

Russia (Russian Federation) (Rossiyskaya Federatsiya) Asian part

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Location and area

Russia is a federal republic in eastern Europe and western and northern Asia. The Russian Federation comprises 89 territorial units: 21 republics, 10 autonomous okrugs (areas), 6 krais (territories), 49 oblasts (regions), 1 autonomous oblast, and two federal cities (Moscow and St Petersburg) with oblast status.

In geographical extent Russia is the largest country in the world. Spanning two continents - Europe and Asia - it has a total area of 17,075,200 km² and a total land area of 16,888,500 km². North to south the country extends for more than 4,000 km and from west to east the maximum extent is almost 10,000 km.

On the north the Asian part of Russia is bordered by a number of arms of the Arctic Ocean comprising, west to east: the Barents, Kara, Laptev, East Siberian, and Chukchi seas. On the east it is bordered by several arms of the Pacific Ocean, comprising, north to south: the Bering Strait, the Bering Sea, and the seas of Okhotsk and Japan (East Sea). In the extreme southeast, Russia borders the northeastern tip of North Korea. On the south it is bordered, east to west, by China, Mongolia, Kazakhstan, the Caspian Sea, and Azerbaijan in Asia. (Microsoft Encarta Encyclopedia 2002).

Topography

Asian Russia can be divided into Siberia, stretching from the Urals almost to the Pacific Ocean, and the Russian Far East including the extreme southeast and the Pacific coastal fringe. The Asian part also comprises the major island possessions of Russia, including the Franz Josef Land archipelago, Novaya Zemlya, Vaygach Island, the Severnaya Zemlya archipelago, the New Siberian Islands, and Wrangel Island in the Arctic Ocean, and the Kuril Islands and Sakhalin in the Pacific Ocean. The majority of the land lies north of latitude 50° N, and a sizeable portion lies north of the Arctic Circle.

Siberia consists of three distinct parts:

1. The West Siberian Lowland is situated east of the Urals. It forms an extensive and extremely flat, poorly drained, and generally marshy or swampy area.
2. The Central Siberian Platform begins just east of the Yenisey River. It is a rolling upland with elevations about 500 to 700 m above sea level. The region's geological structure is complex; a basement of igneous and metamorphic rocks is covered in many places by thick sedimentary rocks and volcanic lavas. Rivers have dissected the surface and in some places have formed deep canyons.
3. The East Siberian Uplands, east of the Lena River, consist of a series of mountains and basins. The higher ranges, such as the Verkhoyansk, Cherskogo, and Kolyma, reach elevations of about 2,300 to 3,200 m. On the eastern margins with the Pacific Ocean, the mountains are higher and steeper, and volcanic activity becomes prevalent. There are 120 volcanoes on the Kamchatka Peninsula, 23 of which are currently active; the highest, Mount Klyuchevskaya, reaches an elevation of 4,750 m. The volcanic mountain chain of Kamchatka continues southward in the Kuril Islands, which contain about 100 volcanoes, 35 of which are active.

Along the southern border of central and eastern Siberia mountain ranges stretch northeastward to the Pacific Ocean. Among them are the Altai, Sayan, Yablonovyy, and Stanovoy ranges. (Microsoft Encarta Encyclopedia 2002).

Climate

The harsh climate reflects the high latitude and the absence of moderating maritime influences. Winters are generally long and very cold; and summers are short with temperatures ranging from hot to relatively cool. The high mountains running along the southern boundary largely prevent the penetration of maritime tropical air masses from the south. In the north, the Arctic Ocean is frozen right up to the coast during the long winter, preventing the ameliorating influence of relatively warm ocean waters. Because Russia lies in the northern hemisphere's westerly wind belt, warm influences from the Pacific Ocean do not reach far inland in the east. This is particularly true in winter, when a large, cold, high-pressure cell, centred over Mongolia, spreads over much of Siberia and the Russian Far East. The primary marine influence comes from the Atlantic Ocean in the west. The Atlantic air penetrates most easily during summer, when a low-pressure system exists over much of the country and the warm, moist air may push east well into central Siberia. Therefore most of the territory receives a fairly pronounced summer maximum of precipitation. This is fortunate for the development of peatlands.

Throughout Siberia and the Russian Far East, annual precipitation ranges generally between 500 and 800 mm; in higher elevations annual totals may reach 1,000 mm or more, although intermontane basins may receive less than 300 mm.

Because the climate of Russia is largely continental, it is characterized by temperature extremes. The coldest winter temperatures occur in eastern Siberia; air from the Atlantic Ocean tempers conditions somewhat in the west. Verkhoyansk in northeastern Siberia is the "cold pole of the world" with average January temperatures of -49°C and a minimum of -68°C . Absolute temperatures during winter are higher along the Arctic and, especially, the Pacific coasts; Vladivostok, for example, on the Pacific coast averages a relatively mild -14°C in January; the July average is 18°C . The same conditions that make for extremely cold temperatures during winter in the far northeast - isolation from the sea and narrow valleys between mountains - restrict air movement during the summer. This allows for strong heating under nearly continuous daylight at these high latitudes. During July, temperatures in Verkhoyansk average 15°C and have reached as high as 35°C . The city has an absolute temperature range of 103°C , by far the greatest on Earth.

Russia encompasses a number of distinct climatic zones, which generally extend across the country in east-west belts. Along the Arctic coast a polar climate prevails, extending inland in the Far East on upper mountain slopes. To the south of this zone is a broad belt of subarctic climate that comprises almost all of Siberia and Far Eastern Russia. A more humid-temperate continental climate includes a narrow strip of the southern West Siberian Lowland. Temperate conditions are also found in the extreme southeastern portion of Far Eastern Russia, including Vladivostok.

A broad belt of drier steppe climate with cold winters and hot summers covers the southern part of western Siberia. It continues eastward in isolated mountain basins along the extreme fringes of Siberia and the Russian Far East. (Microsoft Encarta Encyclopedia 2002).

Water

The largest single river system is the Ob-Irtysh; these rivers together flow some 5,410 km from western China, where the Irtysh rises, north through western Siberia to the Arctic Ocean.

The second longest system is the Onon-Shilka-Amur, which flows out of northern Mongolia eastward along the Chinese-Siberian border to the Pacific coast opposite Sakhalin Island. Among individual rivers, the Lena is longest; rising west of Lake Baikal in Irkutsk Oblast, it flows north through Siberia and Far Eastern Russia for about 4,300 km to the Arctic Ocean. The next longest are the Irtysh and the Ob. The fifth longest river, the Yenisey, flows north from Mongolia through eastern Siberia to the Arctic Ocean. Its main tributary, the Angara River, drains Lake Baikal. The Yenisey, which delivers 623 km³ of water to the Arctic Ocean yearly, has the largest flow of any river system in the country. Many natural lakes occur in Russia. The Caspian Sea, in the south, is the largest inland body of water in the world, with a surface area of about 371,000 km². The second-largest body of water in Russia is Lake Baikal (31,470 km²). (Microsoft Encarta Encyclopedia 2002).

Land use

Russia contains a wide variety of biomes. In the far north a tundra vegetation of mosses, lichens, and dwarf shrubs grows where the summers are too cool for trees. Permafrost is found throughout this region.

The coniferous boreal forest, or taiga, lies south of the tundra and extends over much of Siberia and the Russian Far East. Much of this region also has permafrost. Although the vast taiga zone is made up predominantly of coniferous trees, in some places birch (*Betula*), aspen (*Populus*), and willow (*Salix*), add to the diversity of the forest. The taiga of the West Siberian Lowland is made up primarily of various species of pine (*Pinus*), but along its southern fringes birch (*Betula*) becomes dominant. Throughout much of the Central Siberian Platform and the mountains of the far eastern region, larch (*Larix*) is dominant.

The trees of the taiga zone are generally small and rather widely spaced. The soils of the taiga are generally podzolic and infertile. Where local drainage is poor, mires form the vegetative cover. They dominate in Western Siberia.

A mixed-forest, comprising both coniferous and broadleaf deciduous trees, prevails throughout much of the southern Far East, along the middle Amur River valley and south along the Ussuri River valley. Grey-brown forest soils are found in this zone, that are not as infertile as those of the taiga.

In the southern parts of the West Siberian Lowland and in isolated areas in the southern intermontane basins of eastern Siberia a narrow zone of forest-steppe separates the mixed forest from the steppes.

A mixture of grasses with only a few stunted trees in sheltered valleys is the natural vegetation of the Russian steppe that covers parts of western Siberia.

Western Siberia has large proven reserves of oil, mainly in a number of very large oilfields. These Western Siberian "super-giants" came into production during the 1970s. The Arctic region is a much smaller producer at present, but is expected to increase in significance. Other new oil developments are located in western Siberia, near the border with Kazakhstan, and near Sakhalin Island. Around three quarters of the proven reserves of natural gas in Russia are located in some 20 super-giant fields in the Tyumen oblast in western Siberia.

The forest-steppe is the best agricultural area because of its good moisture supply and its black chernozem soils with a high humus content and a right balance of nutrients. The soils of the steppe, known as brown-steppe soils, are not quite as rich in humus as the chernozems to the north, but are very high in the minerals that are the main source of plant nutrients. Most farmland lies in the southwestern fringes of Siberia. East of the Altai Mountains, agriculture is found only in isolated mountain basins in the south and in the far eastern region. Areas outside these areas are unsuitable for crops without human modification. To the north,

the growing season is too short; to the south the climate is too dry without irrigation (Microsoft Encarta Encyclopedia 2002).

Peatlands

According to Neishtadt (1977) there are about 100 million ha of peatlands in western Siberia alone (quoted in Kivinen & Pakarinen 1981).

Schneider (1976, 1980) and Schneider & Schneider (1990) mention a “peatland” area for the Asiatic part of the Russian federation of 414,000 km².

In recent years Vompersky (1994a, b, Vompersky et al. 1994, 1996) analysed the available data in detail (see tables 1 and 2). He found that 3,691,000 km² in total Russia (or 21,6 % of the land area) is covered with a peat layer > 0 cm. 2,301,000 km² have a peat layer < 30 cm thick, whereas 1,390,000 km² have a peat layer = 30 cm thick. Almost 85% of this extent is found in the Asian part of the Russian federation. Novikov & Usova (2000), based on the analysis of topographical maps and aerial photographs, estimate the peatland area in Asian Russia on 1,260,000 km².

Tab. 1: Peat-covered wetlands of Russia, according to the “Soil Map of the RSFSR (1988), scale 1:2,500,000” (Fridland 1988) and the areas of peat deposits accounted as of 01.01.1991, according to the „Distribution of Stocks of Mineral Resources of Russia as of January 1st 1991“ (1992), and areas of peatlands > 0.5 m deep, according to Fridland (1988) for Russia in km² (compiled after Vompersky et al. 1996 p. 389, 390).

Peat thickness	> 0 cm	>0 - 30 cm	= 30 cm	> 0.5 m		
				Total	Industrial deposits	Others
Parts of Russia						
European part	588,000	375,000	213,000	198,000	105,100	92,800
Asian part	3,103,000	1,926,000	1,177,000	777,100	357,600	419,500
West Siberia	991,000	408,000	583,000	446,700	324,400	122,300
East Siberia				70,100	12,100	58,000
Far East				260,300	21,100	239,200
Total Russia	3,691,000	2,301,000	1,390,000	975,000	462,700	512,300

Table 2: Distribution of peatlands (in km²) in Russia (European and Asian part) according to the biomes. (after Vompersky et al. 1996).

Total Russia	3,691,000	2,301,000	1,390,000
Tundra, forest-tundra	1,062,000	605,000	457,000
Taiga, forest steppe, and steppe	2,629,000	1,696,000	933,000
Permafrost areas	2,706,000	1,797,000	909,000

Other authors present different figures. Markow et al. 1996 give for Western Siberia a total recent peatland area (> 30 cm peat) of over 760,000 km² (0.3-0.7 cm: 440,000 km², > 0.7 cm: 320,000 km²), with peat resources of 113 Gt. Solomesh (2000) gives an area for the West Siberian Lowlands “peatlands” of 750,000 km².

Bleuten et al. (2000) present for Western Siberia an underdivision of “peatlands”: 108,000 km² in the Subarctic Tundra: 226,000 km² in the Forest Tundra and Northern Taiga, 254,000 km² in the Middle Taiga, and 316,000 km² in the Southern Taiga, totalling 904,000 km². Keddy & Fraser (2000) estimate the area of wetlands in the West Siberian Lowlands to be 780,000 – 1,000,000 km².

Many other data on peatland distribution for the USSR and Russia are found in the literature, but these often only refer to peat resources, i.e. peatlands with a specific minimum peat thickness and minimum extent (cf. Smirnov et al. 1972, Markov & Khoroshev 1986).

It has to be recognized that the inventory data do not cover all areas in the same detail. Data on the distribution of peatlands are practically absent for Yakutia, eastern Siberia, and the northern Far East. Furthermore inventory has concentrated on “commercial” peatlands (Turchinovich et al. 2001).

According to the interpreted World Soil Map (Van Engelen & Huting 2002) 1,747,407 km² of histosols exist in the Asian part Russia and 2,627,377 km² of gley soils.

Mire and peatland losses

At the end of the 1970s, 91 % of the USSR peatlands were considered to be still in a virgin (undrained) condition (Kivinen & Pakarinen 1980).

According to Ilnicki (1996) during the 1980s 500 km² of peatlands (predominantly fens) were drained.

According to Kuzmin et al. (2000) of the recent “bog” area in Russia of 668,000 km², 20,000 km² is developed, 8,000 km² is completely cut-over, and 40 000 km² is cultivated. Consequently they estimate the natural “bog” area, in which anthropogenic impact is absent, on 600,000 km².

Kreshtapova et al. (2000) estimate the area of cutover peatlands in Russia on 20,000 km².

In Western Siberia of the 5,000 deposits explored, 261 sites (1.6 Gt = 1% of resources) are „prepared for industrial use“, 216 sites are protected for conservation, 834 sites (10.3 Gt) are „subject to detailed study and may be reserved for agriculture, fuel-energy, and health resorts“, 112 sites (0.8 Gt) are for „chemical processing“, and 747 sites are “recommended to remain in natural state (gathering berries, herbs, scientific investigations) (Markow et al. 1996).

According to Ivanyuta & Ivanyuta (2001) 2,300 km² out of a total of 30,000 km² of “peat bogs” in the Irkutsk Region are drained and cultivated.

fotos of Sibirean peatlands: <http://www.ipcc.ie/wpsiberia.html>

Still to be checked:

Neistadt, M.I. 1977. The world’s largest peat basin, ist commercial potentialities and protection. Int. Peat Soc. Bulletin 8: 37-43.