



The Russia portion of the new Raster Circumpolar Arctic Vegetation Map (CAVM)

Martha K. Raynolds, Donald A. Walker, and Raster CAVM Team (see citation below)

Institute of Arctic Biology, University of Alaska Fairbanks, mkaynolds@alaska.edu



Introduction

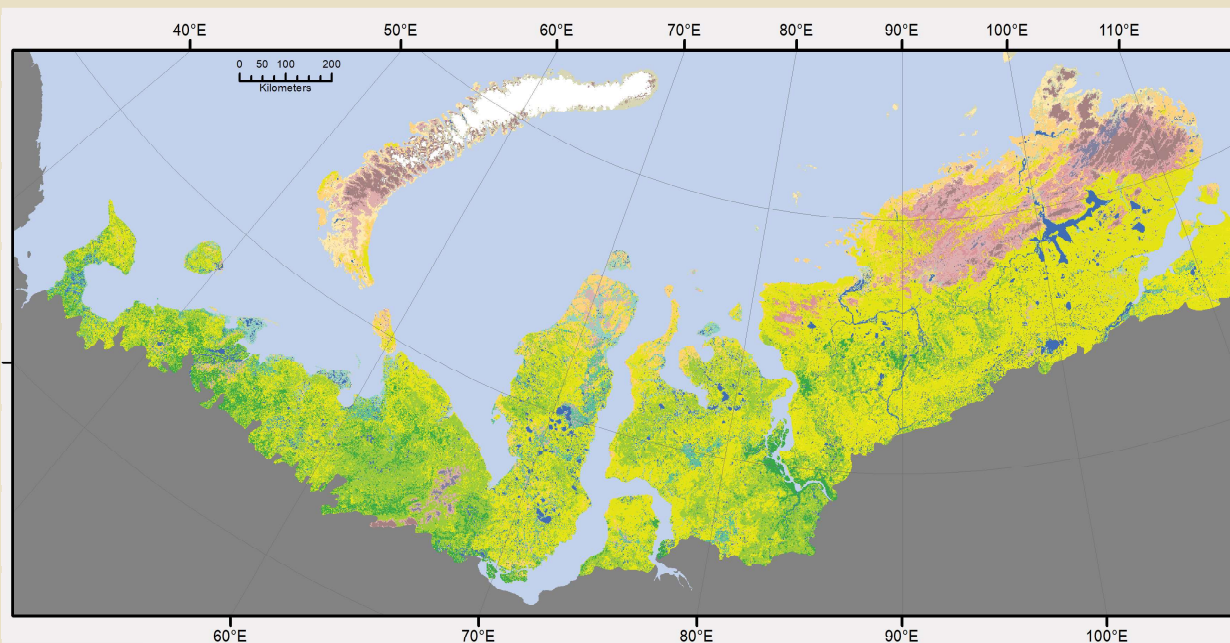
The Raster Circumpolar Arctic Vegetation Map (CAVM) shows the dominant physiognomy of the vegetation of the Arctic, with 16 vegetation types. It was created to improve on the original vector (polygon) CAVM. The raster format matches satellite data, and is commonly used by modelers and other researchers. The Raster CAVM has 1-km pixels, compared to the minimum mapping unit of 14 km for the original CAVM. This poster presents the Russian portion of the Raster CAVM.

Methods

Unsupervised classification of 18 regions of the Arctic used seven data layers: AVHRR Band 1, Band 2 and NDVI (Markon 1995), MODIS Band 1, Band 2 and NDVI (Trishchenko et al. 2009), and elevation (ESRI 1993). The resulting units were then modelled to the CAVM types using a variety of ancillary layers: climate data, substrate maps, regional vegetation maps, and ground studies.

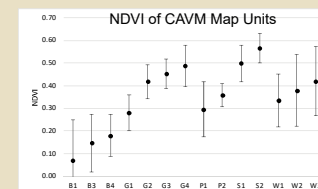
Map extent and projection are the same as the original CAVM. The same legend was used as the original CAVM. The spatial resolution of the raster CAVM is 1 km.

The map was reviewed by experts (see list in citation below) with experience mapping the vegetation of their particular regions, including many of the original authors of the CAVM. This expert input was used to revise and improve the map.

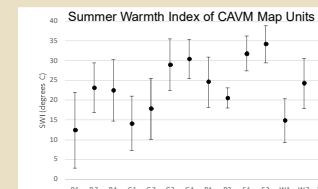


Legend

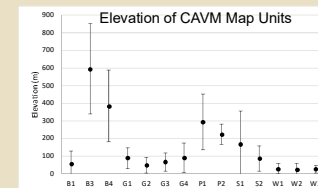
- B1 - Cryptogam, herb barren
- B3 - Noncarbonate mountain complex
- B4 - Carbonate mountain complex
- G1 - Rush/grass, forb, cryptogam tundra
- G2 - Graminoid, prostrate dwarf-shrub, forb tundra
- G3 - Nontussock sedge, dwarf-shrub, moss tundra
- G4 - Tussock sedge, dwarf-shrub, moss tundra
- P1 - Prostrate dwarf-shrub, herb tundra
- P2 - Prostrate/Hemiprostrate dwarf-shrub tundra
- S1 - Erect dwarf-shrub tundra
- S2 - Low shrub tundra
- W1 - Sedge/grass, moss wetland
- W2 - Sedge, moss, dwarf-shrub wetland
- W3 - Sedge, moss, low-shrub wetland
- FW - Fresh water



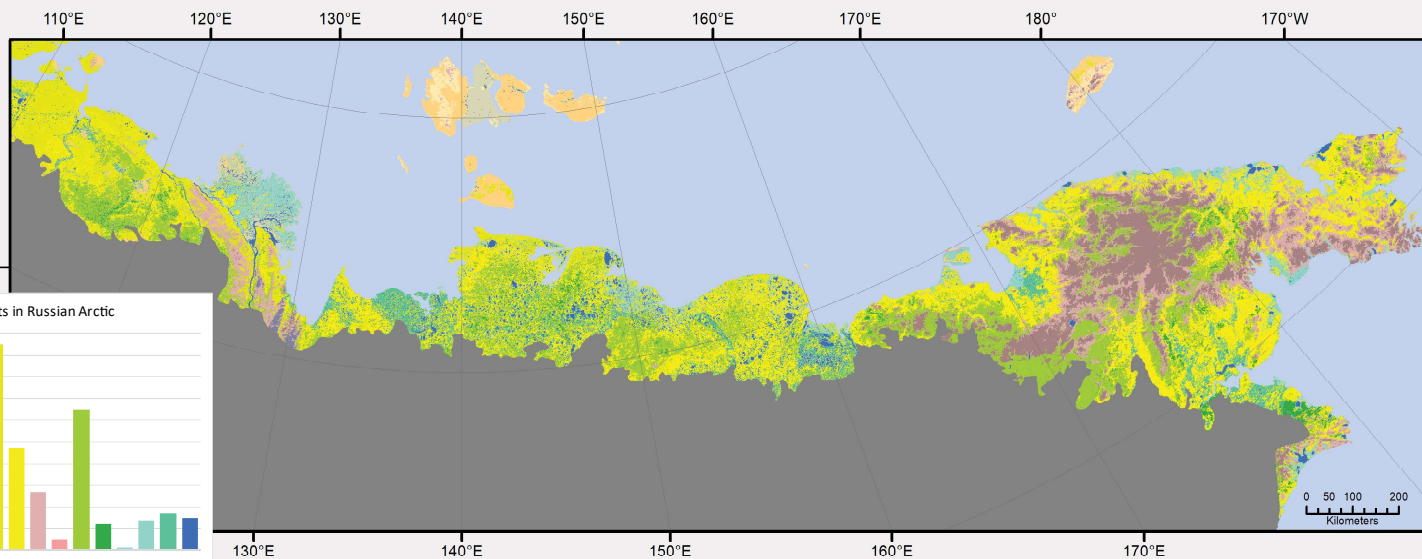
Mean and standard deviation of MODIS NDVI for each of the CAVM map units. Values are averaged across the whole Russian Arctic. The MODIS data are from a circular maximum NDVI composite produced by the Canadian Centre for Remote Sensing, from a mid-summer compositing window for the years 2000–2009 (Trishchenko et al. 2009).



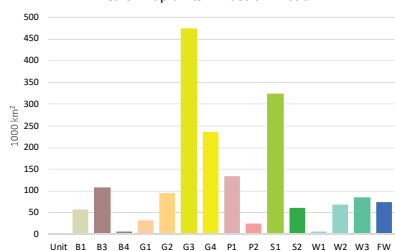
Mean and standard deviation of Summer Warmth Index (SWI) for each of the CAVM map units. Values are averaged across the whole Russian Arctic. The SWI data are calculated as the sum of annual monthly means above 0 °C, based on AVHRR surface temperature 1982–2003 (Raynolds et al. 2008).



Mean and standard deviation of elevation for each of the CAVM map units. Values are averaged across the whole Russian Arctic. Elevation data are from the Digital Chart of the World (ESRI 1993).



Area of map units in Russian Arctic



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Raster CAVM data available at www.geobotany.uaf.edu

Citation for Raster CAVM

Raynolds, M.K., Walker, D.A., Balser, A., Bay, C., Campbell, M.W., Cherosov, M.M., Daniels, F.J.A., Eideisen, P.B., Ermokhina, K.A., Frost, G.V., Jedrzek, B., Jorgenson, M.T., Kennedy, B.E., Kholod, S.S., Lavinenko, I.A., Lavinenko, O., Magnússon, B., Mettäläsmä, S., Olthof, I., Pospelov, I.N., Pospelova, E.B., Pouliot, D., Razzhivin, V.Y., Schaepman-Strub, G., Šibík, J., Telyatnikov, M.Y., & Troeva, E. 2019 (in review). A raster version of the Circumpolar Arctic Vegetation Map (CAVM). Remote Sensing of Environment.

References

ESRI (1993). Digital Chart of the World. In: Redlands, CA: Environmental Systems Research Institute, Inc. Markon, C.J., Fleming, M.D., & Binnian, E.F. (1995). Characteristics of vegetation phenology over the Alaskan landscape using AVHRR time-series data. Polar Record, 31, 179–190. Raynolds, M.K., Comiso, J.C., Walker, D.A., & Verbyla, D. (2008). Relationship between satellite-derived land surface temperatures, arctic vegetation types, and NDVI. Remote Sensing of Environment, 112, 1884–1894. Trishchenko, A.P., Luo, Y., Khlopenkov, K.V., Park, W.M., & Wang, S. (2009). Arctic circumpolar mosaic at 250m spatial resolution for IPY by fusion of MODIS/TERRA land bands B1–B7. International Journal of Remote Sensing, 30, 1635–1641.



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