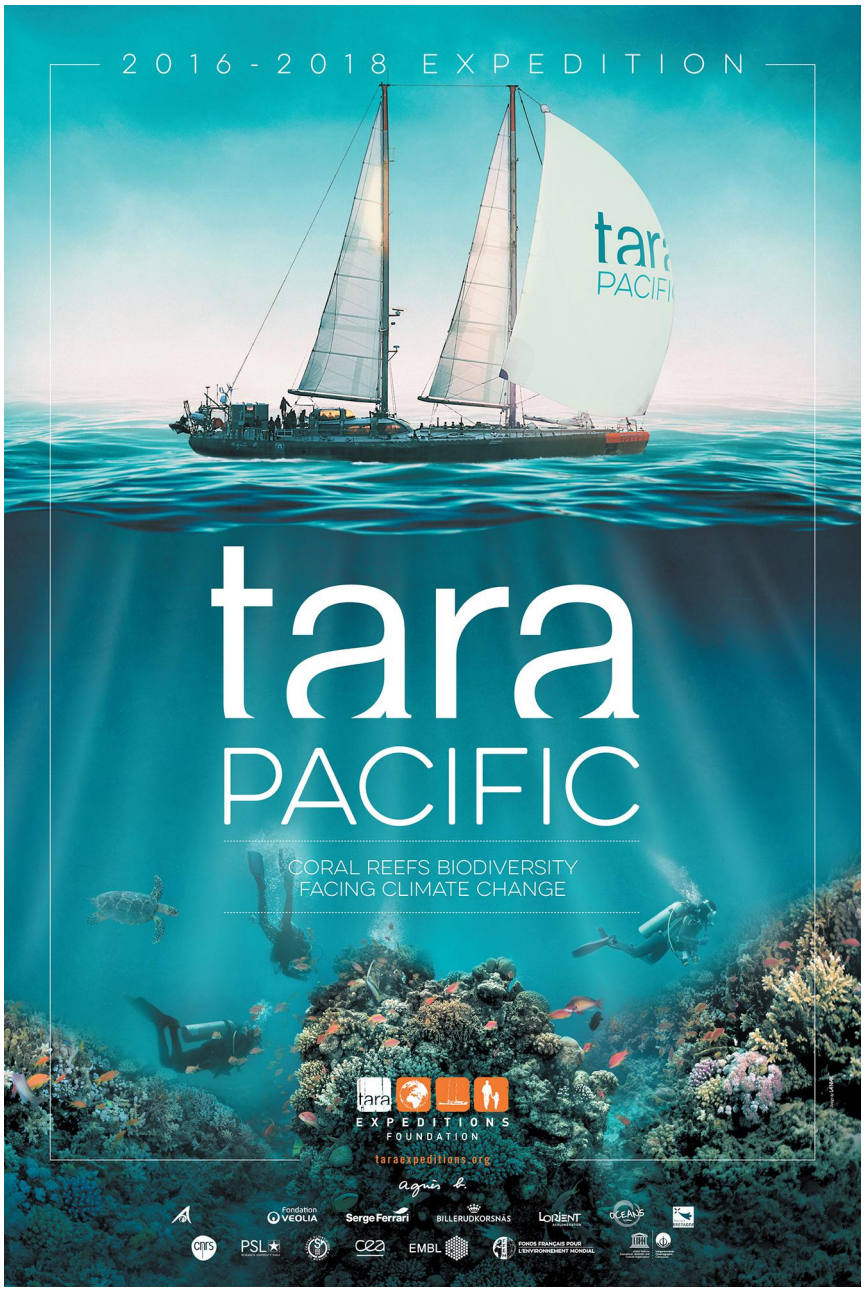
PRESS RELEASE



tara EXPEDITIONS FOUNDATION

tara PACIFIC

PSL RESEARCH UNIVERSITY PARIS

cea

CENTRE SCIENTIFIQUE DE MONACO

cnrs

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SUMMARY

1. PROGRAM

Launch of Tara PACIFIC 2016-2018

Coral reefs biodiversity facing climate change

- Press conference -
Thursday, Avril 14, 2016 – 10:00
CNRS - 3, rue Michel-Ange, Paris 16th
Métro Michel-Ange Auteuil (Lines 9, 10)

The research schooner Tara will leave Lorient, her home port on May 28th 2016 for a new expedition in the Asian Pacific. Our goal? To study in a thorough and innovative way the evolution of coral reefs in response to climate change and the pressure of human activities.

From east to west and from south to north, Tara will traverse the Pacific Ocean to explore the hidden diversity of coral and gain a better understanding of its ability to adapt to climate change. Though coral reefs cover only 0.08% to 0.16% of the ocean's surface, they include nearly 30% of marine biodiversity. Their good health is crucial to the diversity of the species they shelter, but also for humanity. Studying this ecosystem throughout the Pacific Ocean is a priority because a large number of coral reefs – true indicators of the ocean's health – have been disappearing in recent years.

Speakers

- Stéphanie Thiébault, director of the CNRS Institute of Ecology and Environnement
- Thierry Coulhon, president de Paris Sciences and Letters
- Serges Planes, CNRS director of research at CRIOBE (EPHE / CNRS / UPVD) and scientific director of Tara Pacific
- Denis Allemand, scientific director of the Monaco Scientific Centre and scientific co-director of Tara Pacific
- Etienne Bourgois, founder and president of the Tara Expeditions Foundation

Organization: Romain Troublé, général director of the Tara Expeditions Foundation

#TaraPacific

2. THE TARA PACIFIC TEAM

Etienne Bourgois

Founding president of the Tara Expeditions Foundation and CEO of agnès b. for over 20 years, Etienne Bourgois heads Tara Expeditions with Romain Troublé, general director of the Foundation.

"*Agnès b and I acquired the schooner Tara in 2003 in order to create Tara Expeditions. The project developed from our passion for the ocean, infused with a humanistic, engaged vision. Thanks to our legendary boat and faithful partners, we take action to protect the environment and promote research. Tara's scientific expeditions are focused on the ocean and its biodiversity, confronted today with climate change and pollution. Our expeditions result from collaboration with scientific institutes and bring concrete results on these topics. To date we have completed 3 major expeditions: Tara Arctic, Tara Oceans, and Tara Mediterranean. Every day the Tara Expeditions Foundation acts to increase the environmental awareness of the general public and young people. We also encourage politicians to take action to protect the environment. This exceptional boat must continue her mission as Ambassador for the world's citizens. Tara must remain a catalyst of energy and tackle the essential question facing us all: What future are we preparing for our children? This has been my motivation for the past 12 years and will remain the same during the upcoming Tara Pacific expedition.*"

Romain Troublé

Director of the Tara Expeditions Foundation, Romain Troublé received training in two fields with a Masters 2 in molecular biology (UPMC) and a Masters at HEC-TelecomParis. He was also a sailboat racer at the highest level, participating twice in the America's Cup French challenges in 2000 and 2003 in Auckland. From 2003 to 2006, he organized polar expeditions for the Cerpolex company specializing in polar logistics in the Arctic, Antarctica and Siberia for recreational, touristic and scientific expeditions, including the discovery of frozen mammoths. Since 2004 he has been responsible for the operational management of Tara Expeditions and is now general director of the Tara Expeditions Foundation.

Serge Planes

Scientific director of the Tara Pacific expedition, Serge Planes is a director of research at the CNRS Island Research Center and Environment Observatory (CNRS / EPHE / UPVD) and director of Paris Sciences and Letters – Environnement. Specialist in population genetics of coral reef fish, he is co-author of over 185 scientific articles on this subject, but also on the ecology of marine protected areas and recruitment of fish. His early work suggested that connectivity between the marine environment and coral reefs occurs in a much smaller space than was generally accepted before the early 90s. Serge Planes and his team demonstrated that local connectivity and self-recruitment (*i.e.,* the return of fish larvae to their population of origin) are essential to the local renewal of marine populations. This research led the international community to understand that marine systems are more closed than had been previously assumed. Serge Planes directs the Laboratory of Excellence (Labex) "CORAL" which brings together more than 80 coral reef specialists from 9 major French institutions: EPHE, IRD, IFREMER, CNRS, EHESS, Universities of La Réunion, New Caledonia, French Polynesia and Antilles-Guyane.

Denis Allemand

Co-director of the Tara Pacific expedition, Denis Allemand is scientific director of the Monaco Scientific Centre (CSM). Professor of biology at the University of Nice-Sophia Antipolis, he is currently on leave. His main area of research concerns the physiology of marine organisms (especially coral) and their use as model organisms for understanding some of the major biological processes (biomineralization, symbiosis, etc.) Co-author of more than 130 scientific articles and numerous chapters of books, Denis Allemand is a member of several scientific commissions including the Oceanographic Institute's Albert I Prince of Monaco Foundation; the Prince Albert II Foundation; the Ecole Pratique des Hautes Etudes; and IFREMER. He is also member of the board of directors of the Observatoire Océanologique de Villefranche-sur-Mer (CNRS / UPMC). He was named Knight of the Order of St. Charles, of the Order of Grimaldi, and of the French Order of Maritime Merit, as well as Officer of Academic Palms.

Martin Hertau

Captain of Tara Martin, Hertau is from Saint-Malo. Sailing since adolescence, he obtained his captain 500 certificate in 2004 and the mechanic 750 kilowatts in 2011. He has always been attracted by polar regions, and in 2008 the opportunity arose to work in northern Norway. He will spend there three seasons as captain then three seasons in Spitsbergen. His experiences then led him on the east coast of Greenland, and in Antarctica. It was during an Antarctic Peninsula return that he "encountered" Tara in Puerto Williams in Chile. In August 2011 he embarked on Tara for the first time during the Tara Oceans expedition. Then he sailed as a captain during Tara Oceans Polar Circle in 2013. He will be captain in turn with Samuel Audrain throughout the Tara Mediterranean Mediterranean expeditions and then for the Tara Pacific expedition.

Samuel Audrain

Captain of Tara. “It took a while for me to realize that sailing could become my career and an important part of my life. I was studying at the UCPA and Glénans, and I wanted to share what I had learned. Later on, a combination of chance, luck and nerve took me to Clipperton Island in the Pacific to work with the explorer Jean-Louis Etienne. At the time I was sailing towards Clipperton, I had already heard a lot about the boat called Antarctica – Tara's former name. Jean-Louis Etienne transformed chance into action by putting me in contact with the new owner of the boat, Etienne Bourgois. I met Etienne, and my first mission aboard Tara began in 2005, in South Georgia. A few months later, I embarked on Tara for the Arctic Drift – 11 months in the heart of the icepack, following in the wake of the famous Fram expedition of 1893. I embarked as a sailor 10 years ago, and became captain of Tara in 2015”.

The Tara Expeditions Foundation was created in March 2016

“In March 2016, the French state acknowledged Tara Expeditions as a public interest foundation for contributions to the scientific understanding of the Ocean, and for education, mediation and advocacy work among the general public”.

3. PRESS RELEASE

Press conference - April 14 - CNRS - PARIS

Tara PACIFIC 2016-2018

Coral reefs biodiversity facing climate change

The research schooner Tara will leave her home port of Lorient on May 28th 2016 for a new expedition in the Asian Pacific. The boat will sail nearly 100,000 km around the Pacific Ocean for more than two years. The interdisciplinary team of scientists aboard, coordinated by the CNRS and the Scientific Centre of Monaco (CSM), will examine in a new way the biodiversity of coral reefs and their evolution in response to climate change and human activities. This adventure is sponsored by the CNRS, PSL, CEA, CSM and many other public and private partners.

Coral reefs cover less than 0.2% of the oceans' surface, yet they include nearly 30% of known marine biodiversity. Their health is crucial to the diversity of species, and also for humanity. Studying this fragile and endangered ecosystem is a priority since a large number of reefs have been disappearing in recent years.

From east to west and from south to north, Tara will criss-cross the Pacific Ocean to explore the hidden diversity of coral reefs and gain a better understanding of their capacity to adapt to climate change. From the Panama Canal to the archipelago of Japan (2016-2017), from New Zealand to China (2017-2018), the schooner will traverse 11 time zones of the world's largest ocean, and visit the most remote islands and reefs.

A novel approach to reef biodiversity

This expedition is unique in that it will cover such a huge geographical area – the Pacific Ocean – where over 40% of the world's coral reefs are concentrated. A study on this scale has never before been accomplished.

According to Serge Planes, CNRS researcher and scientific director of the expedition, "*Tara Pacific will explore each reef 's hidden biodiversity – genomic, genetic, viral and bacterial – in order to compare it with the biodiversity of the surrounding body of water. Our goal is to get a real idea of the overall diversity of a coral colony."*
This approach will give us new information concerning the still-unknown role of biological, chemical and physical parameters in the life of coral colonies and their ability to adapt to environmental change.

The Tara Pacific expedition will traverse a very wide gradient of biodiversity, culminating in the "Coral Triangle" of Southeast Asia. During the expedition, 40 different archipelagos will be studied, each in exactly the same way, so as to detect variations in the presence of 3 reef species: 2 corals and 1 small invertebrate in the hydroid family.
Adopting a comparative and interdisciplinary approach, scientists will review the recent past of coral colonies to observe the contemporary evolution of the reefs, and to envisage the future, especially through computer simulations.

Besides the state of health of each reef and its biodiversity at different levels, the scientific team will focus on the capacities of resistance, adaptation and resilience of the reef ecosystems. A last aspect of our study will focus on the potential applications of coral biology to medical research.

Educate and inform on environmental issues

"The scientific community needs new data, but local and international groups need this information too. Tara will contribute to a better understanding of issues affecting the reefs, these cradles of biodiversity so important for the future of some populations, especially on small islands", says Etienne Bourgois, President of the Tara Expeditions Foundation.

The Tara Expeditions Foundation will use this expedition to inform people in the political and business worlds, to raise public awareness about the most pressing environmental challenges and problems faced by populations that depend on the ocean's good health. Many stopovers in the Pacific and in Asia will allow us to share information on environmental issues with as broad a public as possible.

Major stopovers

Panama, Malpelo (Colombia), Easter Island, Papeete (French Polynesia), Cook Islands, Samoa, Wallis and Futuna, Marshall Islands, Micronesia, Mariana, Japan, Taiwan, Fiji, New Zealand, New Caledonia, Papua New Guinea, Philippines, China, Hong Kong, South Korea, etc.

Major partners

- agnès b., Prince Albert II of Monaco Foundation, Serge Ferrari, Veolia Foundation, BillerudKorsnäs, Lorient Agglomération, Région Bretagne, World Courier, Oceans by Disney
- CNRS, Paris Sciences and Letters, Centre scientifique de Monaco (CSM), CEA, EMBL, Fonds Français pour l'Environnement, Unesco-Commission Océanographique intergouvernementale

4. TARA PACIFIC EXPEDITION 2016-2018

Having sailed the seas of the planet to explore the world of plankton during the Tara Oceans expedition, and after assessing the impact of plastic pollution in the Mediterranean Sea, Tara continues her missions. Just as the multidisciplinary Tara Oceans expedition allowed us to cross a new frontier in our knowledge of the ocean, for the next 2 years Tara will study the state of health of Pacific coral reefs.

The Tara Pacific expedition is co-coordinated by Serge Planes, CNRS researcher at CRIOBE (CNRS / EPHE / UPVD) and by Denis Allemand, scientific director of the Scientific Centre of Monaco (CSM). Throughout the expedition, educational outreach efforts aimed at the general public and schoolchildren will focus primarily on the importance of coral reefs to island nations and to humanity in general.

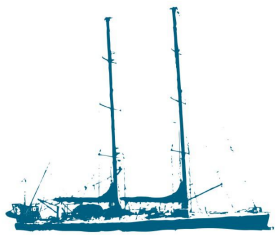
How did this new expedition come to be?

During the Tara Oceans expedition (2009-2013) devoted primarily to the study of plankton, Tara sailed the high seas, but also approached remote reefs with coral experts aboard, including Francesca Benzoni (University of Milan - Bicocca). Starting in 2010, a first research program documented as clearly as possible comparisons between coral in the Indian Ocean and the Pacific Ocean (or Indo-Pacific). A new species of coral was even discovered in the Gambier Islands in French Polynesia. It was baptized *Echinophyllia tarae* in reference to the schooner.

In 2013, Tara returned to her home port of Lorient after collecting plankton for 4 years. For Etienne Bourgois, Romain Troublé and the Tara Expedition crew, mobilizing the schooner for an expedition devoted to coral reefs is a logical follow-up.

The Tara Pacific route

Our new study will cover Pacific Ocean coral reefs from east to west and from north to south. From the Panama Canal to the archipelago of Japan (2016-2017), from New Zealand to China (2017-2018), Tara will travel through 11 time zones across the Pacific, visiting the most isolated islands and reefs on the planet. Reefs to be explored during the second year of navigation will be determined in the course of 2016.



tara EXPEDITIONS FOUNDATION

tara PACIFIC
2016 - 2018

5. SCIENTIFIC OBJECTIVES OF THIS NEW EXPEDITION

Why study corals?

Threatened by global warming and ocean acidification, coral reefs play a crucial role both ecologically and economically. Given their extreme sensitivity to changes in the environment, they are good indicators of the ocean's state of health. For Tara Expeditions, studying coral means alerting as many people as possible about the many environmental challenges that today affect the ocean, a key ecosystem for humanity.

By examining coral reefs, Tara Pacific scientists will try to answer 2 major questions: **1. How does this fragile ecosystem function**, and **2. What is its capacity to adapt to climate change?** Scientists will focus on the evolution of these ecosystems in the context of climate but also demographic changes.

The Pacific from east to west and from south to north

This kind of study has never before been accomplished over such a broad geographic area, though many local research projects have already been done on coral reefs. The unique nature of this expedition is its global approach, offering us the chance to establish an inventory on a spatial scale never before apprehended.

The Tara Pacific expedition will pass through a very wide gradient of biodiversity, culminating in the “Coral Triangle”, considered a “hotspot” of biodiversity. Using a comparative and interdisciplinary approach, the scientific team will try to understand the recent history of the first coral settlements, observe the contemporary evolution of the reefs visited, and envisage the future through computer simulations.

The areas covered by Tara during her route across the Pacific Ocean include many islands and reefs spread over vast territories. For example, French Polynesia alone comprises 347 islands spread over nearly 6,800 km2. Some of these islands are subject to direct and local disturbances, but the vast majority are far from sources of anthropogenic pollution and therefore allow us to principally measure the disruptions resulting from natural changes in the Earth's ecosystem.

The Tara Pacific expedition offers us the opportunity to distinguish the effects of local disturbance (pollution, urbanization, sedimentation due to erosion) from the impact of global change (warming, ocean acidification) and to assess the health of coral populations subjected to these 2 different types of disruption.

THE TARA PACIFIC EXPEDITION WILL FOCUS ON 4 LINES OF RESEARCH

- Biodiversity of coral reefs: The different levels of complexity, from their genome to the whole ecosystem.
- Reef health in the context of climate change: How is climate change actually affecting the health of coral reefs? Most of the islands or islets to be explored during the expedition are geographically isolated from human activities and therefore preserved from sources of anthropic disturbance.
- Capabilities of resistance, adaptation and resilience of coral reefs: How are these habitats responding to climate change?
- From reef biology to human health: Possible applications for future medical research.

Focus “From gene to ecosystem”

Corals represent an ancient group of animals, from which metazoans - all multicellular animals - derive. As such, corals are considered to be the first true “metazoans”. Sequencing their genome therefore provides an opportunity to access the origin and evolution of functional processes in metazoans.

Beyond their genomic complexity (similar to the one of vertebrates), corals also demonstrate considerable biological complexity. They live in symbiosis with photosynthetic micro-algae, and host a diversity of bacteria, viruses and other symbionts with which they maintain an intimate and sustainable association. This coral/symbiont group forms an entity called “holobiont”. Its equilibrium depends on the relationship between the host (coral) and all the symbionts. One of the main objectives of the Tara Pacific expedition is to thoroughly study 3 aspects of holobiont diversity:

- genetic diversity by studying the genomes in a whole group of populations (meta-bar coding)
- diversity of gene expression (transcriptome)
- diversity of metabolic processes (sugars, amino acids, fatty acids, etc. - the “metabolome”).

“TRANSECT AND ONE-TIME STUDY LOCATIONS”

Methods of research by site and by ongoing approach

These 2 approaches are to be carried out in parallel:

- 30 archipelagos systematically analyzed and compared to identify the differences and similarities between coral colonies,
- 10 sites to be the subject of one-time studies focusing on local contextual issues.

A contextual approach applied to 5 sites in 2016-2017

- Site 1, July 2016 in Malpelo (Colombia) focusing on migration of whale sharks
- Site 2, October 2016 in the Tuamotu Archipelago (French Polynesia) focusing on coral physiology and interaction with algae
- Site 3, November 2016 in the Tuamotu Archipelago (French Polynesia) assessing the production of coral reefs as a function of island systems
- Site 4, December 2016 in Futuna Island, assessing Futuna’s biodiversity
- Site 5, April 2017 in Shimoda and the Ryukyu Archipelago (Japan), focusing on the impact of the warm Kuroshio current on larval dispersion of reef fish.

NB : Study sites for 2017/2018 remain to be determined.

THE EXPEDITION IN FIGURES

- Tara's 11th expedition since 2003
- Duration: 2 years (May 2016 to September 2018)
- Visiting 30 countries
- Making 70 stopovers
- Voyaging 100 000 km parcourus

- 40 archipelagos will be analyzed in an identical manner and compared
- 10 sites will be the subject of one-time studies on local contextual issues, including 5 in 2016-2017 (sites for 2018 sites to be determined)
- A total of 40,000 samples will be collected in 2 years
- 70 scientists on board from 8 different countries
- 18 institutions and research laboratories

- Longest non-stop navigation: 31 days (Taiwan - Fiji in May 2017)
- 11 time zones will be traveled in the Pacific Ocean
- Navigating across 7 seas and oceans: the Atlantic Ocean, Caribbean Sea, South Pacific Ocean, South and East China Seas, Solomon Sea, Coral Sea
- 32° C: warmest temperature recorded in the Pacific Ocean

- 6 sailors and 7 scientists aboard Tara at all times
- 8 artists in residence between 2016 and 2018
- 55 partners including 6 major financial institutions
- Budget of the expedition: 5 million euros

VARIOUS SAMPLING

From reefs

- Manual sampling of coral fragments (a few grams)
- Fine drilling
- Photographic survey of sampling sites and *in situ* study of sampled species
- Sampling of one specific species of reef fish: *Acanthurus triostegus* or convict tang
- Sampling of reef algae (Phanerogams)
- Sampling of seawater and microorganisms (bacteria and viruses)

Nearby and between reefs

- Measurements of sea water temperature and biochemical parameters (salinity, turbidity, etc.)
- Continuous characterization of surface waters when sailing between reefs

Adaptation of the schooner for studying corals

Science

- Wet lab set up on the rear deck where filtrations will be performed
- Tanks of liquid nitrogen installed for storing of coral samples
- Bench set up in the rear hold

Diving

- Deck organized to accommodate diving equipment
- Diving gear and compressor to fill the tanks
- Hyperbaric chamber (decompression)
- New tender (Zeppelin) equipped with lastest generation engines (Suzuki)

6. CORAIL: OVERVIEW OF THE SITUATION

Corals, animals of a particular kind

Even though coral reefs cover only 0.08 to 0.16% of the total area of oceans, they host about 1/3 of all known marine species (about 100 000 species). Like primary tropical forests, they constitute a unique reservoir of terrestrial biodiversity. An ecological success made possible thanks to the association (symbiosis) between 2 organisms: the coral, and micro-algae called zooxanthellae that provide pigments and nutrients. A coral in good health is beige or brown. When it undergoes stress, it expels the algae, becomes pale and withers.

Able to build a calcareous skeleton, corals are “engineer organisms” generating the most extensive bio-constructions on our planet: for instance, the Great Barrier Reef is 2,300 km long and in New Caledonia, the reef is 1,600 km long. True oasis of life, reefs provide food and shelter for many species of fish and crustaceans. They supply a livelihood via fishing for more than 500 million people worldwide. Moreover, ecological services provided by coral reefs include the protection of coasts from erosion, tourism, etc. - services are estimated at about $30 billion a year[1].

... currently threatened

Coral growth depends on many factors (light, temperature, pH, nutrients, turbidity, etc.). As a result, coral reefs are extremely sensitive to current environmental changes (warming of sea waters, or ocean acidification) in addition to local disturbances (pollution, sedimentation, coastal development, over-fishing, maritime traffic, proliferation of invasive species, etc.).

By bleaching

A temperature increase of less than 1° C above a certain threshold for several weeks is sufficient to cause a phenomenon visible to the naked eye: coral bleaching. This corresponds to the breakdown of the coral/algae (zooxanthellae) symbiosis and can rapidly cause significant mortality in corals. In the context of climate change and increasing sea temperatures, the El Niño climatic oscillations are particularly traumatic for coral reefs. They cause a warming of Pacific and Indian Ocean waters, provoking important mortality in corals (almost 20% in 1998).

By acidification

Ocean acidification disrupts the formation of coral skeletons and many other biological functions, such as reproduction. It results from atmospheric emissions of greenhouse gases. The excess gases disturb ocean chemistry, leading to more acidic waters. Since the last century, sea water acidity has increased by about 30% on average. This phenomenon mainly limits the rate of coral calcification and therefore, reef growth.

Coral reefs are mainly affected by global change and the combined effects of increased human demography and climate change. In particular, the growth of the world population in the area called the “Coral Triangle” (Indonesia, Malaysia, Philippines, China Sea and Solomon Islands) – home to more than 35% of the world’s reefs – threatens the survival of these fragile and unique ecosystems.

According to recent estimates, 19% of reefs are currently destroyed, 15% are seriously damaged and may disappear within a decade, and an additional 20% will be endangered within the next 40 years.

[1] Source http://coralreef.noaa.gov/aboutcorals/values/

KEY NUMBERS ON CORAL

- Coral reefs are home to 30% of the marine known biodiversity
- They cover less than 0,2% of the surface of the ocean
- 57 557km^2 of reefs are in the French territory
- $30 billion of services are provided annually by reefs
- 46% of reefs are healthy
- 20% of reefs are now destroyed
- 15% are seriously affected and may disappear within a decade
- 20% are threatened with extinction in less than 40 years

- Coral distribution by country:
  18% in Indonesia,
  9% in the Philippines,
  5% in Papua,
  2% in Solomon Islands,
  1.5% in Malaysia
- France has 5% of the world's coral in her overseas territories, essentially in Polynesia and New Caledonia.

7. RAISING AWARENESS ON THE IMPACTS OF BOTH CLIMATE CHANGE AND THE ECOLOGICAL CRISIS ON THE OCEAN

While sailing around the Pacific Ocean, besides pursuing research activities, Tara will continue to call for responsible governance of the oceans. Tara Pacific offers an opportunity to challenge players in the political and economic worlds, and heighten awareness among the general public concerning the most urgent ecological issues and challenges faced by populations inhabiting small islands in the Pacific Ocean.

Ocean governance

This research program covers **biology**, **oceanography**, **ecology** and **social sciences,** and investigates the relationship between issues of ecosystem biodiversity and humanity. We aim to highlight the environmental decisions necessary to improve **oceans governance**. According to the Tara Expeditions Foundation, knowledge of the reef environment is a decisive factor in strategies of management, integration of scientific expertise and scientific interaction with policy makers.

Ocean & Climate: encouraging concrete measures

During the climate negotiations held last December, the Paris Agreement finally took into account the world's oceans. For the first time, the impacts of climate change on the Ocean - including ocean acidification, warming and deoxygenation - were acknowledged as a major risk for the entire climate system. But this is only a starting point! All those who committed to the COP21 agreement must now ensure implementation of the announced measures and initiatives. During the upcoming expedition, Tara will continue to support the commitment of nations through the "Because The Ocean" initiative and the messages of the Ocean & Climate platform[2].

Coral Reefs and Preservation

On June 1, 2016, France (following Japan and Thailand) will become Secretary of the International Coral Reef Initiative (ICRI) in partnership with Madagascar. This informal international initiative – established in 1994 by 8 countries including France – aims to bring together governments, international organizations, scientific institutes and NGOs with the goal of sharing knowledge about coral reefs and improving reef management practices around the world. The Tara Expeditions Foundation will be a partner of ICRI during the Tara Pacific expedition.

Tara will also visit the Fiji Islands in 2017 to participate in the United Nations conference on the oceans and coasts, aimed at promoting the implementation of necessary measures to achieve the Objective of Sustainable Development 14, dedicated to the Ocean.

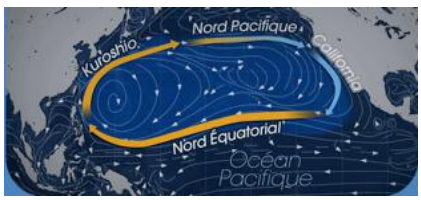
[2] For further information: http://www.ocean-climate.org/

8. SPREADING AWARENESS: 3 MONTHS STOPOVER IN JAPAN, BEGINNING FEBRUARY 2017

Tara in Japan, a long-lasting friendship

Tara will be in Asia starting in February 2017. Japan was logically the schooner's first destination, since agnès b. – French fashion designer, co-founder and main sponsor of Tara Expeditions – has been present in the archipelago for more than 31 years. Since 2009, a fruitful collaboration has developed between the scientific team of the Tara Expeditions Foundation and Hiroyuki Ogata, expert in evolutionary biology and ecology of microorganisms, senior researcher at Kyoto University and first Japanese scientist to join the schooner's expeditions. Tara Expeditions has a long-standing relationship with Japan and its people: many of our journals, documents and newsletters have already been published in Japanese, and now, Tara plans on gradually developing our own strategy in Japan, directly from Japan.

Science: Focus on the Kuroshio current



From south to north and north to south, Tara will study the impact of the Kuroshio marine current on larval dispersal of reef fish. The Kuroshio is the second main ocean current after the Gulf Stream. Carrying warm water, this current is generated in the western Pacific Ocean off the eastern coast of Taiwan. It then flows towards the northeast waters of Japan where it merges with the

eastern drift of the North Pacific current along the archipelago of Japan, and then moves back to the polar region. The warm waters of the Kuroshio current feed the coral reefs of Japan, the most northerly of the planet.
Studying its variations in temperature (ranging from 13°C to 29°C) will help us better understand and anticipate the impacts of future climate change and how species adapt.

Takeshi Kitano: Tara's Ambassador in Japan

It is with "We are very pleased that Takeshi Kitano has accepted the title of Ambassador of Tara in Japan" says Romain Troublé, executive director of the Tara Expeditions Foundation. Takeshi Kitano knows Tara well, *"agnès b.'s beautiful schooner, able to drift for months with the North Pole ice pack!*" Long-time friend of agnès b., he met at length with Etienne Bourgois in Tokyo in 2010. At this meeting, the 2 men expressed their deep concern about the current disruptions of climate and major ecological imbalances. Takeshi Kitano never fails to remind us that as a teenager, he was fascinated by the adventures of French Captain Jacques Cousteau and the Calypso and even dreamed of becoming a marine biologist!

Numerous stopovers

At the beginning of 2017, after crossing the South Pacific, Tara will arrive first in Fukuoka. Then the schooner is expected to stop in Hiroshima, Kobe, Shikine Shimoda, Yokohama and Sendai. After sailing elsewhere in Asia, Southeast Asia (including South Korea and China) and across the South Pacific, Tara will return to Japan in 2018.

Stopovers with visits for the public

The stopovers in Fukuoka (February, 18-22, 2017), Hiroshima (February, 23-27), Kobe (March, 1-5), Yokohama (March, 7-19) and Sendai (March, 21-25) will offer public access to the schooner and provide an opportunity for educational outreach aimed at adults and children.

These stopovers will be accompanied by:

- press conferences with national and local media to present Tara's research
- open public tours, organized by the crew, to present the schooner, daily life and scientific research aboard, past and present expeditions, etc.
- educational programs for schools: visits on board to raise awareness about issues concerning the Ocean, etc.
- an exhibition on coral reefs and the links between Ocean & Climate;
- conferences and film screenings for the general public.

9. ART ABOARD TARA: ARTISTS-IN-RESIDENCE

During long-distance expeditions, Tara welcomes a wide variety of artists-in-residence - a way to get a different views on the environment, science and daily life aboard. Tara will host 8 artists between 2016-2018, adding a new dimension to our mission by sharing and showing the beauty of the ocean and the scientific work performed on board.

Camille Henrot

Installations, sculptures, drawings and videos, Camille Henrot's work includes a wide variety of media. She won the Silver Lion award as best young artist at the 2013 Venice Biennale for her work entitled "Grosse Fatigue". Her artwork reconsiders object typologies and established knowledge systems. She will embark in the South Pacific in 2016.

Elsa Guillaume

2015 Coal Prize winner (Tara Expeditions was a partner for this first edition of the Oceans Prize), Elsa Guillaume is a multimedia artist. In engravings and ceramic, her universe is populated with coral, marine animals and small island inhabitants. She will develop her project entitled "Coral cosmography" and add pages to her travel notebook.

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ANNEXES

The 3 species sampled in our cross-sectional study in the Pacific Ocean

Three species will be sampled and observed to understand the life of coral reefs, their biodiversity and ability to adapt. They are present in surface waters (0-50 meters deep) from east to west and north to south in the Pacific Ocean and include 2 coral species (*Porites lobata* and *Pocillopora meandrina*) and a hydroid (*Millepora platyphylla*) - a small animal, distinct from corals - that also gathers to form colonies like corals.

These 3 species are all reef builders.

Porites lobata also called *"hard encrusting coral"*

These massive corals grow at the rate of 1 cm per year. A 40 cm-long core sample gives information concerning the last 40 years, like an ice core or a tree ring. *Porites lobata* records past climate changes and keep them almost intact in its external skeleton. These corals are therefore good indicators for retracing changes (temperature, salinity and pH) associated with climate disturbances over the past 50-100 years. By studying them, we can better understand current conditions and develop models for future evolution.

Pocilopora meandrina also called *"cauliflower coral"*

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These common corals are characterized by the very important biodiversity of their symbionts (bacteria, cyanobacteria and micro-algae) and inhabitants they accommodate (crabs, shrimps, bivalves gastropods, marine worms, brittle stars, small fish, etc.) thanks to their 3-D structure and the habitat this provides for other species. Present throughout the Pacific Ocean, these corals are representative of major reef-builder groups.

Millepora platyphylla improperly referred to as *"plate fire coral"*

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"Fire corals" get their name from the skin irritation they cause (similar to jellyfish stings). They are not corals, but hydroids, *i.e.* small invertebrates attached to algae or shells where they form colonies. They represent the second most important reef-builders after hard corals and therefore play a major ecological role in the functioning of reefs. Unlike other corals, they are not attacked by *Acanthaster planci* - the coral-eating starfish. They even seem to protect nearby corals and thus contribute to reef resilience. Nevertheless, like other corals, this species is subject to bleaching episodes, in particular in warm sea waters generated by the El Niño phenomenon. This makes the species fragile, even though it is abundant.

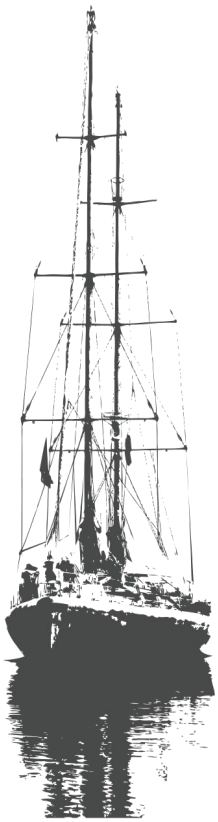
WORK ON THE SCHOONER DURING THE WINTER 2015

After sailing 320,000 km during the Tara expeditions, then returning from the “Ocean & Climate” campaign at the COP21 in Paris, the schooner has been dry-docked in Lorient – her home-port – for 3 months.Tara has undergone a major renovation in preparation for the next expedition:

- Extraction of the 2 former port and starboard engines after approximatively 33,000 running hours or 800,000 NM since her construction in 1989 (800,000 NM = 1.481.600 km = 37 times the Earth circumference!).
- Replacement by 2 new generation engines: Cummins-brand.
- Replacement of the propellers: coupled with the engine change, the fuel saving is considerable – 4 liters of diesel / hour, that is to say 30% less!
- Standards update of pollution discharge
- Complete refurbishment of the engine room
- Preparation and 5-year control visit from Bureau Veritas
- Painting of hull and deck
- Inspection of sails and replacement of 2 head sails
- Refurbishing of the propeller shaft and gearbox

Heat protection

- Installation of air conditioning in the dry lab and communication control room
- Rehabilitation of all the sun awnings (Serge Ferrari)
- Manufacture of cowl vents (to enable air circulation from the deck to the cabins)
- Ventilation



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