The Census of Marine Life Project

South Atlantic MAR ECO

Cruise #1_2009

R/V Akademik Ioffe

Academy of Sciences
Shirshov Institute
Russia

25 October - 29 November 2009

Summary of Activities

- The cruise started on the 25th of October of 2009 in Las Palmas (Gran Canaria – Spain) and ended in Cape Town (South Africa) on the 29th of November of 2009 (34 days at sea). During that period the R/V Akademik Ioffe sailed a total of 9,666 km (5,233 Nm), 27% of this extent was over the Mid-Atlantic Ridge (Figure 1).

- The biological research team was composed of 17 scientists from Russia (11), Brazil (4), Uruguay (1) and New Zealand (1) (Table 1). Andrey Gebruk (Russia) and Angel Perez (Brazil) coordinated the sampling operations during the cruise.

- Sampling was conducted both continuously along the ship's track and in pre-determined stations (Superstations).

- Ten Superstations were defined during the planning phase being gradually displaced along the cruise according to local conditions (depth, topography, time etc…). Three main samplers were used: Sigsbee Trawl (benthic communities), Isaac-Kidd Midwater Traw-IKMT (pelagic communities – macropzooplankton + micronecton) and WP2 plankton net (zooplankton) (Table 2, Figure 1). Additionally, because microorganisms (bacteria) were also to be sampled on the Southern MAR, samples of sediment and seawater were collected by "push corers" and "Niskin Bottles". The geology and physical oceanography teams on board operated both samplers, respectively, and gently made these samples available to SA MAR-ECO.

- At each Superstation sampling points were defined for each of the gears (Local Stations) (Table 3). A total of 48 sampling events were conducted in these Superstations, 19 in SA MAR-ECO's South Equatorial MAR Sector (SEMS), 8 in the Tropical MAR Sector (TMS) and 10 in the Walvis Ridge Sector (WRS). Additionally, 15 sampling events were added to the SA MAR-ECO sampling plan as conducted in extra stations defined for pelagic sampling (IKMT – Local station 202), benthic (Sigsbee trawl – Local Station 303) and geological stations (Push corer – Local Station 204) (Figure 1). The latter provided almost all sediment microbiology samples. In total, 63 sampling events produced biological samples over the MAR, Walvis Ridge and intermediate areas.

- One benthic trawl was conducted at each Superstation depending on the topography of the ridge. Trawls were carried on over 1000-2000m and 2000-3000m deep strata. As for the IKMT two trawls were conducted at each Superstation, one from 1000 – 2000 m depth stratum to the surface and another from the depth where the Sound Scattering Layer (SSL) was located to the surface. In this case a previous assessment of the SSL depth was obtained by the ship's echosounder. One WP2 tow was conducted at each Superstation. Because it was

concluded that this gear was not suited to deepwater sampling, a basic arrangement of the net allowed for a vertical non-stratified tow from 1000 m to the surface. Finally four CTD casts were conducted at or in the vicinity of the Superstations. In three of them Niskin Bottles were arranged in a Rosette and allowed seawater collection at ~2000, 1000 and 500 m strata.

- All three samplers presented technical problems during operations over the MAR (e.g.wire and net entangling, wire rupture and crashes with rocks). These have affected the intended sampling plan but effective solutions were worked out in all cases. Invalid trawls were normally repeated when shiptime allowed for.

- Sampling along the track of the ship was directed at whales and sea birds. A team of 5 scientists performed 4-hour observation shifts (often two shifts per day), rotating between both sides of the ship every 30 minutes. A total of 108,4 hours were dedicated to observations along 1,149.3 nm (~ 6895,8 nm^2). Additionally, the single-beam echosounder operated throughout the ship's track, most of the time at a 0 – 5000 m scale. That allowed an almost continuous record of SSL over the southern MAR that has a potential for further studies.

- IKMT trawls samples were sorted for fish and cephalopods. In these groups, taxa were identified to the lowest possible level and entered in the SA MAR-ECO catch forms. Fish was preserved for further studies (including genetics) in Russia. Cephalopods were also preserved for taxonomy and genetic studies, being divided between scientists of Brazil, South Africa and New Zealand. All other groups in the IKMT catch were preserved in formalin (0.5 l bottles) for processing on land in Brazil. The same procedure was adopted for zooplankton samples collected by the WP2 net.

- After the Sigsbee trawls the catch was sorted by major groups and also included in the catch forms. Samples were preserved and divided between Russian and South American scientists according with previous agreements.

- All catch forms were inserted in the MAR-ECO Biological Data-Bank system during the cruise. These records are still incomplete partly because some samples still need to be sorted on land (e.g WP2 samples and part of IKMT samples). A total of 976 animal records were entered in the data bank, most of them fish and cephalopods (Table 4). This number tends to increase, as zooplankton and benthos samples will be further processed.

- 3,776 specimens of fishes were measured and about 7,000 DNA samples were taken. At least 175 species of deepwater fishes belonging to 49 families were registered. Highest taxonomic richness and maximum abundance of mesopelagic fishes were observed at SS 3 and 4 in the SEMS. New data on geographic distribution pattern of deepwater fishes were obtained. A total of 258 cephalopods were caught. These were included in 44 species of 22 families and 4 orders. The most abundant and diverse catches originated from SEMS Superstations. DNA samples were taken from 17 individuals.

- Successful benthic catches were obtained in 8 Superstations (Table 5). Roughed topography and the scarcity of soft sediments on the selected areas of the MAR were major constraints for the Sigsbee trawl operation. However a total of 1,980 specimens were collected principally in SEMS and WRS (not including colonial forms). 4 – 35 different species were preliminarily identified in each trawl, mostly echinoderms and cnidarians (corals) but also including Ascidiacea, Anellida, Porifera, Crustacea, Mollusca and other groups. Total number of species collected by the R/V Ak. Ioffe is still uncertain but it is expected to be around 200.

- There were 23 whale-sighting events distributed along the entire route of the R/V Ak. Ioffe (Fig.2). Species were identified in 14 sightings. At least 13 seabird species were recorded during the cruise.

- A daily journal was produced by members of the SA MAR-ECO team and posted in real-time in Portuguese on the University of "Vale do Itajaí" web-page (www.univali.br/mar-eco) and in English on the MAR-ECO web-page (www.mar-eco.no).

Concluding Remarks

- Despite time constraints and other operational problems that limited sampling activity, the first SA MAR-ECO cruise produced a substantial amount of benthic and pelagic samples. Preliminary results also indicate a high diversity of organisms.

- More important results are expected principally from zooplankton and benthic samples careful examination and microbiology.

- Samples have been distributed among several institutions in Russia, Brazil, South Africa and New Zealand for identification and further studies. The SA MAR-ECO STEERING GROUP and Working Groups will coordinate this work.

- A full report of the cruise is being now prepared which will include accounts of all Working Groups on the diversity collections, spatial distribution and zoogeography analysis and studies of early-life stages of fish and cephalopods. This report is to be completed until early June 2010.

Table 1. List of participants of the South Atlantic MAR-ECO Cruise# 1_2009 on board of the R/V Akademik Ioffe (Academy of Sciences – Russia) – 25 October – 29 November 2009.

Name	Institution	Country	Research Interests
Andrey Gebruk*	SIO	Russia	Macrobenthos
José Angel Alvarez Perez*	UNIVALI	Brazil	Cephalopods
Alexei Mishin	SIO	Russia	Fish
Alexei Orlov	VNIRO	Russia	Fish
André da Silva Barreto	UNIVALI	Brazil	Whales
Antonina Rogacheva	SIO	Russia	Macrobenthos
Daniela de A. Lopes	MN-UFRJ	Brazil	Deepwater sponges
Elena Goroslavkaya	SIO	Russia	Macrobenthos
Kathrin Bolstad	EOSRI	New Zealand	Cephalopods
Kirill Minin	SIO	Russia	Macrobenthos
Konstantin Tabachnik	SIO	Russia	Macrobenthos
Maria Shtaut	SIO	Russia	Fish
Marisa Hutton Puentes	U de la R	Uruguay	Macrobenthos
Natalia Gordeeva	VIGG	Russia	Fish
Sergey Galkin	SIO	Russia	Macrobenthos
Stanislav Kobylyanskiy	SIO	Russia	Fish
Thassya C. dos Santos Schmidt	IOUSP	Brazil	Fish

*Coordinators of South Atlantic MAR-ECO Work
EOSRI – Earth and Ocean Science Research Institute – New Zealand
IOUSP – Oceanographic Institute – University of São Paulo - Brazil
MN-UFRJ – National Museum, Federal University of Rio de Janeiro - Brazil
SIO – Shirshov Institute of Oceanology – Academy of Sciences - Russia
UNIVALI – University of Vale do Itajai - Brazil
U de la R – University “de la República” – Uruguay
VNIRO – Russian Federal Institute of Fisheries and Oceanography - Russia
VIGG – Vavilov Institute of Genetic Studies - Russia

Table 2. Sampling gear used for collection of biological samples during the SA MAR-ECO Cruise #1_2009.

Local Station	Gear	Biota	Sampling Strategy
201	Sigsbee Trawl	Macrobenthos	Bottom trawl ▪ 1000 - 2000 m ▪ 2000 - 3000 m
202	Isaac-Kidd Midwater Trawl - IKMT	Macrozooplankton – Micronekton	Midwater trawl ▪ 0 to 1000/2000 m ▪ 0 to SSL depth
203	WP2 – Plankton Net	Zooplankton	Vertical tow ▪ 0 to ~1000m
204	Push Corer	Sediment samples – microbiology	Abissal plains
205	Niskin Bottle	Water samples - microbiology	During CTD casts ▪ 500 m ▪ 1000 m ▪ 2000 m

Table 3. Summary of sampling tows conducted during the SA MAR-ECO #Cruise 1_2009 (25 October - 29 November 2009). Depth, in meters. Local Stations =- sampling gear (see table 1). SEMS, South Equatorial MAR Sector; TMS, Tropical MAR Sector; WRS, Walvis Ridge Sector.

								Local Station			
Superstation	Latitude	Longitude	Depth	Sector	CTD	201	202	203	204	205	Total
1	00°34,86'N	17°16,52'W	3116	SEMS	1	0	2	1	0	0	3
2	00°26,18'N	17°03,57'W	902	SEMS	0	2	2	1	0	0	5
3	04°05,04'S	12°25,18'W	3342	SEMS	1	1	2	1	0	3	7
4	04°40,22'S	12°16,20'W	2014	SEMS	0	1	2	1	0	0	4
5	17 °55,08'S	13°26,17'W	2663	TMS	1	1	2	1	0	3	7
6	18°06,95'S	13°07,25'W	2502	TMS	0	0	1	1	0	0	2
7	29°29,87'S	01°10,06'E	3721	WRS	1	1	2	1	0	3	7
8	30°00,62'S	02°49,92'E	1074	WRS	0	1	2	1	0	0	4
9	32°44,69'S	01°50,08'E	1107	WRS	0	1	3	1	0	0	5
10	33°40,17'S	02°35,12'E	4715	WRS	0	1	2	1	0	0	4
Total					3	9	20	10	0	9	**48**
Extra-stations											
	00°23,11'N	16°26,57'W	5560	SEMS	1	1	0	0	0	0	1
	03°03,97'S	13°18,00'W	3555	SEMS	0	0	1	0	0	0	1
	11°02,44'S	12°45,80'W	2487		0	0	1	0	0	0	1
	15°46,22'S	13°13,07'W	3334		0	0	1	0	0	0	1
	23°30,52'S	04°17,19'W	4985		0	0	0	0	1	0	1
	25°43,50'S	02°21,10'W	1602		0	0	1	0	0	0	1
	25°41,70'S	02°20,72'W	4640		0	1	0	0	0	0	1
	30°17,98'S	03°07,01'E	981	WRS	0	0	1	0	0	0	1
	30°19,18'S	03°08,28'E	997	WRS	0	1	0	0	0	0	1
	35°55,42'S	07°18,51'E	2518		0	0	1	0	0	0	1
	35°50,18'S	03°26,38'E	5200		0	0	0	0	3	0	3
	36°25,00'S	08°00,00'E	4750		0	0	0	0	1	0	1
	36°25,00'S	08°00,00'E	4750		0	0	0	0	1	0	1
Total					1	3	6	0	6	0	**15**
TOTAL					4	12	26	10	6	9	**63**

Table 4. Summary of organisms recorded during the South Atlantic MAR-ECO Cruise#1_2009. These records correspond to the preliminary identifications conducted on board the R/V Akademik Ioffe and entered into the MAR-ECO Biological Data Bank. Therefore these are only partial numbers since many groups were not identified to species levels and zooplankton samples (either from the plankton net and IKMT trawls) have not been examined yet.

Sperstations	Pisces	Cephalopoda	Anellida	Ascidiacea	Cnidaria	Crustacea	Echinodermata	Mollusca*	Porifera	Other	Total
1	30	8	0	0	0	0	0	0	0	0	38
2	51	15	1	0	28	15	7	2	6	0	125
3	64	15	1	0	2	5	5	5	4	2	103
4	92	10	0	1	3	2	4	2	0	0	114
5	24	7	1	0	0	4	1	0	4	0	41
6	17	2	0	0	0	1	0	0	0	0	20
7	65	13	1	1	6	10	12	4	2	4	118
8	48	3	0	0	2	6	5	2	1	1	68
9	49	4	3	0	3	8	9	2	0	1	79
10	50	10	1	1	4	4	4	2	3	4	83
Extras stations	134	29	1	0	3	14	0	3	1	2	187
Total	624	116	9	3	51	69	47	22	21	14	**976**

*Other than Cephalopods

Table 5. Summary of benthic organisms recorded during the South Atlantic MAR-ECO Cruise#1_2009. These records correspond to the preliminary identifications conducted on board the R/V Akademik Ioffe

SS	Region	Number of species	Number of specimens*	Weight (wet), g
2	Romanche, Northern wall	23	31	913.77
2	Romanche, Northern wall	18	61	7391.12
3	SEMS, south	26	224	105.47
4	SEMS, south	8	15	63.09
5	TMS, north	4	7	11.93
7	Walvis Ridge, base north	35	440	344.29
8	Walvis Ridge	13	582	1918.81
Extra Station	Walvis Ridge	18	438	931.73
9	Walvis Ridge	21	142	8842.21
10	Walvis Ridge, base south	26	40	124.56
Total		**192**	**1980**	**20646.98**

* Colonial forms (corals, etc.) were not included

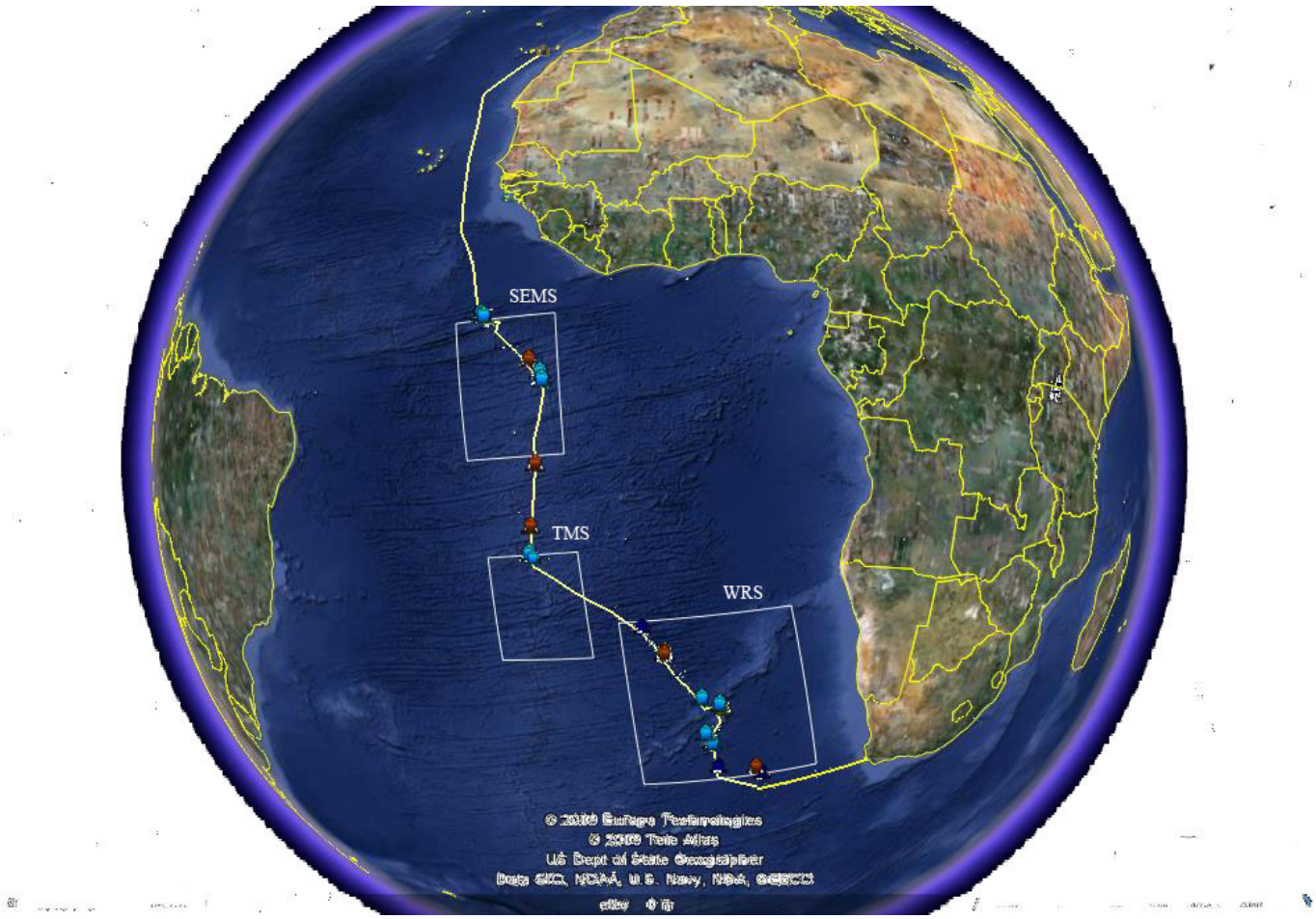

Figure 1. Route of the R/V Akademik Ioffe, 25 October – 29 November 2009 (yellow line). Light blue symbols represent positions of the SA MAR-ECO Superstations. Red and yellow symbols represent IKMT and Sigsbee Trawl extra trawls. Dark blue symbols represent positions of geological stations where sediment samples for microbiology analysis were obtained. Boxes represent SA MAR-ECO target areas.

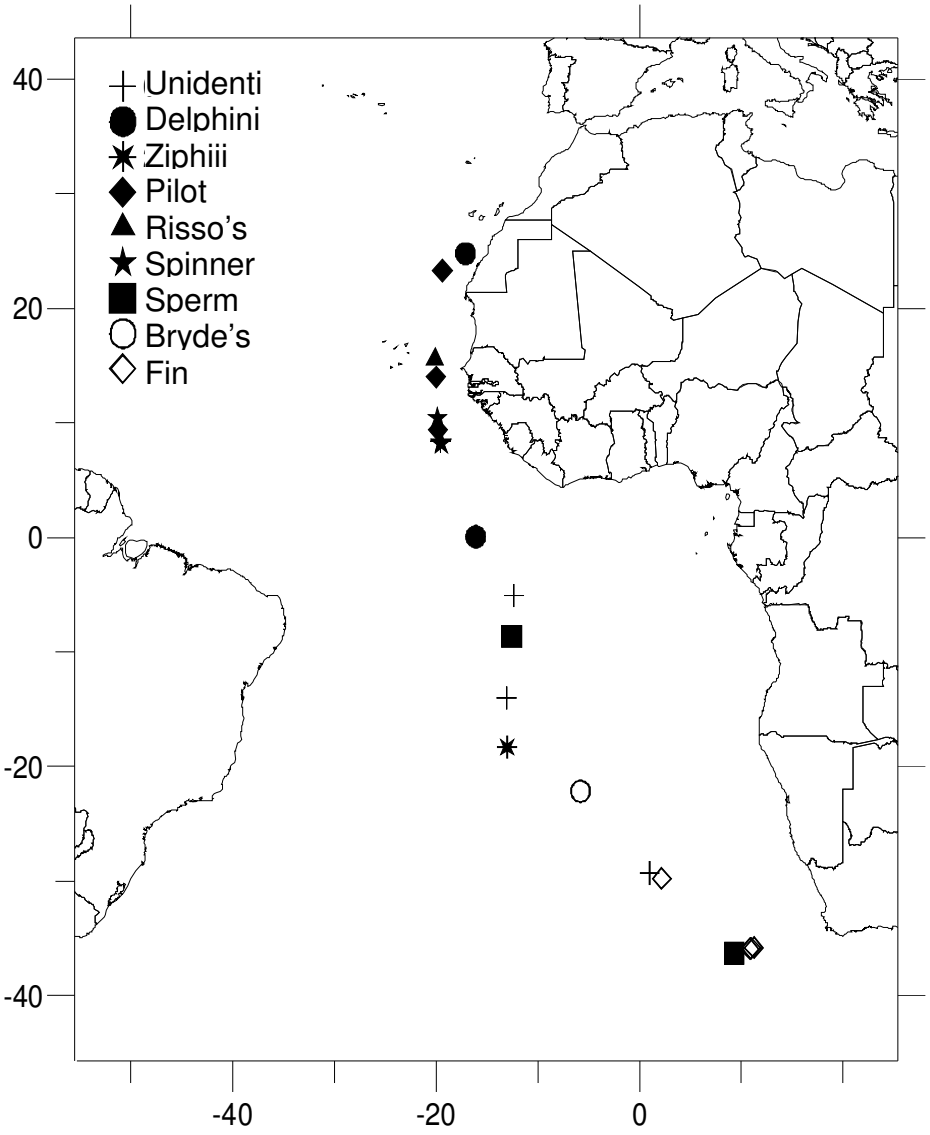

Figure 2. Cetacean sightings along the R/V Akademik Ioffe route – SA MAR-ECO Cruise 1-2009.