

# Land Resources of Russia -- Maps of Soil Characteristics, Version 1

---

## USER GUIDE

### How to Cite These Data

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

Stolbovoi, V. and I. Savin 2002. *Land Resources of Russia -- Maps of Soil Characteristics, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. <https://doi.org/10.7265/vk5t-nh20>. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT [NSIDC@NSIDC.ORG](mailto:NSIDC@NSIDC.ORG)

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/GGD601>



National Snow and Ice Data Center

# TABLE OF CONTENTS

1	DATA DESCRIPTION .....	2
1.1	Parameters .....	2
1.2	File Information.....	3
1.2.1	Format.....	3
1.2.2	Naming Convention .....	3
1.2.3	Geolocation.....	3
2	DATA ACQUISITION AND PROCESSING.....	4
2.1	Processing.....	4
3	CONTACTS AND ACKNOWLEDGMENTS .....	5
4	REFERENCES .....	5
5	DOCUMENT INFORMATION.....	7
5.1	Publication Date .....	7
5.2	Date Last Updated.....	7

# 1 DATA DESCRIPTION

This data set consists of maps of various soil characteristics for all of Russia. The maps are available as ESRI Shapefiles and they are accompanied by databases of soil profiles and related characteristics. The soil classification Shapefile was generalized from the standard 1:2,500,000 soil map of Russia (Fridland, 1988). Several different soil classifications are presented as well as detailed soil characteristics. Additionally, investigators compiled two databases (.dbf files) of detailed soil characteristics from 234 measured soil profiles. These data were extracted from a larger collection entitled Land Resources of Russia. Data and documentation © 2002 copyright International Institute for Applied Systems Analysis and the Russian Academy of Sciences

## 1.1 Parameters

---

The soil classification coverage was generalized from the standard 1:2,500,000 soil map of Russia (Fridland, 1988). Investigators aggregated the thematic content or soil classes of the source map and spatially aggregated the mapping units to accommodate a smaller scale presentation. General soil classifications include the Russian Soil Classification, the United States Department of Agriculture Soil Taxonomy, the United Nations Food and Agriculture Organization's major soil groups, and the World Reference Base soil groups. Detailed soil characteristics include:

- total available water capacity
- soil drainage
- bulk density
- cation exchange capacity
- methane production
- topsoil acidity
- nitrogen content
- CO<sub>2</sub> respiration
- organic carbon 30cm
- organic carbon 50cm
- organic carbon 100cm
- organic carbon 200cm

Investigators also created a soil "naturalness" coverage. Soil naturalness is a measure of human impact on soils. The coverage was created from a series of overlays and, therefore, is presented as an individual coverage.

Additionally, investigators compiled two databases (.dbf files) of detailed soil characteristics from 234 measured soil profiles. These databases each contain a field linked to the soil code in the soil classification coverage. The databases also contain latitude and longitude coordinates allowing them to be converted into spatial coverage.

More detailed information of these data can be found in the comprehensive description and the technical summary of the coverages and databases provided by the investigators.

## 1.2 File Information

---

### 1.2.1 Format

The maps are in a vector format stored as ESRI Shapefile spatial data format. The Shapefiles are most easily imported into ESRI's ArcView, but most other GIS packages can import ESRI Shapefiles. ESRI also provides a free basic GIS package, ArcExplorer, on the ESRI web site. Databases are stored as .dbf files. These can be imported into most spreadsheets and databases, and some GIS packages including ArcInfo.

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.

### 1.2.2 Naming Convention

Table 1. File Names & Descriptions

File Name	Description
ggd601_soil_russia.dbf	soil attribute data
ggd601_soil_russia.shp	soil feature geometry
ggd601_soil_russia.shx	soil feature geometry index
ggd601_soilnat_russia.dbf	soil naturalness attribute data
ggd601_soilnat_russia.shp	soil naturalness feature geometry
ggd601_soilnat_russia.shx	soil naturalness feature geometry index
profiles.dbf	detailed soil profile database
soil_adjusted_characteristics.dbf	summary soil profile database

### 1.2.3 Geolocation

The projection is Lambert Azimuthal, with the following parameters:

Units: meters  
 Datum: None  
 Parameters:  
 6370997.24063 (radius of the sphere of reference)  
 100 0 0.000 (longitude of center of projection)  
 45 0 0.000 (latitude of center of projection)

0.00000 (false easting (meters))  
 0.00000 (false northing (meters))

## 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: 100.0
  - Latitude\_Of\_Origin: 45.0

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 6370997.24063. Click OK until the Define Projection wizard runs. The shapefiles are now projected.

Note: the [Land Resources of Russia](#) site defines the projection parameters as follows, for those who use the "projectdefine" Arc command:

Projection: Lambert Azimuthal

Units: Meters  
 Datum: None  
 Parameters:  
 6370997.24063 (radius of the sphere of reference)  
 100 0 0.000 (longitude of center of projection)  
 45 0 0.000 (latitude of center of projection)  
 0.00000 (false easting (meters))  
 0.00000 (false northing (meters))

While all spatial datasets on the "Land Resources of Russia" CD are stored in the Lambert Azimuthal projection, differences occur between the coverages in terms of resolution and scale. In particular, the outer boundary of Russia, islands, and water bodies may vary between data sets.

## 3 CONTACTS AND ACKNOWLEDGMENTS

### **Vladimir Stolbovoi**

Dr. in Geography  
International Institute for Applied Systems Analysis  
Austria.

### **Igor Savin**

Dr. in Agricultural Sciences  
Dokuchaev Soil Institute  
Russia.

### **Boris Sheremet**

Dr. in Biology  
Dokuchaev Soil Institute  
Russia.

## 4 REFERENCES

Arinushkina E.V. 1970. *Manual for Chemical Analysis of Soils. 2nd Ed.* Publ. Moscow State University, Moscow, 487 pp. [In Russian]

Blagodatski, S.A., A.A. Larionova and I.V. Evdokimova, 1993. Contribution of root respiration to CO<sub>2</sub> emission from soil. In: Soil Respiration. In: *Proceedings of the Institute of Physico-Chemical and Biological Problems of Soil Science of Academy of Science of Russia*, Puschino, 26-32. [In Russian]

Dokuchaev, V.V. 1951. *Selected Works, Vols. I and II*, Moscow-Leningrad.

FAO-UNESCO. 1998. Soil Map of the World, Revised Legend. *World Resources Report No. 60*. FAO, Rome, ISBN 92-5-102622-X.

FAO. 1998. World Reference Base of Soil Resources. *World Soil Resources Reports 84*, Rome, 88 pp.

Fridland V.M. (Ed.) 1988. Soil Map of the Russian Soviet Federative Socialist Republic at Scale 1:2.5 Million. *All Union Academy of Agricultural Science*, Moscow. Government Administration for Geodesy and Cartography (GUGK), 16 sheets.

Fridland V.M. 1982. Main Principles and Elements of Basic Soil Classification and Program for Development. *All Union Academy of Agricultural Science*, Moscow, 149 pp. [In Russian]

Fridland, V.M. 1972. The structure of Soil Cover. *Mysl*, Moscow.

Grishina, L.A., 1986. *Humus formation and humus status of soils*. Publ. Moscow State University, 244. [In Russian]

*Guidelines for Soil Profile Description*. 1990. 3rd Ed. (Revised). FAO, Rome, 70 pp.

Kogut, B. and A. Frid. 1993. Comparative Evaluation of Methods of Determining Humus Concentration in Soils. *Pochvovedenie* 9:119-123. [In Russian]

Kudeyarov, V.N., F.I. Hakimov, N.F. Deyeva, A.A. Il'ina, T.V. Kuznetzova, and A.V. Timchenko, 1996. Evaluation of respiration of Russian soils. *Eurasian Soil Science*, 28 (3).

Madsen, H.B. and R.J.A. Jones. 1993. Guidelines for Completing Soil Attribute Tables I and II: Users Guide, Soil Database of Europe. *Unpublished manuscript*, SESCPE, INRA, France.

Makarov, B.N., 1993. Soil respiration and its role in carbon nutrition of the plants. *Agrokhimia*, 8, 94-104. [In Russian]

Rode, A.A. 1975. *Explanatory Dictionary of Soil Science*. Nauka, Moscow.

Rode, A.A. 1978. The Problems of the Soil Water Regime. *Gydrometizdat*, Leningrad, 212 pp. [In Russian]

Shishov L.L., and I.A. Sokolov. 1992. A New Version of Soil Classification in the Soviet Union. *Pochvovedenie* 4:112-120. [In Russian]

Shishov, L.L., V.D. Tonkonogov, and I.I. Lebedeva. 1998. *Russian Soil Classification*. Academy of Agricultural Science, Moscow, 236 pp. [In Russian]

Soil Taxonomy. 1999. Second Edition by Soil Survey Staff, *Agriculture Handbook, Number 436*. United States Department of Agriculture Natural Resources Conservation Service, Washington DC, 869 pp.

Soil and Physiographic Database for North and Central Eurasia at 1:5 Million Scale. 1999. *Land and Water Digital Media Series, 7*, CD-ROM. FAO, Rome.

Stolboboi V. 2000. Soils of Russia: Correlated with the Revised Legend of the FAO Soil Map of the World and World Reference Base for Soil Resources. *Research Report, RR-00-13*. IIASA, Laxenburg, Austria, 112 pp.

Stolbovoi V., 2001. Soil Respiration in the Full Carbon Account for Russia. *Sixth International Carbon Dioxide Conference*, 2001 Sendai Japan, Extended Abstracts, pp. 434-437.

Stolbovoi V., L. Montanarella, V. Medvedev, N. Smeyan, L. Shishov, V. Ungureanu, G. Dobrovolski, M. Jamagne, D. King, V. Rozhkov, I. Savin, 2001. Integration of Data on the Soils of Russia, Byelorussia, Moldova and Ukraine into the Soil Geographic Database of the European Community. *Eurasian Soil Science*, Vol. 34, No. 7, pp. 687-703.

Stolbovoi V., and B.V. Sheremet. 1995. A New Soil Map of Russia, Compiled in FAO System. *Pochvovedenie* 2:149-158. [In Russian]

Stolbovoi V.S., and B.V. Sheremet. 1996. Soil Map of Russia, Scale 1:8 Million, in the U.S. Soil Taxonomy System. *Eurasian Soil Science* 28(12):73-82.

Stolbovoi V.S., and I.Y. Savin. 1996. Experience of RUSOTER Digital Database Compilation. *Pochvovedenie* 11:1295-1302. [In Russian]

Stolbovoi V. and I. McCallum, eds. 2002. *Land resources of Russia*. Laxenburg, Austria: International Institute for Applied Systems Analysis and the Russian Academy of Science. CD-ROM.

USDA. 1999. Soil Taxonomy, 2nd Ed. by Soil Survey Staff, *Agriculture Handbook, Number 436*, United States Department of Agriculture, Natural Resources Conservation Service, Washington DC, 869 pp.

Van Engelen, V.W.P., and T.T. Wen. 1993. Global and National Soil and Terrain Digital Databases (SOTER). *Procedures Manual (Revised Version)*. ISRIC, Wageningen, Netherlands, 115 pp.

World Soil Resources. An explanatory note on the FAO World Soil Resources Map at 1:25,000,000 scale. 1993. *World Soil Resources Reports*, 66 Rev. 1, FAO, Rome, 66 pp.

## 5 DOCUMENT INFORMATION

### 5.1 Publication Date

---

16 September 2002

### 5.2 Date Last Updated

---

01 March 2021