Northern Circumpolar Soils Map, Version 1

USER GUIDE

How to Cite These Data

As a condition of using these data, you must include a citation:

Tarnocai, C., J. Kimble, D. Swanson, S. Goryachkin, Y. M. Naumov, V. Stolbovoi, B. Jakobsen, G. Broll, L. Montanarella, A. Arnoldussen, O. Arnalds, and M. Yli-Halla. 2002. *Northern Circumpolar Soils Map, Version 1*. [Indicate subset used]. Ottawa, Canada. Research Branch, Agriculture and Agri-Food Canada. https://doi.org/10.7265/eb1s-4551. [Date Accessed].

NSIDC National Snow and Ice Data Center

TABLE OF CONTENTS

1 DATA DESCRIPTION

This data set consists of a circumpolar map of dominant soil characteristics, with a scale of 1:10,000,000, covering the United States, Canada, Greenland, Iceland, northern Europe, Russia, Mongolia, and Kazakhstan. The map was created using the Northern and Mid Latitude Soil Database. The map is in ESRI Shapefile format, consisting of 11 regional areas. Polygons have attributes that give the percentage polygon area that is a given soil type. The map shows the dominant soil of the spatial polygon unless the polygon is over 90 percent rock or ice. It also shows the proportion of polygon encompassed by the dominant soil or nonsoil. Soils include turbels, orthels, histels, histosols, mollisols, vertisols, aridisols, andisols, entisols, spodosols, inceptisols (and hapludolls), alfisols (cryalf and udalf), natric great groups, aqu-suborders, glaciers, and rocklands. Data are available via ftp.

1.1 Parameters

General soil classifications include the United States Department of Agriculture Soil Taxonomy. Soils include turbels, orthels, histels, histosols, mollisols. vertisols, aridisols, andisols, entisols, spodosols, inceptisols (and hapludolls), alfisols (cryalf and udalf), natric great groups, aqu-suborders, glaciers, and rocklands.

Smaller inset maps on the .rtl map show the circumpolar distribution of gelisols (turbels, orthels, and histels), and the ice content (low, medium, or high) of circumpolar soil materials (from the International Permafrost Association, 1997).

1.2 File Information

1.2.1 Format

The map is in a vector format stored as ESRI Shapefile spatial data format (ArcView file). The Shapefiles are most easily imported into ESRI's ArcView, but most other GIS packages can import Shapefile data. ESRI also provides a free basic GIS package, ArcExplorer, on the ESRI web site.

The map is also available in rasterized in a .rtl form, and can be sent to a printer on a Unix system using the lp command. Polar.rtl produces the Northern Circumpolar Soil Map at 1:10 000 000.

The map consists of Shapefiles for 11 regions. Each Shapefile consists of three files: filename.dbf (attribute data), filename.shp (feature geometry) and filename.shx (feature geometry index). All maps were converted from e00 files to ESRI Shapefiles using the ARCSHAPE command. When necessary, field names in attribute tables were changed so that they conformed to the 10-character limit for field names in dBase .dbf.

All coverages, except ITALY have .PAT files of the following format (data is in the US soil classification system). The Italy cover does not have any distribution values but it does retain the WRB classification and its legend dominant mapping symbol (US).

AREA (metres)

PERIMETER

COVER# (internal ARC/INFO #)

COVER-ID (internal ARC/INFO ID#)

MAPUNIT_ID (link to original source data, 7 CHAR)

GELISOL_PCT (3 Integer - percentage of polygon that is Gelisol)

HISTOSOL_PCT (3 Integer - percentage of polygon that is Histosol)

MOLLISOL_PCT (3 Integer - percentage of polygon that is Mollisol)

VERTISOL_PCT (3 Integer - percentage of polygon that is Vertisol)

ARIDISOL_PCT (3 Integer - percentage of polygon that is Aridisol)

ANDISOL_PCT (3 Integer - percentage of polygon that is Andisol)

ENTISOL_PCT (3 Integer - percentage of polygon that is Entisol)

ULTISOL_PCT (3 Integer - percentage of polygon that is Ultisol)

SPODOSOL_PCT (3 Integer - percentage of polygon that is Spodosol)

INCEPTISOL_PCT (3 Integer - percentage of polygon that is Inceptisol)

ALFISOL_PCT (3 Integer - percentage of polygon that is Alfisol)

NATRIC_PCT (3 Integer - percentage of polygon that is Natric type)

AQU_PCT (3 Integer - percentage of polygon that is Aqu suborder)

TURBEL_PCT (3 Integer - percentage of polygon that is Turbel of the Gelisol order)

ORTHEL_PCT (3 Integer - percentage of polygon that is Orthel of the Gelisol order)

HISTEL_PCT (3 Integer - percentage of polygon that is Histel of the Gelisol order)

ROCKLAND_PCT (3 Integer - percentage of polygon that is rockland)

GLACIER_PCT (3 Integer - percentage of polygon that is glacier)

MISC_PCT (3 Integer - percentage of polygon that is miscellaneous)

1.2.2   File Contents

ggd602_soils_alaska.dbf
ggd602_soils_alaska.shp
ggd602_soils_alaska.shx

ggd602_soils_canada.dbf
ggd602_soils_canada.shp
ggd602_soils_canada.shx

ggd602_soils_conusa.dbf
ggd602_soils_conusa.shp
ggd602_soils_conusa.shx

ggd602_soils_eurasia.dbf
ggd602_soils_eurasia.shp
ggd602_soils_eurasia.shx

ggd602_soils_greenland.dbf
ggd602_soils_greenland.shp
ggd602_soils_greenland.shx

ggd602_soils_iceland.dbf
ggd602_soils_iceland.shp
ggd602_soils_iceland.shx

ggd602_soils_italy.dbf
ggd602_soils_italy.shp
ggd602_soils_italy.shx

ggd602_soils_kazakstan.dbf
ggd602_soils_kazakstan.shp
ggd602_soils_kazakstan.shx

ggd602_soils_mexico.dbf

ggd602_soils_mexico.shp

ggd602_soils_mexico.shx

ggd602_soils_mongolia.dbf

ggd602_soils_mongolia.shp

ggd602_soils_mongolia.shx

ggd602_soils_svalbrd.dbf

ggd602_soils_svalbrd.shp

ggd602_soils_svalbrd.shx

1.3 Spatial Information

1.3.1 Coverage

The map covers polar and mid-latitude regions of the northern hemisphere: Alaska, Canada, Contiguous USA (conusa), Eurasia, Greenland, Iceland, Kazakstan, Mexico, Mongolia, Italy, Svalbard.

2 DATA ACQUISITION AND PROCESSING

2.1 Processing

Following is a quick tutorial for defining the projection of this data set in ArcGIS. These steps were tested with ArcGIS 9:

1. Open ArcToolbox. Select Data Management Tools --> Projections and Transformations --> Define Projection.
2. In the Define Projection window, select an input shapefile for the "Input Dataset or Feature Class" field. The "Coordinate System" field now says "Unknown." Click the icon to the right of the "Coordinate System" field.
3. In the Spatial Reference Properties window that appears, click Select to select a predefined coordinate system. Click Projected Coordinate Systems --> Polar. Select North Pole Lambert Azimuthal Equal Area.prj. Click Add.
4. Back in the Spatial Reference Properties window, click Modify. Change the parameters to the following:
   - False_Easting: 0.0
   - False_Northing: 0.0
   - Central_Meridian: 180.0
   - Latitude_Of_Origin: 90.0

Leave the "Linear Unit" as meters. In the "Geographic Coordinate System" section, click Modify. For "Datum" and "Spheroid" select <custom>. For "Semimajor axis" and "Semiminor axis" enter 6370997.00. Click OK until the Define Projection wizard runs. The shapefiles are now projected.

3   CONTACTS AND ACKNOWLEDGMENTS

Charles Tarnocai
Agriculture and Agri-Food Canada
Research Branch (ECORC)
K.W. Neatby Building, Rm. 1135
960 Carling Avenue
OTTAWA, Canada, K1A 0C

4   REFERENCES

Arnalds, O. and E. Gretarsson. 2001. *Generalized Soil Map of Iceland. 2nd Edition*. Agricultural Research Institute (Rala), Reykjavik, Iceland.

Cryosol Working Group. 2001. *Northern and Mid Latitude Soil Database, Version 1*. National Soil Database, Research Branch, Agriculture and Agri-Food Canada, Ottawa, Canada.

Dorzhgotov, D. and N.A. Nogina. 1990. Khors (The Soil Map of Mongolia). pp. 66-67 in: *Undesniy Atlas (Atlas of Mongolia).* BNMAU-in Shinzhlekh Ukhaany Akademi, Ulan Bator, Mongolia.

European Soil Bureau. 1999. *The European Soil Database, version 1.0*. CD-ROM. Ipra, Italy.

Fridland, V.M. (editor). 1998. *Pochvennaya Karta RSFSR* (Soil Map of the Russian Republic), RSFSR. V.V. Dokuchayev Soils Institue, Moscow, Scale 1:2,500,000.

International Permafrost Association. 1997. *Circum-Arctic Map of Permafrost and Ground Ice Conditions*. (J. Brown, O.J. Ferrians Jr., J.A. Heginbottom, E.S. Melnikov, Eds.). U.S. Geological Survey, Information Services, Denver, Colorado, US.

Jakobsen, B.H. and A. Eiby. 1997. *A Soil Map of Greenland*. II International Conference, Cryopedology, August 1997, Syktyvkar, Russia.

Schlesinger, W.H. and J.F.B. Mitchell. 1987. Climate model simulations of the equilibrium climatic response to increased carbon dioxide*. Rev. Geophys.* 25:760-798.

Soil Classification Working Group. 1998. *The Canadian System of Soil Classification*. Third Ed. Agriculture and Agri-Food Canada Publ 1646 (Revised), 187 pp.

Soil Science Staff. 1999. *A Basic System of Soil Classification for Making and Interpreting Soil Surveys*, Second Ed. NRCS, USDA, Lincoln, NE, US.

Tarnocai, C. and B. Lacelle. 1996. *The Soil Organic Carbon Digital Database of Canada*. Research Branch, Agriculture Canada, Ottawa, Canada.

US Soil Conservation Service. 1994. *The State Soil Geographic Database*, STATSGO. NRCS, USDA, Lincoln, NE, US.

Uspanov. U.U. (Ed.). 1976. *Pochvennaya Karta Kazakhskoy SSR* (Soil Map of the Kazakh SSR). GUGK, Moscow, Scale 1:2,500,000.

5   DOCUMENT INFORMATION

5.1 Publication Date

11 December 2002

5.2 Date Last Updated

01 March 2021