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EARLY CAREER SCIENTIST NEWS

WORLD

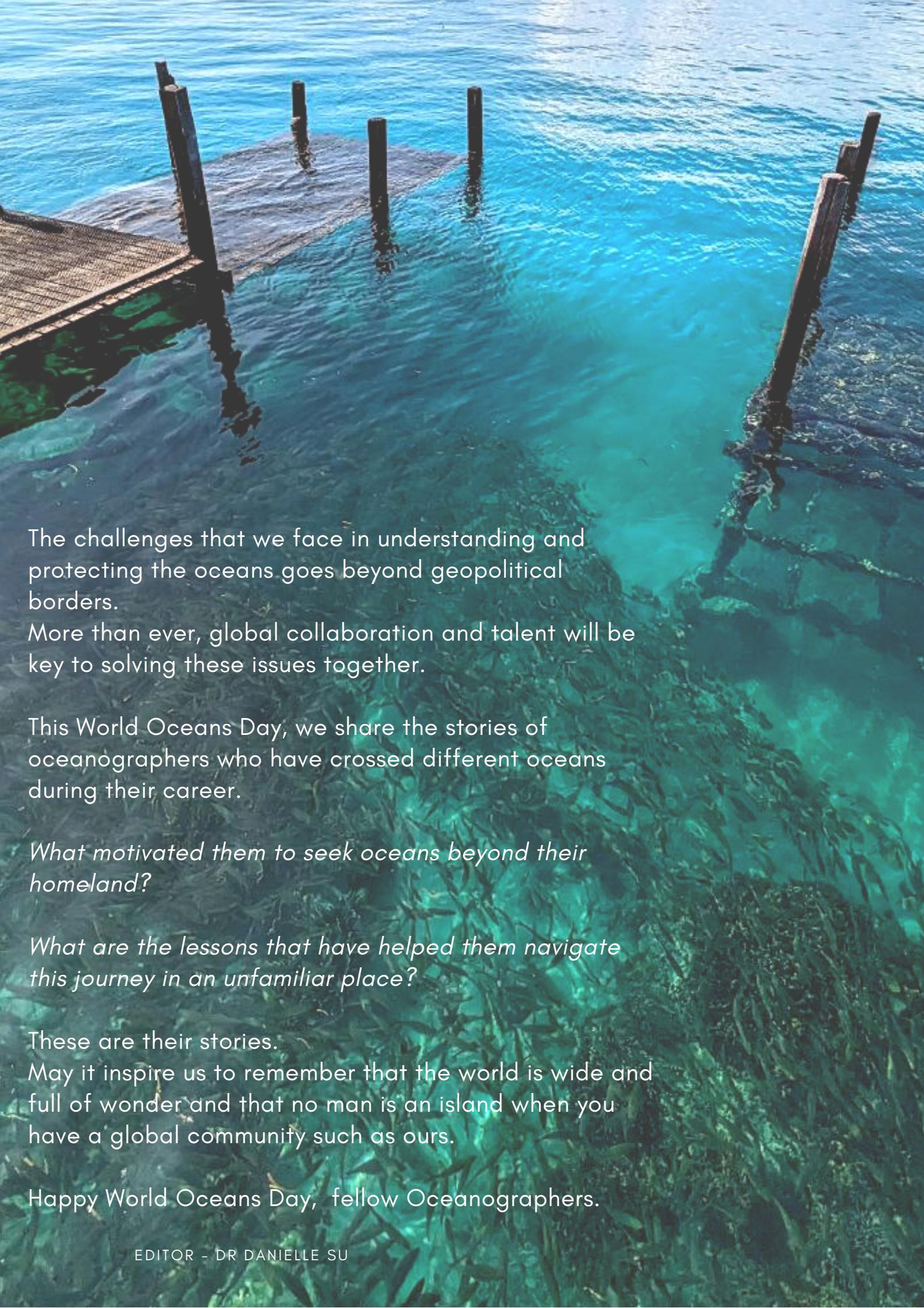
OCEANS

8 JUNE 2021

8 JUNE 2023

DAY

PLANET OCEAN:
TIDES ARE CHANGING



The challenges that we face in understanding and protecting the oceans goes beyond geopolitical borders.

More than ever, global collaboration and talent will be key to solving these issues together.

This World Oceans Day, we share the stories of oceanographers who have crossed different oceans during their career.

What motivated them to seek oceans beyond their homeland?

What are the lessons that have helped them navigate this journey in an unfamiliar place?

These are their stories.

May it inspire us to remember that the world is wide and full of wonder and that no man is an island when you have a global community such as ours.

Happy World Oceans Day, fellow Oceanographers.



DR FEHMI DILMAHAMOD

POSTDOCTORAL RESEARCHER
GEOMAR HELMHOLTZ-ZENTRUM FÜR OZEANFORSCHUNG KIEL

Tell us about your current research

The Labrador Sea is a key location where dense, deep-water formation occurs due to enhanced atmospheric-oceanic exchanges during wintertime.

Another process controlling this deep-water formation is the presence of (sub)-mesoscale eddies, that are critical to the horizontal transport of warm water from the West Greenland Coast to the central Labrador Sea. Vertical transport induced by these eddies can also be important in terms of heat transport and biological tracers such as oxygen and nutrients.

My research consists of unraveling the larger-scales as well as the fine-scales occurring within and on the peripheries of these eddies, to better understand the impacts of these scales on the physical/biogeochemical tracers. I use a set of high-temporal sampling instruments such as autonomous ocean gliders, moving vessel profiler (MVP) and underway CTD (u-CTD) in combination to high-resolution biophysical model. In other words, I get to enjoy some time at sea on research cruises taking all measurements in between sitting in an office time analyzing these measurements and ocean model outputs.

Describe the first time you decided to “cross oceans”

In one line, my hunger for more and more scientific knowledge and expanding my scientific network was the sole motivation.

After finishing my PhD on the physical and biological dynamics of the South Indian Ocean, I felt that I had learnt a lot in the Indian Ocean and would enjoy a new research focus in a new ocean, hence switching to the tropical Atlantic before moving into the colder subpolar North Atlantic. In addition, switching my scientific focus and moving to other institutes would enhance my scientific network and I think this was the best career move I have made so far.

What are some concepts/ideas that you've found are transferable across your research sites?

Scientific concepts-wise, most are transferrable within the ocean. It's one ocean after all.

For instance, I focused on eddies in the South Indian Ocean, and the underlying processes of their formation are quite comparable to the tropical and subpolar North Atlantic Ocean, with a few exceptions.

Phytoplankton blooms, occurring on similar seasonal time-scales can be explained through similar processes. Additionally, scientific skills such as writing and communication, as well as coding are transferable skills throughout your scientific journey.

Name 1-3 qualities/values that you feel have helped you in this transboundary journey as an oceanographer so far.

Passion, confidence and being true to yourself. Personally, these are the qualities and values that are fundamental to being myself and an oceanographer.

What is your World Oceans Day wish?

It's been said over and over again. But I will say it one more time.

We do not know the earth without our ocean or with a warmer ocean.

It's our duty and responsibility to protect and save our oceans.

A collective wish is for a thriving marine ecosystem that can be enjoyed by present and future generations.



DR YANG LUWEI

POSTDOCTORAL RESEARCHER
UNIVERSITY OF CALIFORNIA, LOS ANGELES

Tell us about your current research

My research focuses on the interactions of ocean currents across a broad range of scales in time and space. I use a combination of theory, numerical simulations, and in-situ observations in my research. Currently, I am investigating the interactions of mesoscale eddies, submesoscale fronts, and wind-forced internal waves in the subpolar North Atlantic. Wind-forced internal waves play a significant role in the global ocean circulation and climate, as they are a major driver for upper ocean turbulent mixing. While previous studies have examined the interactions between mesoscale eddies and wind-forced internal waves, my research takes a step further. I use realistic highresolution numerical simulations that resolve the submesoscale features to explore how the interactions between mesoscale eddies, sub-mesoscale fronts, and windforced internal waves can explain the observed generation, propagation, and dissipation of wind-forced internal waves.

My work contributes to the field by providing a comprehensive quantification of the energy budget associated with wind-generated internal waves and by revealing the role of mesoscale and sub-mesoscale features for distributing and dissipating the energy of wind-forced internal waves. By advancing our understanding on the internal wave energy dissipation and the resulting mixing processes, my research will contribute to more accurate predictions of oceanic heat and carbon transport under changing climatic conditions.

Describe the first time you decided to “cross oceans”

During my PhD, I focused on studying the impacts of small-scale internal waves generated in the deep Southern Ocean on the large-scale circulation in the Southern Ocean. However, since my postdoc, I've taken a different path and explored the interactions of mesoscale eddies, sub-mesoscale fronts, and wind-forced internal waves in the upper North Atlantic. This transition not only required me to 'cross oceans' geographically but also involved a shift in my research focus from the deep ocean to the upper ocean. My decision was driven by my passion for growth, exploration, and collaboration. I embraced the challenges and opportunities presented by the new project as catalysts for personal and professional growth.

Throughout this journey, I've faced moments of doubt and uncertainty, questioning my abilities and considering giving up. However, the invaluable support, guidance, and encouragement from my advisors, collaborators, mentors, and colleagues have helped me navigate through the rough waters. I'm truly grateful for the opportunities this transition has provided, and I'm excited to keep pushing the boundaries of my research while contributing to the collective knowledge of physical oceanography.

What are some concepts/ideas that you've found are transferable across your research sites?

One of these is the skill of conducting a thorough literature review, which helps me identify gaps, place my work in a broader context, and generate innovative research questions. Another transferable skill is effective communication, allowing me to clearly present my findings to scientific and non-scientific audiences, both in written and oral formats. Lastly, collaboration and teamwork have played a crucial role in my research endeavors. By working with colleagues, sharing resources, and tapping into diverse expertise, we've achieved successful outcomes through collaborative efforts.

Name 1-3 qualities/values that you feel have helped you in this transboundary journey as an oceanographer so far.

Curiosity has been a driving force, fueling my passion for exploration and pushing me to challenge existing paradigms. Critical thinking has been vital, enabling me to analyze data, evaluate evidence, and approach complex challenges with an analytical mindset.

What is your World Oceans Day wish?

I wish for a significant reduction in marine pollution, particularly plastic waste, that poses a severe threat to marine life. I hope to see increased awareness and actions at individual, organizational, and international levels to prevent plastic pollution, as well as innovative solutions to clean up existing waste. I wish for greater global cooperation and collaboration to address transboundary issues that affect our oceans, such as climate change, ocean acidification, and the loss of coastal habitats. I hope for enhanced international agreements and commitments that prioritize the long-term health and resilience of our oceans.



DR MIRJAM VAN DER MHEEN

POSTDOCTORAL RESEARCHER
THE UNIVERSITY OF WESTERN AUSTRALIA

Tell us about your current research

I am currently doing postdoctoral research at the University of Western Australia in the Wernberg lab. The goal of my research, combined with the research of many others in the lab, is to determine how large the carbon sink associated with Australia's Great Southern Reef is. The Great Southern Reef is a system of interconnected kelp forests that extends over thousands of kilometres along the southern part of Australia. Kelp is extremely productive and produces lots of detritus every year. However, unlike many other vegetated coastal ecosystems, such as mangroves and sea grass meadows, kelp does not grow root systems and so cannot directly sequester carbon by burying organic material in sediments. Instead, kelp carbon becomes sequestered if detritus is transported into the deep sea – deep enough so that there is no exchange with the atmosphere for geologically significant periods of time.

The focus of my research is to determine how and how much kelp detritus is transported into the deep sea. Preliminary results show that this transport occurs mainly during winter, when dense shelf water outflows develop along the Australian continental shelf and flow offshore along the seafloor.

Describe the first time you decided to “cross oceans”

I'm afraid my switching ocean basins had no scientific reasons behind it but was purely motivated by a desire to move somewhere warm and sunny with lots of nature – initially at least. I had been doing some volunteer work on marine plastic debris research in the Netherlands and decided I wanted to pursue a PhD in this field. I jumped at the opportunity to do PhD research in Perth, Australia. After moving there, I started to appreciate the unique dynamics of the Indian Ocean. I also realised that research on marine plastic debris in the Indian Ocean was lagging that in the northern Atlantic and Pacific oceans, even though the problem is just as pressing. That realisation, combined with the unique ocean dynamics, made doing marine plastic debris research in the Indian Ocean highly motivating and interesting to me.

What are some concepts/ideas that you've found are transferable across your research sites?

I quickly discovered that it doesn't matter whether I am on the stormy, grey North Atlantic or the calm, blue Indian Ocean: I will get seasick everywhere.

From a more methods-based perspective, I really enjoy applying somewhat out of the ordinary techniques and concepts from other fields. For example, during my MSc research, I used some techniques from graph theory to try and predict the tipping point of the Atlantic Meridional Overturning Circulation. During my PhD research, I created transport matrices from observed locations from ocean surface drifters to show that the behaviour of the subtropical Indian Ocean garbage patch is very different from that of all the other subtropical garbage patches.

From a physical oceanography perspective, in the North Atlantic I studied how cold, dense, sinking water drives the Meridional Overturning Circulation. I am now studying how cold, dense, sinking water in winter along the Australian continental shelf transports kelp detritus into the deep sea.[MVDM1]

Name 1-3 qualities/values that you feel have helped you in this transboundary journey as an oceanographer so far.

I have been very lucky and had great and extremely knowledgeable supervisors, and I always try to learn as much as from them as I can.

I think it is also important not to make assumptions when studying a new area. For example, based on Sverdrup theory and every other eastern boundary current, you would expect to find a northwards flowing current along Western Australia. But instead, the Leeuwin Current flows southwards along the west coast. And this is just one of many examples of the unique dynamics of the Indian Ocean.

What is your World Oceans Day wish?

I hope humanity heeds the IPCC's final warning and starts bending the emissions curve before we pass irreversible climate tipping points.

DR MELENA SOARES

PROJECT SCIENTIST
NATIONAL CENTRE FOR
POLAR AND OCEAN RESEARCH
INDIA



Tell us about yourself

Growing up in Goa, the Arabian Sea was ever-present in my childhood.

Summertime visits to the beach were moments when I would pause between playing with my friends to glance at the water and wonder why the water was the color it was, why I could see a ship floating way out in the distance, and what moved the waves. The ocean represents to me the unpredictability of life, especially after having experienced the calm before and after multiple storms during fieldwork.

Describe the first time you decided to “cross oceans”.

An opportunity to sail with the National Institution of Oceanography in India came early after I graduated, which was when I realized that oceanography was a viable career option. Since then, I've sailed in every ocean, from fjords in the Arctic to the icy Southern Ocean.

The only ocean I have yet to sail in is the Pacific, which I hope to sail in soon!

Each region that I have sailed to has left a distinct impression on me. From the chemical composition of the water column she studies, to the feel of being tossed around by the swells of a rough Bay of Bengal & Southern Ocean, each ocean has left behind an emotional imprint on my life.

During my first expedition in 2005 into the Bay of Bengal, I was torn between excitement for my newfound independence from my sheltered childhood but also having struggling anxiety over my sudden isolation from friends and family. Nevertheless, I persisted and made new memories when I finally ventured into the Southern Ocean on another expedition.

Till this day, I still remember the awe and wonder I felt when I first saw the icebergs and whales and penguins of the Southern Ocean.

Name 1-3 qualities/values that you feel have helped you in this transboundary journey as an oceanographer so far.

I find that there is a lot of value in building authentic relationships with genuine emotional connection, which is especially important to do on-board a ship. After all, it's impossible to maintain a façade for thirty days or more, especially when living and working in such close quarters!

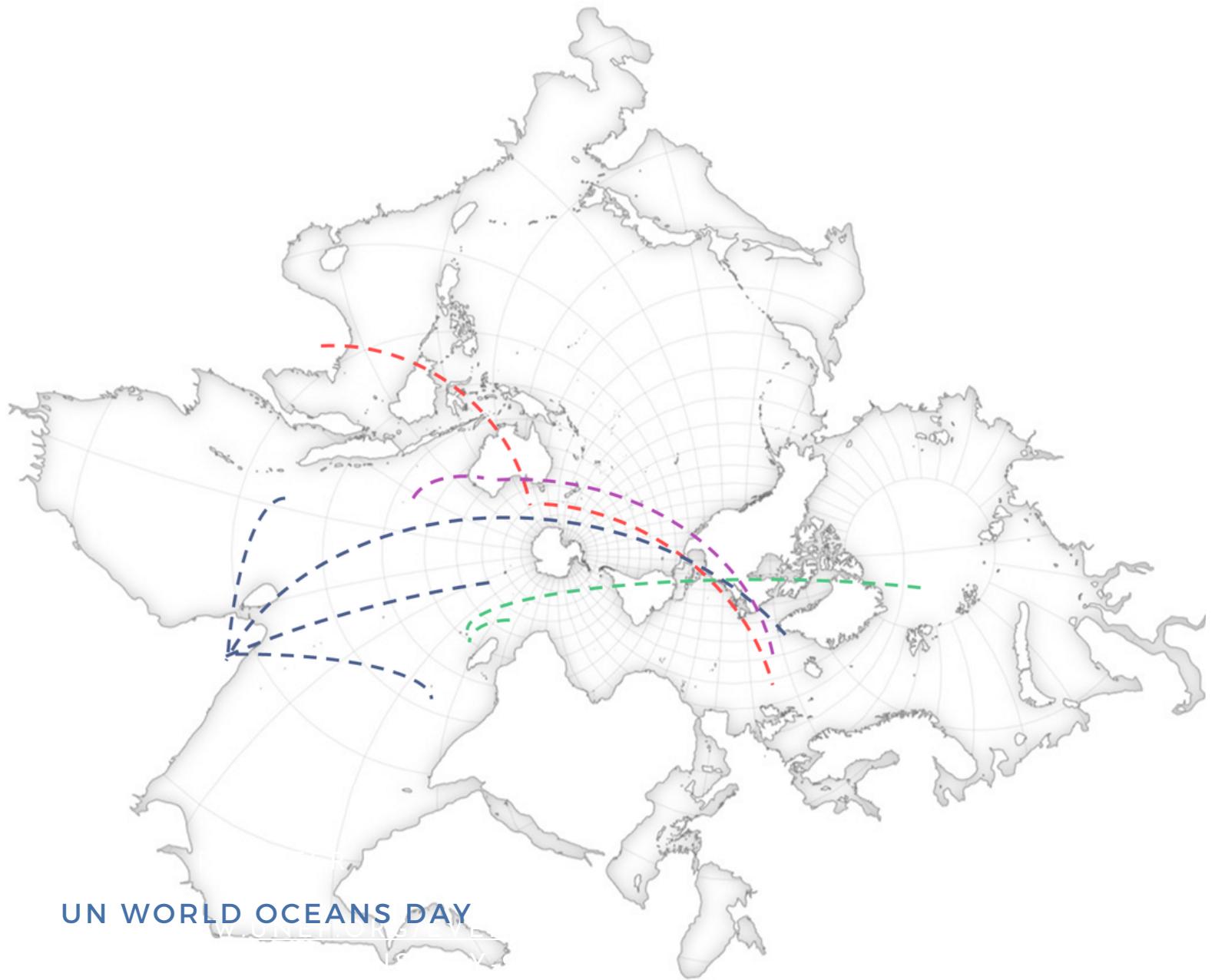
After working in a high-pressure environment such as a research vessel, I feel that I have grown as a person and had to become tougher. Also, having sailed with people from across the world, I have developed more respect for different cultures and each person's unique perspective. To me, being accepting of differences is important but it is also necessary to set firm personal boundaries when it matters.

What is your World Oceans Day wish?

I remember a time when women found it difficult to even gain access to research vessels, but attitudes have changed over the last decades with more institutional support becoming available to women.

Personally, I've not faced any overt discrimination and count myself lucky to have had supportive colleagues right from the beginning of my career.

Going forward, I wish that there will be more women in leadership roles since this would ensure that institutions take action to mitigate acts of harassment or discrimination that women may face while engaged in fieldwork at sea.



UN WORLD OCEANS DAY

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