Collected Data from The Boreal Ecosystem-Atmosphere Study, NASA, CD-ROM

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Documentation Revision Date: 2016-11-14

Data Set Version: V1

Summary

This data set provides Boreal Ecosystem-Atmosphere Study (BOREAS) project information and data collected at selected sites in the boreal forest of Saskatchewan and Manitoba, Canada from 1993 through 1996. The data include surface, airborne, and satellite-based observations. Note that all of the data products on these CDs have been archived as separate BOREAS data sets by the ORNL DAAC and in many cases the published data are later versions. Users should search for BOREAS data among these individual data sets. These data were originally distributed on 12 CD-ROMs, but are now archived as 12 zip files to ensure historical completeness of the BOREAS data record.

BOREAS was a large-scale experiment initiated in 1990 to investigate interactions between the boreal forest biome and the atmosphere. Data were collected to study the biological and physical processes and conditions that govern the exchanges of radiative energy, water, heat, carbon, and trace gases between boreal forest ecosystems and the atmosphere, particularly those processes that may be sensitive to global change.

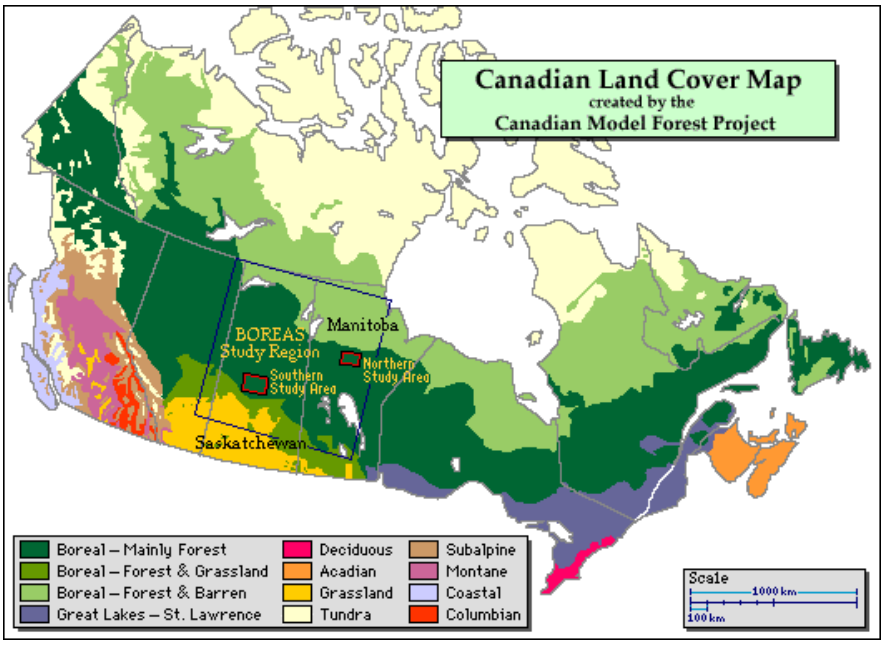

Figure 1. BOREAS study region with the two intensive study areas highlighted. Background image is Canadian land cover classification at the time of the study.

Citation

Newcomer, J.A., D.R. Landis, S. Conrad, S. Curd, K.F. Huemmrich, D.E. Knapp, A. Morrell, J.E. Nickeson, A. Papagno, D. Rinker, R.F. Strub, T. Twine, F.G. Hall, and P.J. Sellers. 2016. Collected Data from The Boreal Ecosystem-Atmosphere Study, NASA, CD-ROM. ORNL DAAC, Oak Ridge, Tennessee, USA. http://dx.doi.org/10.3334/ORNLDAAC/1350

Table of Contents

1. Data Set Overview

Project: Boreal Ecosystem-Atmosphere Study (BOREAS)

This data set provides Boreal Ecosystem-Atmosphere Study (BOREAS) project information and data collected at representative sites in the boreal forest of central Canada from 1993 through March 1997. The data include surface, airborne, and satellite-based observations. These data were originally distributed on 12 CD-ROMs, but are now archived as 12 zip files to ensure historical completeness of the BOREAS data record.

BOREAS was a large-scale experiment initiated in 1990 to investigate interactions between the boreal forest biome and the atmosphere. Data were collected to study the biological and physical processes and conditions that govern the exchanges of radiative energy, water, heat, carbon, and trace gases between boreal forest ecosystems and the atmosphere, particularly those processes that may be sensitive to global change.

Acknowledgements

For the US, the effort was led by NASA's Earth Science Enterprise with participation from NOAA, NSF, USGS, USFS, and EPA.

Significant contributions in the form of funding, data, and personnel were made by the following Canadian agencies: Canada Centre for Remote Sensing, Environment Canada, the Natural Sciences and Engineering Research Council, Agriculture and Agri-Food Canada, National Research Council, Heritage Canada (Parks), Canadian Forest Service, Institute for Space and Terrestrial Science, and Royal Society of Canada.

The BOREAS Project was overseen by Diane Wickland, NASA Headquarters, and the BOREAS Coordinating Committee, including Micheal Allen, Richard Asselin, Carmen Charette, Michael Coughlan, Bruce Hicks, Hank Margolis, Gordon Miller, Jarvis Moyers, Leo SaynWittgenstein, Mac Sinclair, Lowell Smith, Robert Stewart, John Stone, and Jeffrey Watson.

Background information on BOREAS and the BOREAS data are contained in the following publications:

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):28,731-28,769.

Sellers, P., F. Hall, H. Margolis, B. Kelly, D. Baldocchi, G. den Hartog, J.Cihlar, M.G. Ryan, B. Goodison, P. Crill, K.J. Ranson, D. Lettenmaier, and D.E. Wickland. 1995. The boreal ecosystem-atmosphere study (BOREAS): an overview and early results from the 1994 field year. Bulletin of the American Meteorological Society. 76(9):1549-1577.

2. Data Characteristics

Spatial Coverage: The northern and southern edges of the Canadian boreal forest in a 1000 x 1000-km region covering most of Saskatchewan and Manitoba, Canada.

Spatial Resolution: 1000 x 1000 km region

Temporal Coverage: Most of the data cover the period 1993 – 1996. Some files contain data from 1997.

Temporal Resolution: Most data are monthly.

Study Area (All latitudes and longitudes are given in decimal degrees)

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Saskatchewan and Manitoba, Canada	-111	-93.50	59.98	50.09

Data File Information

There are 12 zip files with this data set. When unzipped, the file contents are identical to the original 12 CD-ROMs. Folders provide information and data in various formats- images, readme text files (.txt and .doc), comma-separated (.csv) files, etc.

Most of the data files provide one month of data at a particular site. Some of the data sets are broken up into day-files, but these are special cases (such as aircraft overflight data).

Each data file has four header lines of HTML code at the top. When viewed with a Web browser, this code displays header information (data set title, location,

date, acknowledgements, etc.). Line five of each data file is a list of the column names, and line six and following lines contain the actual data.

Contents of the zip files

The files within the zip folders are named by dates, site, study areas, and site type. There are text documents that describe the file naming conventions and attributes. There are also documents describing the study sites.

The BOREAS project had 85 science teams organized into six study areas: Hydrology data (HYD), Remote Sensing Science (RSS) Non-image Data, Terrestrial Ecology (TE), Tower Flux (TF) Data, Trace Gas and Biogeochemistry (TGB). The data are organized under these areas in the files.

Data file descriptions:

BOREAS_CD01.zip: Provides BOREAS project documents as well as ground data, tower flux data, and software. Includes the following areas: Hydrology data (HYD), Remote Sensing Science (RSS) Non-image Data, Terrestrial Ecology (TE), Tower Flux (TF) Data, Trace Gas and Biogeochemistry (TGB).

BOREAS_CD02.zip: Provides aircraft flux and surface meteorology data.

BOREAS_CD03.zip: Provides upper air and surface meteorology data.

BOREAS_CD04.zip: Provides land cover, soil maps, and GIS data.

BOREAS_CD05.zip: Provides C-130 ASAS and CASI aircraft images and html pages of information pertaining to the project such as site descriptions and overviews .

BOREAS_CD06.zip: Provides C-130 and ER-2 aircraft images.

BOREAS_CD07.zip: Provides aircraft and Landsat TM satellite images.

BOREAS_CD08.zip: Provides Landsat TM satellite images.

BOREAS_CD09.zip: Provides Landsat TM satellite images.

BOREAS_CD10.zip: Provides Landsat TM satellite images and ECMWF data.

BOREAS_CD11.zip: Provides AVHRR satellite images and upper air data.

BOREAS_CD12.zip: Provides GOES satellite images.

3. Application and Derivation

These data could be useful in climate models.

4. Quality Assessment

Please refer to the documentation in each of the 12 files.

5. Data Acquisition, Materials, and Methods

The Boreal Ecosystem-Atmosphere Study (BOREAS) was an interdisciplinary and international experiment to improve the understanding of boreal forest ecology, the interactions between the boreal forest and the atmosphere, how these interactions are affected by climate change, and how satellite data can be used to monitor the forests (Sellers, et al., 1997). The geographic focus of BOREAS was a 1000 x 1000 km region in central Canada. Within that region were two concentrated study areas: a northern area near Thompson, Manitoba and a southern area including Prince Albert National Park in Saskatchewan.

BOREAS employed 85 science teams from the United States, Canada, Great Britain, France, Russia, and Japan. The teams focused on the following study areas: Hydrology data (HYD), Remote Sensing Science (RSS) Non-image Data, Terrestrial Ecology (TE), Tower Flux (TF) Data, Trace Gas and Biogeochemistry (TGB). The 1994 and 1996 BOREAS field campaigns put over 300 scientists and aircrew into the field, supported by eleven research aircraft.

It is recommended that a user should open file **BOREAS_CD01.zip.** This file provides descriptions of the overall project and for each of the individual six study areas.

User Note: All of the data products on the original CDs have been archived as separate BOREAS data sets by the ORNL DAAC and in many cases these data are later versions. Users should search for BOREAS data among these individual data sets.

6. Data Access

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

Collected Data from The Boreal Ecosystem-Atmosphere Study, NASA, CD-ROM

Contact for Data Center Access Information:

- E-mail: uso@daac.ornl.gov

- Telephone: +1 (865) 241-3952

7. References

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):28,731-28,769.