

JUNE 2021 - ISSUE NO.7



EARLY CAREER SCIENTIST NEWS



WORLD OCEANS DAY

8 JUNE 2021

THE OCEAN
LIFE AND LIVELIHOODS



FROM THE POLES TO THE
TROPICS,

THE WORLD'S OCEANS
CONNECT US ALL

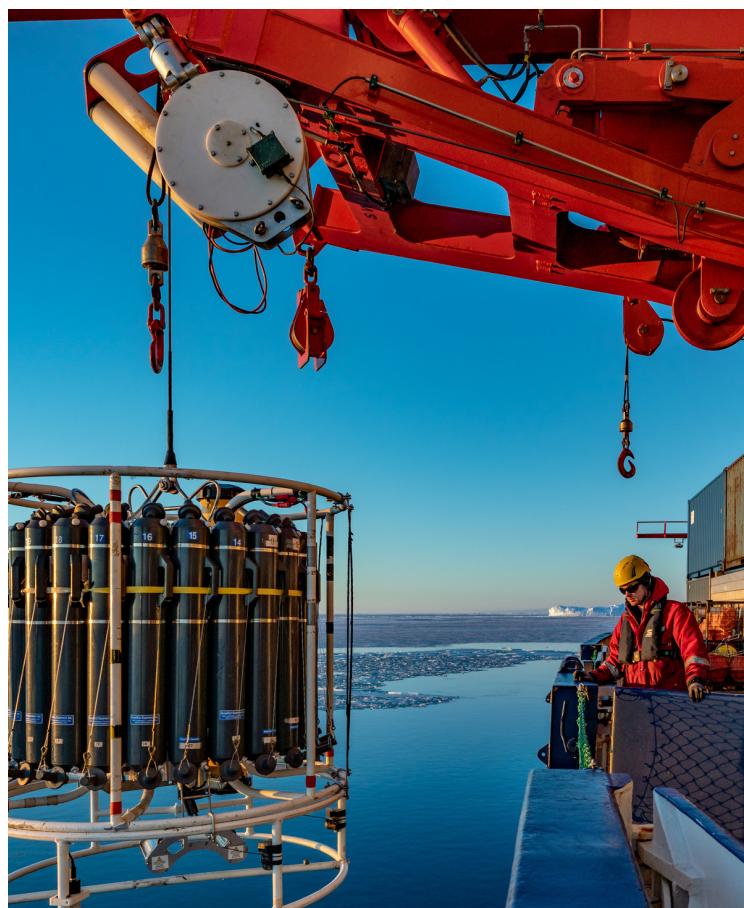


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MEET OUR OCEANOGRAPHERS WORKING ACROSS THE WORLD



RAFAEL GONÇALVES-ARAUJO
DENMARK
ARCTIC OCEAN



SARA BERGLUND
SWEDEN
NORTH ATLANTIC OCEAN



STAMATIS PETALAS
GREECE
MEDITERRANEAN SEA



ADITI MODI
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INDIAN OCEAN



RABITAH DAUD
MALAYSIA
WEST PACIFIC OCEAN



LEILANE PASSOS
BRAZIL
SOUTH ATLANTIC OCEAN



LUCIE VIGNES
FRANCE
SOUTHERN OCEAN



MORITZ WANDRES
FIJI
SOUTH PACIFIC OCEAN

A NOTE FROM THE EDITOR, DANIELLE SU

To celebrate this year's World Oceans Day theme "Life and livelihoods", we've decided to spotlight early career oceanographers working across each of the major ocean basins and share their research stories.

When I first set out to interview oceanographers from every ocean basin for this newsletter, I did feel quite daunted since I have mostly worked in the tropical oceans and was not confident that I could reach out in time to those working in the polar sciences or in the Atlantic Ocean.

But I underestimated the power of our community and within a week, I had names for every ocean basin. During my interactions with fellow oceanographers, I was moved by the number of people who recommended their peers and sought to elevate profiles that they felt were underrepresented in our community. Such actions set the tone for how we approach science as a community, and it gives me great optimism about the future of oceanography.

This newsletter is a testament to the spirit of our early career scientist community and the amazing things that can happen when we work together. It also shows that oceanographers can come from anywhere in the world and that science is all the better for it.

As you read this newsletter, you will see a common thread that runs through many of our oceanographers' stories - a childhood love for the ocean and a strong desire to understand and protect the natural world.

Although many of them share similar motivations in becoming oceanographers, the projects and challenges that they work on in their part of the world are truly unique.

I hope that all of you will enjoy reading their stories and research as much as I have.

ARCTIC OCEAN



Rafael Gonçalves-Araujo

Marie Skłodowska Curie Postdoctoral Research Fellow | Denmark

Section for Oceans and Arctic National Institute of Aquatic Research | Technical University of Denmark (DTU Aqua)

Tell us about yourself and your research

Hello, I am Rafael Gonçalves-Araujo, or Rafa, and I am a Brazilian oceanographer. I consider myself a multidisciplinary researcher lying at the interfaces of biology, chemistry, physics, oceanography and data science.

My overall goal is to advance the understanding of the impacts of climate changes in marine ecosystems and further societal implications. I investigate the biogeochemical processes related to the carbon cycle in Arctic marine ecosystems by employing multiscale, complementary approaches spanning traditional water sampling to state-of-the-art in situ sensor-based monitoring and satellite remote sensing.

Despite being from the tropics, the polar environment has always fascinated me. During my studies in Brazil at the Federal University of Rio Grande, I have studied the impacts of variable oceanographic conditions on the phytoplankton communities and biogeochemistry in the Southwestern Atlantic and North Antarctic Peninsula. Being involved in those projects gave me the opportunity to join several expeditions in those regions, including three cruises to the Antarctic Peninsula.

In 2013, I started my PhD in Natural Sciences at the University of Bremen, in Germany, developing my thesis at the Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research and it was at that moment when I changed poles. I then started to study the dynamics of dissolved organic matter (DOM) in the Arctic Sea, which has been the focus of my research ever since. I currently coordinate two projects (EU-MSCA-IF-CarbEx and EU-ARICE-NoTAC) which are focused on unravelling the dynamics and export of DOM across the Fram Strait, which is a major gateway connecting the Arctic to the North Atlantic. For that, we employ complementary spectroscopy measurements (e.g., absorption and fluorescence) and chemometrical data analysis combined to hydrography data from moored platforms and from a series of cruises conducted by the Norwegian Polar Institute in the region since 2009.

Finally, other key subjects of my current projects are to assess the reactivity of DOM (e.g., susceptibility to microbial-and photodegradation) and its potential to be employed as a proxy to trace Arctic water masses origins and circulation, with a focus on the freshwater component, which is a climate change-relevant parameter to be monitored.

What is your World Oceans Day wish?

Given that the United Nations Decade of Ocean Science for Sustainable Development has just been launched, my wish for the World Oceans Day is that we can attract more attention to the Ocean Sciences to largely **increase the awareness of how important the oceans are to our climate and life** and how important it is to care about them, so that we can hopefully reach a sustainable development.

Favourite fun fact about the Arctic Ocean?

The Arctic is the smallest and shallowest ocean basin on Earth and whenever we think about the Arctic Ocean, I believe one of the first images that comes to our mind is an ocean covered by sea-ice, which is quite unusual. However, one thing that people generally do not take into consideration about the Arctic Ocean is that it is the only ocean basin which is totally located in the polar domain. Thus, it experiences a period of about three months of completely darkness in winter whereas the opposite is observed during summer. And this is a striking factor that largely influences the marine life in the cold waters under the Arctic sea-ice cap, so that the organisms that live therein had to adapt to those unique and extreme conditions.

NORTH ATLANTIC OCEAN



Sara Berglund

PhD Candidate | Sweden

Department of Meteorology, Stockholm University



Tell us about yourself and your research

Hello, my name is Sara Berglund and I am from Stockholm, Sweden. I've been a doctoral candidate for almost five years and am so close to the finish line! Besides research, I spend a lot of my time with my kids and family, enjoying all aspects of life in Stockholm.

One passion that I have is football, both playing it myself but also going to football matches both in Sweden and in Europe. Thus, I really look forward to the European World Cup coming up in a couple of days. Football training is a big part of my life and is usually my go-to whenever research or anything else makes life hard.

For my research, I am studying the general circulation in the Atlantic Ocean using a Lagrangian trajectory model (TRACMASS) together with data fields such as velocity, temperature and salinity from an Earth System Model (ESM). I follow water parcels to be able to understand temperature and salinity distributions in the Atlantic Ocean, connecting it with mixing processes and air-sea interactions such as evaporation, precipitation and heat exchange. My work is mostly gathered around modelling and presenting and analyzing the results. However, I've also been running the ESM EC-Earth to be able to learn a bit more about how climate modelling works and the details about the data used.

My thesis is focused on the North Atlantic Subtropical Gyre and its connection to the northern parts of the Atlantic and importance for the general climate and in Europe.

What is your World Oceans Day wish?

The obvious wish for now is that the World will be able to fight this pandemic together and learn from it.

For the Oceanographic community, I wish that in the near future, we will be able to gather again to learn and inspire each other to do awesome and fun research. Until then, I wish that we will continue finding new ways of connecting with each other.

Favourite fun fact about the Atlantic Ocean?

I have several fun facts about the Atlantic Ocean!

Here are a few of my favourite ones -

1. The Atlantic Ocean covers about 1/5 of Earth's surface.
2. The name "Atlantic" was mentioned for the first time in Histories of Herodotus of Ancient Greek around 450 BC.
3. The name "Atlantic" originates from the Greek mythology and means "Sea of Atlas". The name Atlas comes from the Titan "Atlas" who carried the heavens on his shoulders.

4. The Atlantic Ocean is separated by the submarine mountain range Mid-Atlantic Ridge (MAR) which stretches between the North Pole and Bouvet Island and is about 190 miles long.
5. The Sargasso Sea in the Atlantic Ocean is the only sea without any shore around it.
6. The Atlantic Ocean is fed by many of the world's major rivers, such as the Mississippi, the Amazon, the Niger, the Rhine, the Congo, and further by all major rivers draining into the Baltic seas and the Mediterranean.



SOUTH ATLANTIC OCEAN

Leilane Gonçalves dos Passos

PhD Candidate | Brazil

University of Bergen | Norway

Tell us about yourself and your research

I am from a tropical city called Vitória, localized in the southeast coast of Brazil. I decided to study marine biology after watching the movie "Free Willy" when I was 10 years old. I had been asking myself for a while what I would like to do when I grew up. After I figured out that there was a profession that takes care of those magical creatures, I decided that this was what I wanted to do for living. As the years passed by, I found out that there was no public university for marine biology in Brazil - just a private university in another city that I could not afford to attend. That was when I heard about oceanography and thought: "I can study not only animals but also other parts of the ocean. This seems interesting.". In addition, there was a public university in Vitória which offered the topic.

Before starting my degree, I thought "I am going to study dolphins and whales. The last thing I want to study is physics!" This changed after my introductory course in oceanography where I worked with vibrant colored satellite images - I was so fascinated by them that I decided to continue down this path.

After I finished my bachelor's degree, I decided to do my master's in physical oceanography. My thesis was exciting work using observational data and hydrodynamic modeling to study an eddy of the Brazil Current that forms off the coast of my home city: the Vitória Eddy.

Upon finishing my master's, I worked briefly as a coastal oceanographer in an oil company before I decided to go back to academia as a research assistant.

This was when I started to work in the world of climate models. If I had been fascinated by hydrodynamic modeling before, the game was now at a whole other level. It was even harder and more interesting to work with the results of a coupled ocean, atmospheric, sea-ice, and land models. During the same period, I had the opportunity to participate in a research cruise to Antarctica!

Because of these "climate experiences", I decided to focus my work more on climate research and my PhD is about trying to improve decadal climate predictions in the North Atlantic. It's a new area, new currents, new physical processes.

Seeing the Arctic-Atlantic region through my tropical eyes is like discovering physical oceanography all over again.

Climate prediction is a massive endeavor that requires many different systems and interactions between ocean, atmosphere, sea-ice and land to be studied. My focus is the deep, blue ocean, since the ocean is the working memory of the climate system.

It's challenging to think about the system as a whole, but challenging is what makes this job exciting!

What is your World Oceans Day wish?

The deep ocean is slow, peaceful and strong. Humans are changing it with overfishing, hunting, polluting, and heating.

My wish is that one day we can stop interfering with this wondrous place and live in harmony with each other.

Favourite fun fact about the South Atlantic Ocean?

The Brazil Current is a unique western boundary current.

Unlike its counterparts in other ocean basins that are very strong, in some cases transporting up to 150 Sv, the Brazil Current transports down to only 4 Sv on some latitudes. The reason for this is the Western Intermediate Current flowing underneath and in the opposite direction.

The small transport volume and intense eddy activity makes some researchers question whether it is even a current at all?!

Despite this, the Brazil Current formation is so complex and full of details that makes it a field day for research!



MEDITERRANEAN SEA



Stamatis Petalas

PhD Candidate | Greece

Department of Marine Sciences | University of the Aegean

Tell us about yourself and your research

I grew up in Alexandroupolis, a town at the coast of the Aegean Sea. During my childhood and teenage years, it only felt natural to play and interact with the sea, it being a constant source of inspiration and imagination. Although as a child I was taken away by stories of both oceanic and scientific discoveries, following a career in oceanography was not even an option in my mind at that point. It was only a few years later while pursuing my B.Sc. in Physics in Thessaloniki that I discovered a true interest in geosciences, and decided to follow a M.Sc. degree in Meteorology, Physical Oceanography and Climate.

Moving to Utrecht for this reason and studying in an international environment, was at a personal level, one of the most intense and transforming periods of my life, while in an academic level it solidified my interest in geophysical fluid dynamics, oceanic circulation and mechanics.

I now live and work in Mitilini doing my PhD research on quantifying the interaction between the Black Sea and the Mediterranean Sea regarding buoyancy, mass and energy transport, while highlighting the impact of the water exchange, through air-sea interactions, on the regional climate of the Aegean Sea.

The Black Sea is a textbook example of a dilution basin, and the Mediterranean the contrasting concentration basin. As a result, the surplus water of the Black Sea outflows through the Dardanelles Strait into the North Aegean Sea, forming a surface layer covering most of the northwestern part of the Aegean. This largely determines the circulation, the ecological characteristics and the thermohaline functioning of the Aegean Sea. Moreover, this layer of lighter and colder surface waters may be a contributing factor in defining local climate by preventing the exchange of energy between the atmosphere and the underlying warm waters, thus keeping the region cooler. Until today, most simulations of the circulation of the Mediterranean and Black Seas have been using either parameterizations of the exchange between the two seas, or have been simulating the full hydrodynamics, but for short periods.

In order to assess the above in climatic time-scales, I use a hydrodynamic fully three-dimensional numerical model (ROMS) with a grid covering the whole Black Sea and Mediterranean Sea area east of 10oE, setup for realistic historical climatic runs. This configuration provided valuable realistic datasets of current-velocity, temperature, salinity and other relevant fields for a 30 year period. Model validation shows good comparison with observations while having continuous spatio-temporal coverage. The same configuration will be used for future projections.

In conjunction, besides seasonal teaching responsibilities, I also participate as a research assistant in several parallel projects, which help me fund my main PhD research, and give me the opportunity to get out of the office every now and then. Most of these projects involve field work on board research vessels, constituting a very interesting break from the computer screen, and a way to acquire a deeper and more round understanding of the processes in oceanography.

What is your World Oceans Day wish?

I wish the human race becomes wiser and that Poseidon is not vengeful.

Favourite fun fact about the Mediterranean Sea?

If the three main entrance points of the Mediterranean Sea were to be sealed (namely the strait of Gibraltar, the strait of Dardanelles and the Suez canal), the Mediterranean sea surface would drop at around 0.8 meters per year!

In a concentration basin, evaporation is larger than precipitation on climatic timescales, requiring non-atmospheric water input (i.e. runoff and/or exchange with other basins) to maintain its mass budget.

INDIAN OCEAN

Aditi Modi

Scientist | PhD Candidate | India

Indian Institute of Tropical Meteorology | Ministry of Earth Sciences | IIT Bombay



Tell us about yourself and your research

Sure! My name is Aditi Modi and I am a Scientist at the Centre for Climate Change Research, Indian Institute of Tropical Meteorology, Pune, India. In addition, I am pursuing my PhD from IIT Bombay, India.

I come from a small town called Agra in India, which is known for being home to the 7th wonder of the world — The Taj Mahal.

My research focuses on understanding the biophysical interactions in the tropical oceans, particularly the Indian Ocean.

In the wake of unprecedented climate change, it is crucial to examine the response of marine phytoplankton — which is at the base of the marine food web — to climate change.

Any change in the bloom timings (aka phenology) of phytoplankton is likely to create a “match-mismatch” with the higher trophic levels, thus impacting the marine ecosystem.

Therefore, as part of my PhD, I am looking at the shifts in the phytoplankton phenology in the Indian Ocean under the current climate change scenario and its underlying drivers, using both the observations (satellite and in-situ) and earth system models. I use python for a large part of my work and I absolutely adore the language at all levels. I am also associated with the development and diagnostics of the in-house earth system model — IITM-ESM — which has recently participated in CMIP6.

Besides work, I am an adjunct faculty for the course Physical Oceanography to the Trainees at the Meteorological Training Institute, Regional Centre to WMO, India, which I sincerely enjoy.

What is your World Oceans Day wish?

On this World Ocean's day, I would wish for some real solutions being executed collectively by the nations which would be a step-forward just beyond-the-talks going on quite for some time now.

This would possibly allow our marine ecosystem to flourish back into their natural habitats. Which is fairly analogous to the rare sights of wildlife spotted in the cities (once their homes) amidst the lockdown during the current pandemic.

Though, the top one on my Wishlist these days is an end to the ongoing pandemic !

(Yeah, I can imagine you nodding on this one!)

Favourite fun fact about the Indian Ocean?

Well, there are many! But the one that tops the list is the yearly Southeast Asian Monsoon hosted by the Indian Ocean! These monsoonal winds force the Indian Ocean to change the course of its circulation twice a year. The fact that the Indian Ocean is home to the world's most unique monsoonal system, along with its warmer waters makes it a potential research bed for researchers across the globe to study the impact of climate change on this ocean basin. The fascination garnered by the basin is not new, it dates back to the time when the ancient sailors started circumnavigating the globe and first observed the uniqueness exhibited by the Indian Ocean.

The Indian Subcontinent is closely coupled to the Indian Ocean, both culturally and economically, to the extent that every year we mark the arrival of monsoon throughout the country with humongous celebrations in the form of festivals hosted by various names in different parts of the subcontinent, all which say the same thing, — The Rain Began Again.



WEST PACIFIC OCEAN

SOUTH CHINA SEA

Nurul Rabitah Daud

Researcher | Academic Lecturer | Malaysia

School of Civil Engineering | Universiti Teknologi MARA Shah Alam



Tell us about yourself and your research

Hello, my name is Nurul Rabitah Daud! I'm an ocean modeller at the Institute of Oceanography and Environment (INOS), Universiti Malaysia Terengganu (UMT) and an academic at the School of Civil Engineering, Universiti Teknologi MARA (UiTM) Shah Alam, Selangor, Malaysia.

Ever since I was in kindergarten, I've had a strong curiosity about the natural world. This motivated me to do my first degree in Marine Science at the Universiti Malaysia Terengganu. That would be my first foray into Oceanography and the start of a lifelong passion for the ocean. I continued on to do a Masters and PhD in Oceanography which also provided me the opportunity to attend seminars, training and summer schools around the world. I got to meet expert researchers that I had only read about and make many new friends around the world! One of the highlights during my PhD was moving to Perth, Western Australia to do a six month research attachment using the Regional Ocean Modelling System (ROMS).

Apart from my research, I was also actively involved with the Tropimundo Erasmus Mundus Master Program and Ocean Teacher Global Academy at INOS. After graduating, I started my teaching career at UiTM.

Currently, I am working on developing ocean models for the southern South China Sea, specifically in Malaysian waters and the Gulf of Thailand. My research investigates the interaction between these two bodies of water in terms of seasonal variations, and transport of heat, salt and freshwater fluxes.

The purpose of this study is to **assess the potential of renewable energy harvesting in the area, especially for thermal energy**. The model simulations improve our understanding of the circulation and transport throughout this complex region. The complex bathymetry of southern South China Sea has a strong influence on the regional ocean dynamics and processes. The depths of this area ranges from the deep sea (>2000m depth), shallow shelf (<100m depth in area as wide as 240km) and also, a narrow sea bottom ridge (<5m contour) in the Gulf of Thailand basin. Through a combination of observations and ocean models, we are able to identify oceanographic phenomena such as seasonal coastal upwelling in the east coast Peninsular Malaysia, seasonal mesoscale eddy and coastal thermal front zone in the southern South China Sea.

What is your World Oceans Day wish?

One of the biggest threats to our ocean right now are plastics, especially the single-use plastics. Plastics injure and kill our precious marine animals, transport marine species from its origin across the oceans through "ocean rafting", release toxic chemicals while remaining buried in the sea bottom sediment and get into our food chain when scientists discover microplastics in marine animal guts.

For World Oceans Day wish, I wish that we could address this ocean plastic issue with scientific data and findings, find solutions and alternatives for our ocean and raise awareness to each contributing sector and public.

Just because the plastic is invisible in our backyard does not mean that it doesn't exist.
It is simply because the ocean hides it well for us.

We have to do our part to protect our irreplaceable oceans.

Favourite fun fact about the South China Sea?

The South China Sea (SCS) is significant since it connects the Pacific Ocean and Indian Oceans. It is a key commercial route connecting the Asian continent to the world. However, the SCS is a busy waterway not just for shipping lanes but also for sea life - especially migratory marine species such as sea turtles, marine mammals, seabirds and sharks! The migratory period of these animals follow the monsoon seasons and peaks during the Southwest monsoon where we could easily spot these migratory species in the SCS basin!

There are many sanctuary sites gazetted for these species in the SCS region where people could visit the places for wildlife observation experience. People are also able to spot whale sharks and other marine mammals swimming closer to the shore of east coast Peninsular Malaysia waters during this season.



SOUTH PACIFIC OCEAN

Moritz Wandres

Physical Oceanographer | Fiji



Geoscience, Energy and Maritime Division of the Pacific Community (SPC)

Tell us about yourself and your research

For someone growing up in central Germany, more than 350 km from the nearest body of salt water (the North Sea), becoming an oceanographer was not an obvious career choice. However, being born into a travel-loving family, I was fortunate to spend frequent family holidays at the beach. When I was 14 or 15 years old, I learned how to surf on the French Atlantic coast.

Anyone who has ever ridden a wave knows how addicting the sport is. It was not only the thrill of rushing down the face of a breaking wave that captivated me, but the physics of surfing as well. The fact that solar radiation generates winds, which in turn generate waves that can propagate thousands of kilometers across the world's oceans before dissipating over a shallow obstacle like a sandbar or a reef fascinated me in similar ways as riding the waves did.

Almost two decades later, I am now a Physical Oceanographer working for the Pacific Community (SPC), the principal scientific and technical organisation in the Pacific region. I am based in Fiji, a small island nation in the middle of the Pacific Ocean (and home to some of the world's best surf breaks). True to my teenage self, my research focuses on understanding wave processes on different temporal and spatial scales using a wide range of numerical and statistical models as well as observation platforms.

The South Pacific is the perfect laboratory for someone with an interest in waves. It is frequently exposed to large waves generated locally by tropical cyclones and by distant extra-tropical storms in the Southern Ocean and in the North Pacific. While these waves create ideal surfing conditions, they can also cause severe flooding and destruction to coastal communities.

In recent years, I specialized in assessing coastal hazards and risks to low-lying Pacific Island coasts. I am further involved in the development of operational impact-based multi-hazard forecast systems tailored to reef-fronted islands. These forecast systems are deployed at the National Meteorological Services and help forecasters predict whether a certain part of the island is likely to be impacted by an extreme event.

The work is diverse, interesting, and rewarding - especially since I can see my research results influence decision-making and have a positive impact on Pacific Island communities.

Favourite fun fact about the Pacific Ocean?

From an oceanographer's perspective, the South Pacific is arguably one of the most exciting places to study. It is at the heart of inter-decadal climate phenomena such as the El Niño Southern Oscillation. Additionally, due to regular seismic activity, the South Pacific is frequently exposed to tsunamis. The South Pacific is also one of the first regions to fully experience the impacts of climate change (sea-level rise, ocean acidification, saltwater intrusion into freshwater reserves etc.).

Due to its remoteness, the South Pacific is also incredibly challenging to study. One thing that perplexed me when I started working in the region was the fact that there is no accurate baseline data (i.e. bathymetry or topography) for a large number of islands. We have a pretty good idea how climate change will impact us on a global to regional scale (e.g. overall the sea level is rising) yet without a proper vertical reference datum we have no idea what a certain projected change in sea level could mean on a local scale.

What is your World Oceans Day wish?

I wish more decision-makers would listen to scientists and implement long-term strategies and policies to mitigate climate change, pollution, and destruction of ecosystems that go beyond their legislation period. This way, future generations can still enjoy the ocean the same way we can.



SOUTHERN OCEAN



Lucie Vignes

PhD Candidate | France

LOCEAN | Sorbonne Université



Tell us about yourself and your research

My work focuses on the dynamics of the water mass circulation in the Weddell Sea. This sea is located in the Southern Ocean around the Antarctic Continent. It is a sea of major importance regarding the regulation of global climate as well as the modifications induced by climate change. In this sea is located the biggest of the Antarctic Ice Shelves: the Filchner Ronne Ice Shelf (FRIS). The ice shelves are the floating part of the ice sheet that forms where the ice sheet flows down from the land onto the ocean surface. One of the roles of the ice shelves is to stabilize the ice sheet by the effect of buttressing.

However, nowadays with the accelerated melting of these ice shelves this effect is diminishing, the ice sheet mass loss is accelerating in Antarctica and therefore has an indirect impact on sea level rise. The Weddell Sea is also the place on Earth that forms the most important volume of Antarctic Bottom Waters, which are then exported through the Southern Ocean in every ocean basins and feed the global overturning circulation. The bottom water formation in the Weddell Sea is linked to the interaction between the ocean, the sea ice and the ice shelves. The modification of these interactions induced by climate change could have a major impact on the bottom water formation and possibly on the global oceanic circulation.

My work is focused on the circulation and modification of the Circumpolar Deep Water (CDW) brought from the Southern Ocean to the south of the Weddell Sea by the Weddell Gyre. The surface freezing temperature of the sea water being around -1.89°C, these relatively warm CDWs cause ice melt and ice shelf mass loss if they come in contact with the ice shelves. In the Weddell Sea, the ice shelves currently have a low melt rate, with even some of them gaining mass, in East Antarctica (Amundsen and Bellingshausen Seas) the melt rates of the ice shelves are much higher. This difference is due to the deep oceanic heat fluxes from the Southern Ocean to the ice shelf cavities which are much higher in East Antarctic than in the rest of the Antarctic Margins.

My PhD focuses on the study of the circulation of this CDW on the southwestern Weddell Sea continental shelf toward FRIS. There is a paradox in this region because CDWs are observed to be rising on the continental shelf from the slope current, and to be driven toward the ice shelf through canyons, but the melt rate of FRIS is relatively low. Thus, it is then interesting to understand what happens to these waters on their way to the south and how they are modified by different processes.

What is your World Oceans Day wish?

The development of marine protected areas over the Southern Ocean is essential to protect the complex ecosystems from current and future exploitation of natural resources. The most important thing is to develop our understanding of these ecosystems and the effect of anthropogenic pressure and climate change on these systems. This requires a continuous and long-term observing system. However, it still remains complex to fund long term observational research despite this being the key to a full understanding of the changes in ecosystem structure and function and how to protect these marine areas. The development of long-term observations over the Southern Ocean would also be a great way to understand interannual variability, as well as long term changes of the region, not only for the ecosystems but also in terms of chemistry, physical oceanography or even glaciology.

Favourite fun fact about the Southern Ocean?

The Antarctic Circumpolar Current is an eastward flow circumnavigating the Antarctic continent in the Southern Ocean. Two cyclonic gyres are found in the Weddell and Ross Seas. In the Weddell Sea, the Weddell Gyre is bringing the CDW from the ACC to the continental shelf through its southern branch. CDWs are transformed on their way to the west, getting slightly cooler and less saline. When found on the continental slope of the southwestern Weddell Sea, this version of the CDW is called Warm Deep Water, even though it does not exceed 1°C. So when speaking to people working on non-polar regions it is very confusing and we have to explain that "our" Warm Water is often around 0°C. It is also something to remember when you are working on the field; when opening the sampling bottles, I still had the idea that I was sampling "Warm Water" and I did not bother wearing gloves the first time and I regretted it.

Having 0°C water running on your hands for several minutes is very painful and now I always remember to explain to people that the water is warm for the ice shelf but not for us.

CALENDAR OF EVENTS

UNITED NATIONS
WORLD OCEANS DAY

8 JUNE 2021

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THANK YOU

I would like to thank the entire IAPSO ECS committee for their support in putting together this newsletter for World Oceans day. The process from ideation to implementation is never smooth, especially across timezones but my fellow members like Jesse Cusack and Alexander Haumann always manage to make the magic delivery of the newsletter to your inboxes in time.

I would also like to thank all the wonderful oceanographers who took the time to do this interview, especially within such a short notice period. I've tried to remain as true to their stories as possible but sometimes formatting considerations have demanded a level of reluctant editing. They are also responsible for many of the wonderful photos used in this newsletter.

To know even more about these remarkable scientists and their work, please feel free to reach out to us at our email and we would be happy to put you in touch with them. Alternatively, word on the street is that Google is an excellent resource in finding people.

Special thanks to the following individuals who shared their contacts and their photos for this newsletter – Arvind Singh, Alexander Haumann, Alejandra Sanchez-Franks, Eric Raes, Malin Odalen, Moritz Wandres (who is responsible for far too many beach photos from Fiji) and Nery Neto.

- Danielle

