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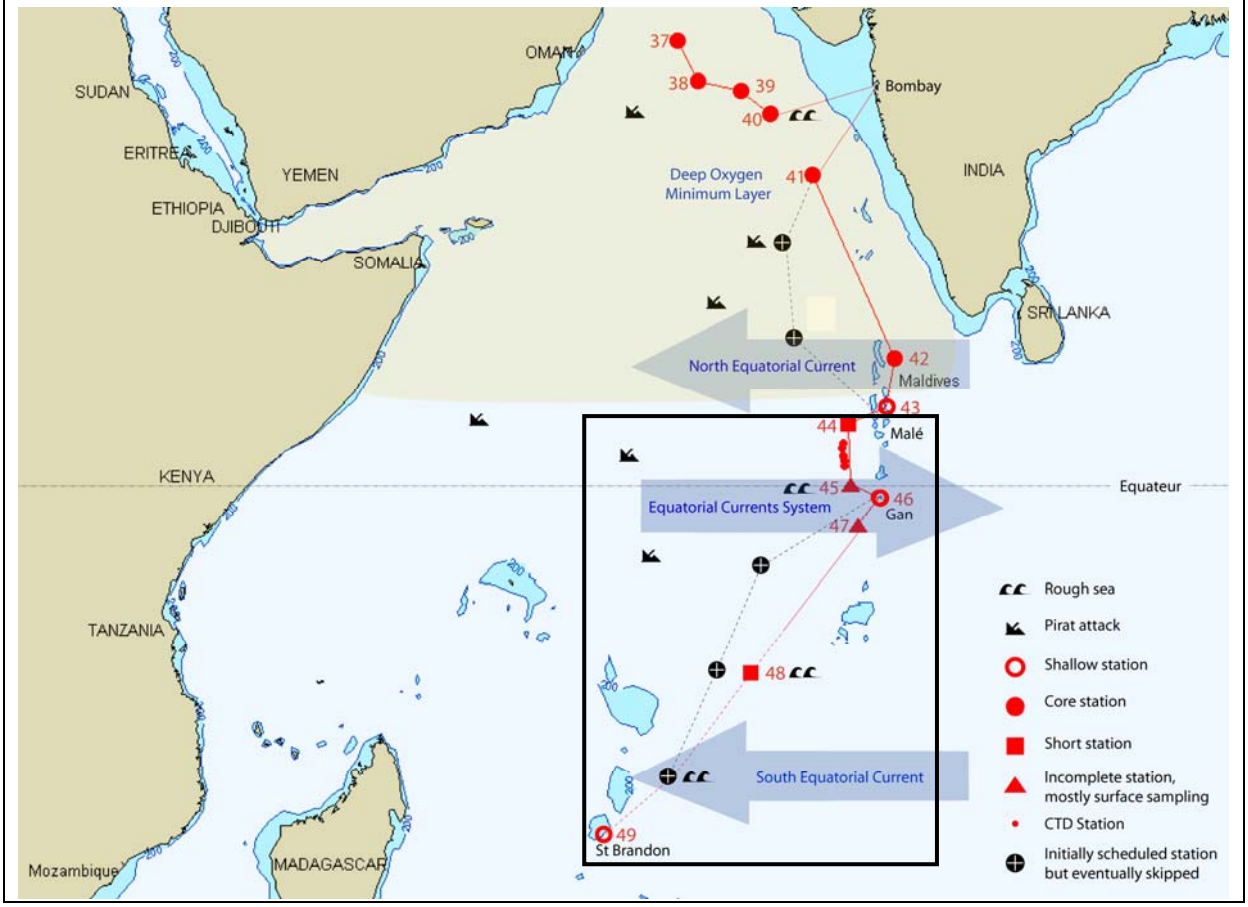
CHIEF SCIENTIST'S SUMMARY REPORT

CRUISE OBJECTIVES

The sampling between Male and StBrandon (Mauritius) aims at collecting and describing planktonic organisms -ranging from viruses to macro-zooplankton - and of physico-chemical characteristics of the water column in the equatorial and south equatorial Indian (Fig. 1).



MAJOR ACHIEVEMENTS & FINDINGS

Open sea stations were carried out in the Northern Equatorial Currentand the Equatorial Current systems. Coastal shallow stations were carried out in lagoons in the Gan (Maldives) and Saint Brandon (Mauritius) atolls.

The utilisation of the Mercator forecast was very helpfull in the positioning of the station with respect to the major surface current patterns (Fig. 2 and 3)

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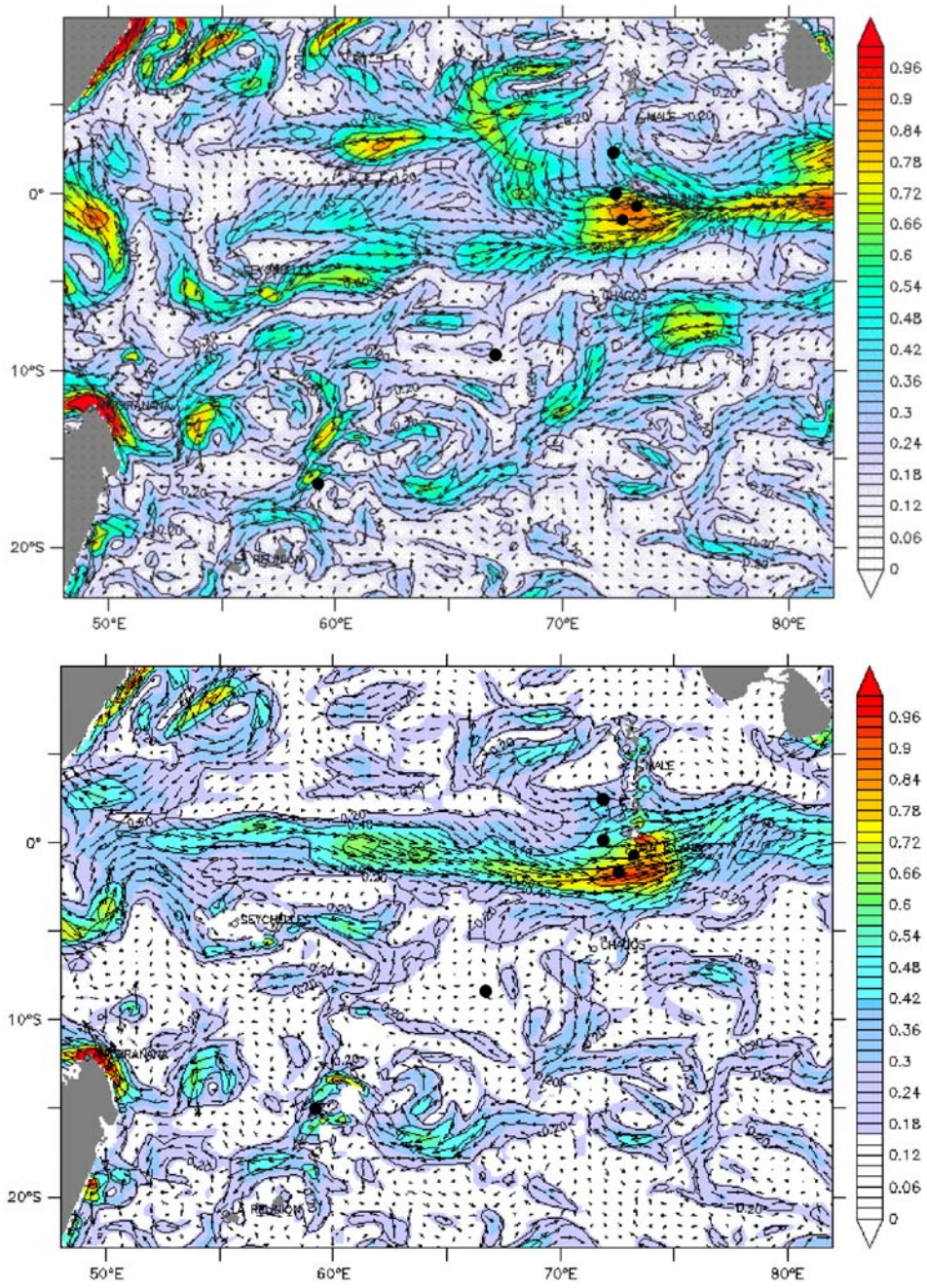

Fig. 2. Position des stations sur les cartes des courants de surface et à 75 m prédits pour le 13 avril 2010 par Mercator

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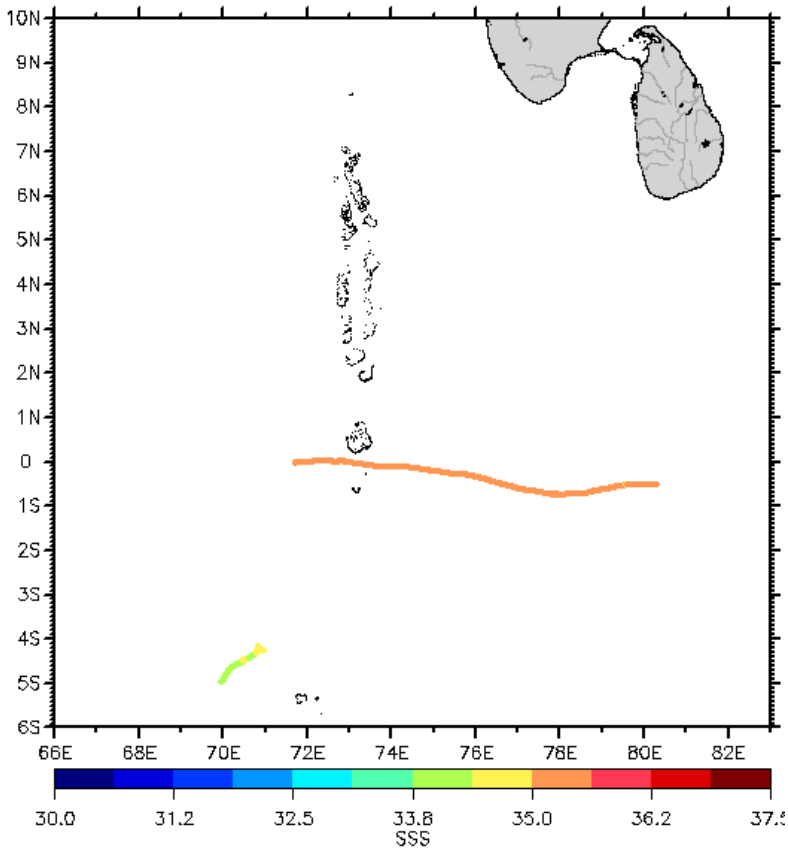

Fig. 3. Salinité de surface et trajectoire des bouées de surface déployées à l'équateur (13 avril) et vers 5°S (17 avril) à la date du 26 avril 2010 (données de G. Reverdin, LOCEAN)

MAJOR CONCERNS & ACTIONS TO TAKE

I discovered and realized the multiple constraints of daily operations specific to the Tara expedition. I am fully aware of the constraints when putting together the imperatives relating to scientists and to media, with limited time allowed. Everyone has his contract and its objectives and strives to achieve its work at best. I am very supportive and appreciated the efforts media coverage and outreach, as I respect and have nothing to say about the choices that were made.

I have, however, some remarks and proposals to make on the balance between the efforts required from scientists and the crew and the time allotted to science. The timetable imposed by the stops and long distances leaving relatively little time for the completion of the stations. It is implicitly necessary to maximize the time available. The "core stations" have become extremely heavy and last between 16 and 18 hours. Transits between stations allow just enough time to finalize the processing of the previous station and prepare for the next station. The recovery time is very short and difficult as it accumulates over a one month period. Furthermore, there is no time available for coping with bad weather conditions (such as the one we met at the last station close to the equator), the failures of scientific equipment or the boat that can delay significantly or impair the achievement of the station.

The intensity of work must also take into account the relative hardship working conditions and life aboard. Tara is a very well insulated boat. The high temperature of the water in the Tropics makes the atmosphere inside the vessel close to that of a sauna most of the day and night despite the air conditioning. On top there are the night shifts which are a regular part of life on board for the crew, scientists and journalists. The fatigue caused by the stifling heat, lack of sleep, the excessive length of "core station" does not allow us to be always vigilant and fully operational, and increases the risk of material and human accidents over a long term period.

So that kind of non-stop work is the rule for conventional oceanographic campaigns that are short-term effort (up to 30 days) it does not seem suited to the Tara Oceans, which will run for a longer period of three years. This is like trying to sprint a whole marathon. The only way to allow time for recovery and preserve human resources is to reduce the scientific program, either by reducing the number of stations, or the content of the stations. This is often a difficult choice because everyone wants to get a maximum of measures, but the reality of the working conditions should drive us.

Personally, what I saw during my stay on Tara and what I understood from the objectives of the expedition will incline me to focus on "core stations". They seem more complete and promising in terms of scientific potential. They nevertheless require to be spread over two days in order to redistribute the 16-18 working hours over 36 hours. This would ensure its completion,taking into account the inevitable weather or equipment uncertainties,and better distribute the workload and incidentally maintain a higher level of security. The time could be save with a station that would run smoothly, will be useful to make up for lost time on another station or to complete some additional steps in a next station.

Some specific recommendations to improve the working capacities are listed in the working strategy comments.

While the Northern equatorial current was correctly sampled, the equatorial current system was incompletely sampled due to bad weather and lack of time. The south equatorial current was also not sampled because of the bad weather.

Moreover, no sampling were made for Methyl Mercury, which was planned to be sampled at the aforementionned stations.

Finally there are two important points to stress :

- It is very important to have a sufficient overlap, at least 2 days, between scientific crews so that a smooth transition is assured with proper exchange of information. This is especially true for newly embarqued people with no previous experience of Tara.
- A scientific crew of 6 people is better adapted for the tasks required in particular those related to observing and imaging plankton as well as tasks which are not currently done (for example dissolved DNA, Girus DCM)

PARTICIPANTS

	ROLE	**NAME, Surname, Affiliation**
1	CREW- Captain	BOURMAUD Hervé, Tara Expeditions
2	CREW- 1st Officer	MENARD Mathilde, Tara Expeditions
3	CREW- Deck officer	REGNIER Baptiste, Tara Expeditions
4	CREW- Chief engineer	DANIEL Julien, Tara Expeditions
6	CREW- Cook	GIRARDOT Julien, Tara Expeditions
7	CREW- Media	BOLLET Alexandra, Tara Expeditions
8	CREW- Media	CASTAGNE Christophe, MC4
9	CREW- Media	BRETAUD Matthieu, MC4
10	SCIENCE- Chief Scientist	DURRIEU DE MADRON Xavier, CNRS Perpignan
11	SCIENCE- Oceanography Engineer	SEARSON Sarah, CNRS Villefranche/mer

12	SCIENCE- Optical Engineer	AMIEL Aldine, Univ. Hawaii
13	SCIENCE- Biology Engineer	NOT Fabrice, CNRS Roscoff
14	SCIENCE- Biology	THOMPSON Anne, MIT, USA
15	SCIENCE- Backup	SARDET Christian, CNRS Villefranche/mer
16	Maldivian Observer	YOOSUF Rilwann, Marine Research Center, Malé

GENERAL DIVISION OF WORK

RESPONSIBILITIES	**NAME**
LOGISTICS – Planning, quality assurance, data & metadata archives	Chief Sci. DURRIEU DE MADRON Xavier
LOGISTICS – Consumables and samples storage & inventories	Biol. Eng. THOMPSON Anne, NOT Fabrice
BGC – Nutrients	Chief Sci. DURRIEU DE MADRON Xavier
BGC – Carbonates	Chief Sci. DURRIEU DE MADRON Xavier
BGC – Hg	Chief Sci.*NOT SAMPLED*
BGC – OM Lugol/Formol	Chief Sci. DURRIEU DE MADRON Xavier
BGC – Cultures	Chief Sci. DURRIEU DE MADRON Xavier
BGC – HPLC	Chief Sci. DURRIEU DE MADRON Xavier
META – Metagenomic	Opt. Eng. AMIEL Aldine
META – Taxo Genetic	Opt. Eng. AMIEL Aldine
META – Taxo Morphology	Opt. Eng. AMIEL Aldine
BACT – GIRUS – VIRUS	Biol. Eng. THOMPSON Anne
PROT – dDNA	Biol. Eng. NOT Fabrice
IMAG – FlowCam	Opt. Eng. AMIEL Aldine
IMAG – Macroscopy	Opt. Eng. AMIEL Aldine, SARDET Christian
IMAG – SeaFlow	Opt. Eng. *NOT WORKING*
IMAG – SPIM	Opt. Eng. *NOT WORKING*
OCEANO – Rosette	Oceano. Eng. SEARSON Sarah
OCEANO – Nets	Oceano. Eng. SEARSON Sarah
OCEANO – Pump	Oceano. Eng. SEARSON Sarah
OCEANO – TSRB	Oceano. Eng. SEARSON Sarah
OCEANO – ARGO floats	Oceano. Eng. SEARSON Sarah
OCEANO - TSG	Oceano. Eng. SEARSON Sarah
OCEANO – FRRF	Oceano. Eng. SEARSON Sarah
OCEANO – ACS	Oceano. Eng. SEARSON Sarah

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CALENDAR OF ACTIVITIES

DATE (MMDD)	ACTIVITY	COMMENTS
April 10	Departure from Male Sailing towards station 44	Good weather
April 11	Short station 44	Test of shadok sampling with rosette. Good weather
April 12	CTD station 45a to 45e	N-S hydrological transect. Good weather
April 13	Core station 45 Deployment of Pacific Gyre and surplas buoys.	Heavy precipitation. Station abbreviated due to rough sea and large drift. Work done corresponds roughly to a short station but with the absence of water sampling with the rosette in the upper 200 m of the water column
April 14	Sailing towards Gan atoll	Good weather
April 15	Shallow station 46 Sailing towards station 47	Desembarked maldivian observer. Good weather
April 16	Core Station 47 Sailing towards Station 48	Station abbreviated due to the lack of time. Problems with one of the engines significantly reduced the maximum transit speed compromising the anticipated arrival time in St Brandon. Only a CTD-rosette in the upper 500 m with water sampling and surface nets were performed
April 17	Sailing towards Station 48 Deployment of Pacific Gyre and surplas buoys.	
April 18	Sailing towards Station 48	
April 19	Short station 48	Station done despite strong drift of the ship
April 20	Sailing towards station 49	Wind and sea state getting rougher
April 21	Core Station 49 Sailing towards Saint Brandon	Station 49 cancelled because of strong wind, large swell and drift of the ship
April 22	Sailing towards Saint Brandon	Strong wind (25-35 knots) and rough sea conditions
April 23	Arrival in St Brandon Shallow station 49	Strong wind
April 24	Change of scientific crew	

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GENERAL ASSESSMENT, SPECIFIC CONCERNS & ACTIONS TO TAKE

(if anonymous, the comments will be taken into consideration in the chief scientist's report)

LIFE ONBOARD

Oceanography engineer (Sarah Searson). Morale very good considering the very trying and tiring circumstances.

Protist sampling (Fabrice Not). Even if the temperature onboard was nearly unbearable and prevented everyone from good rest and sleep most of the time, no problem with life onboard occurred during the leg from Malé to St Brandons.

Optical engineer (Aldine Amiel). Very good, good crew and good spirit

Biological engineer (Anne Thompson). Life on board Tara was generally good in between Male and Saint Brandons. Though, the extreme heat in some parts of the boat made it difficult to sleep and work even with the air-conditioning running. In addition, there was a period of about 24 hours when we were without cooking gas because the fittings for the new tank could not be located. If this period had lasted longer, perhaps it would have adversely influenced life on board but as it was short, it was not too bad.

Science Back up / Squeezed Place (Plankton Observer: Christian Sardet). Good spirits, hard work despite extreme heat and humidity and the non optimal weather and sea conditions which precluded sampling on the second part of the trip.
This gave us time to reorganize and properly relocate all necessary tools for sorting, observing plankton which was scatered over many places. Instructions sheets on how to best set up a lab in small carre and use Zeiss Macroscope and Canon5D camera are posted near the instruments. The inventory off Maco/Micro equipment has been updated.

COMMUNICATION (ONBOARD and WITH LAND)

Oceanography engineer (Sarah Searson). In some ways, communications on board is easy as we are only a small community. However, sometimes it can be difficult given that circumstances change so quickly.
People are very helpful to translate for me, but I have still missed some information due to my lack of language, but that is entirely my problem.
On any ship the flow of scientific and logistical information from land is always somewhat unsatisfactory. Tara in addition has to cope with unusually large numbers of people involved, and a particularly complicated logistical challenge.

Protist sampling (Fabrice Not). Communication between scientists was good, with talks lead by scientist on various subjects.
Attempts were carried out to keep people ashore posted on the current situation. A section "fresh news from Tara" could eventually be implemented on the TIP with Didier Velayoudon as unique contact person for the chief scientist on board. Didier would be in charge of uploading these news.

Optical engineer (Aldine Amiel). Very good. Science group and sailors communicate very well. Science team members great communications too.

Biological engineer (Anne Thompson). As a non-French speaker, I had some trouble understanding everything that was going on, but many members of the crew and scientist s were willing to explain to me what was going on so that I would be informed. I very much appreciated this effort. Among the scientists, I think there could have been a little more communication in advance of the first station after Male. There was some confusion regarding deck responsibilities at that first station.
In addition, communication before my embarkment could have been better. It was difficult to obtain details about dates to arrive in Mumbai and regarding the change in visa requirement. I had to change my flights several times because of changed plans, which was very expensive. In addition, I was not informed that the transit between Saint Brandon's and Port Louis in Mauritius would cost 300 euros until after we left land in the Maldives. I brought the $100 required, but no more, and I am currently uncertain of how I will pay for my passage. Furthermore, this is a significant cost which should have been communicated clearly and in advance or should be covered in full by the expedition.

Science Back up / Squeezed Place (Plankton Observer: Christian Sardet). Communication was good between all Taranautes. Interestingly the mission chief programmed several presentations by scientists on various subjects (ocean currents and falls, protests, the plankton of the Indian ocean..). This was a great way to share with the crew, media and science people. Media people showed Taranautes their completed subjects and as usual Sacha posted the current blog on the toilet door, ideal place for reading and feedback.

SECURITY

Oceanography engineer (Sarah Searson). Safe working practices were basically followed concerning working vests and working shoes on deck. The health and wellbeing of everyone was challenged by the extreme heat. In addition the heat added lethargy to existing fatigue which is still a major ongoing concern, especially for the days surrounding stations.

Protist sampling (Fabrice Not). Security rules have been clearly explained when I arrived onboard. They were quite well respected by everyone (lifejacket, secure shoes, etc…).
Work load of everyone should be considered when thinking about securities issues. Also, regarding the limited amount of space onboard, special attention should be taken to maintain order, and organization to avoid potential injuries.

Optical engineer (Aldine Amiel). Security and safety measures were respected at all time. Especially for equipment deployment.

Biological engineer (Anne Thompson). Security measures on board were explained to me following my arrival by the second captain and security was a priority on board when deciding how the weather conditions would influence our station plans.

Science Back up / Squeezed Place (Plankton Observer: Christian Sardet). OK

SAMPLING STRATEGY

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Chief of mission (Xavier Durrieu de Madron). Two stations were abbreviated or cancelled because of the strong wind (20-25 knots), rough sea state and large swell (2-3 m), and significant drift by the ship (3 knots). I believe these conditions will be quite common for the following months during the travel through the southern Indian and Atlantic oceans during the austral wintertime.
Two improvements should be made to allow the manipulation of gears (CTD-Rosette and nets) in rough seas. A shock absorber need to be installed to allow the safe deployment and recovery of the CTD-Rosette. A sea anchor is needed to slowdown the drift of the ship and improve our work capabilities.

Oceanography engineer (Sarah Searson). The time needed before and after a station should NOT be forgotten when talking about how long a station takes. For me, a 16 hour long station, in reality will last 20 consecutive hours with another 3 or 4 hours the following day. The proposed solution of a long station over 2 days would help alleviate this particular problem.

Protist sampling (Fabrice Not). Sampling strategy has been essentially based on maps of currents to sample the main water masses we went across (North equatorial, equatorial, and south equatorial currents). For biology, it would have been interesting to be able to consider surface chlorophyll maps for stations selection. Overall the sampling schedule has been largely perturbed by a series of unpredictable events (inherent to any field work), in general pointing to the overly tight planning of events meaning that the boat is always short on time and sampling time turns out to be often the easiest compressible amount of time. A deep reflection / discussion on the global sampling strategy and stopover planning need to be performed as soon as possible.

Optical engineer (Aldine Amiel). Really well organized for my job (optical engineer)

Biological engineer (Anne Thompson). The sampling strategy was influenced greatly by the time available and sea state from our departure from Male to Saint Brandons. As a result, there were two-three stations that were planned then abbreviated or canceled because of time or weather. It seems to me that we should have spent less time sampling the atolls in the Maldives (we completed two short stations in two different atolls) in favor of open ocean stations where we could sample different currents and water masses and cover gradients of nutrients with distance from land.
It is likely impossible, but it seems like there should be more flexibility at the end of each leg. Because of being pressed for time, we nearly had to skip sampling of an entire ocean transect. This would have been quite a shame for the science of the expedition. If scientists could remain on board for longer periods of time, some of these problems would be fixed as there would be fewer exchanges of personnel and more flexibility in the schedule. In addition, if places easier to access are chosen for starting and ending the legs of the trip, logistics would be easier. For example, in Saint Brandons, the crew embarking and disembarking must use a fishing boat/ferry that runs only once every two weeks, thus timing of arrival is very important. If we were to end in a more convenient place, such as Port Louis on Mauritius, the logistics could be easier and more priority could be given to sampling.

Science Back up / Squeezed Place (Plankton Observer: Christian Sardet). As plankon oberver I adapted to live samples provided to me throghout the stations. Also used the Plankton light trap on 2 occasions (Male / Gan lagoon) and obtained planktonic material for imaging while Tara was anchored

STATION PREPARATION

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Protist sampling (Fabrice Not). Good preparation of the stations within the scientist team. A meeting led by the chief scientist explained to everybody the location and the sampling strategy applied during the station.
For the protist protocol, I re-organized the working boxes by depth. 1 box for surface and 1 box for DCM. It is more convenient to use during the sampling procedure.
The preparation of station went well and is efficient as it is organized now. Regarding the aliquots, there is no need for FISH aliquots in 250 Nalgene bottles as those bottles are only use for SW fixation prior to filtration and could be re-used later. As it is now it generates lots of plastic ware waste and takes a lot of space (one of the main issue on board).

Optical engineer (Aldine Amiel). Good

Biological engineer (Anne Thompson). Station preparation went very well with the barcode labeling system and station log sheets that are being used. These tools made it simple to collect and label all the appropriate sample containers and types of filters in advance of the station. The inventory Celine put together made it easy and quick to find the right materials for each station. Pre-aliquots of fixatives such as for virus TEM, sybr staining, and flow cytometry (glutaraldehyde) made it even easier to prepare for each station. One thing I noticed after leaving Male was some confusion on deck at the beginning of the stations. Once we arrived on station, we lost some time because we were not ready to start sampling right away. Perhaps there is a better way to communicate the responsibilities to each member of the science team before stopping on station. In addition, another station started at 7am instead of 8am. I found this extra hour useful for completing more of the sampling before the mid-day meal.

Science Back up / Squeezed Place (Plankton Observer: Christian Sardet).
Set up lab in petite carre for plankton sorting and preparation fotr macro/micro imaging. Reorganized all the elements to ease set up of functional lab including sheets of instructions / storage with drawings.

ACTIVITIES ON DECK (e.g. instruments, protocols, timing)

Oceanography engineer (Sarah Searson). We would benefit enormously by an extra crew member. This would save time and add to safety.
Thanks to Aldine who has helped with Nets + CTD deployments and recoveries. Also all others who gave time whenever asked for help.

Protist sampling (Fabrice Not). Deployment of surface pumping went well. Because of sea conditions no deployment was performed for deep pumping. Also at some stations the drift was important and prevented the deployment of 20µm nets.
I prepared one of the grey box on deck to receive 2 additional LN2 dewars.

Optical engineer (Aldine Amiel). Excellent

Biological engineer (Anne Thompson). As the person sampling for TANIT, many of the deck activities (CTD, nets, etc) are not important for sampling. For pumping, it helps the person sampling for TANIT greatly if someone is present and willing to help rinse and fill the 100L bottles while the RNA filtration is started. With someone helping in this way, the pumping time is shortened greatly.

ACTIVITIES IN THE WETLAB (e.g. instruments, protocols, timing)

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Protist sampling (Fabrice Not). All samples for genetics were stored in 15ml tubes filled with 10ml RNALater and subsequently frozen at -20°C.
LN2 tanks are full and need to be re-filled as soon as possible.
At station 45 the GPSS cod end 5µm plastok broke and has been replaced using spare found in the forward haul.
The first station performed after Malé was a short station coupled with a SHADOK sampling. We did not do the P3 (bathypelagic) because of 2 unsuccessful CTD cast at 1200 and 1000 meter depth. Filtration through 3µm and 0.2µm took ca 1:30 with the BGV pump. We should probably use the protist pump in order improve the filtration process.
WetLab improvements to come:

- The 2 water jet pumps and the vaccum pump will be replaced by flow through pumps. This will allow saving space on the shelves and under the chemical bench. Flowing of the water directly to the sea will make the procedure easier.
- Chemical cabinet will be installed on the outside of the wetlab to avoid toxic vapor in the working area
- A small fridge will be installed under the chemical bench.

Biological engineer (Anne Thompson). The protocols for TANIT are very good, in general. I think one of the most challenging parts of the protocols and stations is the timing of each of the different sample types. I was lucky that Defne Arslan was still on Tara between Mumbai and Male. She showed me how to work through the protocols for maximum efficiency. It would be great if there could be overlap for each job as it would have been difficult to become acquainted with the protocols and timing of sampling on my own.
A large bottle-neck in the TANIT protocol is the sampling for GIRUS on a 0.1um filter and the VIRUS sampling for DNA using the FeCl3 precipitation method. An extra filter rig dedicated to filtering the FeCL3 would be very useful as one channel of the multichannel pump is available since the bacteria filter rigs are not being used when it is time for the FeCl3 sampling. This would allow the 0.1um sampling for GIRUS and the FeCl3 filtration to proceed at the same time and would shorten the day for the TANIT sampler.
Some of the pumps used in the wetlab make filtering a little more complicated than necessary. I do not know the name of the pumps, but they require a certain volume of liquid in the pump to work. While filtering, one must keep an eye on the pump to make sure too much liquid has not accumulated. Then, a valve must be opened to allow just enough liquid to leave. A less attention-requiring pump in this position would allow better multi-tasking for the person sampling for TANIT.
There is a place in the wetlab where liquid collects on the floor. It is under the racks for the 20L FeCl3 carboys on the left side where several cords pass through the floor. There is some open space between the cords and the floor but not enough to allow water to drain. A drainage hole placed in this spot would make for a little cleaner floor as standing water would be eliminated.

ACTIVITIES IN THE DRYLAB (e.g. instruments, protocols, timing)

Oceanography engineer (Sarah Searson). By far the most disruptive problem to the data collection is the issue of POWER.
TSG GPS is not functional, and has been an intermittent problem for a long time.
Sea water flow blockages can be an issue requiring time to sort out (on this occasion, due to other time commitments, it took over 2 days)
Otherwise TSG, ACS, FRRF have been working well.

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Tarabak was installed on the TaraNAS server by Uros in Male and is being developed to coordinate the backing up of data in the Dry Lab. It is a work in progress but looks very promising and user friendly!

Protist sampling (Fabrice Not). One of the best place to sleep !!!
We experienced connection problems with the pump of the flowcam, it would need to be revised at some point.
Unfortunately, because of the time required for the protist protocol and the bad sea we had toward the end of the leg I could not really test the new equipment installed in Malé on Stereodiscovery.

Optical engineer (Aldine Amiel). Great, but two people inside the dry lab (one optical engineer and one technical deck) is definitively enough for all the work to do. Because lots of instrument onboard inside the dry lab are currently not working (seaflow, spim…) and because the space, 3 people IS TOO MUCH! Currently, the optical engineer can easily work alone during station to help people for the net, to fix samples, to use flowcam, and between station to use the discovery, and the macroset photography. And the technical deck can easily do all his job too.
A few problems to address:
Concerning the flow cam, I had some connection problem with the pump. I needed to unplug and plug the pump again to have it working fine.
Some connection problem with the mouse and the keyboard too.
The seaflow and the Spim are not functional at this time.

Science Back up / Squeezed Place (Plankton Observer: Christian Sardet).
Set up new transmission base for discovery Macroscope with Aldine. The macroscope nowpProvides good images in bright and dark fields. Acquisition of films and still images with Macroscope fitted with Canon5D for HD format have been optimized sheet of instruction provided and is on a laminated sheet near the screen.

EQUIPMENT & CONSUMABLES (e.g. filters, tubes, chemicals)

Oceanography engineer (Sarah Searson). Not involved in this activity, engineers gear pretty self-contained and self- managed

Protist sampling (Fabrice Not). In order to save space in the forward haul, Anne Thompson and I sorted out the material stored and moved to the forepeak the equipments not used on a regular basis during the sampling procedures. We updated the lists and gave them to Céline Dimier.
Storage of aliquots has to be optimized.

Optical engineer (Aldine Amiel). Great. Need more slide and cover slide.

Biological engineer (Anne Thompson). Everything I needed was available in the supply storage. Supplies were well organized in boxes with a convenient inventory created by Celine.
Use of 250ml square plastic bottles for the FISH sampling seems like a waster of plastic and a waste of space in the garbage. Perhaps another vessel could be used for the FISH fixation that takes less volume when it is disposed of? Or, maybe there is a way clean and reuse the containers in order to minimize waste.

SAMPLE STORAGE

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Chief of mission (Xavier durrieu de Madron). After the breakage and loss of 3 bottles of formmaldehyde phytoplancton samples from station 47, thez storage in the fridge at +4°C has been secured with bungees to avoid the accidental fall of boxes due to the rolling of the ship.

Oceanography engineer (Sarah Searson). Not involved in this activity. Gear storage continues to be improved, bit by bit.

Protist sampling (Fabrice Not). Fridge: Because of bad sea conditions, one box fall down from the fridge and 3 brown glass bottles broke. Xavier and I set up bungies to prevent samples from falling.
-20°C: Aliquots need to be organized better.
LN2: One of the LN2 tank is full of samples. Last station samples were not put in the canister because space was lacking. They were directly thrown in the LN2 tank. Need re-fill asap. The use of cryocanes and plastic sleeves improves a lot the storage and recovery of samples, it should be used more regularly. We need to buy more of those.

Optical engineer (Aldine Amiel). Good, considering the challenge of small multifunction space

Biological engineer (Anne Thompson). Sample storage was fine for all samples except those that were flash frozen in liquid nitrogen. There was not a lot of space in the liquid nitrogen dewar for samples and often it was a little difficult to fit the racks back in after removal. Otherwise, the sample storage system in the -20 freezer and refrigerator in the cale avant worked well.

METADATA & DATA

Chief of mission (Xavier durrieu de Madron). It would be interesting for the chief scientist to upload (via Didier Velayoudon) the work plan of the last station so that scientific coordinators can check and see the progress of the on going sampling.

Oceanography engineer (Sarah Searson). It has been a great improvement for me, that the filling in (+ scanning) of Tara logsheets is now the responsibility of the Chief Scientist!

Protist sampling (Fabrice Not). In the labsheets, one of the flowcam labeling for 20µm does not match the protocol.

Optical engineer (Aldine Amiel). Great

OTHER

Oceanography engineer (Sarah Searson). Scientists/media should be made aware before they arrive of the importance of Night Watches and communal chores.
As has been said before, it should be made clear to non-francophones, before joining Tara, that French is the dominant language. That way they can be a little better prepared.

Protist sampling (Fabrice Not). When a new sampling team arrives on board I think it is a good idea to start with a short or half core station in order to get familiar with the location of all the consumable and material required.