OVERVIEW OF SEA OF OKHOTSK POLLOCK FISHING SEASON IN 2018

April, 2018 KamchatNIRO

SUMMARY REPORT

One of Russia's largest and economically important fisheries – Sea of Okhotsk Pollock Expedition – operated during January 01 – March 31, 2018 in West Kamchatka (61.05.2) and Kamchatka-Kuril (61.05.4) sub-zones and during January 01 – April 09, 2018 in North Sea of Okhotsk subzone (61.05.1) has completed.

According to data of Vessel Daily Reports (VDR) from the Fishery Monitoring System (FMS) run by the Federal Fishery Agency as of April 09, 2018, total pollock catch amounted to 824.8 kilotons (kt) (85.3% of TAC) compared with 858.8 kt (88.8% of TAC) during the same period a year ago.

Characteristics of pollock fishing season in 2018

Same as in 2016–2017, pollock TAC for 2018 has been set at 348.0 kt in sub-zone 61.05.1, 348.0 kt in sub-zone 61.05.2 and 270.7 kt in sub-zone 61.05.4. Same as in 2010–2017, quotas for subzones 61.05.2 and 61.05.4 in 2018 are included in the total TAC of 618.7 kt for both sub-zones.

Table 1. Performance results of Far Eastern fishing companies in pollock fishery in the Sea of Okhotsk in January – early April 2018

Region	Target trawl fishery				Total catch, t	
	Number of companies	Number of ships	Number of ship-days	Number of hauls	Target trawl fishery	All fishing gear types
Primorsky region	17	69	3196	7658	243489	243727
Sakhalin region	16	37	1520	3938	146548	149047
Kamchatka region	20	45	2521	7055	282574	314187
Magadan region	2	3	257	624	18764	19129
Khabarovsk region	12	31	1104	2707	96823	98667
Total	**67**	**185**	**8598**	**21982**	**788198**	**824757**

Pollock catch by pelagic trawls in a commercial fishing mode in the RF EEZ (target fishery) by all ships of the expedition totaled approx. 788.2 kt by April 10, 2018 (Table 2) which is less than in the preceding year (823.3 kt) but, for instance, more than in 2015 (769.5 kt). About 36.6 kt (35.7 kt in 2017) was harvested by other fishery types, mostly Danish seine fishery, off West Kamchatka. Total catch off West Kamchatka in January – March 2018 was 495.5 kt, nearly 27 kt less than a year ago.

Total pollock catch in the season “A” of 2018 amounted to 824.8 kt (85.3% of TAC) compared with 858.8 kt (88.8% of TAC) during the same period in 2017.

Table 2. Pollock TAC, catch and TAC use by fishing areas in the northern part of the Sea of Okhotsk in January – early April 2018

<table>
<tr><th rowspan="2">Sub-zone</th><th rowspan="2">TAC, kilotons</th><th rowspan="2">Number of ship-days in target trawl fishery</th><th rowspan="2">Number of hauls in target fishery</th><th colspan="2">Total catch, t</th><th rowspan="2">% of TAC caught by all fishing gear types</th></tr>
<tr><th>target trawl fishery</th><th>all fishing gear types</th></tr>
<tr><td>61.05.1</td><td>348.0</td><td>3344</td><td>8756</td><td>326951</td><td>329269</td><td>94.6</td></tr>
<tr><td>61.05.2</td><td>348.1</td><td>3293</td><td>8348</td><td>293559</td><td>312410</td><td rowspan="2">80.0</td></tr>
<tr><td>61.05.4</td><td>270.7</td><td>2027</td><td>4878</td><td>167690</td><td>183079</td></tr>
<tr><td>**Total**</td><td>**966.7**</td><td>**8664**</td><td>**21982**</td><td>**788200**</td><td>**824758**</td><td>**85.3**</td></tr>
</table>

Same as in 2017, pollock fishing activities in January 2018 were concentrated mostly in Kamchatka-Kuril subzone (Fig. 1–2, Table 3). Total catch in this month was about 177.8 kt in this area. Catch intensity in West Kamchatka and North Sea of Okhotsk sub-zones was low, with pollock by-caught in the herring fishery and other fisheries. For comparison, 146.1 kt was harvested in January of last year in sub-zone 61.05.4, and catch in sub-zones 61.05.1 and 61.05.2 was 22.4 and 26.8 kt respectively. On some days, total number of ships operating in all sub-zones was reaching 106 and averaged at 73. Maximum mean catch per ship was 106.2 t and mean catch per month was 82.9 t. For comparison, these figures in 2017 were 117.1 t and 79.8 t respectively.

Daily catch was also different for the expedition as a whole. While in January 2018 it varied from 1,001 to 9,154 t with an average being 6,106 t, in 2017 it varied in the range of 1,677 to 11,027 t with an average being 6,305 t. As a result, total pollock catch in the northern part of the Sea of Okhotsk in January 2018 was 177.8 kt versus 195.5 kt a year before. For information, in the initial period of the 2016 fishing season this figure was 176.0 kt.

In February, Kamchatka-Kuril sub-zone remained a key fishing area. Catch noticeably reduced here from January and amounted to 104.0 kt which is roughly equal to last year’s figure (105.3 kt) (Fig. 1–2, Table 3). In other sub-zones, catch was nearly twice lower than in this-sub-zone and less than in last year. Up to 132 ships of different types operated in all sub-zones on some days, with an average being 113 ships. Similar figures were registered in last year. Mean catch per ship in the expedition as a whole varied from 54.3 to 93.3 t, with a an average monthly catch being 69.7 t. Similar figures in last year were 52.0, 95.7 and 77.4 t respectively. Maximum daily catch harvested by all ships of the expedition was comparable with last year’s daily catch – 11,665 and 11,735 t respectively. However, mean monthly catch was significantly less which reflected on total catch. Monthly catch was 219.9 kt compared with 248.2 kt in the same period of last year. Fleet distribution in February 2018 was similar to that in last year (Fig. 2).

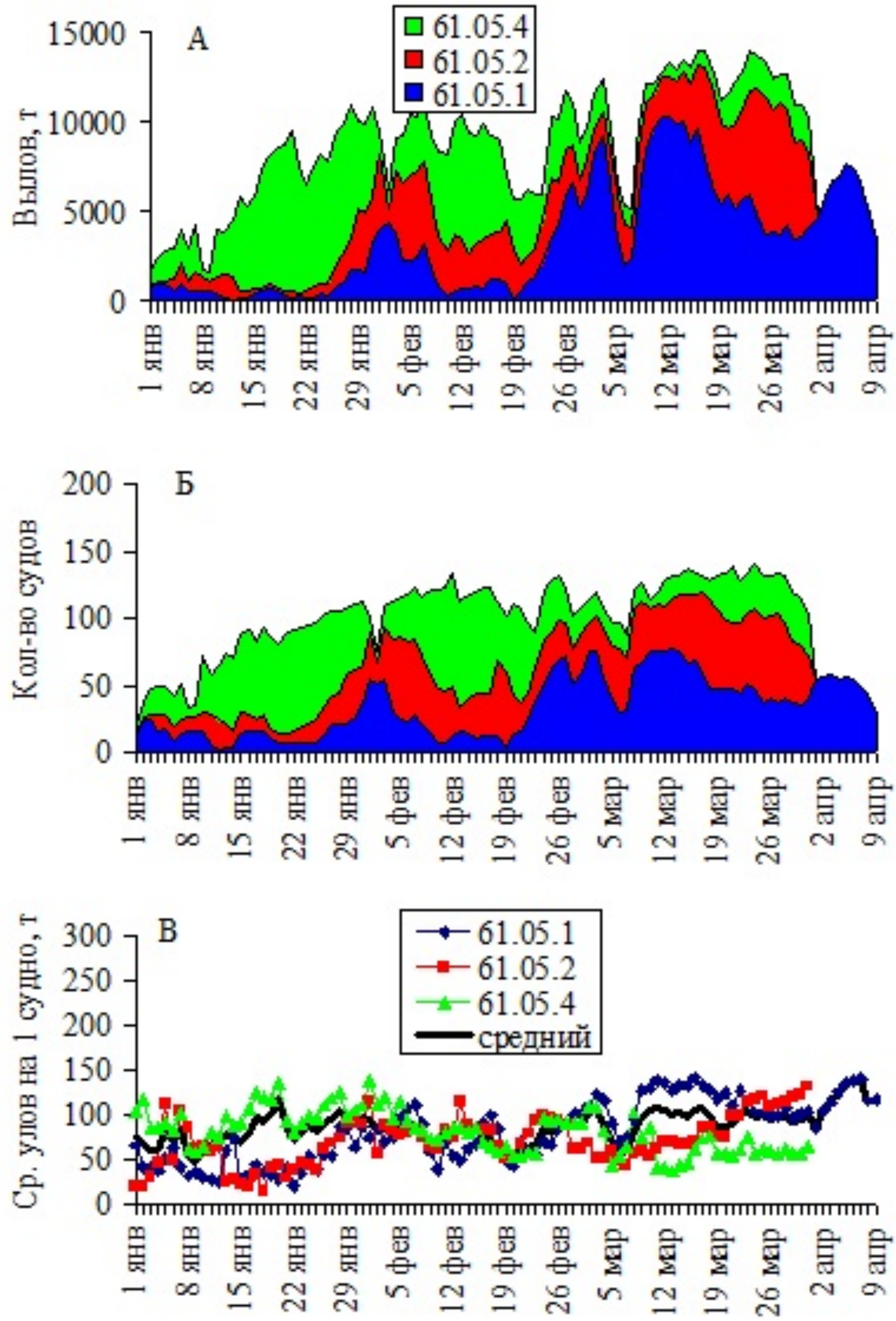


Fig. 1A. Dynamic of daily catch (A), number of ships (Б) and mean catches per ship (B) in the northern part of the Sea of Okhotsk in January – first 10-day period of April 2017

In March 2018, same as in 2017, main fishing activities shifted to North Sea of Okhotsk and West Kamchatka sub-zones (Fig. 1–2, Table 3). Catch distribution by sub-zones was roughly same as in last year but catch in March of this year was lower than in last year in absolute terms. 90 to 154 ships were fishing for pollock, with an average number being 126 ships. For comparison, these figures were 88, 141 and 123 ships respectively in last year. Mean catch per ship was lower than in last year and amounted to 84.7 t. As a result, both maximum and mean daily pollock catch harvested by all ships of the expedition was lower in this year than a year ago which reflected on total monthly catch. It amounted to 330.4 kt compared with 360.4 kt in last year. Same as in the preceding month, fleet distribution in March 2018 was virtually identical to fleet distribution in last year. 84.9 kt of pollock was harvested in the North Sea of Okhotsk sub-zone during 01–09 April, 2018 compared with 54.8 kt in last year (Fig. 1–2, Table 3).

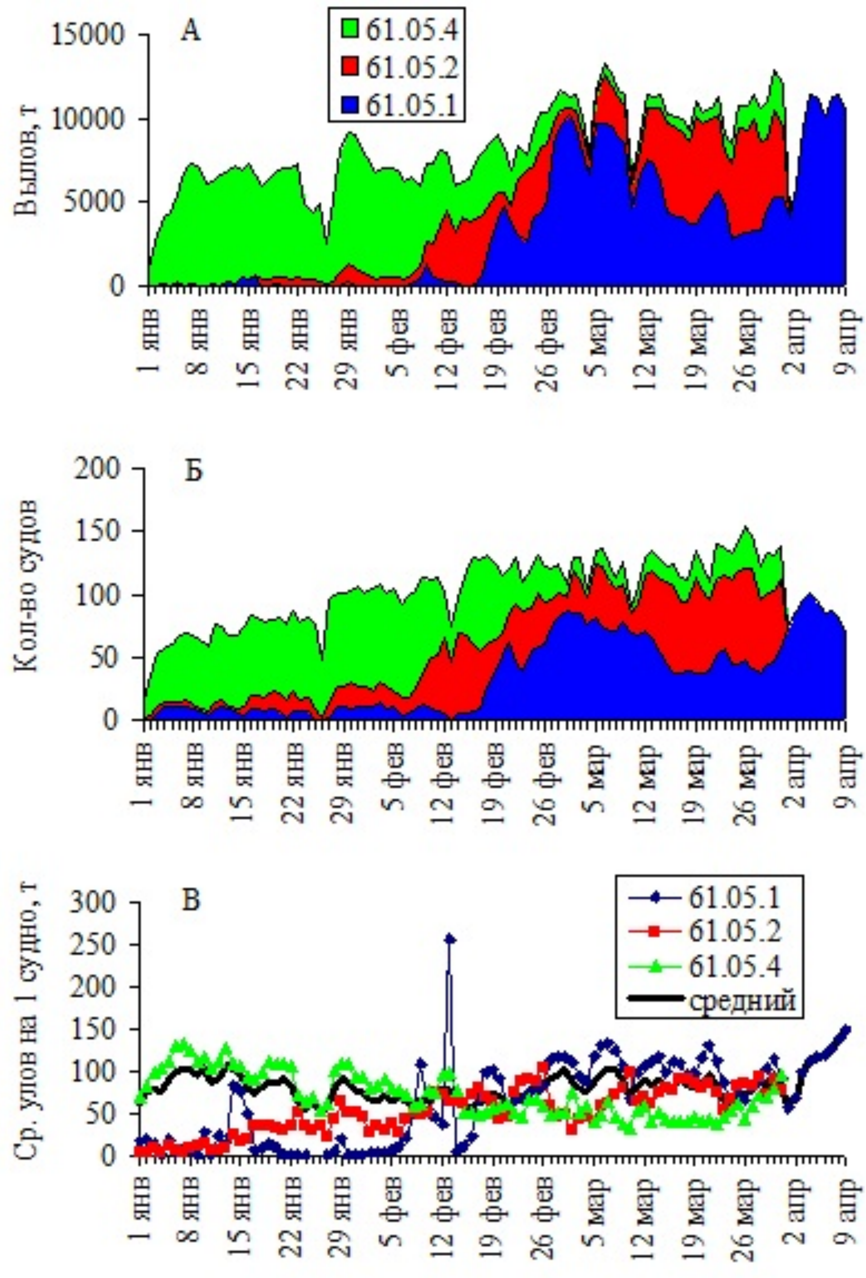


Fig. 1Б. Dynamic of daily catch (А), number of ships (Б) and mean catches per ship (В) in the northern part of the Sea of Okhotsk in January – first 10-day period of April 2018

In general, daily pollock catch harvested by the whole expedition in the northern part of the Sea of Okhotsk in the fishing season of 2018 was gradually growing as more catchers joined the expedition and the number of performed fishing operations increased: from 1.0 kt in early January to 7.2 kt by the end of the first week of this month (Fig. 1). Then, it remained on roughly same level till the end of the second 10-day period of February – about 6.7 kt. By the end of month, it grew to approx. 12.0 kt and then varied within 10.6 kt till the end of March. The reduction of daily catch in April was caused by completion of fishing operations off West

Kamchatka. Mean daily catch over the whole fishing season was 8.3 kt which is somewhat less than in last year (8.7 kt).

Table 3. Dynamic of mean daily and total catch, number of ships and catches per ship in the pollock fishery in the fishing seasons of 2017 and 2018 by sub-zones and by months

Month	Mean daily catch, t min.-max./mean	Total catch, t	Number of ships min.-max./mean	Mean catch per ship min.-max./mean
2017				
January				
61.05.1	50-3198/725	22466	2-54/16	19.6-86.4/46.3
61.05.2	18-3407/866	26841	1-38/14	13.3-111.4/51.3
61.05.4	427-8956/4714	146149	7-76/47	57.2-135.7/96.9
Total	1677-11027/6305	195456	22-112/76	47.9-117.1/79.8
February				
61.05.1	147-6581/2265	63414	3-73/29	38.2-110.1/73.5
61.05.2	831-4809/2838	79464	15-62/36	50.2-115.3/79.3
61.05.4	1011-7018/3762	105324	9-83/49	54.0-138.0/83.6
Total	5697-11735/8864	248202	76-133/114	52.0-95.4/77.4
March				
61.05.1	2057-10340/6306	195499	30-78/54	68.6-140.7/112.8
61.05.2	1305-7593/3903	120996	22-66/46	43.9-131.1/81.5
61.05.4	372-2289/1417	43914	7-42/23	36.3-109.6/64.5
Total	5183-14068/11626	360409	88-141/123	54.6-107.4/93.8
01–09 April				
61.05.1	3482-7647/6084	54759	30-59/51	84.9-139.3/119.1
Grand total	1677-14068/8675	858826	22-141/99	47.9-139.3/87.1
2018				
January				
61.05.1	1-497/105	3038	0-12/8	0.3-82.9/14.6
61.05.2	3-1122/274	8487	1-22/8	3.1-63.1/23.5
61.05.4	964-7868/5734	177753	14-82/58	52.1-132.4/99.5
Total	1001-9154/6106	189278	17-106/73	51.0-106.2/82.9
February				
61.05.1	16-9532/2039	57079	1-81/27	1.3-255.9/59.0
61.05.2	341-4267/2101	58834	13-63/32	26.2-104.5/58.9

61.05.4	969-6861/3716	104035	22-81/54	44.1-97.6/67.2
Total	5937-11665/7855	219948	75-132/113	54.3-93.3/69.7
March				
61.05.1	2746-10136/5942	184213	37-87/58	62.4-133.6/101.9
61.05.2	470-6500/3728	115573	10-78/50	30.1-98.6/71.2
61.05.4	163-2486/987	30595	5-34/18	32.6-95.6/52.0
Total	6315-13254/10657	330381	90-154/126	63.5-103.0/84.7
1–9 April				
61.05.1	4106-11420/9438	84941	70-102/86	56.2-148.8/109.4
Grand total	1001-13254/8329	824548	17-154/102	51.0-148.8/82.2

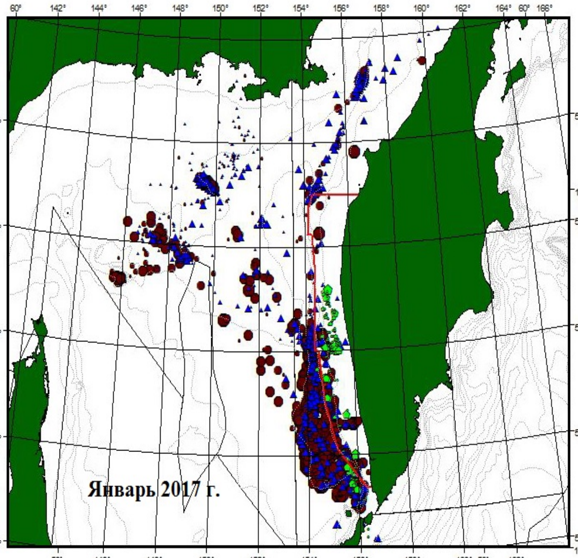
The success of any fishery and, in particular, pollock fishery depends first of all on fishing situation. Fishing situation is known to depend on stock condition. As a rule, all other conditions being equal, the higher is stock level the higher is catch per effort (day, haul, seine cast) and, accordingly, daily catch of a particular ship and, eventually, total catch of the whole expedition. However, this relationship works not in all cases by far. As for pollock, it is known, for instance, that even at a low level of its stock this species may gather in very dense aggregations in certain periods of its yearly cycle (e.g. during spawning period) and in certain areas where fishing may be very efficient. At the same time, fishable aggregations may be not so dense at a high level of its stock due to a whole complex of external factors. Accordingly, fishing efficiency will be low.

In addition to stock condition, fishing situation is affected by many other factors. In the Sea of Okhotsk, which reminds arctic seas by severity of its climate in the winter season, such important factors are meteorological and ice conditions, and year's thermal conditions.

Effects of meteorological conditions on operations of the whole fleet, particularly medium- and small-tonnage vessels, are obvious. Frequent storms directly interfere with normal operations of ships, lead to down time and affect fish distribution (fish scatters). Search for fish aggregations after storms normally takes more effort.

Temperature conditions directly affect ice formation processes and, secondly, essentially affect formation of stable fishable aggregations, rate of gamete maturity and, consequently, roe yield and male-to-female ratio, and govern the beginning of spawning season. Effects of ice conditions on fishing situation are also quite obvious, with medium- and small-tonnage fleets being more exposed to these effects. Along with above said factors, fishing situation also depends on qualitative composition (size distribution) of fish in particular areas and in particular time.

Other factors which do not affect fishing situation directly but govern daily catches of particular vessels and expedition as a whole are their product range, total number of ships and fleet composition.



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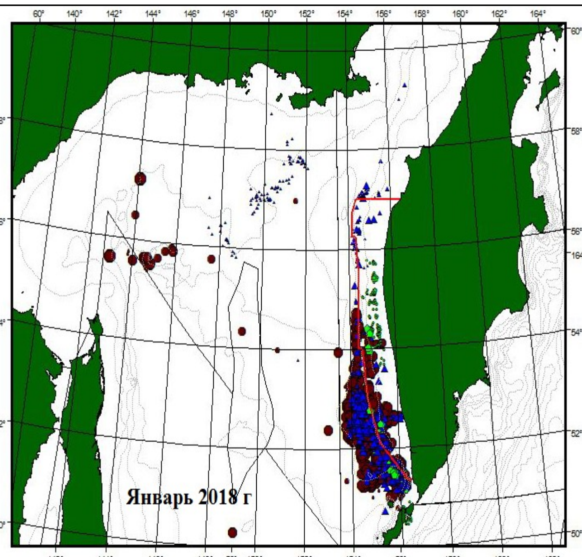

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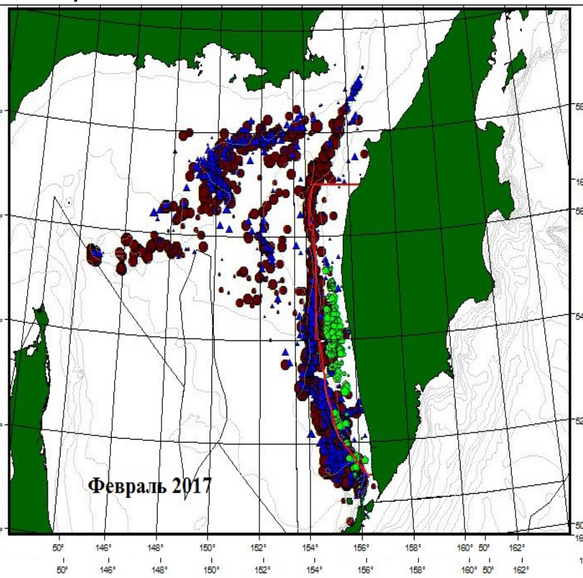

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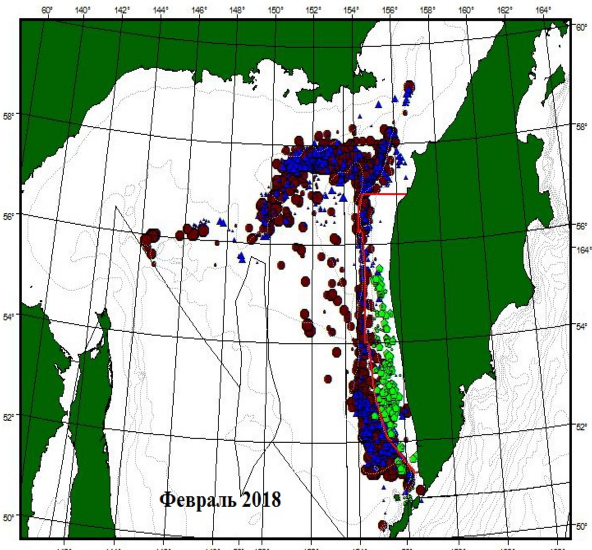

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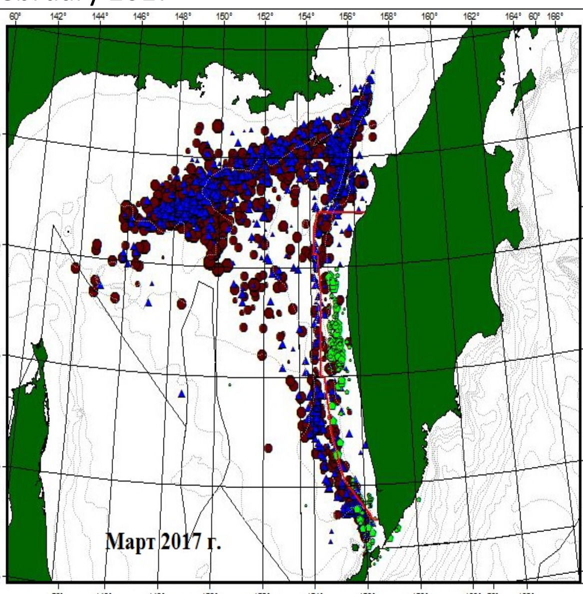

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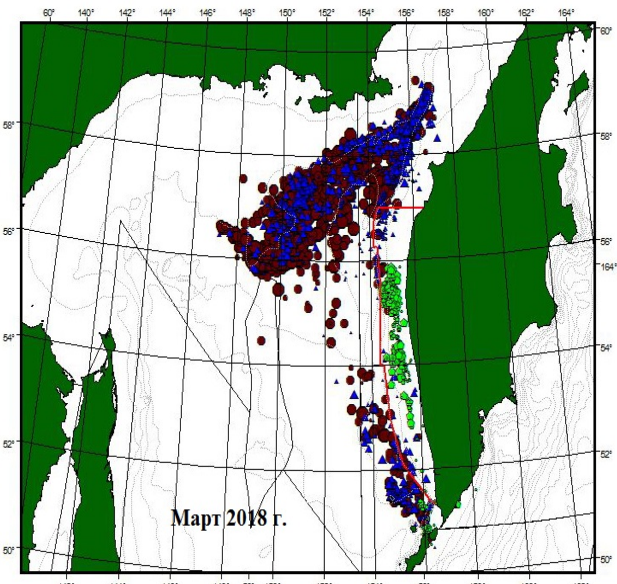

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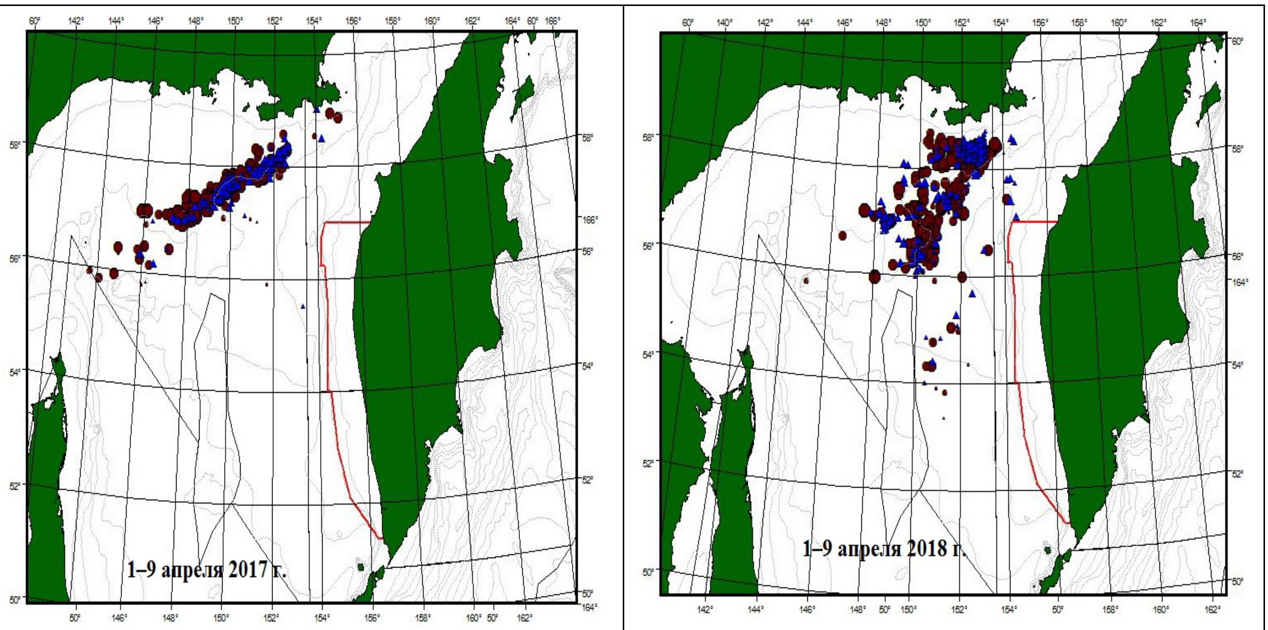

April 01-09, 2017 | April 01-09, 2018

Fig. 2. Fleet distribution in the pollock fishery in the Sea of Okhotsk in January – first 10-day period of April 2017 and 2018 (circles – large-tonnage fleet (trawls), blue triangles – medium-tonnage fleet (trawls), green rhombi – all ships (Danish seines))

Current stock condition of North Sea of Okhotsk pollock

According to model-based assessments tuned on 11 independent stock condition indices, total pollock stock biomass and its spawning stock biomass in the northern part of the Sea of Okhotsk as of early 2018 was 10.2 and 6.6 million tons respectively (Fig. 3). A brief characteristic of its stock dynamic shows that both spawning and total stock biomass grows in recent years because a strong year class born in 2011 joins the fishable stock. According to KamchatNIRO predictions, this upward trend will continue in the coming years because another strong year class was born in 2013 and is followed by two consecutive medium-abundant cohorts.

New data on stock condition for North Sea of Okhotsk pollock will be obtained in April – May of this year by results of an integrated survey performed by the Professor Kaganovsky research vessel.

Therefore, KamchatNIRO specialists had predicted a favorable fishing situation for this year’s fishing season from the viewpoint of stock condition which is assessed by specialists as above medium and with prospects for growth. It was expected that catches per effort will be at least not lower than in the last fishing season.

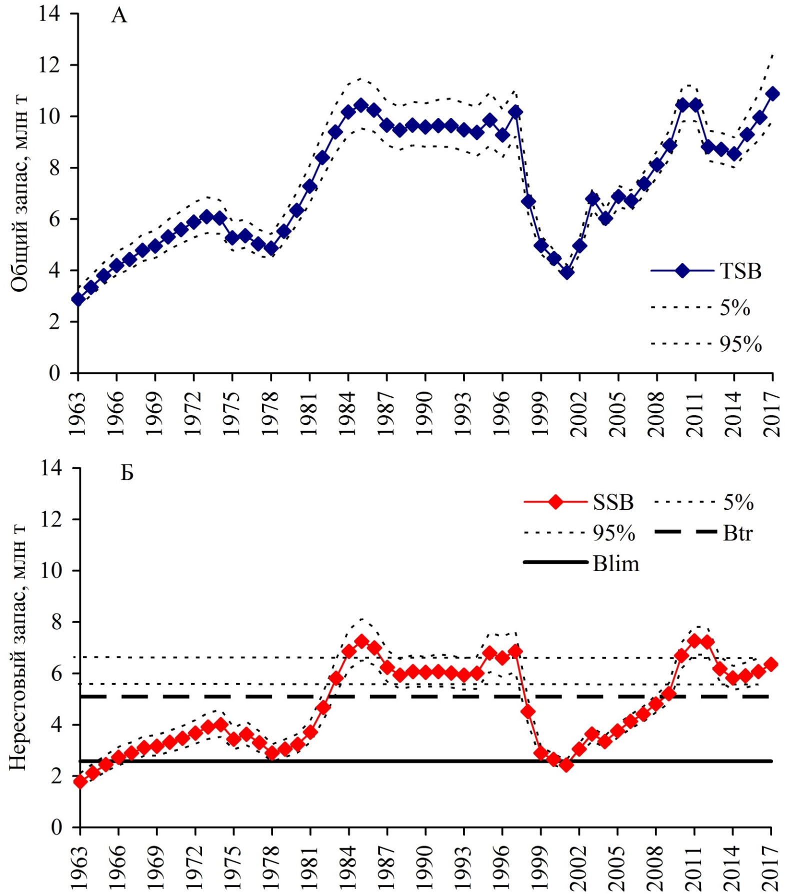

Fig. 3. Year-to-year dynamic of total stock biomass (A) and spawning stock biomass (Б) of North Sea of Okhotsk pollock

Meteorological conditions

Meteorological conditions in January were characterized by an eastward shift of the depression's main center toward Alaska Bay (Fig. 4) which is not typical of this time of the year. Furthermore, less intensive than normal development of the seasonal anti-cyclone was observed in the northeast of the Asian continent. All this governed specifics of distribution of the ground atmospheric pressure anomaly. Thus, lower than normal values were observed over the mainland and Sea of Okhotsk as well as Alaska Bay and increased values were observed over the ocean, Aleutian Islands and Bering Sea, i.e. over the area where the Aleutian depression is normally located.

In February and March, the center of the seasonal cyclone shifted, contrary to January, westward of its climatic position and stayed off the eastern coast of Kamchatka (Fig. 5–6). This is explained by approach and stabilization of several deep southern cyclones which caused a strong inflow of relatively warm sea air and, in turn, became the key reason for essentially "milder" winter weather and hydrological conditions in the area under consideration from mid-January through mid-February and in early March. Ground atmospheric pressure was lower than normal by 2–6 hPa over Kamchatka, adjacent waters and the arctic part of the area under consideration. Atmospheric pressure values considerably exceeded normal values in the east of the area, over the ocean and Alaska, rising up to 12–17 hPa.

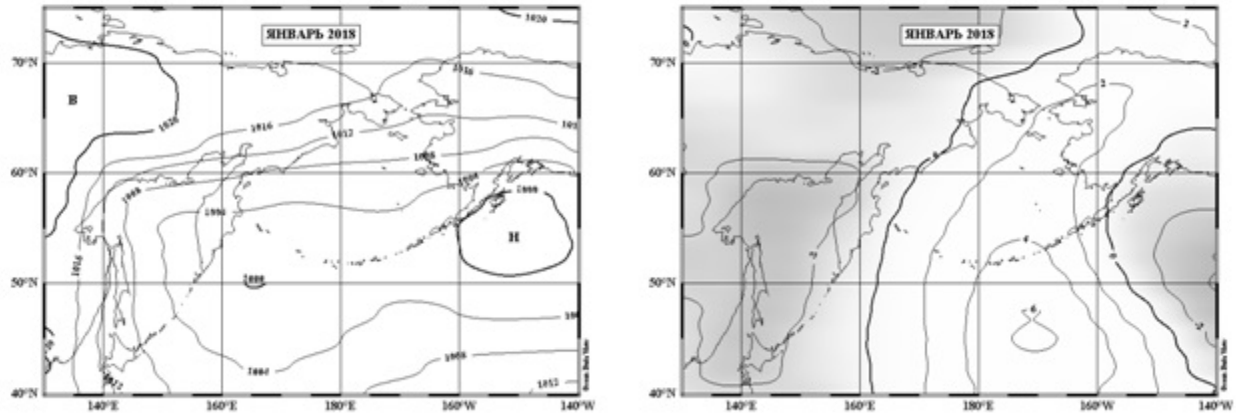

Fig. 4. Mean monthly field of ground atmospheric pressure (left) and its anomalies (right) in January 2018

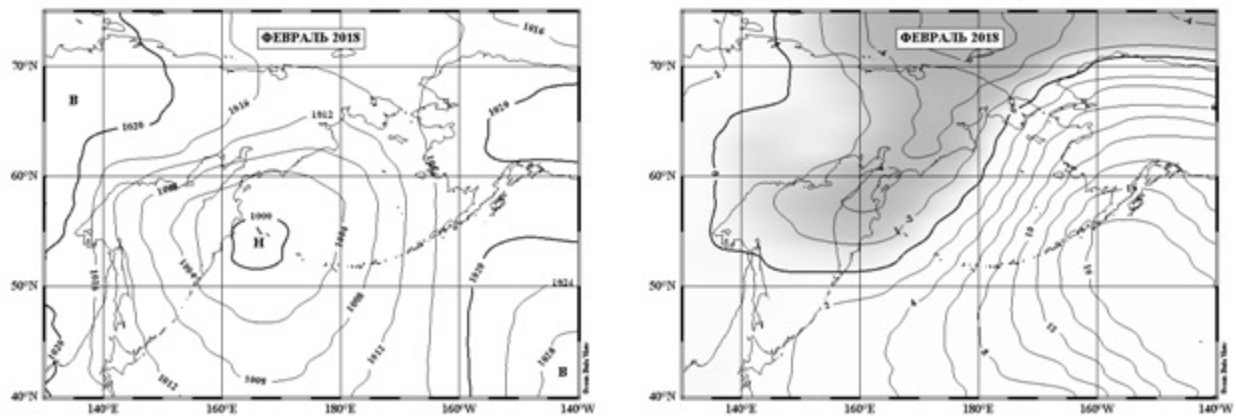

Fig. 5. Mean monthly field of ground atmospheric pressure (left) and its anomalies (right) in February 2018

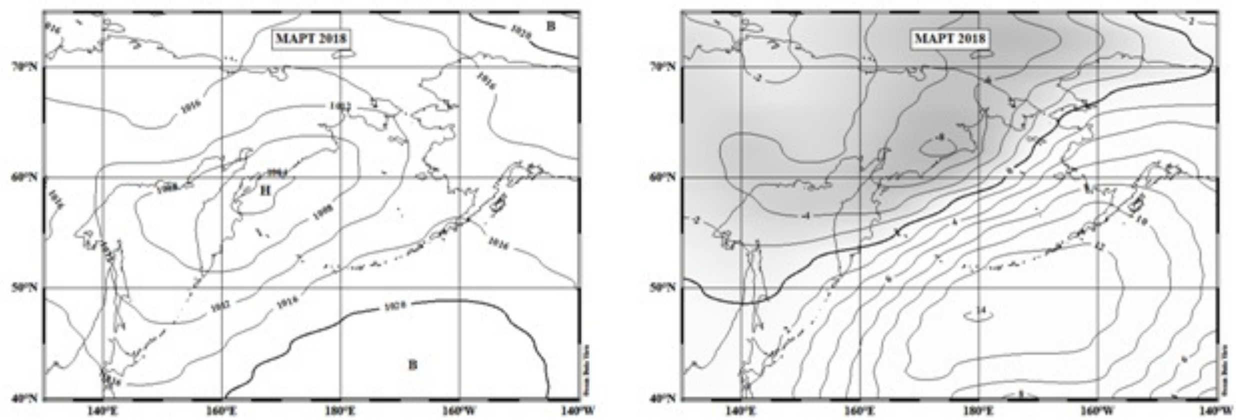

Fig. 6. Mean monthly field of ground atmospheric pressure (left) and its anomalies (right) in March 2018

Figure 7 shows intra-seasonal variation of the maximum wind speed modulus in 2017 and 2018 averaged for the northeastern part of the Sea of Okhotsk limited by 150° E in the west, 50° N in the south and by the shore in the north and east. According to this figure, seven strong cyclones were directly and intensively affecting the area under consideration. Total number of periods with registered maximum wind speed at the height of 10 m exceeding 20 m/s was 12 or 23 days. The last year was also unfavorable but the number of cyclones was smaller. The number of periods with wind speed exceeding 20 m/s was 10 and total number of storm days was 18.

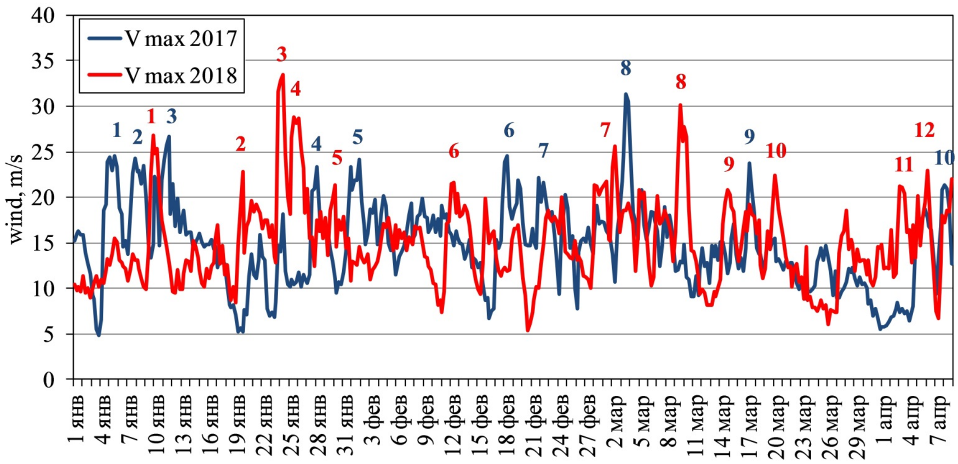

Fig. 7. Intra-seasonal (January – early April) variation of maximum wind speed at the height of 10 m in the northeastern part of the Sea of Okhotsk in 2017 and 2018. Figures indicate periods when observed maximum wind speed exceeded 20 m/s causing storm weather

If we compare data presented in Fig. 7 with daily catch data in Fig. 1A, we can see that an abrupt reduction of catches on several days (26.01, 13.02, 04.03, 10.03) coincides with appearance of strong atmospheric vortexes in the Sea of Okhotsk.

Therefore, meteorological conditions were producing adverse effects on formation of an overall fishing situation in the pollock fishery in the northern part of the Sea of Okhotsk in this year, which were much greater than, say, in the preceding year.

Ice conditions

The beginning of the winter season, December through mid-January, in the northeastern part of the Sea of Okhotsk was characterized by intensive ice cover formation (Fig. 8). Its rate was sometimes higher than normal but the amount of ice cover was somewhat lower than normal. However, this situation dramatically changed in mid-January when several strong cyclones came from south and virtually stopped ice cover formation processes, and even an abrupt reduction of the amount of ice cover was observed in late January. While the amount of ice cover in the eastern part of the Sea of Okhotsk was 28% in the second 10-day period of January, which is 6% less than its multi-year mean, it reduced to 22% in the first 10-day period of February and was 24% lower than its normal value. In the latter half of February, weather and hydrological processes again became typical for winter and ice cover continued growing. Its seasonal peak occurred in the third 10-day period of March, with its maximum value in this period being 49% and reaching its multi-year mean for the first time in this season.

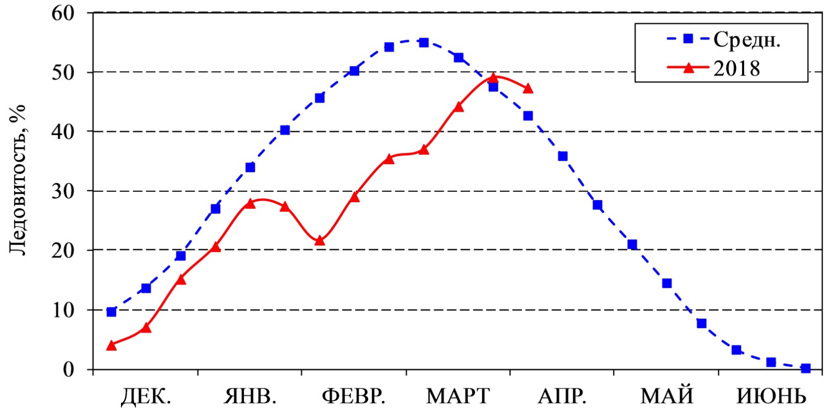

Fig. 8. Variation of the amount of ice cover in the eastern part of the Sea of Okhotsk in winter of 2017–2018 and during 1995–2014 on average

In summary, due to exposure to strong cyclonic vortexes during mid-January – mid-February the strongest of which occurred on January 22–26, the winter calendar season of 2017–2018 in the northeastern part of the Sea of Okhotsk may be generally characterized in ice cover terms as “low amount of ice cover” (Fig. 9). Its mean value in February – March (period of maximum ice cover development) was 36% which close to “low amount of ice cover” winters of 2014, 2015 and 2017. Furthermore, mean amount of ice cover in February was at its lowest since 1995.

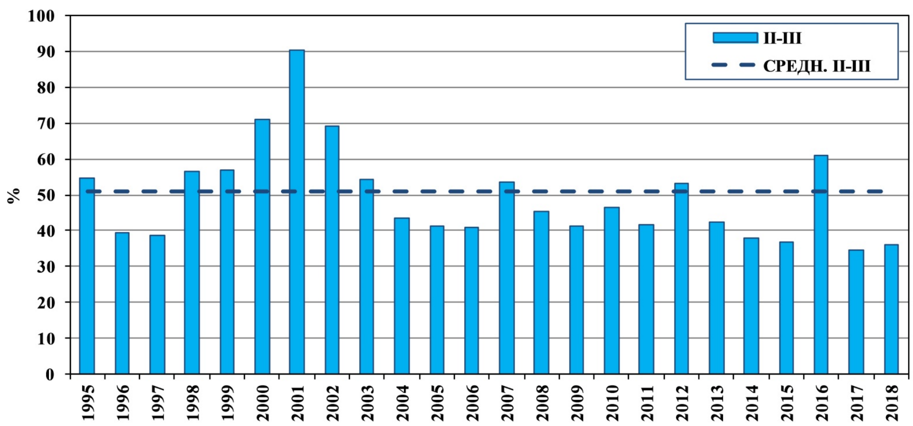

Fig. 9. Year-to-year variation of mean amount of ice cover in February–March in the eastern part of the Sea of Okhotsk during 1995–2018

It should be noted that, in general, the amount of ice cover in the winter season of 2017–2018 in the Sea of Okhotsk as a whole was close to its multi-year mean which shows that cyclones affected largely the eastern part of the sea (Fig. 10).

It can be concluded that ice conditions in the fishing season of 2018 did not have any noticeable effect on fishing situation off West Kamchatka and, on the contrary, prevented efficient fleet operations, particularly for medium-tonnage fleets, in some areas of the North Sea of Okhotsk sub-zone.

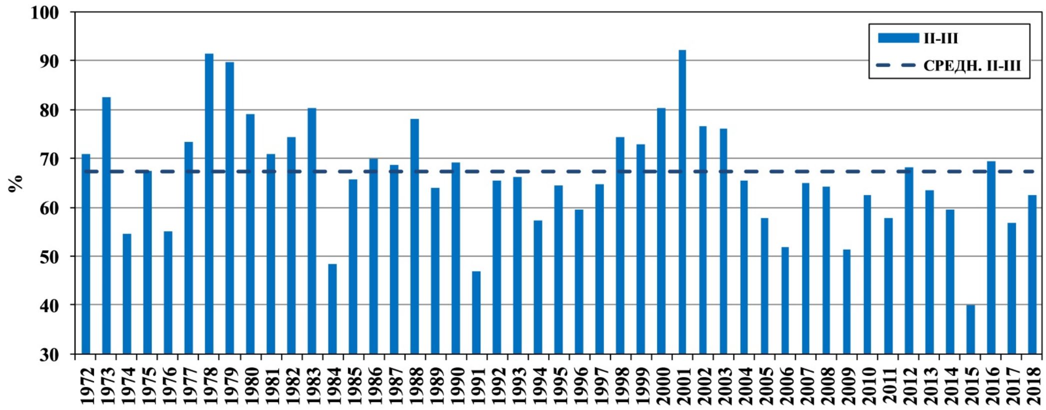

Fig. 10. Year-to-year variation of mean amount of ice cover in February–March in the entire Sea of Okhotsk during 1972–2018

Thermal conditions

According to Figures 11–13 showing mean monthly fields of sea surface temperature (SST) and its anomalies (aSST), its maximum values in January – March were traditionally observed in a strip stretching in a meridional direction at some distance from West Kamchatka and associated with the area to which relatively warm transformed ocean waters, coming with the West Kamchatka Current, flow. Minimum SST values were registered near the shore along West Kamchatka and in the west of that area – in intensive ice formation areas. According to distribution of SST anomaly, it is obvious that water temperatures higher than normal prevailed in ice free offshore areas near West Kamchatka coast.

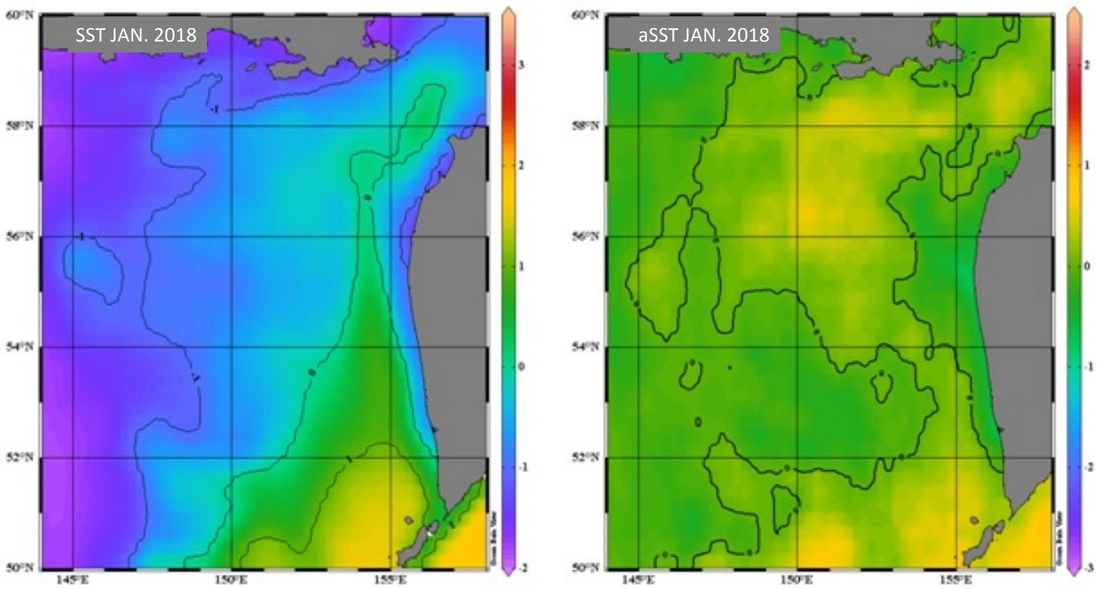

Fig. 11. Distribution of sea surface temperature (SST) and its anomaly (aSST) in the northeastern part of the Sea of Okhotsk in January 2018

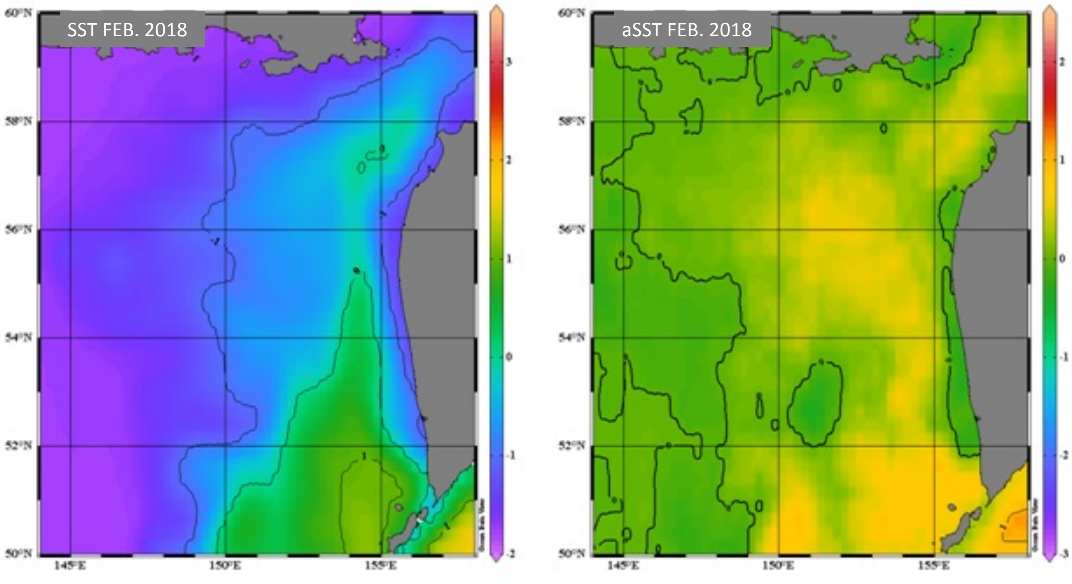

Fig. 12. Distribution of sea surface temperature (SST) and its anomaly (aSST) in the northeastern part of the Sea of Okhotsk in February 2018

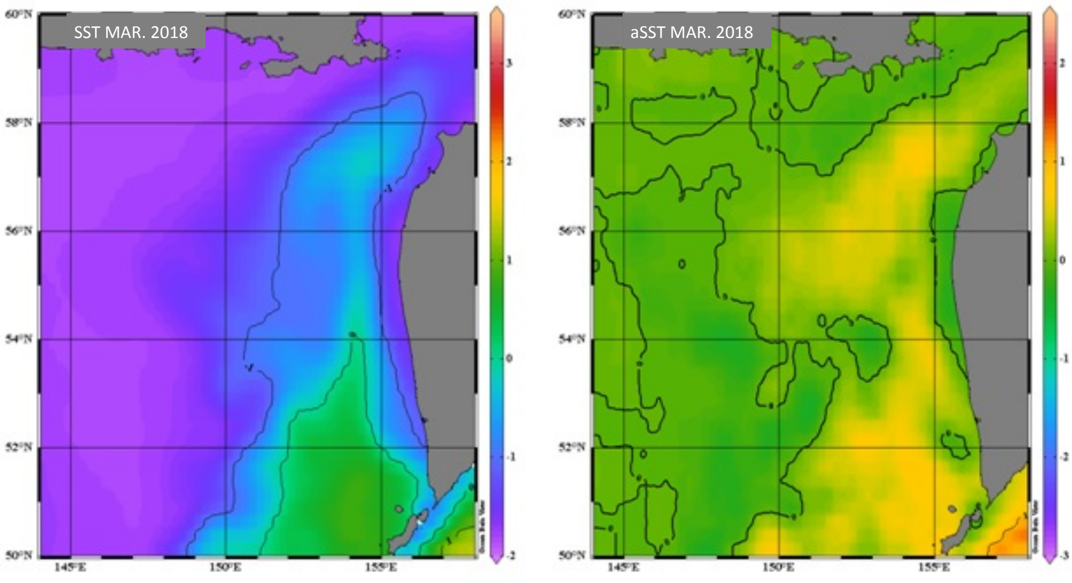

Fig. 13. Distribution of sea surface temperature (SST) and its anomaly (aSST) in the northeastern part of the Sea of Okhotsk in March 2018

According to results of satellite-based monitoring of sea surface temperature, periodical warming caused by effects of strong warm cyclones on this area was observed against the background of gradual surface water cooling down in the northeastern part of the Sea of Okhotsk during the winter season (Fig. 14). Such variability is well consistent with dates of cyclonic vortex activities noted in Fig. 7. Thus, the most marked warming was observed in the latter half of January through the first half of February and another, less significant, SST growth was registered in early March. A peak of seasonal cooling down as well as of the amount of ice cover occurred in the third 10-day period of March, with SST values reaching minus 1.2–1.3°C in this period which corresponds to a negative deviation from normal by 0.2–0.3°C.

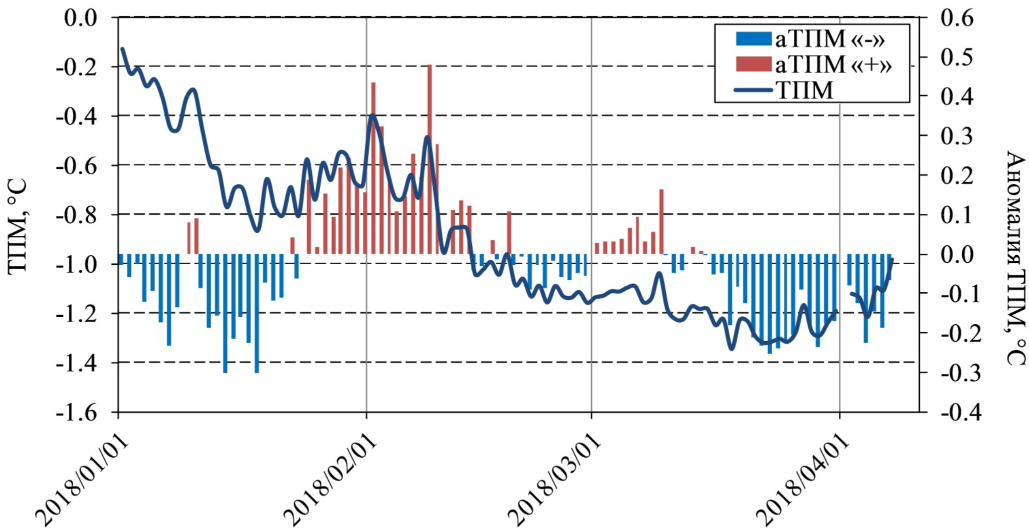

Fig. 14. Intra-seasonal variation of sea surface temperature (SST) and its anomaly (aSST) in the northeastern part of the Sea of Okhotsk during January – early April 2018

According to Figure 15 which shows year-to-year variation of mean sea surface temperature in January – March, the winter season of 2017–2018 was, in general, very close to its multi-year mean. It was –0.89°C versus its multi-year mean of –0.88°C. If we consider mean sea surface temperature separately in each month, we will see that in January this indicator was close to normal, somewhat higher than its multi-year mean in February and lower in March (Fig. 16).

Of recent winters, winters with the most similar hydrological conditions occurred in 2013 and 2014 and, as for the whole series of satellite-based observations, such winter occurred in 1985.

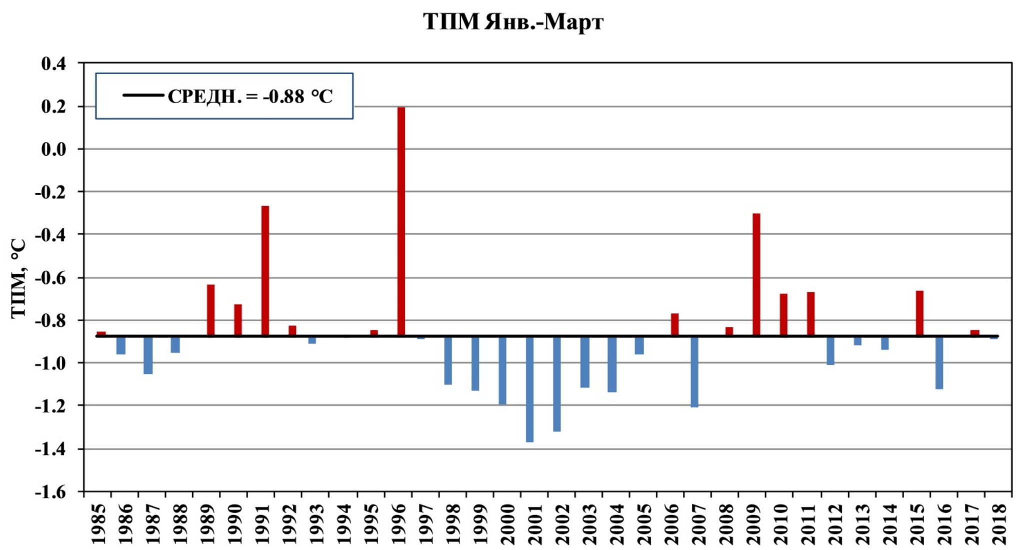

Fig. 15. Year-to-year variation of mean surface water temperature in January – March in the northeastern part of the Sea of Okhotsk in 1985–2018

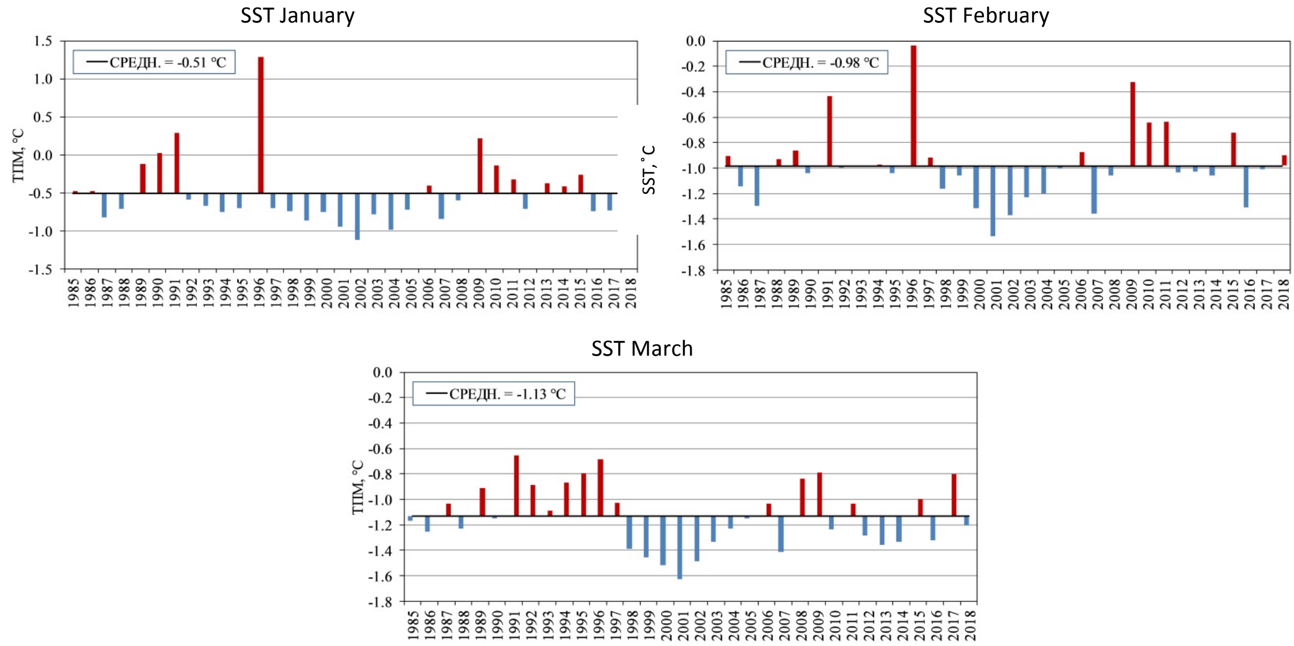

Fig. 16. Year-to-year variation of mean surface water temperature in January, February and March in the northeastern part of the Sea of Okhotsk in 1985–2018

KamchatNIRO specialists believe that thermal conditions existing in the Sea of Okhotsk in January – April 2018 noticeably affected pollock distribution. Its later incoming migrations and formation of fishable aggregations in North Sea of Okhotsk and West Kamchatka sub-zones are likely to be caused by active cyclonic processes in late January resulting in an abrupt anomalous fluctuation of weather and hydrological conditions in fishing areas under consideration which lasted almost a whole month. A similar situation was observed in 2015 when an abrupt reduction of winter cooling-down rate was registered beginning from the latter half of January which, same as in 2018, was caused by warm air inflow with deep cyclones coming to the Sea of Okhotsk basin from south. Along with reduced cooling-down rates, considerably higher than normal water temperatures were observed in that year.

As for the timing of intensive spawning processes, it can be concluded based on the dynamic of gonad maturation that it was close to its multi-year mean, i.e. late March – early April.

Qualitative composition of catches

This year's fishing season was a record-high in terms of the number of observers. More than 20 specialists from Far Eastern fishery research institutes worked in the trawl fishery and two specialists worked in the Danish seine fishery, of which number up to 6 observers represented KamchatNIRO. A large set of fishing and biostatistical information was collected and will be processed and thoroughly analyzed.

According to data of KamchatNIRO observers, fish length in the target trawl pollock fishery in January 2018 in Kamchatka-Kuril sub-zone – key fishing area in that month – varied from 30 to 71 cm and individuals of 40–44 cm size group (45.8%) belonging to the 2011 year class dominated in catches (Fig. 17). The percentage of individuals shorter than the commercial length of 35 cm (37 cm according to Smith) was low and averaged at 3.7%.

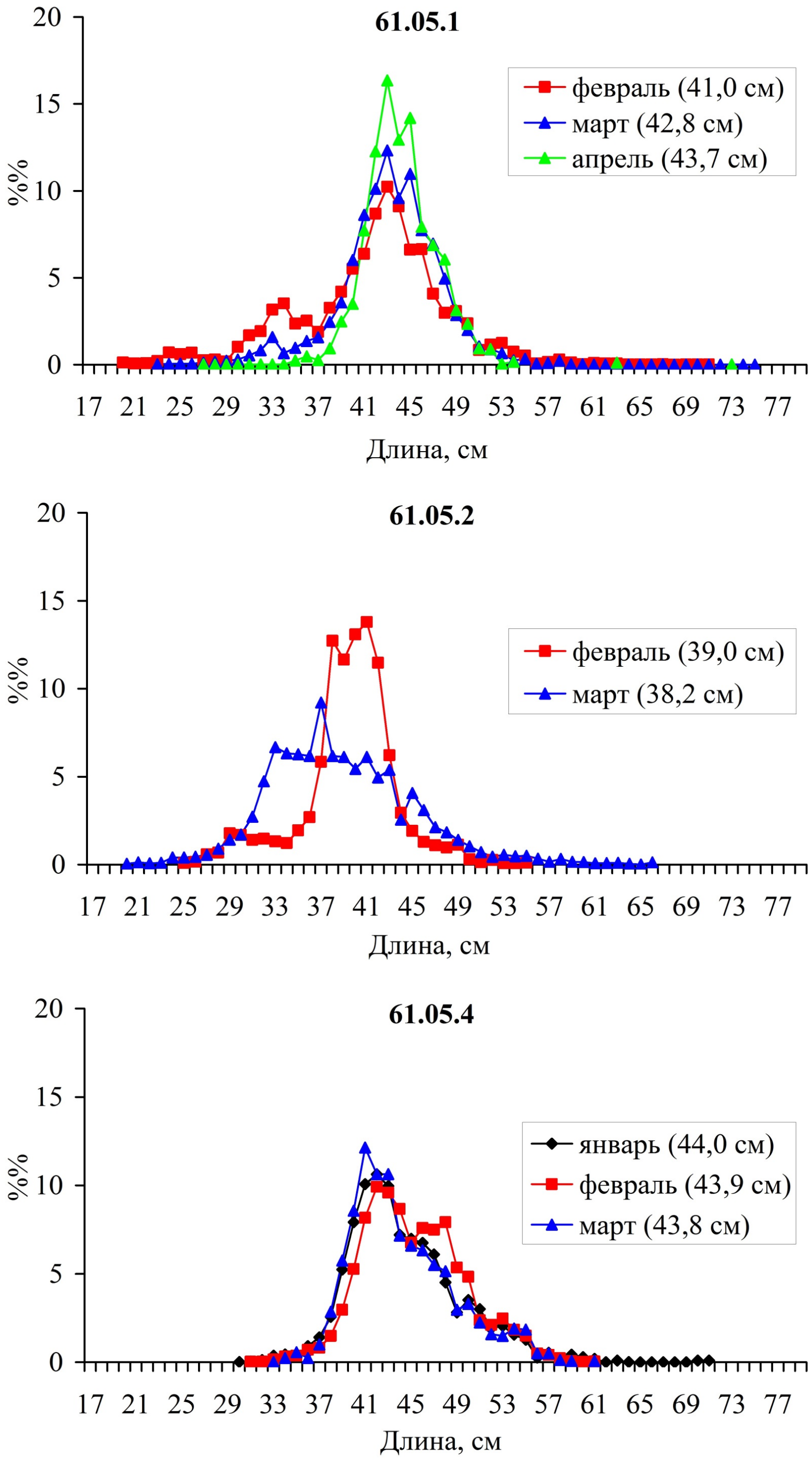

Fig. 17. Pollock size distribution in commercial trawl catches in January – first 10-day period of April 2018 in the northern part of the Sea of Okhotsk

One month later, the bulk of catches in sub-zone 61.05.1 were individuals born in 2011 belonging to size groups of 41–46 cm (47.6%). A small peak on the size distribution curve was registered for classes of 33–35 cm and attributed to the strong 2013 year class. By-catch of juveniles in some hauls exceeded the 20-% limit and averaged at 21.3%. The bulk of catches in sub-zone 61.05.2 was composed of individuals 38–42 cm long (62.7%). A small peak in size groups of 29–30 cm can be attributed to 3–4-year-old individuals belonging to medium-strong year classes of 2014–2015. By-catch of juveniles in some (occasional) hauls reached high values (up to 60%) and was 20.8% on average. As for sub-zone 61.05.4, virtually no changes in pollock size distribution were registered here in this month.

In March, pollock size distribution in the North Sea of Okhotsk sub-zone was roughly same as in February. Individuals 41–46 cm long (59.4%) at the age of 7–8 years dominated in catches. Mean by-catch of individuals of under-commercial sizes was 8.5%. In West Kamchatka sub-zone, the bulk of catches were individuals 33–41 cm long (58.5%). Accordingly, mean by-catch of juveniles (48.2%) was twice higher than its limit. In Kamchatka-Kuril sub-zone, size distribution changes were insignificant.

Individuals 42–46 cm long dominated in catches in sub-zone 61.05.1 in April (63.7%) and by-catch of juveniles averaged at 1.0%.

Pollock size distribution in Danish seine catches off West Kamchatka in February – March was roughly same as in trawl catches (Fig. 18). The bulk of catches was composed of individuals belonging to size groups of 40–46 cm.

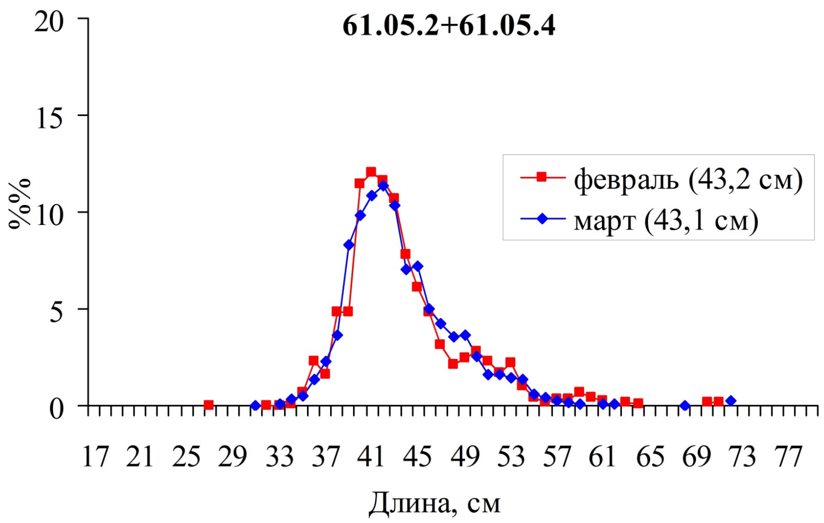

Fig. 18. Pollock size distribution in commercial Danish seine catches in February – March 2018 in the northern part of the Sea of Okhotsk

In summary, fishing conditions in the northern part of the Sea of Okhotsk in February – March 2018 were unfavorable in terms of qualitative composition of pollock catches in some areas of sub-zones 61.05.1 and 61.05.2. Virtually everywhere and particularly in West Kamchatka sub-zone between 57th and 58th parallels, catches included fractions of by-caught juveniles as the strong 2013 year class and two following medium-abundant 2014 and 2015 cohorts joined fishable stock.

It should be noted that the northeastern part of the Sea of Okhotsk is a traditional habitat for pollock junior age groups. Juvenile aggregations normally stay together with large-size pollock, that's why juveniles under commercial size are always present in catches. It is also known that, if a strong year class comes into existence, juveniles may be distributed in the winter-spring season near the shelf edge and at seabed drop-off virtually all over West Kamchatka coast, as the case was in 2010 when strong year classes of 2004–2005 were joining fishable stock.

Despite mandatory use of selectivity devices in modern trawls – "mirror" inserts (Fishing Rules, clause 18.3), by-catches of juveniles can never be avoided due to high density of aggregations in areas where juveniles traditionally stay and, when strong year classes join fishable stock, by-catch of juveniles grows. It is due to this circumstance that there is no complete ban on by-catch of juveniles in the Fishing Rules and, instead, a permissible limit of 20% is specified. Furthermore, the Fishing Rules do not prohinit accidental by-cacth but prescribes set of actions in that case. In this case, ship master must proceed to another fishing area, fully process such catch and report the fact of increased by-catch to territorial bodies of the Federal Fisheries Agency.

One of measures to control by-catch of pollock juveniles may be quickly made decisions to assign a no-entry status to areas with increased by-catches of small-size fish. For instance, the Sea of Okhotsk Expedition Command Center in March 2018 recommended fishermen to withhold from fishing in West Kamchatka sub-zone between 57th and 58th parallels.

Catches per effort

Both maximum and mean catches per unit effort (ship-day) by sub-zones, months and fishing season as a whole were lower in this year's fishing season than in last year (see Table 3). For instance, mean catch per ship-day during the entire fishing season and for all ship types was 82.2 t in 2018 compared with 87.1 t in 2017.

In this year, pollock fishing efficiency was additionally investigated for vessels providing maximum contributions to total catch – BMRT factory trawlers of Pulkovsky Meridian type (BATM) using the most widespread trawl system (pelagic trawl 154/1120 m pr. 342 EKB). It is seen that catches per ship-day and per haul went down compared with 2016–2017 (Table 4).

Table 4. Year-to-year dynamic of the number of efforts and mean catches per unit effort during target pollock trawl fishery (January – April) in the northern part of the Sea of Okhotsk by BATM type vessels

Year	Catch, t	Number of ship-days	Number of fishing operations	Mean catch per ship-day, t	Mean catch per fishing operation, t
BATM (pelagic trawl 154/1120 m pr. 342 EKB)					
2014	73995	670	1791	110.4	41.3
2015	108994	870	2215	125.3	49.2
2016	118050	905	2511	130.4	47.0

2017	138323	1068	2987	129.5	46.3
2018	156806	1361	3628	115.2	43.2

Other factors

Fleet number and composition in the target pollock trawl fishery in the fishing season of 2018 was different from that in 2017 (Table 5). While the number of large-tonnage trawlers in some months was even higher than a year before, the number of super-trawlers and medium-tonnage vessels was significantly smaller. As a consequence, the number of ship-days in this year was smaller than in last year – 8,664 and 8,788 respectively.

Table 5. The number of catchers in the target pollock trawl fishery in the northern part of the Sea of Okhotsk in January – April, 2017 and 2018

Months/Fleet	Large-tonnage fleet	Super-trawlers	Medium-tonnage fleet	Total
2017				
January	62	7	43	112
February	71	7	62	140
March	73	7	63	143
01-09 April	41	5	28	74
2018				
January	64	3	36	103
February	74	6	43	123
March	74	6	57	137
01-09 April	69	4	44	117

Summary

In summary, although the current status of North Sea of Okhotsk pollock stock is high, mean catch per effort has reduced from the preceding year due to a whole number of unfavorable environmental factors (frequent storms, severe ice conditions, particularly in the western part of the sea, anomalous thermal conditions in February – March) and juvenile by-catches in February – March in West Kamchatka and North Sea of Okhotsk sub-zones as the strong 2013 year class and two following medium-abundant year classes of 2014–2015 joined fishable stock. Given smaller numbers of vessels operating in this year and, accordingly, smaller numbers of performed fishing operations, total catch in season “A” was 34.3 kt lower than in the last year.

Still, given that the fishing situation in this year was difficult in all respects, we believe that the harvested catch of 824.8 kt is a good result. For reference, only 803.0 kt was harvested in season “A” of 2010 versus a TAC of 1,010 kt.

It is expected that some 30 kt of pollock will be harvested during summer in the Danish seine fishery, and then some 112 kt will remain for season "B" and can be harvested during season "B".

In conclusion, we extend our warmest thanks to management of companies and vessel crews: BATM Mys Olyutorsky, BATM Baklanovo (PJSC "Okeanrybflot"), BATM Mikhail Staritsyn (Kolkhoz named after V.I. Lenin), MKRT Peter I ("Tralflot" LLC), STR Ogni ("Kamchattralflot" LLC), RS Sibir ("Sfera-Marin" LLC), who deployed FSBRI KamchatNIRO specialists on their board for studies in the pollock fishery in the Sea of Okhotsk.

We also extend our thanks to G. Zverev, President of Pollock Catchers Association, and A. Buglak, Executive Director of PCA, for their cooperation and all-round support to organization of our studies. As a result of our joint efforts, scientists have a full volume of necessary biostatistical information which will constitute a basis for Sea of Okhotsk pollock stock assessment in 2018, stock condition projections and TAC planning for 2020.

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The original report in Russian is availible at the KamchatNIRO website by the link.