An East-West comparison of plankton communities in the northern Okhotsk Sea

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Purposes

• To analyse the some changes of biological characteristics of zooplankton communities in the northwestern and northeastern Okhotsk Sea
• To compare biological characteristics of zooplankton and environmental condition (atmospheric circulation and physical oceanography) in the northern Okhotsk Sea
Sampling area
Dynamics of zooplankton biomass (g/m$^2$) in the northern Okhotsk Sea
“2004-2005” years

Good for northwestern plankton

Why?

Good for northeastern plankton

“2000-2001”
Changes in winter ice cover area (% from the total sea area) in the Okhotsk Sea (Ustinova et al. 2002)
Season average baric field of surface pressure in the "warm" years (2004-2005):

Aleutian Low had a southern position in the Gulf of Alaska, and easterly winds over the Sea of Okhotsk.

General circulation of currents is focused from east to west.
135 140 145 150 155 160

Warm

From east to west

Zooplankton carrying out and accumulation in northwest areas of Okhotsk Sea.

Cold

Cold years

General circulation of currents is focused from west to east

From west to east

Zooplankton carrying out and accumulation in northeast areas of Okhotsk Sea.

*Authors thank G.KHen for the given scheme of currents
From east to west

Zooplankton carrying out and accumulation in northwest areas of Okhotsk Sea.

Cold years

General circulation of currents is focused from west to east

Zooplankton carrying out and accumulation in northeast areas of Okhotsk Sea.

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Next question:

Does composition of zooplankton (taxonomic, trophic) change in the warm and cold years?
Changes in taxonomic composition of macroplankton in the northern Okhotsk Sea

Warm years
Increase the biomass copepods

Cold years
Increase the biomass of sagitta
Changes in taxonomic composition of macroplankton in the northwestern Okhotsk Sea

Warm years
Increase the biomass of euphausiids and copepods

Increase the biomass of sagitta
Changes in taxonomic composition of macroplankton in the northeastern Okhotsk Sea

**Warm years**
Increase the biomass of copepods, decrease the biomass of euphausiids

**Cold years**
Increase the biomass of sagitta and euphausiids
**Changes of trophic composition**

**Northeastern Okhotsk Sea**
- Predators (sagitta, hyperiids) 25-32%
- 32%
- Cold 17%

**Northwestern Okhotsk Sea**
- Predators 7-17%
- 7%
- Warm
Zooplankton production in the “cold” years

2000-2001

Production of zooplankton communities (Pc)

Production of predatory zooplankton (P3)

Production of phyto-, euryphagous (P2)

*Pc=P2+P3-A,

A - assimilated part of predatory plankton diet
Zooplankton production in the “warm” years

2004–2005
Zooplankton production in northwestern and northeastern Okhotsk Sea in warm and cold years
Distribution of Walleye pollock in Okhotsk Sea in spring 2005

*Unpublished by A. Vasilenko*
Conclusions

• Zooplankton distribution and its community stuff depends on physical oceanography condition in the northern Okhotsk Sea.

• Production of zooplankton in the northeastern and northwestern Okhotsk Sea is approximately same in cold years.

• Production of zooplankton is higher in the northwestern Okhotsk Sea in warm years.

• Feeding condition for fish usually more stable in the northeastern Okhotsk Sea.