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

Forrest G. Hall and Andrea Papagno, Editors

Volume 184
BOREAS TE-20 SSA Site Characteristics Data

R. Knox

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Space Administration

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BOREAS TE-20 SSA Site Characteristics Data

Robert G. Knox

Summary

The BOREAS TE-20 team collected several data sets for use in developing and testing models of forest ecosystem dynamics. This data set contains measurements of site characteristics conducted in the SSA from 18-Jul-1994 to 30-Jul-1994. The data are stored in CSV files.

Table of Contents

1. Data Set Overview

1.1 Data Set Identification

BOREAS TE-20 SSA Site Characteristics Data

1.2 Data Set Introduction

The Terrestrial Ecology (TE)-20 team studied site characteristics in the Southern Study Area (SSA) of the boreal forest as part of the BOReal Ecosystem-Atmosphere Study (BOREAS) from 18-Jul-1994 to 30-Jul-1994.

1.3 Objectives/Purpose

The objectives of the work were to:

- Provide data for developing and testing remote sensing algorithms for characterizing biomass and surface cover in the SSA modeling subarea.
- Help place results from tower sites and auxiliary sites in context by sampling regional patterns of structural and compositional variation; in conjunction with remote sensing, these will facilitate scaling studies and surface flux modeling for aircraft flux data and taller tower sites having larger and more heterogeneous flux surface areas.

1.4 Summary of Parameters

The data parameters include site coordinates, species, diameter at breast height (DBH), tree height, height to base of crown, surface cover, percent surface cover of subplots A and B, area, and site group (Random sampling (RAN) or sampling for synthetic aperture radar (SAR) studies).

1.5 Discussion

From 18-Jul-1994 to 30-Jul-1994, investigators from TE-20 and Remote Sensing Science (RSS)-15, with support from the Forest Ecosystem Dynamics (FED) and Shuttle Imaging Radar - C (SIR-C) projects and TE-08, sampled an extensive series of sites in the SSA modeling subarea. Data from these new field sites are intended to complement process studies and more intensive continuous or multivisit data from regular auxiliary sites and tower sites. When combined with data from the regular auxiliary sites, they will provide adequate sample size for developing and testing remote sensing algorithms for characterizing biomass and surface cover in the SSA modeling subarea. They will also help place results from tower sites and auxiliary sites in context by sampling regional patterns of structural and compositional variation; in conjunction with remote sensing, these will facilitate scaling studies and surface flux modeling for aircraft flux data and taller tower sites having larger and more heterogeneous flux surface areas. Each site was sampled in a single visit, without extensive prior screening. The data collected showed slowly varying soil and vegetation structural characteristics that could be compared with imagery covering a wide timespan. In the same field effort, we also sampled four sites of particular interest for SAR studies and four of the regular auxiliary sites for method intercomparison, using the same field methods.

1.6 Related Data Sets

BOREAS RSS-15 SIR-C and Landsat TM Biomass and Landcover Maps of the NSA and SSA
BOREAS TE-08 Aspen Bark Chemistry Data
BOREAS TE-08 Aspen Bark Spectral Reflectance Data
BOREAS TE-22 Allometric Forest Survey Data
BOREAS TE-23 Map Plot Data

2. Investigator(s)

2.1 Investigator(s) Name and Title

Robert G. Knox
Elissa R. Levine
K. Jon Ranson
S.J. Goetz

2.2 Title of Investigation

Multidisciplinary Integrative Models of Forest Ecosystem Dynamics for the Boreal Forest Biome: Modeling Gas and Energy Fluxes from Landscapes

2.3 Contact Information

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Andrea.Papagno.gsfc.nasa.gov

3. Theory of Measurements

None given.

4. Equipment

4.1 Instrument Description
Surveying wheel, fiberglass tapes, belt transects.

4.1.1 Collection Environment
Measurements were made in ambient outdoor conditions during the measurement dates.

4.1.2 Source/Platform
Measurements were taken from the ground.

4.1.3 Source/Platform Mission Objectives
The ground supported the trees and observers.

4.1.4 Key Variables
The variables include site coordinates, species, DBH, tree height, height to base of crown, surface cover, percent surface cover of subplot A, percent surface cover of subplot B, area, and site group.

4.1.5 Principles of Operation
To assist in precise registration to high-resolution imagery, distances from easily recognized landmarks were measured along roads with a surveying wheel. Most sites were reached by stopping at fixed 2-km intervals along major roads. Distances from road centers were measured with fiberglass tapes and selected randomly between 150 and 250 m. The bearings selected were perpendicular to the road (or its tangent line) and randomly assigned to either side. [Differential Global Positioning System (GPS) reading for the landmarks selected would be widely useful for aircraft image registration.] Similar randomization was used to reach exact site locations for the purposive sampling of four sites, but with median distances from a starting point adjusted to fall within the stand of interest.

A soil scientist (E. Levine) recorded profile descriptions suitable for soil classification and comparison with broad-scale soil maps. Separate descriptions span the variation noted in a roughly 100- x 100-m area.

4.1.6 Sensor/Instrument Measurement Geometry
None given.

4.1.7 Manufacturer of Instrument
None given.

4.2 Calibration
None given.

4.2.1 Specifications
None given.

4.2.1.1 Tolerance
None.

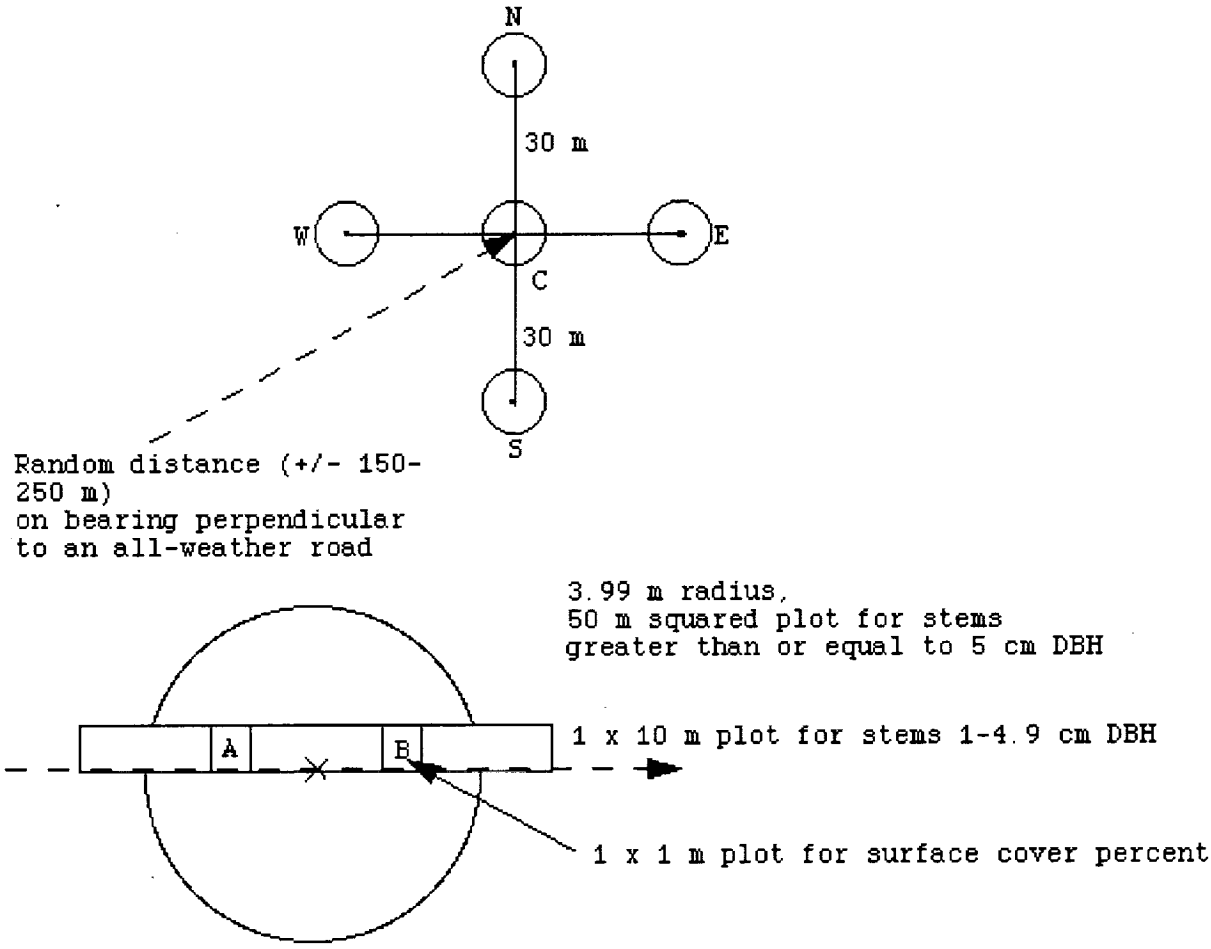
4.2.2 Frequency of Calibration
None given.

4.2.3 Other Calibration Information
None.

5. Data Acquisition Methods

Sites were sampled with five plots (see diagram below). The DBH was recorded for all trees within the 3.99-m radius plot whose DBH was at least 5 cm. Each tree was also assigned a species code and a live crown position code. In 1- x 10-m belt transects, living woody stems 1-5 cm were counted, by species and 1-cm diameter class. In two 1- x 1-m subplots, cover of vegetation less than 1 cm dbh and of litter, open water, and bare soil was visually estimated using a 100-point 10- x 10-cm grid counting technique. Cover percentages over 3% were rounded to the nearest 5%. Data from a site consist of 5 circular plots for trees, 5 belt transects for saplings and large shrubs, and 10 1- x 1-m surface cover subplots. Circular plots were centered on the randomly selected location and on points 30 m N, E, S, and W of that point. Belt transects were aligned to one side of the tape used to measure it to the center point, for 5 m either side of the plot center. Surface cover subplots, A and B, were within the belt transect, 2 to 3 m from the plot center. For each circular plot with sufficient live trees, two living trees were randomly selected for height measurements and increment boring at breast height, totaling up to 10 trees per site with height, crown depth, and age information.

Nested Plot Diagram for sampling vegetation of randomized sites. This plot diagram shows the 5-plot layout and 10 subplots sampled at each site.



6. Observations

6.1 Data Notes

Dominance Class	Code	Rating Criteria
Dominant	DOM	Fully illuminated crown;some crown exposed at all angles.
Co-Dominant	COD	Greater than or equal to 1/2 crown exposed.
Intermediate	INT	Less than 1/2 crown exposed, but gets some direct light.
Suppressed	SUP	Underneath a closed canopy.
Dead	DED	No rating due to no live crown being present.

6.2 Field Notes

None given.

7. Data Description

7.1 Spatial Characteristics

7.1.1 Spatial Coverage

The SSA measurement sites and associated North American Datum of 1983 (NAD83) coordinates that were sampled for methods cross-comparison are:

- Site id F7J0P, Lat/Long: 53.88336°N, 105.05115°W, Universal Transverse Mercator (UTM) Zone 13, N: 5970323.3, E: 496667.
- Site id G9I4S, Lat/Long: 53.99877°N, 105.11805°W, UTM Zone 13, N: 5983169.1, E: 492291.2.
- Site id G1K9P, Lat/Long: 53.9088°N, 104.74812°W, UTM Zone 13, N: 5973404.5, E: 516546.7.
- Site id G4K8P, Lat/Long: 53.91883°N, 104.76401°W, UTM Zone 13, N: 5974516.6, E: 515499.1.

Systematic, randomized sampling at 2-km intervals along Rt. 120, between 265 and Rt. 106, and along Rt. 106 between 120 and Harding Road: 35 sites.

Purposive sampling related to radar signatures, along Harding Road and on the fen site peripheral road (road loops around N end of fen with tower site): 4 sites.

The SSA sites and associated NAD83 coordinates:

- Site id F0L9T, Lat/Long: 53.80206_N, 104.61798_W, UTM Zone 13, N: 5,961,566.6, E: 525,159.8.

TE-20 sites:

ID UTM Easting UTM Northing

ID	UTM Easting	UTM Northing
1	485118.398	5951907.48
2	487070.262	5953387.69
3	488506.519	5954770.21
4	490291.434	5955712.15
5	491413.037	5957417.97
6	491128.714	5959406.83
7	490539.802	5961388.15
8	491385.859	5963332.67
9	493141.764	5964408.76
10	493466.405	5965974.29
11	494200.048	5967770.49
12	495409.564	5969388.52
13	496840.464	5970312.13
14	498854.505	5970488.04
15	500849.729	5970495.26
16	502874.042	5970381.72
17	504818.456	5971028.79
18	506682.775	5971811.04
19	508549.843	5972739.12
20	510074.302	5973917.86
21	511949.122	5974733.92
22	513819.033	5975422.04
23	515253.163	5976771.14
24	515853.96	5978776.69

25	516749.216	5980634.85
26	518318.562	5982003.86
27	519488.121	5983731.89
28	520928.126	5985159.56
30	521553.238	5984120.35
31	522241.113	5982316.86
32	522985.711	5980437.38
33	522988.604	5978403.79
34	523800.954	5976506.78
35	524197.555	5974554.87
36	524770.325	5972757.53
37	518568.234	5971769.73
38	526532.907	5972466.38

7.1.2 Spatial Coverage Map
Not available.

7.1.3 Spatial Resolution
These data are point source measurements at the given locations.

7.1.4 Projection
Not applicable.

7.1.5 Grid Description
Not applicable.

7.2 Temporal Characteristics

7.2.1 Temporal Coverage
Sampling took place from 18-Jul-1994 to 30-Jul-1994.

7.2.2 Temporal Coverage Map
None given.

7.2.3 Temporal Resolution
Each site was sampled during a single visit.

7.3 Data Characteristics
This data set consists of four components:

- LIVE_WOODY_STEMS
- PLOT_COORDINATES
- SITE_TREE_INVENTORY
- SURFACE_COVER

Each of these components are described in the following sections.

7.3.1 Parameter/Variable

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

LIVE_WOODY_STEMS

Column Name
SITE
PLOT
SPECIES
1-1.9
2-2.9
3-3.9
4-4.9
PLTAREA
SITEGRP
COMMENTS

PLOT_COORDINATES

Column Name
SITE
UTM EASTING
UTM NORTHING

SITE_TREE_INVENTORY

Column Name
SITE
PLOT
SPECIES
DBH
POSIT
HEIGHT
HBC
PLTAREA
SITEGRP

SURFACE_COVER

Column Name
SITE
PLOT
SURFCOV
A%
B%
AREA
SITEGRP

7.3.2 Variable Description/Definition

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

LIVE_WOODY_STEMS

Column Name	Description
SITE	The TE-20 site identification number or the BORIS site grid ID where JMM6=G1K9P.
PLOT	The TE-20 plot identification where C=Center, N=North, E=East, S=South, and W=West.
SPECIES	The 4 letter Latin species code where: ABBA=Abies balsamea ACNE=Acer negundo ALRU=Alnus rugosa AMAL=Amelanchier alnifolia BEPA=Betula papyrifera BEOC=Betula occidentalis CRCH=Crataegus chrysocarpa FRPE=Fraxinus pennsylvanica LALA=Larix laricina NONE=no trees present PIGL=Picea glauca PIMA=Picea mariana PIBA=Pinus banksiana POBA=Populus balsamifera POTR=Populus tremuloides PRPE=Prunus pennsylvanica PRVI=Prunus virginiana SALI=Salix sp..
1-1.9	The number of live woody stems having a DBH of 1 cm to 1.9 cm.
2-2.9	The number of live woody stems having a DBH of 2 cm to 2.9 cm.
3-3.9	The number of live woody stems having a DBH of 3 cm to 3.9 cm.
4-4.9	The number of live woody stems having a DBH of 4 cm to 4.9 cm.
PLTAREA	The plot area.
SITEGRP	The site group category where RAN=Spatially Stratified Random sampling, SAR=Synthetic Aperture Radar sampling, AUX=auxiliary site, and AUXfc=auxiliary Forestry Canada site.
COMMENTS	Comments about the plot.

PLOT_COORDINATES

Column Name	Description
SITE	The TE-20 site identification number.
UTM EASTING	The NAD83 UTM Easting TE-20 site coordinate.
UTM NORTHING	The NAD83 UTM Northing TE-20 site coordinate.

SITE_TREE_INVENTORY

Column Name	Description
SITE	The TE-20 site identification number or the BORIS site grid ID where JMM6 = G1K9P.
PLOT	The TE-20 plot identification where C=Center, N=North, E=East, S=South, and W=West.
SPECIES	The 4 letter Latin species code where: ABBA=Abies balsamea ACNE=Acer negundo ALRU=Alnus rugosa AMAL=Amelanchier alnifolia BEPA=Betula papyrifera BEOC=Betula occidentalis CRCH=Crataegus chrysocarpa FRPE=Fraxinus pennsylvanica LALA=Larix laricina NONE=no trees present PIGL=Picea glauca PIMA=Picea mariana PIBA=Pinus banksiana POBA=Populus balsamifera POTR=Populus tremuloides PRPE=Prunus pennsylvanica PRVI=Prunus virginiana SALI=Salix sp. UNK=species unknown
DBH	The diameter at breast height measured for trees having a DBH > 5 cm.
POSIT	The canopy dominance class where: DOM=Dominant COD=Co-Dominant INT=Intermediate SUP=Suppressed DED=Dead 0=no crown present. Please see Section 6.1 for details.
HEIGHT	The tree height measured from the ground.
HBC	The height from the ground to the base of the live crown. NA=dead tree, fallen tree, or no crown present.
PLTAREA	The plot area.
SITEGRP	The site group category where RAN=Spatially Stratified Random sampling, SAR=Synthetic Aperture Radar sampling, AUX=auxiliary site, and AUXfc=auxiliary Forestry Canada site.

SURFACE_COVER

Column Name	Description
SITE	The TE-20 site identification number or the BORIS site grid ID where JMM6 = G1K9P.
PLOT	The TE-20 plot identification where C=Center, N=North, E=East, S=South, and W=West.
SURFCOV	The surface cover vegetation where gram=grasses, sedges, and rushes woody=woody plants having DBH < 1 cm forb=other vascular plants.
A%	Percentage of surface covered in subplot A.
B%	Percentage of surface covered in subplot B.
AREA	The area of subplot A + subplot B.
SITEGRP	The site group category where RAN=Spatially Stratified Random sampling, SAR=Synthetic Aperture Radar sampling, AUX=auxiliary site, and AUXfc=auxiliary Forestry Canada site.

7.3.3 Unit of Measurement

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

LIVE_WOODY_STEMS

Column Name	Units
SITE	Unitless
PLOT	Unitless
SPECIES	Unitless
1-1.9	Unitless
2-2.9	Unitless
3-3.9	Unitless
4-4.9	Unitless
PLTAREA	Meters2
SITEGRP	Unitless
COMMENTS	Unitless

PLOT_COORDINATES

Column Name	Units
SITE	Unitless
UTM EASTING	Unitless
UTM NORTHING	Unitless

SITE_TREE_INVENTORY

Column Name	Units
SITE	Unitless
PLOT	Unitless
SPECIES	Unitless
DBH	Centimeters
POSIT	Unitless
HEIGHT	Meters
HBC	Meters
PLTAREA	Square Meters
SITEGRP	Unitless

SURFACE_COVER

Column Name	Units
SITE	Unitless
PLOT	Unitless
SURFCOV	Unitless
A%	Percent
B%	Percent
AREA	Square Meters
SITEGRP	Unitless

7.3.4 Data Source

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

LIVE_WOODY_STEMS

Column Name	Data Source
SITE	[Human Observer/BORIS Designation]
PLOT	[Human Observer]
SPECIES	[Human Observer]
1-1.9	[Laboratory Equipment]
2-2.9	[Laboratory Equipment]
3-3.9	[Laboratory Equipment]
4-4.9	[Laboratory Equipment]
PLTAREA	[Laboratory Equipment]
SITEGRP	[Human Observer]
COMMENTS	[Human Observer]

PLOT_COORDINATES

Column Name	Data Source
SITE	[Human Observer]
UTM EASTING	[Human Observer]
UTM NORTHING	[Human Observer]

SITE_TREE_INVENTORY

Column Name	Data Source
SITE	[Human Observer/BORIS Designation]
PLOT	[Human Observer]
SPECIES	[Human Observer]
DBH	[Laboratory Equipment]
POSIT	[Human Observer]
HEIGHT	[Laboratory Equipment]
HBC	[Laboratory Equipment]
PLTAREA	[Laboratory Equipment]
SITEGRP	[Human Observer]

SURFACE_COVER

Column Name	Data Source
SITE	[Human Observer/BORIS Designation]
PLOT	[Human Observer]
SURFCOV	[Human Observer]
A%	[Human Observer]
B%	[Human Observer]
AREA	[Laboratory Equipment]
SITEGRP	[Human Observer]

7.3.5 Data Range

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

LIVE_WOODY_STEMS

Column Name	Minimum Data Value	Maximum Data Value
SITE	1	JMM6
PLOT	C	W
SPECIES	ABBA	SALI
1-1.9	0	28
2-2.9	0	15
3-3.9	0	4
4-4.9	0	5
PLTAREA	10	10
SITEGRP	AUX	SAR
COMMENTS	n/a	n/a

PLOT_COORDINATES

Column Name	Minimum Data Value	Maximum Data Value
SITE	1	38
UTM EASTING	485118.398	526532.907
UTM NORTHING	5951907.479	5984120.353

SITE_TREE_INVENTORY

Column Name	Minimum Data Value	Maximum Data Value
SITE	1	JMM6
PLOT	C	W
SPECIES	ABBA	SALI
DBH	5.1	39.3
POSIT	0	SUP
HEIGHT	0	27.506
HBC	0	20.3
PLTAREA	49	100
SITEGRP	AUX	SAR

SURFACE_COVER

Column Name	Minimum Data Value	Maximum Data Value
SITE	1	JMM6
PLOT	C	W
SURFCOV	forb	woody
A%	0	99
B%	0	100
AREA	2	2
SITEGRP	AUX	SAR

7.4 Sample Data Record

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

LIVE_WOODY_STEMS

```
Site,Plot,Species,1-1.9,2-2.9,3-3.9,4-4.9,PltArea,SiteGrp,Comments
1,C,SALI,1,0,0,0,10,RAN,Sampled
1,N,SALI,0,0,0,2,10,RAN,
1,E,SALI,3,3,1,0,10,RAN,
1,S,NONE,0,0,0,0,10,RAN,
1,W,PIMA,0,0,0,1,10,RAN,all the rest are dead
```

PLOT_COORDINATES

```
1,485118.398,5951907.48
2,487070.262,5953387.69
3,488506.519,5954770.21
4,490291.434,5955712.15
5,491413.037,5957417.97
```

SITE_TREE_INVENTORY

```
Site,Plot,Species,DBH,Posit.,Height,HBC,PltArea,SiteGrp
37,C,PIBA,13.9,COD,0,0,50,SAR
37,C,PIBA,9.6,DED,0,0,50,SAR
37,C,PIBA,14.5,COD,0,0,50,SAR
37,C,PIBA,13.5,COD,0,0,50,SAR
```

SURFACE_COVER

```
Site,Plot,SurfCov,A%,B%,Area,SiteGrp
1,C,moss,2,10,2,RAN
1,C,lichen,0,3,2,RAN
1,C,gram,20,20,2,RAN
1,C,woody,5,20,2,RAN
1,C,forb,25,15,2,RAN
1,C,litter,45,30,2,RAN
1,C,soil,0,0,2,RAN
1,C,rock,0,0,2,RAN
1,C,water,0,0,2,RAN
```

8. Data Organization

8.1 Data Granularity

The smallest unit of data tracked by the BOREAS Information System (BORIS) was the data collected at a given site on a given date.

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.

9. Data Manipulations

9.1 Formulae

None.

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

Not applicable.

9.3.2 Calculated Variables

Not applicable.

9.4 Graphs and Plots

Not applicable.

10. Errors

10.1 Sources of Error

None given.

10.2 Quality Assessment

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
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

These data can be used to study the spatial and physical properties of boreal vegetation.

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 SSA site characteristics 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 http://www-eosdis.ornl.gov/.

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.

17.2 Journal Articles and Study Reports

Newcomer, J., D. Landis, S. Conrad, S. Curd, K. Huemmrich, D. Knapp, A. Morrell, J. Nickeson, A. Papagno, D. Rinker, R. Strub, T. Twine, F. Hall, and P. Sellers, eds. 2000. Collected Data of The Boreal Ecosystem-Atmosphere Study. NASA. CD-ROM.

Sellers, P. and F. Hall. 1994. Boreal Ecosystem-Atmosphere Study: Experiment Plan. Version 1994-3.0, NASA BOREAS Report (EXPLAN 94).

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Sellers, P.J., F.G. Hall, R.D. Kelly, A. Black, D. Baldocchi, J. Berry, M. Ryan, K.J. Ranson, P.M. Crill, D.P. Lettenmaier, H. Margolis, J. Cihlar, J. Newcomer, D. Fitzjarrald, P.G. Jarvis, S.T. Gower, D. Halliwell, D. Williams, B. Goodison, D.E. Wickland, and F.E. Guertin. 1997. BOREAS in 1997: Experiment Overview, Scientific Results and Future Directions. Journal of Geophysical Research 102(D24): 28,731-28,770.

17.3 Archive/DBMS Usage Documentation

None.

18. Glossary of Terms

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FED     - Forest ecosystem dynamics, a model shell allowing the interfacing of
          several different models of forest ecosystem dynamics and, hence,
          several different ecosystem processes
RAN     - Random sampling
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19. List of Acronyms

ADC - Analytical Development Company
ASCII - American Standard Code for Information Interchange
BOREAS - BOReal Ecosystem-Atmosphere Study
BORIS - BOREAS Information System
CD-ROM - Compact Disk-Read-Only memory
DAAC - Distributed Active Archive Center
DBH - Diameter at Breast Height
EOS - Earth Observing System
EOSDIS - EOS Data and Information System
FED - Forest Ecosystem Dynamics
GIS - Geographic Information System
GPS - Global Positioning System
GSFC - Goddard Space Flight Center
HTML - HyperText Markup Language
IFC - Intensive Field Campaign
IRGA - Infrared Gas Analyzer
MIX - Mixed
NAD83 - North American Datum of 1983
NIR - Near Infrared Radiation
NOAA - National Oceanic and Atmospheric Administration
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
PAR - Photosynthetically Active Radiation
PPFD - Photosynthetic Photon Flux Density
RSS - Remote Sensing Science
SAR - Synthetic Aperture Radar
SIR-C - Shuttle Imaging Radar - C
SSA - Southern Study Area
TE - Terrestrial Ecology
TF - Tower Flux
TM - Thematic Mapper
URL - Uniform Resource Locator
UTM - Universal Transverse Mercator
YA - Young Aspen
YJP - Young Jack Pine

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The BOREAS TE-20 team collected several data sets for use in developing and testing models of forest ecosystem dynamics. This data set contains measurements of site characteristics conducted in the SSA from 18-Jul-1994 to 30-Jul-1994. The data are stored in CSV files.

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