

INFLOW Interim Report No.6

INFLOW CRUISE REPORT:

NEGoF 2009

The RV Ladoga 4th July – 7th July 2009



<p>Title</p> <p>INFLOW Cruise Report</p> <p>NEGoF 2009, the RV Ladoga 4.-7.07.2009</p>	<p>INFLOW Interim Report No. 6</p>		
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<p>Final Report</p>	<p>VZ, AK</p>	<p>DR</p>	<p>1.2.2010</p>
<p>Draft Report</p>	<p>VZ, AK</p>	<p>DR</p>	<p>8.8.2009</p>
<p>Description</p>	<p>Checked</p>	<p>Approved</p>	<p>Date</p>
<p style="text-align: center;">Key words</p> <p>Palaeoenvironment, marine sediments, climate change, Holocene, INFLOW-project, BONUS-research program, Baltic Sea, Eastern Gulf of Finland</p>			

VSEGEI = A. P. Karpinsky Russian Geological Research Institute, St. Petersburg, Russia
 GTK = Geological Survey of Finland, Espoo, Finland

This report should be cited as:

Ryabchuk D. et al. 2010. INFLOW Cruise Report, FYTO 2009, the RV Ladoga 4.-7.7.2009. INFLOW Interim Report No. 6. St.Petersburg: VSEGEI. 14 p. Electronic publication. Available at <http://projects.gtk.fi/inflow/index.html> .



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1. NEMoF 2009, Participants (4.-7.07.2009)

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2. Introduction

Marine geologists from A. P. Karpinsky Russian Geological Research Institute (VSEGEI)/Russia participated in research vessel Ladoga (Figure 1) NEGoF (North-Eastern Gulf of Finland) – 2009 cruise to the Gulf of Finland 4.-7.7.2009. Altogether 7 scientists, 6 of them from INFLOW – project, participated in the cruise.

The main aims of the cruise was to collect surface sediment samples and long sediment cores for BONUS Research Programme INFLOW project purposes from the Russian part of the Eastern Gulf of Finland.

The NEGoF 2009 cruise was organized by A.P.Karpinsky Russian Research Geological Institute (VSEGEI) and funded by Russian Fund for Basic Research (RFBR).



Figure 1. Research vessel Ladoga in Fort Obrutchev harbour.
Photo: Daria Ryabchuk, VSEGEI.

3. Study area

The study area of the NEGoF 2009 Cruise was the Russian part of the Eastern Gulf of Finland, the Baltic Sea (Figure 2), within Vyborg Bay and in the open part of the Gulf of Finland between Beriozovy Archipelago and Gogland Island (north-eastern part of the gulf).

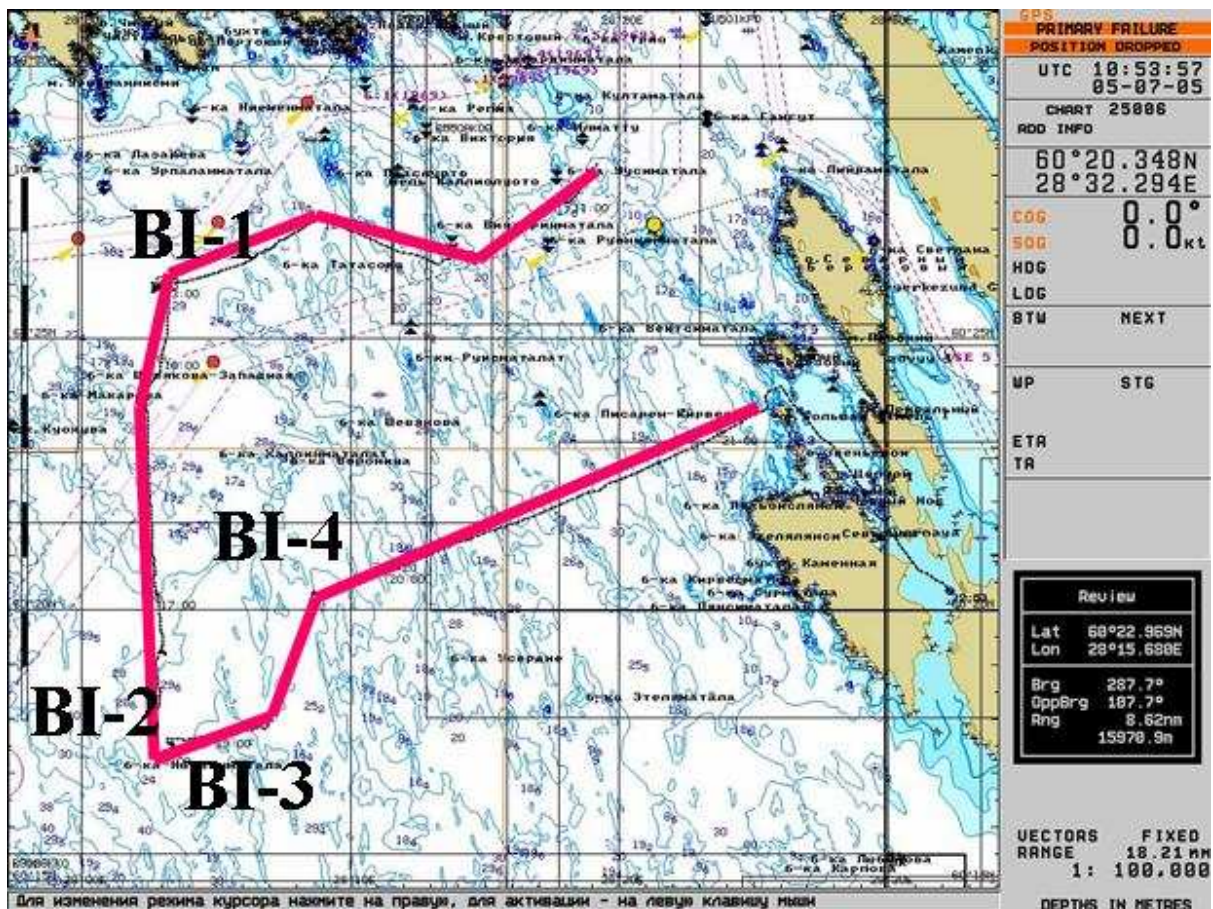


Figure 2. Echo-sounding track lines of the RV Ladoga NEGoF 2009 cruise.

The NEGoF 2009 Cruise (from Primorsk town to St. Petersburg) was carried out from 4rd July to 7th July 2009.

4. Results of previous study and chose the sampling sites places

The areas within sedimentation basins were chosen at first in the base of analysis of existing VSEGEI surface sediment maps and field work results (44 stations, 1.5 - 3.7 m long sediment cores and 21 echosounding profiles, undertaken in 1984-2000) (Spiridonov et al., 1988; Spiridonov et al., 2007).

4.1. Survey data of previous study

Echosounding profiles were studied for choosing of local sedimentation basins most suitable for the INFLOW project proxy-study (Figure 3).

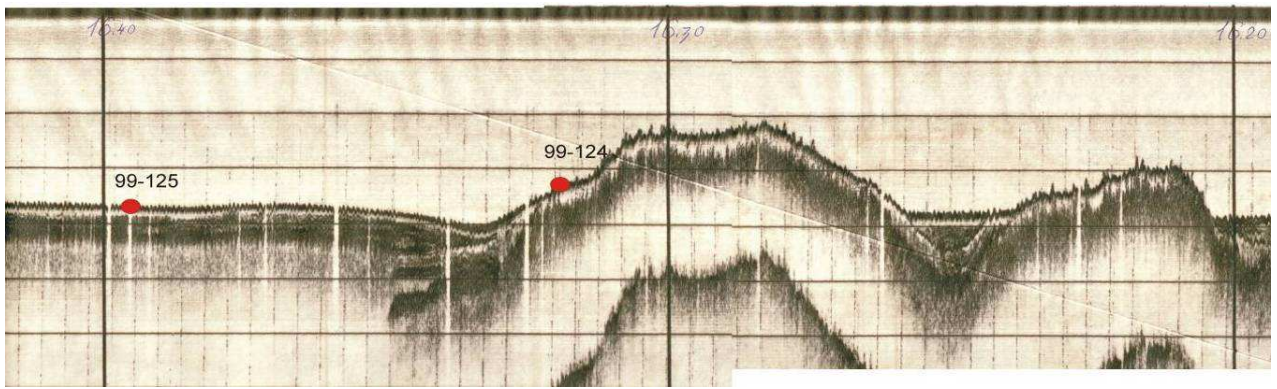


Figure 3. Echo-sounding profile 25 (1991) within study area. Red points correspond to piston core sampling sites (1999-125 – in sedimentation basin and 1999-124 in erosion zone on the surface of submarine rising slope).

4.2. Sediment sampling data of previous study

In order to find the best places for sediment sampling the descriptions of 44 piston cores taken within study area in 1984 – 2000 were carefully studied. Station 639 undertaken in 1985 was chosen as the best place for proxy-study of uninterrupted sedimentation during last 6000 years (site 09-BI-1) (Figure 4). Station 654 undertaken in 1985 was chosen as a best place for longer time period study as it represents sedimentation archive of Baltic Ice Lake, Ancylus Lake, Littorina and PostLittorina Seas (site 09-BI-3). Sites 09-BI-2 and 09-BI-3 were chosen using echosounding data.

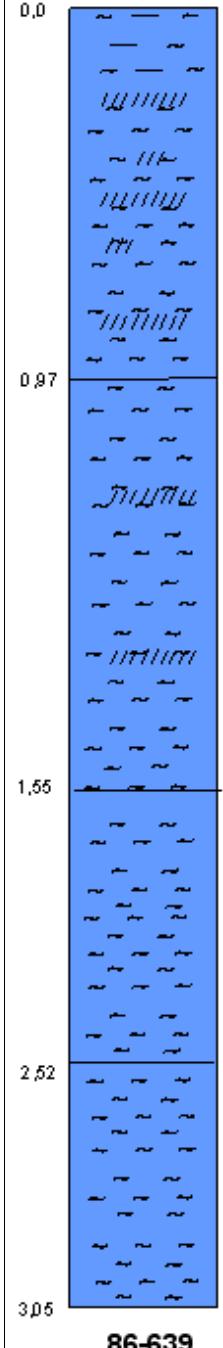
Station number	Latitude	Longitude	Depth
1985-639	60°26,01	28°03,23	37 m
Description			
	0.0 – 0.97 m – light olive grey silty-clay mud (clayey mud), laminated because of alteration of light olive grey and black layers.		
	0.97 – 1.55 m – olive grey laminated silty-clay mud (clayey mud). In the intervals 1.28 – 1.35 m – layer of dark olive grey (up to black) color. Thickness of black layers 1-4 mm, thickness of olive grey layers – 0.1 – 1 cm.		
	1.55 – 2.52 m – dark olive grey (black) laminated silty-clay mud (clayey mud). Thickness of black layers 3-10 mm, thickness of olive grey layers – 7 – 10 mm.		
	2.52 – 3.05 m – black partly laminated silty-clay mud (clayey mud).		

Figure 4. Description of station 1985-639.

5. Methods of study and sampling

5.1. Positioning

The RV Ladoga as well as its survey systems in use were continuously positioned using the DGPS (Differential Global Positioning System) with ± 5 m accuracy. We used the WGS 84 as the geographic coordinate system with the UTM35 (center 27) as projection for all data. Acoustic complex worked together with Furuno GP7000F system.

5.2. Echo-sounding

The acoustic survey during the NEGoF 2009 –cruise was performed using geo-acoustic complex GEONT-HRP ("Spektr-Geophysika" Ltd.). Boomer transmitter: working frequency range - 2-7 kHz (figure 5).



Figure 5. Work with geo-acoustic complex GEONT-HRP ("Spektr-Geophysika" Ltd.).

5.3. Sediment sampling methods

5.3.1. Niemisto –corer (GGT)

Surface sediment samples from soft bottoms were recovered using a *Niemisto –corer* with an inner diameter of 50 mm of the core liner (Figure 6). After coring one core obtained was usually split vertically for description and the other cores were used for sub-sampling. In station 09-BI-1-N two cores were sliced for analyses in VSEGEI and GTK laboratories.

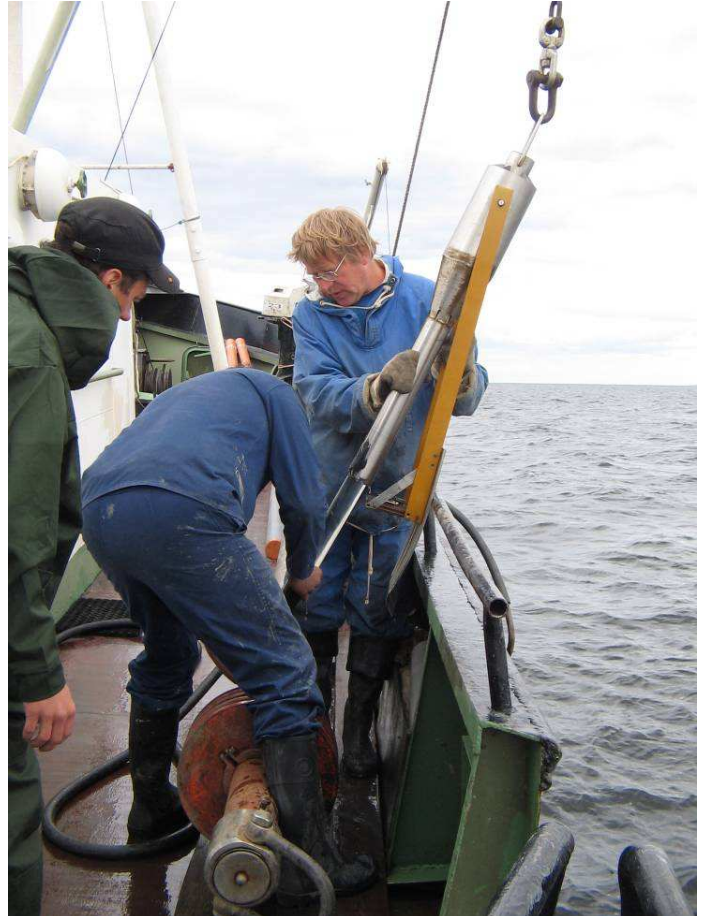


Figure 6. Work with Niemisto-corer on board r/v Ladoga.

5.3.2. Gravity corer

Long sediment cores were recovered using VSEGEI's 4 meters long gravity corer with diameter 110 mm (Figure 7). First sediment core was taken with plastic (inner) foil (or without liner) in order to check the type of sediment, sediment description and make photos. Next sediment cores were recovered with liner.



Figure 7. Work with gravity corer on board r/v Ladoga.

5.4. Sediment descriptions

All recovered surface sediment cores were photographed and documented onboard (Figure 8). Sedimentological descriptions of Niemisto-cores were made both through the plastic core liner and from the splitted and trimmed sediment surfaces. Long sediment cores were cut into 100 cm sections, labelled and stored in the cold store.

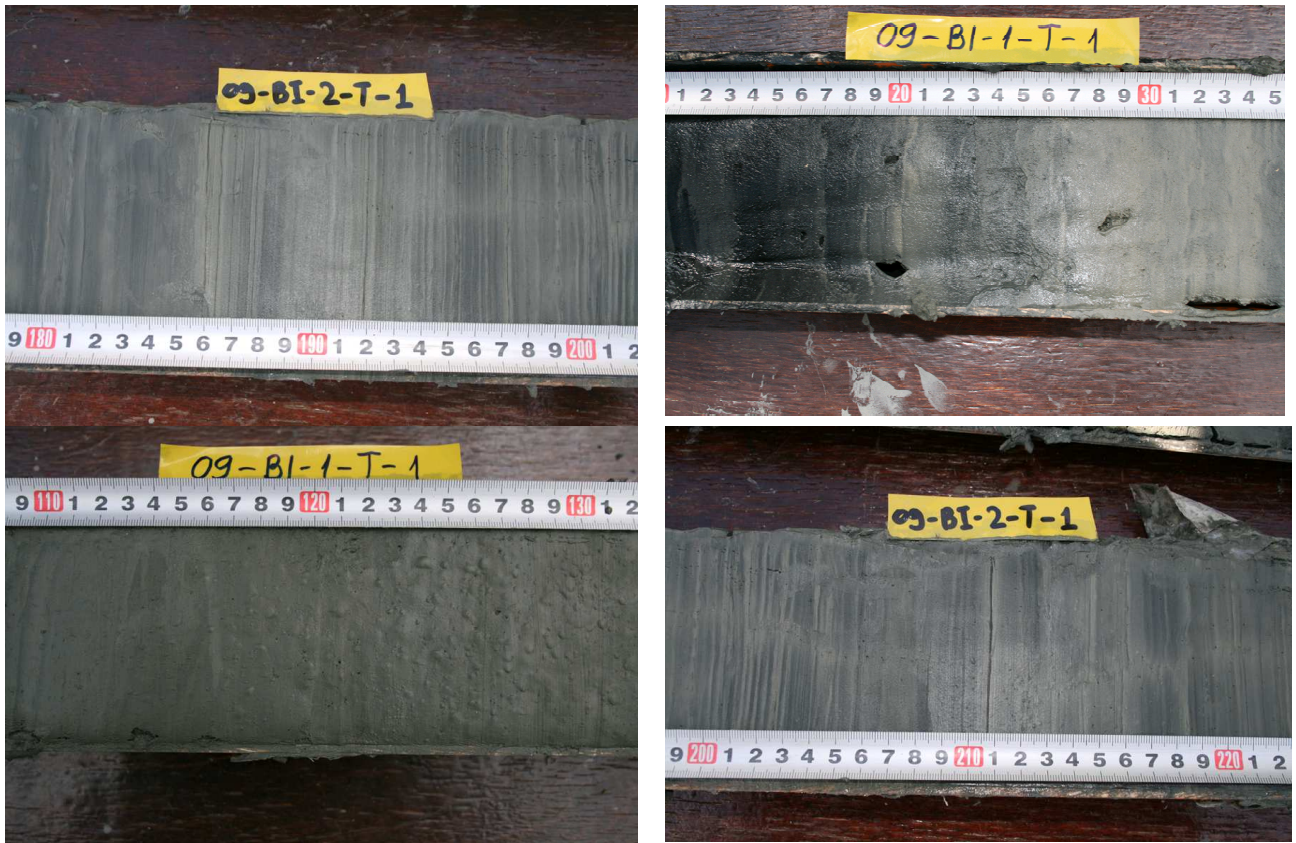


Figure 8. Pictures of long-core sections on board r/v Ladoga.

5.6. Subsampling

All surface sediment cores (Niemisto-cores) were subsampled onboard Ladoga during the cruise. The surface sediment cores were sliced normally into 1 cm thick subsamples onboard and packed in plastic bags.

6. Sediment data

6.1. Sediment cores

A total of 4 Sites were sampled during the NEGoF 2009 cruise (Table 1). In all stations were taken surface sediment samples using a Niemisto-corer and long cores using gravity core.

Table 1. Sediment cores recovered from stations during the NEGoF 2009 -cruise.

Core ID number	Corer type	Lat (N) Lon (E)	Core length (cm)	Depth (m)	Time (Moscow time)
09-BI-1-T-1	Gravity corer	60 ⁰ 26,004 28 ⁰ 03,211	199 cm	36,5 m	4.7.2009 13:10
09-BI-1-T-2	Gravity corer	60 ⁰ 26,002 28 ⁰ 03,210	In plastic bag	36,5 m	4.7.2009 15:30
09-BI-1-T-3	Gravity corer	60 ⁰ 26,003 28 ⁰ 03,220	In plastic bag	36,5 m	4.7.2009 15:55
09-BI-1-N-1	Niemisto-corer	60 ⁰ 26,003 28 ⁰ 03,233	26 cm	36,5 m	4.7.2009 16:17
09-BI-1-N-2	Niemisto-corer	60 ⁰ 26,002 28 ⁰ 03,227	22 cm	36,5 m	4.7.2009 16:30
09-BI-1-N-3	Niemisto-corer	60 ⁰ 25,993 28 ⁰ 03,231	22 cm	36,5 m	4.7.2009 17:00
09-BI-2-T-1	Gravity corer	60 ⁰ 17,498 28 ⁰ 02,998	232 cm	40 m	5.7.2009 9:15
09-BI-2-T-2	Gravity corer	60 ⁰ 17,499 28 ⁰ 02,995	In plastic bag	40 m	5.7.2009 11:05
09-BI-3-T-1	Gravity corer	60 ⁰ 17,503 28 ⁰ 03,406	230 cm	40 m	5.7.2009 12:15
09-BI-3-T-2	Gravity corer	60 ⁰ 17,506 28 ⁰ 03,405	In plastic bag	40 m	5.7.2009 14:00
09-BI-4-T-1	Gravity corer	60 ⁰ 20,100 28 ⁰ 08,172	In plastic bag	41 m	5.7.2009 18:10



6. Conclusions

INFLOW –project partners from VSEGEI/Russia participated in the RV Ladoga NEGoF 2009 -cruise to the eastern Gulf of Finland 4.-7.7.2009.

Altogether over 58 km of geo-acoustic data was collected during the NEGoF 2009 – cruise. Long sediment cores were recovered from 4 Sites using VSEGEI's 4 m long gravity corer. Maximal length of undertaken core was 232 cm. Surface sediment samples were collected from 1 sites using Niemisto-corer.

We can summarize that BONUS Research Programme INFLOW-project participation in the RV Ladoga NEGoF 2009 cruise was successful. All the objectives proposed for this cruise were fulfilled.

7. Acknowledgements

VSEGEI participants thank the Captain Vladimir Snetko and boatswain Vladimir Nikulin onboard the RV Ladoga for their very help during whole scientific work.

8. References

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