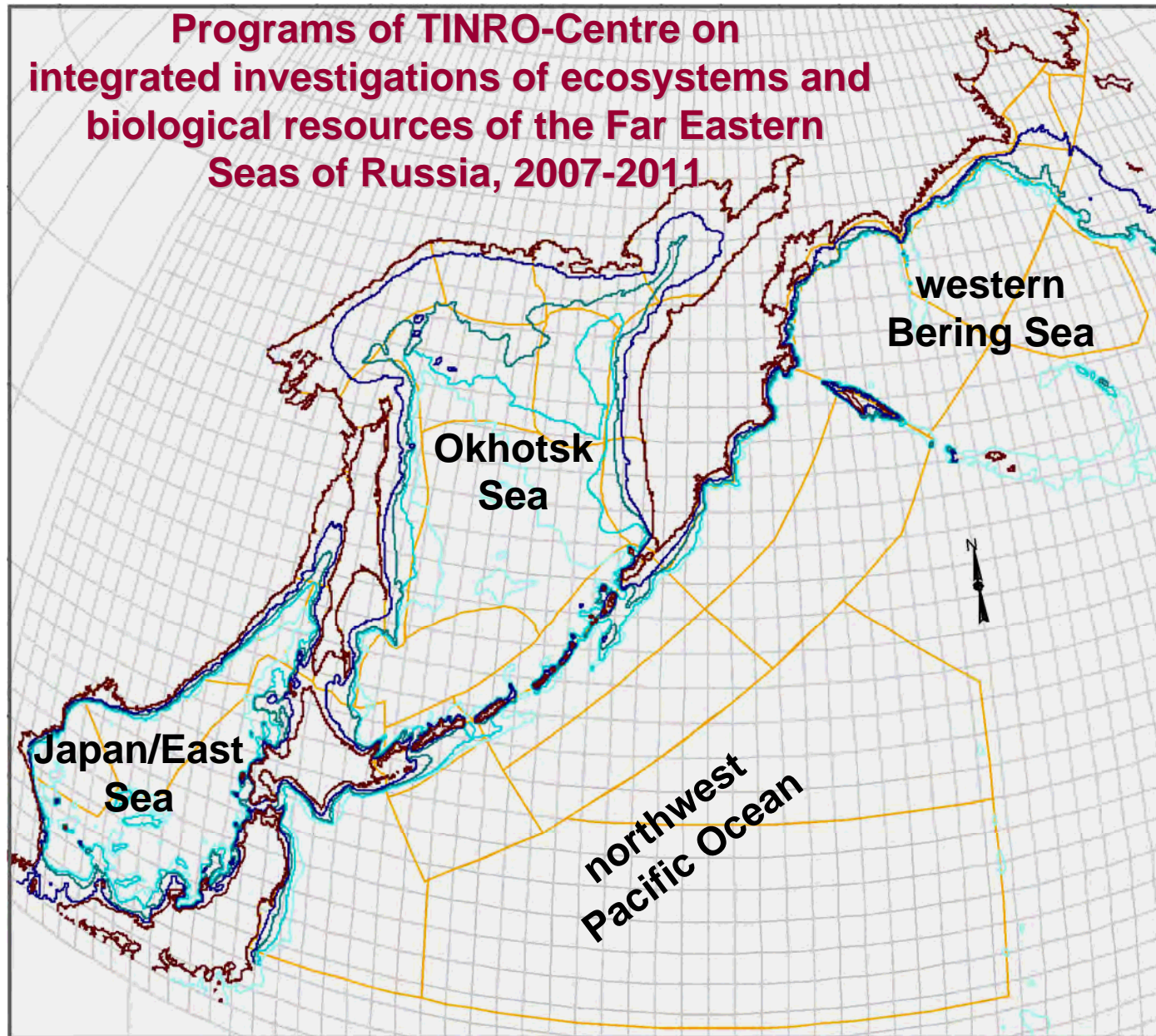


Russian Research Programs in the northwest Pacific Ocean and marginal seas



**Programs of TINRO-Centre on
integrated investigations of ecosystems and
biological resources of the Far Eastern
Seas of Russia, 2007-2011**



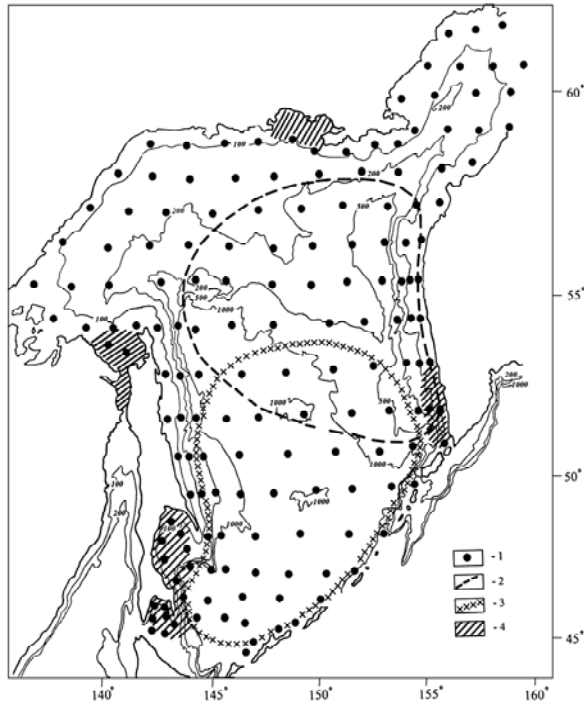
Major Goals

- Regularly monitor ecosystems of the Bering, Okhotsk, Japan/East seas, and Pacific Ocean in order to estimate their state, productivity and resilience, and to provide a scientific basis for rational use of marine resources
- To coordinate research activities of Russian Fishery organizations that operate within the study area (Bering, Okhotsk, Japan/East seas, Pacific Ocean)

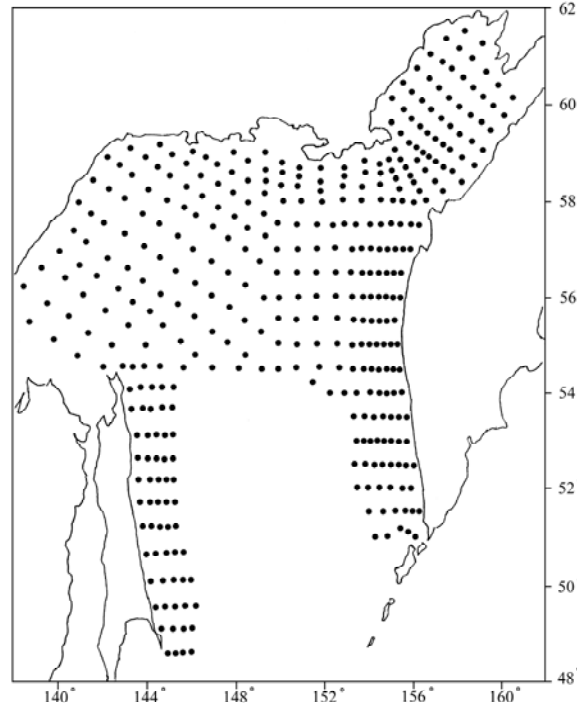
Research Objectives

- Continue **ecosystem studies**, including research in **climate and oceanography**, hydrobiology, trophology (**trophic interactions**), production biology, biocenology, conservation measures
- Continue regular research on biological resources, particularly valuable commercial species; detailed studies of their ecology and **relations to the observed changes in climate and oceanography**, and in hydrobiology background; population and production biology, biocenology, rational fishery and management of natural resources
- Continue research of aquatic biological resources that are weakly covered by fishery activity and constitute reserves (not high priority species) for Russian fishery (capelin, some flatfishes, shrimps, clams and cephalopods, echinoderms, etc.)
- Continue and expand research of **coastal areas**, improve monitoring activities, involve new resources into fishery, and develop balanced approach toward their stable utilization
- Coordinate studies on **unification and standardization** of methods of stock assessment, estimates of recruitment and TAC, research programs of various regional fishery institutions
- Continue **inter-calibration experiments** on the efficiency of various catching gears (plankton nets, trawls, pots, etc.); improve the existing methods of data collection and calculations of stock abundance of commercial species
- Compile a database that will include catch statistics in order to develop principles of **multi-species approach to fishery**... (towards EBM)
- Develop regional approach toward **coastal mariculture**, estimate capacity of farmed areas, work out technology for rearing species in artificial plans and in nature
- Develop technology for a **complex utilization** of biological resources that are subject to fishery and aquaculture

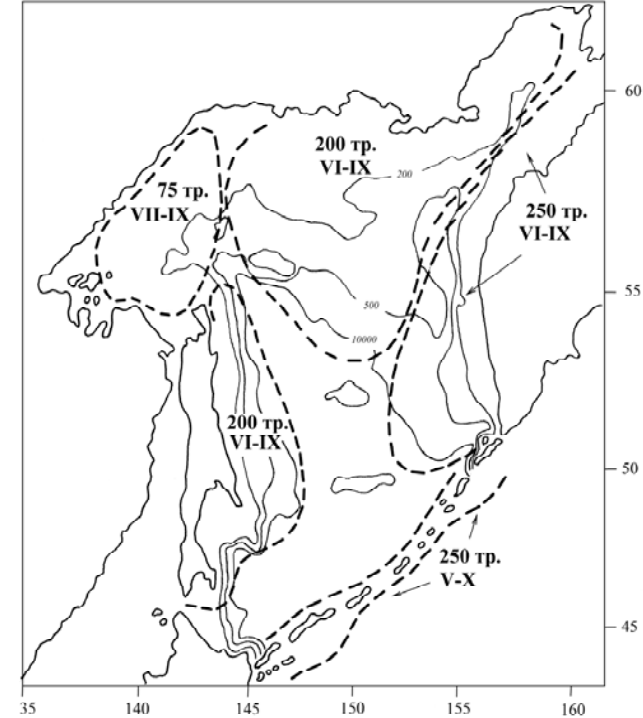
Okhotsk Sea



Pelagic surveys



Ichthyoplankton survey



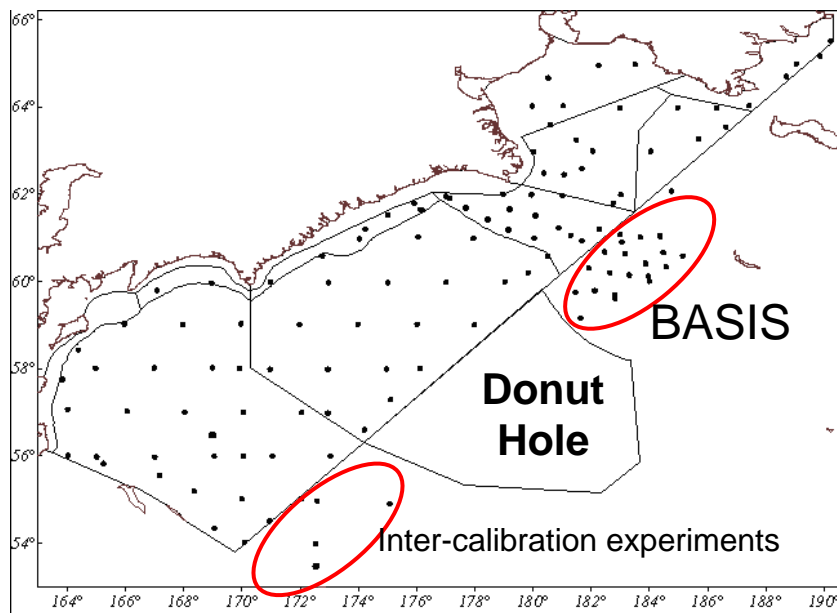
Bottom study areas

- 1) **Annual pelagic surveys**, March-June (mostly southern areas depending on the ice shield) and July-September (the entire basin), 200 stations
- 2) **Annual ichthyoplankton survey**, spring, 350-400 stations
- 3) **Bottom research**, May-October, up to 1000 stations in total (not on a regular basis, except in some areas, e.g., west Kamchatka shelf)

Cold icy seasons:

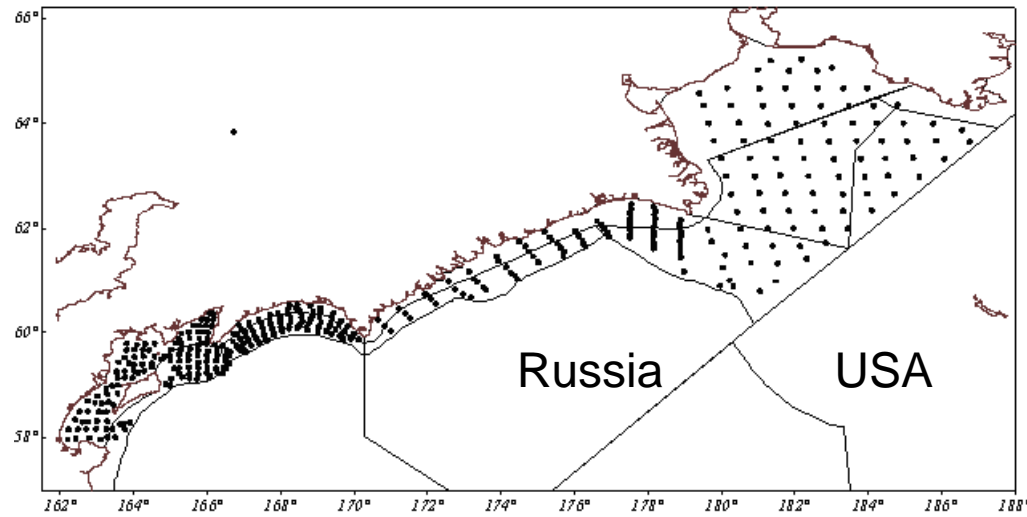
Satellite information about ice distribution

Biostatistical information from fishery vessels (catching pollock, squid, cod, flatfishes)



The scheme of summer-autumn
pelagic trawl survey

Western Bering Sea



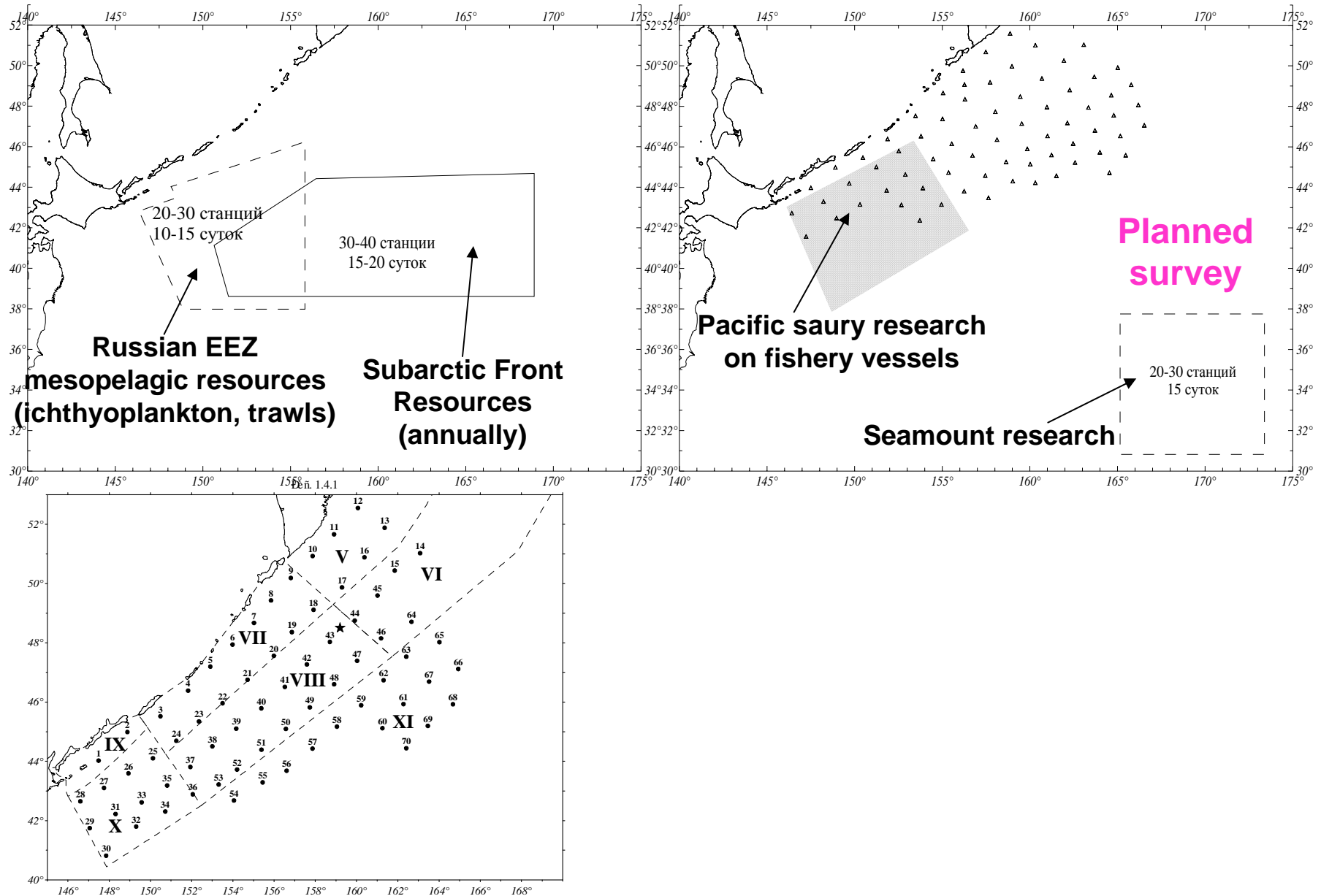
The scheme of summer-autumn
bottom trawling (and EI MWT survey)
stations

Summer through autumn (June-
November)

Regularity:

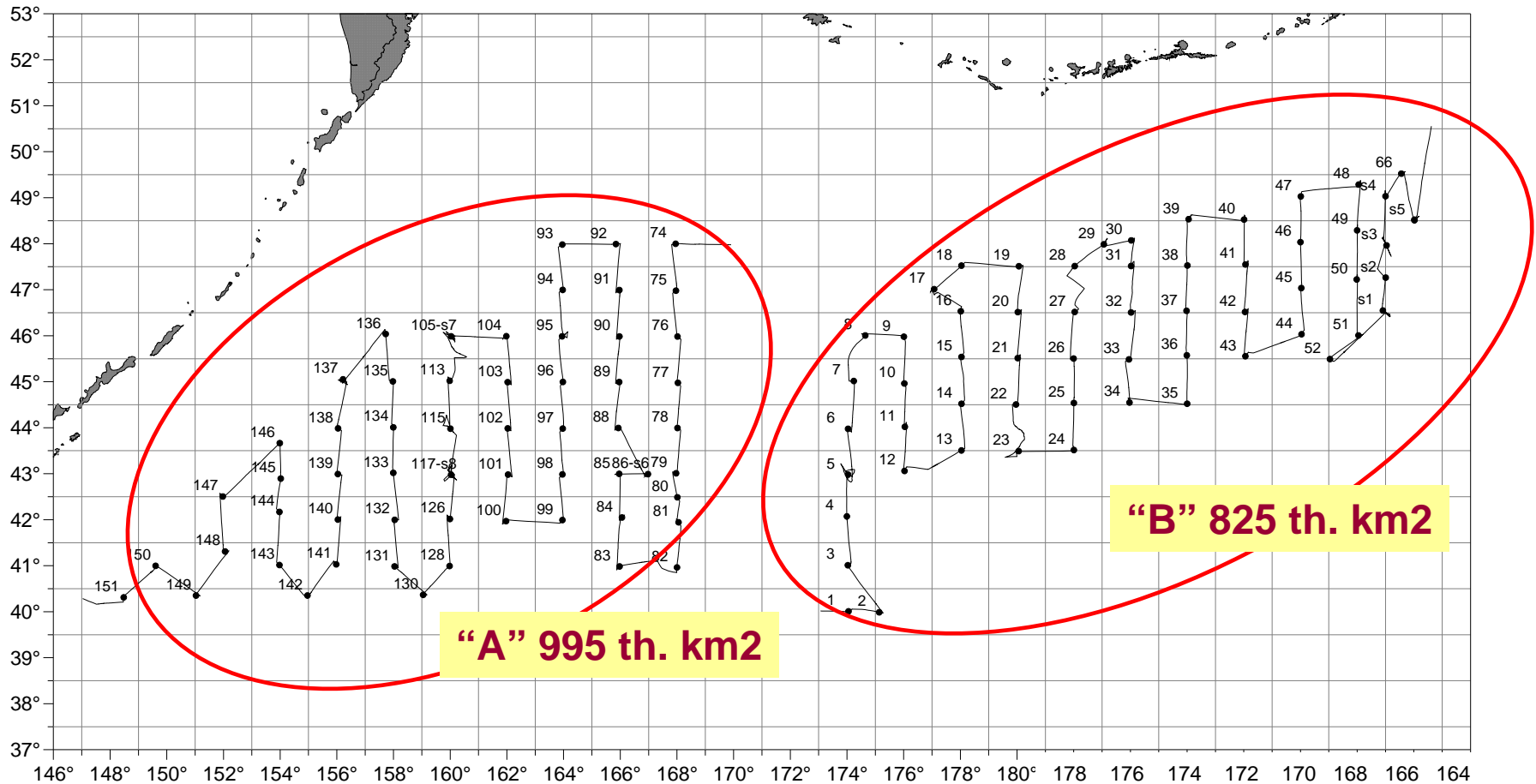
- **Pelagic** survey – on the annual basis
- **Bottom** survey – every two-three years (part of the area)
- **Coastal** surveys – every one-two years

Northwest Pacific Ocean



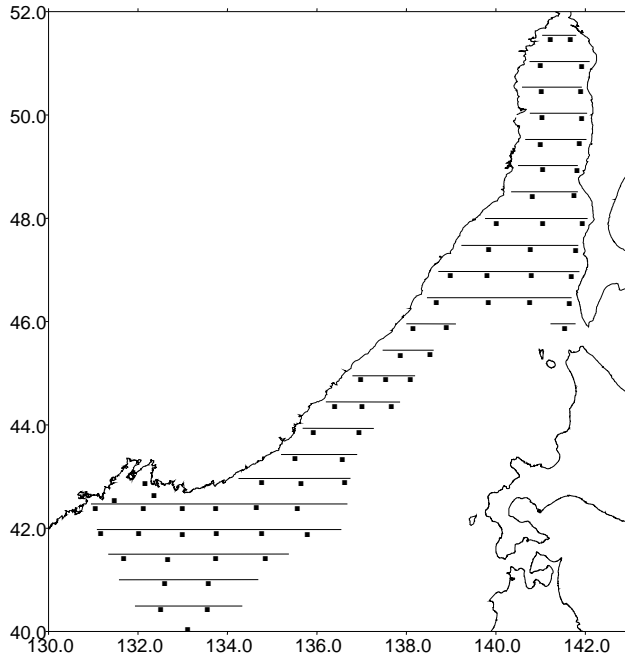
Trawling stations of RV "TINRO" in the northwest Pacific Ocean 15.06 - 17.07.2006 г.

Epipelagic trawl surveys made by TINRO-Centre in the high-seas in the NPO (February-April 2009)

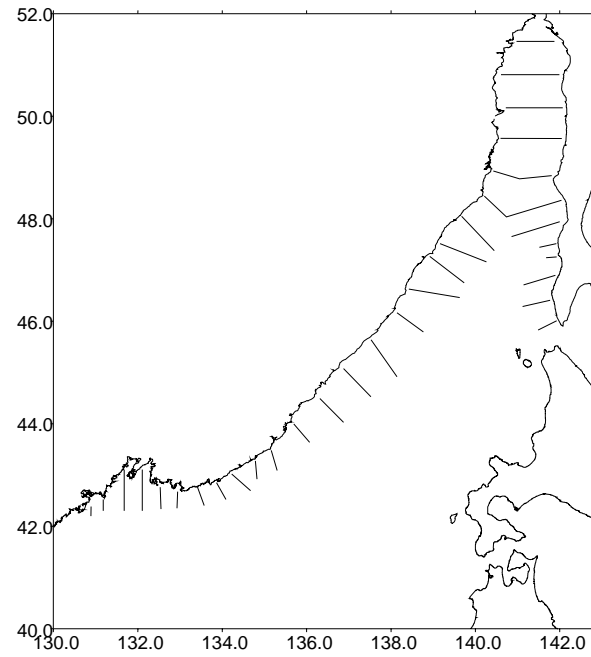


- 1) Species composition of winter epipelagic community: nekton and macroplankton
- 2) Estimates of biomass and abundance have been obtained (>30 fish species, >10 squid species, 6 species of jellyfish)
- 3) Epipelagic community was dominated by small squid in region "B", and squid, mictophids and salmonids in region "A"

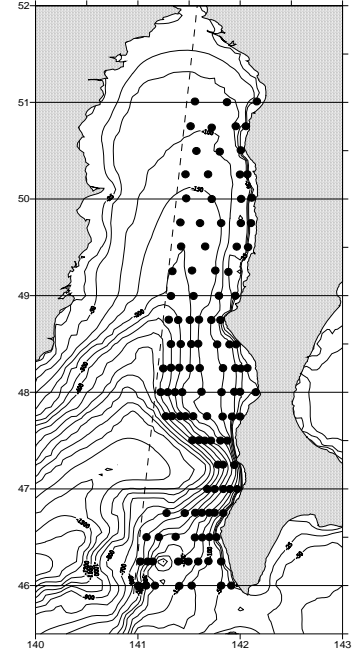
northwestern Japan/East Sea



Pelagic survey



Bottom survey



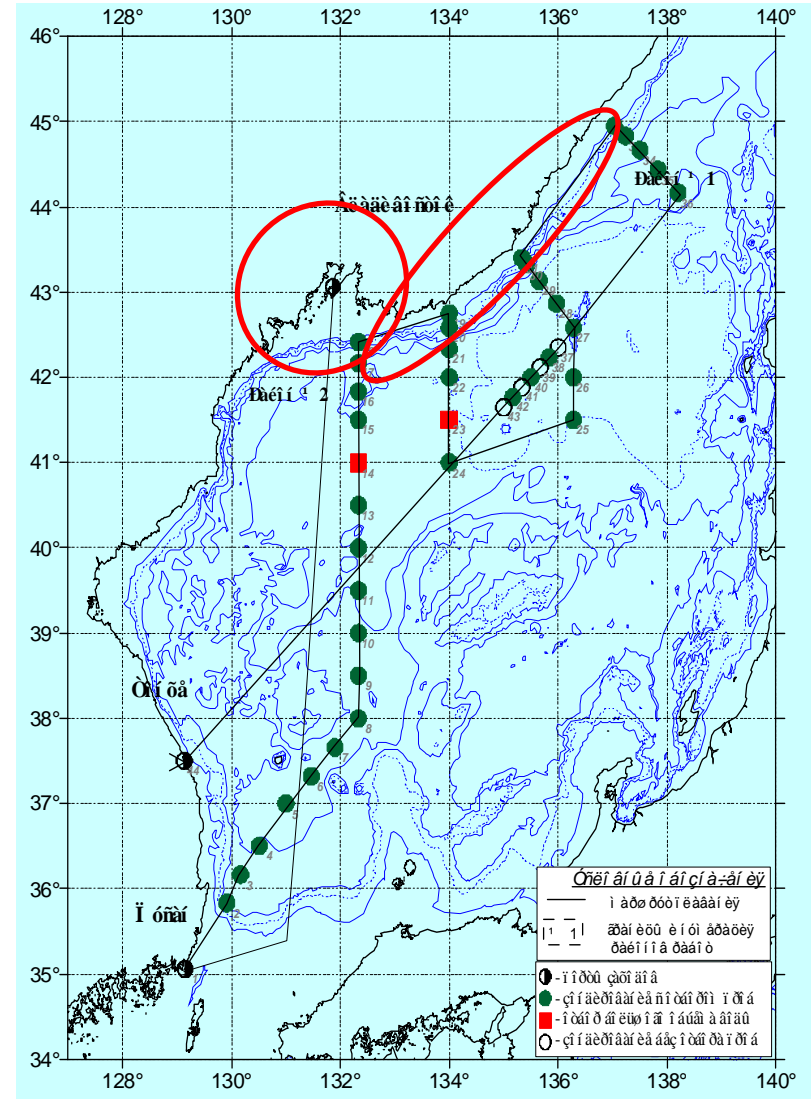
- 1) **Pelagic survey** (not on a regular basis)
- 2) **Annual bottom survey** (spring or summer, not every year, is going on right now, in March-May, 2009)

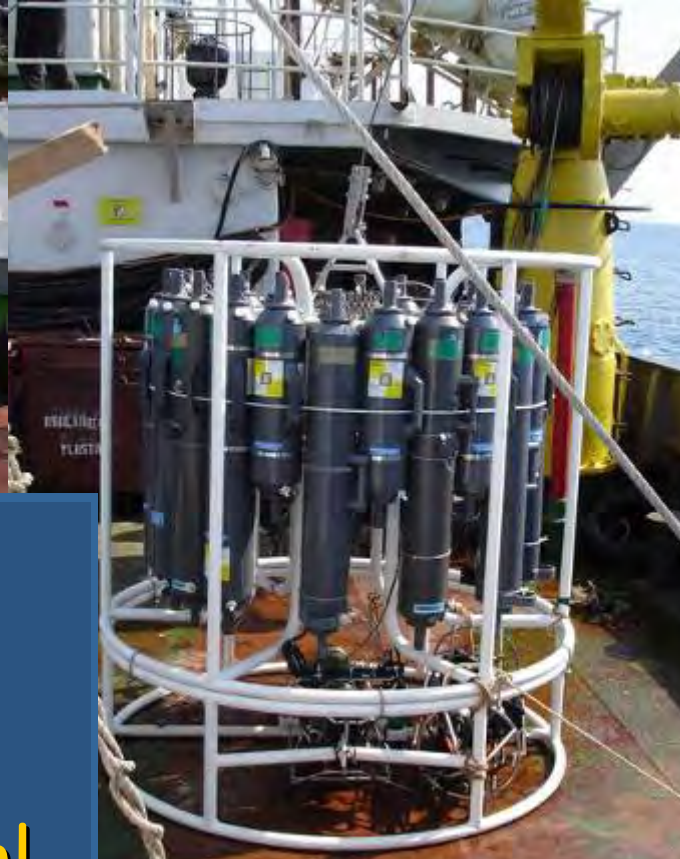
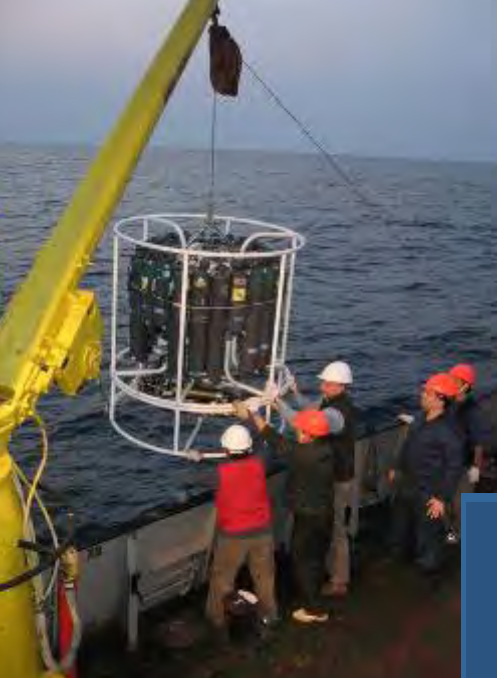
Japan/East Sea in Changes

(incl. CREAMS/PICES EAST-I program)

Main projects:

1. Monitoring for climatic changes: (water mass properties, ECS water advection, deep and bottom water formation, etc.) 2009-2010
2. Primary production multi-scale variability and its physical causes: interannual, seasonal and mesoscale
3. Geochemical processes in the bottom layer: oxygen depletion zone along continental slope
4. Physical and hydrochemical drivers of coastal ecosystem dynamics (incl. upwelling, ice formation, river discharge)



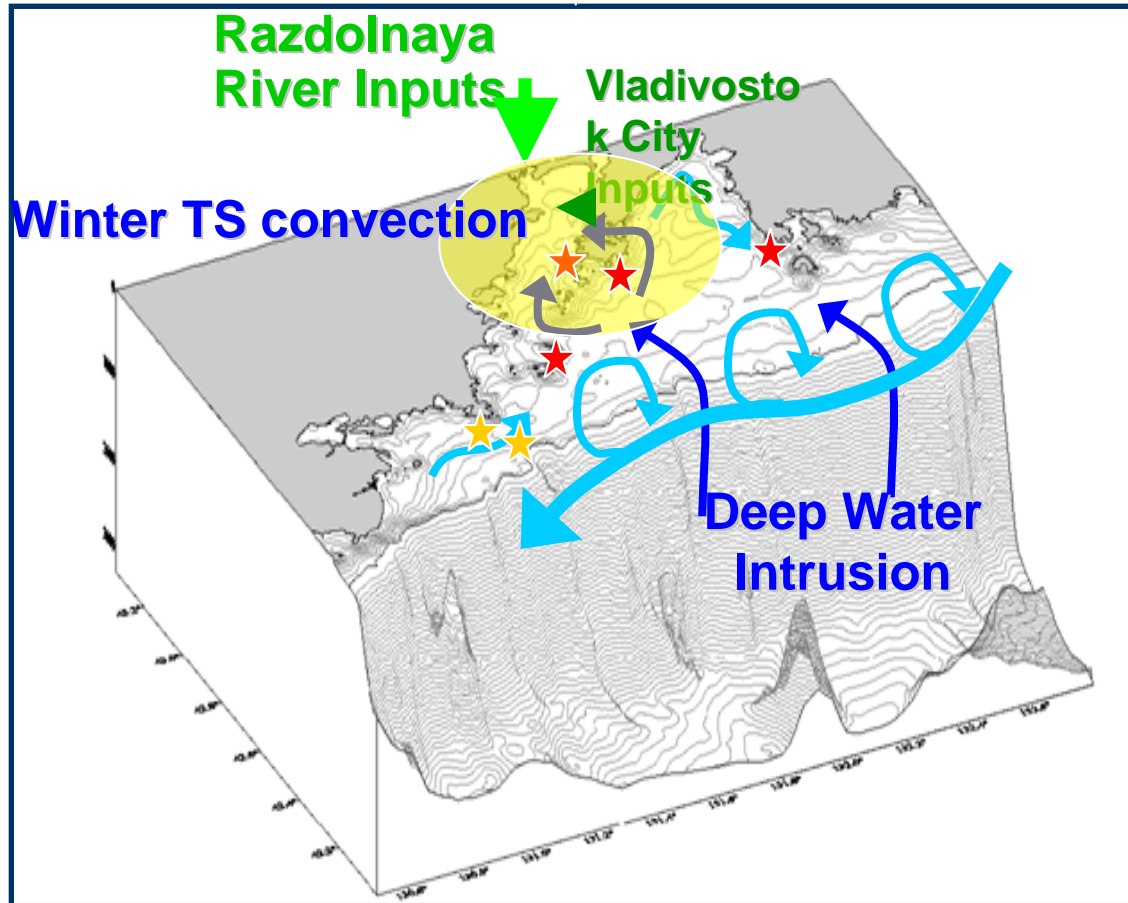


CREAMS/PICES
EAST-I program
time series for JES
Now with plankton!

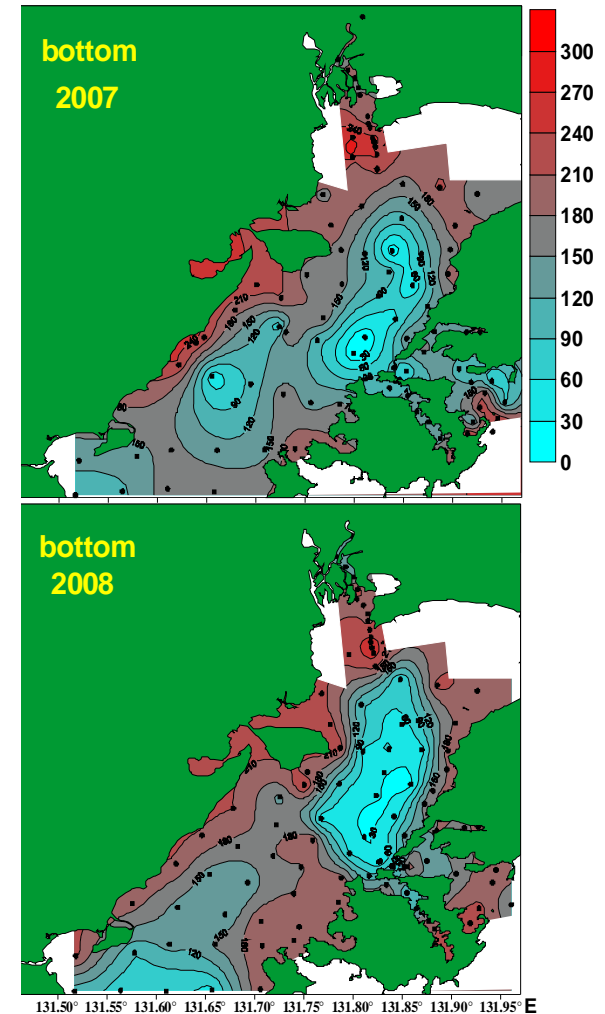


Peter the Great Bay Ecosystem Dynamics:

POI, IBM FEB RAS (Primorye Regional Admin., APEC-2012)



Key questions: eutrophication, hypoxia formation and ventilation processes under natural and anthropogenic impacts



Strong hypoxia event occurred in 2007 and 2008 summer off Vladivostok

Amur River Impacts on adjacent marine areas: climate variability, ecosystem dynamics, environmental quality

Goal: status, interactions
and variability of major
physical, chemical and
biological components
from microbes to higher
trophic levels

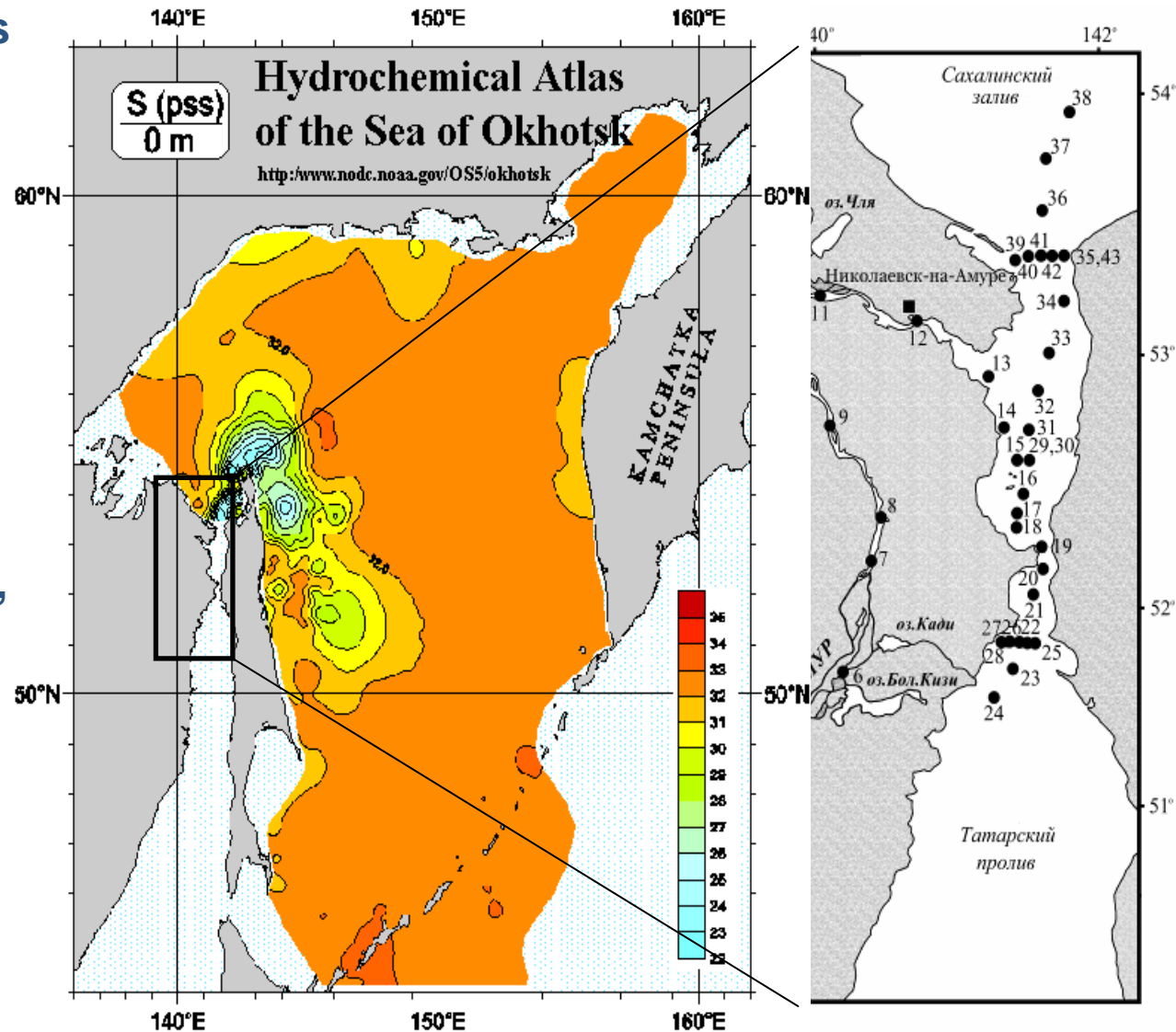
Participants: POI, IMB,
IWP FEB RAS

Completed:

5 surveys in 2005-2008,
various phases of
discharge cycle, incl. ice
winter survey

Planning:

More comprehensive
surveys, detailed
sampling in Fall 2009



Advantages

◆ **Advantages** – multi-disciplinary approach (assessment and regular study of living resources using a variety of approaches and techniques: pelagic and bottom trawl surveys, hydrobiology, ichthyoplankton and echointegration surveys; oceanographic research; basin-scale and cross-region comparisons; time-series observations using standard techniques)

◆ **Requirement** – collaborative multi-national approach

How do these studies apply to the FUTURE?

- ✦ Everything that has been, is and will be done under the Programs can be related to the FUTURE
- ✦ The studies are COMPLEX (multi-disciplinary) and describe the structure, state and function of oceanic and coastal communities, and climate and oceanography of the vast marine areas
- ✦ The studies reveal changes and trends in communities and environmental factors, and apply to human uses of marine resources
- ✦ The studies collect database on environmental and anthropogenic impacts on marine resources
- ✦ The results of the studies are used to assess trends in communities and resources, and to produce outlooks and forecasts
- ✦ The major achievements are delivered to the broad community, including public, managers, politicians, etc.

One Goal – Two objectives

- **Objective 1** – Understanding Critical Processes in the North Pacific

Three Key Questions will be addressed by **Two SSGs**

AICE – Anthropogenic Influences on Coastal Ecosystems

COVE – Climate and Oceanographic Variability and Ecosystems

- **Objective 2** – Status Reports, Outlooks, Forecasts and Engagement

This Product will be addressed by **One SSG – SOFE**

These objectives are partly intercepted (three partly intercepted circles)

Therefore, **Russia suggests** to be conservative (at least to some extent) when relating national Programs to FUTURE:

- 1) Relate Programs to Key Questions as it was initially planned (we still did not divide clearly the responsibilities of AICE and COVE)
- 2) Show the relationship of Programs to SOFE separately

Russian Research Projects relevant to FUTURE

[illegible]

Russian Research Projects relevant to FUTURE
How are they related to Status, Outlooks, Forecasts and Engagement

| Scale | Research Program (Project) | S | O | F | E |
|-----------------|---|---|---|---|---|
| Regional /Basin | Integrated Studies of Biological Resources in the Bering Sea | | | | |
| Regional /Basin | Integrated Studies of Biological Resources in the Okhotsk Sea | | | | |
| Regional /Basin | Integrated Studies of Biological Resources in the Japan/East Sea | | | | |
| Regional /Basin | Integrated Studies of Biological Resources in the Northwest Pacific Ocean | | | | |
| Regional | Status and variability of oceanographic field in the Far Eastern Seas and North Pacific | 2 | 2 | 0 | 1 |
| Regional | Ecosystem dynamics and bioproductivity in the Far Eastern Seas under anthropogenic and climate changes | 2 | 2 | 1 | 1 |
| Basin /Global | Ocean-atmosphere energy exchange anomalies and their relation to global ocean circulation and climate variability ... | 1 | 1 | 0 | 1 |
| Basin /Global | Study of marine ecosystems and development of technologies for biological resources protection ... | 1 | 1 | 0 | 1 |
| Regional | Peter the Great Bay ecosystem dynamics | 2 | 2 | 1 | 2 |
| Regional | Amur River impacts | 2 | 1 | 1 | 1 |
| Basin | Changes of the Japan/East Sea environment | 2 | 2 | 1 | 1 |

General conclusions from Russian potential investment to the FUTURE implementation

- *Key Questions – AICE and COVE business*
 - 1) Major effort is given to physical-chemical processes and ecosystem structure, state and function (COVE)
 - 2) Less effort is given to coastal issues relating to anthropogenic influence (AICE)
- *SOFE business*
 - 1) Major effort is given to STATUS and OUTLOOK
 - 2) Less effort is given to FORECAST and ENGAGEMENT