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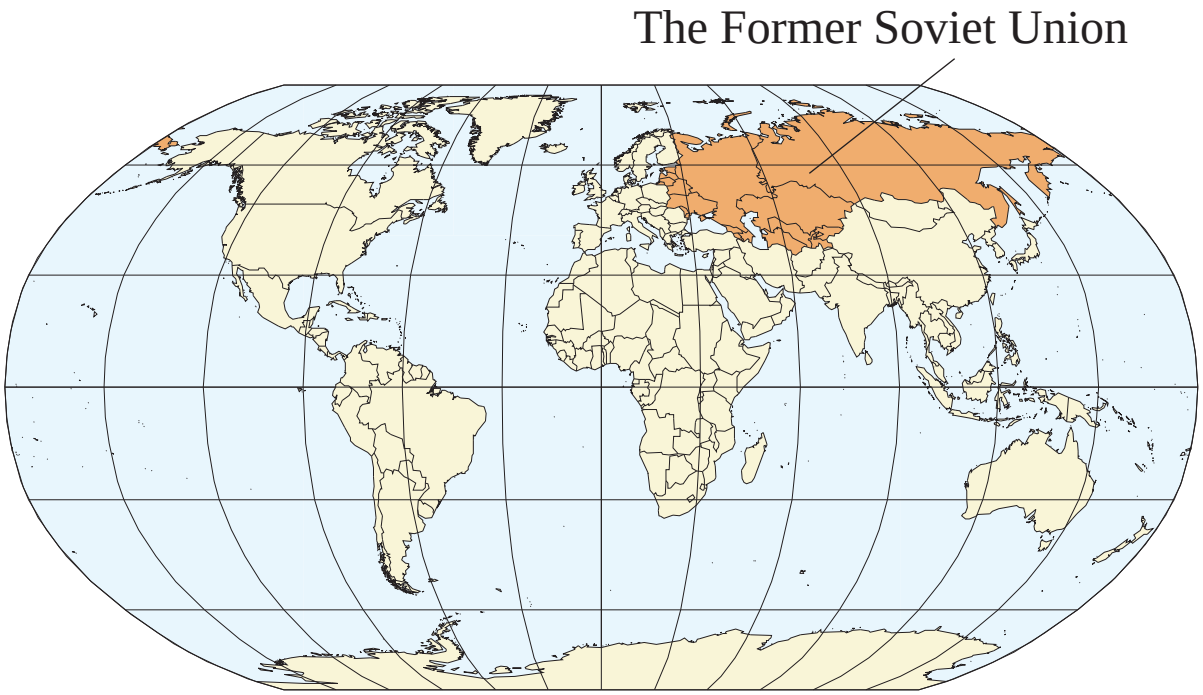
U.S. Department of the Interior
U.S. Geological Survey

MAPS SHOWING GEOLOGY, OIL AND GAS FIELDS AND GEOLOGIC PROVINCES OF THE FORMER SOVIET UNION

by F. M. Persits, G. F. Ulmishek, D. W. Steinshouer



Open-File Report 97-470E

This report is preliminary and has not been reviewed for conformity with U. S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the U. S. government.

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U.S. Geological Survey Open File Report 97-470E

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INTRODUCTION

This digitally compiled map includes geology, geologic provinces, and oil and gas fields of the Former Soviet Union. The map is part of a worldwide series on CD-ROM by the World Energy Project released of the U.S. Geological Survey . The goal of the project is to assess the undiscovered, technically recoverable oil and gas resources of the world and report these results by the year 2000. For data management purposes the world was divided into eight energy regions corresponding approximately to the economic regions of the world as defined by the U.S. Department of State. The Former Soviet Union (Region 1) includes Armenia, Azerbaijan, Byelarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.
Each region was then further divided into geologic provinces on the basis of natural geologic entities and may include a dominant structural element or a number of contiguous elements. Some provinces contain multiple genetically related basins.
Geologic province boundaries for the Former Soviet Union were delineated using data from a number of geologic maps and other tectonic and geographic data (see References).
Offshore province boundaries were defined by the 2000 meter bathymetric contour from the map edited by Gabrielyants, 1990 (see References). Each province was assigned a unique number; the first digit is the region number; province numbers follow. An attempt was made to number the provinces in geographical groups; onshore, offshore, and combined on and offshore. The numbering starts in the west.

Oil and gas field data from Petroconsultants International Data Corporation worldwide oil and gas field database were allocated to these provinces. The geologic provinces are being further subdivided into petroleum systems and assessment units in order to appraise the undiscovered petroleum potential of selected provinces of the world. For a more in-depth discussion on the geologic provinces and their relative ranking in terms of total known petroleum volume, see Klett and others, 1997.

Specific details of the data sources and map compilation are given in the metadata file on this CD-ROM and in the page 4. Smaller stratigraphic subdivisions of Phanerozoic rock were combined to simplify the map and to maintain consistency with other maps of the series. Precambrian rocks are undivided. Oil and gas field markers represent field centerpoints published with permission from Petroconsultants International Data Corp., 1996 database.
This map was compiled using Environmental Systems Research Institute, Inc. (ESRI) ARC/INFO software. Political boundaries and cartographic representations on this map were taken, with permission, from ESRI's ArcWorld 1:3M digital coverage, have no political significance, and are displayed as general reference only.
Portions of this database covering the coastline and country boundaries contain intellectual property of Environmental Systems Research Institute,Inc.(ESRI), and are used herein with permission. Copyright 1992 and 1996, Environmental Systems Research Institute,Inc.
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This map has been digitally compiled and abstracted from
the Geological Map of the USSR,1966,
D. V. Nalivkin, editor
Ministry of Geology of the USSR
Vsesoyuzniy Nauchno-Issledovatel'skiy
Geologicheskiy Institute (VSEGEI).
Sheets 1,2
Scale 1:7,500,000.

The projection and coordinate system for the original map were not given.
It was necessary to georeference the map to real world coordinates.
This was done as follows:

1. The latitude/longitude grid with cell size 4 * 6 degrees was projected to Equidistant Conic projection and then used to create ARC/INFO point coverage. That point coverage was used to create "to - from" links by ARC/INFO CONTROLPOINTS program.

2. A gray-scale scanned image of the original paper map was transformed to Equidistant Conic projection by ARC/INFO GRIDWARP program (polynomial of the second order) using the "to - from" links created by CONTROLPOINTS program.

3. The scanned image from the second step was vectorized by the method of extraction of linear features described by F.Persits, 1997, (USGS open-file report OF-97-713), and then corrected by hands-on digitization.

4. A series of piecewise "rubbersheet" transformations applied to the final ARC/INFO coverage. The ARC/INFO coverages that were used for transformation were ESRI's ArcWorld 1:3M GIS cartographic layers (RIV3M, CTRY3M).

Petroleum field locations Centerpoints are published here from 1996 data with permission of Petroconsultants International Data Corp.

Geologic province boundaries are those defined by USGS World Energy Project.

REFERENCES

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3. Gramberg, I.S., and Pogrebitsky, Yu.E.,eds,1984, Geologic framework of the USSR and distribution of useful minerals (Geologicheskoye stroeniye SSSR i zakonomernosti razmeshcheniya poleznykh iskopaemykh), Vol.9, Seas of the Soviet Arctic: St. Petersburg Nedra, 280p.
4. Klett, T.R., Ahlbrandt, T.S., Schmoker, J.W., and Dolton, G.L., 1997, Ranking of the World's oil and gas provinces by known petroleum volumes: U.S. Geological Survey Open File Report 97-463, one CD-ROM.
5. Persits F.M., GRIDVECTOR (version 1): An ARC/INFO AML program to extract linear features from a gray-scale image of a paper geologic map: U.S. Geological Survey Open File Report 97-713.
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7. Rozanov,L.N.,ed.,1970, Tectonic map of petroleum provinces of the USSR (scale 1:2,500,000): All-Union Petroleum Research Geological Institute (VNIGRI), St. Petersburg.
8. Spizharsky,T.N.,ed.,1966, Tectonic map of the USSR (scale 1:7,500,000): All-Union Research Geological Institute (VSEGEI), St. Petersburg.

Geologic Provinces sorted by Code

1003 ----- Moscow Basin
1004 ----- Belorussian-Voronezh High
1005 ----- Kotelnich Arch
1006 ----- Mezen Basin
1007 ----- Timan High
1008 ----- Timan-Pechora Basin
1009 ----- Dnieper-Donets Basin
1010 ----- Pripyat Basin
1011 ----- Russian Craton Margin
1012 ----- Poles Saddle
1013 ----- Ukrainian Shield
1014 ----- Donbass Foldbelt
1015 ----- Volga-Ural Region
1016 ----- North Caspian Basin
1017 ----- Ural-Novaya Zemlya Foldbelt
1018 ----- Mugodzhary-South Emba
1050 ----- South Barents Basin
1051 ----- Kola Monocline-Finnmark Platform
1059 ----- Ludlov Saddle
1060 ----- North Barents Basin
1061 ----- Admiralty Arch
1062 ----- Novaya Zemlya Monocline
1064 ----- Grumant Uplift
1065 ----- North Novaya Zemlya Basin
1066 ----- St. Anna Basin
1067 ----- Vize High
1068 ----- Ushakov High
1069 ----- Uedineniya Basin
1070 ----- Central Kara High
1071 ----- Schmidt Basin
1072 ----- Severnaya Zemlya High
1102 ----- Black Sea Deep-Water Basin
1103 ----- Dobrogea Foreland
1104 ----- Crimea High
1105 ----- North Crimea Basin
1106 ----- Northeast Black Sea Shelf
1107 ----- Black Sea Continental Slope
1108 ----- Azov-Kuban Basin
1109 ----- Middle Caspian Basin
1110 ----- Great Caucasus Foldbelt
1111 ----- Rioni Basin
1112 ----- South Caspian Basin
1113 ----- Kura Basin
1117 ----- Arctic Ocean Slope
1150 ----- North Ustyurt Basin
1151 ----- East Aral Basin
1152 ----- Mangyshlak-Ustyurt Foldbelt
1153 ----- Karabogaz-Karakum High
1154 ----- Amu-Darya Basin
1155 ----- Kopet-Dag Foldbelt
1156 ----- Afghan-Tajik Basin

1157 ----- Pamir High
1158 ----- Tian Shan Foldbelt
1159 ----- Fergana Basin
1160 ----- Alay Basin
1161 ----- Naryn Basin
1162 ----- Issyk-Kul Basin
1163 ----- West Ili Basin
1164 ----- East Ili Basin
1165 ----- Chu-Sarysu Basin
1166 ----- Turgay Depression
1167 ----- South Turgay Basin
1168 ----- Central Kazakhstan Folded Region
1169 ----- Alakol Basin
1170 ----- Zaysan Basin
1171 ----- Kuznetsk Basin
1172 ----- North Minusa Basin
1173 ----- South Minusa Basin
1174 ----- West Siberian Basin
1175 ----- Yenisey-Khatanga Basin
1176 ----- Taimyr-Kara High
1177 ----- Syr-Darya Basin
1178 ----- East Aral Slope
1200 ----- Anabar Basin
1201 ----- Khatanga Saddle
1202 ----- Anabar-Olenek High
1203 ----- Tunguska Basin
1204 ----- Turukhan-Norilsk Folded Zone
1205 ----- Turukhan-Igarka Uplift
1206 ----- Yenisey Ridge
1207 ----- Baykit Arch
1208 ----- Cis-Sayan Basin
1209 ----- Angara-Lena Terrace
1210 ----- Nepa-Botuoba Arch
1211 ----- Cis-Patom Foredeep
1212 ----- Kempendiay Region
1214 ----- Lena-Vilyuy Basin
1215 ----- Aldan Uplift
1216 ----- Aldan Shield
1217 ----- Upper Zeya Basin
1218 ----- Laptev Shelf
1219 ----- Altay-Sayan Folded Region
1220 ----- Bureya-Dunbey Region
1222 ----- Zeya-Bureya Basin
1223 ----- Upper Bureya Basin
1224 ----- Sikhote-Alin Folded Region
1225 ----- Suifun Basin
1226 ----- Khanka Basin
1227 ----- Middle Amur Basin
1230 ----- Baikal-Patom Folded Region
1250 ----- Verkhoyan-Chukotka Folded Region
1251 ----- Zyryanka Basin
1252 ----- Moma Basin
1253 ----- Ayon Basin
1254 ----- Blagoveshchensk Basin

1255 ----- Anzhu Uplift
1256 ----- Novosibirsk Basin
1257 ----- De Long High
1258 ----- North Chukchi Basin
1259 ----- Wrangel Basin
1260 ----- Wrangel-Herald Uplift
1261 ----- South Chukchi-Hope Basin
1300 ----- Anadyr Basin
1301 ----- Gangut High
1302 ----- Khatyrka Basin
1303 ----- Penzhina Basin
1304 ----- Koryak-Kamchatka Foldbelt
1305 ----- Kinkil Basin
1306 ----- Talov Uplift
1307 ----- Gizhigin Basin
1308 ----- Koni-Tayganos Uplift
1309 ----- North Okhotsk Group of Basins
1310 ----- Tinro Basin
1311 ----- West Kamchatka Basin
1312 ----- Central Kamchatka Group of Basins
1313 ----- East Kamchatka Uplift
1314 ----- Olyutor Basin
1315 ----- East Kamchatka Basin
1316 ----- Kuril-Kamchatka Slope
1317 ----- Onekotan Basin
1318 ----- South Kuril Basin
1319 ----- Central Okhotsk High
1320 ----- South Okhotsk Basin
1321 ----- Deryugin Basin
1322 ----- North Sakhalin Basin
1323 ----- East Sakhalin Uplift
1324 ----- Terpeniya Bay Basin
1325 ----- West Sakhalin Uplift
1326 ----- Susunay Uplift
1327 ----- Aniva Basin
1328 ----- Tatar Strait Basin

Geologic Provinces sorted by Name

1061 ----- Admiralty Arch
1156 ----- Afghan-Tajik Basin
1169 ----- Alakol Basin
1160 ----- Alay Basin
1216 ----- Aldan Shield
1215 ----- Aldan Uplift
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1117 ----- Arctic Ocean Slope
1253 ----- Ayon Basin
1108 ----- Azov-Kuban Basin
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1207 ----- Baykit Arch
1004 ----- Belorussian-Voronezh High
1107 ----- Black Sea Continental Slope
1102 ----- Black Sea Deep-Water Basin
1254 ----- Blagoveshchensk Basin
1220 ----- Bureya-Dunbey Region
1312 ----- Central Kamchatka Group of Basins
1070 ----- Central Kara High
1168 ----- Central Kazakhstan Folded Region
1319 ----- Central Okhotsk High
1165 ----- Chu-Sarysu Basin
1211 ----- Cis-Patom Foredeep
1208 ----- Cis-Sayan Basin
1104 ----- Crimea High
1257 ----- De Long High
1321 ----- Deryugin Basin
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1151 ----- East Aral Basin
1178 ----- East Aral Slope
1164 ----- East Ili Basin
1315 ----- East Kamchatka Basin
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1113 ----- Kura Basin
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1003 ----- Moscow Basin
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1016 ----- North Caspian Basin
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1105 ----- North Crimea Basin
1172 ----- North Minusa Basin
1065 ----- North Novaya Zemlya Basin
1309 ----- North Okhotsk Group of Basins
1322 ----- North Sakhalin Basin
1150 ----- North Ustyurt Basin
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1062 ----- Novaya Zemlya Monocline
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1163 ----- West Ili Basin
1311 ----- West Kamchatka Basin
1325 ----- West Sakhalin Uplift
1174 ----- West Siberian Basin
1259 ----- Wrangel Basin
1260 ----- Wrangel-Herald Uplift
1206 ----- Yenisey Ridge
1175 ----- Yenisey-Khatanga Basin
1170 ----- Zaysan Basin
1222 ----- Zeya-Bureya Basin
1251 ----- Zyryanka Basin

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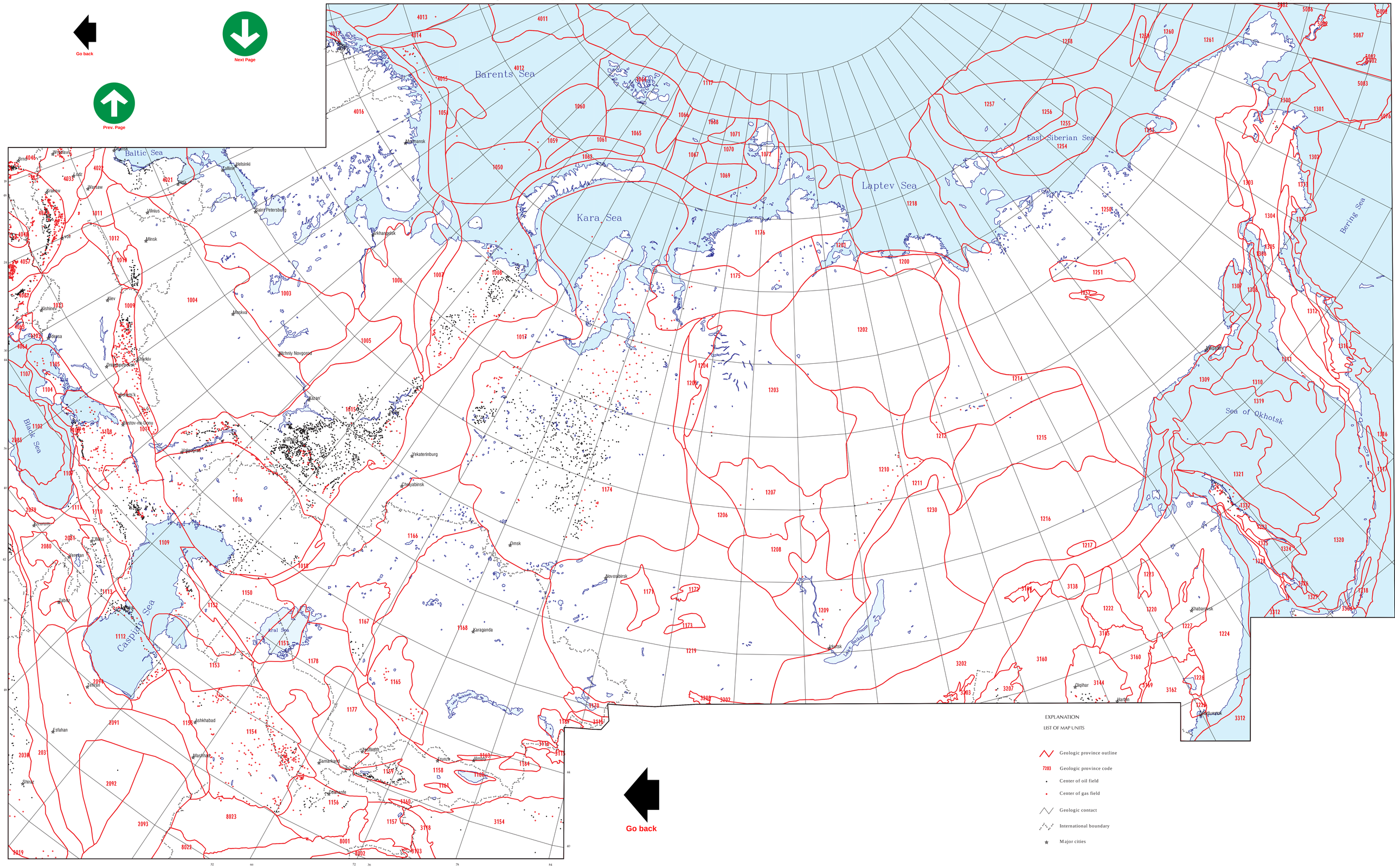

EXPLANATION

LIST OF MAP UNITS

- Geologic province outline
- 7203 Geologic province code
- Center of oil field
- Center of gas field
- Geologic contact
- International boundary
- Major cities

Projection - EQUIDISTANT CONIC
Spheroid - KRASOVSKY
Latitude of the standart parallel - 58
Central Meridian - 100°

SCALE 1: 7 500 000

100 0 100 200 300 400 500 MILES

100 0 100 200 300 400 500 KILOMETERS

MAP SHOWING OIL AND GAS FIELDS AND GEOLOGIC PROVINCES OF THE FORMER SOVIET UNION

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Barents Sea
Kara Sea
Laptev Sea
East Siberian Sea
Baltic Sea
Black Sea
Caspian Sea
Aral Sea
Lake Baikal
Sea of Okhotsk
Bering Sea

EXPLANATION

LIST OF MAP UNITS

- Q Quaternary (undivided)
- QT Quaternary and Tertiary
- N Neogene
- NPg Neogene and Paleogene
- Pg Paleogene
- PgK Paleogene and Cretaceous
- K Cretaceous (undivided)
- KJ Cretaceous and Jurassic
- J Jurassic (undivided)
- JTr Jurassic and Triassic
- Tr Triassic
- Pz Paleozoic (undivided)
- P Permian
- TrP Triassic and Permian
- PC Permian-Carboniferous
- C Carboniferous
- CD Carboniferous and Devonian
- D Devonian (undivided)
- DS Devonian and Silurian
- S Silurian
- SO Silurian-Ordovician
- O Ordovician
- OCm Ordovician-Cambrian
- Cm Cambrian
- pC Precambrian (undivided)
- CmPt Cambrian-Proterozoic
- Pt Proterozoic
- Z Upper Proterozoic
- Y Upper and Middle Proterozoic
- X Lower and Middle Proterozoic
- A Archean
- Qv Extrusive rocks Pliocene and Quaternary
- TKi Acidic intrusive rocks Cretaceous, Paleogene and Neogene
- Mi Acidic Mesozoic intrusive rocks
- Pi Paleozoic intrusive rocks
- PtAi Acidic Proterozoic and Archean intrusive rocks
- ii Basic, Ultrabasic and Alkaline intrusive rocks of unknown age
- Areas outside of the former Soviet Union
- Arctic areas covered by Ice
- Sea and large lakes
- Lakes and wide rivers
- Geologic province outline
- 7203 Geologic province code
- Center of oil field
- Center of gas field
- Geologic contact
- International boundary
- Major cities

SCALE 1: 7 500 000

100 0 100 200 300 400 500 MILES

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Projection - EQUIDISTANT CONIC
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