
Permafrost of the Usa River Basin, Version 1

USER GUIDE

How to Cite These Data

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

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National Snow and Ice Data Center

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1 DATA DESCRIPTION

The map consists of ESRI Shapefiles of the Usa River basin, Russia, including Lek-Vorkuta and Bolshaya Rogovaya. There are four data layers in the data set: a base map layer, a permafrost layer, and two key (permafrost) areas. Each data layer comprises several sub-layers. The map is based on a UTM 41 projection with the WGS 1984 spheroid. Parameters include permafrost temperature and degree of continuity; permafrost temperature classes, lithology, and stratigraphy; thermokarst, pingos, mass ground ice, and topography, lakes, large rivers (in streams), rivers, and watershed boundary. Data are available via ftp.

1.1 Parameters

This data set consists of permafrost temperature and degree of continuity; permafrost temperature classes, lithology, and stratigraphy; thermokarst, pingos, mass ground ice, and topography, lakes, large rivers (in streams), rivers, and watershed boundary.

1.2 File Information

1.2.1 Format

There are four data layers in the data set. Each data layer comprises several layers. The data layers are a location map (jpeg file), a base map layer, a permafrost layer, and two key (permafrost) areas. Each layer is stored as ESRI Shapefile spatial data format. The Shapefiles are most easily imported into ESRI's ArcView, but most other GIS packages can import Shapefiles. ESRI also provides a free basic GIS package, ArcExplorer, on the ESRI web site.

The Shapefiles for each layer consist of the files:

- ggd614_descriptive_text.dbf (attribute data)
- ggd614_descriptive_text.shp (feature geometry)
- ggd614_descriptive_text.shx (feature geometry index)
- ggd614_project.apr (ArcView project file)

1.2.2 File Contents

The ESRI Shapefiles range from 102 B to 3.87MB.

1.2.2.1 Base map Layer

Layer: ggd614_streams
Data type: polygons
Description: large rivers

Attributes: Elevations a.s.l. for each contour are given in the attribute table of the layer "Hyp_line" (lines). width_mid - the average object width (e.g., average width of each river polygon). There are three classes 0, 29, and 30. 29 is "more than 120m", 30 is "200m or more", and 0 is not explained but probably is "no data."

Speed, water, width_plac, and ground attributes were not explained and had no data, so they have been removed.

Layer: ggd614_river
Data Type: line, Represents: smaller rivers
Attributes: length - is river length in meters
Layer: ggd614_lake (aqua)
Data Type: polygon
Coverage layer: lakes
Attributes: area - in square meters and hectares

1.2.2.2 Permafrost Layer

Layer: ggd614_permafrost
Data type: polygon
Description: permafrost regions
Attributes:

The attribute table contains permafrost temperature classes, lithology and stratigraphy classes. All classes in the attribute table are given as codes. Explanation of the codes are in the tables "ggd614_pfstroclass.dbf", "ggd614_lithoclass.dbf" and "ggd614_stratclass.pdf", respectively, which can be joined to the attribute table of the layer.

There are also four point layers: "Thermokarst and other cryogenic processes", "Frost mounds with massive ice", "Massive ground ice" and "Reference boreholes". To get details of a particular borehole, identify its number using Info button and then find the number in the table "ggd614_borehole_cat.dbf".

pertemp - This is a character field of width 2. There are nine possible values for the field. Values range from 1 to 9. These values correspond to annual (soil? ground?) temperature (degrees C) and a descriptive field that describes map zones as continuous, isolated and sporadic. The annual temperature values and descriptive fields that correspond to each value are given in ggd630_pfstroclass.dbf.

geology - This is a 16 character field that describes the geology and stratigraphy. Values are alphanumeric (eg a III, Pz). Lowercase letters describe rock type (sedimentary, metamorphic etc) and deposit. Sedimentary deposits as the type of deposit, a for alluvial, c for colluvial, g for glacial etc. Uppercase letters and roman numerals denote chronostratigraphic units (e.g. Palaeozoic, Upper Pleistocene, Quarternary). No distinction is made between rock types for the Proterozoic and Palaeozoic (US Palaeozoic) eras. Explanations for these alphanumeric codes are given in ggd630_stratclass.dbf.

lithology - This is an 11 digit numeric field that describes the lithology, e.g. peat, sands etc. There are 8 possible values, coded 1 to 8. A description for each code is in ggd614_lithoclass.dbf.

Layer: ggd614_pingo
Data type: point

Description: ice cored mounds
Attributes: id - point id for coverage (auxiliary data)
type - all of these are 'P' for pingo
[Note: the pingos in the Usa basin are not classical pingos]

Layer: ggd614_thermokarst
Data Type: point
Description: Thermokarst features and other cryospheric processes
[thermokarst are topographic depressions that result from thawing of groundice]
Attributes: id - point id for coverage
type - all of these are 'T'

Layer: ggd614_ice
Data Type: point
Description: massive ground ice
Attributes:
id - point id for coverage
type - all of these are 'I' for ice (Check!)

Layer: ggd614_borehole
Data Type: point
Description: Location of boreholes. IDs relate to complete description contained in
ggd614_bholecat.dbf (also in ggd614_bholecat.xls)
Attributes:
id - relates to id in ggd614_bholecat.dbf or xlc [can be related in ArcView]
type - all 'B' for borehole.

1.2.2.3 Key Areas

The two key areas provide detailed information about areas within the Usa Basin. "Lek-Vorkuta" represents discontinuous, and "Bolshaya Rogovaya" represents continuous permafrost zones. Layers and attributes classes are similar to those in the View "Permafrost The data layer characteristics are the same as the characteristics of the data layers for the larger Usa Basin.

Lek-Vorkuta

Layer: ggd614_permafrost_lekvor
Data type: polygon
Description: permafrost zones
Attributes: [For full descriptions permafrost zone map above]
permtemp - annual temperature and continuity of permafrost
geology - Chronostratigraphy of zone
lithology - Lithology of zone

Layer: ggd614_pingo_lekvor
Data type: point
Description: ice-cored mounds
Attributes: ID [No value, zero]

Layer: ggd614_thermokarst_lekvor
Data type: point
Description: thermokarst and cryospheric processes
Attributes: ID [No value, zero]

Layer: ggd614_borehole_lekvor
 Data type: point
 Description: location of borehole sites in Lek-Vorkuta key area
 Attributes: userid, number - relates to BOREHOLE field in catalog.dbf

Bolshaya Rogova

Layer: ggd614_permafrost_rogov
 Data type: polygon
 Description: Permafrost zones in the Bolshaya Rogova key area
 Attributes: permafrost, geology, lithology

Layer: ggd614_pingo_rogov
 Data type: point
 Description: ice cored mounds in the Bolshaya Rogova key area
 Attributes: id [no data in this field, all zeros]

Layer: ggd614_thermokarst_rogov
 Data type: point
 Description: Thermokarst and kryospheric processes in the Bolshaya Rogova key area.
 Attributes: id [no data in this field, all zeros]

Layer: ggd614_borehole_rogov
 Data type: point
 Description: Location of borehole sites in the Bolshaya Rogova key area
 Attributes: userid, sites - relates to BOREHOLE field in catalog.dbf

1.2.2.4 Borehole Catalog

The borehole catalog (ggd614_bholecat.dbf) contains borehole log and other data for borehole locations in the ggd614_borehole, ggd614_bhole_lekvor and ggd614_bhole_rogov layers. The catalog is also available as an Excel file. The fields in these files are listed below.

Table 1. Borehole Fields & Descriptions

| Field | Description |
|--------------------------------|---|
| Borehole site number | site number |
| Location | General geographic area that borehole is located in |
| Landform | Type of landform borehole is located in |
| Vegetation | Vegetation cover at borehole site |
| Period_of_ | Period of observation |
| Snow Depth | Snow depth at borehole site in meters (m) |
| Lithological layer (6 columns) | Lithology, including geostratigraphic code, of borehole. Each distinct layer is described in a separate column. |
| Water_cont (first column) | Water content in the active layer before winter freezing as a percentage |
| Water_cont (second column) | Water content in the active layer at the end of |

| Field | Description |
|-------------|---------------------------------------|
| Seasonally | |
| Depth_of_z | |
| Temperature | |
| Elevation | Elevation of borehole in meters (m) |
| Zpatterned | Patterned ground type or micro-relief |
| Notes_to_ | |
| Column 7 | |
| Column 8 | |
| Column 9 | |
| Column 10 | |

1.2.3 Naming Convention

Filenames for this data set have the format `ggd614_descriptive_text.ext`

Where:

- `descriptive_text` describes the content of the data layer or file
- `.ext` indicates the type of file

Commonly used `descriptive_texts` are:

| | |
|--|---|
| permafrost, pfrst | permafrost zone map (polygons) |
| pingo | pingos and frost mounds (point) |
| thermokarst, tkrst | thermokarst and other cryospheric processes (point) |
| ice | massive ground ice (point) |
| borehole, bhole | borehole site maps (point) |
| Two key study area maps are included in the data set Lek-Vorkuta and Bolshaya Rogovaya. Data layers for these regions have <code>lekvor</code> and <code>rogov</code> , respectively, in the descriptive text strings. | |

1.3 Spatial Information

1.3.1 Coverage

The map covers the Usa river basin, Russia, including Lek-Vorkuta and Bolshaya Rogovaya. The map is based on a UTM 41 projection with the WGS 1984 spheroid. The default unit for this projection is meters.

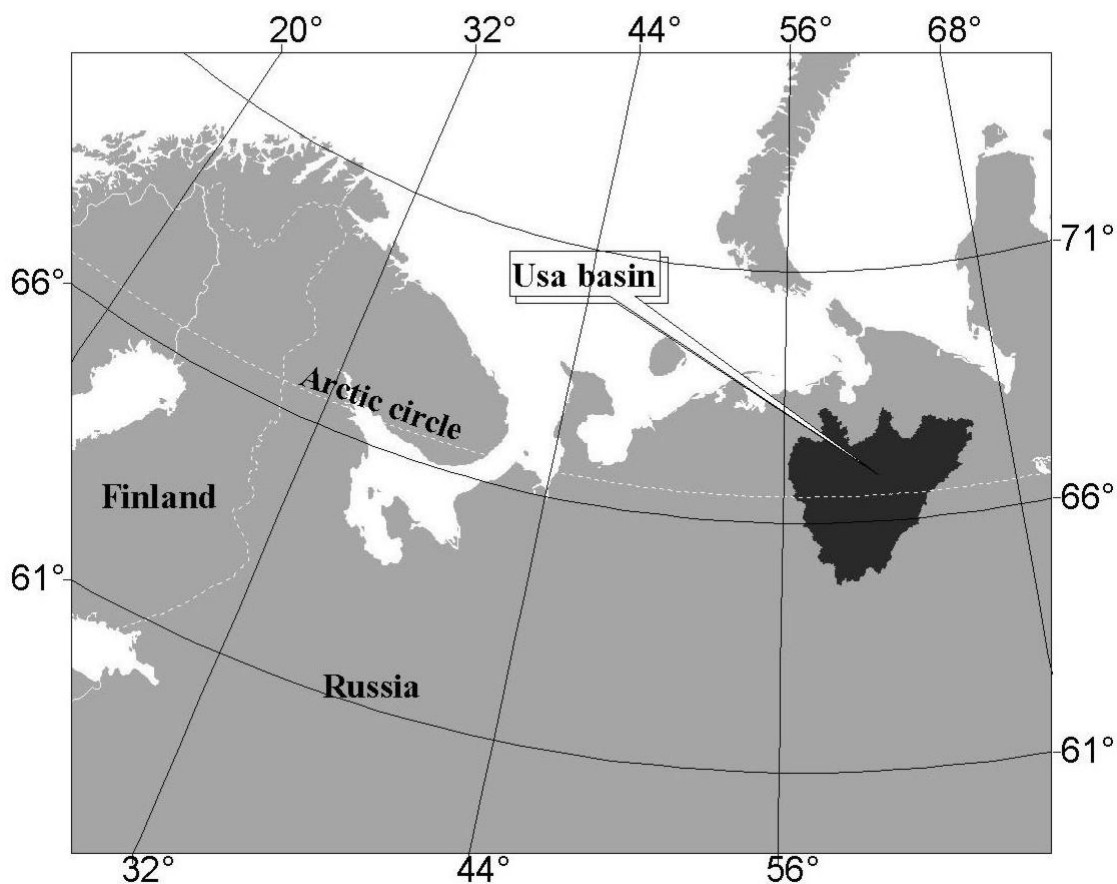


Figure 1. Usa River Basin; UTM 41 Projection, WGS 84 (meters)

2 CONTACTS AND ACKNOWLEDGMENTS

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3 REFERENCES

N.G. Oberman & G.G. Mazhitova. 2001. Permafrost dynamics in the north-east of European Russia at the end of the 20th century. *Norwegian Journal of Geography*, 55(4): 241-244.

N.G. Oberman & G.G. Mazhitova. 2003. Permafrost mapping of Northeast European Russia based on the period of climatic warming 1970-1995. *Norwegian Journal of Geography*, 57(2): 111-120.

4 DOCUMENT INFORMATION

4.1 Publication Date

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4.2 Date Last Updated

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