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Modern distribution of forest fires in front coastal area of the Baikal

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Abstract

Varying state of forested area has different environment forming importance. Fires are considered as forming factor of actual spatial forests structure and possible influence on environment protection functions near the Baikal Lake. The electronic fires database from 1995 till 2017 year of Prebaikalski national park (PNP) area was analysed with GIS using, remote sense data and field research, and was given attention to common data before this period. Integral cartographical pattern of forest fires distribution was carried out. It was burnt-over 115754 ha of more than half of PNP area, forming derived forests structure. Maximum fires quantity was in spring-early summer usually dry period. Taiga forests of different successional restoration states were impacted by fires within low mountain and middle mountain area of front coastal territory near the Baikal. Ground forest fires with small burnt area predominate. Their propagation depends not only on climatic conditions, but also on natural localities, when southern exposure slopes are more subjected to the fires. Greatest quantity of fires concentrates near settlements and roads of different kind. But the largest forest fire areas (about 33,000 ha) took place during the irregular summer droughts, for example in August 2015 within hard available upper part of the mountain taiga belt. The catastrophic consequences of forest fires under mountain conditions are connected with the activation of slope processes, as a result with processes of forest cover recovery inhibiting. It is stated formation of the stably prolonged derived forest cover structure in the Baikal basin with decreased of water-protection functions.

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Introduction

The spatial structure of forests in Siberia reflects changes in the ecological conditions, by the caused macro-geographical reasons, connected with the global latitudinal-zone differences, macro-regional, high-altitude-zone. On the force of action in one row with this it should be take into attention changes in the forests structure under the effect of the exodynamic factors, which form the contemporary state of territory geosystems and respectively regional successional age structure of biocoenoses. One of the basic exodynamic factors, which influence the successional changes in the forests structure, which can be considered also natural - forest fires, their manifestations are general both in the territory and in the time. Pyrogenic factor is considered as the natural, constantly being present factor of dynamic and even evolutionary geosystem changes.

The forest fires, which lead to contrasting changes in the properties of the biotic component of geosystems, and the subsequent long-term successional age changes of biogeocoenoses in the dynamics of geosystems render influence on the carbon balance, gas composition of the atmosphere and water balance of the territory (Fjodorov, 1997; Vaganov *et al.*, 2005). The manifestation of pyrogenic factor we have examined was based on the example to the special protected territory of the Prebaikalski national park (PNP), included in the Central ecological zone of the Baikal Lake on federal law "On the Protection of the Baikal Lake", and this zone has paramount water protection value. In spite of special attention to the protection of forests from the fires and the fire-prevention measures within the guarded natural territory of federal importance, fires propagation at present reflect the general nature of the manifestation of this factor as in all Siberian regions.

In the long-term dynamics of geosystems the burnt areas are the result of fire disturbances of natural biocoenoses, which cause the significant emission of carbon from the deposited organic matter of natural biogeocoenoses, and are the most contrasting states of the complete disturbance of plant cover for the area hydrolofagical properties are substantially changed. Under mountainous conditions forest fires impose catastrophic consequences, when processes of forest recovery are inhibited with activation of slope processes and with soil degradation.

Materials and methods

Nature background

Particular features of the natural conditions of the southwestern Baikal region, such as mountain relief, the variation of climate, the variety of plant cover, it is caused differentiated, by places with the high degree of contrast, the state of landscape structure. For local differences in the distribution of atmospheric precipitation and heat due to the complicated mountain landforms on the territory in the vicinity surrounding the Lake Baikal, there are co-existence and changing of the steppe, meadow-bog, subtaiga, mountain-taiga, sub-golets and golets geosystems with a different degree of resistance to disturbances and stabilization of their structure.

The contrasts of the natural variety of territory are strengthened by the diversity of the succession-dynamic states of geosystems, which appear as a result of different action factors, and cardinal one is pyrogenic. The conditions of its manifestation are defined as by the natural reasons: by nature and by the dynamics of climatic conditions, by fire from the lightning, by the differentiation of the geosystems properties of the territory and their spatial combinations, as by the nature of anthropogenic activity, too.

Extent of the national park, which adjoins to the lake Baikal, from its southern point to northern, is about 470 km.

This territory in the limits of South and West Baikal region, conditionally can be named the southwestern Prebaikalie. The distance of the PNP boundary from the lake considerably varies. On the north and in the center section it unevenly becomes narrow from 12 to

3 km, and in the southern part for the elongation about 110 km it reaches almost 33 km. Entire reserved territory of the park relates to the Central ecological zone of the Baikal in accordance with federal law "About the protection of the Baikal Lake" and got a strict nature-conservation regime, which facilitates the realization of the water-collecting and water-protecting functions of the largest reservoir of fresh water all over the world.

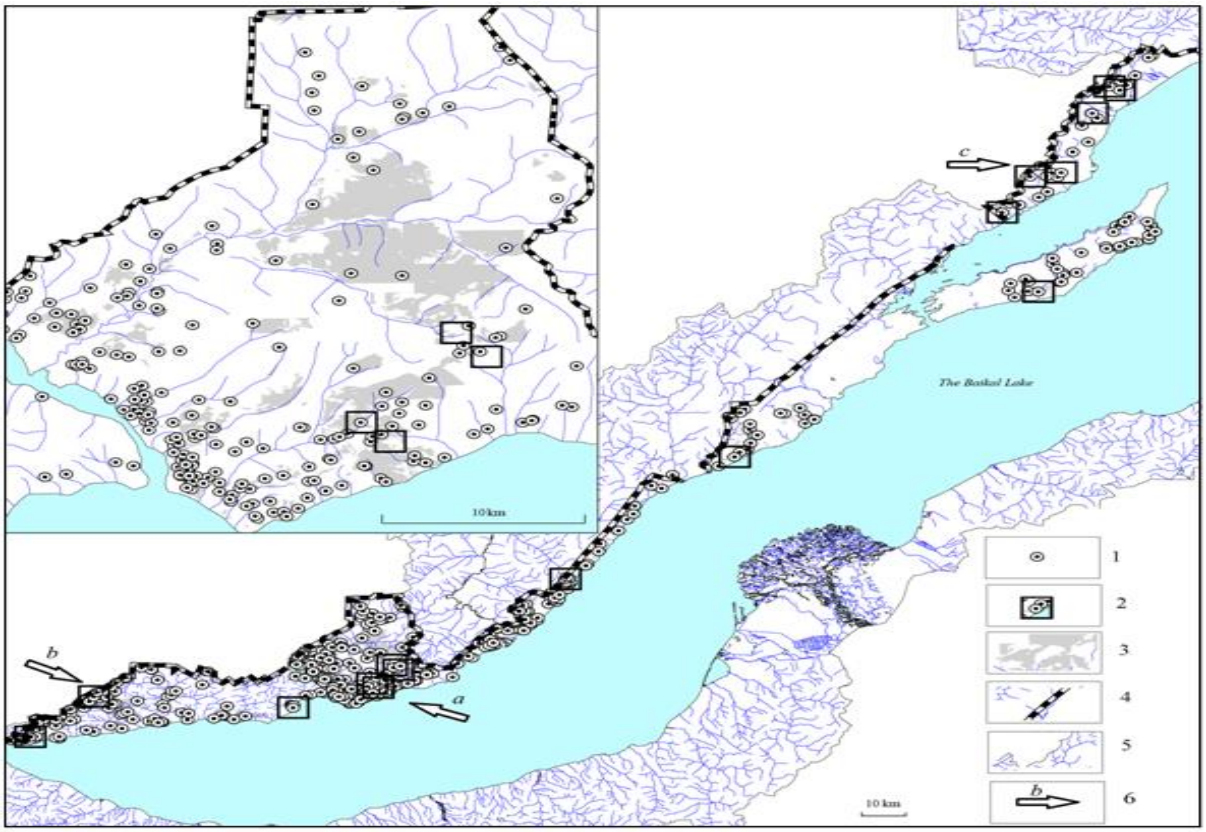

Fig. 1. Distribution of forest fire centers within the Prebaikalski National Park in 1995-2017, 1 – the centers of forest fires with the area less than 200 ha; 2 – the centers of forest fires with the area more than 200 ha; 3 – burnt areas according to forest inventory in 1991; 4 – the border of Prebaikalski National Park; 5 – the border of Central ecological zone in accordance with federal law «On Protection of the Lake Baikal »; 6 – the examined situations (a, b, c, in text).

According to physical geographical regionalization (Mikheev, 1990; Suvorov, 2002) major portion of the territory in question is represented by Prebaikalskaya golets mountain taiga and depression province of Baikal-Dzhugdzhur mountain taiga physical geographical oblast, and in the extended southern part - by Upper-Angara (Verkhnepreangarskaya) bog-steppe and subtaiga submontane province of Southern-Siberian mountain physical geographical oblast. Frontcoastal narrow sections from the north to the source of the Angara river are characterized by the submontane-steppe geosystems, which pass along the spurs of Baikalski and Premorski (Seaside) ridges into mountain-subtaiga and above into mountain taiga.

Formation of submontane steppe goes inland to 12 km, by places represented sporadically on the southern exposures slopes. Directly along the coast, bordering the sections with steppe formation, subtaiga light-coniferous pine (*Pinus sylvestris*) and larch (*Larix sibirica*) rhododendron (*Rhododendron dauricum*) dushekia (*Duschekia fruticosa*) cowberry (*Vaccinium vitis-idaea*)-grassy forests grow. Gramineous-forb and forb-gramineous steppes are encountered by small sections at the southern and the

southwestern slopes along entire western coast. Drier poa (*Poa pretense*)-fescue (*Festuca ovina*) and wild rye (*Leymus chinensis*)-fescue steppes are widespread on the north in Preolkhonie and at Olkhon island, occupying low-mountain slopes and lake-tectonic piedmont plain.

Nevertheless within the limits of national park the mountain taiga geosystems of the low-mountain and middle-mountain conditions prevail with the maximum altitude to 1300 m. At middle mountains area fir (*Abies sibirica*)-Siberian stone pine (*Pinus sibirica*) and larch-Siberian stone pine bergenia (*Bergenia crassifolia*), subshrub (*Ledum palustre, Vaccinium vitis-idaea, Vaccinium myrtillus*)-true mosses (*Pleurozium schreberi, Hylocomium splendens*) with bergenia and subshrub-short grass (*Trientalis europaea, Maianthemum bifolium*) true mosses forests are primary, which take moistened slopes and watersheds. To a considerable degree they are substituted by stable prolonged derived larch-pine and birch (*Betula platyphilla*)-pine secondary forests.

Low mountainous area is represented everywhere with pine and larch-pine rhododendron-dushekia cowberry-grassy and subshrub (cowberry, blueberry (*Vaccínium myrtíllus*), labrador tea (*Ledum palustre*))-true mosses forests and by derived aspen (*Populus tremula*)-birch grassy communities at such places, too. In the south (Olkhinskoe plateau and the spurs of Eastern Sayan) with the predominance of larch and pine-larch cowberry-labrador tea subshrub-true mosses forests there is everywhere developed the renewal of Siberian stone pine, the sections of dark-coniferous forests were preserved, all of this can testify about the dark-coniferous equifinal structure of forests (Suvorov and Novitskaya, 2017).

It was repeatedly emphasized that the vegetation of the southwestern Baikal region even before the establishment of the separately protected natural area in 1986 was strongly disrupted by anthropogenic factor – by fires, industrial cutting of forest, by excessive pasturing in the steppes (Belov, 1990), the particular transformation of vegetation occurred in the most mastered near the Angara river regions. The existence on this territory of mosaics of successional-dynamical states of geosystems (from early stages of regeneration following external impacts with grassy pine and small-leaved plant communities to equifinal stages with dark-coniferous plant communities) is evidence of the varied and rather dynamical structure of geosystem states under different factors.

On the basis of averaged estimates of the fire hazard it was defined on the territory the South-Baikalian pyrogenic okrug (district) with the number of fires per season ranging from 2.1 to 7.0 or larger for 100 ths ha, and the West-Baikalian okrug with the number of fires varying from 0.1 to 7.0. The general description of the pyrogenic okrugs included the estimated data on the relief (altitude and ruggedness), climate (seasonal dynamics of atmospheric precipitation, and forest-fire index of dry periods), vegetation, and combustibility (Sofronov *et al.*, 1999). According to the data of the fires accounting in the PNP territory (Fire-prevention forests arrangement, 1989) fires appear since April until September.

It is thought that the possibility of forest fires originating is influenced primarily by meteorological conditions. They determine the potential hazard that combustible plant materials get ready for ignition (Kurbatski, 1964; Valendik, 1985, 1995; Volokitina and Sofronov, 2002). The characteristics of climate are given based on the local meteorological stations data (Reference book on the climate of the USSR, 1966, 1968; Scientific applied reference..., 1991) and on thematic researches data (Bufal, 1966; Suvorov *et al.*, 2008).

The sunshine duration in the southern and middle part of the Baikal lake, it is 2000-2400 hours/year (Bufal, 1966). The maximum values of total radiation under moderate cloudiness conditions – 439.6 $\cdot 10^4$ – 460.5 $\cdot 10^4$ kJ/m^2.

The positive values of radiation balance for the Baikal reach 154.9· 10^4 – 167.5 ·10^4 kJ/m^2. On the western coast of Baikal the air temperature in May comprises 5.2-5.5 °C, maximum is in July - 14.7-15.4 °C. To the south air May temperatures have the large values amplitude - 4.9-6.3 °C.

The high mountain ranges surrounding the lake prevent, to some extent, the external air currents from penetrating into the lake's hollow thus giving rise to local circulation processes in it, with mountain-valley winds and with the sharply pronounced breezes. On the western coast of the Middle Baikal the yearly mean wind velocity reaches 3 m/s, and the highest velocity of 4 m/s is observed in April-May. At the south it is about 5 m/s. In a fire-hazardous season, the wind velocity is different, but the highest velocity is recorded in May (4.3). In the mountains, the yearly mean wind velocity is lower - 1.3. High wind velocities larger than or equal to 15 m/s are observed everywhere. A total of about 18 such days correspondent to the fire-hazardous months.

The regime of atmospheric precipitation is determined largely by the atmospheric circulation whose behavior in a warm season is governed by enhanced cyclonic activity, and by atmospheric precipitation amounting to 65-85 % per annum. On the larger part of the coast PNP territory from the sett. Kultuk to the Buguldeyka river the amount of precipitation varies from 450-500 to 300-350 mm, to the north territory where subtaiga and submontane-steppe conditions prevail, there is the most arid conditions, where the annual amount of precipitation varies from 200-250 mm in the coastal zone and grows to 300-350 in the mountain part.

The least amounts are observed on Olkhon Island – about 200 mm. From the coast of the Baikal in low mountain area and in middle mountain, where the mountain taiga vegetation extends, the precipitation amount rises from 300-400 mm to 600 mm. According to the experimental data in the interval of altitudes 460—500 m precipitations increase with the gradient 25 mm per 100 m (Antipov and Petrov, 1990).

In fire-hazardous season, the smallest amount of precipitation correspondents to April-May. Maximum is observed in August on the territory of the middle part of the Baikal region, - 55-60 mm, and in July on the western coast in the Southern Baikal region, – 64. The amount of precipitation decreases in September throughout the territory involved. On Middle Baikal snow cover appears usually in the first ten-day period of November, in the south – in mid-October, respectively, and it disappears in late April – early May.

The values of relative air humidity in April-May are the lowest and constitute 54-56 % in the middle part of Baikal's western coast, and they make up 59-65 % in the southern part, and in the mountains. From July to August the relative air humidity increases to 74-80 % and decreases to 65-77 % in September. The largest number of dry days (with 30 % or lower humidity) is observed in April, while in July-August the number of dry days decreases (to 0.1), and in September it increases to 0.3 on the western coast of southern Baikal region, and to 1.6 in the mountains. In some years the number of dry days deviates considerably from the above values. A dry period can last for more than ten days continuously or with a short break, which promotes the occurrence of fires. On the basis of the long-standing data about the time-start of the first fires the beginning of flammable season is established since April after disappearing of snow cover. It depends on the spring changes of climatic conditions and on the presence of the fire sources in the forests.

Data on PNP territory forest fires before 1988

According to forestry data on the occurrence of fires within the PNP (before it was granted the status of a specially protected territory) (Fire-prevention forests arrangement, 1989), with the totaling area of lands 475.6 ths ha, the forested territory was 278.3 ths ha (58.5 %), including 224 ths ha (or 80.4 %) occupied by coniferous species (pine, larch and Siberian stone pine). Forbs, bergenia and labrador tea type forests were dominant.

The area occupied by the most fire-hazardous plant communities (young growth of conifers and other kinds of trees) was 35.8 ths ha, or 12.9 % of forested land. The naturally occurring fire hazard was estimated having regard to the typological structure of forests using a five-point scale due to Melekhov (1947) at a level of a medium class – II.4. In doing this, a forest management compartment was used as the taxonomic fire unit.

The scale that was refined and extended by Ovsyannikov (1978) is currently used in anti-fire forest management. The categories of forests are distributed in it by classes of the hazard with due regard for the priority of fire maturing and for the possible occurrence of strong fires. Class two of hazard is the commonest. It includes cowberry pine forests, especially with the inclusion of pine undergrowth or a layer consisting of juniper with density above moderate; larch forests with underwood of brushwood of mountain pine *(Pinus pumila)*; Siberian stone pine forests with thick underwood, and uneven-aged forests with vertical closure. The fire hazard is assigned one class higher for coniferous forests, the structure or other characteristics of which promotes a change of ground forest fire into a crown fire (tall thick undergrowth of the conifers, debris-strewn forests, and etc.); for small forested areas along waterless valleys surrounded by localities with considerable combustibility; for forested areas adjacent to public roads, and to railroads, and to settlements. Ground fires in this case are possible throughout a fire-hazardous season, while crown fires can occur at periods of fire maxima.

The practical significance of this categorization notwithstanding, it is pointed out that class IV of hazard includes not only poorly combustible sphagnum and polytric (*Polytrichum commune*) pine forests but also all grassy forests, although disastrous fires in them are not uncommon in the spring and autumn in southern Siberia. The development of other fire typologies is underway. On the other hand, even these scheme permits a more detailed territory differentiation with regards to the pyrogenic hazard when the conditions are assessed not in terms of forestry units but according to the types of homogeneous natural condition, and this is possible by use of landscape-typological mapping. For the purpose of making such an estimate, an analysis was made of the data on fire spreading within the Prebaikalski National Park.

Entire within the ten-year period before the arranging of the special protected territory of federal importance (1978-1987), it was fixed 137 forest fires with burnt area of 2750.1 ha, and the average area of single fire composed 20.1 ha. According to the relative fire incidence rate of this territory (in terms of years and the number of fires per million hectare), the territory corresponds to the gradations of the “Soyuzgiproleskhoz” scale below average (from 6 to50) and above average (from 0.5 to 1.0). The duration of a fire-hazardous season between the first and last fires is 154 days. In accordance with the number and areas of fires, the maxima of fire-hazardous season corresponds to May-June (respectively, 43.8 and 16.8 % in May, and 50.8 и 40.3 % in June). Typically they are ground (lower) fires, so that they mostly affect forest litter and do damage to the root system of trees with the result that the affected tree stands are doomed to die, and the problem is compounded by the fact that very short profile mountain soils are dominant. Forest fires are in the most cases deliberately set (the proportion of “unnatural”, or man-made, fires constitute 80 %), and the share of naturally occurring (cased by lightning) is 9 %. Nearly every seventeenth fire (5.8 %) occurs due to unknown reason.

Most of the territory is being monitored by the aircraft-assisted forest fire control service. Aircraft detect 30.5 % of fires, and 80 % of them can be identified in area as small as 0.5 ha (and 51 % of these in an area as small as 0.1 ha), which indicates a reasonably high efficiency of this monitoring operations. Only 39.4 % of fires and about one-sixth of fires with an area of about 0.5 ha, and several tens

of hectares, respectively, are successfully eliminated. More than 77.9 % of fires took more than 24 hours to be eliminated. For comparison, only 21 forest fires, with 16.1 ha the mean area of a single fire, were recorded on the territory of the Slyudyanka forestry district adjacent to the national park in the Southern Baikal region just the same period. The territory of the forestry district compares with PNP – 352 ths ha; it should be noted, however, that the physical-geographical conditions, including the climatic conditions, the landscape structure, the structure of the geosystem states (Mikheev, 1990; Suvorov, 2002; Trofimova, 2002), and also the transport and residential infrastructure are different. Given the validity of the analysis of averaged estimates made for forestry districts in the case of small-scale pyrological zoning, it is of interest to examine the situational dynamics of fires, and the condition of their localization.

Research approach to assessment of modern fires propagation

The individualities of forest fires are relatively many-sided. There are long-standing statistical data on the propagation of the fires for the territory of PNP, which make possible for us to build and to analyze the data base for forest fires with the use of electronic tables, which reflect the calculation of forest fires in the territory of park from 1995 on the present time. The database includes the place of fire occurrence (within a forestry compartment), the date, the area, and the possible causes. Adjustment of fires to the topographic and forest-husbandry base makes it possible to analyze, in a more thorough manner and by taking into consideration the ambient properties of the territory, the favorable conditions for occurrence and spread of fires. For analyzing the local conditions, the hotspots (center of fire) and the burned-over areas in the vector form were superimposed on the layers of the topographic base, forest inventory data, and with thematic materials and field studies of the Institute of Geography RAS SB, and with space remote data from different years among which the highest informational content correspondent to the Landsat-ETM 2000-2017 represented in 7 spectrum zones, and synthesized by us with the eighth channel, that gave a resolution of 15 m (http // www.landsat.org). The hotspots, which in the database correspondent to a forest-husbandry compartment, were actually localized on the ground with field observations, and by the available remotely sensed data, with the burned-over areas are clearly interpretable – this is especially true for the fresh burnt areas.

Results and discussion

For the period from 1995 to 2017 484 fires were recorded on the PNP territory (Figure, Table). Their total area was 115754 ha, and the averaged area of a single fire - 239 ha. The areas of a single fire strongly vary. The number of small fires (with burned-over areas less than 0.5 ha) constituted 60 (12.4 % from the total quantity), in the range 0.5-5 ha - 178 (36.8 %), 5-200 ha - 199 (41.1 %), and of large, ≥ 200 ha, - 47 (9.7 %). Burned-over areas measuring more than thousand ha were recorded in some years: 1996 - 1117 ha in May, 1997 - 1400 ha in the end of May and 1650 ha in August, 1998 - 1500 ha in May, 2000 - 2000 ha in May, 2006 in May - 1423 ha; 2014 in June - 1088 in the end of May and 1650 ra in August. The largest territories that were affected by single fires were recorded in August 2015: 7345 ha; 9238 ha; 9792 ha; 4337 ha – all of them on the north in mountain conditions. Over the years the greatest territory, passed by fires, is noted in 2015 - 33284 ha, in 2010 - 26712 ha, and in 1997 - 5709.5 ha. The year of case-fires proved to be most flammable is 2003 - 62 burning events.

Noteworthy fact is the gross difference in the averaged statistical data on the number of forest fires on the same territory, with relatively identical natural conditions: before arranging of the special protected natural territory and afterward. This can be explained not only by the differences in the dynamics of climatic conditions, but also such factors as a change of the economic entity, and hence by the different attitude to the forest fires recording as well as by the growth of

the infrastructure of the coastal settlements and by the increased utilization of the territory as the touristic resource.The distribution of forest fires across the territory (see Fig.) is uneven and does not show any obvious match of its differentiation by humidification in warm season (Trofimova, 2002). The most likely cause is anthropogenic factor. As regards the concentration of the centers of ignition, their largest number is observed near the residential zone of Listvyanka settlement which is the large recreational center on the Baikal shore (see Fig., a).

Table 1. Forest fires within the Prebaikalski National Park in 2006-2017.

Year	Quantity of forest fires	Total burned-over area, ha	Quantity of single forest fires with area more than 200 ha
2006	25	24229.5	2
2007	32	3954.1	7
2008	15	301.2	
2009	22	1216.6	1
2010	28	26712.2	
2011	12	322.5	
2012	1	7.0	
2013	9	138.1	
2014	40	1535.75	1
2015	28	33284.5	6
2016	11	273.7	
2017	6	608.6	1
In total	229	92583.8	18

This is coast zone, which adjoins the settlements, to the bases of leisure, and also to the roads of different designation. Localization of large fires coincides with the domination in the territorial structure of the stable-derived states of mountain taiga geosystems. Such areas are characterized by small-leaved plant communities, as in the case with Olkhinskoe plateau at the south of PNP. Furthermore, here sometimes the areas of large fires go from the adjacent the national park territories (see Fig., b).

The fact that there were no fires for a 10-year period in secondary structures of geosystems and that only small fires occurred is beneficial for a successful renewal of coniferous forests, which is confirmed by the field descriptions, pointing out the regeneration of Siberian stone pine and fir trees under the canopy of small-leaved trees. The strongest fires occurred in May-June. They are rather common in the presence of numerous small fires. The large fire (creeping ground, rapid, strong) embracing an area of 2000 ha was recorded in the last ten-day period of May 2000 along the right bank of the Cheremshanka river in the Premorsko-Onotski mountain-taiga and subtaiga okrug – it affected near-watershed and (southern exposure) slope localities, represented with pine and small-leaved grassy forests. A natural obstacle to it from the south was the valley of the Cheremshanka river; only the southern exposure slope was actually burned out. Another large fire that occurred in this same area in mid-May 1998 encompassed 1150 ha. This burned-over area lies in the upper part of the Nikulikha low at south-western exposure slope. From one side, limited by the upper reaches of river along creek valley it was extended from the trough complexes to the watershed spur. This fire took place in the stable-derivative territorial structure of mountain taiga geosystems with grass small-leaved plant communities. Usually large in the area fires occur in those sufficiently distant from the residential zones and the roads places. Obviously, fire in May 1998 over the area of 1100 ha in the low Raspopikha had anthropogenic origin, being localized next to the path, which goes from the Angara reservoir.

An extensive burned-over locality at Olkhinskoe tableland (piedmont-elevated mountain-taiga area) is clearly seen on the synthesized 2002 image. This area includes at least four fires that occurred in different years over the course of ten years. Specifically, a large burned-over area of 1100 ha was recorded here in May 1998. The spread of fires in different years, and the secondary succession structure of the geosystems states with pine and small-leaved forests indicate that fires occurred on multiple occasions. This area is bounded by valley complexes; yet, it encompasses the upper parts of interfluves of several small rivers. Territorially, these burned-over areas are associated with fires arriving to the boundaries of PNP from the north (see Fig., b). In 2003 62 forest fires were fixed with burned-over area of more than 5000 ha of them nine large (each more than 200 ha). They all occurred in the attended places on the slopes of small creek valleys the Elovka, the Kirpichnaya, the Bolshie Koty, near Talovka settlement, in the limits of 300–800 m from the roads and cuttings within the middle-age pine and small-leaved forests. The propagation of fire occurred according to the type of the steady ground fire and crown forest fire of average intensity.

The total distribution of the fires shows their concentration in the secondary state structures of geosystems and supports their spatial pattern through the long time, which characterizes geosystems as stable prolonged-derived. In this case important value has a factor of local transport accessibility, too. Major portion of the fires occurs in May-June. In the moist years the propagation of small fires predominantly occurs, the years of the increased dryness determine the more uniform distribution of large fires. As noted, the most extensive forest fires were fixed on the north PNP in 2015 in the upper part of the mountain taiga belt, where were extended forests of the limited and reduced development from the larch and the Siberian stone pine and the brushwood of mountain pine at the heights about 1000 m and above, in the uncharacteristic time for the mass fires - in August, caused by the set of the conditions: climatic with the prolonged arid period and local dry thunderstorms, the high level of combustion of plant material, conifers, trees and bushes, accumulated ground dead organic matter in the off-fire period with high combustion possibility, and also by difficult accessibility and so by the complexity of fire extinguishing in the mountains (see Fig., c).

Conclusions

The analysis of the distribution of the forest fires demonstrates their concentration in the secondary geosystem state structures, which determines maintenance of such states over a long period of time, and steady nature of pattern with the derived vegetation, too. It takes place both immediately in the coastal zone of the Lake Baikal and in the frontcoastal mountain part of the PNP. As a whole during the period 1995-2017 in question almost half of PNP area was subjected to impact by forest fires. Despite the fact that they occurred in the different time, but integrally they characterizes the decrease of the water-protecting and environmental forming functions in the Central ecological zone of the Baikal lake with a change in the runoff forming and runoff regulating potentials of this territory, connected with a after-fire change of geosystem states. Under mountain conditions with reduction of forests it takes place change of ground hydrological significance from high, - with steady uniform water release, regulating and stabilizing influence of biogeocoenoses with the large regulated capacity of ground cover; to the low hydrological significance, with an increase in the intensity of the runoff of melt and rain waters, by an increase in the evaporation, by the degradation of ground cover and respectively by the decrease of the run-off regulating functions (Fjodorov, 1997). Thus the territory of the Prebaikalski National Park is facing a strained fire-hazardous situation exerting direct impact on fulfilling of water protection and environment regulating functions. The existing situation variety of the conditions of the forest fire beginnings requires the territorial differentiation of fire-prevention measures.

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