LONG-TERM CHANGES OF NUCULANA PERNULA COMMUNITY AS THE INDICATOR OF GLOBAL BENTHIC CHANGES IN SOUTH PART OF OKHOTSK SEA

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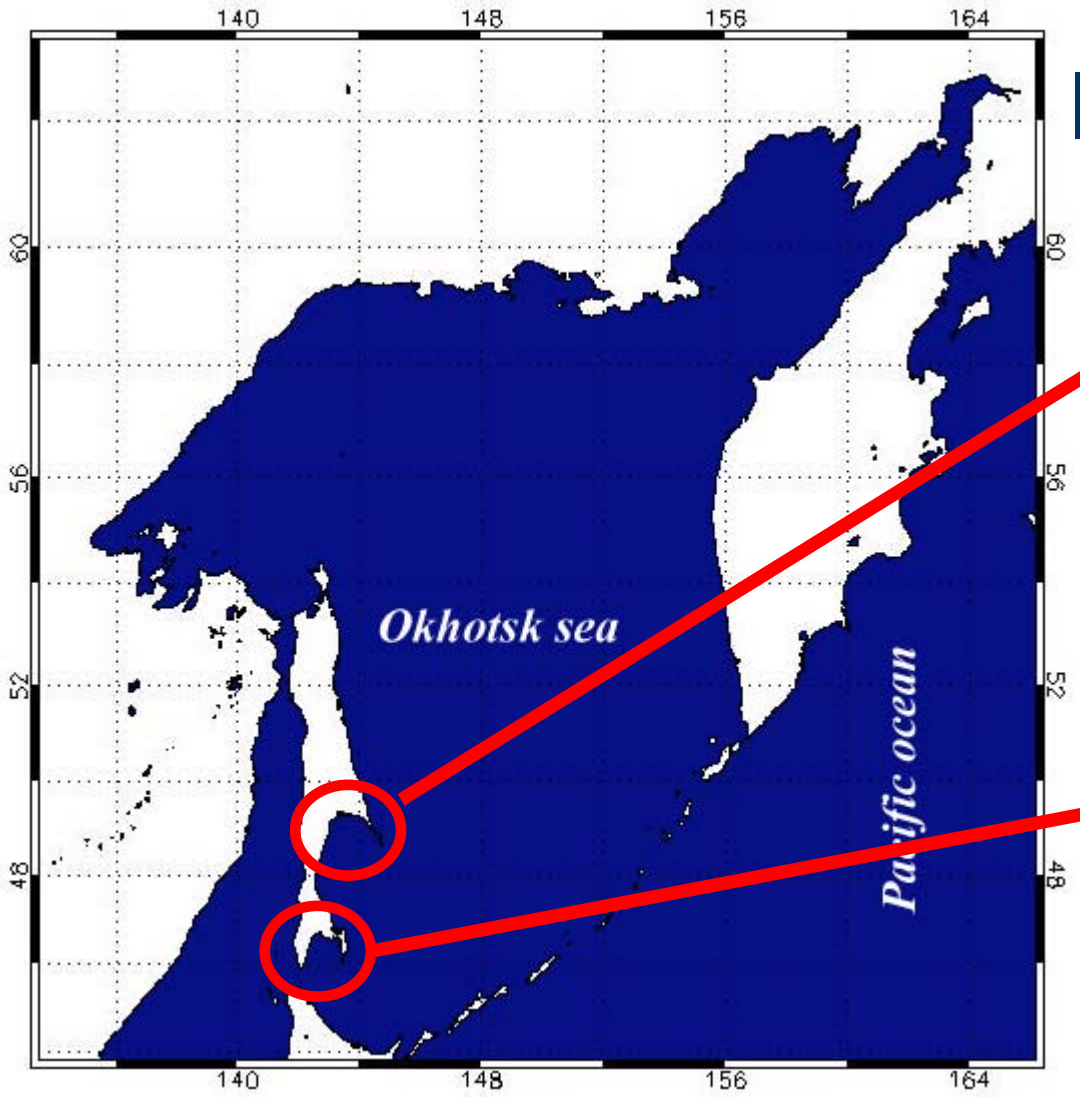
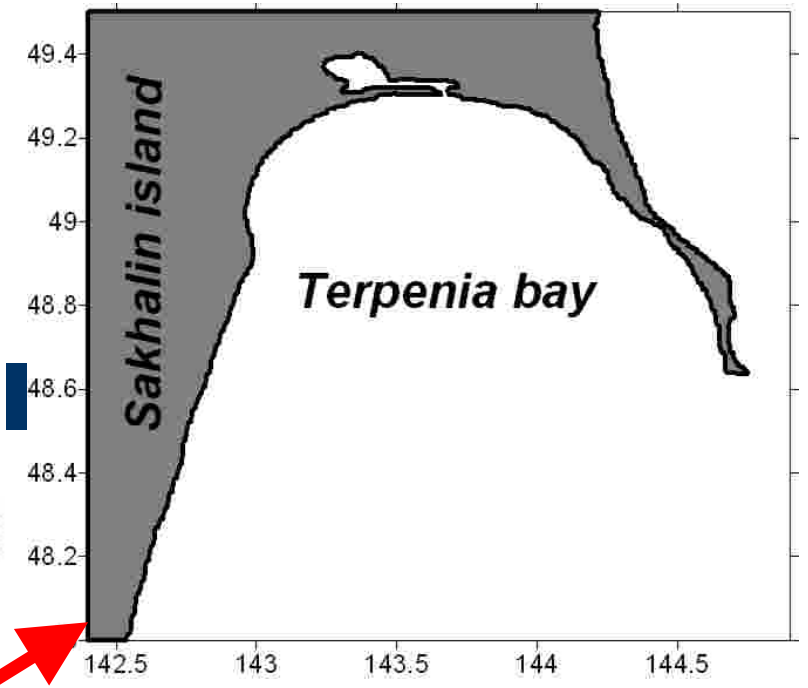
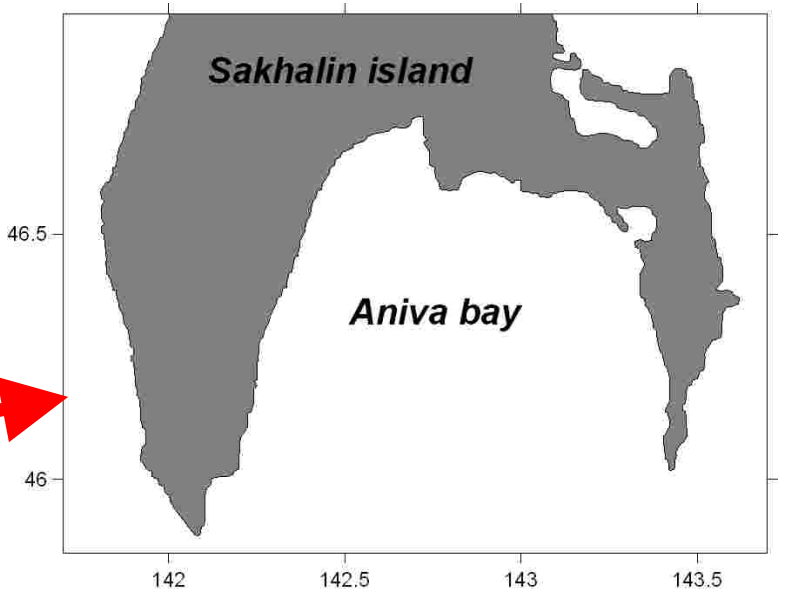
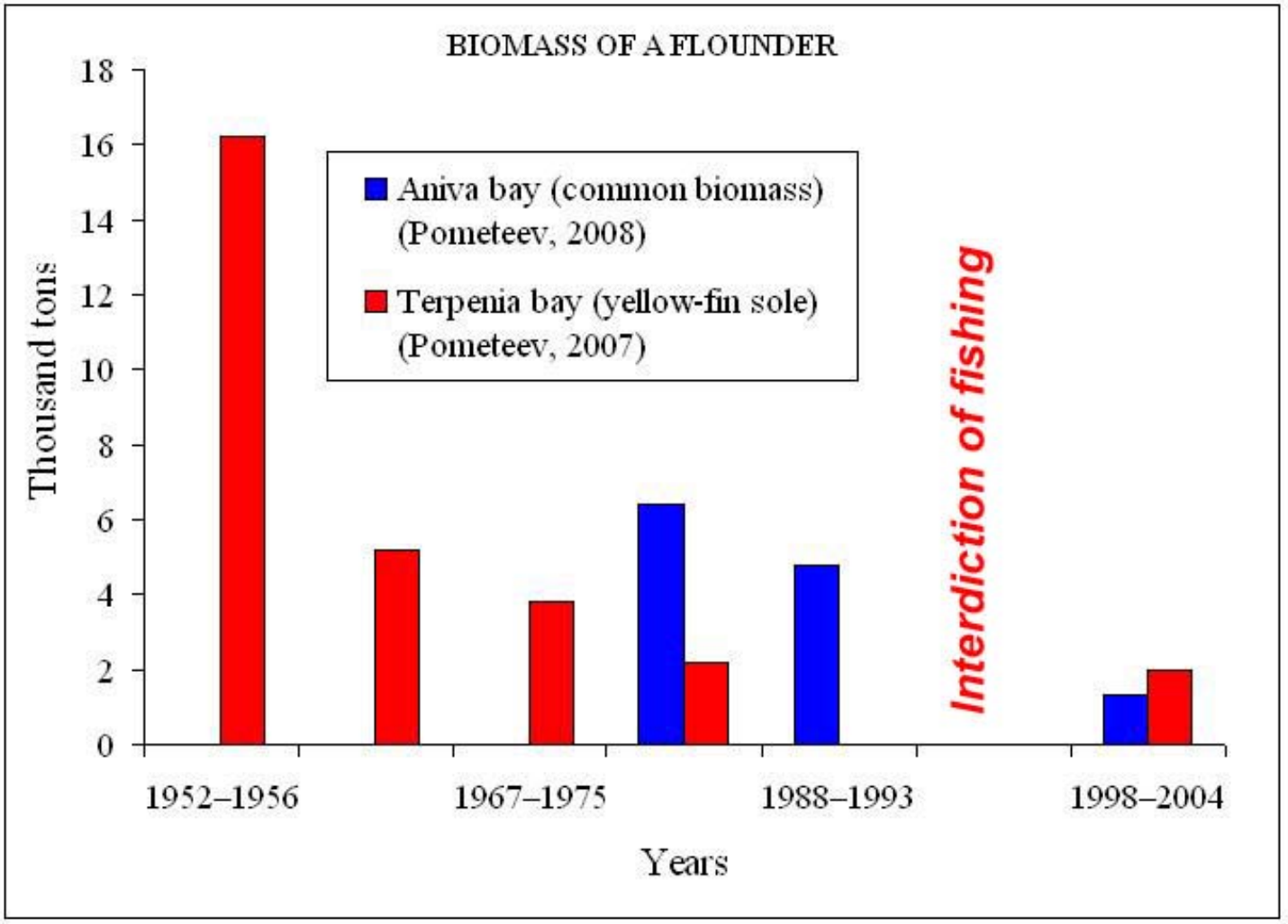
Localization







Prologue



Standard opinion: "the Reason of decrease in a stock is an overfishing a flounder by fisherman"

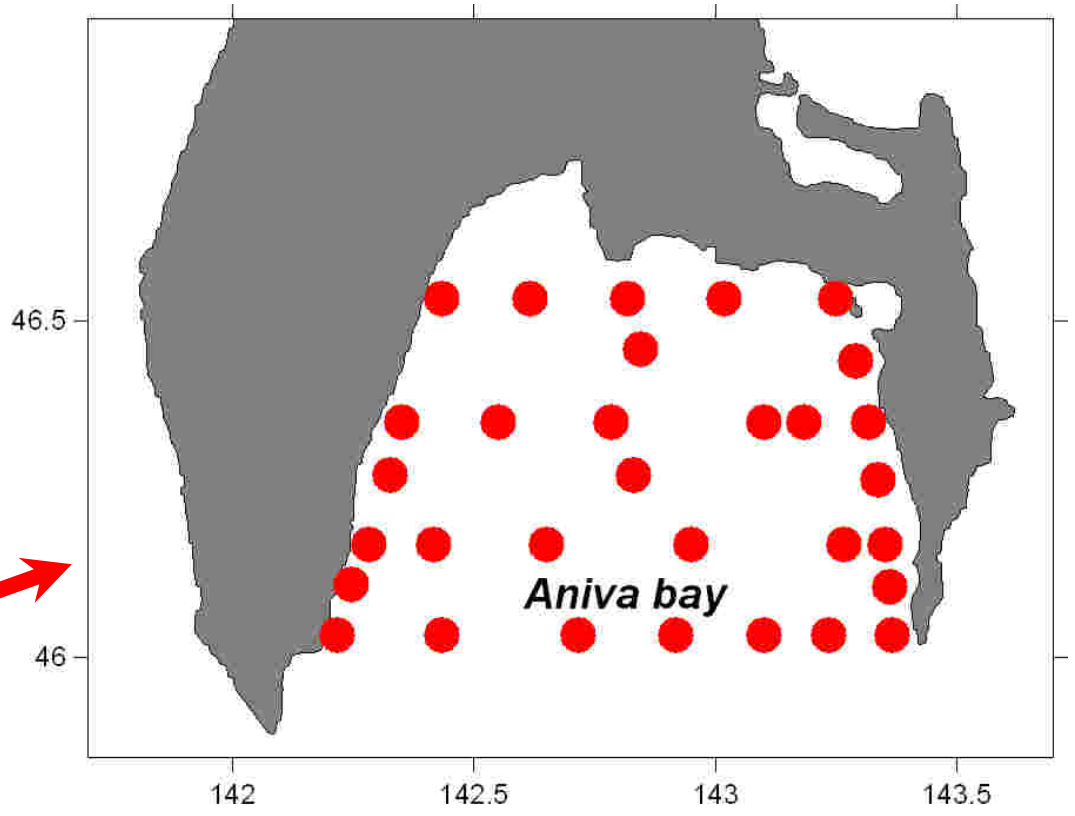
MATERIALS AND METHODS

Aniva bay

The literary data:

- 1949-1950 (The atlas of oceanographic bases…, 1955);
- 1965 (Skalkin, 1970);
- 1980 (Alekhnovich, 1980).

2005 (Own data)



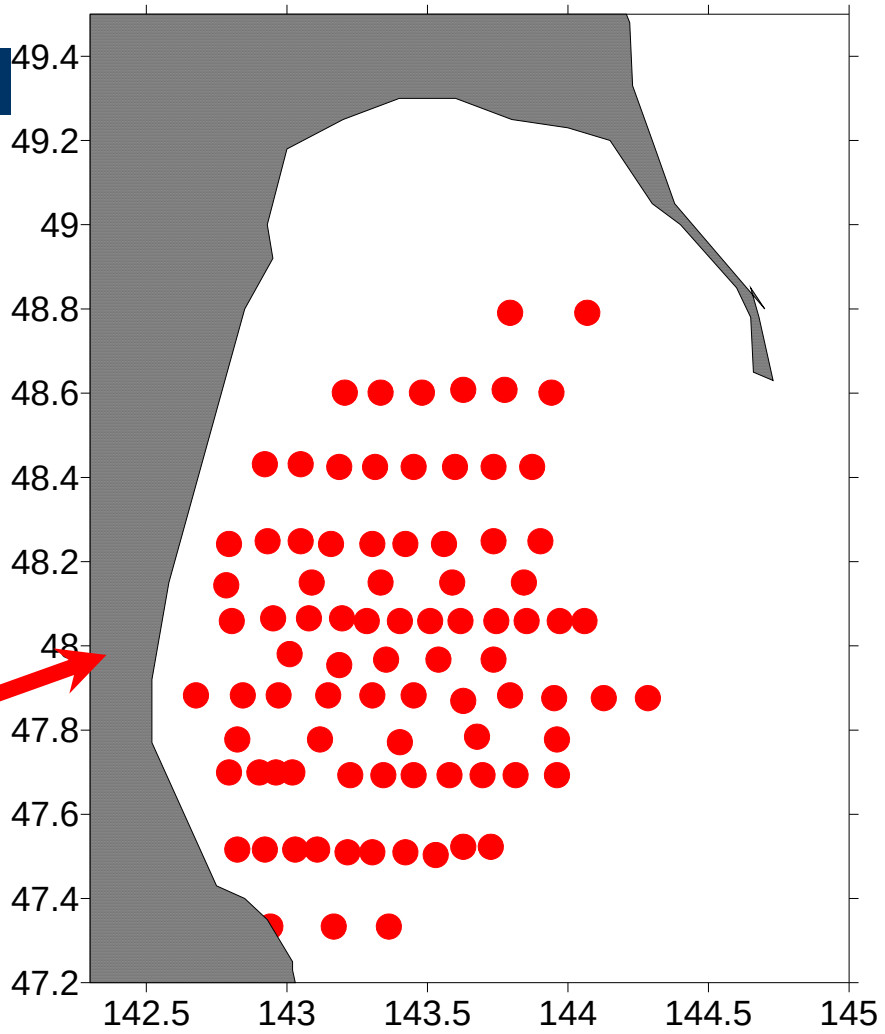
MATERIALS AND METHODS

Terpenia bay

The literary & archival data:

- 1949-1950 (The atlas of oceanographic bases…, 1955);
- 1964 (Tabunkov, 1966);
- 1970 (Skalkin, 1970);
- 1975 (Tabunkov, 1975).

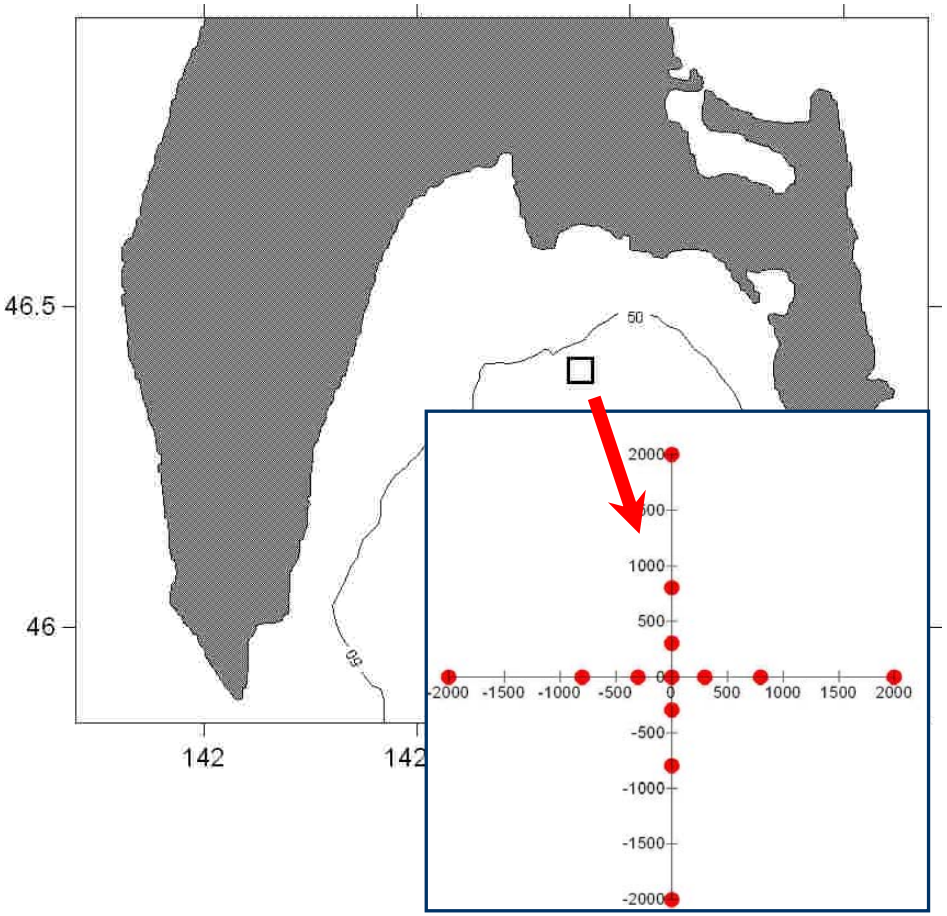
2006 (Own data)



MATERIALS AND METHODS

Control area in Aniva bay

- Benthos was sampled:
  August 2003;
  October and December 2004,
  May 2005;
  August 2005;
  August 2006;
  August 2007;
  September 2008.
- Stations located at 300, 800 and 2000 m off the central point (coordinates 46°24.5,0' N and 142°55,0' E) to the north, east, south and west.



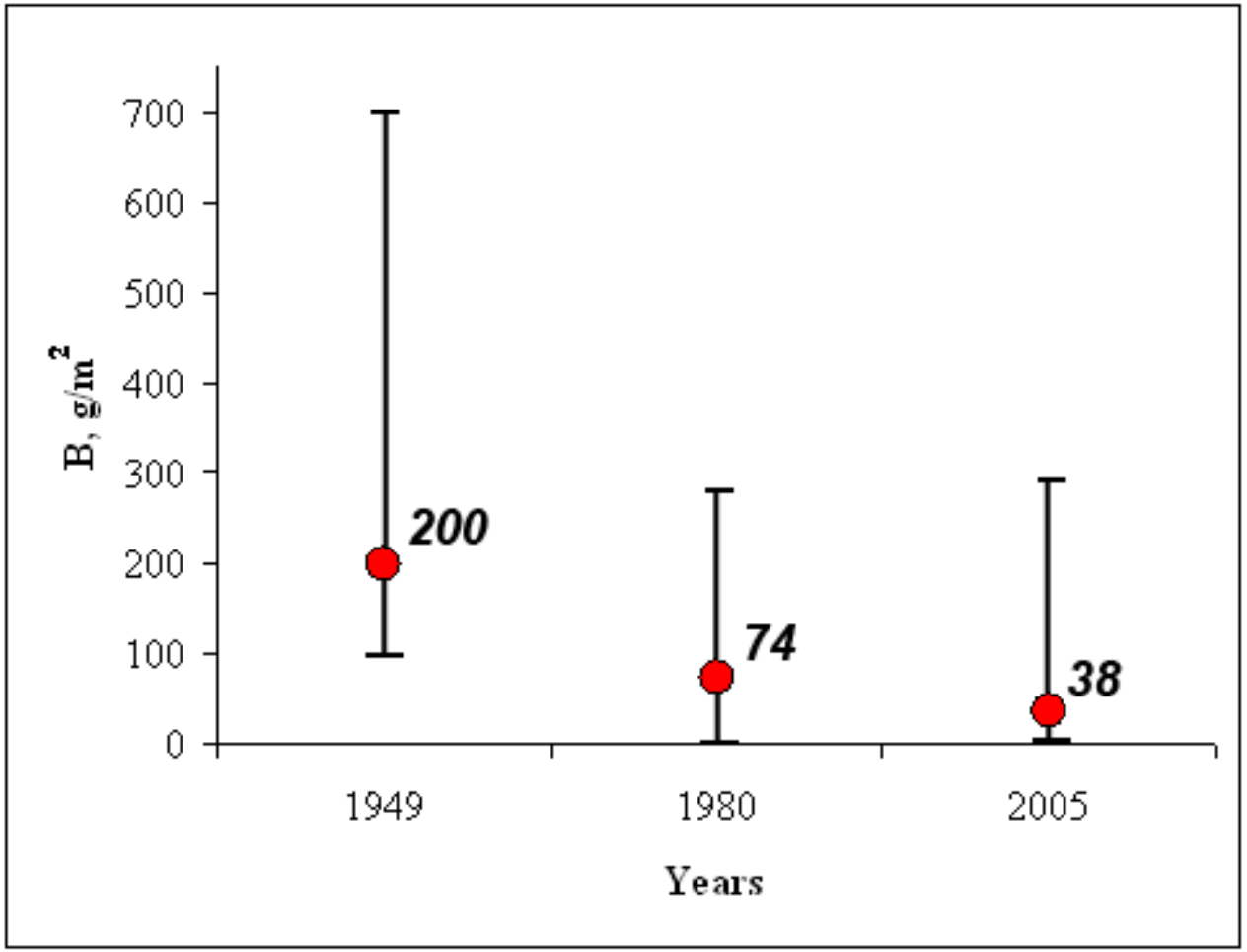
MATERIALS AND METHODS

- Benthos was sampled from the R/V “Dmitry Peskov” using a Van-Veen grab (0,2 m^2) – three samples from one station.

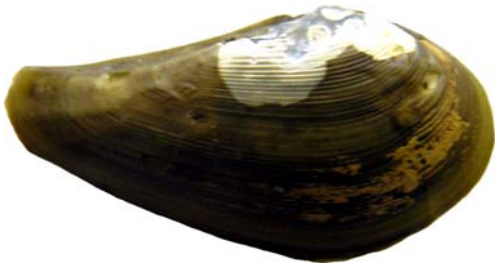
- For construction of distributions the program “SURPHER 8.00” was used: Method of a linear triangulation; Filtration on average.

Aniva bay: Change of a benthos biomass

For the period with 1949 on 2005 the average biomass has decreased almost 5 times!

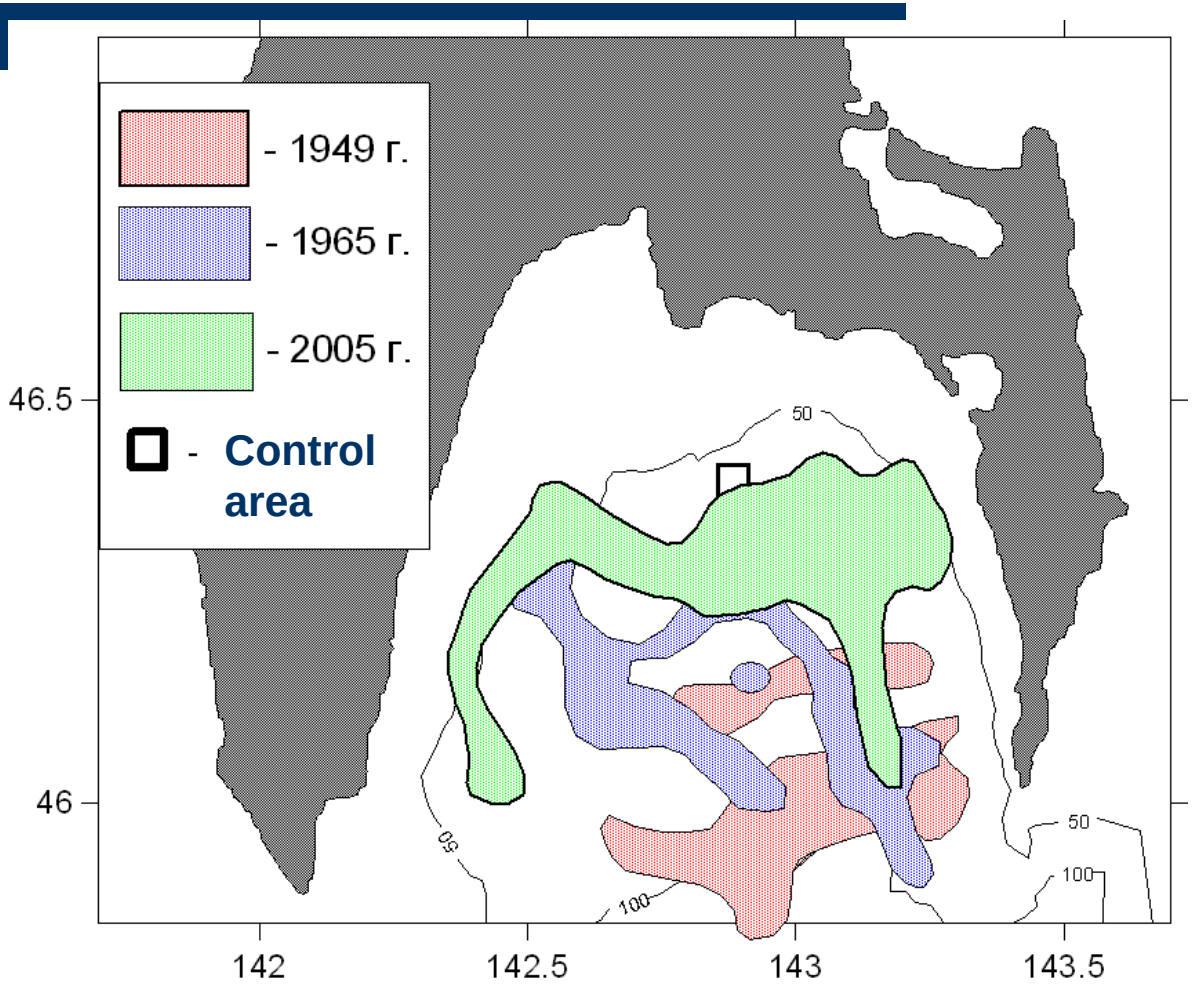


Aniva bay: Change of an area of community *Nuculana pernula*



Migration of community with 1949 on 2005 of the central southern deep-water part on periphery in more shallow areas was observed. Migration was accompanied by decrease in a biomass and change of community structure:

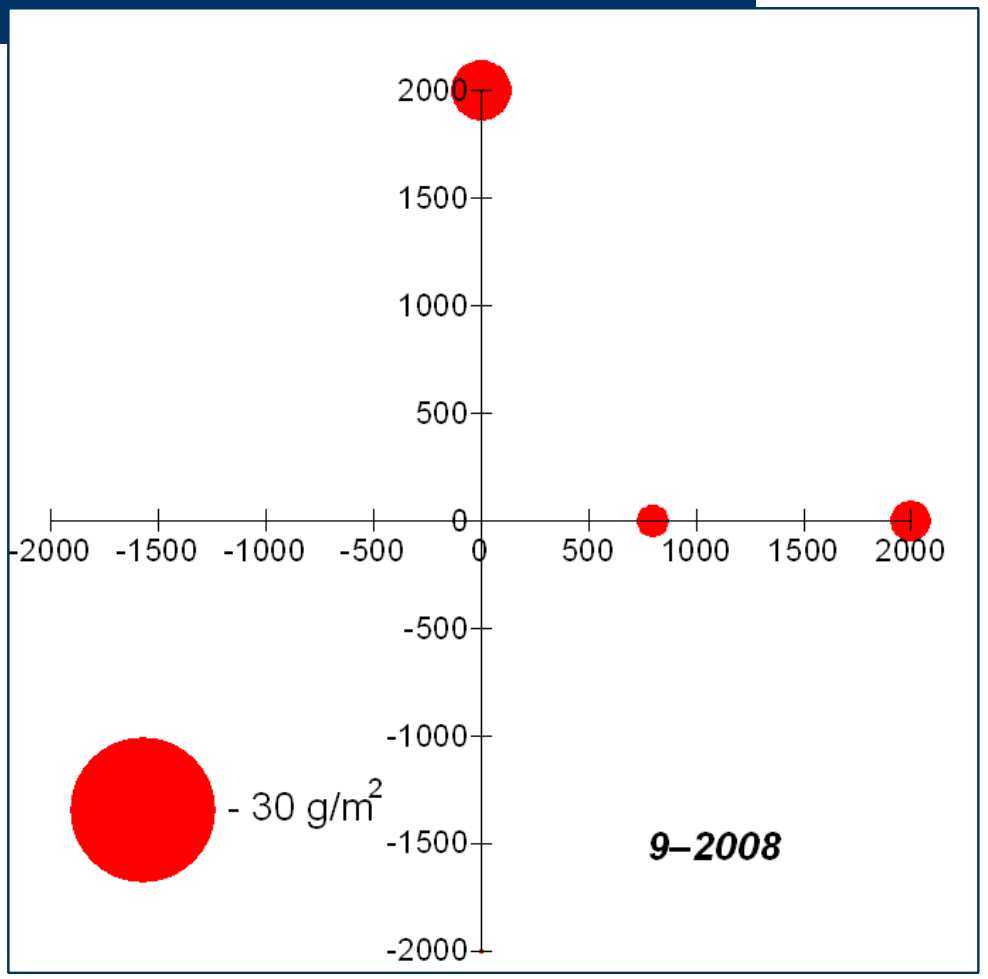
- **1949 – average 400 g/m² (up to 900 g/m²);**
- **1965 – up to 64 g/m²;**
- **2005 – average 12 g/m² (up to 15 g/m²)**



Aniva bay: Control area: *Change of distribution Nuculana pernula*

On a control area with 2003 to 2008 occurrence of a congestion of Nuculana pernula and its displacement on the north in the direction of coast was observed.

Occurrence of a congestion was accompanied by growth of a biomass by 2006. After displacement of a congestion on the north the biomass has decreased almost up to initial.



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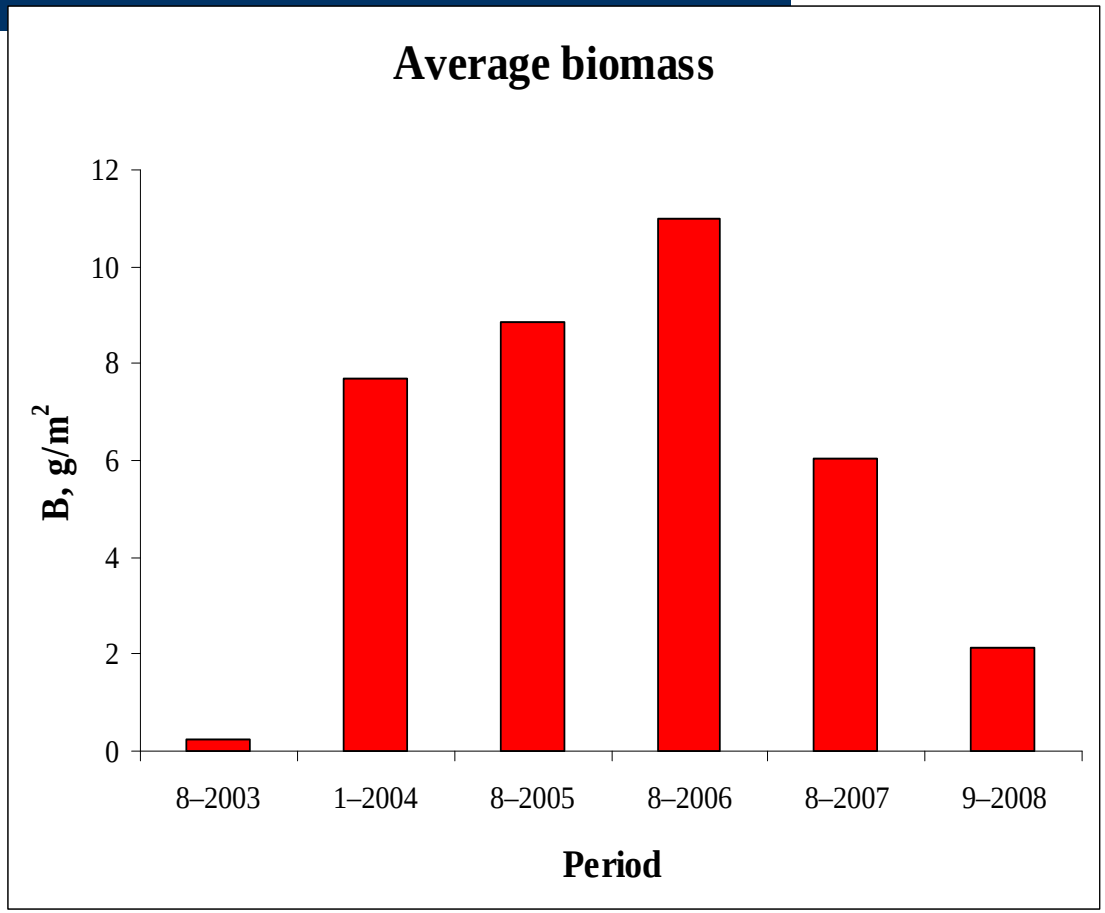
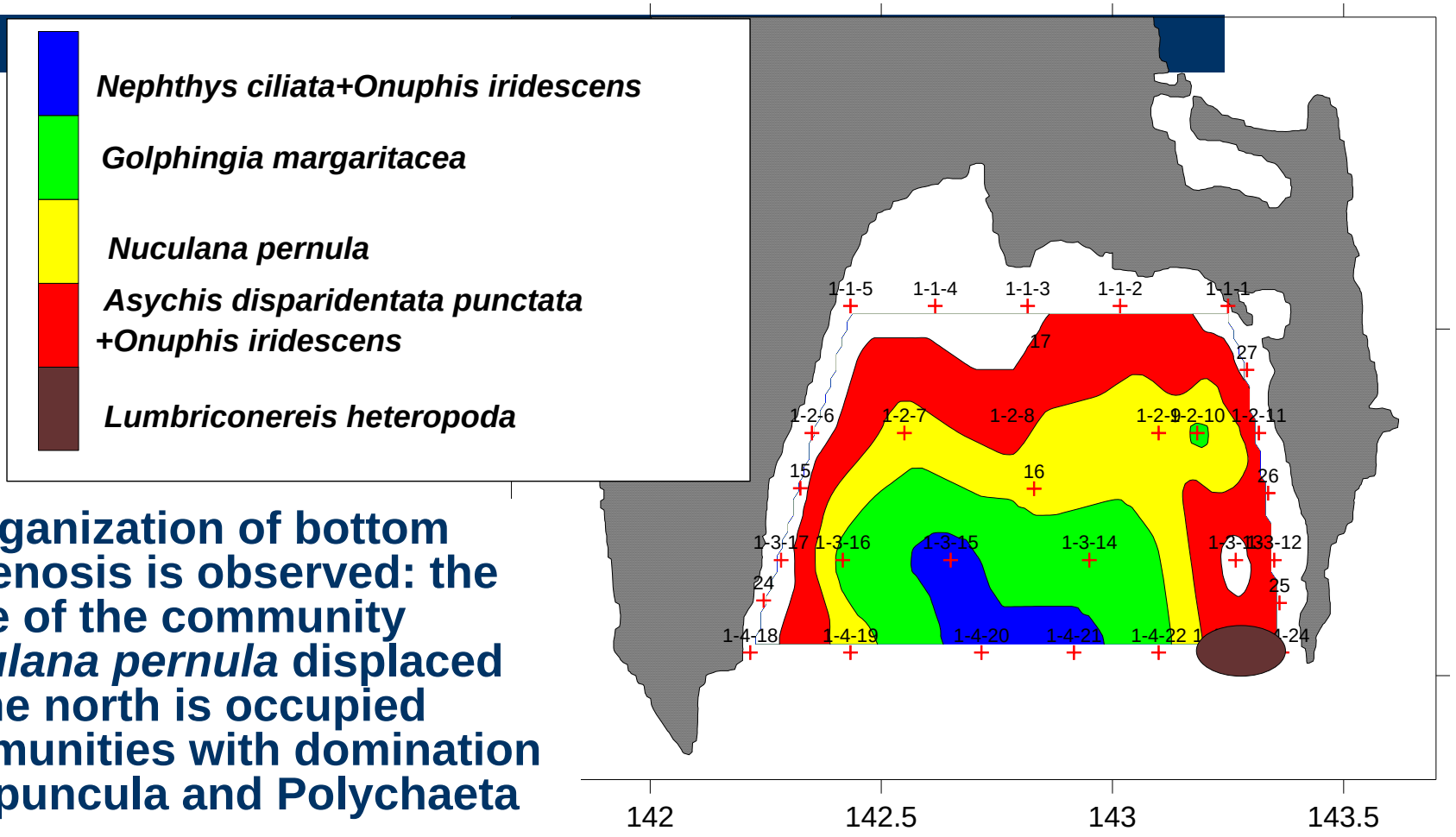
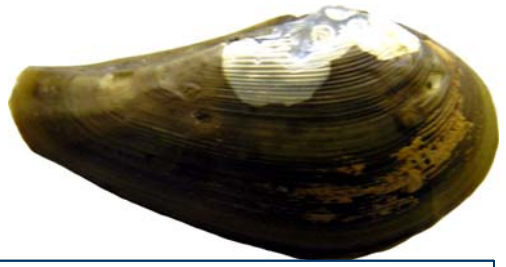


Aniva bay: *Replacement of benthos communities*



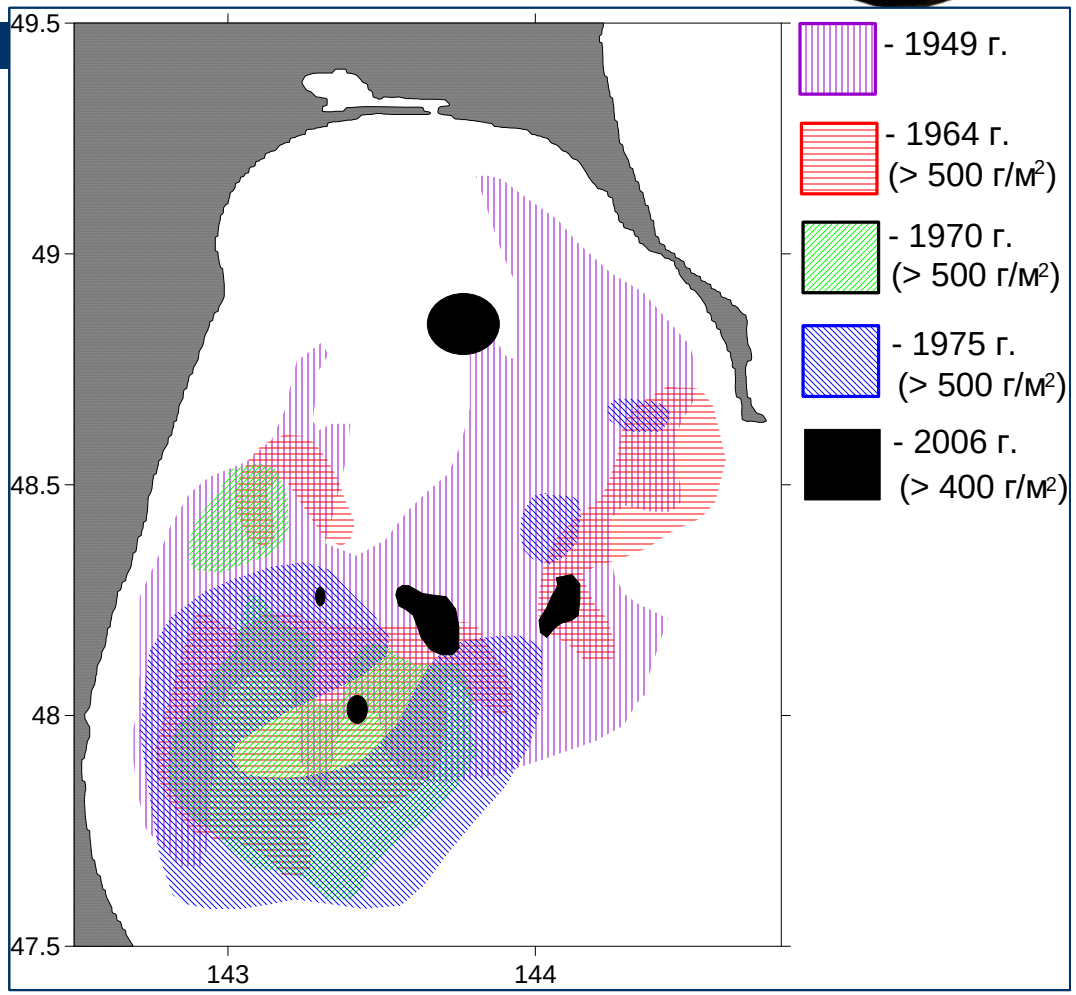
Reorganization of bottom biocenosis is observed: the place of the community *Nuculana pernula* displaced on the north is occupied communities with domination of Sipuncula and Polychaeta

Terpenia bay: Change of an area of community *Nuculana pernula*



Division uniform before an area of community on parts and reduction of its area was observed with 1949 on 2006 division was accompanied by decrease in a biomass :

- **1949 – average 1.5-2 kg/m²;**
- **1964 – average 1.1 kg/m² ;**
- **1970 - average 625 g/m²;**
- **1975 – average 550 g/m²;**
- **2006 – average 94 g/m²**



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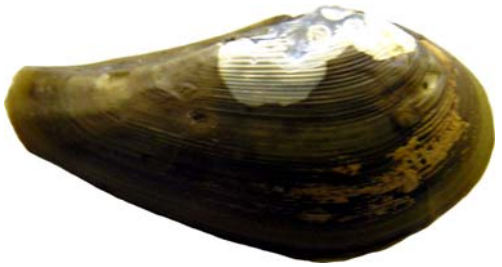

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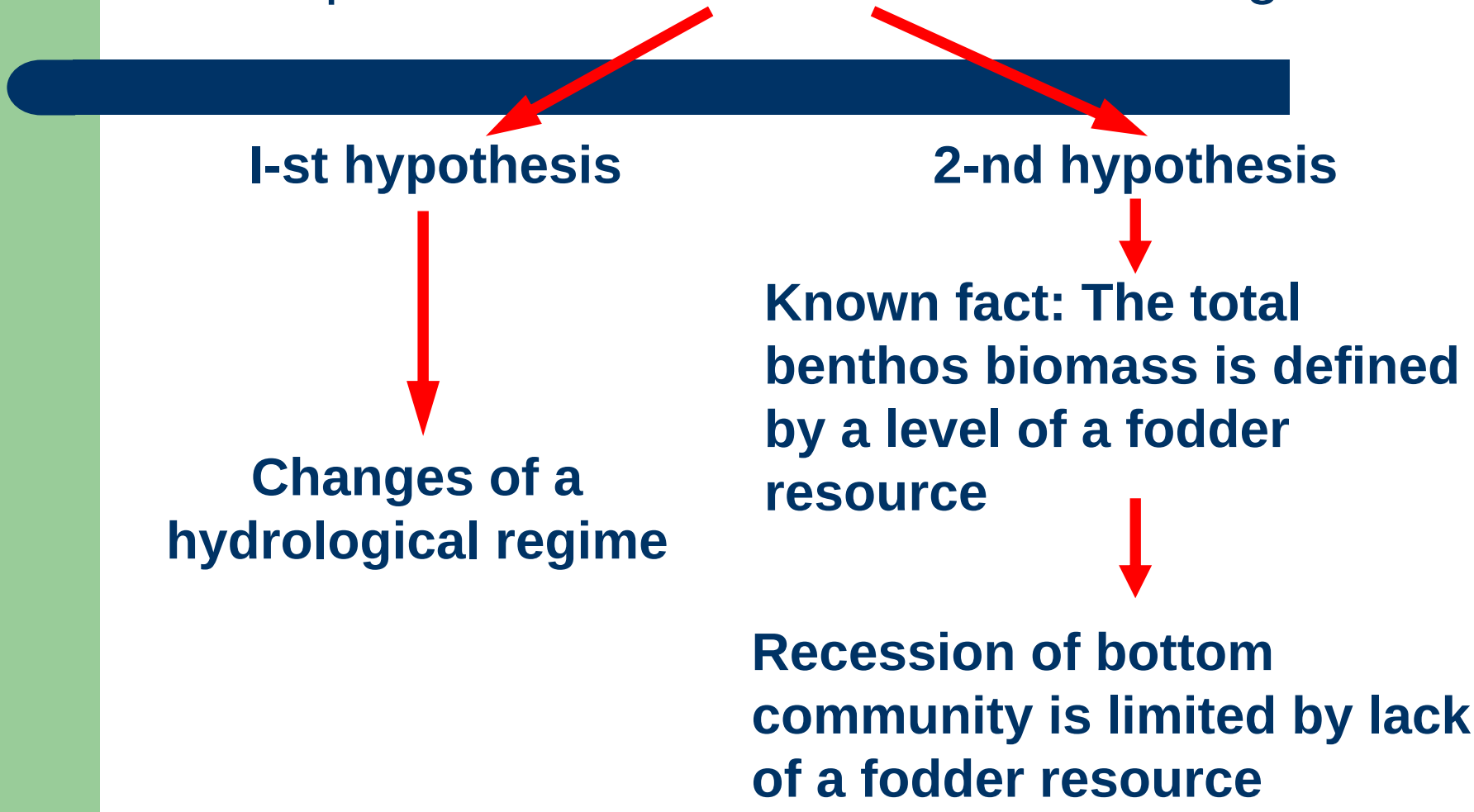
Parameter	1964	1970	1975	2006
The area of a congestion, km^2	5250	4550	4100	–
Biomass more than, g/m^2	> 500	> 500	> 500	–
Average biomass, g/m^2	1108	625	552	94

The possible reasons of benthos changes



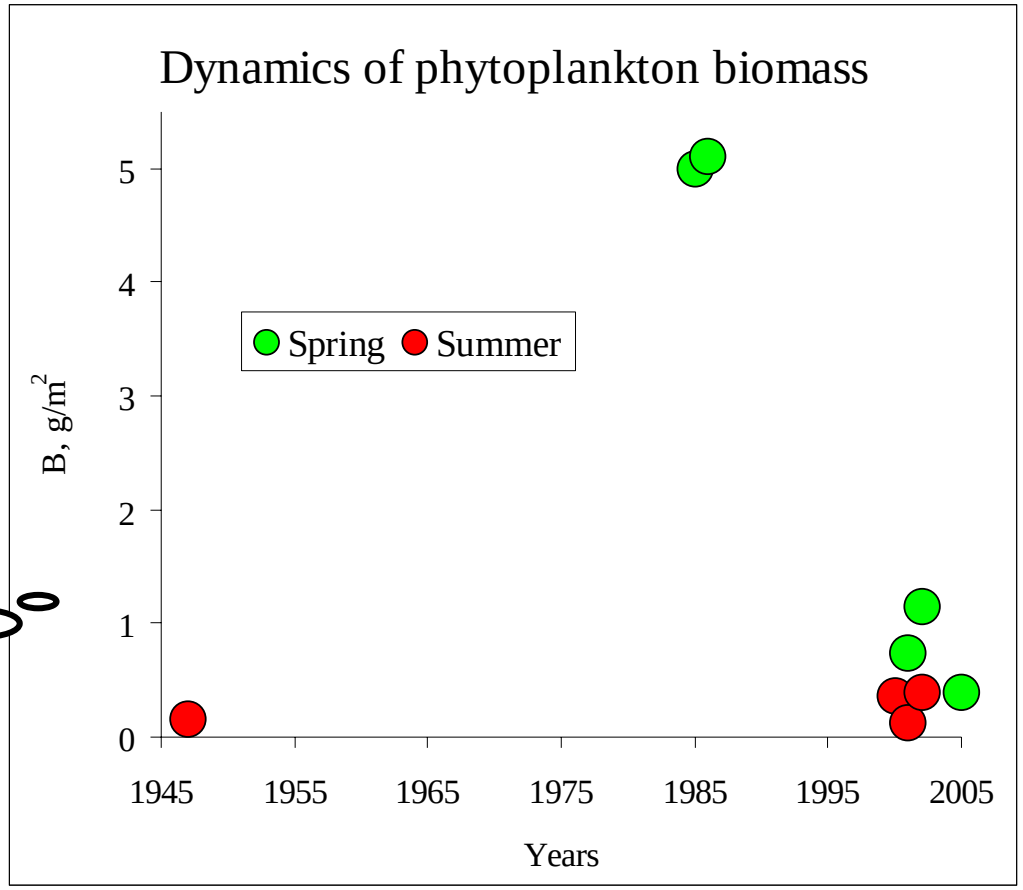
First hypothesis: Change of a hydrological regime

- Conditions of dwelling: Cold spreading layer of water; negative temperature
- The volatility of a cold down layer has no expressed law
- On the average; area of down layer have not changed (1950-2006)
- Hence, the hydrological regime of spreading layer does not determine change of bottom ecosystem

Second hypothesis: Lack of a fodder resource

- **Trophic characteristic of *Nuculana pernula*: collecting detritophagous**
- **The basic supplier of detrit: phytoplankton**
- **Decrease in productivity of phytoplankton can be the probable reason of benthic changes**

The literary data



During the spring phytoplankton productivity is limited by temperature of water; summer – biogenes concentration (Tzhay, 2007)

Decrease in temperature of an upper layer during the warm period (1950-1999) (Schevchenko & other, 2003, 2004):

- 1.4°C (HMSt Kholmsk),
- 2°C (HMSt Yuzhno-Kurilsk)

Thus, decrease in temperature of a superficial layer has probably led to reduction in productivity of phytoplankton and has caused benthic changes.

The report puts more questions than gives answers

- It is necessary to unit actions of scientist for detection of the similar phenomena in other parts of Pacific Ocean
- Check of serviceability of the stated hypothesis is necessary
- Long-term complex monitoring of a plankton, benthos and organic substance in a ground of a bottom is necessary

Thank for attention