aava_atlas2_mraynolds_2002_readme_metadata.pdf

AAVA readme file for ATLAS-2 (Council and Quartz Creek) Vegetation Plots (July 19, 2016)

Dataset Title: Alaska Arctic Vegetation Archive: ATLAS-2 (Council and Quartz Creek) Vegetation Plots

Dataset Author: Martha K. Raynolds

Alaska Arctic Vegetation Archive Dataset Name: atlas2_mraynolds (ATL2_MR)

Dataset Description:

The ATLAS-2 dataset is part of larger NSF-funded Arctic Transition in Land-Atmosphere System (ATLAS) project. ATLAS-2 contains the Seward Peninsula portion of the project with 52 plots at Council and Quartz Creek. The full ATLAS Transect also includes 15 releves at locations on the North Slope at Barrow, Atkasuk, Oumalik, and Ivotuk which are in the ATLAS-1 dataset (Edwards et al. 2000). The focus of the ATLAS project was to improve understanding of controls over spatial and temporal variability of terrestrial processes in the Arctic that have potential consequences for the climate system, i.e., processes that affect the exchange of water and energy with atmosphere, the exchange of radiatively active gases with the atmosphere, and delivery of freshwater to the Arctic Ocean. The purpose of the ATLAS vegetation studies were: 1) to characterize the major zonal vegetation types found along the North Slope climate gradient, 2) to quantify differences between acidic and non-acidic tundra along the same gradient, and 3) to investigate relationships between plant biomass, Leaf Area Index (LAI), and Normalized Difference Vegetation Index (NDVI). The data reported here are from a National Science Foundation funded, ATLAS study by D. A. Walker and colleagues titled ‘Arctic Climate Change, Substrate and Vegetation’ (OPP-9908829). The data from fieldwork completed in 2000 are compiled in a data report by Raynolds et al. (2002).

Reconnaissance fieldwork was conducted in 1998, while plot data (species and environmental) were collected in 2000. Similar to ATLAS-1 100 x 100 m grids were established an the plots were located within the grid. Although the plots were not permanently marked, there are latitude and longitude coordinates for all but one site. In the report there are 53 plots, however one plot (CC-C) had environmental data, but no species data and it was dropped from the Alaska-AVA dataset. The source species and environmental data for the plots were obtained from homogenous areas of dominant vegetation within the grids. In some cases where the vegetation was more heterogeneous, as for example in patterned ground, areas with frost boils, stone stripes, or closely spaced water tracks, samples were divided into representative

microhabitats with each releve representing a microsite within the grid. These microsites were labeled with the letters A, B, C as needed.

Forty-five plots were assigned to 5 different arctic community types: a) tall forb and shrub vegetation on mesic-moist soil (13 plots); b) dwarf-shrub heath and low shrub vegetation on acidic poor substrate (13 plots); c) bog vegetation, acidic mires, including tussock tundra (8) plots); d) dry and mesic dwarf-shrub heath and graminoid vegetation on non-acidic tundra (9 plots); and e) lichen communities on silicate rocks (2 plots). Of the remaining 7 plots, 6 are undefined forest types (C1, C4-A, C-9, C-A, C-C, C-E) and plot C-F is not included due to insufficient community data.

The report (Raynolds et al. 2002) includes select soil descriptions, soil physical and chemical data, select LAI data, subjective site assessments, and active layer depths. In addition the report includes a preliminary Landsat MSS-derived map of the Seward Peninsula, and a report on the comparison of forest composition and structure of old and new growth Picea glauca forests. Additional information on the ATLAS vegetation studies may be found at http://www.geobotany.uaf.edu/atlas/atlas_sites.html.

These data were subsequently used in several reports and publications listed below.

References:

Ahn, J. Y. 2014. Monitoring Regional Vegetation Changes in Seward Peninsula, Alaska, using Remote Sensing Technique. Masters Thesis. Department of Geomatics Engineering, University of Calgary, Calgary, Alberta, Canada.

Raynolds, M. K., Martin, C. R., Walker, D. A., Moody, A., Wirth, D., and C. Thayer-Snyder. 2002. Atlas Vegetation Studies: Seward Peninsula, Alaska, 2000, vegetation, soil, and site information, with Seward vegetation map. Alaska Geobotany Center, Institute of Arctic Biology, University of Alaska, Fairbanks. 125 pp.

Thayer-Snyder, C. R., H. A. Maier, and D. A. Walker. 2003. A preliminary Landsat-derived land-cover map of the Seward Peninsula, Alaska: classification methods and comparison with existing data sets. ATLAS The Arctic Transitions in the Land-Atmosphere System (ATLAS) project: Seward Peninsula Sites. http://www.eol.ucar.edu/projects/atlas/. Accessed 12 May 2015.

Walker, D. A., G. J. Jia, H. E. Epstein, M. K. Raynolds, F. S. Chapin III, C. Copass, L. D. Hinzman, J. A. Knudson, H. A. Maier, G. J. Michaelson, F. Nelson, C. L. Ping, V. E. Romanovsky and N. Shiklomanov. 2003. Vegetation-soil-thaw-depth relationships along a

low-arctic bioclimate gradient, Alaska: synthesis of information from the ATLAS studies. Permafrost and Periglacial Processes. 14:103-123.

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Direct Plot Archive Record Link: http://geobotanical.portal.gina.alaska.edu/manager/catalogs/10671-alaska-arctic-vegetation-archive-atlas-2-rayn

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Link to VegBank Record: Add when available

Missing data: Indicated by '-9999' for numerical data and 'n/a' for categorical or text data

Files Available for Download:

1) AAVA ATLAS-2 Modified Source Data

1a) ATLAS-2 Species Cover
aava_atlas2_mraynolds_2002_spp_modsrc.csv
aava_atlas2_mraynolds_2002_spp_modsrc.xlsx

These files contain species cover data for the ATLAS-2 vegetation studies in both comma separated value (.csv) and Microsoft Excel (.xlsx) format. The source of these data is the data report Raynolds et al. (2002, Table 12). 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. Species cover classes are old Braun Blanquet: r (rare), + (common, but less than 1 percent cover), 1 (1 to 5 percent), 2 (6 to 25 percent), 3 (26 to 50 percent), 4 (51 to 75 percent), 5 (76 to 100 percent). In one instance, taxa were lumped into a single taxon in the PASL: 1) Dicranum spadiceum = (Dicranum angustum and Dicranum spadiceum). The field plot numbers in the source data are the author's. The main plot numbers in the Turboveg database are accession numbers and will differ. The author's plots were numbered following a 'letter(s), number, and letter' system, where the first letter(s) equal(s) the location of grid: C=Council, BH=Blueberry Hill, QC=Quartz Creek, CC=Cassiope Cone, or Lava, the number equals the plot number, and the letter(s), if present, A, B, C etc., equal the plot microsite. The field numbers are retained in the 'Field releve number' field in

the Turboveg database.

1b) ATLAS-2 Environmental Data
aava_atlas2_mraynolds_2002_allenv_modsrc.csv
aava_atlas2_mraynolds_2002_allenv_modsrc.xlsx

These files contain modified environmental data for the ATLAS-2 vegetation studies in both .csv and .xlsx format. The source of these data is the ATLAS-2 data report by Raynolds et al. (2002); Tables 8, 9, 11, and 16, original datasheets, and author communication, in that order. The header data in the Turboveg database only includes a subset of these data. The field plot numbers in the source data are the author's. The main plot numbers in the Turboveg database are accession numbers and will differ. The field plot numbers in the source data are the author's. The main plot numbers in the Turboveg database are accession numbers and will differ. The author's plots were numbered following a 'letter(s), number, and letter' system, where the first letter(s) equal(s) the location of grid: C=Council, BH=Blueberry Hill, QC=Quartz Creek, CC=Cassiope Cone, or Lava, the number equals the plot number, and the letter(s) A, B, C etc., if present, equal the plot microsite. The field numbers are retained in the 'Field releve number' field in the Turboveg database.

Improvements to the source data include: 1) Data for aspect, slope were given for only one microsite but were applied across all micro sites (A, B, C etc. as necessary)., 2) Plot shape was provided by the author (D. A. Walker), and 3) For the modified source data, decimal degree latitudes and longitudes (Table 8) were used for plots C-5,9,13,14,15,16,17,19; C-A,D,E; CC; Lava; and QC25,35,49. Universal Transverse Mercator or Degree Decimal Minutes measurements (Table 9) were used for plots C-3 and BH-1. Based on Color Infrared photos used in the field under consultation with the authors, new latitudes and longitudes were assigned for plots C-1,2,3,4,6,8,18; C-C,F,H; and QC-38,45. Final data are presented as WGS 84 decimal degrees.

2) AAVA ATLAS-2 Turboveg Database
aava_atlas2_mraynolds_2002_tv.zip

This file is the ATLAS-2 Turboveg Database file (.dbf). Turboveg is a software program for managing vegetation-plot data (see http://www.synbiosys.alterra.nl/turboveg/). The database includes both species cover and environmental header data. The header data for the database are consistent across all datasets in the AAVA. There are both required and recommended fields for inclusion in the AAVA. Consequently, only a subset of the modified source environmental data are included in the database and these may be cross-walked to the AAVA data dictionary. The species nomenclature used in the database is according to the Panarctic Species List (beta 1.1) created for the Arctic Vegetation Archive. The current data dictionary and PASL files are required for the correct use of these data in Turboveg. These

files are updated periodically and available for download via ‘Data and Resources’ section of the data record.

For the crosswalk from the modified source data to the Turboveg database, we made the following changes: 1) slope was given as a range in several instances and a mean was calculated to crosswalk to Turboveg for these plots, 2) aspect given as cardinal and inter cardinal directions were converted to degrees, and in several cases aspect was assigned as too flat to determine or too irregular to determine based on photographs and communications with the authors, 3) vegetation cover values of r (rare) and + (common but less than 1 percent) were converted to 1 percent as an integer is required for Turboveg, and 4) soil texture for the releves were abbreviated to the major soil separates, plus gravel and loam.

3) AAVA ATLAS-2 Ancillary Data

3a) ATLAS-2 Location Map
aava_atlas2_mraynolds_2002_plotmap_anc.jpg

This file is a plot map of the ATLAS-2 releves. All releves occur within the grids.

3b) ATLAS-2 Photos
aava_atlas2_mraynolds_2002_plotphotos_anc.txt

These are photos of the individual releves.

3c) ATLAS-2 Soils Data
aava_atlas2_mraynolds_2002_soilchemistry_anc.csv
aava_atlas2_mraynolds_2002_soilchemistry_anc.xlsx
aava_atlas2_mraynolds_2002_soildescript_anc.csv
aava_atlas2_mraynolds_2002_soildescript_anc.xlsx
aava_atlas2_mraynolds_2002_soilmoisture_anc.csv
aava_atlas2_mraynolds_2002_soilmoisture_anc.xlsx

Soils were described, and soil samples were collected at most releves (Raynolds et al. 2002, Tables 16, 17, and 18). Soil samples were dried and weighed to calculate soil moisture. Soil chemical and size composition were analyzed at the Palmer Experimental Laboratory. See aava_atlas2_mraynolds_soilslegend_metadata.pdf for code definitions.

3d) AAVA ATLAS-2 Spectral Data
aava_atlas2_mraynolds_2002_selectreleve_lai_anc.csv
aava_atlas2_mraynolds_2002_selectreleve_lai_anc.xlsx

LAI (Leaf Area Index) data were obtained at select releves using a LICOR-2000 Plant Canopy Analyzer. An above-canopy reading (control) was followed by one below-canopy reading (which was taken above the moss layer). All measurements were taken facing away from the sun and

an umbrella was used to shade the sensor on sunny days. A 90 degree field-of-view shield was used to prevent interference from observers. LAI was calculated for each point, and a mean LAI was calculated (Raynolds et al. 2002; Table 15).

3e) ATLAS-2 Publications
ahnj_2014_msterthesis_councilvegchng_remotesense.pdf
raynoldsm_2002_datareport_sewardvegdata.pdf
thayer-snyderc_2003_prelimlandsatmssderivedlandcovmap_seward.pdf
walkerd_2003_permafrostperiglac_vegsoilthawatlasgrid.pdf

These are the Adobe Acrobat portable document files (.pdf) of all of the references cited in the dataset description (above) for the ATLAS-2 vegetation studies. Journal names are abbreviated using the standards for the abbreviation of titles of periodicals and serial titles.

4) AAVA ATLAS-2 Metadata
aava_atlas2_mraynolds_2002_envlegend_metadata.docx
aava_atlas2_mraynolds_2002_envlegend_metadata.pdf
aava_atlas2_mraynolds_2002_readme_metadata.txt
atlas2_mraynolds_2002_soilslegend_metadata.pdf

The readme file and metadata legend for the modified environmental data are specific to the ATLAS-2 vegetation study plots. The soils legend provides definitions for codes used in the soil description file.

Modifications to environmental source data:

The table below in comma separated values format indicates the modifications made to source data in the preparation of the AAVA ATLAS-2 Modified Source Environmental Data files (aava_atlas2_mraynolds_2002_allenv_modsrc.csv and aava_atlas2_mraynolds_2002_allenv_modsrc.xlsx) and fields that were used to crosswalk these data to the Turboveg database (aava_atlas2_mraynolds_2002_tv.zip).

VARIABLE,IN ENVIRONMENTAL MODIFIED SOURCE DATA FILE,IN TURBOVEG FILE AS THE SAME NAMED FIELD,DATA SOURCE AND CHANGES MADE TO DATA.
RELEVE NUMBER,Y,Y,"Table 8, Raynolds et al. 2002. The author’s plots were numbered following a 'letter(s), number, and letter' system, where the first letter(s) equal(s) the location of grid: C=Council, BH=Blueberry Hill, QC=Quartz Creek, CC=Cassiope Cone, or Lava, the number equals the plot number, and the letter(s), if present, A, B, C etc., equal the plot microsite."
DATE,Y,Y,"Table 8, Raynolds et al. 2002."
LATITUDE (DD) WGS 84,Y,Y,"Table 8, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed. For the modified source data, decimal degree latitudes and longitudes (Table 8) were used for

plots C-5,9,13,14,15,16,17,19; C-A,D,E; CC; Lava; and QC25,35,49. Universal Transverse Mercator or Degree Decimal Minutes measurements (Table 9) were used for plots C-3 and BH-1. Based on Color Infrared photos used in the field under consultation with the authors, new latitudes and longitudes were assigned for plots C-1,2,3,4,6,8,18; C-C,F,H; and QC-38,45. Final data is presented as WGS 84 decimal degrees."
LONGITUDE (DD)WGS 84,Y,Y,"Table 8, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed. For the modifled source data, decimal degree latitudes and longitudes (Table 8) were used for plots C-5,9,13,14,15,16,17,19; C-A,D,E; CC; Lava; and QC25,35,49. Universal Transverse Mercator or Degree Decimal Minutes measurements (Table 9) were used for plots C-3 and BH-1. Based on Color Infrared photos used in the field under consultation with the authors, new latitudes and longitudes were assigned for plots C-1,2,3,4,6,8,18; C-C,F,H; and QC-38,45. Final data is presented as WGS 84 decimal degrees."
ELEVATION (M),Y,Y,"Table 8, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
SITE LOCATION AND DESCRIPTION,Y,N,"Table 8, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed. These site descriptions are included in Turboveg field 'Remarks.' The description for C-8 was modified - it is not near Grid C-1."
ADDITIONAL DESCRIPTION,Y,N,"Table 8, Raynolds et al. 2002. Included in Turboveg field 'Remarks.'"
PLANT COMMUNITY,Y,Y,"Table 8, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed. Aided with crosswalk to Turboveg field 'Habitat Type.'"
SLOPE (DEGREES),Y,Y,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed. For entry into Turboveg L. Druckenmiller, in consultation with the authors, calculated the mean where there was a range of data, and choose -1 for too flat to determine and -2 for too irregular to determine where appropriate. Turboveg field 'Slope.'"
THAW DEPTH (CM) MEAN PLUS OR MINUS STANDARD ERROR,Y,N,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
ASPECT (DEGREES),Y,Y,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed. Converted to degrees for entry into Turboveg field 'Aspect.'"
ELEVATION (M),Y,Y,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
LAND FORM (SCALAR),Y,N,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
SURFICIAL GEOLOGY (SCALAR),Y,Y,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed. Aided with the crosswalk to Turboveg field 'Surficial Geology.'"
SURFACE GEOMORPHOLOGY (SCALAR),Y,N,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
MICROSITES,Y,N,"Table 9, Raynolds et al. 2002. Applied data to

microsites A, B, and C etc., as needed. In modified source data there is no definition for code 12 and it could not be ciphered without the physical datasheets."
SITE MOIST (SCALAR),Y,Y,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
SOIL MOIST (SCALAR),Y,N,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
GLACIAL GEOLOGY (CODE),Y,N,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
TOPOGRAPHIC POSITION (SCALAR),Y,Y,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed. Cross-walked to Turboveg field 'Topographic Position.'"
SOIL UNITS,Y,N,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
EXPOSURE (SCALAR),Y,N,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
SNOW (SCALAR),Y,N,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
DISTURBANCE (SCALAR) PLUS TYPE OF DISTURBANCE,Y,N,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
STABILITY (SCALAR),Y,N,"Table 9, Raynolds et al. 2002. Applied data to microsites A, B, and C etc., as needed."
NOTES (DATASHEETS),Y,N,"Table 9, Raynolds et al. 2002."
COVER TREES (PERCENT),Y,Y,"Table 11, Raynolds et al. 2002."
COVER TALL SHRUBS (PERCENT),Y,Y,"Table 11, Raynolds et al. 2002."
COVER LOW SHRUBS (PERCENT),Y,Y,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
COVER DWARF SHRUBS (PERCENT),Y,Y,"Table 11, Raynolds et al. 2002. Data was separated into two columns erect- dwarf shrub cover and prostrate dwarf shrub cover for the Turboveg database. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
COVER EVERGREEN SHRUBS (PERCENT),Y,N,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
COVER DECIDUOUS SHRUBS (PERCENT),Y,N,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
COVER FORBS (PERCENT),Y,Y,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
COVER GRAMINOIDS (PERCENT),Y,Y,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
COVER LICHENS (PERCENT),Y,Y,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
COVER BRYOPHYTES (PERCENT),Y,Y,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is

required to meet Turboveg standards."
ROCKS (PERCENT COVER),Y,Y,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
BARE SOIL (PERCENT COVER),Y,Y,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
WATER (PERCENT COVER),Y,Y,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
FROST SCARS (PERCENT COVER),Y,N,"Table 11, Raynolds et al. 2002. Cover values given as + or r were rounded up to 1.0 percent as an integer is required to meet Turboveg standards."
TOTAL DEAD (PERCENT COVER),Y,Y,"Table 11, Raynolds et al. 2002."
CANOPY HEIGHT (CM),Y,Y,"Table 11, Raynolds et al. 2002. In 6 instances multiple measurements were given for a plot. In these cases data is retained in the modified source data, but recorded as -9 for the Turboveg field 'Mean Height'"
COMMENTS,Y,N,"Table 11, Raynolds et al. 2002."
DEPTH OF ORGANIC LAYER,Y,Y,"Table 18, Raynolds et al. 2002. L. Druckenmiller used the soil description data to estimate organic layer depth where present."
SOIL TEXTURE (FROM TOP MINERAL HORIZON),Y,Y,"Table 18, Raynolds et al. 2002. Soil abbreviations follow U.S. Department of Agriculture, Natural Resources Conservation Service standards. Soil texture is primarily from the top mineral horizon per the soil descriptions; secondarily from 10 cm, or are assigned 'organic' when no mineral horizon is present. Crosswalked to the Turboveg field 'Soil texture.'"
SOIL PH (PASTE),Y,Y,"Table 18, Raynolds et al. 2002."
FIELD OBSERVERS,Y,N,Datasheets.
PHOTO NUMBERS,Y,N,Datasheets.
PLOT SIZE (METER X METER),Y,Y,Datasheets. L. Druckenmiller calculated area of plot in square meters for Turboveg field 'Releve area.'
MICROSITE,Y,N,Datasheets.
WEATHER,Y,N,Datasheets.
STUDY AREA,Y,N,"Datasheets. Applied data to microsites A, B, and C etc., as needed. Study area data is included in Turboveg field 'Remarks.'"
THAW DEPTHS (CM),Y,N,Datasheets.