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Floods in Siberia: a Historical Overview

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In the given work we present the information about floods on the territory of Siberia, which have taken place for the last 300 years. We consider their reasons, frequency of their distributions, territorial coverage and social consequences of these floods. For the time being, we compare the floods frequency data with the variation of the northern hemisphere's annual temperatures.

Keywords: Siberia, history, floods.

Introduction

Flood is one of the most widespread and dangerous natural phenomena for people's life and economical activity. Floods take the first place according to their average annual inflicted damage among all other kinds of natural disasters in the world, including Russia (Avakyan, Istomina, 2000), thereat, during the last decades, we have been observing the tendency of their frequency increase (Dobroumov, Tumanovskaya, 2002; Mandych, 2002; Naydyonov, Shveykina, Vikhrova, 2003).

The main economical activity of the Siberian population has been connected with the development and usage of its territories, neighbouring to the large water arteries, which have been the main transport waterways on the territory of Siberia for a long time, starting from the moment of its annexation. The main number of inhabited localities and objects of agricultural significance, which have been flooded and undergone the threat of economical and social

instability, is concentrated precisely on this very zone. Though at the present time there are no research works being dedicated to a detailed analysis of the history of floods on the regional and local levels, in spite of the fact that there is a significant and solid block of historical documents, which describes in detail social consequences of the natural hazards and the damage, which has been inflicted to human health and economical activity. It is mainly connected with that fact that soviet scientists, in comparison with the pre-revolutionary researchers (Lyubavsky, 2000) and with a rare exception (Borisenko, Pasetky, 1988) did not consider the impact of the natural phenomena (for example, droughts, floods and etc.) on the social processes. In the given direction, the main success has been achieved by the foreign scientists who have visually demonstrated that the works dedicated to the questions of climatic history, floods, fires and so on are in demand and have an applied character (Le Roy Ladurie, 1971; Braudel, 1986 and many others.).

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At the present time addressing to the history of floods seems to be most topical when the occurring climatic changes dictate the necessity to monitor the existing natural risks and it is impossible to realize without their frequency data and the intensity of their manifestations in the past. Possibility of forecasting of this dangerous natural phenomenon is one of the most important questions of social and economical stability of Russia.

Materials and methods

In the course of our work (Myglan, 2010) historical information concerning the floods in Siberia has been collected in one data base and has been divided according to the territorial and chronological principals. Thereat, we have combined the data, taken from various sources, which concern one and the same event. In the result of this work we have got as a working basis the information which has been taken from 107 reports about floods, which have been spread the following way – 17 out of them were registered in the 17th century, 35 – in the 18th century and 55 – in the first half of the 19th century. This way, we observe the tendency of growth of the reports number since the 17th to the 19th centuries. It nicely agrees with the fact of the general increase of the paperwork volume in the course of achievement of the present time.

The collected material is rather heterogeneous; we meet most often only short messages, fixing just the fact of flooding, for example, E.P. Zipper (1968) mentions in his work that in 1732 Tobolsk city was flooded. As a rule, such reports do not let us characterize the scale of the occurred damages. The best variant is when the information about one and the same flood can be found in various sources (in this case it is added and verified). For example, the 1660 flood in the Yenisei province is presented by two reports: the first one contains the information about the

fact that “the flood washed away the winter rye” (Kopylov, 1965, p. 78), and that is why we are getting a false impression that this refers to quite an ordinary event; but the second report reveals the real immensity of the natural disaster – “...this year, the Yenisei river and the rivers flowing into it have extremely inundated... Yeniseisk Voivode Rzhnevsky reported to the Tsar that on April 17, 1660, the Yenisei fortress and all the villages of the Yenisei province were damaged by the rivers flood, and all the fields, had been sewn in 1659, were inundated” (the Tobolsk Branch of the State Archive of the Tyumen Region – TBSATR, f. I.691, list. 1).

Discussion and results:

In the course of consideration of the question of floods impacts on the human economical activity, we shall, first of all, linger on the aspect of city planning. In the process of reclamation of Siberian key territories, which allowed controlling significant large areas, they built fortified localities (small fortresses, winter quarters and so on.). They strived to find elevated and naturally defended places for constructions; at least it was a requirement, which was not once mentioned in the orders of the voivodes (Miller, 1999). At the same time, they did not always manage to find right and flood-defended places, and it later resulted in removal of some of the inhabited localities. It firstly referred to the Irtysh and Ob rivers basins, where vast territories were flooded because of a minor drop of true altitudes in the course of spring high waters. Thus, according to the petition of fur tax payers to Moscow, “in various volosts many fur tax payers were starving and dying of hunger”, as far as in the course of the 1667 spring flood “various hunting areas were inundated ...” (Apollova, 1976, p. 92).

Let us address the historical materials: in 1613, the Narymsk and Ketsk fortresses were removed after they had “suffered” from the flood

(Shcheglov, 1993, p. 58). Though, the place which was selected for the Narymsk fortress was again a failure, and in 1630 it was almost completely washed away in the course of the next high waters – "...the citizens turned out to be in an extremely tight situation because they had lost their houses and property", and the situation became even worse because of "...the epidemic of smallpox which up to then had been unknown on the territory of Siberia, and almost all the diseased dyed of it. The citizens could not bury their dead near the church inside the fortress, as far as there was lack of spare space..." (Miller, 2000, p. 76), and all mentioned above again resulted in the fortress's removal. Let us note that the removals of the inhabited localities occurred later as well: in 1669 in the result of the flood Tara town was removed to "a higher place which was situated 30 versts from the old one", in 1812 Nerchinsk town was removed due to frequent floods (Shcheglov, 1993, p. 121, 235). Such reports are first of all typical for the initial stage of reclamation of new territories, when the arrived people could not foresee all the possible risks.

If we consider the reasons of the occurred floods, then we should mark that the analysis of the historical data has let us disclose only two of them: spring high waters and summer rain showers. Quantitatively they have dispensed almost equally, in 26 cases it is mentioned about spring floods, and in 30 cases – about rain showers. In territorial scale, the reports about the floods are spread in a mosaic way. We observe very rarely the years, when floods swept vast territories of East and West Siberia at a time. In the 17th century there were no such cases, in the 18th century we can single out the year 1784, when in Tobolsk there was "... a severe flood which washed away and emptied the city" (the Tobolsk Gubernial Vedomosti, 1857, p. 508 – 510), and in Irkutsk "on July, 11, there was a flood from the Irkut River" (the Irkutsk Chronicles, 1990,

p. 134). In the 19th century the number of such messages increased significantly, as far as in 1800 in Yeniseisk "the water overflowed all the town" because of "an awful" flood (Krivoshapkin, 1865, p. 207), and the same year "on April, 27, the Lena River overflowed its banks because of extreme and immoderate high waters and floating ice... and washed away the common cottage (courthouse) ... the streets, fields, and the hay meadows along the Lena River were injured by ice, in the result of all this the fields will not be able to give crops this year, but it is not yet known for sure"; moreover, the common cottage gave a short list of peasants' damages and losses: one peasant's "house was pushed away from its place", the other peasant "lost his cattle", the rest "lost their barns, wood, plows, harrows, forges, hemp, pigs, bread crops, thrashing-floors... the bell tower of the Znamenskaya Chapel was also moved away" (Sherstoboev, 1957, p. 272 – 273). In both cases the population evidently suffered from the spring waters.

In 1820 the cities Tomsk, Yeniseisk (more than half of the town was inundated) and Kirensk were most severely damaged because of ice jams in the course of the spring high waters. Irkutsk city, the Nizhneudinsk, Verkhneudinsk and Olekminsk regions were flooded and severely damaged as well because of the rain showers – the water washed away the cattle, yurts, and houses (Shcheglov, 1993, p. 159). Here we shall present a detailed description of the flood in Irkutsk – "on June, 13, the rivers overflowed because of hard rains, the water flooded the city streets. From the 21st till 23rd of June it was again raining, and it caused the second flood, the water inundated the hay meadows and washed away the mown hay. On July 8, 9, 10 and 11, the June floods repeated because of the rains; and on the 17th and the 18th of July there was a church intercession for that purpose" (the Irkutsk Chronicles, 1991, p. 200).

In 1824 there were floods in the cities Yeniseisk and Tobolsk, in the later case “the water still overflowed the river banks in the middle of July” (Krivoshapkin, 1865, p. 207; the Tobolsk Gubernial Vedomosti, 1857, p. 508 – 510). In 1836 there were floods in Yeniseisk and Irkutsk, in the later case, the reason of the floods was rain showers “... in the beginning of August the waters were very high in the Angara and Irkut Rivers; much wood which had been placed on the river banks and at the estuary was washed away; in the Irkutsk region, the haycocks and even haystacks were drifting on the meadows along the road to the Resurrection Monastery” (Krivoshapkin, 1865, p. 207; the Irkutsk Chronicles, 1991, p. 206, 208). In 1841 there were registered cases of floods in the Yeniseisk and Irkutsk guberniyas (provinces). In the regions along the Lena River peasants lost “their cereal stocks, cattle, houses, winter sowings and all their property” because of high waters; the damages of only the Kirensk region amounted to 42, 782 silver rubles” (Krivoshapkin, 1865, p. 207; Kozhukhov, 1967, p. 178).

We have the most detailed information concerning the 1851 flood, when the extremely rainy summer became the reason of significant high waters in the rivers of the Yeniseisk and Irkutsk guberniyas – “it was 1.5-2 fathoms higher than the nominal value”. The damage of the Irkutsk guberniya (together with the Zabaikalsk region) amounted to 100 thousand rubles, the damage of Yeniseisk – to 19, 146 rubles. (Kozhukhov, 1967, p. 178). In Irkutsk city “on July, 11, the waters of the Angara River became so high after three days’ rain, that the island in front of Telyachy town and others was covered with water, the Irkut overflowed its banks completely. The 12th of July was a day of clear sky and the water was ebbing quickly. The settlements lying downstream of the Irkut river were severely damaged; some of them lost whole houses, barns and saunas” (the Irkutsk Chronicles, 1992, p. 182). The Minusinsk District

reported that “By the 28th of May the Yenisei’s arm waters had overflowed so high, that they flooded the territory and some houses ... in the lower part of the city, near the river arm. On the 14th of June the grass would not grow, because of much sand, which had been brought by the waters. On the 21st of June the water had not gone back into the river or into the ground in some places, and that was why there was no grass there. In the period of July-August rains also interfered with hay and bread harvesting”. (Vatin, 1916 – 1922, p. 74 – 75). The same year there was also registered a flood in Tobolsk town (The Tobolsk Gubernial Vedomosti, 1857, p. 508 – 510).

Analysis of the presented information let us come to the conclusion that, even in the years when the floods covered vast territories, their reasons were various in most cases. Among all these cases we can single out the Yeniseisk and Irkutsk guberniyas, which reported simultaneously about high waters because of spring ice jams and summer rains.

Within the work carried out it is important to single out the social component of the floods, i.e. to show the degree of damages from this natural disaster. Bearing this in mind, let us select the years, when the most severe floods took place and distribute this information among the largest river basins for the convenience of data perception. Thus, in 1636 Tobolsk town “suffered countless damages of constructions, food-stocks, and cattle in the result of a great flood”. (TBSATR, f. 329, l. 16, d. 13). In 1784 and 1794 in Tobolsk very heavy floods were registered, which were characterized as “... an awful flood which ravaged the city» (The Tobolsk Gubernial Vedomosti, 1857 r., No. 2; No. 15 p. 508 – 510).

In 1649 there was a heavy flood in the Yeniseisk province which damaged almost all the sowings and a part of population (Kopylov, 1962, p. 35, 39; Sherstoboev, 1949, p. 338). In 1660 there was also a heavy flood (its description is given

hereinabove). In 1763 in Abakan city the flood “washed away several best houses” together with the church bell tower, thereat the wooden fortress was damaged as well (Vatin, 1913, p. 62). In 1765 “... people say that such a flood has been only once... that all the islands” near Krasnoyarsk city have been under the water. (Stepanov, 1997, p. 57). In 1800 an “awful” flood happened in Yeniseisk town when the water overflowed the entire town (Krivoshapkin, 1865, p. 207).

In July 1718 “a dreadful flood occurred because of extremely high waters of the Irkut River, all the lands of Buryats in the upper course of the river and peasants’ hay meadows and islands along all the river bank suffered, and in Usolye the water damaged the salt in the barns and washed away a lot of yards” (the Irkutsk Chronicles, 1989, p. 111). In 1745 some volosts (districts) reported about significant damages, which had been inflicted by the Lena River flood. Shevelyov, the estate manager of the Chechuisk burg wrote that the Lena and Kirenga Rivers overflowed “because of heavy rains” and flooded the fields and hay meadows, covering them with “various bits and pieces”, some cattle also drowned in the water. A similar report was sent by the community elder, foremen “and all the plough peasants” who wrote to their writ cottage that “the heavy flood was God’s willing: from 4 – 11 of August the water was high in the fields” (Sherstoboev, 1957, p. 269). In 1754 village people lost a lot of cattle, harrows, ploughs and some constructions in the result of the May high waters of the Lena River; the water was “a legal fathom higher than the unflooded ridges, and it was still higher in low places”, we have the information that the water overflowed the constructions by 2 fathoms. Thus, for example, in spring, a lot of winter sowings of Kezhemskaya settlement peasants “were washed away and pulled with ice”, the fields and hay meadows were flooded and it postponed the spring sowing

(it was over only on June, 7 and later); and, finally, the autumn was an early one, while the cereals were only blossoming “... and one could not get away from the great frosts. And they came already on the 22nd of August and the crops got frozen”. The peasants could not buy bread in Yeniseisk, as far as “there was no bread crops as well” (Sherstoboev, 1952, p. 256-258, 296, 270). In 1767 peasants’ fields were twice inundated: this time the volosts which were situated along the Lena, Ilim and Ilga Rivers suffered. As it was reported by the selected of the Kirensky burg, the waters of the Lena River washed away the spring sowings; and the people had to re-sow the fields, not having any bread left for food. “From the 10th till the 27th of May the so-called Lena River washed away the Chechuisk administration...” – was reported about the first flood from the Chechuisk burg. The succeeding June freshet flooded the sowings once again. The Krivolutsk writ cottage informed: “it was God’s will that in a short period of time after that (sowing), a new flood happened and the water began to rise, and it was much more heavier than in the previous time”. In Ilimsk town itself “it was constantly raining at the mercy of God since the 11th of May. And on the 13th of the month a great flood occurred on the Ilim River and it inundated the houses of citizens in Ilimsk, in the Upper and Lower suburbs, the Holy Cathedral of Our Savior, the Voivode’s chancellery, the municipal barns... the municipal wine underground stock, pubs and the Voivode’s house and yard ... and the municipal food stocks and shops behind the Ilim River – everything was completely flooded in 3 hours, and there was no any dry place even for an arshin anywhere... the same thing occurred with the citizens’ houses – a lot of them were damaged and some of them were smashed and washed away with water”. The water was just near by the very towers of the burg; it washed away 44 fathoms of the palisade (lath fence), “the fence of the old burg around the

church... the ladder and the gate were smashed”, and 20 yards in the Upper suburb, 28 yards in the Lower suburb and 9 yards were damaged in the Old burg. (Sherstoboev, 1957, p. 270 – 271). As a rule, hunger was following such heavy floods. For example, in 1771 “...all the people of Orleusk settlement were broken because of the wrath of God, and now, they were dying from hunger, as if after severe frosts and damage of bread”. One peasant died, because “he had had nothing to eat in his house, but grass”. Two children died

as well due to the same reason. Their families, “though being alive, had become very thin and their faces were emaciated... and they already could not walk even in order to get some grass for food” (Sherstoboev, 1957, p. 267).

We should mark that it is also important to consider the issue how much does the frequency of spring and summer floods manifestations depend on the northern hemisphere’s climatic temperature changes. (Esper, Cook, Schweingruber, 2002) These data have been

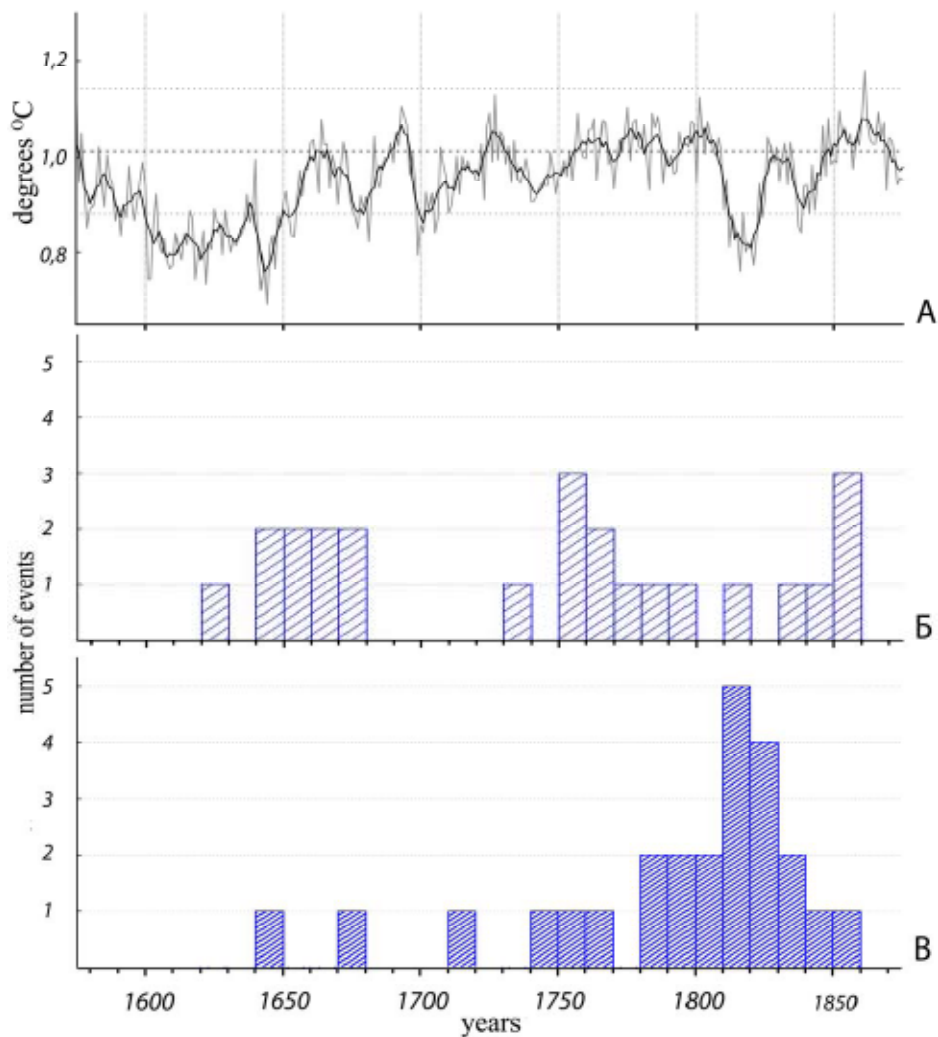


Fig. 1. Dynamics of the temperature changes on the territory of Siberia. A – the curve of the northern hemisphere’s annual average temperatures, Б – the number of reports about spring floods, Б – the number of reports about summer high waters. The dotted line shows the arithmetical average, the grey line denotes a \pm standard deviation; the 5 years’ middle sliding line gives the notion of the weather changing

correlated (Fig. 1). It is well seen in the figure that the reports about the spring floods approximately coincide with the periods of annual temperatures increase. Analysis of the frequency of summer floods has showed that they mainly occur in the period of cold spells – the first half of the 19th century was a little Ice Age, and what concerns the period from 1680 till 1725 the reports about spring and summer floods are almost absent. This way, we cannot assert that there is a certain dependence between inter-centennial dynamics of annual and summer temperatures and frequency of floods manifestations. We can presuppose that, spring floods gravitate towards the period of the temperature increase, while summer floods – towards the period of the temperature decrease.

Conclusions

Thus, summarizing our work we shall say that floods have been inflicting a colossal damage to the economic activity of people as in the past, so in the present time, and have been our permanent satellite. The role of floods and their influence on the economic processes have been evidently underestimated and require further detailed studies. Our references to the historical data well illustrate the fact that the policy of regulation of the large Siberian rivers' flow, the policy which was actively pursued by the state in the second half of the 20th century, despite of its few negative results, has also had a significant positive effect – the decrease of the risk of flooding in the major built-up areas.

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Наводнения в Сибири: исторический очерк

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В работе представлена информация о наводнениях на территории Сибири за последние 300 лет. Рассматриваются причины, частота распределения, территориальный охват и социальные последствия наводнений. Проводится сопоставление данных о частоте проявлений наводнений с ходом годовых температур в Северном полушарии.

Ключевые слова: Сибирь, история, наводнения.

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