Application for Consent to conduct
Marine Scientific Research
In EEZ Anguilla

Date: 25th of September 2013

1. General Information

1.1 Cruise name and/or number: ANTITHESIS (leg 1 and 2)

1.2 Sponsoring Institution(s):	
Name:	IFREMER
Address:	Siège social : Technopolis 40 155, rue Jean-Jacques Rousseau - 92138 Issy les Moulineaux - France
Name of Director:	François JACQ

1.3 Scientist in charge of the Project:	
Name:	Boris Marcaillou
Country:	FRANCE
Affiliation:	University of Antilles Guyana - Institute of Researches for the development
Address:	Département de Géologie - Campus de Fouillole - 97159 Pointe a Pitre - Guadeloupe
Telephone:	+590 5.90.48.30.94
Fax:	+590 5.90.48.30.94
Email:	boris.marcaillou@ird.fr
Website (for CV and photo):	

1.4 Entity(ies)/Participant(s) from coastal State involved in the planning of the project:		
Name:		
Affiliation:		
Address:		
Telephone:		
Fax:		
Email:		
Website (for CV and photo):		

2. Description of Project

2.1 Nature and objectives of the project:
90% of the seismic energy stored on earth is released along subduction zone triggering the most destructive quakes and tsunamis. At an international level, after the catastrophic events in Sumatra (2004) and Japan (2011), the hazard related to great subduction earthquakes is a scientific topic of primary importance. The Lesser Antilles subduction zone has undergone big subduction earthquakes and particularly in 1843 with a Mw>8 event. The specialists consider that this kind of events will certainly occur again in the future (Feuillet et al., 2011; Gutscher et al., 2013). Based on GPS data the greatest slip deficit along the subduction interface, and thus the highest seismic hazard is located along the margin segment from St Martin to Virgin Island (Manaker et al., 2008). Paradoxically this segment has been the less studied for the past three decades in the Lesser Antilles.

Data acquisitions and analyses carried out during the Antithesis cruise are essential to evaluate the seismogenic potential of the Northern Segment of the Lesser Antilles margin. Seismic data will be acquired onboard vessel *Atalante* during the first leg (24/11/2013 to 23/12/2013). Heat-flow data will be acquired onboard vessel *Pourquoi Pas?* during the second leg (25/12/2013 to 08/01/2014).

- We will image with reflexion and refraction seismic data, the deep structure of the margin and particularly the interplate contact, this megathrust fault that divides the downgoing plate from the overriding plate, and produces the greatest quakes in the world. Earthquakes magnitudes are directly related to the size of the seismogenic portion of the faults, mainly controlled by the slab dip, geometry, structural heterogeneities... every structural aspect that we will image.
- We will acquire heat flow data in order to decipher the thermal regime of the margin based on 2D thermal modelling. The seismogneic zone is primarily controlled by the temperature distribution along the interplate contact. Estimating these temperatures results in proposing a size and a location for the area able to trigger great subduction earthquakes.
- At shallower depth, we will discriminate the seismically active faults of the fore-arc area from the sealed ones. The "Les Saintes" earhtquakes (2004) highlighted that even intermediate size active faults (compared to megathrust) are able to cause damages to coastal areas, when located close to populated zones. A particular emphasis will be put to the Anegada Passage, a mysterious major fault that possibly behaves as an active micro-plate boundary.
- These geophysical data all together with bathymetry, gravimetry and magnetic anomalies acquisition will constraint post-cruise 2D and 3D thermo-mechanical modelling. These models aim at deciphering the strain and stress distribution within the fore-arc area in order to explain the tectonic deformation, faults activation, vertical displacements, and earthquakes possible nucleation.

In addition, Cetologists and Marine Mammals acoustic specialists will use the vessels and the marine hydrophones to report and number cetacean species and possibly new species currently unobserved in the Lesser Antilles. This first phase will prepare a 2014-2015 experiment dedicated to a 6-month long passive monitoring of the ground and water noises in order to detect and locate earthquakes as well as whales migrations. This passive monitoring will be performed by Ocean Bottom Seismometers and Hydrophones (OBSH) deployment.

2.2 If designated as part of a larger scale project, then provide the name of the project and the Organisation responsible for coordinating the project:

Antithesis leg 1 and 2 are a part of a 4 legs project also called Antithesis (2013-2015) and primarily led by the University of Antilles-Guyane (UAG), with the Institute of Researches for the Development (IRD) and IFREMER as co-leaders.

2.3 Relevant previous or future research projects:

We previously led and/or participated to similar cruises dedicated to the study of the deep and shallow structure of the Lesser Antilles margin southern segment (Guadeloupe to Barbados) and the great Antilles (Haïti to Cuba).
- "Sismantilles I" (2005), "Sismantilles II" (2007), "Thales was Right" (2007) to the South of Guadeloupe.
- Kashallow I to III (2005-2011) in the Guadeloupe fore-arc domain.
- Haïti-OBS (2010) and Haïti-Sis (2013).

We list the most relevant publications related to these previous cruises in the following section.

Antithesis leg 1 and 2 are included in a much more ambitious offshore and onshore project that will last for 2 years for the acquisition phase and likely 5 years for the valorisation phase. Moreover discussions are ongoing with Jenny Collier (Imperial college of London) and co-workers to cement our collaboration plan around their own cruise project "Volatile recycling at the Lesser Antilles arc Processes and Consequences" offshore of Guadeloupe - Martinique submitted to the EC framework.

2.4 Previous publications relating to the project:

This list includes the most relevant papers for this project published the five past years. In bold, the name of members of the Antithesis scientific party.

Bécel, A., Diaz, J., **Laigle, M**., Hirn, A., 2013. Searching for unconventional seismic signals on a subduction zone with a submerged forearc: OBS offshore the Lesser Antilles. Tectonophysics 603, 21–31.

Evain, M., Galve, A., Charvis, P., **Laigle, M.**, Kopp, H., Bécel, A., Weinzierl, W., Hirn, A., Flueh, E., Gallart, J., 2013. Structure of the Lesser Antilles subduction forearc and backstop from 3D seismic refraction tomography. Tectonophysics 603, 55–67.

Dessa, J.-X., **Klingelhoefer, F., Graindorge, D.**, André, C., Permana, H., Gutscher, M.-A., Chauhan, A., Singh, S. C. and the SAGER-OBS boarding team, 2009 Evidence for a nucleation of the great 2004 Sumatra-Andaman Earthquake in the fore-arc mantle, Geology, 37, (7), 659-662.

Graindorge, D., F. Klingelhoefer, J.-C. Sibuet, L. McNeill, T. Henstock, S. Dean, M.-A. Gutscher, J.-X. Dessa, H. Permana, S. Singh, H. Leau, N. White, H. Carton, J. A. Malod, K. G. Aryawan, A. K. Chaubey, A. Chauhan, D. R. Galih, C. J. Greenroyd, A. Laesanpura, J. Prihantono, G. Royle, and U. Shankar (2008). Interaction/links between lower and upper plate deformation at the NW Sumatran convergent margin from seafloor morphology, Earth Planet Sci Lett. 275, 3-4, 201-210.

Gutscher, M.A., Westbrook, G.K., **Marcaillou, B., Graindorge, D.**, Gailler, A., **Pichot, T.**, Maury, R.C., 2013. How wide is the seismogenic zone of the Lesser Antilles forearc? Bulletin de la Société Géologique de France 184, 47–59.

Heuret, A., **Lallemand, S.**, Funiciello, F., Piromallo, C., Faccenna, C., 2011. Physical characteristics of subduction interface type seismogenic zones revisited. Geochemistry, Geophysics, Geosystems 12, n/a–n/a.

Klingelhoefer, F., Gutscher, M.A., Ladage, S., Dessa, J.X., **Graindorge, D.**, Franke, D., André, C., Permana, H., Yudistira, T., Chauhan, A., The limits of the seismogenic zone in the epicentral region of the 26 Dec. 2004 Great SumatraAndaman earthquake: results from a wideangle and reflection seismic surveys and thermal modeling, J. Geophys. Res., 115, B01304, doi:10.1029/2009JB006569, 2010.

Kopp, H., Weinzierl, W., Becel, A., Charvis, P., **Evain, M.**, Flueh, E., Gailler, A., Galve, A., Hirn, A., Kandilarov, A., Klaeschen, D., **Laigle, M.**, Papenberg, C., Planert, L., Roux, E., Team, T. and T., 2011. Deep structure of the central Lesser Antilles Island Arc: Relevance for the formation of continental crust. Earth and Planetary Science Letters 304, 121–134.

Laigle, M., Becel, A., De Voogt, B., Sachpazi, M., Bayracki, G., **Lebrun, J.-F.**, **Evain, M.**, Group, the "Thales W.R.S.R. working, 2011. Along-arc segmentation and interaction of subducting ridges with the Lesser Antilles Subduction forearc crust revealed by MCS imaging. Tectonophysics 603, 32–54.

Laigle, M., Hirn, A., Sapin, M., Bécel, A., Charvis, P., Flueh, E., Diaz, J., **Lebrun, J.-F.**, Gesret, A., Raffaele, R., Galvé, A., **Evain, M.**, Ruiz, M., Kopp, H., Bayrakci, G., Weinzierl, W., Hello, Y., Lépine, J.-C., Viodé, J.-P., Sachpazi, M., Gallart, J., Kissling, E., Nicolich, R., 2013. Seismic structure and activity of the north-central Lesser Antilles subduction zone from an integrated approach: Similarities with the Tohoku forearc. Tectonophysics 603, 1–20.

Lucazeau, F., Leroy, S., Bonneville, A., Goutorbe, B., **Rolandonne, F.**, D'acremont, E., Watremez, L., Düsünur, D., Tuchais, P., Huchon, P., and Bellahsen, N. (2008), Persistent thermal activity at the Eastern Gulf of Aden after continental break-up, *Nat. Geosci.*

Lucazeau, F., Leroy, S., **Rolandone, F.**, D'acremont, E., Watremez, L., Bonneville, A., Goutorbe, B., and Düsünur, D. (2010), Heat-flow and hydrothermal circulation at the ocean-continent transition of the eastern gulf of Aden, *Earth Planet. Sci. Lett.*, *295* (3-4), 554-570, doi:10.1016/j.epsl.2010.04.039.

Marcaillou, B., Collot, J.Y., 2008. Chronostratigraphy and tectonic deformation of the North Ecuador - South Manglares forearc basin. Marine Geology 255, 30–44.

Marcaillou, B., Henry, P., Kinoshita, M., Kanamatsu, T., Screaton, E., Daigle, H., Harcouèt-Menou, V., Lee, Y., Matsubayashi, O., Kyaw Thu, M., Kodaira, S., Yamano, M., 2012. Seismogenic zone temperatures and heat-flow anomalies in the To-nankai margin segment based on temperature data from IODP expedition 333 and thermal model. Earth and Planetary Science Letters 349-350, 171–185.

Marcaillou, B., Spence, G., Wang, K., Collot, J.Y., Ribodetti, A., 2008. Thermal segmentation along the N . Ecuador – S . Colombia margin (1 – 4 ° N): Prominent influence of sedimentation rate in the trench. Earth and Planetary Science Letters 272, 296–308.

Münch, P., **Lebrun, J.F.**, Cornée, J.J., Thinon, I., Guennoc, P., **Marcaillou, B.**, Bégot, J., Bertrand, G., Bes de Berc, S., Biscarrat, K., Claud, C., De Min, L., Fournier, F., Gailler, L., **Graindorge, D.**, Léticée, J.L.L., Marie, L., Mazabraud, Y., Melinte-Dobrinescu, M., Moissette, P., Quillévéré, F., Vérati, C., Randrianasolo, A., 2012. Pliocene to Pleistocene carbonate systems of the Guadeloupe archipelago, French Lesser Antilles: a land and sea study (the KaShallow project). Bulletin de la Société Géologique de France 184, 103–115.

Pichot, T., M. Patriat, G.K. Westbrook, T. Nalpas, M.A. Gutscher, **W.R. Roest**, E. Deville, M. Moulin, D. Aslanian and M. Rabineau, 2011 submitted, Tectonostratigraphic evolution of the Barracuda and Tiburon Ridges as recorded by Cenozoic stratigraphy, east of the Barbados accretionary wedge, Marine Geology.

Patriat M., **Pichot T.**, Westbrook G., Umber M., Deville E., Bénard F., **Roest W.R.**, Loubrieu B. and the ANTIPLAC cruise party, 2011, Evidence for Pleistocene to Recent convergence between the North American and South American plates, east of the Lesser Antilles, Geology Vol. 39, 979-982.

3. Geographical Areas

3.1 Indicate geographical areas in which the project is to be conducted (with reference in Latitude and longitude in decimal degrees, including coordinates of cruise/track/way points/sampling stations). Please provide coordinates in a separate excel spreadsheet.
The annex I provides a detailed table with geographical position of every seismometer, seismic line and heat flow measurement station.

3.2 Attach chart(s) at an appropriate scale (1 page, high-resolution) showing the geographical Areas of the intended work and, as far as practicable, the location and depth of sampling Stations, the tracks of survey lines, and the locations of installations and equipment.
The annex II provides chart with OBSs, lines and heat flow station positions.

4. Methods and means to be used

4.1 Particulars of vessel:	
LEG 1 (Seismic data)	
Name:	***L'Atalante***
Type/Class:	Bureau Veritas : I3/3E, , Haute Mer, glace II, AUT - PORT, Oceanographic vessel
Nationality (Flag State):	French
Identification Number (IMO/Lloyds No.):	**IMO:**8716071 **MMSI** : 227 222 00
Owner:	Ifremer
Operator:	Genavir
Overall length (meters):	84.6 m
Maximum draught:	5,10 m
Displacement/Gross Tonnage:	3 559 UMS
Propulsion:	Diesel Electric
Cruising & maximum speed:	10/11 knots
Call sign:	FNCM
INMARSAT number and method and capability of communication (including emergency frequencies):	*GSM :* *- 33.6.82.81.38.16 (bridge)* *- 33. 6.82.81.37.89 (captain)* *Fax : 33. 6.29.36.97.41* *Inmarsat :Tel : 00. 0.870.773.160.305 or 00.870.3.227.222.52 (std. auto)* *Fax : 00. 870.783.180.644 (bridge) or 00.870.3.227.222.60* *- Vsat : Tel : 33.2.29.00.85.70 (bridge)*

	Fax : 33.2.29.00.85.71 *- Telex Inmarsat C1 : 058x.4.227.222.14* *- Telex Inmarsat C2 : 058x.3.227.222.15* *(Codes: East Atlantic: 0581 - West Atlantic: 0584 - Pacific : 0582 - Indian Ocean: 0581)* *email : AT.Commandant@atalante.ifremer.fr* *Email Telex C1 : AtalanteC1@skyfile-c.com* *Email Telex C2 : AtalanteC2@skyfile-c.com*
Name of Master:	Philippe Moamaux
Number of Crew:	30
Number of Scientists on board:	30
LEG 2 (Heat flow measurment)	
Name:	***Pourquoi Pas?***
Type/Class:	Oceanographic Bureau Veritas : Class 1, , Service spécial, High Sea, ALP, ALM, ALS, AUT-IMS, AUT - PORT, SYS-NEQ-1, DYNAPOS AM/AT R, COMF-G1
Nationality (Flag State):	French
Identification Number (IMO/Lloyds No.):	IMO 9285548, **MMSI** : 228 207 600
Owner:	Ifremer
Operator:	Genavir
Overall length (meters):	107,6 m
Maximum draught:	6,9 m
Displacement/Gross Tonnage:	7854 UMS
Propulsion:	Diesel Electric
Cruising & maximum speed:	11/13 knots
Call sign:	FMCY
INMARSAT number and method and capability of communication (including emergency frequencies):	GSM : *Tel : 33 (0)6.85.76.63.78 (bridge) - 33 (0)6.82.84.11.60 (captain)* *Fax : 33 (0)6.19.49.78.34* Inmarsat : *Tel : 00.870.7.643.367.38 (bridge)* *00.870.7.643.367.48 (stand. auto.)* *Fax : 00.870.7.643.367.50* Vsat : *Tel : 33 (0)2.98.22.41.15 (bridge) - Fax : 33 (0)2.98.22.41.80* - Telex Inmarsat C : *058x-4-228-207-61 ou 058x-228-207-62* *(Codes: Atlantic East : 0581 - Atlantic West : 0584 - Pacific : 0582 - Indian Ocean: 0581)* - Email : *PP.Commandant@pourquoipas.ifremer.fr* - Email Telex 1 : *PourquoipasC1@skyfile-c.com* - Email Telex 2 : *PourquoipasC2@skyfile-c.com* - *Email : PP.Commandant@pourquoipas.ifremer.fr*
Name of Master:	Gilles FERRAND
Number of Crew:	33

Number of Scientists on board:	40 maximum

4.2 Particulars of Aircraft: NO Aircraft	
Name:	
Make/Model:	
Nationality (flag State):	
Website for diagram & Specifications:	
Owner:	
Operator:	
Overall Length (meters):	
Propulsion:	
Cruising & Maximum speed:	
Registration No.:	
Call Sign:	
Method and capability of communication (including emergency frequencies):	
Name of Pilot:	
Number of crew:	
Number of scientists on board:	
Details of sensor packages:	
Other relevant information:	

4.3 Particulars of Autonomous Underwater Vehicle (AUV): No AUV	
Name:	
Manufacturer and make/model:	
Nationality (Flag State):	
Website for diagram & Specifications:	
Owner:	
Operator:	
Overall length (meters):	
Displacement/Gross tonnage:	
Cruising & Maximum speed:	
Range/Endurance:	
Method and capability of communication (including emergency frequencies):	
Details of sensor packages:	
Other relevant information:	

4.4 other craft in the project, including its use: NO

4.5 Particulars of methods and full description of scientific instruments to be used(for fishing gear specify type and dimension)		
Types of samples and Measurements:	Methods to be used:	Instruments to be used:
Seismic reflexion line	Seismic reflexion	360-channels sesimic streamer / 18 airguns GUN and BOLT representing a total volume of 7070 inch3 (see document "Acoustic impact" for details about the seismic source).
Wide angle lines	Seismic refraction	42 Ocean Bottom seismometers MicrOBS-type will be deployed. 18 airguns GUN and BOLT representing a

		total volume of 7070 inch3
Bathymetry		Kongsberg EM122 multibeam (MBES), very low acoustic level, (see document "Acoustic impact" for details
Sediment profiler	Chirp 3,5 khz	Sub-Bottom Profiler (SBP) very low acoustic level, (see document "Acoustic impact" for details).
Heat flow data	Measurement of heat gradient between the seafloor and 4-m-deep below the seafloor	microprocessor-controlled heat-flow (MCHF) : a 4-m-long cylinder that includes 12 thermistors penetrates the sediment during 8 minutes to measure the heat gradient.

4.6 Indicate nature and quantity of substances to be released into the marine environment:
32 10-kg steel (E24) anchors (no paint, no galva) will ballast the seismometers and will not be collected back onboard. Nothing else will be released in the marine environment.

4.7 Indicate whether drilling will be carried out. If yes, please specify:
No drilling are planned during this cruise

4.8 Indicate whether explosives will be used. If yes, please specify type and trade name, Chemical content, depth of trade class and stowage, size, depth of detonation, frequency of Detonation, and position in latitude and longitude:
No use of explosive

5. Installations and Equipment

Details of installations and equipment (including dates of laying, servicing, method and Anticipated timeframe for recover, as far as possible exact locations and depth, and Measurements):
To acquire Wide-angle seismic data, 32 Ocean Bottom Seismometers will be deployed from the 26 of November 2013 to the 10 of December 2013. The exact locations of the OBSs are provided in the excel table in Annex.

6. Dates

6.1 Expected dates of first entry into and final departure from the research area by the research vessel and/or other platforms:
The expected dates of entry and departure are subject to slight changes (~2days) in case of bad weather, unexpected material issues... 1st leg : seismic data acquisition onboard *Atalante* - first entry : 24/11/2013 - final departure : 24/12/2013 2nd leg : heat-flow measurement onboard *Pourquoi Pas?* - first entrance : 25/12/2013 - final departure : 07/01/2014
6.2 Indicate if multiple entries are expected:
During the survey more than one entry is expected in the UK waters

7. Port Calls

7.1 Dates and Names of intended ports of call: no port call in the country. Port of mobilization and demobilisation for each vessel will be Pointe à Pitre as explained point 8.2

7.2 Any special logistical requirements at ports of call:no

7.3 Name/Address/Telephone of shipping agent (if available): no agent in the country

8. Participation of the representative of the coastal State

8.1 Modalities of the participation of the representative of the coastal State in the research Project:
The Antithesis survey is an international project and scientists or any representative of the coastal State can participate to it. Names of participants (one for each part of the survey) must be sent to the scientist in charge at least 1 month before the beginning of the survey. Participant has to provide a medical certificate testify his ability to embark.

8.2 Proposed dates and ports for embarkation/disembarkation:
Leg 1 : embarkation (24/11/2013) disembarkation (23/12/2013) in Pointe a Pitre (Guadeloupe) Leg 2 : embarkation (24/12/2013) disembarkation (08/01/2014) in Pointe a Pitre (Guadeloupe)

9. Access to Data, Samples and Research Results

9.1 Expected dates of submission to coastal State of preliminary report, which should include The expected dates of submission of the data and research results:
After the survey, data will firstly be used for the herring assessment working group in January 2014. The cruise report will be available in June. All reports and data acquired in the Anguilla (UK) water will be available on demand.

9.2 Anticipated dates of submission to the coastal State of the final report:
The cruise report will be available in June 2014

9.3 Proposed means for access by coastal State to data (including format) and samples:
Segy data for the seismic and text files for the heat flow will be stored on hard disk and could be asked directly to the scientist in charge of the survey (boris.marcaillou@ird.fr)

9.4 Proposed means to provide coastal State with assessment of data, samples and Research results:
(see 9.3)

9.5 Proposed means to provide assistance in assessment or interpretation of data, samples And research results:
(see 9.3)

9.6 Proposed means of making results internationally available:
The data and interpretation will results in scientist publications in international journals and communications in international meeting such as American Geophysical Union (San Francisco, December) and European Geophysical Union (Vienna, April).

10. Other permits Submitted

10.1 Indicate other types of coastal state permits anticipated for this research (received or Pending):
During the Antithesis Cruise, data will be acquired in waters of Antigua-Barbuda, France, Virgin Islands (UK), Netherland, Dominica and Barbados. A similar application for consent to conduct marine scientific research was sent to these coastal states.

11. List of Supporting Documentation

11.1 List of attachments, such as additional forms required by the coastal State, etc.:
- Accoustic impact of seismic experiment on Marine Mammals - Excel file of acquisition location (also show in Annex 1)

Signature:

Contact information of the focal point:
Name: Marcaillou Boris
Country: Guadeloupe - France
Affiliation: University of Antilles Guyana - Institute of Researches for the development
Address: Campus de Fouillole - 97159 Pointe a Pitre - Guadeloupe
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Email: boris.marcaillou@ird.fr

ANNEX I :
Location for seismometers deployment and seismic lines and heat flow measurements

LEG 1 -Seismic acquisition - Vessel *Atalante* - 24/11/2013 to 23/12/2013					
Days	**Action**	**Lattitude**	**Longitude**	**Active seismic source**	**Waters**
Day 1	transit Guadeloupe to OBS 1 location	/	/	No	
Day 2	First entry in Anguilla Water	/	/	No	Anguilla
Day 2 to 5	Deployment of OBSs #1 to #42	/	/	No	Anguilla
Day 2 to 5	OBS #1	18,49°N	62,77°W	No	Anguilla
Day 2 to 5	OBS #2	18,56°N	63,06°W	No	Anguilla
Day 2 to 5	OBS #3	18,63°N	63,35°W	No	Anguilla
Day 2 to 5	OBS #4	18,86°N	63,18°W	No	Anguilla
Day 2 to 5	OBS #5	18,79°N	62,85°W	No	Anguilla
Day 2 to 5	OBS #6	18,70°N	62,54°W	No	Anguilla
Day 2 to 5	OBS #7	18,89°N	62,31°W	No	Anguilla
Day 2 to 5	OBS #8	18,99°N	62,66°W	No	Anguilla
Day 2 to 5	OBS #9	19,09°N	63,04°W	No	Anguilla
Day 2 to 5	OBS #10	19,51°N	63,29°W	No	Anguilla
Day 2 to 5	OBS #11	19,4718°N	63,3054°W	No	Anguilla
Day 2 to 5	OBS #12	19,4336°N	63,3209°W	No	Anguilla
Day 2 to 5	OBS #13	19,3954°N	63,3363°W	No	Anguilla
Day 2 to 5	OBS #14	19,3572°N	63,3518°W	No	Anguilla
Day 2 to 5	OBS #15	19,3190°N	63,3672°W	No	Anguilla
Day 2 to 5	OBS #16	19,2809°N	63,3827°W	No	Anguilla
Day 2 to 5	OBS #17	19,2427°N	63,3981°W	No	Anguilla
Day 2 to 5	OBS #18	19,2045°N	63,4136°W	No	Anguilla
Day 2 to 5	OBS #19	19,1663°N	63,4290°W	No	Anguilla
Day 2 to 5	OBS #20	19,1281°N	63,4445°W	No	Anguilla
Day 2 to 5	OBS #21	19,09°N	63,46°W	No	Anguilla
Day 2 to 5	OBS #22	19,0518°N	63,4754°W	No	Anguilla
Day 2 to 5	OBS #23	19,0136°N	63,4909°W	No	Anguilla
Day 2 to 5	OBS #24	18,9754°N	63,5063°W	No	Anguilla
Day 2 to 5	OBS #25	18,9372°N	63,5218°W	No	Anguilla
Day 2 to 5	OBS #26	18,8990°N	63,5372°W	No	Anguilla
Day 2 to 5	OBS #27	18,8609°N	63,5527°W	No	Anguilla
Day 2 to 5	OBS #28	18,8227°N	63,5681°W	No	Anguilla
Day 2 to 5	OBS #29	18,7845°N	63,5836°W	No	Anguilla
Day 2 to 5	OBS #30	18,7463°N	63,5990°W	No	Anguilla
Day 2 to 5	OBS #31	18,7081°N	63,6145°W	No	Anguilla
Day 2 to 5	OBS #32	18,67°N	63,63°W	No	Anguilla
Day 2 to 5	departure from Anguilla waters to Virgin Island Waters	/	/	No	Virgin Isl.
Day 2 to 5	OBS #33	18,42°N	63,86°W	No	Virgin Isl.
Day 2 to 5	OBS #34	18,4889°N	63,8933°W	No	Virgin Isl.
Day 2 to 5	OBS #35	18,5578°N	63,9267°W	No	Virgin Isl.
Day 2 to 5	OBS #36	18,6267°N	63,96°W	No	Virgin Isl.
Day 2 to 5	OBS #37	18,6956°N	63,9933°W	No	Virgin Isl.
Day 2 to 5	OBS #38	18,7644°N	64,0267°W	No	Virgin Isl.
Day 2 to 5	OBS #39	18,8333°N	64,06°W	No	Virgin Isl.
Day 2 to 5	OBS #40	18,9022°N	64,0933°W	No	Virgin Isl.

Day 2 to 5	OBS #41		18,9711°N	64,1267°W	No	Virgin Isl.
Day 2 to 5	OBS #42		19,04°N	64,16°W	No	Virgin Isl.
Day 6	Line MCS-01 acquisition	From	19,13°N	64,24°W	yes	Virgin Isl.
		To	18,43°N	63,86°W	yes	Virgin Isl.
Day 7	Line MCS-02 acquisition	From	18,43°N	63,86°W	yes	Virgin Isl.
		To	19,90°N	63,77°W	yes	Virgin Isl.
Day 7	Line MCS-03 acquisition	From	19,90°N	63,77°W	yes	Virgin Isl.
		To	19,91°N	63,12°W	yes	Virgin Isl.
Day 7	entry in Anguilla Waters		/	/	yes	Anguilla
Day 8	Line MCS-04 acquisition	From	19,91°N	63,12°W	yes	Anguilla
		To	18,67°N	63,63°W	yes	Anguilla
Day 8	Line MCS-05 acquisition	From	18,67°N	63,63°W	yes	Anguilla
		To	18,58°N	63,36°W	yes	Anguilla
Day 9	Line MCS-06 acquisition	From	18,58°N	63,36°W	yes	Anguilla
		To	19,73°N	62,64°W	yes	Anguilla
Day 9	Line MCS-07 acquisition	From	19,73°N	62,64°W	yes	Anguilla
		To	19,56°N	62,15°W	yes	Anguilla
Day 10	Line MCS-08 acquisition	From	19,56°N	62,15°W	yes	Anguilla
		To	18,51°N	63,12°W	yes	Anguilla
Day 10	Line MCS-09 acquisition	From	18,51°N	63,12°W	yes	Anguilla
		To	18,42°N	62,84°W	yes	Anguilla
Day 11	Line MCS-10 acquisition	From	18,42°N	62,84°W	yes	Anguilla
		To	19,36°N	61,74°W	yes	Anguilla
Day 11	Line MCS-11 acquisition	From	19,36°N	61,74°W	yes	Anguilla
		To	19,06°N	61,94°W	yes	Anguilla
Day 12	Line MCS-12 acquisition	From	19,06°N	61,94°W	yes	Anguilla
		To	19,45°N	63,37°W	yes	Anguilla
Day 12	Line MCS-13 acquisition	From	19,45°N	63,37°W	yes	Anguilla
		To	19,22°N	63,49°W	yes	Anguilla
Day 13	Line MCS-14 acquisition	From	19,22°N	63,49°W	yes	Anguilla
		To	18,86°N	62,17°W	yes	Anguilla
Day 13	Line MCS-15 acquisition	From	18,86°N	62,17°W	yes	Anguilla
		To	18,67°N	62,40°W	yes	Anguilla
Day 14	Line MCS-16 acquisition	From	18,67°N	62,40°W	yes	Anguilla
		To	19,03°N	63,77°W	yes	Anguilla
Day 14	Line MCS-17 acquisition	From	19,03°N	63,77°W	yes	Anguilla
		To	18,81°N	64,01°W	yes	Anguilla
Day 15	Line MCS-18 acquisition	From	18,81°N	64,01°W	yes	Anguilla
		To	18,47°N	62,66°W	yes	Anguilla
Day 15 to 20	Recovery of OBSs #1 to #42		/	/	No	Anguilla
Day 20	departure from Anguilla waters to Antigua-Barbuda waters		/	/	No	Antigua-Barbuda
Day 21-22	Deployment of OBSs #43 to #85		/	/	No	Antigua-Barbuda
Day 23	entry in Anguilla Waters		/	/	No	Anguilla
Day 23	Line MCS-19 acquisition	From	19,02°N	62,24°W	yes	Anguilla
		To	18,86°N	62,07°W	yes	Anguilla
Day 23	departure from Anguilla waters to Antigua-Barbuda waters		18,86°N	62,07°W	yes	Antigua-Barbuda

Day 25	entry in Anguilla Waters		18,58°N	62,28°W	yes	Antigua-Barbuda
Day 25	Lines MCS-21, 22 acquisition	From	18,58°N	62,28°W	yes	Anguilla
		To	18,30°N	62,36°W	yes	Anguilla
Day 25	departure from Anguilla waters to Antigua-Barbuda waters		18,30°N	62,36°W	yes	Antigua-Barbuda

LEG 2 -Heat Flow - Vessel *Pourquoi Pas* - 25/12/2013 to 08/01/2014					
Day 11	First entry in Anguilla Water	/	/	No	Anguilla
Day 11	HF station 24	18,56°N	62,69°W	No	Anguilla
Day 11	HF station 25	18,64°N	62,59°W	No	Anguilla
Day 11	HF station 26	18,75°N	62,46°W	No	Anguilla
Day 11	HF station 27	18,84°N	62,36°W	No	Anguilla
Day 12	HF station 28	18,96°N	62,24°W	No	Anguilla
Day 12	HF station 29	19,04°N	62,14°W	No	Anguilla
Day 12	HF station 30	19,10°N	62,05°W	No	Anguilla
Day 12	HF station 31	19,17°N	61,98°W	No	Anguilla

ANNEX I :
Location for seismometers deployment and seismic lines and heat flow measurements