APPLICATION FORM CONSENT TO CONDUCT MARINE SCIENTIFIC RESEARCH IN AREAS UNDER JURISDICTION OF MONTSERRAT

Date: 11.11.2013

1. General information

1.1 Cruise name and/or number: **Investigation of Lithosphere Deep Structures of the Caribbean Region by seismic methods**

1.2 Applicant institution:

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1.3 Scientist in charge of the project:

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1.4 Scientist involved in the planning of the project

Program leader scientists:

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2. Description of project

2.1 Nature and objectives of the project:

The main objective of the investigation is to study interrelationships of blocks of continental and oceanic crust, genesis of rifts of different depths, the role of shear and thrust tectonics in the formation of regional structure of the basement and the sedimentary cover, the main features in distribution and structure of carbonate platforms, including deepwater ones. A special feature of the planned seismic survey is the use of floating seismic systems (sonobuoys) for recording refracted waves at offsets exceeding 30 km. The use combined reflection and refraction data will allow an anticipated depth of investigation of 45-60 km. Study of structure and evolution of the lithospheric layer and its upper part – the earth crust -are the main objectives of sciences dealing with the solid Earth. Thus study of the evolution of major crustal structures is of great importance to science, economics and security. Please refer to Program Description for details.

2.2 Relevant previous or future research cruises:

Notwithstanding numerous studies, this region of such complex structure and a total area of several million square kilometers remains poorly understood, especially in its interior, where, crustal structure is known only from sparse survey lines. Since the Caribbean Plateau must be seen in its geological context as part of the Caribbean Plate, relevant aspects of regional geology are included here. Key references in chronological order allow to trace evolution of plateau data/understanding. Donnelly *et al.* (1990) provide the most comprehensive discussion of Caribbean magmatism. Kerr *et al.* (2003) summarise additional methodology and data. Diebold *et al.*, (1999) summarised the history of seismic investigation in the Caribbean area, described the internal (seismic) aspects of the Caribbean Plateau and discussed possible origins of unusually thin Caribbean crust. For recent discussions of allocthonous and in-situ understanding of the Caribbean, see Pindell *et al.*, (2005, 2006) and James (2005a, 2006), respectively.

2.3 Previously published research data relating to the project:

Research results were set forth in a number of fundamental publications including international monographs and atlases; they form the basis for recent ideas concerning the development of the Caribbean Basin Please refer to references in Program Description for details.

3. Methods and means to be used

3.1 Particulars of vessel

- ... Name: **r/v Mezen**
- ... Operator: **Laboratory of Regional Geodynamics (LARGE LLC), Russia**
- ... Nationality: **Russian Federation**
- ... Owner: **Laboratory of Regional Geodynamics (LARGE LLC), Russia**
- ... Overall length: **76 meters**
- ... Maximum draught: **5.85 meters**
- ... Gross tonnage: **2022 tons**
- ... Propulsion: **3xSulzer 845kW, 1xVolvo Penta 450kW**
- ... Maximum speed: **15 KNOTS**
- ... Cruising speed: **10 KNOTS**
- ... Call sign: **UBYZ**
- ... Method and capability of communication (including telex, frequencies): **VHF channels 16, 68, Radio 2187.5 kHz; 4207.5 kHz; 8414.5 kHz.**
- ... Name of master: **Evstropov Sergey Gennadievich, RF**
- ... Number of crew: **20 people**
- ... Number of scientists on board: **20 people**

Note that the availability of a scientific vessel can be evaluated only upon receiving all the permissions from the participating coastal countries and approvals for the fieldwork schedule therefor the scientific vessel may be substituted for the equivalent. Notification will be sent no later than three months prior to the expedition.

3.2 Aircraft or other craft to be used in the project: **No**

3,3 Particular of methods and scientific instruments

TYPES OF SAMPLES AND DATA	METHODS TO BE USED	INSTRUMENTS TO BE USED (TENDOR)
2D reflection seismic data	2D long-streamer seismic reflection technique.	SERCEL SEAL *(SERCEL)*
	2D deep geophysical data processing focus on Cenozoic structure	Seismic data processing software *GXT (ION), Paradigm Geophysical,*
	2D regional seismogeological model, Velocity seismogeological models	Seismic data interpretation software *Landmark (Halliburton)*
	3D geological model of Upper boundary of asthenosphere, Fault tectonics	Geomechanical modeling software *Mechanical Model (Moscow State University)*
	Geodynamic scheme	GIS software *ArcGIS (ESRI)*
	Schemes of convergent boundaries complexes development, Mechanical properties of earth's crust and lithosphere	Geomechanical modeling software *Mechanical Model (Moscow State University)*
	3D Model of geodynamic evolution of the region, including tectonic reconstructions	Geomechanical modeling software *Mechanical Model (Moscow State University)*
2D Refraction seismic data	Floating thesonobuoy will acquire and record the refractive seismic information and GPS coordinates in real time. Sonobuoys will be deployed along the survey lines. Upon completion of data acquisition, the support vessel will recover the buoy being guided by their actual current position.	Floating seismic buoys developed by Regional Geophysical exploration, Russia
Gravity	Onboard installed Gravitymeter and constant recording of gravity data along the profiles.	Mobile gravity meter Chekan-AM
Magnetic	Towing magnetic sensors	Magnetometer SeaSPY
Heat flow measurements	Submersible thermometer.	Technology developed by Geological institute of Academy of Science, Russia

Note: Please refer to Program Description, chapter "Methods of Scientific Investigations" for details.

3.4 Indicate whether harmful substances will be used:

No harmful substances will be used. Please refer to Program description, chapter "Environmental Impact" for details.

3.5 Indicate whether drilling will be carried out: **No**

3.6 Indicate whether explosives will be used: **No**

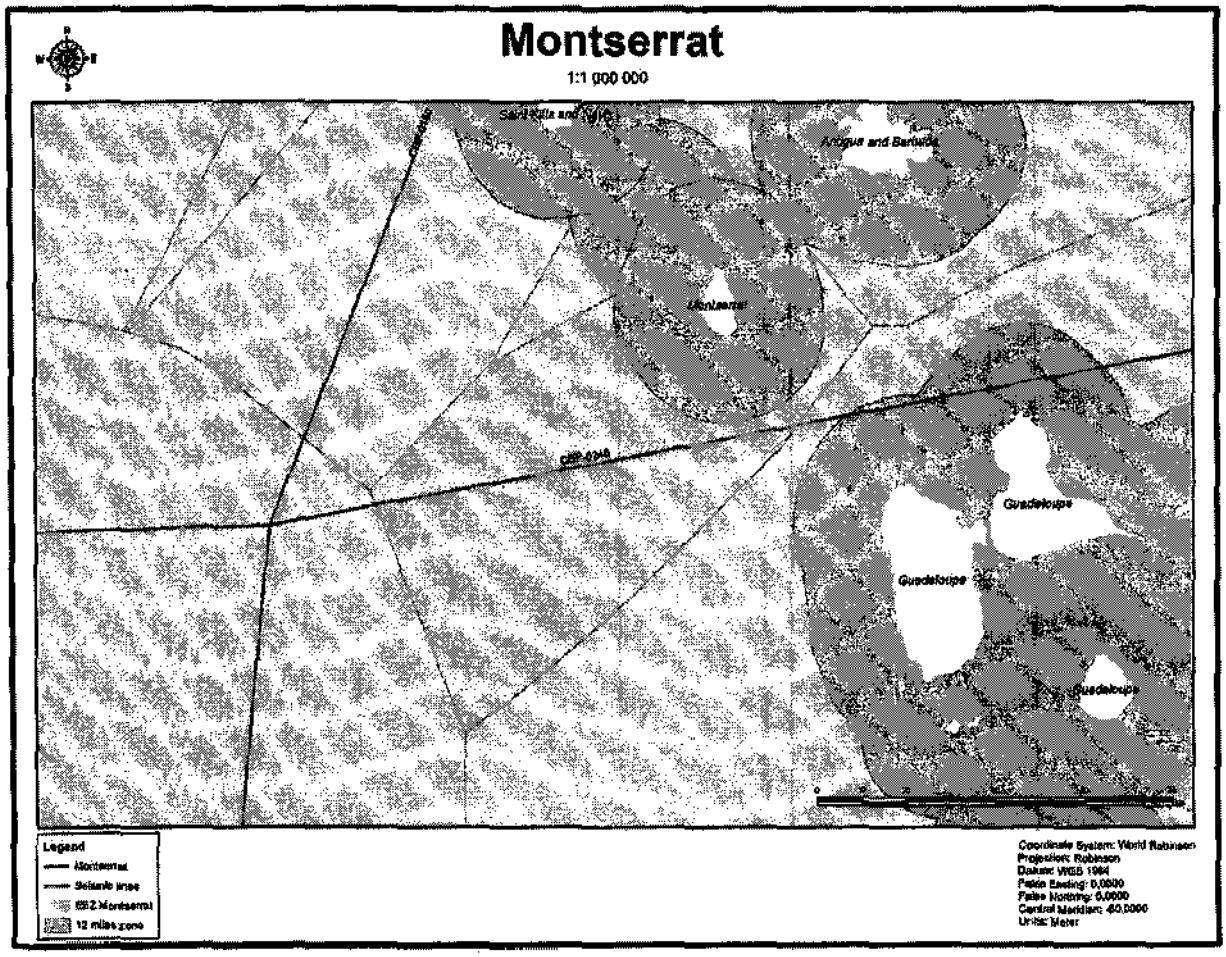
4. Installations and equipment

Details of installations and equipment (dates of laying, servicing, recovery, exact locations and depth): **No equipment of this kind will be used.**

5. Geographical areas

5.1 Indicate geographical areas in which the project is to be conducted (with reference in latitude and longitude): **Investigation area is covering Caribbean basin, beyond the 12-miles zone.**

Demarcation of Exclusive Economic Zones is based on National Oceanic and Atmospheric Administration data. The investigation findings will be available to the participating states throughout their Exclusive Economic Zones in accordance with their claims. If the countries claims overlap the investigation findings for the disputed territory will be equally distributed.



Coordinates of survey lines within Exclusive Economic Zone of Montserrat:

Point number	Line number	Geographic latitude (in degrees, minutes, seconds)	Geographic longitude (in degrees, minutes, seconds)	Length, km
1	CBP-0240	16° 19.0800' N	-63° 1.8600' W	97,6
2		16° 29.1600' N	-62° 0.2400' W	
Total length of survey lines: 97,6 km.				

5.2. Attach charts at an appropriate scale showing the geographical areas of the intended work and, as far as practicable, the positions of intended stations, the tracks of survey lines, and the locations of installations and equipment.

Please refer to Program Description, chapter "Work Performance Area" for survey lines layout.

6. Date

6.1 Expected dates of first entry into and final departure from the research area of the research vessel

Date of first arrival – 1th of October, 2014.

Date of final leaving – 1th of August, 2016.

6.2 Indicate if multiple entry is expected:

Survey lines crossing Exclusive Economic Zone of more than one country. Multiple entries into Exclusive Economic Zone of Montserrat are expected to obtain seamless geophysical information along profiles.

7. Port calls

7.1 Dates and names of Intended ports of call in Montserrat:

Port calls of R/V "Mezen" will be in accordance with "Vessel Movement plan". Crew change and data delivery may be arranged by supply boat at agreed port of Montserrat.

7.2 Any special logistical requirements at ports of call:

No special logistic is required.

7.3 Name/Address/Telephone of shipping agent (if available):

Will be identified late. This information will be provided after "Vessel Movement plan" execution.

8. Participation

8.1 Extent to which Montserrat will be enabled to participate or to be represented in the research project:

Active involvement of geologists and geophysicists is suggested at the stage of planning, analysis and interpretation of the acquired data. This cooperation will make it possible to take advantage of the local scientists high competence and their deep geological understanding of the region as well as to conduct international exchange of scientific results of the program.

Local scientific institute or government service represents of the Costal Country will be included in the Program as Scientific participant. Scientific participants will be involved in program planning, field operation, data processing and result analyze. Final report will be published in co-authorship with all Participants of the program.

Please refer to Program description, chapter "Degree of Participation of Foreign Specialists" for details.

8.2 Proposed dates and ports for embarkation/disembarkation:

Will be identified in "Vessel Movement plan". Country representative and scientific results can be embarked and disembarked by supply boat at agreed port of Montserrat.

9. Access to data, samples and research results

9.1 Expected dates of submission to Montserrat of preliminary reports, which should include the expected dates of submission of the final results:

Preliminary report will be submitted within 90 days after completion of all new geophysical data acquisition. Please refer to Program description, chapter "Work Program" for details.

9.2 Proposed means for access by Montserrat to data and samples:

All scientific data obtained within the Exclusive Economic Zone of Montserrat will be transferred to the indicated responsible organization or Scientific Institute participating in the Program, as well as to the competent coastal states authorities, if required.

In the period of the first 10 years further distribution of the geophysical data is restricted and data usage is limited to scientific usage only.

Please refer to Program description, chapter "Form and Contents of Reporting Documentation. Distribution of Materials of the Program" for details.

9.3 Proposed means to provide Montserrat with assessment of data, samples and research results or provide assistance in their assessment or interpretation:

Participating parties will work in close cooperation aimed at the successful fulfillment of the program. Scientific results of this program obtained within the Exclusive Economic Zone of coastal states will be available to the participants of the Program.

Please refer to Program Description, chapter "Anticipated Results. Procedure of Data Validation" for details.

9.4 Proposed means of making research results internationally available:

The results of the research will be published by the participants of the program. All significant results will be internationally available.

Please refer to Program Description, chapter "Participants of the Association" for details.

Nikolay Amelin

Chief Executive Officer
Association "Geology without Limits"