

**Intergovernmental Oceanographic Commission  
Russian State Hydrometeorological University**

***Baltic Floating University Facility***



**SUMMARY REPORT**

**RV "Sibiryakov"**

XII International Training through the Research Cruise *(July 30 - August 15, 2004)*

**Sailing catamaran "Centaurus-II"**

XIV - XVI International Cruises *(June 20 - 27; July 1 -2; August 22- September 03, 2004)*



**Saint Petersburg**

**2004**

## **RV “SIBIRYAKOV”**

### **XII INTERNATIONAL TRAINING THROUGH THE RESEARCH CRUISE**

The ‘Baltic Floating University’ project (BFU) has been launched by Russian State Hydrometeorological University (RSHU, St. Petersburg) in 1993 with the support of IOC UNESCO, and is being successfully fulfilled for over 10 years. Its main objective is to give practical training for future researchers in the area of complex investigation of oceans and seas. During the past years over 120 students and young specialists from 24 European, Asian and African countries have participated in this programme. For the majority of them, the BFU expeditions were their first experience of working in the sea.

In July and August 2004 the annual survey in the Proper part of the Baltic Sea and its coastal areas was held. The research was done according to subprogram ‘Investigation of the Nature of the World Ocean’ of the Russian Federal Program ‘World Ocean’, international IOC-UNESCO program ‘Floating University’, contract with the State Company ‘Sevmorgeo’ and some other programs. The general duration of the expedition was 17 days. Apart from professors, teachers and students from RSHU and specialists from scientific-research institutes of St.-Petersburg, the students from the Baltic countries, such as Latvia, Lithuania, Poland and Sweden, and also from Byelorussia, Spain and France took part in this expedition.

#### **TASKS FOR THE CRUISE**

The scientific tasks for the expedition onboard the RV ‘Sibiryakov’ became:

- to estimate the current state of the Baltic Sea, including the observations on hydrophysical, hydrochemical and hydrobiological characteristics;
- to describe the bottom sediments and evaluate their pollution;
- to research the changes of the vertical structure of the water masses due to the North-sea waters inflow in January 2003;
- to study the biodiversity and the spatial distribution of the phytoplankton and zoobenthos;
- to carry out geomonitoring in the Gulf of Finland and on Kaliningrad shelf;
- to research the influence of chemical munitions dumped in the Bornholm Deep on state of marine environment.

The scheme of oceanological stations in the Gulf of Finland, and in the Baltic Sea is presented on the Fig 1.

The educational tasks of the expedition were;

- to give ‘training through the research’ for students from the Universities of Byelorussia, France, Latvia, Lithuania, Poland, Russia, Spain and Sweden;
- to organise the mid-cruise seminar in Gdynya, with student presentations;
- to develop international collaboration in the sphere of environmental and marine investigations on different levels.

### **PRE-CRUISE ACTIVITIES**

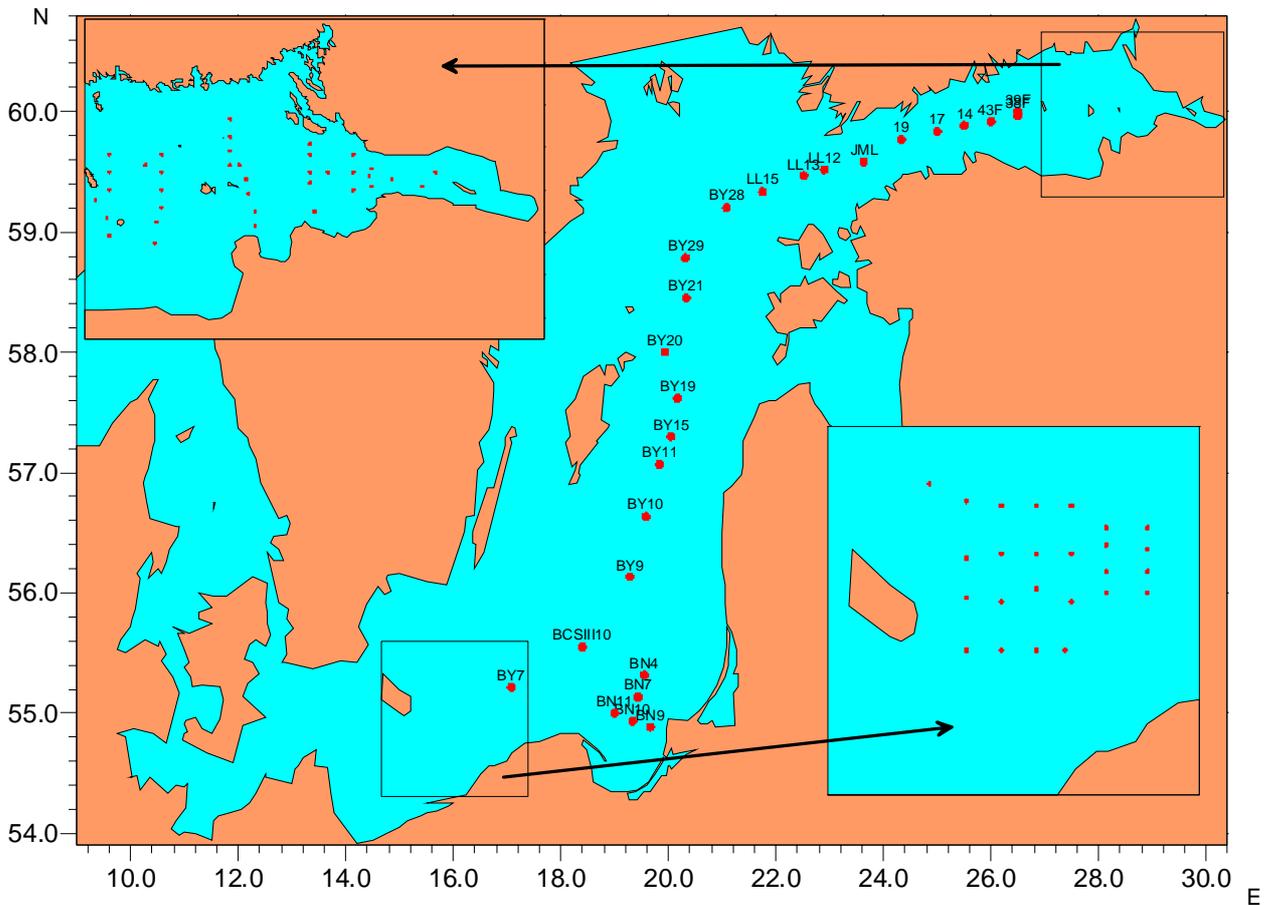
Several days before the start of cruise foreign students have had a possibility to go sightseeing around St.-Petersburg, visiting RSHU, theatres and museums. Students of RSHU have held several excursions to the most beautiful places of the city, entered on the UNESCO World heritage list. By this, through the intercultural exchange, BFU project contributes to the UNESCO programme “World culture”.

### **THE CRUISE**

**Activities in general.** During the July, 29 the laboratories were prepared to the scientific work in the open sea. On August, 1 the training station was made. On August 2-3, hydrological stations were made in the extremely eastern part of the Gulf of Finland. On August, 4 the RV started to work on the axial trans-section in the western part of the Gulf of Finland, and then – in the Baltic Proper. On August, 5 the last station on the axial trans-section in the Baltic proper was made, and the RV followed to the Kaliningrad shelf region for making there complex hydrological stations, and STD-probes. On August, 7 the RV followed to the Stolpe Channel, and Bornholm polygon. By the way, in the shallow part of the Gulf of Gdansk, the special experimental work was done with using the acoustic equipment of the polish and Byelorussian PhD-students. Then, on the Bornholm polygon, where the German chemical munitions was dumped after the WW II, the sound probes were made, and special samples for the phosphorus and silicates determination were collected. By that, the scientific program of the cruise was fulfilled; 91 oceanographic stations were made.

Under supervision of the specialists students have taken direct part in taking the samples, have worked in onboard laboratories (geology, chemistry, hydrology, biology, meteorology and data processing), getting the experience and practical skills in methods and technique of the marine research, they also have taken part in processing and preliminary analysis of the data. During the lectures onboard “Sibiryakov” professors have told the students about the main problems of the Baltic Sea and the ways of their solution to reach sustainable development and conservation of the environment of the sea. The students attended daily lectures and seminars, made presentations of their own scientific projects,

contributed significantly to the discussion of preliminary results of the expedition during the seminar in Sopot.



**Fig. 1.** Scheme of stations in the Baltic Sea and in the Gulf of Finland. RV “Sibiriakov”.

**Lectures.** The lectures and presentations given by both professors and students onboard the vessel covered the significant variety of topics.

Prof. G. Frumin (RSHU, Russia)	<ol style="list-style-type: none"> <li>1. Global ecological problems</li> <li>2. Environmental problems of the Baltic Sea</li> <li>3. Ecological and health risks</li> </ol>
Prof. A. Rybalko (‘Sevmorgeo’, Russia)	<p>Sedimentation processes in the Baltic Sea Problems of marine geo-environment in the GOF</p>
Prof. G. Frumin, and Prof. A. Rybalko	<p>Chemical munitions dumped into the Baltic Sea</p>
Dr. A. Maximov (Zoological Institute, Russia)	<ol style="list-style-type: none"> <li>1. Physical geography of the Baltic sea (video film)</li> <li>2. Biology of the Baltic sea (video film)</li> <li>3. Eutrophication in the Baltic Sea (video film)</li> </ol>
Dr. A. Averkiev (RSHU, Russia)	<p>Main features of hydrological regime of the Baltic Sea</p>

Dr. R. Vankevich (Centre for Ecological Safety, Russia)	1. Introduction to the oceanographic information system 2. Satellite data processing 3. Basics of GIS 4. Field data processing
Dr. D. Gustoev (RSHU, Russia)	Water masses in the Baltic sea and methods of their Identification
Dr. T. Eremina (RSHU, Russia)	Investigations of the coastal areas and Baltic sea proper within the framework of the BFU project
Senior scientist A. Ushakin (RV “Sibiriakov”)	Scientific expeditions to Arctic and Antarctic
Cacicedo Faroszynski Alejandro (University of Cadiz, Spain)	Research groups in Marine Science Faculty at the University of Cadiz
Andrea Wallin (University of Uppsala, Sweden)	The influence of the winter climate on the summer situation in large lakes
Milagrosa Oliva (University of Cadiz, Spain)	Toxicity bioassays
Czerwinski Ivone Alexandra (University of Cadiz, Spain)	Fish population dynamics research group in Cadiz university
Irina Ovcharenko (University of Klaipeda, Lithuania)	New distribution of the Northern Ponto-Caspian mysids

### **Seminar in Gdynya/Sopot.**

The important element in the BFU work is holding the annual inter-cruise scientific seminars, which were carried out before in those cities of the Baltic region, which the RV had visited, including Stockholm, Tallinn and Helsinki. This time the seminar took place on August, 10 in the Institute of Oceanology of the Polish Academy of Sciences (IO PAS, Sopot) during the stay of “Sibiryakov” in Gdynya. On the base of the collected and studied materials, students have made several reports. The researchers from IO PAS also made their presentations, after which there was an excursion along the institute’s laboratories and departments. Moreover, the trip to Hel spit was organized where Gdansk University Marine Station is situated. The specialists of the station have acquainted the BFU expedition participants with the work of laboratories, have showed them a museum and aquarium with the Baltic seals, they also have told about the work on the seal population restoration in the Gulf of Gdansk. Last day of the stay in Gdynya, there was an excursion to the Marine aquarium. Foreign students that had left the vessel in Poland were saying their good-byes warmly and with tears to “Sibiryakov”, to those, going again to the sea.

<b>WORDS OF WELCOME</b>	
Dr. Tatyana Eremina <i>RSHU, Head of the Expedition</i>	OPENING THE SEMINAR
Captain Vadim Sharomov <i>Head of Navy Hydrometeorological Service of Russian Federation</i>	CONTRIBUTION OF NAVY HYDROGRAPHICAL SERVICE OF RUSSIAN FEDERATION TO THE BALTIC FLOATING UNIVERSITY PROJECT
<b>GUESTS SPEECHES</b>	
Prof. Lars Ryden <i>Uppsala University, Director of the Baltic University Program</i>	INTERNATIONALISATION OF EDUCATION IN THE BALTIC SEA REGION, AND THE BALTIC UNIVERSITY PROGRAM
Leif Litsgård <i>Chairman of EURora</i>	EURORA – EDUCATION FOR A LIVING BALTIC SEA
<b>PRESENTATIONS BY THE BFU STUDENTS</b>	
Alexander Smirnov Denis Gladikov	PECULIARITIES OF THERMOHALINE STRUCTURE OF WATERS ON HELCOM SECTION IN THE BALTIC SEA IN AUGUST 2003
Inês Serra Martins Carlos Gonzalez	THERMOHALINE STRUCTURE OF WATERS ON MERIDIONAL SECTIONS IN THE GULF OF FINLAND
Lidia Alexandrova Yevgeny Morozov	INFLUENCE OF THE NORTH SEA WATER INFLOW ON OXYGEN REGIME OF DEEP LAYERS OF THE BALTIC
Paulina Pawlak Lubomira Blom	NITRATES AND SILICON DISTRIBUTION IN THE BALTIC PROPER
Natalia Guslina Alexander Storonkin	INFLUENCE OF THE NORTH SEA WATER INFLOW ON THE NUTRIENTS DISTRIBUTION IN DEEP LAYERS OF THE BALTIC
Maria del Mar Ruiz Francisco Arjona	SPATIAL DISTRIBUTION OF TROPHIC CONDITIONS IN THE BALTIC SEA
Holly Coombes	RELATIONSHIPS BETWEEN CHLOROPHYLL-A CONCENTRATIONS AND CHEMICAL VARIABLES IN THE BALTIC SEA
Ewelina Ferchow	ESTIMATION OF BOTTOM SEDIMENTS AND NEAR-BOTTOM WATERS POLLUTION IN THE MAIN SEDIMENTATION BASINS OF THE GULF OF FINLAND
Alexandra Ershova	GEOECOLOGICAL RESEARCH IN THE AREA OF BORNHOLM POLYGON
Lubomira Blom	DRINKING WATER IN SWEDEN

## **SCIENTIFIC RESULTS**

**Hydrological conditions.** During the cruise, the weather was sunny and calmly, with the speed of wind not more than 5 m/sec. Despite the intensive absorption of solar radiation, the temperature of the surface layer was not more than 21°C (18 – 19 °C in average) because of the cold weather in July. Vertical T, S-profiles and sections demonstrate significant stratification. It is easily to recognize the thin (not more than 10m) upper mixed layer (UML). Between 10 and 30 m, the summer thermocline is located, with gradients 0,7 – 0,8°C/m The underlying cold intermediate layer (CIL) is to recognize on the stations with the depth more than 50 m. Deeper than 50 m, the near-bottom water is located with the salinity up to 7,5 ‰. In the Gulf of Finland, the influence of the strong inflow and “pushing” of the North-sea

waters in January 2003 was reduced through the winter convection, and the vertical intermixing. Generally, the TS-regime of the 2004 is near the average situation.

**The oxygen concentration** in the UML is usually near the situation of the saturation. In the near-bottom layers, the oxygen concentration is decreased, sometimes- up to the analytical zero. In the Gulf of Finland in 51,1% of the samples the oxygen saturation was less than 50%. On the axial trans-section from the Gulf of Finland to the Baltic proper in the near-bottom layer the oxygen deficit was observed; in 6 bottles from the 13 collected samples, the oxygen saturation was less than 10%. The same situation was observed on the Kaliningrad polygon. On the Bornholm polygon, in the 10 bottles from the 25 deep-water samples the oxygen saturation was less than 10%. It is obviously, that in the Baltic sea depths periods of renewals of the deep water are changing with the periods of the stagnation, what leads to the deficit of the oxygen, and accumulating of the hydrogen sulphide. Hydrogen sulphide was found, for example, on the stations BN 10, BY 15 and BY 11 in the near- bottom layers.

**The concentration of the nitrates and phosphates** in the UML is low (near the zero point) because of their utilization by phytoplankton. The highpoint of its “blooming” was in July, so during the cruise the rests of the dead organic material were to observed near the surface in forms of spots and strips. Under the thermocline the concentration of the phosphates is increasing because of the processes of regeneration of organic materials, and is maximal near the bottom (up to 281,7 mkg/l).

**The concentration of silicates** is high, what is based on the high river inflow. The maximal concentration is in the deep water, where the organic material is accumulated and mineralized.

**The strong correlation between hydrochemical (alkalinity) and biochemical (concentration of the chlorophyll “a”) parameters** was found. The coefficient of the pair correlation for 47 observations is 0,858. It is shown that the increasing of the alkalinity of the surface water leads to the decreasing of the chlorophyll “a” concentration.

**Geocological situation** was analyzed on the 15 stations. In the Gulf of Finland it was changed to the worse because of the “pushing” of the near-bottom water from the Gotland depth and northern Baltic in 2003. The oxygen layer of the sediments was reduced, and the negative potential of the surface sediments layer was increased, what are the results of the decreasing of the dissolved oxygen resources in the water layers, and of the accumulation of organic and mineral components near the bottom. In the deep water of the Russian part of the Gulf of Finland the intensive flocculated silt and the free hydrogen sulphide appeared.

The evolution of the deep and shallow parts of the Gulf of Finland is going independently. They are separated by the border near the Seskar Island. The development of the deep part of the Gulf depends from the water exchange with the Baltic proper, particularly from the “pushing” of the water from the Gotland depth. The development of the shallow part depends mostly from the coastal sediments.

In the central part of the Baltic Sea, stations were located mostly in the anaerobic zone. For the Gotland depth it was established, that the near-bottom conditions were stable during

last three years. Because of that, all changes in the concentrations of heavy metals and other pollutants here are connected with the anthropogenic activities, what gives to the monitoring data a special value.

On the Kaliningrad polygon the physical and chemical conditions of the sedimentation are changed to the worse in comparison with 2003. All the samples are characterized by strongly negative redox-potential, what demonstrates the possible risk of the removing of dangerous chemical components from the silts into the near-bottom water.

On the Bornholm polygon the thin film of the aerobic layer was found over sediments; but the negative potential of sediments was too high, so the ecological conditions were estimated as non-favourable.

**Intensity of photosynthesis** was varied from 0,05 until 0,942 g C/m<sup>3</sup> pro day. Maximal intensity was registered in the eastern part of the Gulf of Finland. The intensity was decreased from eastern to the western part of the Gulf of Finland. In the open part of the Gulf of Finland, and in the Baltic proper the intensity was not more than 0,1 g C/m<sup>3</sup> pro day.

**Primary production** is connected not only with the intensity of photosynthesis, but with the water transparency, too. Maximal primary production was found in the Gulf of Finland (0,694 g C/m<sup>2</sup> pro day) and Gulf of Gdansk (Kaliningrad polygon) (0,813 g C/m<sup>2</sup> pro day). For the Baltic proper, the primary production is relatively low (0,3 – 0,5 g C/m<sup>2</sup> pro day).

**Distribution of macrozoobenthos** is extremely non-regular. In the shallow part of the Gulf of Finland the density of the populations of benthic organisms is relatively high – up to 2 – 15 thousands ex/m<sup>2</sup>, mostly because of the high number of *Olygochaeta*. The important role there belongs to the introduced from the North America *Polychaeta* species *Marenzelleria viridis*. At the same time, the fauna of the deep parts of the Gulf of Finland, and of the Baltic proper is very poor. On the most stations benthos was not found. In the Baltic proper, the border for the distribution of benthic organisms is limited by the isobata of 70 m.



**Fig. 2.** Pre-cruise activities at the RSHU



**Fig. 3.** Hydrochemical analysis in the sea



**Fig. 4.** Visit to IO PAS after the Seminar



**Fig. 5.** Work on the hydrological station



**Fig. 6.** At the Marine Station in Hel



**Fig. 7.** In the Marine Aquarium in Gdynia

## **SAILING CATAMARAN “CENTAURUS-II”**

### **XIV - XVI INTERNATIONAL CRUISES**

#### **1. XIV – XV cruises, and participation in public affairs**

##### **General**

The cruise of the CENTAURUS-II to Germany and participation in public undertakings have been conducted within the framework of IOC/UNESCO “Baltic Floating University” Facility being performed by the RSHU. This cruise was realized on basis of invitation to take part in one of the largest North Europe summer arrangement – *Kieler Woche* (Kiel Week) – during June 20-27, 2004. This invitation was for the third year successively obtained by the Academic Foreign Service of the Kiel University (*Akademisches Auslandsamt (AAA) der Christian Albrechts-Universität zu Kiel*) and non-commercial Group for North and Baltic Sea Environment Protection (*Hohe Teide. V. - Umweltgruppe für Nord- und Ostsee*). Moreover, the catamaran was invited in 2004 to visit the Baltic research institute (Institut für Ostseeforschung) in Warnemünde and take part at the International Rostock Convention „Sailing and the Environment in Coastal Areas“ („*Segelsport und Umwelt im Küstenbereich*“).

Participants:

##### Researchers:

1. Prof. A.V. Nekrasov, RSHU;
2. G.I. Bashkina, RSHU;
3. S.I. Vilenkin, RSHU;
4. V.M. Merlin, RSHU;
5. S.A. Tyuryakov, RSHU;
6. V.Y. Tchugayevich, Kaliningrad University;
7. V.V. Grigoryeva, St. Petersburg State University.

##### RSSU students:

8. L.A. Morozov;
9. A.A. Barteneva;
10. A.S. Kurilo;
11. N.V. Savchuk;
12. M.N. Nikolaev.

##### Foreign students:

13. Signe Geertsen (South Denmark University);
14. Simone Nürnberger (South Denmark University);

15. Xavery Piotr Kuligovsky (Olborg University, Poland).

Crew:

16. S.A. Kharkov, captain;

17. A.V. Korovin, mate;

18. O.S. Joubaba, sailor.

### **Participation at the Kiel Week**

The programme of the catamaran's and its staff's participation in the Kiel Week was focused on environmental knowledge dissemination and local inhabitants (above all the pupils) acquainting with methods of environment studying and protection. This programme was developed together with the Hohe Tied and the representatives of the Applied Ecology Centre (Sillamäe, Estonia) and the Cadiz University (Spain) and included the following kinds of activities:

1) Everyday two familiarization studies on the subject of the ecological state of the Baltic Sea with the groups of visitors (mainly school pupils from Kiel and its outskirts) performed together with the scientists from the Kiel University, the Institute of Marine Research and the Hohe Tied Society. The studies included lectures and demonstration exercises on the Baltic Sea model as well as training cruises with the catamaran in the Kieler Förde: in the mouth of the Schwentine River and in the Falkenstein region where the measurements and sampling (water, sediments, plankton, benthos) were carried out. Finally, the sampling analysis and computerized demonstration of results were presented to the visitors who have been involved in all the kinds of works. These studies were performed by the members of the expedition together with Dr. Thorsten Reusch, Mr. Stefan Hansen, Miss Nicola Horn, Miss Anneli Ehlers, Mrs. Nicole Martin and others (Hohe Tied Society) as well as Mr. Erhard Jansson (Sillamäe Applied Ecology Centre) and Miss Monica Ribas Saez (Cadiz University). Among the visitors there were Mr. René Heise (ASD Sensortechnik GmbH), Mrs. Christine Spreen (Schleswig-Holstein German-Russian Friendship Society), Dr. Winfrid Schramm (Institut für Meereskunde), Mr. Plaas (International Journal "Multihulls") and

2) By a previous appointment, the expedition members visited the Leibniz Institute of Marine Sciences (IfM-GEOMAR). During this attendance, a meeting took place with the representatives of the International Department of the IfM-GEOMAR Dr. H. Kassens and Dr.

K. Tuschling consecrate to the questions of possible co-operation of the IfM-GEOMAR and the RSHU in the field of the oceanological education and research. The representative of the CAU Academic International Service Mrs. M. Schmode as well as Miss Horn and Mrs. Martin took part in this meeting. A proposal to try to realise, as a first step, a cooperation between the BFU and POMOR educational programmes by laying special emphasis on BFU training-research cruises.

3) By invitation of the Institut für Meereskunde, the expedition members took part in the series of lectures "Planet Earth" being conducted during the Kiel Week in the IfM Aquarium. Prof. A. V. Nekrasov (RSHU) gave the lecture titled "Sea level changes and their influence on the Coastal Zone life conditions" and V.G.Grigoryeva delivered the lecture "Role of international cooperation in stable ecological tourism developing". Both the lectures have been shown on the TV daily programme devoted to Kiel Week scientific measures.

4) On June 25 the members of Centaurus expedition were invited to participate in an exhibition onboard the RV Alkor (IfM-GEOMAR) consecrate to oceanological research. The information about the Baltic Floating University, its history, structure and activities, expeditionary investigations performed by the vessels Sibiryakov and Centaurus, basic results and wide international relations have been presented on three posters as well as a poster devoted to history of the Saint-Petersburg State University and problems of ecological tourism was also demonstrated.

5) Among the other events of the Kiel Week the following arrangements should be noted:

- Visiting the R/V Alkor (IfM) and training sailing ships Krusenstern (Kaliningrad) and Khersones (Kerch, Ukraine);
- Participation in the friendship evening organised by the German-Russian Society in Kiel (Local division of German Friendship West-Ost Society, Schleswig-Golstein);
- Participation of Centaurus in the General Sailing Parade (Windjammerparade) on the occasion of the end of the Kiel Week.

### **Warnemünde attendance**

Centaurus' visit to Warnemünde was carried out on July 1-2 by the invitation of the Deputy Director of the Baltic Sea Research Institute (Institut für Ostseeforschung

Warnemünde, IOW), Dr. J. Warff. On the morning 1 July, the expedition members have visited IOW, acquainted with its laboratories and research methods, and held a discussion with Dr. Warff concerning the possibilities of cooperation between IOW and RSHU. The observational data (obtained by Centaurus on its way from Kiel to Warnemünde) have been delivered to the Oceanographic Department of the IOW. In the afternoon, the group of IOW specialists headed by Dr. Warff visited the Centaurus and has acquainted with the opportunities of its use in the shallow coastal areas.

On the 2<sup>nd</sup> of July the expedition members took part in the International Rostok Meeting “Sailing sport and Environment in the Coastal Zone”. On the section consecrate to assessment of the boating impact upon the Baltic coastal zone environmental, a communication has been made by V.G. Grigoryeva (SPSU) about the similar problems in the Russian section of the Baltic coast. A number of various contacts has been established with the representatives of WWF and different environmental organizations of Rostok and Warnemünde.

## **2. XVI cruise: visit of the ‘Centaurus-II’ to Gotland**

### **General**

During the period from August 22 till September 03 on invitation from the Gotland University (Visby, Sweden) the catamaran ‘Centaurus-II’ sailed from St. Petersburg to Gotland with the aim to represent RSHU on international seminar ‘Living at the Coast’ held by the CoNet CZA21 Association.

Participants:

#### Researchers:

- 1 G.I. Bashkina, RSHU;
2. S.A. Tyuryakov, RSHU;
3. S.Yu. Vinogradov, RSHU;
4. L.V. Alexandrova, RSHU;
5. V.V. Grigoryeva, St. Petersburg State University.
6. E.N. Plink, RSHU

#### Students:

7. E.N. Chernova, St. Petersburg State University;
8. F.G. Bashkin, RSHU;
9. A.S. Kurilo, RSHU;
10. N.V. Savchuk, RSHU.

On the way from St. Petersburg to Visby and back measurements, observations and sampling was performed from the board of the catamaran.

## **Activities on Gotland**

### **1. Study visit to some interesting Gotland spots on the theme Coastal Lifestyles**

The study visit was organized by the Municipality of Gotland for all the participants of the seminar and for the group that arrived by the catamaran 'Centaurus-II'

The following places were visited:

1) Kneippbyn Tourist attraction – one of the leading tourist attractions on Gotland. Here one can find Summer and Waterland, cottages, camping, hotel and of course Pippi Longstocking and the real Pippihouse. One of the co-owners was talking about development of the complex and the main problem, that is development of business in conditions of strict local environmental legislation.

2) Tofta Gården – a hotel and conference company with environmental profile

At Tofta Gården environmental awareness is a paramount. Returnable packaging, recyclable materials and reduction of disposable articles are some of the measures taken. Tofta Gården newly invested in solar panels as a source of heating water for the restaurant and 30 cottages. Their goal is to have an energy center that will supply all the buildings with solar energy.

3) Näs Wind power Park

Näs is the largest park of wind turbines on Gotland (85 of 150 Gotland turbines are located there, including 2 largest ones of 3000kW each). About 20% of the electricity consumed on Gotland comes from wind power. The end of 2006 plans a double increase of energy produced by wind turbines.

4) Eksta coastal nature reserve

Eksta coast is one of Gotland's 85 nature reserves. Eksta is an example of unspoiled coast with limestone beaches, wind-bent pine forest and a spectacular view towards the two Karlsislands, which are unique bird reserves. On Gotland a general coastal protection zone of 10meters from water exists where all building activities and a lot more is prohibited.

### **2. Seminar 'Living at the Coast' of the CoNet CZA21 Association (Coastal Network Coastal Zone Agenda 21)**

### *Background and tasks of the seminar*

CoNet CZA21's purpose is to promote sustainable development in the communities and regions on the coast of the Baltic Sea, as well as in the wider Baltic Sea Region. Thereby Local Agenda 21 and coastal zone management are seen as some of the major instruments for achieving that goal.

This CoNet CZA 21 seminar focused on coastal lifestyles. At the seminar in Gdansk (August 2003) the topic was sustainable tourism and the Hanko seminar (February 2004) dealt with coastal zone management, including the ICZM implementation. This seminar was to add another dimension to the efforts on creating sustainable communities and regions around the Baltic Sea.

### *The main topics of the seminar*

- Coastal sustainable lifestyles
- Sustainable consumption
- Local produce
- Awareness raising on sustainable development
- Local Agenda 21 and Coastal Zone Management

The seminar offered a platform for

- experience exchange on ongoing projects and activities,
- creating new contacts and developing joint actions.

### *The seminar participants*

8 countries were represented on the seminar: Denmark, Estonia, Germany, Latvia, Norway, Poland, Russia and Sweden. The seminar was attended by 23 participants + 20 students from Gotland University + 5 representatives of the RSHU expedition.

The seminar was held in the building of Gotland University.

A PhD candidate at RSHU S.A. Tyuryakov has presented a report 'Expedition activities of RSHU as a platform for awareness raising on marine environment'.

Ms. V.V. Grigoryeva spoke about 'International cooperation for sustainable development of ecological tourism'.

### **3. One-day educational cruise of the catamaran 'Centaurus-II'**

Gotland University has demonstrated high interest to the RSHU activities within the Baltic Floating University. As a result a program was developed (which included CTD sounding, sediments and plankton sampling and the samples express-analysis) and a short

educational-demonstration cruise was organised for the Gotland University students onboard the catamaran.

The 4hours cruise was carried out within 5miles from Visby. The group of Gotland University consisted of 15 students, mainly biologists. The group was headed by the Director of studies in biology at Gotland University Dr. Bertil Widbom.

The program of the cruise was to full extent implemented by the RSHU group with direct participation of RSHU and SpbSU students.

8 members of the CoNet Association has joined the cruise.



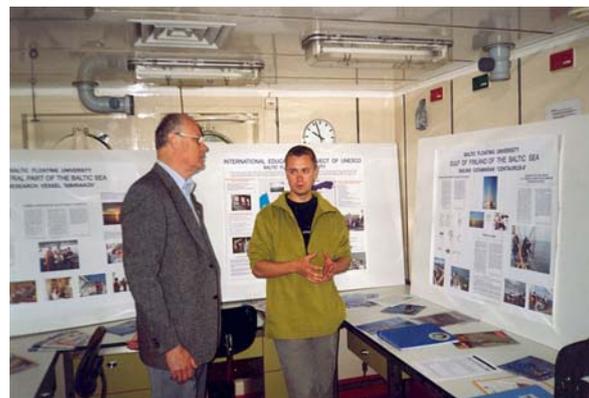
**Fig. 8.** Seminar in Warnemuende



**Fig. 9.** Pre-cruise instructions on Gotland



**Fig. 10.** Plancton sampling near Gotland



**Fig. 11.** Presentation in Kiel



**Fig. 12.** In the University of Kiel



**Fig. 13.** "Kieler Woche" – Week of Kiel