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Pre-ABoVE: Arctic Vegetation Plots, ARCSS/LAII Flux Sites, North Slope, AK, 1995-1996

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Documentation Revision Date: 2017-11-30

Data Set Version: 1

Summary

This dataset provides vegetation cover and environmental plot and soil data collected at flux tower sites of the North Slope Arctic System Science/Land-Atmosphere-Ice Interactions (ARCSS/LAII) project in August of 1995 and 1996. The 19 ARCSS/LAII flux tower sites are located along a North-South transect from near Prudhoe Bay to the foothills of the Brooks Range on the North Slope of Alaska. At 17 of the flux tower sites, one or more vegetation plots (29 total) were established and measurements including (1) plant species cover for the major vegetation types using the Braun-Blanquet approach, (2) plot environmental data, and (3) soil profile descriptions were recorded. In addition, at all 19 sites, plant growth form composition and cover were surveyed using a point sampling technique along multiple transects within selected plots.

The 29 plots assessed occur within 6 broad habitat types including: 1) willow shrub vegetation of riparian areas and warm habitats (4 plots), 2) wet nonacidic tundra (2 plots), 3) bog vegetation, acidic mires including tussock tundra (11 plots), 4) ruderal community on loamy soil (1 plot), 5) dry to moist dwarf-shrub heath and low shrub vegetation on acidic nutrient poor substrates (3 plots), and 6) dry and mesic dwarf-shrub and graminoid vegetation on non-acidic substrates (8 plots).

There are three data files in .csv format. Companion files include soil profile descriptions from soil pits and aerial color infrared images from selected sites.



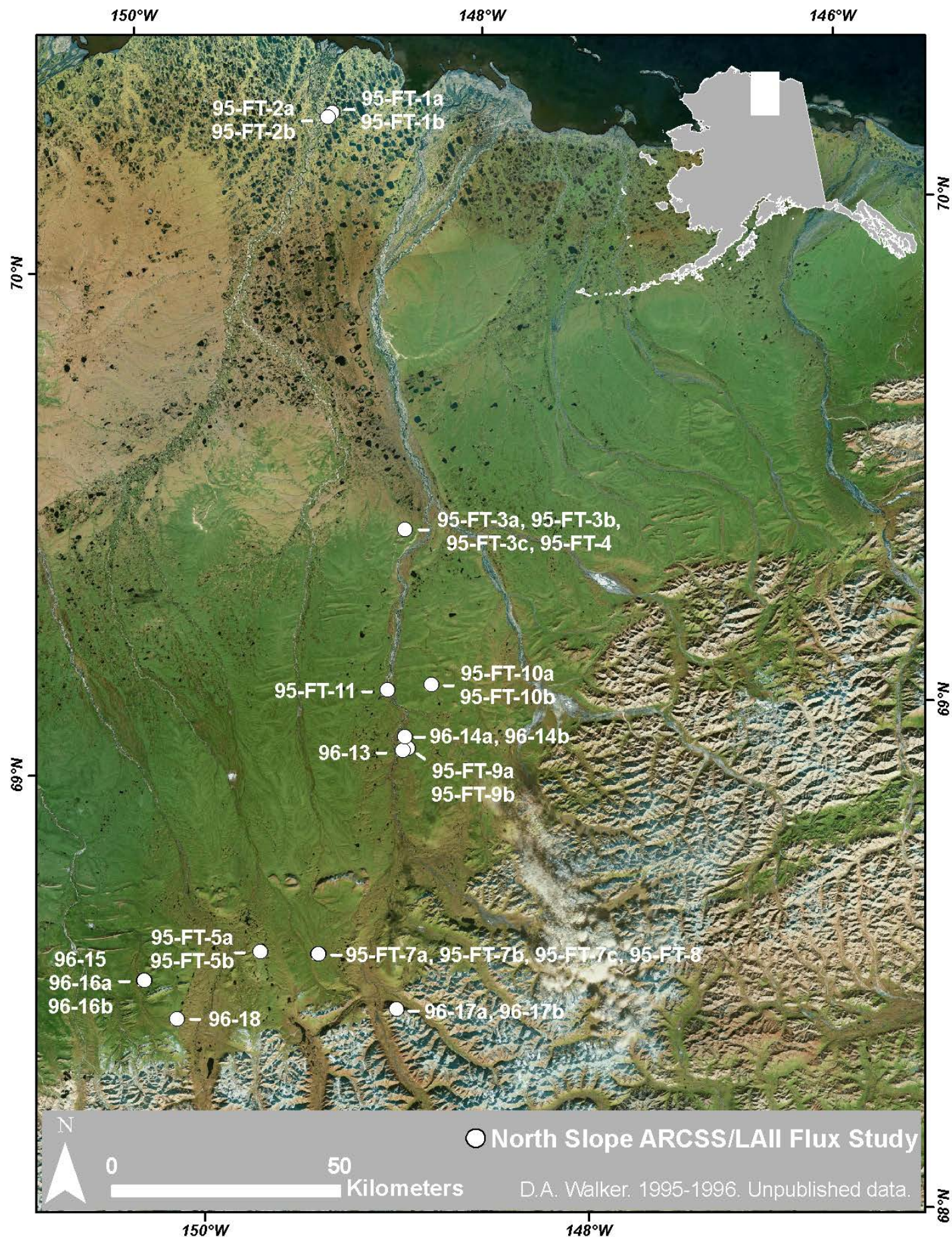


Figure 1. Locations of ARCSS/LAII vegetation plots. Plots were located at flux tower and other selected sites along a North-South transect from near



Prudhoe Bay to the foothills of the Brooks Range.

## Citation

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## 1. Data Set Overview

This dataset provides vegetation cover and environmental plot and soil data collected at flux tower sites of the North Slope Arctic System Science/Land-Atmosphere-Ice Interactions (ARCSS/LAII) project in August of 1995 and 1996. The 19 ARCSS/LAII flux tower sites are located along a North-South transect from near Prudhoe Bay to the foothills of the Brooks Range on the North Slope of Alaska. At 17 of the flux tower sites, one or more vegetation plots (29 total) were established and measurements including (1) plant species cover for the major vegetation types using the Braun-Blanquet approach, (2) plot environmental data, and (3) soil profile descriptions were recorded. In addition, at all 19 sites, plant growth form composition and cover were surveyed using a point sampling technique along multiple transects within selected plots.

The 29 plots assessed occur within 6 broad habitat types including: 1) willow shrub vegetation of riparian areas and warm habitats (4 plots), 2) wet nonacidic tundra (2 plots), 3) bog vegetation, acidic mires including tussock tundra (11 plots), 4) ruderal community on loamy soil (1 plot), 5) dry to moist dwarf-shrub heath and low shrub vegetation on acidic nutrient poor substrates (3 plots), and 6) dry and mesic dwarf-shrub and graminoid vegetation on non-acidic substrates (8 plots).

### Related Publication:

Although the details of the vegetation studies were not published independently, the studies contributed to numerous papers published in a special section of the Journal of Geophysical Research (Kane and Reeburgh, 1998).

Kane, D. L., and W. S. Reeburgh (1998), Introduction to special section: Land-Air-Ice Interactions (LAII) Flux Study, J. Geophys. Res., 103(D22), 28913–28915, <http://dx.doi.org/10.1029/1998JD200017>

**Acknowledgement:** This project was funded by a National Science Foundation, Office of Polar Programs grant, OPP-9318530.

These data were obtained from the Alaska Arctic Geoecological Atlas (<http://agc.portal.gina.alaska.edu>), which provides access to existing Arctic vegetation plot and map data in support of the ABoVE campaign.

## 2. Data Characteristics

**Spatial Coverage:** Data were collected at flux tower sites on the North Slope of Alaska

### ABoVE Site Designation:

- Domain: Core ABoVE region
- State/territory: Alaska
- ABoVE Grid Location: Ah1v0.Bh2v3

**Spatial Resolution:** Point resolution.

**Temporal Coverage:** August of 1995 and 1996

**Temporal Resolution:** Each plot was sampled once.

**Study Area** (All latitude and longitude given in decimal degrees)

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
North Slope, Alaska	-150.25	-148.59	70.2835	68.49

Data File Information:

There are three data files with this dataset in comma-separated (.csv) format. These data may also be found in the TURBOVEG database.

Missing data are represented as -9999.

Table 1. File names and descriptions

Data File Names	Descriptions
<i>North_Slope_Veg_Plots_Species_Data.csv</i>	File contain species cover data for the North Slope ARCSS/LAI flux site vegetation plots.  Species cover classes are the old Braun-Blanquet cover-abundance scale: r (rare), + (common, but less than 1 percent cover), 1 (1-5 percent), 2 (6 to 25 percent), 3 (26 to 50 percent), 4 (51 to 75 percent), and 5 (76 to 100 percent).
<i>North_Slope_Veg_Plots_Environmental_Data.csv</i>	Environmental data for the North Slope ARCSS/LAI flux site vegetation plots.
<i>North_Slope_Veg_Plots_Growthforms_Data.csv</i>	The file summarizes the point-count data along transects within study plots by growth form. Cover values are given for both live and dead vegetation.
Companion Files	
<i>North_Slope_Veg_Plots_Env_Codes_Scalars.pdf</i>	Contains definitions for the codes and scalars used in the environmental data file.
<i>North_Slope_Veg_Plots_1995_soil_description.pdf</i>	This file is a compilation of written data sheets that contain the field soil descriptions for the 1995 North Slope ARCSS/LAI Flux Study sites.
<i>North_Slope_Veg_Plots_1995_field_summary.pdf</i>	This file is a summary dated 12 September 1995 detailing fieldwork completed during the period 12-26 August 1995.
<i>North_Slope_Veg_Plots_1995_aerialphotolog.pdf</i>	This file contains aerial color infrared images (scale 1:3000) for many of the study sites. Sites 11, 12, 17, 18 and 19 were not photographed from the air. . The actual locations of vegetation plots are not marked on the aerial photograph images for a site.

*North\_Slope\_Veg\_Plots\_Species\_Data.csv*

The file contains species cover data for the North Slope ARCSS/LAI Flux plots. The source of these data, collected by D. A. Walker, are from unpublished datasheets.

Species cover classes are the old Braun-Blanquet cover-abundance scale: r (rare), + (common, but less than 1 percent cover), 1 (1-5 percent), 2 (6 to 25 percent), 3 (26 to 50 percent), 4 (51 to 75 percent), and 5 (76 to 100 percent). Both the author's determination and the current taxonomy according to the Panarctic Species List (PASL) are listed. Taxa are listed in alphabetical order according to the accepted PASL name. The plot numbers in the source data are the author's.

During this study, vegetation plots were not established at Tower Site 6 (Toolik Lake) or Site 12 (W. Oechel's flux-tower site at Betty Pingo), however, growthform transect data are available.

Table 2. This file contains species cover data for the vegetation plots. Taxa are listed in alphabetical order according to the accepted PASL name.

Column Numbers	Column Name	Units	Description
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1	PASL_TAXON_Scientific_Name_No_Authors		Current Taxonomy according to the Panarctic Species List (PASL) without authors names
2	PASL_TAXON_Scientific_Name_With_Author(S)		Current Taxonomy according to the Panarctic Species List (PASL)
3	DATASET_TAXON		Dataset taxonomy
4 to 29	29 Plots over Sites 1-5, 7-11, 13-19		Column headings are for 29 plots. See Plot to Site crosswalk table.  Species cover data are given as percentage.

**North\_Slope\_Veg\_Plots\_Environmental\_Data.csv**

The codes used in this file are in the companion file: **North\_Slope\_Veg\_Plots\_Env\_Codes\_Scalars.pdf**

**Table 3.** The file contains environmental data for the North Slope ARCSS/LAII flux site vegetation plots. The source of these data are unpublished data records by D.A. Walker. The plot numbers are the authors'.

Column Name	Units / Format	Description
RELEVE NUMBER		Plot number
SITE_NUMBER		
DATE	YYYYMMDD	Survey date
STUDY_AREA_DESCRIPTION		
LATITUDE	Decimal degrees, WGS 84	Latitude of plot
LONGITUDE	Decimal degrees, WGS 84	Longitude of plot
ELEVATION	M	Elevation
OBSERVER		
VEGETATION		Plant community description
WEATHER		Weather observation at time of survey
PH		pH measured at surface of mineral soil layer
LANDFORMS	Code	Refer to the code defined in companion file North_Slope_Veg_Plots_Env_Codes_Scalars.pdf
SURFICIAL GEOLOGY	Code	Refer to the code defined in companion file North_Slope_Veg_Plots_Env_Codes_Scalars.pdf
SURFICIAL GEOMORPHOLOGY	Code and Location	Refer to the code defined in companion file North_Slope_Veg_Plots_Env_Codes_Scalars.pdf
SITE MOISTURE	Scaler	Refer to the scaler defined in companion file North_Slope_Veg_Plots_Env_Codes_Scalars.pdf
		Refer to the scaler defined in companion file

SOIL MOISTURE	Scaler	North_Slope_Veg_Plots_Env_Codes_Scalars.pdf
GLACIAL GEOLOGY	Code	Refer to the code defined in companion file North_Slope_Veg_Plots_Env_Codes_Scalars.pdf
TOPOGRAPHIC POSITION	Code	Refer to the code defined in companion file North_Slope_Veg_Plots_Env_Codes_Scalars.pdf
ESTIMATED SNOW DURATION	Scaler	Refer to the scaler defined in companion file North_Slope_Veg_Plots_Env_Codes_Scalars.pdf
STABILITY	Scaler	Refer to the scaler defined in companion file North_Slope_Veg_Plots_Env_Codes_Scalars.pdf
EXPOSURE SCALE	Scaler	Refer to the scaler defined in companion file North_Slope_Veg_Plots_Env_Codes_Scalars.pdf
ASPECT	Degrees	Aspect of plot area in degrees
SLOPE	Degrees	Slope of plot area in degrees
DECIDUOUS SHRUB COVER	%	Percent of plot cover that is deciduous shrubs
EVERGREEN SHRUB COVER	%	Percent of plot cover that is evergreen shrubs
FORB COVER	%	Percent of plot cover that is forbs
GRAMINOID COVER	%	Percent of plot cover that is graminoids
MOSS COVER	%	Percent of plot cover that is moss
LICHEN COVER	%	Percent of plot cover that is lichen
ROCK COVER	%	Percent of plot cover that is forbs
BARE SOIL COVER	%	Percent of plot cover that is bare soil
WATER COVER	%	Percent of plot cover that is water
MEAN MAXIMUM SHRUB HEIGHT	CM	Mean maximum vegetation height in centimeters

**North\_Slope\_Veg\_Plots\_Growthforms\_Data.csv**

Species (growth form) occurrence was **sampled at the top and bottom of the plant canopy** with a Buckner optical point sampling device at 1-meter intervals along transect lines across each site. Each site consists of a 100x100-meter square with 6 transects (4 - 50-meter and 2 - 70-meter transects) radiating from the center. Nominally, 340 points were sampled in each plot. Not observed species (growth forms) are reported as '-9999'.

**Table 4.** The .csv file contains a pair of summary tables (observations at top and bottom of the plant canopy respectively) for each of the 19 sites.

<b>SITE (1-19) (n=XXX)</b>	<u>Field site and number of points sampled along transect lines.</u>	
<b>Column 1:</b> <b>Top species or Bottom species</b>	<b>Columns 2-7:</b> <b>Name / Reported Parameters</b>	<b>Parameter Description</b>
Low evergreen shrubs	<b>LIVE FREQUENCY</b>	Occurrence of living plant growth forms (with foliar cover) along transects as observed using point sampling technique.
Low deciduous shrubs	<b>LIVE PERCENT</b>	Calculations of percent live vegetation cover are based on total number of points measured at a site (n). Since some

		points include bare soil, water, etc., the total vegetation cover is less than 100 percent.
Prostrate evergreen shrubs	DEAD FREQUENCY	Occurrence of dead plant growth forms (woody and standing dead) along transects as observed using point sampling technique.
Prostrate deciduous shrubs	DEAD PERCENT	Calculations of percent dead vegetation cover are based on total number of points measured at a site (n). Since some points include bare soil, water, etc., the total vegetation cover is less than 100 percent.
Dwarf evergreen shrubs	TOTAL FREQUENCY	Total of live and dead frequency
Dwarf deciduous shrubs	TOTAL PERCENT	Total of live and dead percent cover
Tussock graminoids		
Non-tussock graminoids		
Forbs/horsetail/clubmoss		
Bryophytes		
Lichens		

### 3. Application and Derivation

These data are useful to climate change studies.

### 4. Quality Assessment

While no specific quality assessment information was provided the data products were reviewed and curated by the GINA repository.

### 5. Data Acquisition, Materials, and Methods

The vegetation and soils at the North Slope Arctic System Science/Land-Atmosphere-Ice Interactions (ARCSS/LAII) Flux tower sites of F. S. Chapin and W. Oechel on the North Slope of Alaska were described by D. A. Walker, J. Bockheim, and C. L. Ping in 1995 and 1996. The primary source documents for this dataset are a collection of unpublished data for 29 plots by D. A. Walker. The provided data products have been compiled and curated by the GINA Staff.

**Site Description:**

The 19 ARCSS/LAII flux tower sites were located along a North-South transect from near Prudhoe Bay to the foothills of the Brooks Range on the North Slope of Alaska.

At 17 of the flux tower sites, one or more vegetation plots (29 total) were established and measurements including (1) plant species cover were recorded for the major vegetation types using the Braun-Blanquet approach and (2) plot environmental data.

The 29 plots assessed occur within 6 broad habitat types including: 1) willow shrub vegetation of riparian areas and warm habitats (4 plots), 2) wet nonacidic tundra (2 plots), 3) bog vegetation, acidic mires including tussock tundra (11 plots), 4) ruderal community on loamy soil (1 plot), 5) dry to moist dwarf-shrub heath and low shrub vegetation on acidic nutrient poor substrates (3 plots), and 6) dry and mesic dwarf-shrub and graminoid vegetation on non-acidic substrates (8 plots).

**Methods:**

Sites were 100 x 100-meter square, marked in the field with air photo panels and 4-foot lath. At most of the flux tower sites, one or more plots, including plant species cover and environmental data, were recorded for the major vegetation types using the Braun-Blanquet approach. During this study, vegetation plots were not established at Tower Site 6 (Toolik Lake) or Site 12 (W. Oechel's flux-tower site at Betty Pingo), however, growth form data transect growth form data is available. GPS coordinates were obtained for most of the plots.

The characteristics of slope, aspect, stability, exposure, parent material and geomorphology were noted at each site. Site and soil moisture and snow duration were categorized on scales of 1 to 10.

At each study site, one to four 1 x 1 x 1-meter soil pits were excavated, and detailed soil descriptions were made. See companion file

North\_Slope\_Veg\_Plots\_1995\_soil\_description.pdf.

At all 19 sites, plant growth form composition and cover were surveyed using a point sampling technique along multiple transects within each plot. Six transects (four 50-meter and two 70-meter transects) that radiated from the center point of the plot were marked with wire flags spaced at 5-meter intervals. Plant species composition and vegetation height were sampled with a Buckner optical device along the six transects at 1-meter intervals.

This dataset was provided by the GINA repository at <http://geobotanical.portal.gina.alaska.edu/catalogs/11487-alaska-arctic-vegetation-archive-north-slope-f> . For additional background information on this dataset please refer to <http://www.arcticatlas.org/support/tldatareport/index>.

## 6. Data Access

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

[Pre-ABoVE: Arctic Vegetation Plots, ARCSS/LAII Flux Sites, North Slope, AK, 1995-1996](#)

Contact for Data Center Access Information:

- E-mail: [uso@daac.ornl.gov](mailto:uso@daac.ornl.gov)
- Telephone: +1 (865) 241-3952

## 7. References

Although the details of the vegetation studies were not published independently, the studies contributed to numerous papers published in a special section of the Journal of Geophysical Research (Kane and Reeburgh, 1998).

Kane, D. L., and W. S. Reeburgh (1998), Introduction to special section: Land-Air-Ice Interactions (LAII) Flux Study, J. Geophys. Res., 103(D22), 28913–28915, <http://dx.doi.org/10.1029/1998JD200017>



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