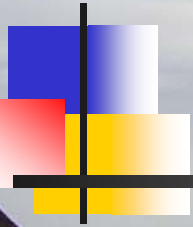


VARIABILITY OF MACROBENTHOS STRUCTURE IN COASTAL WATERS OF NORTHERN SAKHALIN ISLAND (OKHOTSK SEA) AROUND OIL- & GAS EXTRACTING OBJECTS



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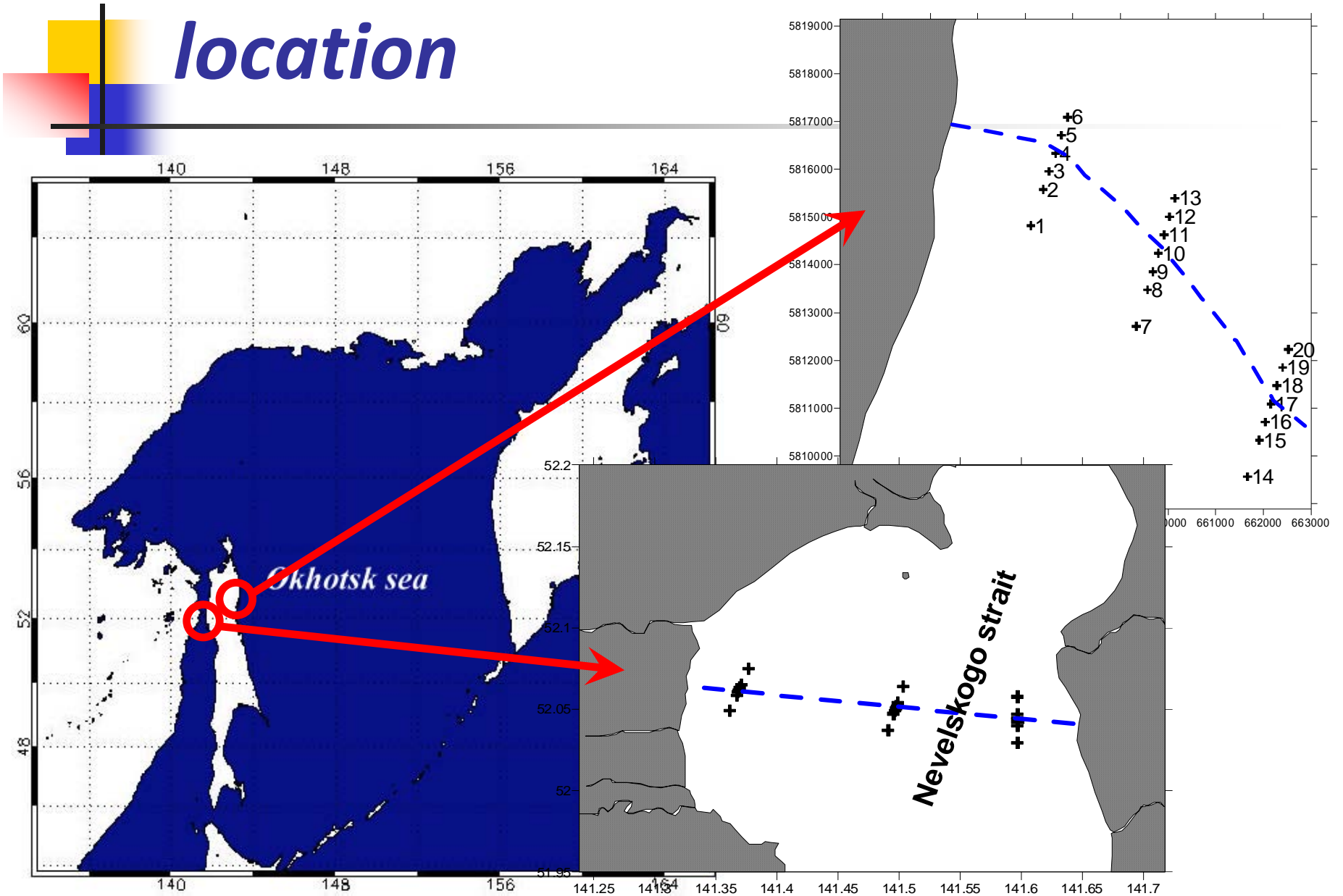


Materials and methods:

initial data

- Background - Hydrobiological researches of Sakhalin Fishery Institute (2000-2003)
- Monitoring after pipeline construction (2007-2009):
 - the basic object – macrobenthos;
 - accompanying measurements – granulometric structure of bottom sediments, concentration of oil hydrocarbons (OH), concentration of metals (Me)

Materials and methods: location



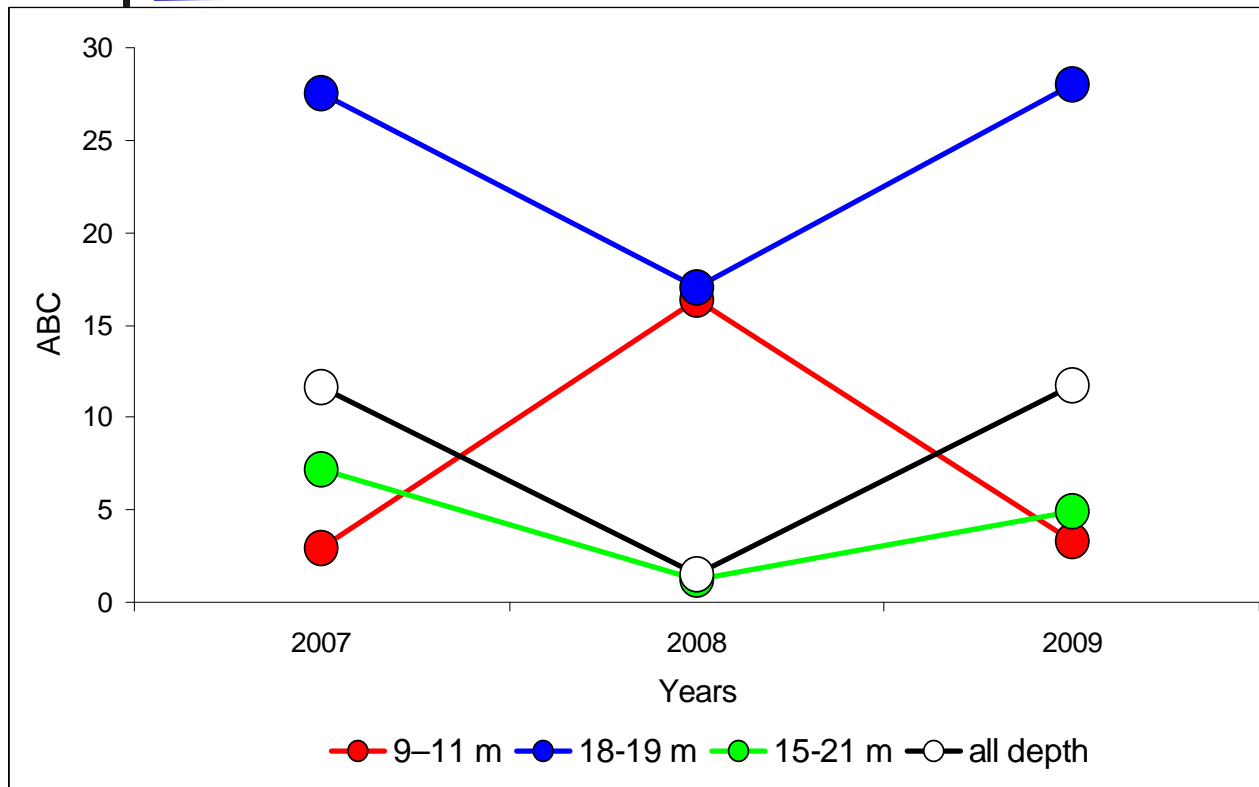


Shelf of northeast Sakhalin

- Background characteristic (2000-2003)
- Zone distribution of bottom communities: Principal cause is a change of a hydrodynamic regime (Labay, Shevchenko, 2004; Labay, 2005)

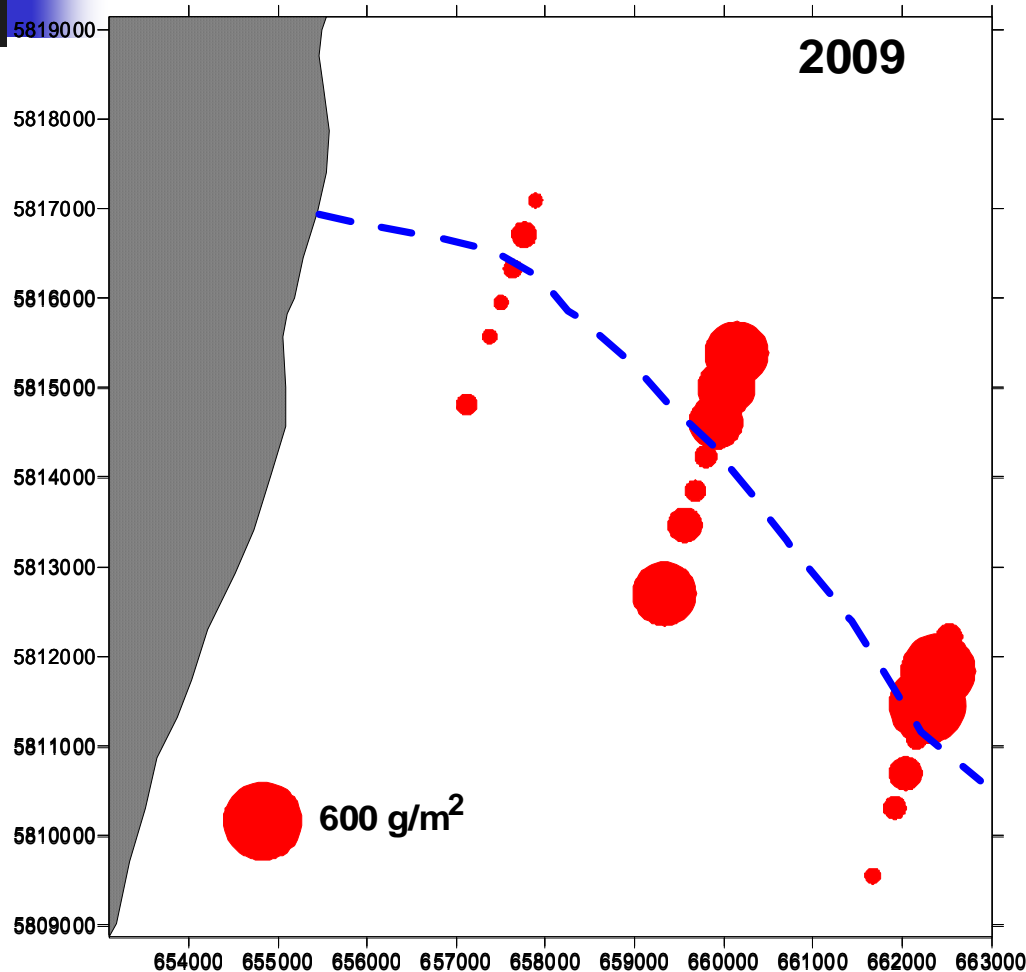
Communities	Depth, m	B, g/m ²	
		Limits	Average
<i>Monoporeia affinis</i> + <i>Synidotea cinerea</i>	5–10	70–164	105±10
<i>Siliqua alta</i> + <i>Megangulus luteus</i>	10–15	1–640 (100–300)	192±23
<i>Megangulus luteus</i>	5–15	12–100	42
<i>Echinarachnius parma</i>	15–20 (90)	79–3400	935±118

Shelf of northeast Sakhalin



Distinction in interannual dynamics of abundance indicators between shallow transects and the transect removed from coast is observed. On values of abundance indicators 2008 is distinctly differs from 2007 and 2009.

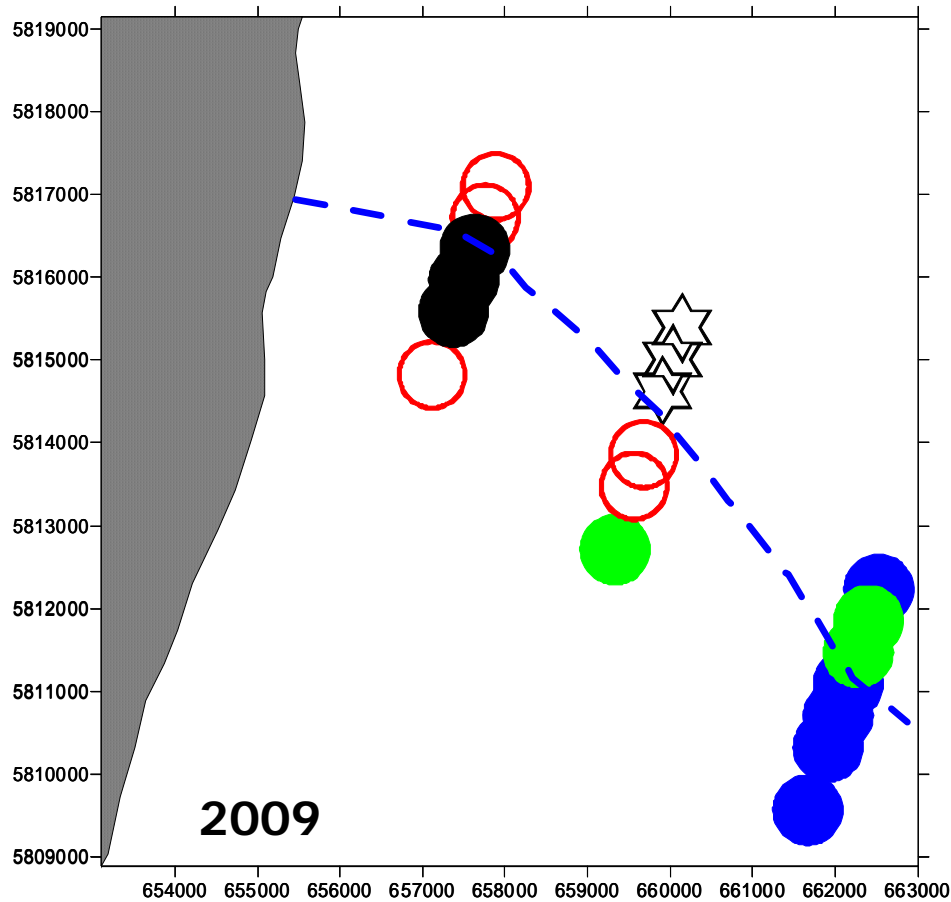
Shelf of northeast Sakhalin



- Asymmetry in distribution of abundance indicators in relation to a pipeline axis is marked.
- The excess factor varies from 0,94 to 20 and exceeds critical value (0,89).

Shelf of northeast Sakhalin

Basic communities:

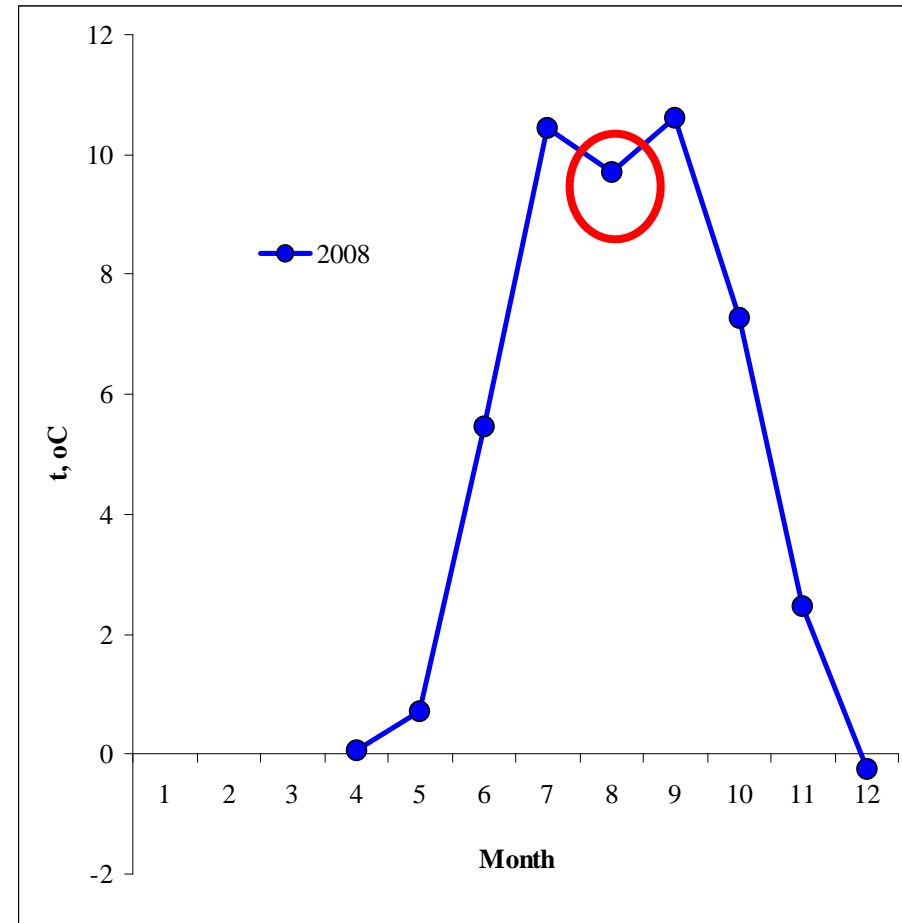
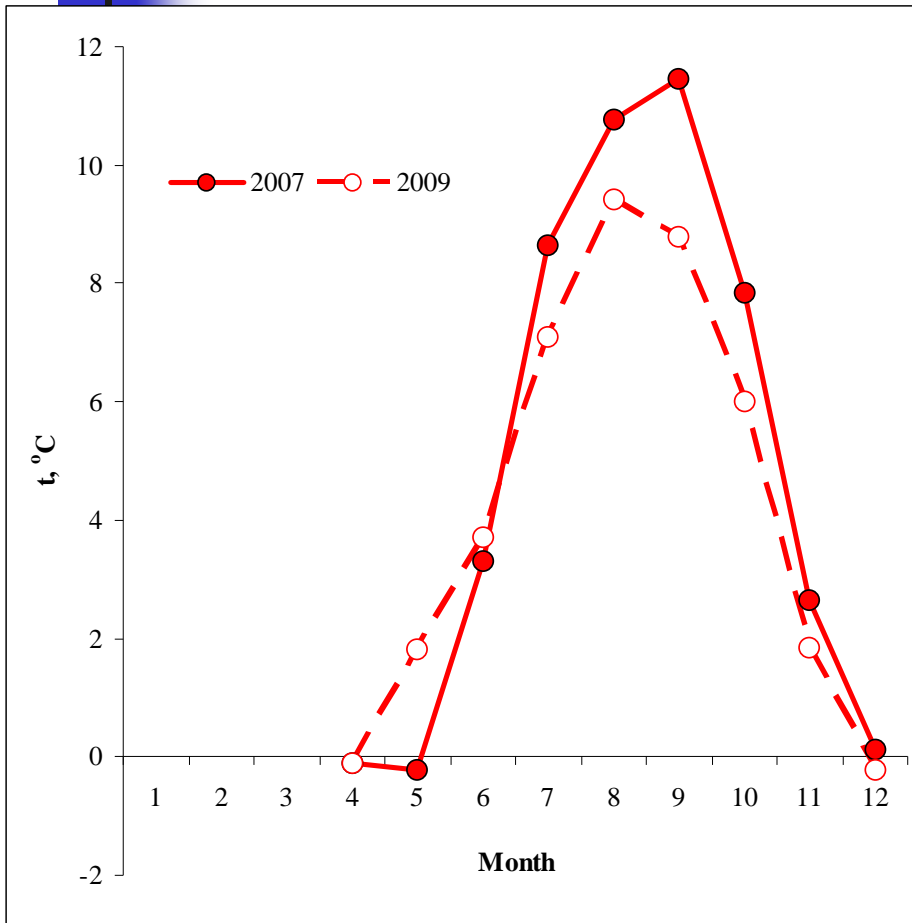


Communities:

- *Monoporeia affinis*
- *Eogammarus schmidti*
- ☆ *Echinarachnius parma*
- *Megangulus luteus*
- *Siliqua alta*
- *Mysella kurilensis*
- *Molgula*

Shelf of northeast Sakhalin:

Data of satellite monitoring (TERASCAN System: Sakhalin Fishery institute)





Shelf of northeast Sakhalin

- Interannual dynamics of abundance indicators is speaks by climatic changes (water warming up during the summer period).
- Water temperature decrease leads to Tunicata biomass increasing (define a biomass on a remote transsect) and to decrease of "sea dollars" (define a biomass on an intermediate transsect).



Shelf of northeast Sakhalin

Concentration of OH and Me after building was in limits of background values.

Obvious anthropogenous pollution in monitoring is absent.

Distribution of abundance indicators and bottom communities at transects correlated with granulometric structure of bottom sediments, the concentration of oil hydrocarbons and some metals (from 0,5 to 1,00 for varios indicators and sediments fractions).

Shelf of northeast Sakhalin:

correlations

Parametre	Fractions of botoom sediments, mm							Average size (f), mm	Ln f
	10-5	5-2	2-1	1-0,5	0,5-0,25	0,25-0,1	0,1-0,05		
	All stations								
S	-	-	-	-	-	-	-	-	-
N, экз./м ²	0,94	0,95	0,82	-	-	-	-	0,77	0,53
B, г/м ²	0,55	0,66	0,69	-	-	-	-	0,66	0,56
	Stations 1-6								
S	-	-	-	-	-	-	-	-	-
N, экз./м ²	-	-	-	-	-	0,62	0,61	-	-
B, г/м ²	-	-	0,60	0,63	0,83	-	-	0,85	0,86
	Stations 7-13								
S	-	-	-	-	0,97	-	-	-	-
N, экз./м ²	-	-	-	-	0,98	-	-	-	-
B, г/м ²	-	-	-	-	0,98	-	-	-	-
	Stations 14-20								
S	-	-	-	-	-	-	-	-	-
N, экз./м ²	0,99	0,97	0,86	-	-	-	-	0,84	0,58
B, г/м ²	0,60	0,67	0,70	-	-	-	0,51	0,50	-

Shelf of northeast Sakhalin

Concentration of OH and Me after construction was in limits of background values.

Obvious anthropogenous pollution in monitoring is absent.

Distribution of abundance indicators and bottom communities at transects correlates with granulometric structure of bottom sediments, the concentration of oil hydrocarbons and some metals (from 0,5 to 1,00 for various indicators and sediments fractions).

In turn, concentration of oil hydrocarbons and metals in bottom sediments correlated with granulometric structure of bottom sediments.

Hence, distribution of abundance indicators at transects is defined exclusively by bottom sediments structure!

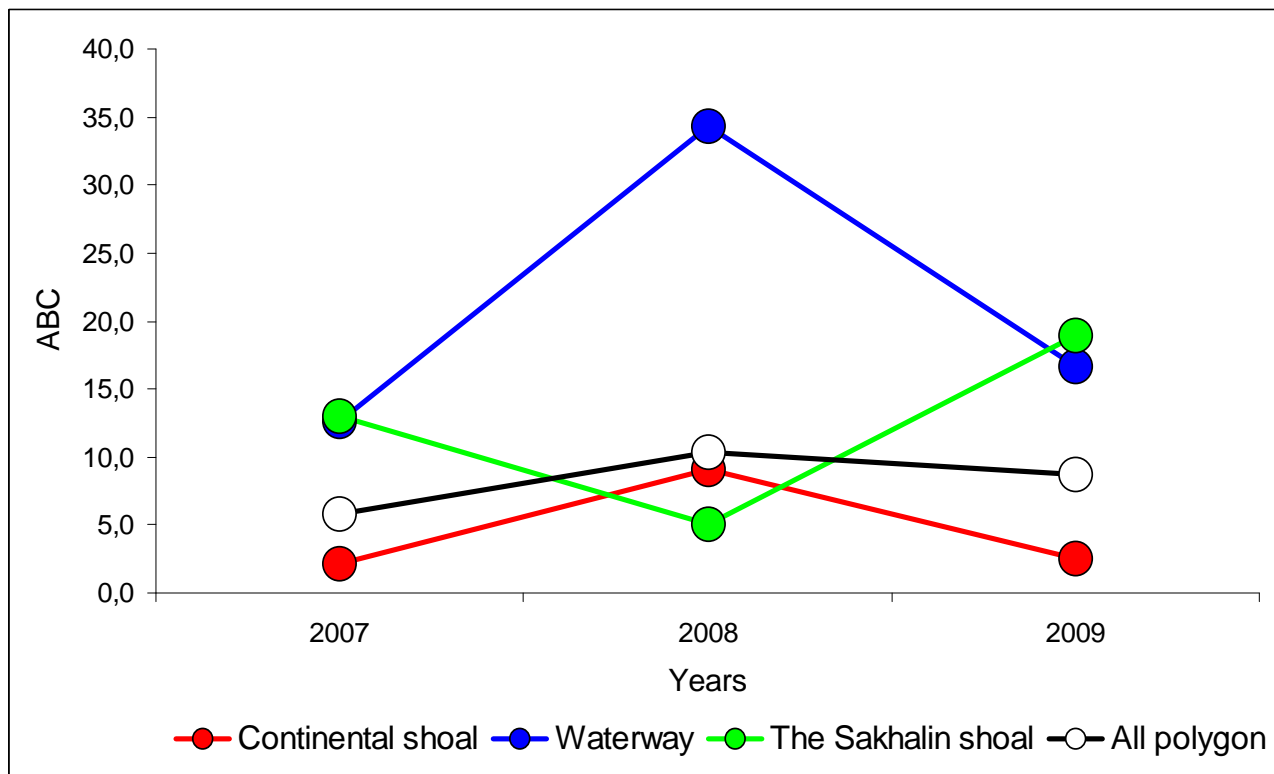


Nevelskogo strait

- Background characteristic (2000-2003):
- Two types of bottom communities: basic – '*Macoma balthica* + *Potamocorbula amurensis*'; minor - '*Abietinaria*' (waterway) (Labay, 2003)
- High speed of a current on a waterway (up to 1 m/second)

Communities	Depth, m	B, g/m ²
<i>Macoma balthica</i> + <i>Potamocorbula amurensis</i>	0,3-14	216
<i>Abietinaria</i>	12-16	1,08

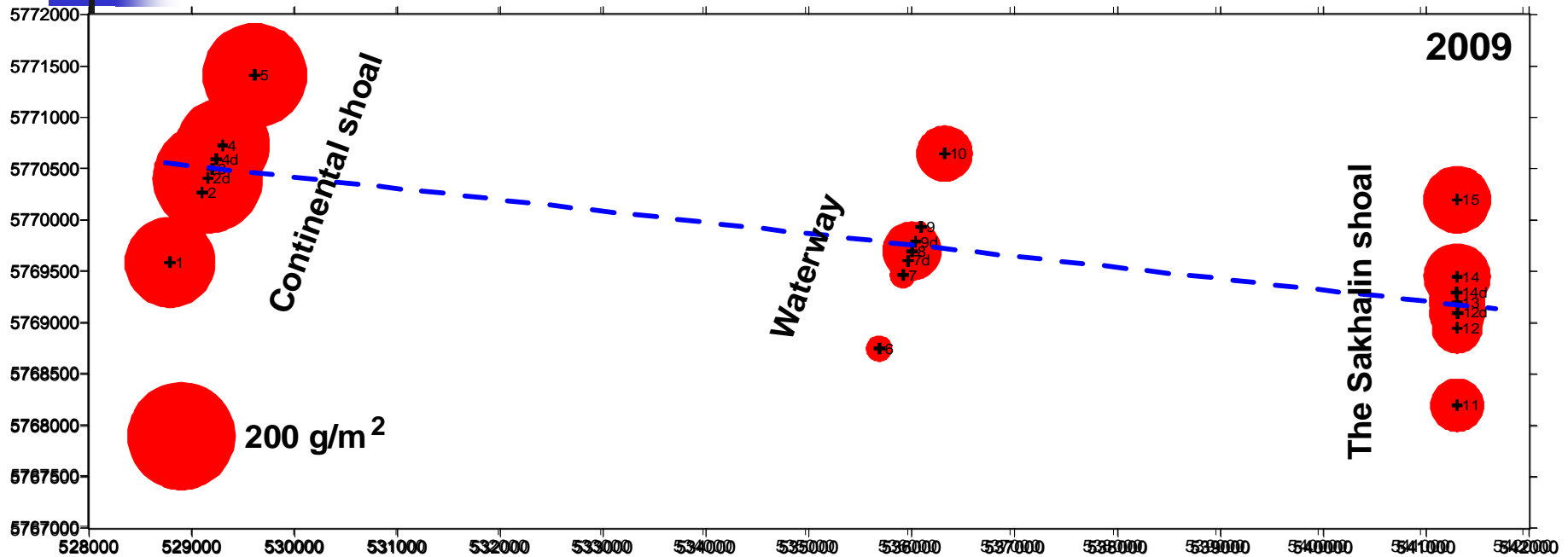
Nevelskogo strait



Distinction in interannual dynamics of abundance indicators between shallow transects and the waterway was observed.

Values of abundance indicators 2008 is distinctly differs from 2007 and 2009.

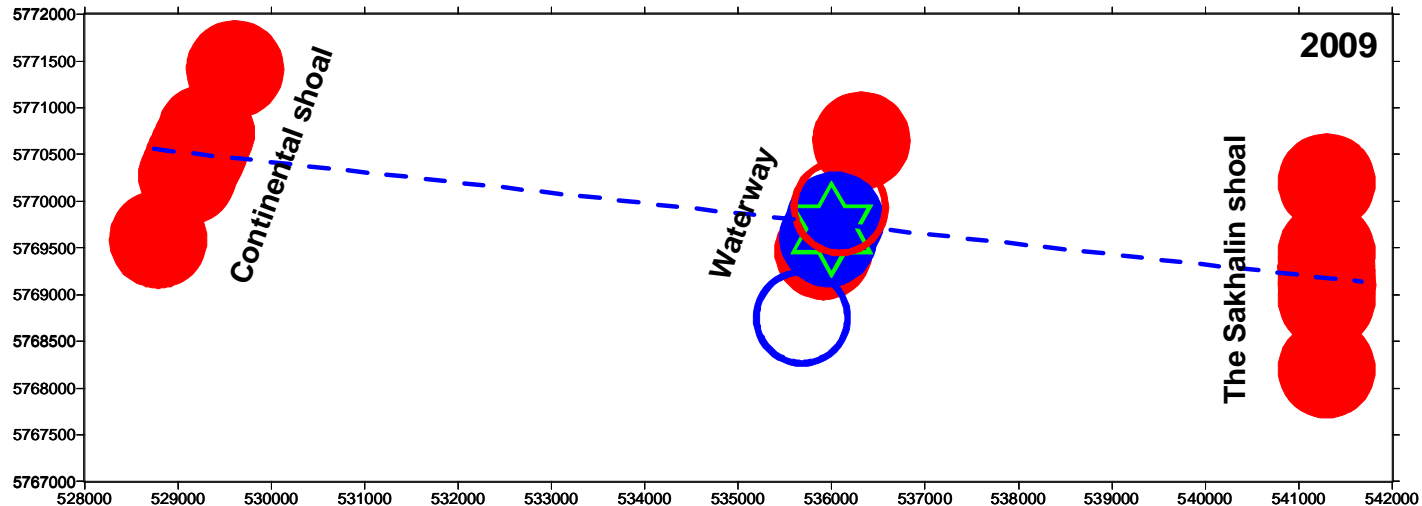
Nevelskogo strait



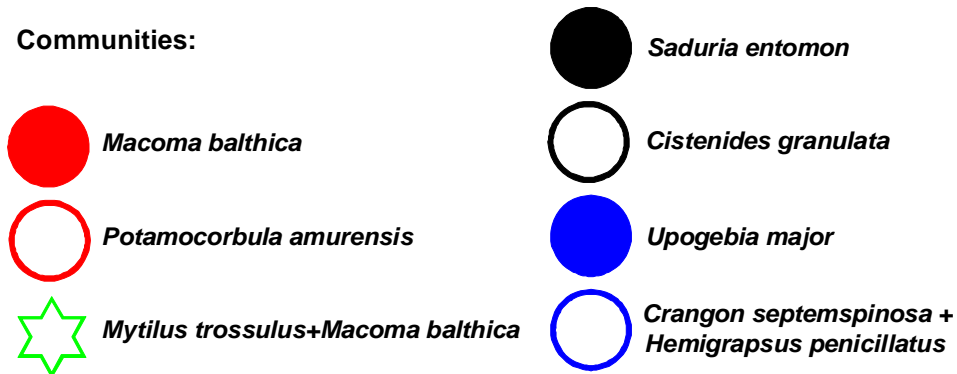
- Asymmetry in distribution of abundance indicators in relation to a pipeline axis is marked rarely.
- The excess factor varies from 0,17 to 7,6 and usually not exceed critical value (0,89).

Nevelskogo strait

Basic communities:



Communities:





Nevelskogo strait

- Interannual dynamics of abundance indicators is speaks by climatic changes (water warming up during the summer period).
- Water temperature decrease (2008) leads to Bivalvia and Decapoda biomass increasing and to growth of Isopoda *Saduria entomon* biomass (define a biomass on a waterway in 2008).

Nevelskogo strait: as a shelf of northeast Sakhalin

Concentration of OH and Me after construction was in limits of background values.

Obvious anthropogenous pollution in monitoring is absent.

Distribution of abundance indicators and bottom communities at transects correlated with granulometric structure of BS, the concentration of OH and some Me (from 0,5 to 1,00 for varios indicators and sediments fractions).

In turn, concentration of OH and Me in BS correlated with granulometric structure of BS.

Hence, distribution of abundance indicators at transects is defined exclusively by BS structure!



The general laws

- **Variability of structure and abundance indicators of bottom communities, caused by two factors is marked: 1) interannual variability of a temperature regime and 2) hydrodynamic activity.**
- **Influence of interannual variability of a temperature regime leads to change of abundance indicators (density and biomass) and by the change of dominating species. The hydrodynamic factor causes infringement of normality of distributions in an influence zone of a "hydrodynamic shade" and occurrence of new local time communities, earlier in the given areas not found out.**

Thanks for attention



- During the monitoring 1 295 677 bottom organisms have been stirred up.
- People have not suffered.