11 BENTHIC INVERTEBRATE COMMUNITY

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In 2018, bycatch records of megabenthos was made from 217 bottom trawl hauls across all four research vessels of the ecosystem survey. The megabenthos was processed to closest possible taxon with abundance and biomass recorded. This was done by six Russian specialists (Juravleva N., Strelkova N., Zimina O., Zakharova L., Nosova T., Uzbekova O.) and four Norwegian specialists (Voronkov A., Gabrielsen H., Johansen R., Keulder-Stenevik F). The total number of taxa identified from the caught invertebrates is presented in table 11.1(in Appendix) and more detailed information about taxonomic processing in the different vessels – in the table 11.2 (in Appendix).

Species diversity

A total of 574 invertebrate taxa (404 identified to species level) have been recorded in 2018. In 2018 amount of identifications till species level was highest in all period of ecosystem surveys (Table 11.1). The main reason can be standardization of the taxonomical processing: during ecosystem cruises 2018 in all vessels benthic experts used for identification new ID book "Atlas of megabenthic organisms in the Barents Sea and adjacent waters" (Zakharov et al., 2018).
Despite of different coverage, the total taxonomic structure of bycatches is practically similar in 2017 and 2018 (Figure 11.1). The most diversity groups in the trawl catches in 2018 were Mollusca (132 taxa), Arthropoda (98 taxa) and Cnidaria (81 taxa) (Figure 11.1.1). Among mollusks, 56 % of taxa belong to the Gastropoda, 31 % – to the Bivalvia and the remaining 13 % are distributed among Cephalopoda, Polyplacophora and Caudofoveata groups. The taxa of Artropoda phylum in the main were presented by Malacostraca and Pycnogonida (84 % of the taxa), and Cnidaria taxa – by hydroids (65 % of taxa) and anthozoans (35 % of taxa).

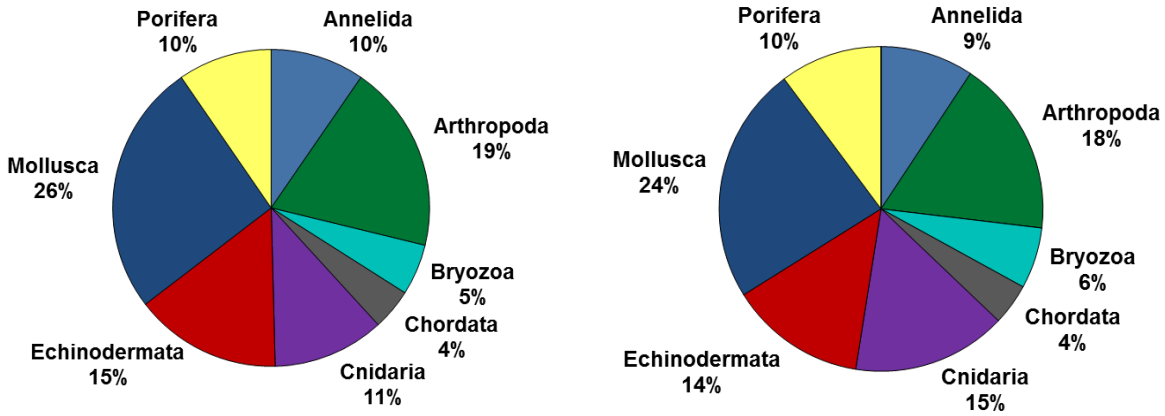

Figure 11.1 *The number of main taxa per megabenthic groups (%) in the Barents Sea, August-October 2017(left) and 2018* (right).

The species density in the terms of the number of taxa in trawl catches ranged from 5 to 95 with average of 39.0±1.1* taxon's per trawl-catch. The hot-spot of taxonomic diversity was observed around of the Spitsbergen archipelago. As a total, the reduction of the taxonomic diversity occurred in the east direction, and the lowest values on some stations (less 10 taxa/trawl) were recorded in the area of Kola Peninsula (Figure 11.2).

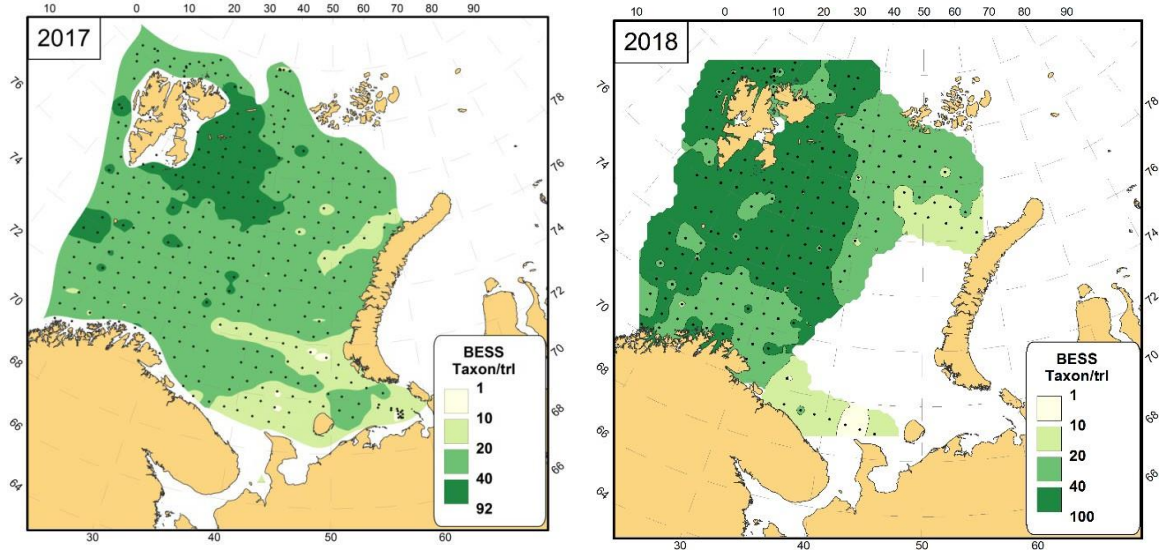

Figure 11.2 *The number of megabenthic taxa per trawl-catch in the Barents Sea, August-October 2017-2018*

Compared with 2017, the total number of recorded species and the species density increase by 21 % and 24.6% respectively.

The ten most common species and taxon's in the catches in 2018 were the following: *Ctenodiscus crispatus* (recorded at 73 % of the stations), Porifera (68 %), *Ophiopholis aculeata* (67 %), Polynoidae (65 %), *Sabinea septemcarinata* (64 %), *Pontaster tenuispinus* (64 %), *Ophiacantha bidentata* (62 %), *Ophiura sarsi* (59 %), *Henricia* spp. (59 %) and *Ophioscolex glacialis* (51 %).

Abundance (number of individuals)

The number of invertebrates individuals in the trawl catches (excluding the pelagobenthic species *Pandalus borealis*) ranged from 11 to 50221 (12.5-62581 ind./n.ml) with an average of 3966±485 ind. per trawl-catch (4932±608 ind./n.ml).

The most abundant catches (about fifty thousand ind.) were recorded in the northern part of the Barents Sea to the south of the Franz Josef Land archipelago (Figure 11.3). In the area of this hot-spot the trawl-catches in the terms of abundance principally dominated by the brittle stars *Ophiacantha bidentata*, *Ophiopleura borealis* and *Ophioscolex glacialis*.

Abundance hot-spot in the area close to the Novaya Zemlya shallow is dominated by sea urchin *Strongylocentrotus pallidus*.

* In section 11 the average values are reported with standard error

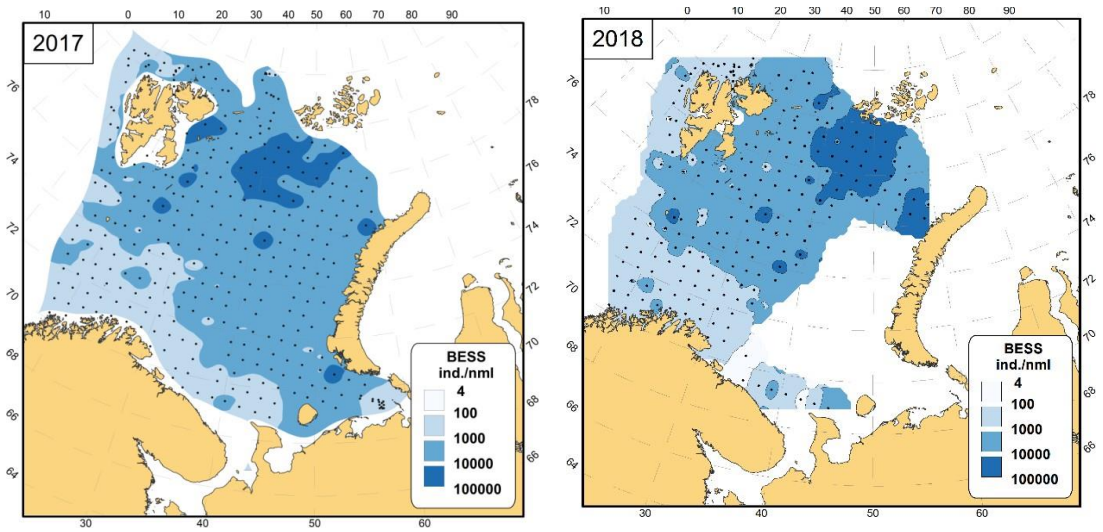

Figure 11.3 *The number of individuals of megabenthos (excluding Pandalus borealis) in the Barents Sea, August-October 2017-2018*

Biomass

Like in previous year in 2018 the biggest part of the total biomass of the by-catches was made up by Sponges, Echinoderms, and Crustaceans (95 %) (Figure 11.4). The increase in the proportion of sponges compared to 2017 resulted by difference of the sea area coverage.

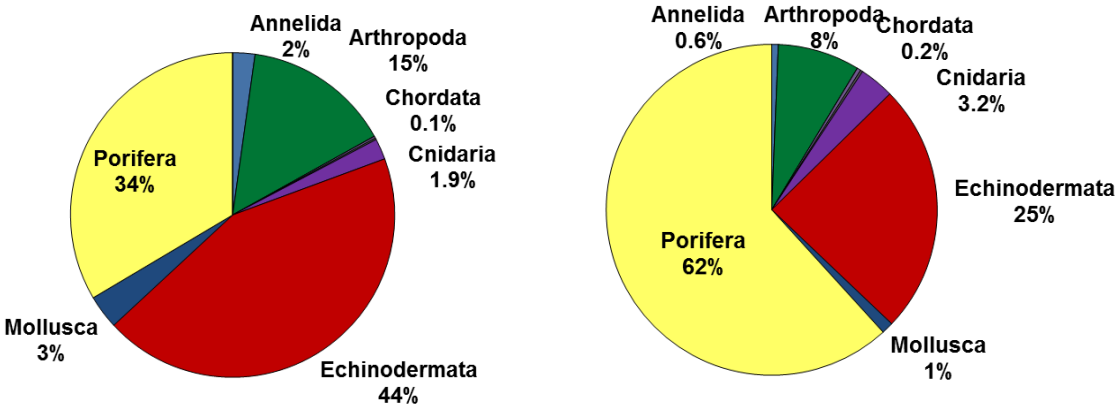

Figure 11.4 *Distribution of biomass (excluding Pandalus borealis) across the main megabenthic groups (%) in the Barents Sea, August-October 2017 (left) and 2018 (right)*

The invertebrate's biomass taken by the trawl (excluding pelagobenthic species *Pandalus borealis*) ranged from 55 g to 6,9 t (0.055-7663 kg/nml) with an average of 72.66±32.01 kg per trawl-catch (91.06±36.37 kg/nml).

The maximum bycatch of megabenthos, as in previous year, was observed in the southwestern part of the Barents Sea in the depth of 331 m (Figure 11.5) and dominated by two species of *Geodia* sponges (*G. barretti* and *G. macandrewii*).

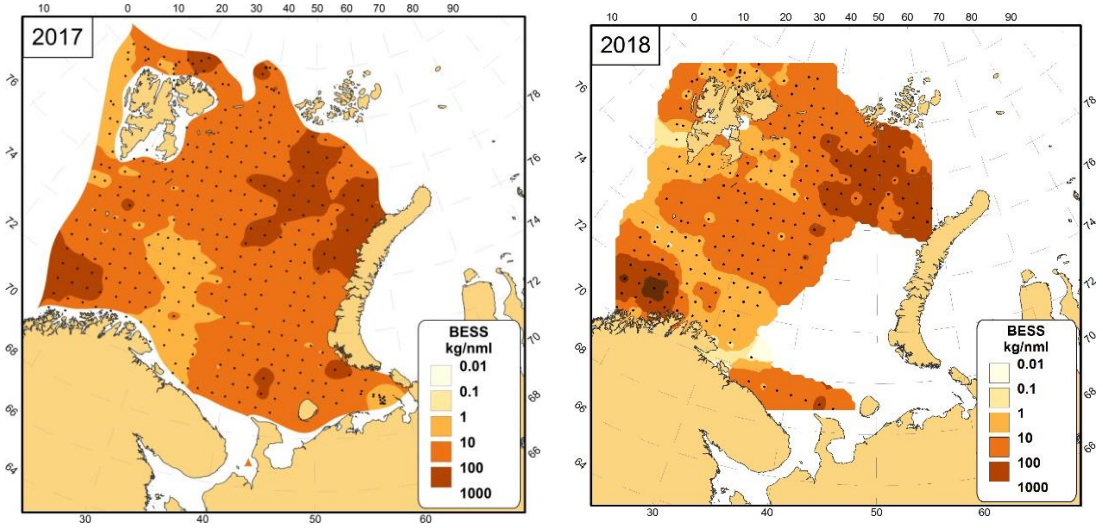

Figure 11.5 *Biomass distribution of megabenthos (excluding Pandalus borealis) in the Barents Sea, August-October 2017 and 2018*

As in previous years, the northern central part of the sea is clearly dominated by echinoderms and south western part, by sponges (Figure 11.6).

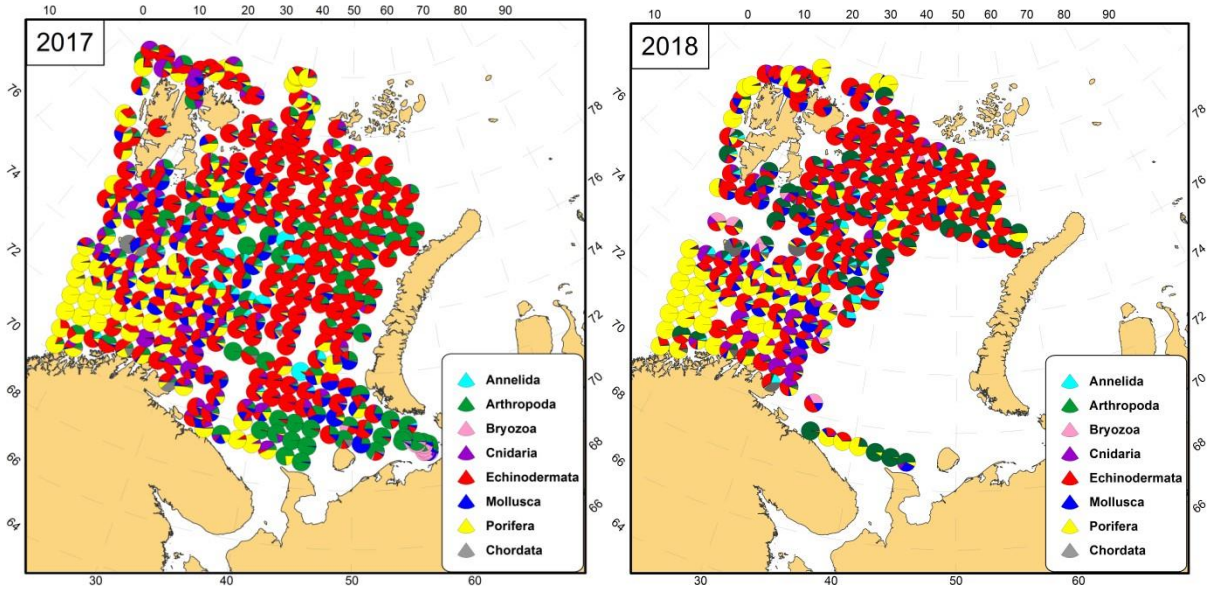

Figure 11.6 *Biomass distribution of main taxonomic groups per station in the Barents Sea (excluding Pandalus borealis), August-October 2017-2018*

The most dominant species observed in the trawl catches were the *Geodia* sponges (54.0 % of the total biomass), *Chionoecetes opilio* (5.5 %), *Strongylocentrotus pallidus* (4.9 %), *Ophiopleura borealis* (4.8 %), *Gorgonocephalus* arcticus (2.4 %).

Reference:

Zakharov, D.V., Strelkova, N.A., Manushin, I.E., Zimina, O.L., Jørgensen, L.L., Luybin, P.A., Nosova, T.B. 2018. Atlas of the megabenthic organisms of the Barents Sea and adjacent waters. PINRO, Murmansk. 534 p.

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Benthic communities

Table 11.1 *The material analyzed in the ecosystem surveys 2005-2017 and its main characteristics.*

Year	Number stations	Total		Average abundance, ind./nm	Average biomass, kg/nm	Number	
		Abundance, ind.	Biomass, t			species	taxa
2005	224	83077	2.1	522.5	12.7	142	218
2006	637	779454	20.7	1576.0	42.1	261	388
2007	551	526263	18.2	1240.2	44.6	222	351
2008	431	757334	12.2	2183.7	35.7	157	244
2009	378	653918	12.3	2056.4	42.2	283	391
2010	319	239282	6.8	900.0	27.3	273	360
2011	391	1089586	10.8	3411.4	34.3	282	442
2012	443	3521820	42.6	9832.1	125.5	354	513
2013	487	1573121	27.6	3885.0	71.7	362	538
2014	165	390444	5.3	2806.7	36.7	220	333
2015	334	481602	5.3	1815.1	19.9	398	599
2016	317	1116405	6.8	4230.1	36.3	266	423
2017	339	1073697	16.2	3769.4	58.6	319	500
2018	217	852613.6	15.4	4887.8	89.2	404	574
Total	5016	13138616	202.2	2940.7*	45.2*	694	1058

* The average long-term value.

Table 11.2 *Statistics of megabenthos bycatch processing and assessment of the quality of taxonomic processing of invertebrates in the BESS 2018*

Research vessels	"G.O. Sars"	"Helmer Hansen"	"Johan Hjort"	"Vilnus"	**Total**
Number of processed hauls	44	37	78	58	**217**
Phyllum	12	11	12	11	**12**
Class	28	28	31	25	**30**
Order	75	75	88	67	**79**
Family	153	164	196	108	**216**
Species	**215**	**201**	**291**	**122**	**404**
Total number of taxa	299	292	398	171	574
Percentage of species identification*	71.9	68.8	73.1	71.3	70.3

* calculated as quotient from division of total number of identifications till species to total number of identifications, %