

The Master's Program in Oceanography and Applications in Benin (<https://master-soac-toulouse.obs-mip.fr/m2oa/>)

Project information:

Project title: The Master's Program in Oceanography and Applications in Benin

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Project location: UNESCO International Chair in Physics and Applied Mathematics (CIPMA),
Université d'Abomey-Calavi (UAC), Cotonou, Benin

Scientific focus: Research capacity development in oceanography and applications

Timeline: The Master's program has been running since 2008

Budget: Our annual budget is around 50 000 € including scholarships for about 10 African students and lecturers' travel costs

Description:

Summary

The regional formation program in Oceanography and Applications situated in Benin, West Africa is unique on the African continent. Since 2008, our Master's program has brought together students from West and Central Africa to study the physics, chemistry and biology of the ocean. It is the only formation on the African continent that specializes in physical oceanography and its applications. We cover a broad range of topics, from ocean circulation theory to the coastal environment. The program is hosted by CIPMA and is run by staff from the two host universities: Université d'Abomey Calavi (UAC), Cotonou, Benin and Université Paul Sabatier (UPS), Toulouse, France. Our instructors include professors from the two host universities and research staff from the French Research Institute for Development (IRD), colleagues from Brazil (University of Recife) and Germany (Alfred Wegener Institute). Successful students receive MSc diplomas from the universities of Cotonou and Toulouse. Many of our students have gone on to doctoral research training in Africa, Europe, North and South America.



The class of 2016-17 in front of CIPMA

Mission

Our Master's program objective is to form the next generation of ocean scientists and to build capacity in local institutions and for research and applications in the civil, industrial and commercial sectors. We also aim to raise consciousness at all levels concerning the important environmental challenges presently facing the region and strongly influencing future growth and development.

Our specific objectives are to:

- Build capacity for research and other professional activities in the domain of the environment, climate and oceanography;
- Transfer competence from visiting instructors to African teaching staff in the region;
- Help develop research teams in the West African region;
- Help promote research activities and reinforce regional expertise.

History

The Master's program in physical oceanography and applications grew from a need for capacity building in the West African region in support of research programs in oceanography such as PIRATA (maintenance and observation of moored data arrays), AMMA-EGEE (the oceanic component of the African monsoon) and PROPAO (regional collaborative network for coastal measurements).



The class of 2016-17 hard at work

It has since grown into a unique regional education program, with students from Benin, Togo, Nigeria, Ivory Coast, Ghana, Cameroon, Ghana, Senegal, Congo and France. Each year we provide a 2nd-year Master (M2) level training to about ten students on all aspects of physical oceanography, from the basic dynamics of ocean currents, waves and tides to the action of ocean circulation on geochemistry, biology and sediments including coastal erosion. The formation program has led to stronger links between coastal countries in the region, and has reinforced participation in international programs such as TACCOVAR (regional program), TRIATLAS (European project), and POGO (global organization for marine observations).

Turning points:

Oct 2008: Creation and first courses for the Master OPA (IRD twin chair project: CIPMA/UPS)

Sep 2009: Partnership with Total S.A.

Jan 2011: Co-graduation UAC and UPS

Jan 2013: Funding from Total Chair in education and research

Jan 2015: New syllabus

Oct 2016: End of association with Total

Oct 2017- present: Support from IRD and LEGOS

Oct 2019-present: Support from the ERASMUS+ MIC program for lecturers/students exchanges within a consortium of French universities (Toulouse, Paris, Brest, Grenoble)

Oct 2020-present: Support from the German Academic Exchange Service (DAAD)



The class of 2017/18 with the educational team after their MSc thesis defense

Key Facts:

- We are the first international diploma in Oceanography to be twinned with a European university.
- We can claim the first MSc diploma in physical oceanography delivered to women in Africa.
- Currently (2021) we have instructed 112 students from 9 countries of which 53 are either currently studying for or already gained a PhD. At least 73 of our alumni are either in full time employment or further studies. Our alumni contributed to more than 120 publications in international journals.
- Our doctoral students have spread to four continents, working in Benin, Ivory Coast, Nigeria, Cameroon, Ghana, Senegal, South Africa, France, Germany, Canada and Brazil.
- Our alumni have now academic positions at universities in Benin, Ghana, Ivory Coast, Cameroon and lecture in the Master’s program
- Our Master’s program is continually evolving through international cooperation between Benin, West, Central and South Africa, France, Germany and Brazil, to foster north-south links and develop south-south partnerships.



Deploying sensors to measure tides in a coastal lagoon

Operation and Collaboration

The Master’s program was launched in 2008 in Benin, as a joint operation between the French research institute IRD, the UNESCO International Chair in Physics and Applied Mathematics (CIPMA) with the University of Abomey Calavi, Cotonou, Benin, the University of Toulouse (UPS) and between 2009 and 2016, the energy company Total.

The host organization CIPMA supply the foundation for our instruction, and lecturers from outside Benin deliver their courses in the form of one or two-week intensive study periods. The continuous presence of IRD research staff and a local permanent office in Benin is of crucial importance to the maintenance, stability and day to day

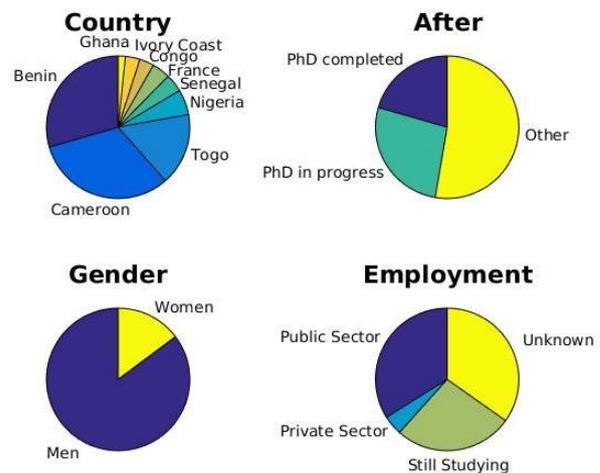
running of the program.

The University of Toulouse has been a core partner since the start of the diploma, providing lecturers, and from the academic year 2011-12 the diploma has been jointly offered by the two universities.

Although most of the students are from French-speaking countries, the program is also opened to English-speaking students thanks to a bilingual approach in the oral/written teaching material. Hands-on training to oceanographic measurements was done in the past onboard French research vessels that called in Cotonou, and is now done on a coastal lagoon in relation with a local research program led by one of our alumni.

The Master’s program is closely associated with the regional TACCOVAR (Tropical Atlantic Climate and Coastal Variability) colloquium co-organized each year by CIPMA and IRD. One day is dedicated to the students’ internship defenses. This is also the welcoming week for the new class of students.

New permanent positions have recently been allocated at the University of Abomey, which has provided for a permanent presence of university staff in Benin specialized in oceanography. These



Statistics on our alumni

positions have been filled by former students of our Master's program who are now ready to rapidly take on responsibility for the local management of the course.

In 2020-21, to cope with the Covid pandemic, courses from foreign lecturers were done through online teaching with additional support from local lecturers.

Our principal expenses are travel and lodging for visiting professors along with logistics and grant support for students. To fund this operation, we have been strongly supported by IRD since the creation of the program. Between 2009 and 2016 we also benefited from our partnership with Total, both for teaching and financial support. Since 2020, some of our students can get a MSc or local PhD scholarship from the German Academic Exchange Service, mobility grants for teaching and internships are also available from the European ERASMUS+ university network and TRIATLAS research project.



About half of our students engage in a PhD project

Future Plans

After analyzing the successes but also the challenges we faced during more than 10 years of running this Master's program, still with capacity strengthening in mind, we decided to evolve towards a more skill-oriented approach with a new syllabus for our training program from 2022.

Our primary objectives are to:

- Strengthen the links between the formation and employment opportunities in the region;
- Increase the amount of teaching relevant to the needs of the region outside the academic sector;
- Deepen the link between first and second year Master's programs (M1 and M2) offered by CIPMA in order to improve the influx of well qualified candidates;
- Progressively transfer responsibility for the management of the program to African research and university staff who now occupy permanent positions.

The new training program will focus on Science of the Ocean and Coastal Environment. Over the medium term, this program offers the potential to the Universities of Abomey Calavi, Abomey, and to CIPMA to become major players in the environmental sciences in West Africa. However, no funding is secured beyond 2022 so we are currently exploring future options for extending the program.