>
</tr>
<tr>
<td>BROMOXYNIL_CONC</td>
<td>.1</td>
<td>.1</td>
<td>None</td>
<td>None</td>
<td>-777</td>
<td>None</td>
</tr>
<tr>
<td>DICAMBA_CONC</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>-777</td>
<td>None</td>
</tr>
<tr>
<td>2,4-D_CONC</td>
<td>.1</td>
<td>.2</td>
<td>None</td>
<td>None</td>
<td>-777</td>
<td>None</td>
</tr>
<tr>
<td>MCPA_CONC</td>
<td>.1</td>
<td>.1</td>
<td>None</td>
<td>None</td>
<td>-777</td>
<td>None</td>
</tr>
<tr>
<td>DICLOFOP_CONC</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>-777</td>
<td>None</td>
</tr>
<tr>
<td>TRIALLATE_CONC</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>-777</td>
<td>None</td>
</tr>
<tr>
<td>TRIFLURALIN_CONC</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>-777</td>
<td>None</td>
</tr>
<tr>
<td>ALACHLOR_CONC</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>-777</td>
<td>None</td>
</tr>
<tr>
<td>ATRAZINE_CONC</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>-777</td>
<td>None</td>
</tr>
<tr>
<td>METOLACHLOR_CONC</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>-777</td>
<td>None</td>
</tr>
<tr>
<td>CRTFCN_CODE</td>
<td>CPI</td>
<td>CPI</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>REVISION_DATE</td>
<td>28-AUG-98</td>
<td>28-AUG-98</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Minimum Data Value -- The minimum value found in the column.

Maximum Data Value -- The maximum value found in the column.

Missng Data Value -- The value that indicates missing data. This is used to indicate that an attempt was made to determine the parameter value, but the attempt was unsuccessful.

Unrel Data Value -- The value that indicates unreliable data. This is used to indicate an attempt was made to determine the parameter value, but the value was deemed to be unreliable by the analysis personnel.

Below Detect Limit -- The value that indicates parameter values below the instruments detection limits. This is used to indicate that an attempt was made to determine the parameter value, but the analysis personnel determined that the parameter value was below the detection limit of the instrumentation.

Data Not Collected -- This value indicates that no attempt was made to determine the parameter value. This usually indicates that BORIS combined several similar but not identical data sets into the same data base table but this particular science team did not measure that parameter.

Blank -- Indicates that blank spaces are used to denote that type of value.

N/A -- Indicates that the value is not applicable to the respective column.

None -- Indicates that no values of that sort were found in the column.
### 7.4 Sample Data Record

The following are wrapped versions of data record from a sample data file on the CD-ROM.

<table>
<thead>
<tr>
<th>SITE NAME, SUB_SITE, START_DATE, END_DATE, PRECIP, BROMOXYNIL_CONC, DICAMBA_CONC, 2,4-D_CONC, MCPA_CONC, DICLOFOP_CONC, TRIALLATE_CONC, TRIFLURALIN_CONC, ALACHLOR_CONC, ATRAZINE_CONC, METOLACHLOR_CONC, CRTFCN_CODE, REVISION_DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>'SSA-999-WSK05', 'TGB07-CON01', '04-MAY-94', '18-MAY-94', '-999.0', '-999.0', '-999.0', '.01', -999.0, -999.0, -999.0, -999.0, -999.0, -999.0, -999.0, 'CPI', '16-APR-97'</td>
</tr>
<tr>
<td>'SSA-999-WSK05', 'TGB07-CON01', '11-MAY-94', '18-MAY-94', '47.2', '-999.0', '-999.0', '.02', -999.0, -999.0, -999.0, -999.0, -999.0, -999.0, -999.0, 'CPI', '16-APR-97'</td>
</tr>
<tr>
<td>'SSA-999-WSK05', 'TGB07-CON01', '18-MAY-94', '25-MAY-94', '56.7', '-999.0', '-999.0', '-999.0', '-999.0', '-999.0', '-999.0', '-999.0', '-999.0', '-999.0', 'CPI', '16-APR-97'</td>
</tr>
</tbody>
</table>

### 8. Data Organization

#### 8.1 Data Granularity

The smallest unit of data tracked by the BOREAS Information System (BORIS) was the herbicide concentration in rainwater for a given site in a given sampling period.

#### 8.2 Data Format(s)

The Compact Disk-Read-Only Memory (CD-ROM) files contain American Standard Code for Information Interchange (ASCII) numerical and character fields of varying length separated by commas. The character fields are enclosed with single apostrophe marks. There are no spaces between the fields.

Each data file on the CD-ROM has four header lines of Hyper-Text Markup Language (HTML) code at the top. When viewed with a Web browser, this code displays header information (data set title, location, date, acknowledgments, etc.) and a series of HTML links to associated data files and related data sets. Line 5 of each data file is a list of the column names, and line 6 and following lines contain the actual data.

### 9. Data Manipulations

#### 9.1 Formulae

*9.1.1 Derivation Techniques and Algorithms*

None given.

#### 9.2 Data Processing Sequence

#### 9.2.1 Processing Steps

None given.

#### 9.2.2 Processing Changes

None given.

#### 9.3 Calculations

#### 9.3.1 Special Corrections/Adjustments

None given.
9.3.2 Calculated Variables
None given.

9.4 Graphs and Plots
None given.

10. Errors

10.1 Sources of Error
None given.

10.2 Quality Assessment
Standard laboratory procedures involving blanks, spikes, and replicates.

10.2.1 Data Validation by Source
None given.

10.2.2 Confidence Level/Accuracy Judgment
None given.

10.2.3 Measurement Error for Parameters
None given.

10.2.4 Additional Quality Assessments
None given.

10.2.5 Data Verification by Data Center
The data were examined for general consistency and clarity.

11. Notes

11.1 Limitations of the Data
None given.

11.2 Known Problems with the Data
None given.

11.3 Usage Guidance
None given.

11.4 Other Relevant Information
None given.

12. Application of the Data Set
The data can be used to quantify the trace organic contaminants entering the site from atmospheric transport and identify chemicals that require further research.
13. Future Modifications and Plans

None given.

14. Software

14.1 Software Description
None given.

14.2 Software Access
None given.

15. Data Access

The rainwater herbicide and organochlorine concentration data are available from the Earth Observing System Data and Information System (EOSDIS) Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

15.1 Contact Information
For BOREAS data and documentation please contact:

ORNL DAAC User Services
Oak Ridge National Laboratory
P.O. Box 2008 MS-6407
Oak Ridge, TN 37831-6407
Phone: (423) 241-3952
Fax: (423) 574-4665
E-mail: ornldaac@ornl.gov or ornl@eos.nasa.gov

15.2 Data Center Identification
Earth Observing System Data and Information System (EOSDIS) Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC) for Biogeochemical Dynamics

15.3 Procedures for Obtaining Data
Users may obtain data directly through the ORNL DAAC online search and order system [http://www-eosdis.ornl.gov/] and the anonymous FTP site [ftp://www-eosdis.ornl.gov/data/] or by contacting User Services by electronic mail, telephone, fax, letter, or personal visit using the contact information in Section 15.1.

15.4 Data Center Status/Plans
The ORNL DAAC is the primary source for BOREAS field measurement, image, GIS, and hardcopy data products. The BOREAS CD-ROM and data referenced or listed in inventories on the CD-ROM are available from the ORNL DAAC.
16. Output Products and Availability

16.1 Tape Products
None.

16.2 Film Products
None.

16.3 Other Products
These data are available on the BOREAS CD-ROM series.

17. References

17.1 Platform/Sensor/Instrument/Data Processing Documentation
None given.

17.2 Journal Articles and Study Reports


17.3 Archive/DBMS Usage Documentation
None.

18. Glossary of Terms
None given.

19. List of Acronyms

ASCII - American Standard for Information Interchange
BORIAS - BOReal Ecosystem-Atmosphere Study
BORIS - BOREAS Information System
CD-ROM - Compact Disk-Read-Only Memory
DAAC - Distributed Active Archive Center
EOS - Earth Observing System
EOSDIS - EOS Data and Information System
GC-MSD - Gas Chromatograph - Mass Selective Detector
GIS - Geographic Information System
GSFC - Goddard Space Flight Center
HTML - HyperText Markup Language
NASA - National Aeronautics and Space Administration
NMHC - Nonmethane Hydrocarbon
NSA - Northern Study Area
OA - Old Aspen
OBS - Old Black Spruce
OJP - Old Jack Pine
ORNL - Oak Ridge National Laboratory
PANP - Prince Albert National Park
SSA - Southern Study Area
TGB - Trace Gas Biogeochemistry
URL - Uniform Resource Locator
20. Document Information

20.1 Document Revision Date
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20.2 Document Review Date(s)
Science Review:

20.3 Document ID

20.4 Citation
When using these data, please contact one of the individuals listed in Section 2.3 and as well as citing relevant papers in Section 17.2.

If using data from the BOREAS CD-ROM series, also reference the data as:


Also, cite the BOREAS CD-ROM set as:

20.5 Document Curator

20.6 Document URL
Technical Report Series on the Boreal Ecosystem-Atmosphere Study (BOREAS)

BOREAS TGB-7 Rainwater Herbicide and Organochlorine Concentration Data

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National Aeronautics and Space Administration
Washington, DC 20546-0001

Technical Report Series on the Boreal Ecosystem-Atmosphere Study (BOREAS)

BOREAS TGB-7 Rainwater Herbicide and Organochlorine Concentration Data

Unclassified

Report available from the NASA Center for AeroSpace Information, 7121 Standard Drive, Hanover, MD 21076-1320. (301) 621-0390.

The BOREAS TGB-7 team measured the concentration and flux of several agricultural pesticides in air and rainwater samples in order to determine the associated yearly deposition rates. This data set contains information on the rainwater concentration of seven herbicides [2,4-dichlorophenoxyacetic acid (2,4-D), bromoxynil, dicamba, 2-methyl-4-chlorophenoxyacetic acid (MCPA), triallate, trifluralin, and diclopr-methyl] known to appear in the atmosphere of the Canadian prairies. Also, the concentration of three herbicides (atrazine, alachlor, and metolachlor), two groups of insecticides (lindane and breakdown products and dichloro-diphenyl-trichloroethane (DDT) and breakdown products), and several polychlorinated biphenyls commonly used in the central United States was measured. All of these chemicals are reported, in the literature, to be transported in the atmosphere. Many have been reported to occur in boreal and arctic food chains. The sampling was carried out from 16-Jun to 13-Aug-1993 and 04-May to 20-Jul-1994 at the BOREAS site in the Prince Albert National Park (Waskesiu). The data are stored in tabular ASCII files.

BOREAS, trace gas biogeochemistry.

Unclassified

Unclassified

Unclassified

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