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# ANNUAL REPORT 2019

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## 2019 ANNUAL REPORT

The Flanders Marine Institute (VLIZ) promotes accumulation of marine knowledge and excellence in marine research in Flanders. The marine research areas are the oceans and seas, the coast and the tidal systems. The target groups for knowledge accumulation are the marine research community as well as educational institutions, the general public, policymakers and the industry (within the scope of the blue economy).



**PROF. DR. JAN MEES**  
General Director of VLIZ



## Dear reader,

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Twenty years ago, the Flemish government, the province of West Flanders and the Research Foundation – Flanders (FWO) officially established the Flanders Marine Institute (VLIZ). Ten enthusiastic staff members moved into the caretaker's house of the Valcke company in Victorialaan on the East Bank of Ostend, ready for the assignment they had been allocated. Showing strong commitment and performing a varied range of duties, we put ourselves at the service of all those who were fascinated by the coast and sea. We developed a wide range of services supporting the numerous marine scientists who were active in Belgium: coordination, point of contact, oceanographic data management, marine library, science communication, research infrastructure, etc. And we constantly pushed back frontiers ...

In 2019, twenty years after the establishment of VLIZ, our festive slogan is not coincidentally 'VLIZ breaks boundaries'. Since its establishment, the number of VLIZ employees has increased no less than tenfold. We now own a hypermodern research vessel (RV Simon Stevin) and three unique marine robots in addition to lots of other highly specialised equipment. We are also ready for the construction of the InnovOcean Campus, a brand-new complex we will move into together with our (inter)national partners and the Ostend office of ILVO in mid-2022. We have consistently pushed the limits of innovation in virtually every discipline. On several occasions we have succeeded in actually breaking the boundaries. Our area of expertise now covers the world's oceans, and our activities are not really restricted to a specific moment in time. The government has granted us an extension of our mandate, enabling us to focus strongly on multidisciplinary top-level research, well-founded policy advice in relevant cases and support of the blue economy over the past few years. We have thus become a professional yet warm-hearted institute which aims to help build a sustainable world on the basis of thorough scientific studies. We aim for a world that offers ample opportunities to future generations and where the seas and oceans receive the attention they deserve.

In 2019, the Flemish government increased the VLIZ budget by € 2,000,000 to conduct basic research linked to innovation aspects of the blue economy, among other things. This investment enabled VLIZ to recruit a second group of 14 marine scientists to reinforce the Research division. VLIZ recruited several new employees across other divisions as well. As a result, we passed the threshold of 100 permanent employees in 2019. This was a milestone for VLIZ. In view of this strong growth, the internal organisation needed to be revised. Through the reformed structure, the institute strongly focuses on three pillars: scientific support, valorisation & innovation, and research.

Also in 2019, the Marine Robotics Centre officially opened its doors. VLIZ thus demonstrates its ambition to become an international knowledge hub for marine autonomous systems and moved up a gear in terms of blue economy innovation projects. In the previous year, VLIZ organised no fewer than 42 events, the majority of which took place in Ostend and boosted the coastal region's local economy. In addition, VLIZ released a variety of publications, ranging from A1 publications in renowned journals to books, digital information graphs and animations. In the run-up to the celebrations for the 20<sup>th</sup> anniversary of VLIZ, we published the 50<sup>th</sup> issue of De Grote Rede, the information magazine on coastal and marine research. In 2019, VLIZ and the province of West Flanders launched the first edition of KustINzicht2019, a handy booklet full of interesting figures and analyses concerning the Flemish coastal area.

We kicked off the festive VLIZ year at the end of 2019. To celebrate this special anniversary together with our extensive network, we are organising a variety of activities in 2020 with 'VLIZ breaks boundaries' as the central theme. We are already looking forward to the next 20 years!

**JAN MEES**  
General Director of VLIZ

Ostend, March 2020

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### HIGHLIGHTS 2019

The highlights are the special events, achievements, activities or projects of VLIZ that took place in 2019. They are often the result of intensive cooperation between various divisions.

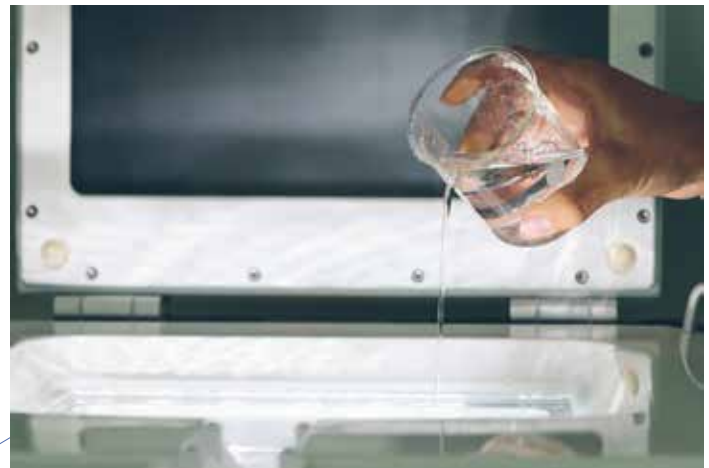


© VLIZ (Decombel)

## 30

### SUPPORT TO INTERNATIONAL ORGANISATIONS

By order of the Flemish government, VLIZ supports several international organisations. This capitalises on VLIZ's international experience and reputation, and makes it possible to embed important European initiatives in Flanders. This chapter briefly explains the specific partnerships in which VLIZ participated in 2019.



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### KEY PERFORMANCE INDICATORS

The Key Performance Indicators (KPIs) refer to important services provided by VLIZ to marine scientific researchers, policymakers, educators and the general public. These are criteria to evaluate the operation of VLIZ. As stated in the covenant for the period 2017-2021, VLIZ has to deliver on at least twelve KPIs every year.

## ANNEXES

📄 Only available in digital format: downloadable from the VLIZ website [www.vliz.be/en/vliz-annual-report](http://www.vliz.be/en/vliz-annual-report)

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### 4 (Annexes)

#### ORGANISATION VLIZ

VLIZ is administered by the Board of Directors and consults the Scientific Committee for its scientific support tasks. The General Assembly provides assistance in managerial and administrative decisions.



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### 14 (Annexes)

#### MANAGEMENT INDICATORS

The Management Indicators refer to important services provided by VLIZ to marine scientific researchers, policymakers, educators and the general public. They complement the Key Performance Indicators (KPIs), which are criteria to evaluate the operation of VLIZ.



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### 38 (Annexes)

#### OTHER ANNEXES

An overview of the national and international networks in which VLIZ participates, projects for which VLIZ receives external funding, the scientific equipment and infrastructure made available by VLIZ, the events (co-)organised by VLIZ and the publications published by VLIZ.

## HIGHLIGHTS

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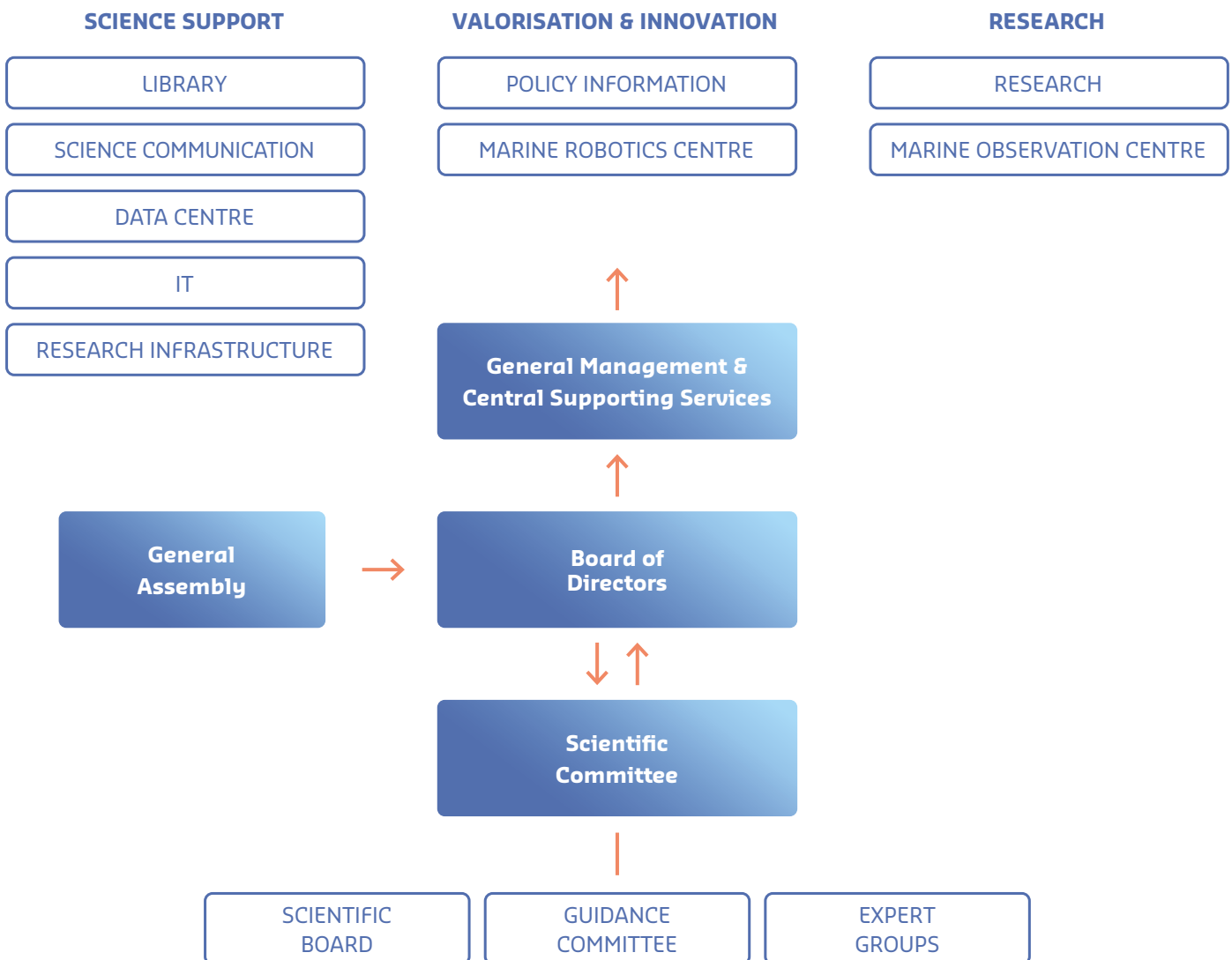
The highlights are the special events, achievements, activities or projects of VLIZ that took place in 2019. They are often the result of intensive cooperation between various divisions.







The VLIZ team in December 2019 © VLIZ



In 2019, VLIZ revised its internal organisation on the basis of three pillars: scientific support, valorisation & innovation, and research

# INTERNAL RESTRUCTURING TO BOOST GROWTH

🌐 [www.vliz.be/en/research-vliz](http://www.vliz.be/en/research-vliz)

When the current covenant (2017-2021) was concluded with the Flemish government, VLIZ was allocated the additional responsibility of initiating and performing research at the service of, in collaboration with or complementary to Flemish and international marine research groups. To this end, VLIZ established a new Research division at the end of 2017 and appointed a Research Division Manager, science managers and the first researchers for the relevant division. In 2018, the Research division got up steam and the first research projects began. In addition, VLIZ was allocated the responsibility of developing the interface between the marine research community and the blue economy.

In 2019, the Flemish government increased the VLIZ budget by € 2,000,000 to conduct basic research linked to innovation aspects identified by the blue economy, among other things. This investment enabled VLIZ to recruit a second group of 14 marine scientists to strengthen the Research division.

The number of new employees increased significantly not only in the Research Department but also in specific teams of other VLIZ divisions. As a result, we passed the threshold of 100 permanent employees in 2019. This was a milestone for VLIZ. The number of employees is expected to increase even further in the coming years, since the recruitment of post-doctoral researchers has a multiplier effect.

In view of this exponential growth of VLIZ, the internal organisation had to be revised. Through the reformed structure, VLIZ strongly focuses on three pillars: scientific support, valorisation & innovation, and research.

These three pillars translated into the establishment of three eponymous departments in the past year. The Science Support Department is aimed at the provision of services which VLIZ has taken care of since its foundation in 1999. The Valorisation and Innovation Department is focused on the so-called triple helix of marine sciences, marine policy and the blue economy. The Marine Robotics Centre was officially inaugurated within this department in 2019.

VLIZ thus demonstrates its ambition to become an international knowledge hub for marine autonomous systems and to push back frontiers in this field by means of innovation projects (see Highlight on pages 20-21). The Research Department strives for a reinforcement of the Flemish marine research community and contributes to the accumulation of marine knowledge and excellence in marine research in Flanders. This research will be partly conducted by the Marine Observation Centre, a centre of excellence which continues to build on the activities developed within the LifeWatch ESFRI project.

The six original divisions (Data Centre, Library, Research Infrastructure, Research, Policy Information and Communication) have been divided over the three new departments. This internal restructuring has enabled the institute to create potential for growth and to prepare for the future.

# 109

**VLIZ EMPLOYEES**

The number of VLIZ employees  
at the end of December 2019.

» *An internal restructuring has enabled the institute to create potential for growth and to prepare for the future.* «

JAN MEES, GENERAL DIRECTOR OF VLIZ

# NEW CAMPUS FOR VLIZ AND ILVO IN THE PIPELINE

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VLIZ, its (inter)national project partners and the Ostend office of ILVO will move into a new communal complex named InnovOcean Campus that will be located on the East Bank of Ostend. Ministers Philippe Muyters and Koen Van den Heuvel signed the relevant construction contract in Brussels on 8 July 2019.

VLIZ is currently housed in the former fish market warehouses located on Wandelaarkaai. However, these buildings will be repurposed in the long term. As a result, VLIZ and its project partners – the UNESCO/IOC Project Office for IODE, the European Marine Board secretariat, the EMODnet secretariat and the Regional Office Coast of the province of West Flanders – had to look for a new location. The marine science division of the Flanders Research Institute for Agriculture, Fisheries and Food (ILVO) was confronted with high energy bills, deterioration, damp and unsafe working conditions in its buildings in Ankerstraat, which were built in the 1970s. The ILVO researchers require a specific infrastructure, including physicochemical laboratories and experimental workshops for wet applications (aquaculture).

A suitable undeveloped site for a new communal building was found next to the current ILVO building in Ostend. The programme for the shared InnovOcean Campus includes offices, a conference centre, a marine library, physicochemical laboratories, aquaculture laboratories and a workshop space.

The InnovOcean Campus promises to become a new landmark in Ostend: an extraordinary project with a unique content and appearance. The façade will be decorated with a blue glass mosaic, whose colour as well as the reflection of the sun and clouds refer to the typical palette of the coast. The building has been designed with an eye to the future: the design encourages maximum cooperation and exchange of knowledge. In addition, the building has a circular and modular plan; the different spaces can easily be rearranged and adapted to changing needs. Technical viability is also an important aspect of the design: this nearly zero energy building (nZEB) has an E-level of E30 or lower. Other aspects of sustainable construction (such as low-maintenance and healthy materials, water (re)use, integral accessibility, daylight and acoustic comfort) are applied in the building as well.

The total project budget amounts to approximately € 17 million excl. VAT. The building will consist of 7 floors and a technical level (gross floor area of 8000 m<sup>2</sup>). The new building will be constructed by Algemene Bouw Maes (part of the Van Roey group). The award process was coordinated by Flemish investment company PMV. The InnovOcean Campus is scheduled to be taken into service in mid-2022.





© evr-architecten.be



© evr-architecten.be

# KUSTINZICHT2019

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📄 Compendium for Coast and Sea: [www.compendiumcoastandsea.be/en/](http://www.compendiumcoastandsea.be/en/)  
📄 Kustportaal: [www.kustportaal.be/en](http://www.kustportaal.be/en)

In 2019, VLIZ and the province of West Flanders launched the first edition of KustINzicht2019, a handy booklet full of interesting figures and analyses concerning the Flemish coastal area. The Flemish coast differs sharply from other regions in Belgium and Europe since it has to cater to a wide variety of functions and users in a limited area, ranging from economic actors such as ports and coastal tourism to the development of unique natural values on the beach and in the dunes as well as intensive agricultural activities in the hinterland. In addition to the combination of economic activities and space for nature, the Flemish coast is also faced with major social challenges. Its social fabric is characterised by a large number of second-home owners, an ageing population and a high level of social disadvantage. Furthermore, the location by the sea and the intensive land use result in the coastal region being very vulnerable to the effects of climate change. After all, the Flemish coast does not just require protection against rising sea levels; it is also faced with challenges in terms of water supply and salinisation. As a result of the sum of all these elements, the Flemish coast is confronted on a daily basis with area-specific phenomena and administrative issues in social, economic and ecological terms.

Through the publication of KustINzicht2019, VLIZ and the province of West Flanders provide a wide range of scientifically sound figures and time series which serve as an accessible area-specific knowledge base. The objective is not only to inform local policy-makers and stakeholders about particular coastal processes and phenomena, but also to increase the visibility and applicability of coastal knowledge. Just like the Compendium for Coast and Sea, KustINzicht2019 serves as a portal referring visitors to other sources of information and data, such as the Knowledge Guide of the Compendium for Coast and Sea, the Coastal Portal, Provincies in Cijfers, etc.

On 23 October 2019, KustINzicht2019 was officially presented to 72 invitees and the press at Cultural Centre De Grote Post in Ostend.

KustINzicht2019 is freely available as a handy pocket-sized booklet but it can also be downloaded from the Compendium for Coast and Sea website. In addition, a large selection of KustINzicht2019 figures and maps has been included in the geoportal [kustportaal.be](http://kustportaal.be).



'KustINzicht 2019' a handy booklet filled with fascinating figures and analyses concerning the Flemish coastal area © VLIZ



The launch of 'KustINzicht2019' took place on 23 October 2019 at Cultural Centre De Grote Post in Ostend. © VLIZ (Verhaeghe)



The VLIZ Marine Science Day (VMSD) is one of the successful annual events organised by VLIZ © VLIZ (Verhaeghe)

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## EVENTS

The number of events organised by VLIZ in 2019, attended by 13,722 participants in total.

In 2019, VLIZ (co)organised no fewer than 42 events with a total of 13,722 participants. The organised events range from multiple-day symposia to workshops and open house days. They are aimed at a highly varied audience, ranging from teachers and coastal guides to scientists and experts as well as the general public. The majority of events organised by VLIZ take place in Ostend and boost the local economy of the coastal region. In 2019, there were 1137 overnight stays in Ostend by people visiting the InnovOcean site or attending events organised by the InnovOcean partners in Ostend. Tourism is the principal economic engine of the coastal area. The meeting industry forms an important component of tourism, and VLIZ contributes significantly to this sector by organising various national and international events.

VLIZ has a long history of organising events and distinguishes itself from other research institutes in this regard. VLIZ has invested in this type of scientific support since its establishment in 1999. The

driving force behind the organisation of all these events has always been the event team, which consists of six enthusiastic VLIZ employees. The event team is responsible for preliminary consultations with the internal or external organiser, the planning and the logistical and practical organisation of the event, including staffing during the event. The event team also takes care of the search for a suitable location and a (sustainable) caterer, the preparation of invitations and registrations, budget management, bookings, etc.

The VLIZ Marine Science Day (VMSD) is an example of a successful event that took place in 2019. The VMSD, which has been organised annually since the establishment of VLIZ, is aimed at scientists from the marine research community. A total of 366 enthusiastic scientists participated in the VMSD In 2019.

By organising the 'Marine Science Meets Maritime Industry' (MS-MMI) event, VLIZ focuses on representatives of knowledge institu-



# VLIZ EVENTS



The VLIZ event team attending the solemn ceremony commemorating the 20<sup>th</sup> anniversary of VLIZ in the KV Oostende football stadium © VLIZ (Jurgen De Witte)

tions, governments and the business community (in partnership with the Blue Cluster). In 2019, a total of 110 participants visited Cultural Centre De Grote Post in Ostend for the fifth edition of MS-MMI (also see KPI 2 on page 39).

Science Day is the most important yearly public event organised by VLIZ. In 2019, the activities of VLIZ revolved around the technological progress in marine sciences. The 2019 edition was another success with an attendance of 1200 visitors to the Marine Station Ostend and 750 visitors to RV Simon Stevin.

Another event worth mentioning is the closing conference of the four-yearly CREST research project, which was held in Greenbridge, the incubation and innovation centrum of Ghent University in Ostend. The CREST project brought together ten institutions from the academic community, the Flemish government and the private sector, and developed a great deal of expertise concerning coastal

processes over the course of four years. The project was part of the Strategic Basic Research (*Strategisch BasisOnderzoek* or SBO) programme of Flanders Innovation & Entrepreneurship (VLAIO) and came to an end on 31 October 2019. The closing conference was attended by 124 interested people. The ten project partners formulated nine key messages and a concise list of remarkable results for each of the four research topics.

An overview of all events organised by VLIZ and the number of participants is available on page 56 of the annexes.

# 50<sup>TH</sup> ISSUE OF DE GROTE REDE

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📄 De Grote Rede digitaal: [www.vliz.be/en/de-grote-rede](http://www.vliz.be/en/de-grote-rede)

In the run-up to the celebrations for its 20th anniversary, VLIZ published the 50th issue of De Grote Rede, the information magazine on coastal and marine research. The non-profit organisation VLIZ was founded on 1 October 1999 (see Highlight on pages 28-29). The first issue of De Grote Rede appeared the following year. Twenty years later, the 50<sup>th</sup> issue looks back and ahead!

In the first leading article, the editors look back on the in-house magazine's 50 issues, which account for a total of nearly 2000 pages of varied and fascinating content. In the second leading article, four authoritative experts take a look at the future. They were asked what the North Sea coast will look like in 2050 or 2100. The festive issue furthermore contains a nice article about the history of our coastal dunes: nature conservation and development. The other articles also look back in time (13 years of Cis the Beachcomber, 15 years of sea-related words, old school posters), go beyond national borders (imported fish not sustainable) or do both things (500 years of change in the world's oceans).

The aim of the editors of De Grote Rede is to provide access to the greatest possible flow of information. De Grote Rede was named after a channel north of Ostend that has been an important springboard for the Flemish coast. Likewise, this newsletter is intended as a bridge between different users. Finally, this magazine also

serves as a quiet anchorage or roadstead (another meaning of 'rede' in Dutch) in our often turbulent waters.

The 50<sup>th</sup> issue of De Grote Rede can be read online or downloaded in PDF format. All issues are publicly available in the De Grote Rede archives on the VLIZ website. Want to subscribe to the digital or paper newsletter free of charge? For more information please go to <http://www.vliz.be/en/de-grote-rede-subscription>.

# 8,797

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## SUBSCRIBERS TO DE GROTE REDE

The number of subscribers to De Grote Rede, including 8,222 recipients of the paper version and 575 recipients of the digital version.



The 50<sup>th</sup> issue of De Grote Rede magazine appeared on the occasion of VLIZ's 20<sup>th</sup> anniversary © VLIZ





Scientists and technicians demonstrated the operation of the autonomous underwater vehicle (AUV) Barabas during the press presentation of the Marine Robotics Centre.  
© VLIZ (Verhaeghe)

## INAUGURATION OF THE MARINE ROBOTICS CENTRE

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» *The Marine Robotics Centre can become the driving force behind VLIZ's important new activities in the future.* «

JOHAN HANSENS, SECRETARY-GENERAL  
OF THE DEPARTMENT OF ECONOMY, SCIENCE AND INNOVATION (EWI)

On 17 September 2019, the Marine Robotics Centre (MRC) of VLIZ was officially inaugurated in the presence of Carl Decaluwé (*chairman of the VLIZ Board of Directors and governor of West Flanders*), Johan Hanssens (*Secretary-General of the department of Economy, Science and Innovation*) and members of the press. The new centre is a testament to VLIZ's ambition to develop into an international knowledge hub for marine autonomous systems. The MRC is embedded in VLIZ, which, as the central point of contact for marine sciences in Flanders, is the ideal institution to manage and utilise this specialised infrastructure.

The exploitation of the seas has increased significantly over the past few years. New users, whose principal exponents include offshore wind farms and aquaculture, emerge besides traditional sectors such as shipping, fisheries and sand extraction. In addition, scientists are trying to gain a better understanding of and provide solutions for global challenges such as climate change and rising sea levels.

A technological revolution for marine activities has meanwhile been taking place in the background. The blue economy is increas-





The official inauguration of the Marine Robotics Centre by Carl Decaluwé (chairman of the VLIZ Board of Directors and governor of West Flanders) and Johan Hanssens (Secretary-General of the department of Economy, Science and Innovation).  
© VLIZ (Verhaeghe)

📄 Marine Robotics Centre: [www.vliz.be/en/marine-robotics-centre](http://www.vliz.be/en/marine-robotics-centre)

📺 Video MRC: [www.vliz.be/en/multimedia/video-gallery?album=5353](http://www.vliz.be/en/multimedia/video-gallery?album=5353)

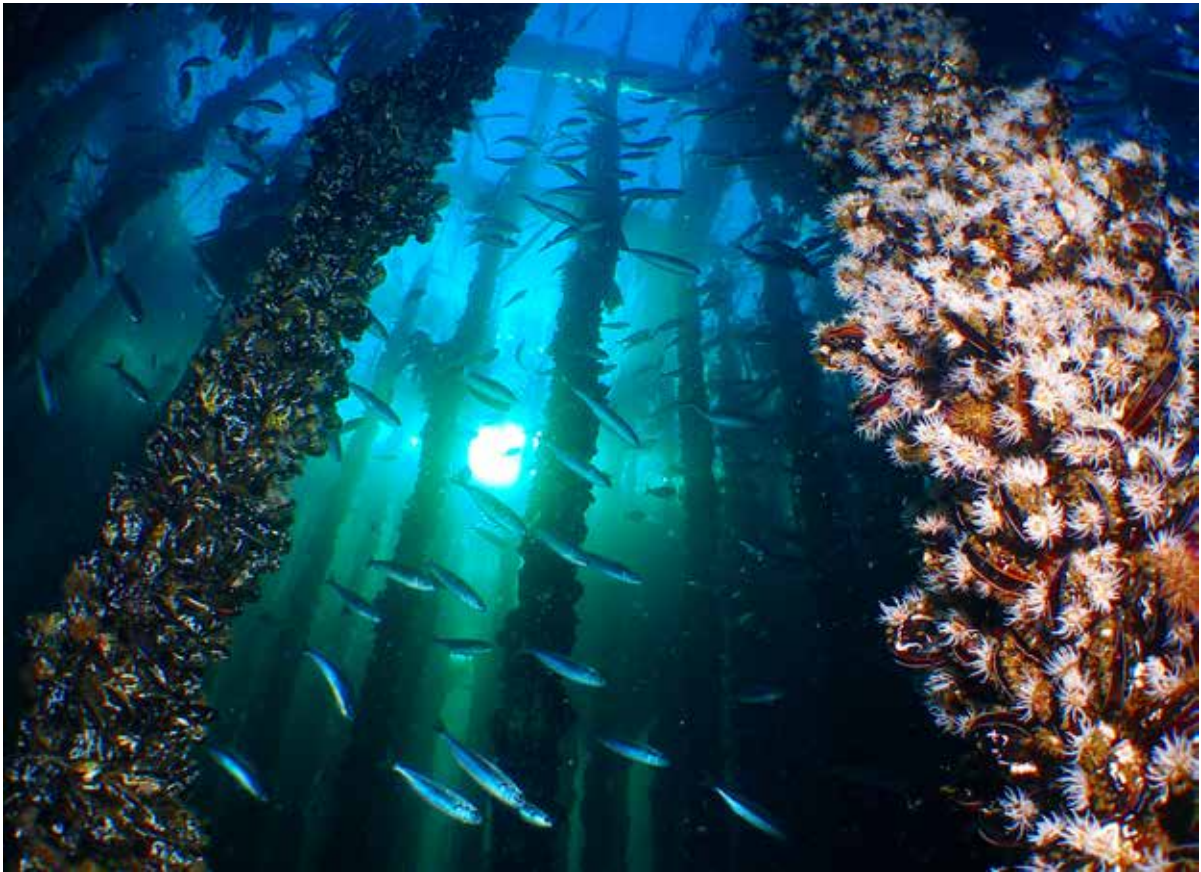
ingly deploying robotics and underwater technology in order to increase the safety of people working at sea and to optimise production and cost efficiency. Robotics enable scientists to study greater and deeper parts of the oceans with a higher level of detail. Thanks to the smart use of marine robotics platforms, researchers are also able to explore new research topics and innovation projects. The Flemish government has therefore decided to invest in this technology and thus provide new stimuli for the marine research and innovation landscape.

The VLIZ Marine Robotics Centre (MRC) will manage the new robotic applications and develop the necessary expertise within this important field. This way, the centre aims to give researchers, maritime companies, government authorities and innovation actors access to this high-tech equipment. Johan Hanssens, Secretary-General of the department of Economy, Science and Innovation (EWI), explains why VLIZ has been entrusted with this task: *“Twenty years into its existence, the Flanders Marine Institute has succeeded in putting itself on the world map of marine research. The*

*launch of the Marine Robotics Centre today is therefore the next logical step in this success story. The Marine Robotics Centre can become the driving force behind VLIZ’s important new activities in the future. This €3 million investment will enable VLIZ to create new value chains in the blue economy.”*

With the support of the Flemish government, VLIZ now has three autonomous or remote-controlled sea-going robots capable of conducting a range of measurements at its disposal: Remotely Operated Vehicle (ROV) ‘Zonnebloem’, Autonomous Underwater Vehicle (AUV) ‘Barabas’ and Unmanned Surface Vehicle (USV) ‘Adhemar’.

The combination of these three robots makes it possible to operate in various domains and disciplines. The deployment of marine robotics also adds a new dimension to the numerous innovation projects which VLIZ has recently undertaken within the scope of the Flemish blue economy. In the future, VLIZ aims to inspire young people to pursue a career in the blue economy or marine research through educational activities.



© Shutterstock



The 'PROBIO' (PROspection for BIOactive compounds in the North Sea) project is an excellent example of a Blue Cluster innovation project that was approved and initiated in 2019 with VLIZ acting as coordinator. © Shutterstock

# BLUE ECONOMY INNOVATION PROJECTS

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📄 PROBIO project: [www.blauwecluster.be/project/probio-prospection-bioactive-compounds-north-sea](http://www.blauwecluster.be/project/probio-prospection-bioactive-compounds-north-sea)

📄 The Blue Cluster: [www.blauwecluster.be/about](http://www.blauwecluster.be/about)

A few years ago, VLIZ started the development of an interface between marine research and the blue economy and innovation. This way, VLIZ acts as a facilitator of an efficient transfer of scientific knowledge from marine knowledge institutions to the maritime business world. In addition, VLIZ aims its research and development efforts at innovation and plays an important part in the Blue Cluster, which was established in 2018.

Within this context, VLIZ's role ranges from the provision of technical and scientific support to the development of research topics in line with the cluster's priorities. In addition, VLIZ supports the Blue Cluster in terms of internationalisation, communication and the organisation of joint events. For instance, the successful annual event entitled 'Marine Science Meets Marine Industry', which is jointly organised by VLIZ and the Blue Cluster, once again proved in 2019 that science and industry both pursue innovation (also see KPI2 on page 39). Finally, VLIZ is an observer in the Board of Directors in its capacity as a representative of the Flemish marine landscape and chairs the Scientific Advisory Board of the Blue Cluster.

In 2019, VLIZ moved up a gear in terms of blue economy innovation projects. The first 12 Blue Cluster innovation projects were initiated, and several projects are in the pipeline for the near future. These first 12 projects had a total budget of nearly € 15 million, which went to companies and knowledge institutions through the Blue Cluster and the submitted innovation projects. VLIZ is instrumental in initiating and supporting the Blue Cluster's innovation projects. The research institution is involved in innovation pro-

jects with a focus on fundamental or applied research to various degrees, acting as coordinator or project partner or engaging in collaborations. The high success rate of the submitted innovation projects demonstrates that the professional guidance and meticulous scientific approach implemented by VLIZ in the project applications is highly valued.

Aimed at strategic basic research for clusters (Cluster SBO), the 'PROBIO' (PROspection for BIOactive compounds in the North Sea) project is an excellent example of a Blue Cluster innovation project that was approved and initiated in 2019 with VLIZ acting as coordinator. One of the objectives of this project is the identification and collection of 50 North Sea species that may contain bioactive substances with commercial potential. The PROBIO project constitutes the first critical step of developing a knowledge base to initiate further innovation and thus facilitate new commercial developments in various sectors. The other project partners are Flanders Institute for Biotechnology (VIB), Ghent University and KU Leuven. The PROBIO project is a nice example of a project where VLIZ introduces new research groups into the marine research community.

VLIZ is also actively involved in the innovation projects COAST-BUSTERS 2.0 (testing of the capacity and added value of certain bio-building organisms for coastal protection) and DATABEACH (development of pioneering new measuring technology, machine learning models and probabilistic calculation methods for disruptive progress in the design of soft coastal protection structures).

# 15<sup>TH</sup> ANNIVERSARY OF EUROBIS

🌐 [www.eurobis.org](http://www.eurobis.org)



On the occasion of its 15<sup>th</sup> anniversary, EurOBIS has been given a makeover, including a new logo

EurOBIS was established in 2004 in order to centralise and disclose the highly scattered and largely inaccessible distribution data of marine animal and plant species in Europe. In 2019, fifteen years later, the system hosted no less than 24 million distribution records of 62,299 species. Thanks to EurOBIS and the sustained effort of numerous scientists working on a voluntary basis, these data have been given a second life.

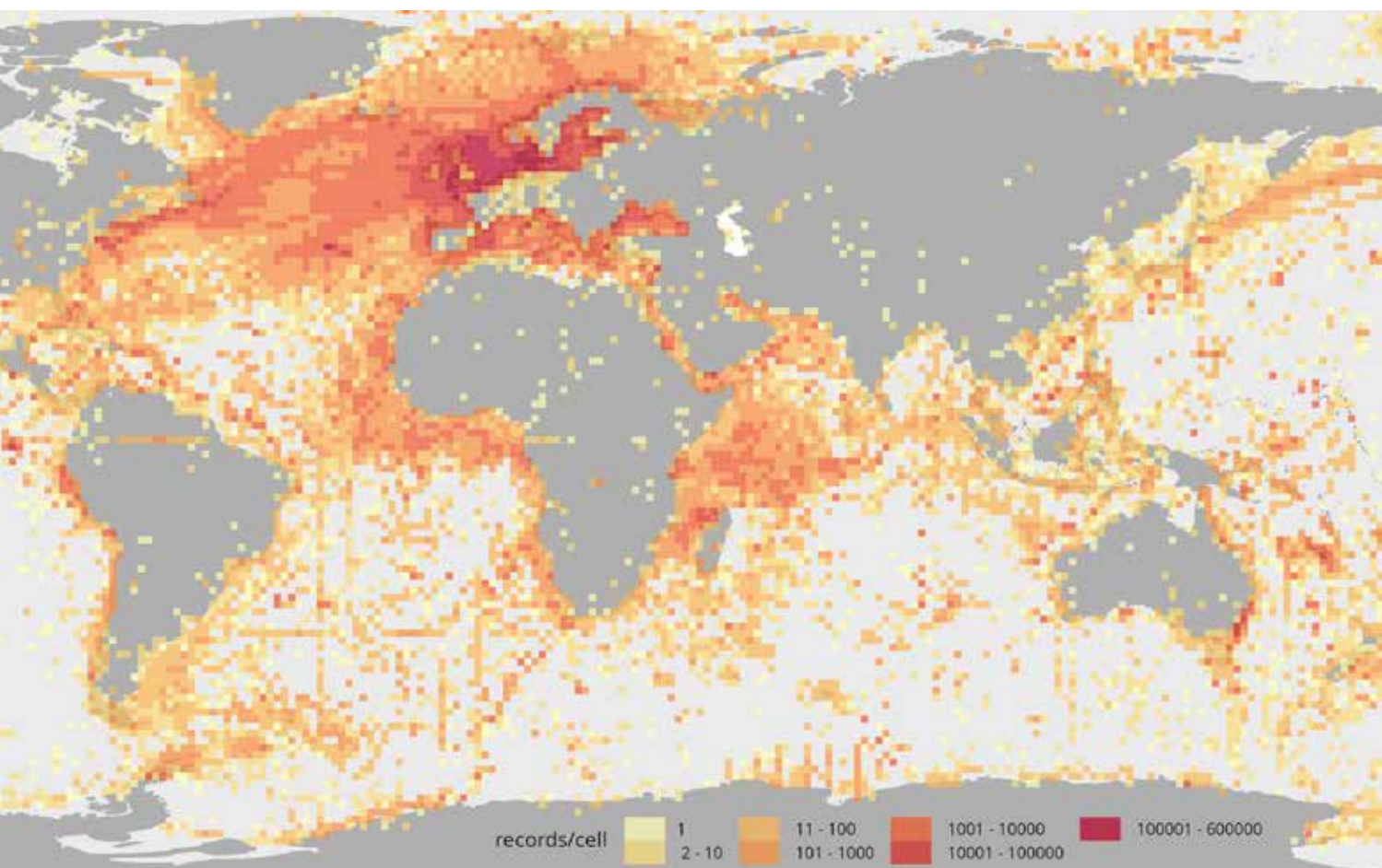
EurOBIS was developed by VLIZ within the framework of the MarBEF project (MARine Biodiversity and Ecosystem Functioning). To the greatest extent possible, EurOBIS brings together biogeographic data collected in European marine waters or by European researchers outside Europe. It focuses on taxonomy and distribution in space and time and offers a number of online tools to easily query and visualise the data. At the end of 2019, EurOBIS held 889 datasets, representing 62,299 species and 24 million distribution records.

With more than 6 million distribution records, fish are the most common in the database, followed by (sea) birds and marine mammals. At a species level, Atlantic herring, dab, whiting and Atlantic cod take the lead with 650,000 – 780,000 distribution records each, some of which go back to the early 17<sup>th</sup> century, predating the studies of marine organisms by Linnaeus and Darwin. The oldest record is for a masked crab, registered in British waters in 1507 and added to the EurOBIS database in May 2019. The EurOBIS database structure has evolved over the years, making it possible to record e.g. biomass data and length measurements in a standardised and structured manner. Even blubber thickness in marine mammals is part of the EurOBIS system, with 247 measurements made on the beach in species such as harbour porpoise, grey seal, harbour seal, white-beaked dolphin and bottlenose dolphin.

EurOBIS is connected with other related systems. Similar to what happens with other regional nodes outside Europe, EurOBIS data







Geographical representation of the spread of all EurOBIS records ([www.eurobis.org](http://www.eurobis.org))

flow to the global initiative *Ocean Biogeographic Information System* (OBIS). There is also a connection with the *Global Biodiversity Information Facility* (GBIF), which hosts global marine and terrestrial distribution data. Since 2009, EurOBIS has been the backbone of the *European Marine Observation and Data Network – Biology* (EMODnet Biology), allowing a flow of EurOBIS data through its portal. In 2014, EurOBIS became part of the central LifeWatch Species Information Backbone, which facilitates the standardisation of species data and the integration of fragmented biodiversity data, taxonomic data repositories and other facilities. The EurOBIS data management team is supported by LifeWatch Belgium, which is part of the *European LifeWatch E-Science Infrastructure for Biodiversity and Ecosystem Research*.

# 24,000,000

## OBSERVATION

The number of observations of 62,299 marine animal and plant species included in EurOBIS at the end of 2019.

# MARINE REGIONS LAUNCHES VERSION 11 OF MARITIME BOUNDARIES

🌐 Marine Regions: [www.marineregions.org](http://www.marineregions.org)

📄 Maritime boundaries download-pagina: [www.marineregions.org/downloads.php#marbound](http://www.marineregions.org/downloads.php#marbound)

🐦 Twitter: @marineregions

» *Marine Regions is absolutely essential to our work at 'Sea Around Us', because compiling and updating the world EEZs by ourselves would be impossible".*

*Dr. Daniel Pauly – Fisheries biologist and leader of the project 'Sea Around Us'. «*

**DR. DANIEL PAULY – FISHERIES BIOLOGIST AND LEADER  
OF THE PROJECT 'SEA AROUND US'**



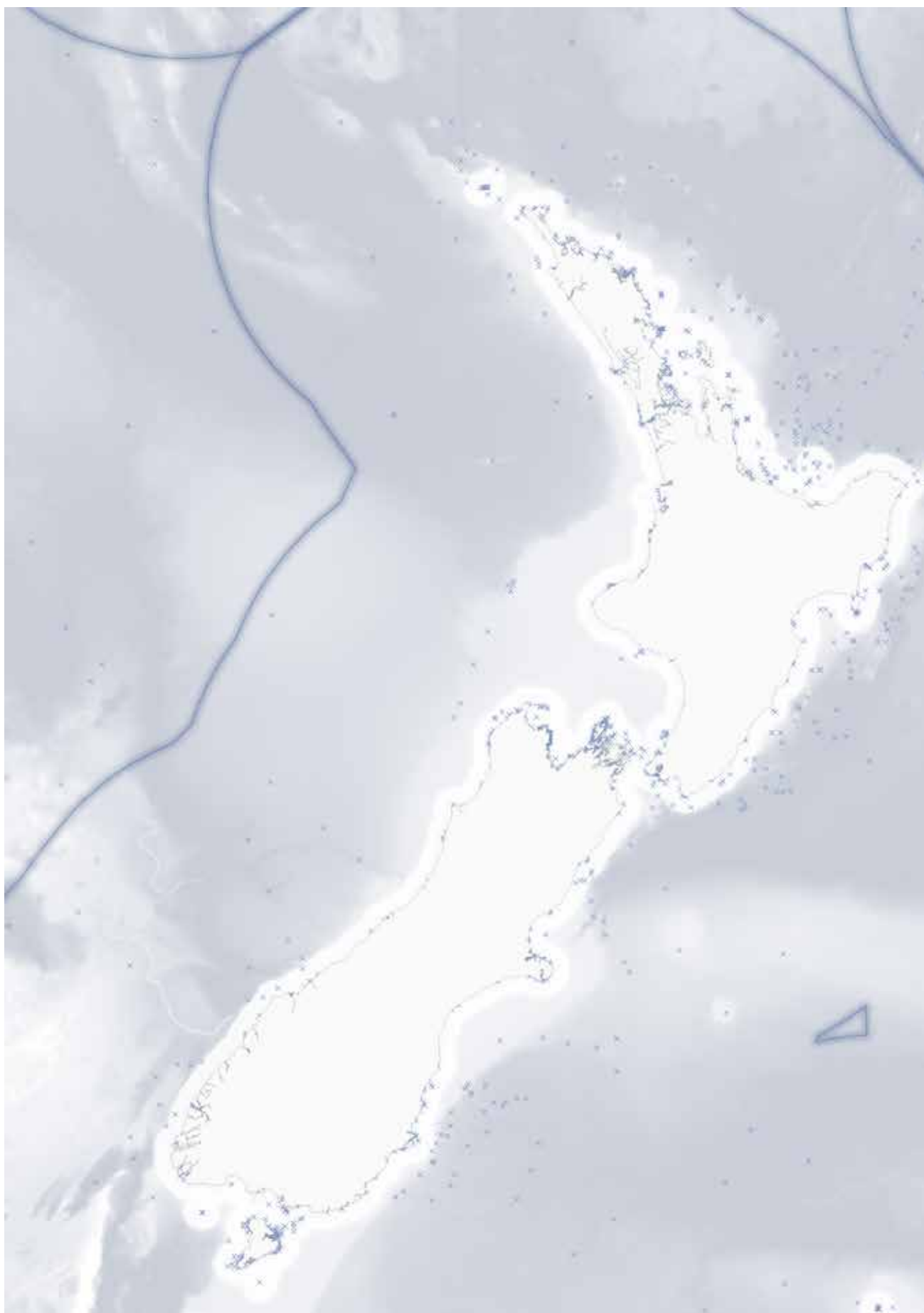
Marine Regions – an open database of global maritime boundaries and names of underwater locations – launched the 11<sup>th</sup> version of its Maritime Boundaries component in 2019. The maritime boundaries are documented in this worldwide product. The new version contains the global Exclusive Economic Zones (EEZ), all 12- and 24-nautical mile zones as well as the internal and archipelagic waters of marine states. The update not only takes into account new international treaties but also the feedback from countless users. The maritime boundaries are freely available via the Marine Regions website: [www.marineregions.org](http://www.marineregions.org)

In addition to the maritime boundaries, Marine Regions also includes a database or gazetteer with over 60,000 names and locations of marine objects such as seas, sandbanks, bays, seamounts and ridges and even sampling locations for marine research. In

2019, Marine Regions adopted the CC BY licence for the Maritime Boundaries dataset and the gazetteer, making them freely available across borders.

On the occasion of the new release, Marine Regions launched video testimonials by Daniel Pauly, renowned fisheries biologist and project leader of the Sea Around Us, and Paul Woods, Chief Innovation Officer of Global Fishing Watch. Both men make intensive use of Maritime Boundaries and explain that Marine Regions is essential for their work. The videos can be viewed on the Marine Regions website.

Marine Regions is managed by the Flanders Marine Institute (VLIZ) as part of the LifeWatch Species Information Backbone and is supported via the Flemish contribution for LifeWatch.





VLIZ celebrated its 20<sup>th</sup> anniversary in the presence of 326 invitees. Left to right: Jan Mees (General Director of VLIZ), Carl Decaluwé (chairman of the VLIZ Board of Directors and governor of West Flanders), Bart Tommelein (Mayor of Ostend) and Bart Plasschaert (Executive Councillor for Leisure of Ostend) © VLIZ (Jurgen de Witte)

# 20<sup>TH</sup> ANNIVERSARY OF VLIZ

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📺 VLIZ video: <https://youtu.be/x0qeoXAjg5E>  
🔊 Audio series VLIZ 20 year: [www.vliz.be/en/audio-series-20-years-vliz](http://www.vliz.be/en/audio-series-20-years-vliz)

The VLIZ logo was given a makeover on the occasion of VLIZ's 20<sup>th</sup> anniversary.





The festivities for the 20th anniversary of VLIZ took place in the KV Oostende football stadium.  
© VLIZ (Jurgen de Witte)

The Flanders Marine Institute (VLIZ) was established twenty years ago. On Thursday 28 November 2019, Versluys Arena in Ostend was the location for the kick-off of the festive year 2020. To celebrate its anniversary together with its extensive network, VLIZ is organising several activities throughout 2020 with 'VLIZ breaks boundaries' as the central theme.

On 1 October 1999, VLIZ was officially established with the support of the Flemish Government, the province of West Flanders and the Research Foundation – Flanders (FWO). The institute was temporarily based in a former caretaker's house of the Valcke company in Victoriaalaan on the East Bank of Ostend, and Jan Mees became the director. The next year, a ten-strong team ensured that the young institute served as a point of contact and support for marine sciences in Flanders.

Showing strong commitment and performing a varied range of duties, they put themselves at the service of all those who were fascinated by the coast and sea. After moving to the InnovOcean site at Wandelaarkaai and the Marine Station Ostend at Slipwaykaai, they developed a wide range of services to support the Belgian research community of over 1500 marine scientists: coordination, point of contact, oceanographic data management, marine library, science communication, research infrastructure, etc.

Since then, the institute has continued to grow and has broken boundaries in terms of both scope and strength, as well as in terms

of activities, workforce and available infrastructure. Since its establishment two decades ago, the number of VLIZ employees has increased no less than tenfold. We now own a hypermodern research vessel (RV Simon Stevin) and three unique marine robots in addition to lots of other highly specialised equipment, and we are ready to build a brand-new home (see Highlight on page 12-13). VLIZ has now become a fully-fledged scientific institution, embedded nationally and internationally in numerous networks and projects.

VLIZ has consistently pushed the limits of innovation in virtually every discipline, and on several occasions we have succeeded in breaking the boundaries. VLIZ's area of expertise now covers the world's oceans and has hardly any limitations in terms of time. The government has granted VLIZ an extension of its mandate, enabling the institute to focus strongly on multidisciplinary top-level research, well-founded policy advice in relevant cases and support of the blue economy over the past few years. The objective has always been to become a professional yet warm-hearted institute which aims to help build a sustainable world on the basis of thorough scientific studies. VLIZ aims for a world that offers ample opportunities to future generations and where the seas and oceans receive the attention they deserve.

To celebrate its anniversary together with its network, VLIZ is organising several activities throughout the festive year 2020. A new VLIZ video has been launched, and there is an audio exhibition featuring stories told by 20 privileged witnesses.



## SUPPORT TO INTERNATIONAL ORGANISATIONS

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By order of the Flemish government, VLIZ supports several international organisations.

This capitalises on VLIZ's international experience and reputation, and makes it possible to embed important European initiatives in Flanders. This chapter briefly explains the specific partnerships in which VLIZ participated in 2019.

[www.vliz.be/en/international-mandates](http://www.vliz.be/en/international-mandates)

# EUROPEAN MARINE BOARD



The launch of the EMB flagship publication 'Navigating the Future V' on the EurOCEAN 2019 conference in Paris (11-12 June 2019).  
© Damien Cook,  
European Marine Board

🌐 [www.vliz.be/en/european-marine-board-emb](http://www.vliz.be/en/european-marine-board-emb) 🌐 [www.marineboard.eu](http://www.marineboard.eu)

*The European Marine Board (EMB) provides an independent Pan-European platform to its marine scientific member organisations to establish common research priorities, to promote marine research and to close the gap between science and policy. VLIZ represents FWO in the European Marine Board and was given the mandate by the Flemish government to accommodate and support the EMB secretariat.*

The EMB secretariat, located at InnovOcean, benefits from VLIZ support through the use of the general VLIZ infrastructure, IT support, and one EMB staff member. Jan Mees, VLIZ General Director, served as the EMB chairman from 2014 until June 2019 and the VLIZ head of Communications, Jan Seys, actively supports the EMB Communications Panel.

In 2019, VLIZ contributed to two of EMB's flagship activities: the publication of 'Navigating the Future V', and the EurOCEAN 2019 conference in Paris on 11-12 June 2019. Navigating the Future V was co-authored by VLIZ staff members and recommends a holistic, solutions-oriented marine research agenda that should be co-designed with all stakeholders and with sustainability at its core.

Its launch was one of the highlights of the EurOCEAN Conference, which was recognised as an official contribution to the preparatory phase of the United Nations Decade of Ocean Science for Sustainable Development (2021-2030). Speakers from VLIZ at the conference included Jan Mees & Ann-Katrien Lescauwaeet, and Alexander Hooyberg participated in the poster competition for early career scientists. In order to further contribute to the Decade of Ocean Science, EMB developed a Policy Brief based on the recommendations from NFV linked to the six societal outcomes for the Ocean Decade. VLIZ took the initiative to translate this publication into Dutch, for use at national level.

VLIZ staff members also contributed to EMB's 25th Position Paper on European Research Vessels (André Cattrijse) which was launched in November 2019; and to the H2020 SOPHIE project on Oceans and Human Health for which EMB is developing the Strategic Research Agenda (SRA) with the help of an international expert group including Michiel Vandegehuchte (VLIZ). The SRA will be launched at the SOPHIE Conference to be organised in Brussels in March 2020.



# EMODnet SECRETARIAT

The European Marine Observation and Data Network (EMODnet) aims to unlock the abundance of existing but often fragmented European marine data and observations and make them optimally accessible for use by government bodies, scientists and maritime companies. An important objective of this Marine Knowledge initiative from the European Commission is to provide these resources to our scientists and engineers to generate the information necessary to improve our knowledge of the seas and to support sustainable economic growth and employment. The Flemish government has mandated VLIZ to accommodate and support the EMODnet Secretariat. In practice, the EMODnet consists of a network of organisations supported by the EU's Integrated Maritime Policy which work together to observe the sea, process the data according to international standards and make that information freely available as interoperable data layers and data products.

Since 2013, the EMODnet Secretariat is administered by Seascope and hosted at the InnovOcean site in Ostend by VLIZ with the support from the Flemish Government. VLIZ supports the EMODnet Secretariat by providing office space for five staff members as well as IT support. Also, VLIZ contributes to the development of the EMODnet Central Portal [www.emodnet.eu](http://www.emodnet.eu). This Central Portal gives users access to the different EMODnet thematic activities (e.g. bathymetry, geology, biology, chemistry, human activities, etc.) to the regional activities (EMODnet Sea-basin Checkpoints) and to data services (map viewer, query tool, data catalogue, etc.).

In 2019, the EMODnet Secretariat and VLIZ jointly updated the recently developed data and data product portfolio - accessible on the Central Portal ([www.emodnet.eu/data-portfolio](http://www.emodnet.eu/data-portfolio)). The portfolio provides a clear and concise overview of the data and products offered by all EMODnet thematic portals. In addition, the data plans for further development of the EMODnet Central Portal data services based on data and information from different EMODnet themes was further developed in 2019 with concrete upgrades to be implemented by summer 2020.

Finally, VLIZ supported the EMODnet Secretariat with the content development and co-organisation of a key events in 2019, including training workshops, technical working group meetings and a very exciting 2<sup>nd</sup> edition of the EMODnet Open Sea Lab hackathon which took place in Gent in September 2019. This event also involved both the Copernicus Marine Environmental Monitoring Service (CMEMS) and the International Council for the Exploration of the Seas (ICES) in collaboration with Marine@UGent,

Global Fishing Watch and OVH. With 70 participants from 19 nations, OSLII proved to be a very creative and productive 3 days of 'ocean hacking' resulting in many demonstrations and prototypes of new products developed building on our resources. It also worked as a stress-test of EMODnet services helping our technical teams better understand what works well and what doesn't, so that we continuously keep improving.

📄 [www.vliz.be/en/european-marine-observation-and-data-network-emodnet](http://www.vliz.be/en/european-marine-observation-and-data-network-emodnet)

📄 [www.emodnet.eu/about-secretariat](http://www.emodnet.eu/about-secretariat)

📄 [www.opensealab.eu](http://www.opensealab.eu)



The second edition of the EMODnet Open Sea Lab hackathon organised by the EMODnet secretariat in cooperation with among others VLIZ. © EMODnet (Dirk Leemans)

# JPI OCEANS



The JPI Oceans seminar took place in January 2019 at the Royal Flemish Academy of Belgium for Science and the Arts in Brussels © JPI Oceans

[www.vliz.be/en/jpi-healthy-and-productive-seas-and-oceans-jpi-oceans](http://www.vliz.be/en/jpi-healthy-and-productive-seas-and-oceans-jpi-oceans)  
[www.jpi-oceans.eu](http://www.jpi-oceans.eu)

The Joint Programming Initiative Healthy and Productive Seas and Oceans (JPI Oceans) is an intergovernmental platform aimed at increasing the impact of national marine and maritime research and innovation investments. By joining forces, JPI Oceans focuses on long-term collaboration between EU member states, associated countries and international partners, providing a shared voice, a strategic agenda and an action plan to address complex, ocean-related societal challenges that cannot be solved at the national level alone.

VLIZ was commissioned by the Flemish government to support the JPI Oceans Secretariat and does so by providing a full-time employee to the JPI Oceans secretariat in Brussels. In addition, a second employee was funded within the scope of the Horizon 2020 CSA Oceans 2 project. As part of this project, VLIZ staff updated and restructured the JPI Oceans website, developed new factsheets and presentations highlighting JPI Oceans actions, and organised the JPI Oceans seminar in January 2019. The seminar, which took place at the Royal Flemish Academy of Belgium for Science and the Arts in Brussels, aimed to provide information and promote

interaction over ongoing JPI Oceans actions and projects as well as their policy impact. It highlighted, among other things, the added value of JPI Oceans and galvanized synergies and collaboration with the European Commission services and various international (scientific) organisations.

In parallel with these supporting activities, in partnership with the European Commission, the BlueBio and MarTERA Cofunds, JPI Climate, Belmont forum and Future Earth, JPI Oceans launched six new calls for research proposals with a total budget of over 80 million Euro for the 2018-2019 period. With 29 projects awarded funding in 2019, JPI Oceans is well set for an exciting time ahead, filled with excellent research and innovation projects.

The year 2019 also marked the beginning of a new phase for JPI Oceans, kick-starting the process towards the revision of the JPI Oceans Strategic Research and Innovation Agenda (SRIA). The new SRIA will build upon the existing design, vision and scope of JPI Oceans, while adopting a new lens shaped by and responding to the external international developments that emerged since the adoption of the SRIA 2015-2020.

# UNESCO/IOC PROJECT OFFICE FOR IODE

[www.vliz.be/en/unescoioc-project-office-iode](http://www.vliz.be/en/unescoioc-project-office-iode)  
[www.iode.org](http://www.iode.org)

Since 2005 VLIZ hosts and supports the secretariat of the ‘International Oceanographic Data and Information Exchange Programme’ (IODE) of UNESCO’s ‘Intergovernmental Oceanographic Commission’ (IOC). The ‘UNESCO/IOC Project Office for IODE’ is also the main training centre of the IODE programme worldwide and the Secretariat of the IOC’s Capacity Development coordinator.

VLIZ supports the ‘IOC Project Office for IODE’ by providing employees who account for 3.5 full-time equivalents. In addition, VLIZ provides support to the operational activities focusing on the development and maintenance of online data and information services, the coordination of the global IODE network of oceanographic data centres and the organization of specialized technical training sessions.

Throughout 2019 the IODE programme coordinated the implementation of 18 OTGA training courses in 8 Regional Training Centres involving 400 trainees globally. The RTC model makes it possible to reach more people and offers trainings in different languages. Additionally, OTGA also supported the hosting and organization of another 11 training courses from other IOC Programmes as well as other partner organisations, involving another 300 participants. The IOC Project Office for IODE currently coordinates the IOC’s capacity development programme. Within this programme there is a close collaboration with the three regional secretariats in Cartagena (Colombia), Nairobi (Kenya) and Bangkok (Thailand), which coordinate the IOCARIBE, IOCAFRICA and WESTPAC regions respectively. In addition, a proposal was prepared in 2019 for the development of an IOC Clearing House Mechanism for the Transfer of Marine Technology (CHM/TMT). This project will start in 2020.

In preparation of the United Nations Decade of Ocean Science for Sustainable Development which will commence in 2021, the IOC Project Office for IODE has started the development of a number of tools (grouped under the name “IOC Ocean data and Information System – ODIS) that will inform users on the global availability of ocean data and information. The first tool is the IOC Ocean Data and Information System “Catalogue of Sources” (ODISCat), an online browsable catalogue of existing ocean related web-based sources/systems of data and information as well as products and services.

Since 2012, the IOC Project Office for IODE has accommodated the secretariat of the Ocean Biogeographic Information System (OBIS).

OBIS ([www.obis.org](http://www.obis.org)) builds and maintains a worldwide database containing data on the distribution, abundance and diversity of all marine species. In addition, the secretariat offers guidance for the development of new data standards and technical processes as well as the promotion of international partnerships. VLIZ manages the European OBIS node (EurOBIS). In 2019, EurOBIS contributed 59 new datasets to OBIS, serving a total of 22.7 million records (38% of all records in OBIS). The VLIZ data centre has also been actively involved in the OBIS activities such as in vocabulary standardisation, georeferencing (through MarineRegions) and taxonomic quality control (through WoRMS). VLIZ also makes a server available and handles IPT requests from other OBIS nodes. The VLIZ library serves as a repository for over 1,400 publications citing OBIS.

Also hosted at the IOC Project Office for IODE is the newly approved (Jun 2019) IOC Ocean Best Practices System (OBPS) which is jointly supported by IODE and the Global Ocean Observing System (GOOS). To meet the urgent, planet-wide challenges identified for the UN Decade, methods across all aspects of ocean observing should be broadly adopted by the ocean community and, where appropriate, should evolve into “Ocean Best Practices.” The new OBPS provides an opportunity space for the centralized and coordinated improvement of ocean observing methods.



Between 20 and 22 February 2019, 100 participants from 39 IOC member states and 7 organisations attended the 25<sup>th</sup> IODE-session (IODEXV) in Tokyo (Japan). The session was preceded by a 2-day scientific conference attended by 150 participants. © IODE



## KEY PERFORMANCE INDICATORS

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The Key Performance Indicators (KPIs) refer to important services provided by VLIZ to marine scientific researchers, policymakers, educators and the general public. These are criteria to evaluate the operation of VLIZ.

As stated in the covenant for the period 2017-2021, VLIZ has to deliver on at least twelve KPIs every year.





# KPI 1

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AT LEAST NINETEEN A1 PUBLICATIONS (THE AVERAGE FIGURE FOR 2017-2019)  
WRITTEN BY A VLIZ EMPLOYEE IN 2019



# 31

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## A1 PUBLICATIONS <sup>(1)</sup>

written by VLIZ employees were published in 2019, including nine A1 publications with a VLIZ employee as the first author and 22 A1 publications with a VLIZ employee as a co-author.

An overview of the A1 publications is available on p. 59 of the annexes.



© VLIZ (Decombel)

<sup>(1)</sup> in 2018: 33.

# KPI 2

## THE ORGANISATION OF THE ANNUAL EVENT 'MARINE SCIENCE MEETS MARITIME INDUSTRY'



Philippe Muylers, Flemish Minister for Work, Economy, Innovation and Sports, gave the opening speech of the fifth edition of Marine Science meets Maritime Industry © De Blauwe Cluster vzw (Pieter Clieteur)



# 110

### REPRESENTATIVES

from knowledge institutions, government agencies and the private sector attended the event 'Marine Science meets Maritime Industry' in 2019.

On 8 May 2019, the fifth edition of *Marine Science meets Maritime Industry* took place at Cultural Centre De Grote Post in Ostend. It was the first edition in which the Flanders Marine Institute (VLIZ) and the Blue Cluster joined forces. Every year, companies and knowledge institutions are invited to come up with innovative ideas about cooperation between science and the maritime industry at this event. The blue growth in Flanders was analysed with *the funding of sustainable business models* as the central theme. The following questions were raised: “How can we exploit our oceans sustainably?” and “How can we find sufficient green capital to do so?” During the speed dating lunch, the participants got the chance to become acquainted and network with the speakers and other representatives from science and industry.



**PRIVATE  
SECTOR**

35,5%



**KNOWLEDGE  
INSTITUTIONS**

50,9%



**GOVERNMENT**

13,6%

# KPI 3

AT LEAST 180 SAILING DAYS SPENT ON SCIENTIFIC RESEARCH,  
MONITORING AND EDUCATION EACH YEAR

RV SIMON STEVIN



182

OTHER VESSELS EQUIPPED  
WITH VLIZ EQUIPMENT



34

RIB ZEEKAT



28

ROV ZONNEBLOEM



11

# 255

DAYS SPENT AT SEA <sup>(1)</sup>

This is the total number of days spent at sea with RV Simon Stevin, RIB Zeekat, ROV Zonnebloem and other vessels equipped with VLIZ equipment.



RIB Zeekat at Visserijdok in Ostend © VLIZ (Verhaeghe)

RV Simon Stevin is deployed for academic coastal oceanographic research in the Southern Bight of the North Sea and the eastern part of the English Channel. It also serves as a training platform for students from marine sciences as well as maritime training courses. In 2019, a total of 1,245 persons boarded the ship, including 846 scientists/divers and 399 students/pupils. Eighteen marine research groups made use of RV Simon Stevin within the scope of 39 different projects (see annex p. 54). The vessel made 29 day trips for educational or demonstration purposes, e.g. within the

scope of Planeet Zee and training courses at the Antwerp Maritime Academy as well as the universities of Brussels (biology), Ghent (geology, biology and environmental toxicology) and Leuven (biology). ROV Zonnebloem is an unmanned underwater vehicle deployed nationally and internationally from research vessels (see p. 41). RIB Zeekat can be deployed from the research vessel Simon Stevin or from the shore, including for sampling in coastal waters, the Belgian ports and the Scheldt estuary. The reinforced keel is designed to run the vessel aground on tidal banks.

<sup>(1)</sup> in 2018: 278



# KPI 4

SEVEN MISSIONS A YEAR CONDUCTED WITH THE EQUIPMENT OF THE MARINE ROBOTICS CENTRE. THIS NUMBER INCLUDES THE MULTIPLE-DAY DEPLOYMENT OF EQUIPMENT IN FOUR-DAY PERIODS



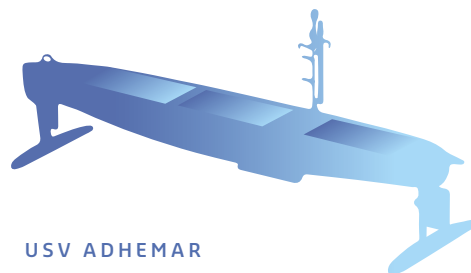
The Unmanned Surface Vehicle (USV) 'Adhemar' is energy neutral and can stay at sea for weeks or months on end.



ROV ZONNEBLOEM



AUV BARABAS



USV ADHEMAR

# 16

MISSIONS <sup>(1)</sup>

8 of which with ROV Zonnebloem,  
4 with AUV Barabas and  
4 with USV Adhemar.

Remotely Operated Vehicle (ROV) Zonnebloem (formerly called 'Genesis') is deployed for national research in the Belgian part of the North Sea and for deep-sea research from international research vessels. ROV Zonnebloem has been operational since 2006 and has explored virtually all ocean basins: the Atlantic Ocean, the Indian Ocean, the South Pacific and the Southern Ocean. ROV Genesis was renamed ROV Zonnebloem on the occasion of the official launch of the VLIZ Marine Robotics Centre in September 2019 (see Highlight on page 20-21). By the end of 2019, the remotely operated underwater vehicle had carried out a total of 33 expeditions. Autonomous Underwater Vehicle (AUV) Barabas is a

torpedo-shaped robot which performs measurements of the water column, the seabed and the soil. It is capable of diving to a depth of 1300 metres and can remain submerged for up to 7 hours. The robot is ideally suited for mapping the seabed and heritage shipwrecks. Unmanned Surface Vehicle (USV) Adhemar exploits wave power for its propulsion while solar panels provide electricity for its measuring instruments. Since the power supply is largely dependent on renewable energy, the USV can perform measurements of water and atmosphere over long periods of time (for several months on end).

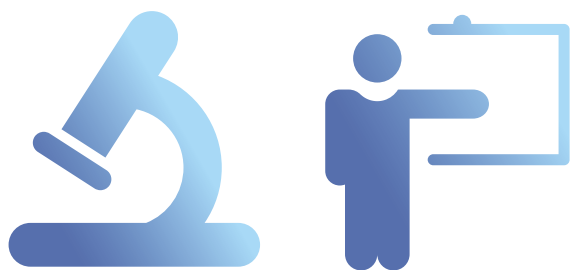
<sup>(1)</sup>in 2018: 4. From 2019 onwards, KPI 4 includes not only the number of missions with ROV Zonnebloem, but also all missions with the measuring instruments of the Marine Robotics Centre.

# KPI 5

EXTERNAL PARTIES USE THE MARINE STATION OSTEND FOR SCIENTIFIC OR EDUCATIONAL ACTIVITIES AT LEAST 120 CALENDAR DAYS A YEAR



© VLIZ (Decombel)



# 205

DAYS <sup>(1)</sup>

The number of days when external parties used the Marine Station Ostend for scientific or educational activities. On these days, a total of 451 scientists, students and visitors made use of the MSO infrastructure. The seawater tanks, climatic chambers and mesocosms were used for 193 days in the past year.<sup>(2)</sup>



© VLIZ (Decombel)

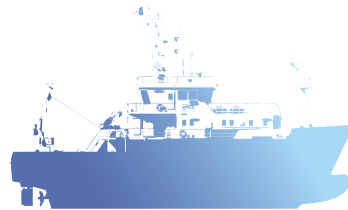
The Marine Station Ostend (MSO) is the satellite laboratory by the sea for all Flemish marine scientists and is used within the scope of the European infrastructure networks LifeWatch, ICOS and EMBRC. The MSO comprises multifunctional wet, dry and molecular laboratories, cold stores with water tanks for marine organisms, a storage and working space for data and research equipment, a core repository for cold storage of drill cores and a space for public activities.

<sup>(1)</sup> in 2018: 155

<sup>(2)</sup> An overview of marine scientific projects that made use of the MSO in 2019 can be found on page 55 of the annexes.

## KPI 6

AT LEAST 30 DATA SETS A YEAR MADE AVAILABLE TO FLEMISH MARINE RESEARCHERS AND PUBLISHED IN 'OPEN ACCESS' AFTER HAVING BEEN ACQUIRED BY RV SIMON STEVIN OR THE FLEMISH ESFRI RESEARCH INFRASTRUCTURES, OR AFTER HAVING BEEN SUPPLIED WITHIN THE SCOPE OF INTERNATIONAL NETWORKS OR PROJECTS IN WHICH VLIZ IS INVOLVED



© Shutterstock



# 90

DATA SETS <sup>(1)</sup>

A great deal of data are collected within the scope of Flemish marine research. Data supplied to VLIZ are archived and – with permission of the data owner – integrated into data systems or processed into data products so that they can be efficiently disclosed. To facilitate the search for data, VLIZ provides a detailed description of the data in data sets and discloses them via an online information system. The data can be requested online via the VLIZ website: [www.vliz.be/en/request-data](http://www.vliz.be/en/request-data).

were made available to Flemish marine researchers and published in 'Open Access' in 2019 after having been acquired by RV Simon Stevin or the Flemish ESFRI research infrastructures, or after having been supplied within the scope of international networks or projects in which VLIZ was involved.

<sup>(1)</sup>in 2018: 120

# KPI 7

AT LEAST 3 DATA ANALYSIS AND TRAINING WORKSHOPS ORGANISED EVERY YEAR



# 9

## DATA ANALYSIS AND TRAINING WORKSHOPS<sup>(1)</sup>

were organised, including 2 ETN workshops, 1 OTGA training course, 2 LifeWatch-WoRMS editor workshops, 1 LifeWatch.be Users & Stakeholders Meeting, 1 course concerning marine environment data, 1 FAIR data workshop and 1 working session concerning marine biodiversity and ecosystem functions.



The LifeWatch-WoRMS Register of Antarctic Species (RAS) Traits Workshop held in Ostend from 25 to 28 November 2019 © VLIZ

VLIZ manages several taxonomic, biogeographical and traits-related databases. Considerable investments were made in training experts who provide data to these databases in 2019.

<sup>1)</sup> in 2018: 14



# KPI 8

ANNUAL GROWTH OF THE NUMBER OF NEW REFERENCES IN THE OPEN MARINE ARCHIVE OF AT LEAST 2500 UNITS A YEAR (BROKEN DOWN BY NUMBER OF ARTICLES, THESES, BOOKS AND REPORTS, CONFERENCE PROCEEDINGS [INCL. ABSTRACTS], ETC.)



81.6%

3,596  
ARTICLES

9.28%

409  
A1-ARTICLES



0.45%

20  
PHD-THESES



17.9%

789  
REPORTS,  
BOOKS AND  
OTHER WORKS

# 3,102

NEW REFERENCES <sup>(1)</sup>

new references were added to the Open Marine Archive. In 2019, 4405 new references were added and 1303 references were removed. This brings the total number of digital publications in OMA to 34,984.

The VLIZ Library manages a very extensive collection of (inter) national marine scientific literature. The collection contains books, maps, periodicals, reports and theses, and can be searched via the online catalogue. VLIZ strives for open communication. The VLIZ Library aims to make as many publications as possible freely available in digital form. A great deal of Belgian marine literature is digitally available via the HYPERLINK "<http://www.vliz.be/open-marien-archieef>" Open Marine Archive (OMA), the principal collection component of the VLIZ library. In addition, search engines such as Google Scholar give publications included in OMA a prominent ranking.

<sup>(1)</sup> in 2018: 2,778

# KPI 9

AT LEAST 90% OF LITERATURE REQUESTS PROCESSED BY THE LIBRARY RESULT IN DOCUMENT DELIVERY WITHIN ONE WORKDAY AFTER THE REQUEST



© VLIZ



# 94.8%

DOCUMENT DELIVERIES  
WITHIN 1 WORKDAY <sup>(1)</sup>

In 2019, the VLIZ library processed 1,724 literature requests.

<sup>(1)</sup> in 2018: 978 95.4%

## KPI 10

**PARTICIPATION IN AT LEAST TEN CONSULTATIONS AT FORMAL CONSULTATION FORUMS (IN ACCORDANCE WITH THE ANNUALLY UPDATED WORK PLAN OR STRATEGIC PLAN) AND THREE POLICY RECOMMENDATIONS WITH REGARD TO RESEARCH INTO THE BLUE ECONOMY, PROVIDED WITHIN TWENTY WORKDAYS AFTER THEY HAVE BEEN REQUESTED, WITHIN THE SCOPE OF AN ANNUALLY UPDATED STRATEGIC PLAN CONCERNING 'POLICY ADVICE ON THE BLUE ECONOMY'**



# 73

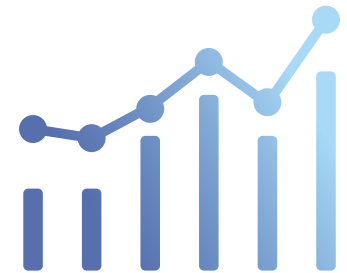
**CONSULTATIONS<sup>(1)</sup>**

participations in consultations at formal consultation forums, including 23 consultations within the scope of the Blue Cluster, 14 consultations with the Think Tank North Sea steering committee, 3 consultations of the Flemish Aquaculture Platform with the Strategic Aquaculture Steering Group (SSAQ), 7 consultations with the Port of Oostende and 26 sectoral consultations.

The industry was added to the target groups to be served in the recently concluded management agreement between the Flemish government and VLIZ (2017-2021). VLIZ was also given the task of representing the scientific community in initiatives to support the blue economy. To perform this task, VLIZ makes a

# 18

**POLICY RECOMMENDATIONS<sup>(2)</sup>**



valuable contribution to the implementation of the policy with regard to economic development at sea through participation in consultations at formal consultation forums and the provision of policy recommendations with regard to research into the blue economy. The majority of policy advice requests came from the Flemish policy areas, in particular Economy, Science and Innovation (5), Mobility and Public Works (1) and Agriculture and Fisheries (1). Federal requests came from the Federal Public Service Environment (5). Finally, there were 6 other policy recommendations.

valuable contribution to the implementation of the policy with regard to economic development at sea through participation in consultations at formal consultation forums and the provision of policy recommendations with regard to research into the blue economy.

## KPI 10<sub>BIS</sub>

**VLIZ ACTIVELY PARTICIPATES IN 4 INITIATED OR ONGOING RESEARCH AND INNOVATION INITIATIVES WITHIN THE SCOPE OF THE BLUE ECONOMY ANNUALLY.**



# 25

**RESEARCH AND INNOVATION INITIATIVES**

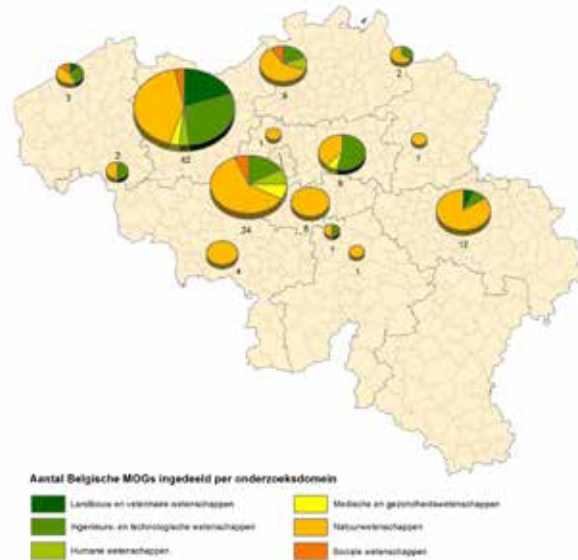
initiated and ongoing research and innovation initiatives within the scope of the blue economy, including 18 ongoing projects relating to the blue economy, 5 project proposals linked to the blue economy and 2 other ongoing initiatives linked to the blue economy.

<sup>(1)</sup> in 2018: 33

<sup>(2)</sup> in 2018: 19

# KPI 11

## ANNUAL UPDATE OF THE INVENTORY OF THE MARINE RESEARCH LANDSCAPE IN FLANDERS (COMPENDIUM FOR COAST AND SEA)



Left: With the policy informing brief *'Inventory of the marine research landscape in Flanders and Belgium'* VLIZ tries to inform stakeholders and other persons concerned about the character and evolution of marine research in Belgium. Right: Marine research groups in Flanders and Belgium presented by research area (Verleye *et al.*, 2019).

📄 Compendium for Coast and Sea: [www.compendiumkustenzee.be/en](http://www.compendiumkustenzee.be/en)

📄 Download the full report here: [www.vliz.be/imisdocs/publications/341221.pdf](http://www.vliz.be/imisdocs/publications/341221.pdf)

Every year, the marine research landscape in Flanders and Belgium is surveyed by means of a fixed methodology. In December 2019, the current situation was reported in a policy informing brief by the VLIZ Policy Information division within the context of the Compendium for Coast and Sea. The 2019 inventory demonstrates that the expertise of the 118 marine research groups is primarily situated in natural sciences (81) and engineering sciences (36). In addition, Flemish/Belgian marine scientists are active in no fewer than 19 research disciplines, which highlights their diverse expertise in the marine research landscape.

Belgian marine research also has a strong international orientation. In nearly 80% of the publications, the research was conducted outside the Belgian part of the North Sea and 74% were the result of international collaboration. This international collaboration mostly takes place with the neighbouring countries and the US, but the network of our marine researchers covers no less than 137 countries.

With this annual update and inventory of the marine research landscape, VLIZ intends to inform marine and maritime (scientific) policymakers, the marine research community and other stakeholders.



# KPI 12

AT LEAST 8 EVENTS ORGANISED AND COMMUNICATION PRODUCTS CREATED A YEAR IN COLLABORATION WITH SCIENTISTS, WITH MARINE INFORMATION BEING TRANSFERRED TO RESEARCHERS, THE GENERAL PUBLIC AND/OR EDUCATORS



In 2019, VLIZ hosted the international science festival Pint of Science in Ostend © VLIZ (Verhaeghe)



VLIZ published the first report of the VLIZ citizen science project SeaWatch-B in 2019



18  
EVENTS



7  
COMMUNICATION  
PRODUCTS

29

EVENTS, PRODUCTS, A.O.<sup>(1)</sup>

One of the strategic objectives of VLIZ is to promote ocean literacy in Flanders and the visibility of marine research to the public at large. VLIZ tries to achieve this objective by disclosing high-quality marine information to very diverse target groups (young and old, professionals and the general public, local and international, education and research) through events, communication products and publications as well as the information desk and social media.

A total of 18 events (page 56 of the annexes), 7 communication products and publications (page 58 of the annexes) and 4 other activities. Other activities include (1) the information desk (page 23 of the annexes), where various target groups can ask questions, (2) VLIZ's presence and activities on social media (page 25 of the annexes), (3) the VLIZ press briefings (page 63 of the annexes) and (4) the provision of expertise and advice for the permanent exhibition 'Sea Change' in the Duinpanne visitor centre at De Panne.

<sup>(1)</sup> in 2018: 28 events and communication products

# COLOPHON

This 2019 Annual Report of the Flanders Marine Institute (VLIZ) has been presented for approval to the Board of Directors and the General Assembly on 25 March 2020.

## COORDINATION AND FINAL EDITING

- **Jan Mees** - General Director of VLIZ
- **Tina Mertens** - VLIZ Assistant Director
- **Jan Seys** - Head of the VLIZ Communication division
- **Bart De Smet** - Senior Science Officer Communications VLIZ

Many thanks to all who contributed to the completion of this document.

## COVER PHOTO

Autonomous Underwater Vehicle (AUV) 'Barabas' deployed from the research vessel (RV) Simon Stevin © VLIZ

## DESIGN

Zoe©k - Marc Roets & Yves Moerman

## AVAILABILITY

This document is available as a PDF file on the VLIZ website ([www.vliz.be/en/vliz-annual-report](http://www.vliz.be/en/vliz-annual-report)).

## TO BE QUOTED AS FOLLOWS:

Mees J.; Mertens T.; Seys J.; De Smet B. (Ed.) (2020). VLIZ Annual Report 2019. Flanders Marine Institute (VLIZ), Ostend, Belgium

ISBN: 978-94-92043-92-4



ANNEXES

---

# ANNUAL REPORT 2019

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# ANNEXES VLIZ ANNUAL REPORT 2019

ONLY AVAILABLE IN DIGITAL VERSION

## ORGANISATION AND FINANCIAL STATEMENT OF VLIZ *p. 4*

VLIZ ORGANISATION *p. 6*

BALANCE SHEET AND INCOME STATEMENT *p. 12*

## MANAGEMENT INDICATORS *p. 14*

## OTHER ANNEXES *p. 38*

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PROJECTS – EXTERNAL FINANCING *p. 42*

TRAINEES, MASTER STUDENTS AND STUDENT EMPLOYEES *p. 51*

SCIENTIFIC EQUIPMENT AND INFRASTRUCTURE *p. 52*

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EVENTS *p. 56*

PUBLICATIONS *p. 58*





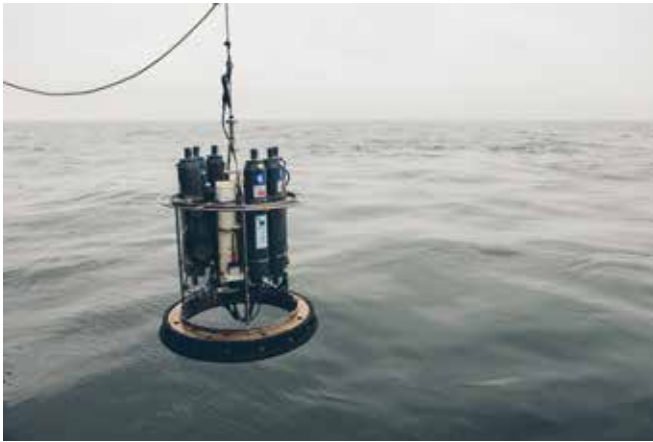
# 4

## ORGANISATION AND FINANCIAL STATEMENT OF VLIZ

VLIZ is administered by the Board of Directors and consults the Scientific Committee for its scientific support tasks. The General Assembly provides assistance in managerial and administrative decisions.



© VLIZ (Decomble)



© VLIZ (Decomble)

# 14

## MANAGEMENT INDICATORS

The Management Indicators refer to important services provided by VLIZ to marine scientific researchers, policymakers, educators and the general public. They complement the Key Performance Indicators (KPIs), which are criteria to evaluate the operation of VLIZ.

# 38

## OTHER ANNEXES

An overview of the national and international networks in which VLIZ participates, projects for which VLIZ receives external funding, the scientific equipment and infrastructure made available by VLIZ, the events (co-)organised by VLIZ and the publications published by VLIZ.



© VLIZ (Decomble)





## ORGANISATION AND FINANCIAL STATEMENT OF VLIZ

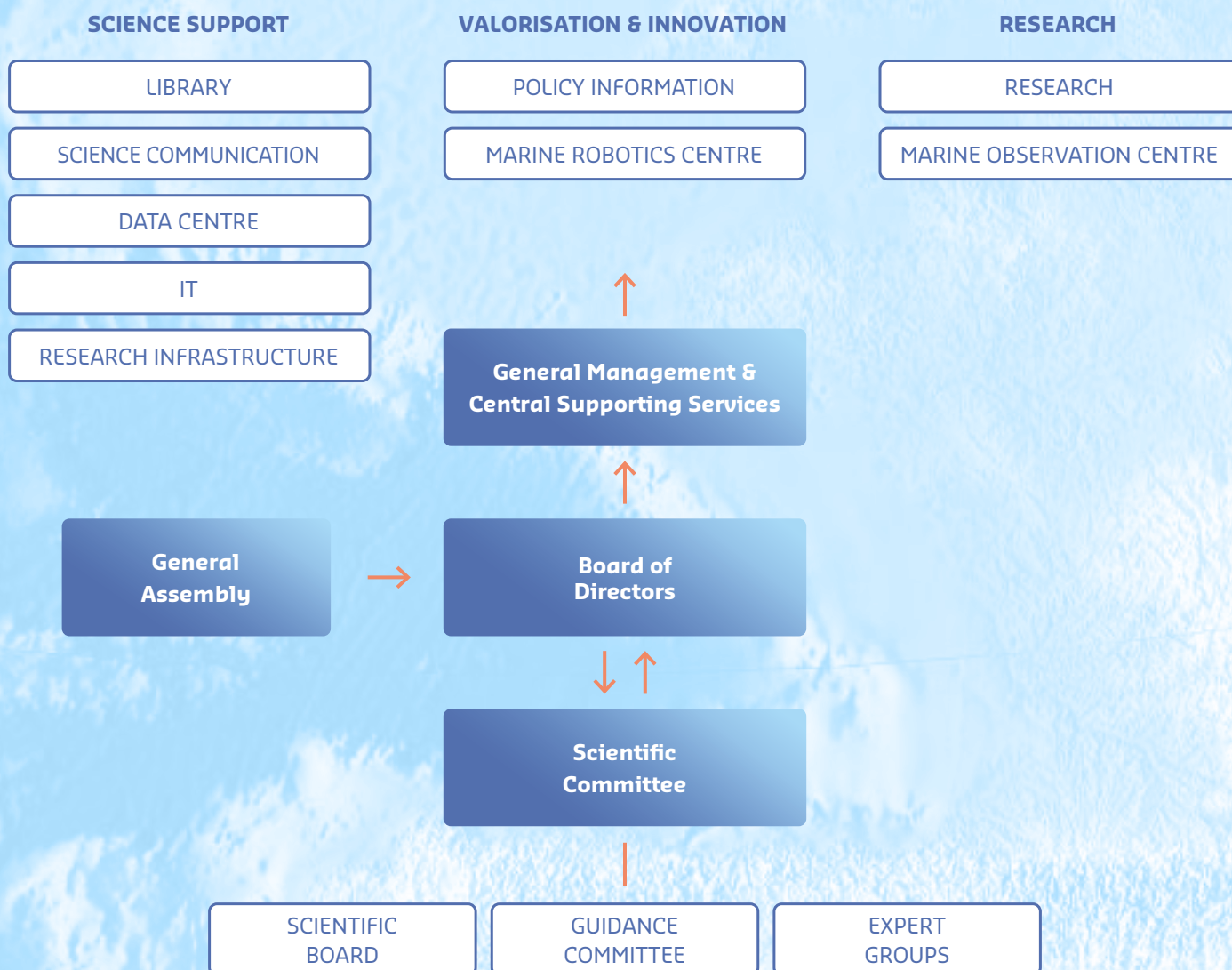
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VLIZ is administered by the Board of Directors and consults the Scientific Committee for its scientific support tasks. The General Assembly provides assistance in managerial and administrative decisions.

 [www.vliz.be/en/organisation](http://www.vliz.be/en/organisation)

# VLIZ ORGANISATION

For more information about the organisation of VLIZ, visit:  
[www.vliz.be/en/imis?module=ref&refid=292447](http://www.vliz.be/en/imis?module=ref&refid=292447)





The Flanders Marine Institute (VLIZ) is an autonomous institute with the legal status of a non-profit organisation under Belgian law that receives an annual allowance from the Flemish government, in particular from the department of Economy, Science and Innovation (EWI), and from the province of West Flanders. The highest ruling organ of VLIZ is the General Assembly. The organisation is administered by a Board of Directors, and its daily operations are overseen by the General Director, assisted by the Coordination division. In 2019, VLIZ installed a new internal structure which creates space for growth and which helps prepare the institute for the future. Through the reformed structure, VLIZ strongly focuses on three pillars: scientific support, valorisation & innovation, and research. In the past year, these three pillars translated into the establishment of

three eponymous departments, each including several divisions. A permanent team of scientists in the Scientific Committee, which advises the Board of Directors on all scientific aspects of the VLIZ operations, is consulted several times a year to define and adjust its scientific support tasks. This committee consists of three interconnected and mutually reinforcing components. The Scientific Board is a compact steering committee giving high-quality and scientifically sound advice to the Board of Directors. The Guidance Committee is convened annually for a plenary meeting open to a wide group of marine scientists to discuss important new and planned activities. Expert groups are thematic working groups composed of the most relevant experts from Belgium and abroad and are established for a limited or longer period of time.

# COMPOSITION OF THE BOARD OF DIRECTORS

AT THE END OF 2019

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VLIZ is administered by the Board of Directors, consisting of 12 members.

## THE SIX MEMBERS NOMINATED BY THE FLEMISH GOVERNMENT ARE:

- **Carl Decaluwé**, governor of West Flanders, chairman
- **Nathalie Balcaen**, Agency for Maritime and Coastal Services
- **Ilse Hoet**, Mobility and Public Works Department
- **Romina Vanhooren**, deputy head of the Gatz cabinet - general policy and Executive Councillor in Oudenburg
- **Hendrik Wallijn**, Director of Partool
- N.N.

## THE TWO MEMBERS NOMINATED BY THE PROVINCE OF WEST FLANDERS ARE:

- **Claude Croes**, member of the Provincial Executive
- **Patrick De Klerck**, member of the Provincial Council

## THE FOUR INDEPENDENT MEMBERS ARE:

- **Colin Janssen**, Ghent University, vice-chairman
- **Jean Berlamont**, Katholieke Universiteit Leuven
- **Ann Overmeire**, Blue Cluster
- **Willy Versluys**, fishing vessel owner

## THE GOVERNMENT COMMISSIONERS ARE:

- **Frans Coussement**, on behalf of the Flemish Minister for Finance
- **Mark Andries**, on behalf of the Flemish Minister for Science Policy

## ATTEND THE MEETINGS:

- **Gert Verreet**, Flemish Government Department of Economy, Science and Innovation
- **Patrick Braet**, province of West Flanders, financial manager
- **Jan Mees**, General Director of VLIZ
- **Tina Mertens**, VLIZ Assistant Director
- **Heidi Coussens**, VLIZ executive secretary and rapporteur

The **tasks and operation** of the Board of Directors as well as the appointment and qualifications of its members can be found in the **VLIZ Good Governance Charter**. [www.vliz.be/en/administrative-documents](http://www.vliz.be/en/administrative-documents)

# COMPOSITION OF THE GENERAL ASSEMBLY

AT THE END OF 2019

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Mr **Carl Decaluwé**, governor of West Flanders, is **THE CHAIRMAN**.

## THE TEN VOTING MEMBERS APPOINTED BY THE FLEMISH GOVERNMENT ARE:

- **Patric Jacobs**, Ghent University
- **Willy Baeyens**, Vrije Universiteit Brussel
- **Jean Berlamont**, Katholieke Universiteit Leuven
- **Ernest Schockaert**, Hasselt University
- **René Van Grieken**, University of Antwerp
- **Magda Vincx**, Ghent University
- **Philip Van Avermaet**, Flemish Government Department of Economy, Science and Innovation
- **Ulrike Vanhessche**, Coast Guard secretariat (MDK)
- **Ilse Hoet**, Mobility and Public Works Department
- **Jan Strubbe**, honorary director-general of the Waterways and Marine Affairs Administration

## THE FOUR VOTING MEMBERS APPOINTED BY THE PROVINCE OF WEST FLANDERS ARE:

- **Guido Decorte**, member of the Provincial Executive
- **Anthony Dumarey**, member of the Provincial Council
- **Patrick Braet**, Provincial Treasurer
- **Jan Denys**, principal of the Mercator Maritime Institute

## THE MEMBER APPOINTED BY THE RESEARCH FOUNDATION - FLANDERS (FWO) IS:

- **Hans Willems**, secretary general of the Research Foundation – Flanders

The members of the Board of Directors of VLIZ have the right to attend the General Assembly with an advisory vote. Sympathising members have the right to participate in the discussions of the General Assembly.

The **competences** of the General Assembly as well as information on the meetings and voting procedure can be found in the **VLIZ Good Governance Charter**. [www.vliz.be/en/administrative-documents](http://www.vliz.be/en/administrative-documents)

# SCIENTIFIC BOARD

AT THE END OF 2019

---

The Scientific Board consists of **16 members** and the composition reflects the **inter-university and interdisciplinary character** of VLIZ.

**THE CHAIRMAN** is the vice-chair of the Board of Directors, **Mr Colin Janssen** (Ghent University).

**TWO DELEGATES FROM GHENT UNIVERSITY (UGENT):**

- **Marleen De Troch** (substitute: David Van Rooij)
- **Gilbert Van Stappen** (substitute: Peter Troch)

**TWO DELEGATES FROM KATHOLIEKE UNIVERSITEIT LEUVEN (KULEUVEN):**

- **Filip Volckaert** (substitute: Gert Jan Weltje)
- **Jaak Monbaliu** (substitute: Erik Toorman)

**TWO DELEGATES FROM VRIJE UNIVERSITEIT BRUSSEL (VUB):**

- **Margaret Chen** (substitute: Marc Kochzius)
- **Marc Kochzius** (substitute: Karolien Van Puyvelde)

**TWO DELEGATES FROM THE UNIVERSITY OF ANTWERP (UA):**

- **Ronny Blust** (substitute: Gudrun De Boeck)
- **Filip Meysman** (substitute: Patrick Meire)

**ONE DELEGATE FROM HASSELT UNIVERSITY (UHASSELT):**

- **Tom Artois** (substitute: Natalie Beenaerts)

**ONE DELEGATE FROM THE INSTITUTE FOR AGRICULTURAL AND FISHERIES RESEARCH (ILVO):**

- **Hans Polet** (substitute: Bart Sonck)

**ONE DELEGATE FROM THE RESEARCH INSTITUTE FOR NATURE AND FOREST (INBO):**

- **Maurice Hoffmann** (substitute: Eric Stienen)

**ONE DELEGATE FROM THE FLEMISH INSTITUTE FOR TECHNOLOGICAL RESEARCH (VITO):**

- **Roger Dijkmans** (substitute: Bart Deronde)

**ONE DELEGATE FROM THE FLEMISH ENVIRONMENT AGENCY (VMM):**

- **Steven Vinckier** (substitute: Marleen Van Steertegem)

**ONE DELEGATE FROM THE FLANDERS HERITAGE AGENCY:**

- **Marnix Pieters** (substitute: Tom Lenaerts)

**ONE DELEGATE FROM FLANDERS HYDRAULICS RESEARCH (FHR):**

- **Frank Mostaert** (substitute: Toon Verwaest)

**ATTEND THE MEETINGS:**

- **Jan Mees**, General Director of VLIZ
- **Tina Mertens**, VLIZ Assistant Director
- **Jan Seys**, rapporteur (substitute: Nancy Fockedeey)

**A DELEGATE FROM THE DEPARTMENT OF ECONOMY, SCIENCE AND INNOVATION (EWI):**

- **Gert Verreet**





On September 3rd 2019, the Board of Directors of VLIZ boarded the research vessel (RV) Simon Stevin © VLIZ

# BALANCE SHEET AND INCOME STATEMENT

DECEMBER 2019

## BALANCE ON 31 DECEMBER 2019

### ASSETS

(kEUR)	31-12-2018	31-12-2019
Intangible fixed assets	0	0.65
Tangible fixed assets	6,264.61	6,818.67
Financial fixed assets	17.93	17.93
Stocks	17.62	17.86
Amounts receivable within one year	5,240.21	2,990.27
Cash investments	0	0
Liquid assets	400.54	2,043.68
Deferred charges and accrued income	3.29	0
<b>TOTAL</b>	<b>11,944.20</b>	<b>11,889.06</b>

### LIABILITIES

(kEUR)	31-12-2018	31-12-2019
Allocated funds	584.00	652.00
Profit and losses brought forward	1,811.91	2,083.92
Capital grants	7,709.09	7,358.77
Provisions for liabilities and charges	0	0
Amounts payable after one year	0	0
Amounts payable within one year	1,839.20	1,794.37
Deferred charges and accrued income	0	0
<b>TOTAL</b>	<b>11,944.20</b>	<b>11,889.06</b>

The figures of the balance sheet and income statement include all subsidies received by VLIZ as stated in the management agreement or the covenant.

No surplus of the allocated subsidy was brought forward as a reserve in 2019 (art. 12 § 3 of the covenant).

Budgetary deviations from the 2019 budget (art. 12 § 3 of the covenant): none.

**INCOME STATEMENT ON 31 DECEMBER 2019****INCOME**

(kEUR)	31-12-2018	31-12-2019
Operating income	10,915.00	12,277.97
Financial income	1,001.22	1,260.49
Exceptional income	11.74	2.28
<b>TOTAL</b>	<b>11,927.96</b>	<b>13,540.74</b>

**COSTS**

(kEUR)	31-12-2018	31-12-2019
Stocks	11.66	1.63
Remuneration and social security	6,562.84	7,531.05
Services and other goods	2,184.17	2,057.90
Provisions for liabilities and charges	0	0
Depreciation	1,173.70	1,430.92
Financial expenses	14.94	7.15
Other operating expenses	1,741.43	2,170.76
Exceptional expenses	0.77	1.32
<b>TOTAL</b>	<b>11,689.51</b>	<b>13,200.73</b>

**RESULT**

(kEUR)	2018	2019
Result for the financial year	238.45	340.01
Transfer to allocated funds	47.00	68.00
Profit brought forward as of 31/12	1,811.89	2,083.90





## MANAGEMENT INDICATORS

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The Management Indicators refer to important services provided by VLIZ to marine scientific researchers, policymakers, educators and the general public. They complement the Key Performance Indicators (KPIs), which are criteria to evaluate the operation of VLIZ.

# SOCIALE INDICATOREN

2019

# 109

## WERKNEMERS

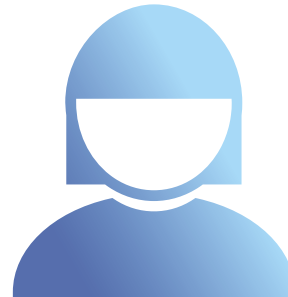
Six people of foreign origin: 6.<sup>(1)</sup>

Two people with an employment disability.



## MEN

60



## WOMEN

49



## PERMANENT

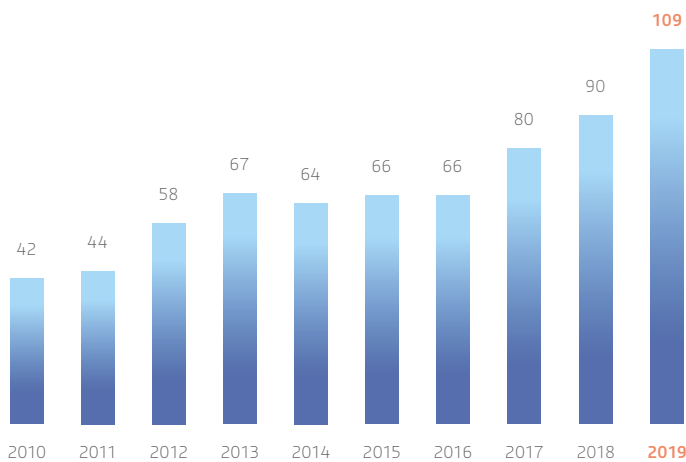
54



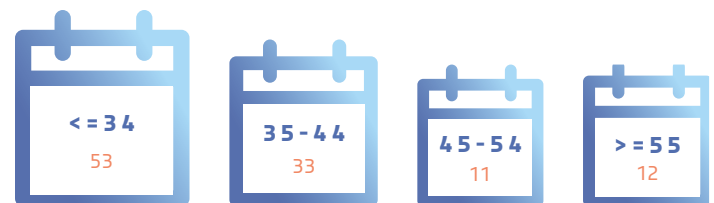
## TEMPORARY

55

## NUMBER OF EMPLOYEES



## AGE OF THE EMPLOYEES



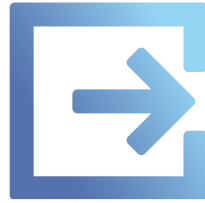
<sup>(1)</sup> Source: Wikipedia (Flemish perspective): any person living in the Flemish or Brussels Region, of whom at least one grandparent was born outside the European Union – excluding other Western and Northern European states, the USA and Canada.

**STAFF TURNOVER**



**IN**

39



**OUT**

16

22.2%

**LEAVE ETC**

The total number of days of absence as a result of maternity leave, parental leave, time credit, leave, sickness, etc. versus the total number of days to be performed. <sup>(1)</sup>



2.77%

**SICKNESS ABSENCE**

2.77% of the total number of days to be performed. <sup>(2)</sup>



59

**DAYS OF TRAINING <sup>(3)</sup>**

received by 23 employees.



85

**PERFORMANCE INTERVIEWS <sup>(4)</sup>**

101

**HIGHER-EDUCATED EMPLOYEES <sup>(5)</sup>**

and 8 persons who completed secondary education at most (ESF definition).



<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
82	19	6	2

<sup>(1)</sup> in 2018: 20.6%  
<sup>(2)</sup> in 2018: 3%

<sup>(3)</sup> in 2018: 150 days of training received by 29 employees  
<sup>(4)</sup> in 2018: 75; <sup>(5)</sup> in 2018: 83

# RESEARCH PROJECTS

2019

## 14 RESEARCH PROJECTS WITH EXTERNAL FUNDING INITIATED <sup>(1)</sup>

PROJECT	TOTAL PROJECT BUDGET	VLIZ BUDGET	NUMBER OF PARTNERS <sup>(1)</sup>
Eurofleets+	€ 9,999,737.50	€ 118,375.00	60 (4)
Enhanced silicate Weathering	€ 1,218,987.00	€ 325,057.00	2 (2)
Aqualooks	€ 224,493.00	€ 74,498.00	1 (1)
Timbers	€ 265,000.00	€ 130,000.00	1 (1)
EOSC-Life	€ 23,745,996.25	€ 511,370.00	62 (2)
EWI EOSC RDM	€ 240,000.00	€ 120,000.00	1 (1)
ENVRI FAIR	€ 18,997,878.75	€ 213,565.00	36 (1)
Blue Cloud	€ 6,783,841.25	€ 358,312.00	23 (1)
Aqua-Lit	€ 587,250.00	€ 68,246.00	6 (0)
Probio	€ 1,061,117.00	€ 235,558.00	3 (3)
Seabiocomp	€ 4,129,325.35	€ 504,409.00	11 (1)
Basta	€ 1,247,056.48	€ 348,469.04	3 (1)
Geans	€ 2,592,814.00	€ 442,480.00	8 (1)
COST-ETN	€ 149,025.50	€ 149,025.50	10 (0)

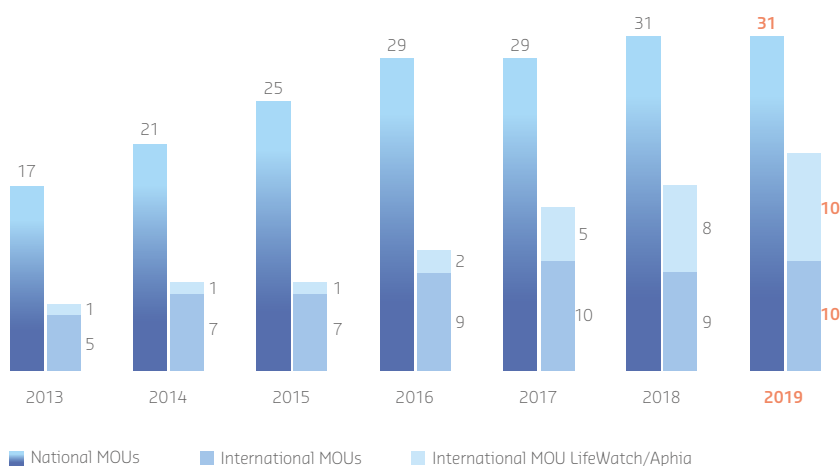
## 12 RESEARCH PROJECTS WITH INTERNAL FUNDING INITIATED

Colonization processes of ecosystem engineers, Trait-based ecosystem modelling, Coastal tourism valuation, Historic fisheries value chains, Microplastic in the marine environment, Oceanographic drivers of the heat exchange at the front of Store Glacier, Coastsnap Flemish Coast, Blackfish, 5G network application for scientific research, Blue health along the Belgian coast: Effect of living by the coast on human health and wellbeing, Paleontologic, archeologic and paleolandscape research of 'het Scheur', Multibeam mapping of the Belgian Continental Shelf.

<sup>(1)</sup> number of Belgian/Flemish projects (figure between brackets)

# NATIONAL AND INTERNATIONAL COOPERATION AGREEMENTS

2019



The number of cooperation agreements in force per year for the 2013–2019 period, divided into national MOUs, international MOUs and international MOUs within the framework of LifeWatch/Aphia.

A list of all agreements is available on [www.vliz.be/en/cooperation-agreements](http://www.vliz.be/en/cooperation-agreements).

<sup>(1)</sup> in 2018: 10 research projects with external funding initiated and 9 with internal funding.

<sup>(2)</sup> in 2018: 33 national and international cooperation agreements.



# ENVIRONMENTAL INDICATORS

2019



97,246

NUMBER OF PRINTS <sup>(1)</sup>  
AND COPIES

One print/copy corresponds to one page.



0.31

TONER CONSUMPTION <sup>(2)</sup>

used for printers and photocopiers  
per staff member.

## GAS, WATER & ELECTRICITY CONSUMPTION <sup>(3)</sup>



39,024  
m<sup>3</sup>



244,243  
kWh



566  
m<sup>3</sup>

## COMMUTING <sup>(4)</sup>

€102,902

TRAIN, TRAM & BICYCLE ALLOWANCES

refunded to employees.

## NUMBER OF KILOMETRES AND FUEL CONSUMPTION OF VLIZ CARS AT THE END OF 2019

NISSAN PULSAR <sup>(5)</sup>

52,861

NISSAN NAVARA <sup>(6)</sup>

14,055

NISSAN PANEL VAN <sup>(7)</sup>

23,992

NISSAN LEAF <sup>(8)</sup>

10,533

0 10,000 km 20,000 km 30,000 km 40,000 km 50,000 km 60,000 km

Number of kilometres at the end of 2019

Total fuel consumption: 3,957 litres <sup>(9)</sup>

<sup>(1)</sup> in 2018: 266,132 prints and copies

<sup>(2)</sup> in 2018: 0.71 toner consumption

<sup>(3)</sup> in 2018 gas: 28,641 m<sup>3</sup>, electricity: 219,715 kWh, water: 674 m<sup>3</sup>

<sup>(4)</sup> in 2018: € 79,125 train, tram and bicycle allowances

<sup>(5)</sup> in 2018: 178,115 km; of which 152,763 by the Fiat Doblo and 25,382 by the Nissan Pulsar.

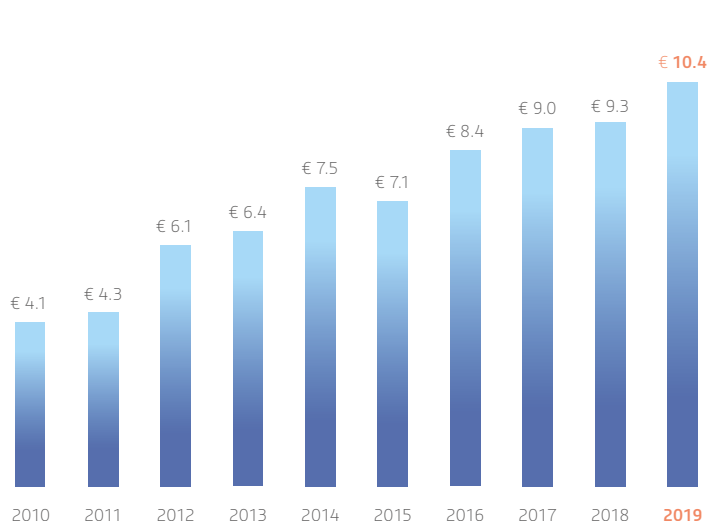
<sup>(6)</sup> in 2018: 119,536 km; of which 6,472 by the new Nissan Navara and 113,064 by the old Nissan Navara.

<sup>(7)</sup> in 2018: 89,030 km; of which 77,074 by the Fiat Scudo and 11,956 by the Nissan Panel Van

<sup>(8)</sup> in 2018: 3,023 km <sup>(9)</sup> in 2018: 5,316 liter

## VLIZ TURNOVER

IN MILLION EURO

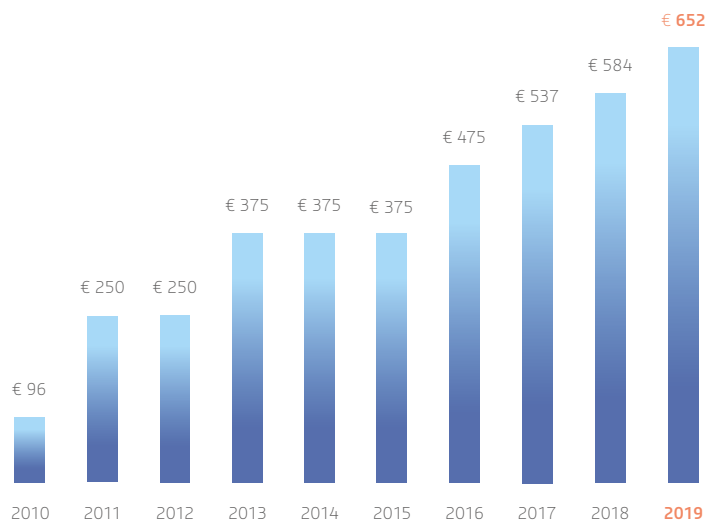


2019: € 10,452,355

Membership fees, donations, legacies and subsidies

## SOCIAL LIABILITIES

IN THOUSAND EURO



2019: € 652,000

## TURNOVER OF INNOVOCEAN SITE PARTNERS

IN EURO

€ 1,047,284

TOTAL



IOC PROJECT OFFICE FOR IODE

€ 624,086



EUROPEAN MARINE BOARD  
SECRETARIAT

€ 145,990



EMODNET-SECRETARIAT

€ 175,208

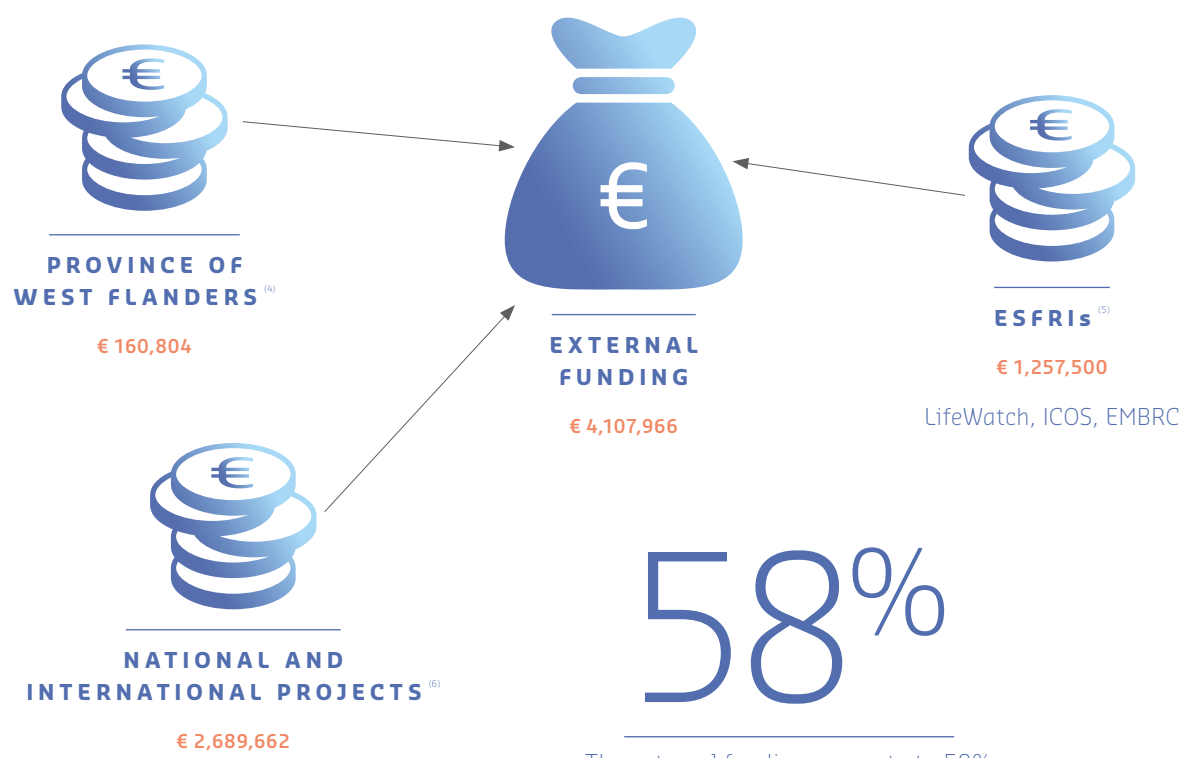
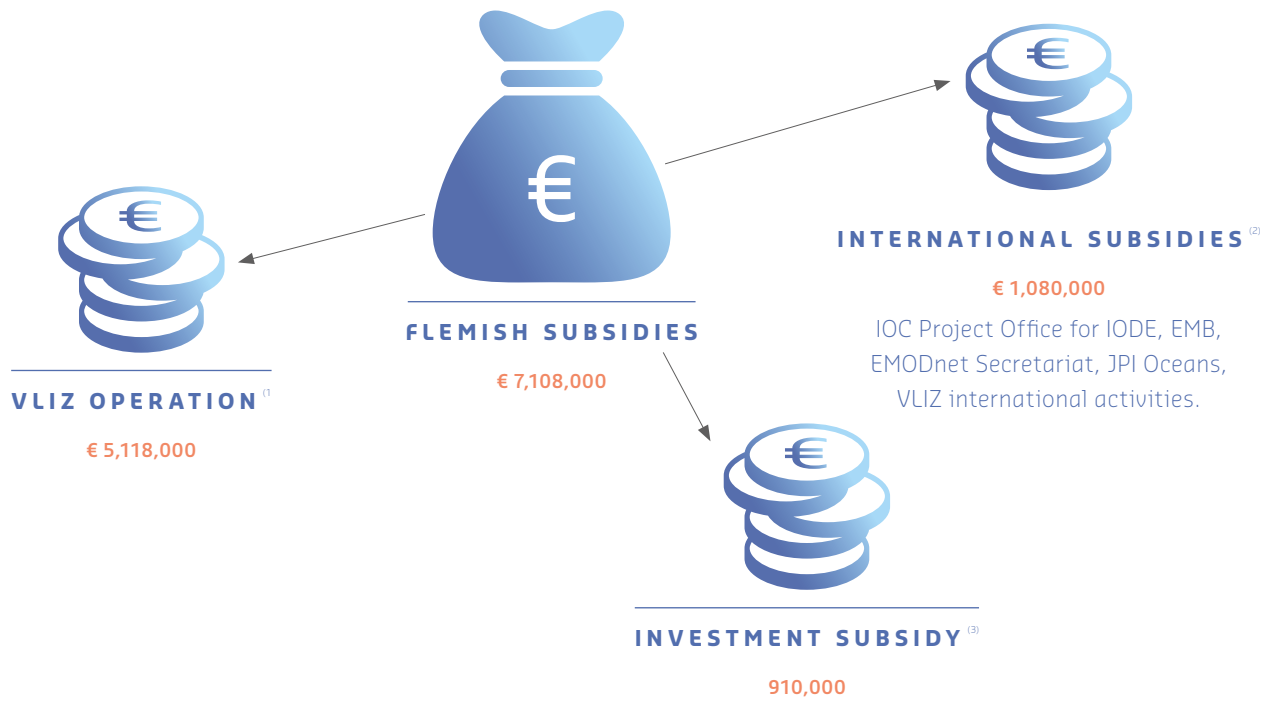


JPI OCEANS

€ 102,000

# OVERVIEW OF SUBSIDIES

IN EURO



# 58%

The external funding amounts to 58% of the Flemish subsidies<sup>(7)</sup>.

<sup>(1)</sup> in 2018: € 3,118,000; in 2013: € 1,632,000; in 2008: € 1,181,700  
<sup>(2)</sup> in 2018: € 1,080,000; in 2013: € 1,100,000; in 2008: € 713,000  
<sup>(3)</sup> in 2018: € 910,000; in 2013: € 1,100,000, in 2008: € 1,100,000

<sup>(4)</sup> in 2018: € 160,487; in 2013: € 151,818; in 2008: € 138,075  
<sup>(5)</sup> in 2018: € 2,298,610; in 2013: € 1,878,987; in 2008: not applicable  
<sup>(6)</sup> in 2018: € 1,906,002; in 2013: € 1,195,912; in 2008: € 958,504  
<sup>(7)</sup> in 2018: 85%

# EVENTS

2019

1,137

## OVERNIGHT STAYS <sup>(1)</sup>

The number of overnight stays in Ostend by people visiting the InnovOcean site or attending events organised by the InnovOcean partners in Ostend.



41

## INTERNATIONAL VISITS <sup>(2)</sup>

The number of meetings and events with an international character that took place in Ostend, attended by 2,358 participants in total.



13,722

## NUMBER OF PARTICIPANTS IN ORGANISED EVENTS <sup>(3)</sup>

The number of participants in 42 events (co)organised by VLIZ.

181

## MISSIONS <sup>(4)</sup>

The number of missions to 26 countries.



<sup>(1)</sup> in 2018: 2,049

<sup>(2)</sup> in 2018: 43 visits with 1,663 participants

<sup>(3)</sup> in 2018: 17,559 participants in 39 events

<sup>(4)</sup> in 2018: 180 missions to 21 countries



684

**VLIZ MEMBERS <sup>(1)</sup>**

The total number of VLIZ members, including 429 individual members, 138 partner members, 27 institutional members, 25 students, 15 honorary members, 18 members of the Board of Directors, 7 members of the General Assembly and 25 members of the Scientific Committee.  
 In 2019, VLIZ was joined by 146 new members and 47 members resigned their membership.



12

**VLIZ AWARDS <sup>(2)</sup>**

Awards were granted by VLIZ, including 1 bachelor students, 2 for master students, 5 for PhD students, 3 for post-doctoral researchers and 1 for master students, PhD students and post-doctoral researchers.



**REQUESTS FOR INFORMATION**

2019

196

**QUESTIONS ANSWERED <sup>(3)</sup>**

Total number of requests for information granted across all VLIZ divisions via info@vliz.be.

1,724

**LITERATURE REQUESTS <sup>(4)</sup>**

Total number of literature requests (incl. requests for information) to the library via library@VLIZ.be

13

**QUESTIONS COMPENDIUM <sup>(5)</sup>**

Total number of requests for information with regard to the Compendium.

<sup>(1)</sup> total number of members in 2018: 573; in 2017: 517; in 2016: 430 ; in 2015: 328; in 2014: 222  
<sup>(2)</sup> in 2018: 10 awards

<sup>(3)</sup> in 2018: 328  
<sup>(4)</sup> in 2018: 978  
<sup>(5)</sup> in 2018: 17

# SUBSCRIBERS

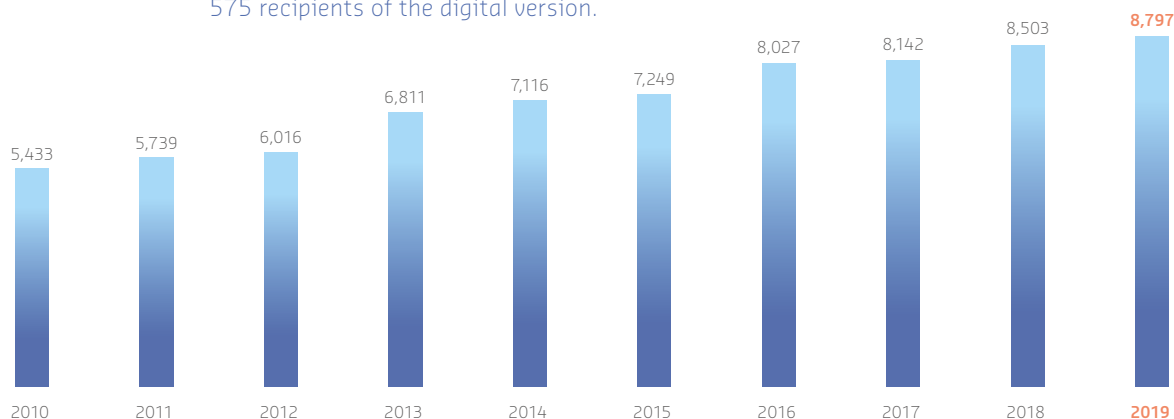
2019

# 8,797



## ABONNEES VAN DE GROTE REDE

The number of subscribers to De Grote Rede (since 1999), including 8,222 recipients of the paper version and 575 recipients of the digital version.

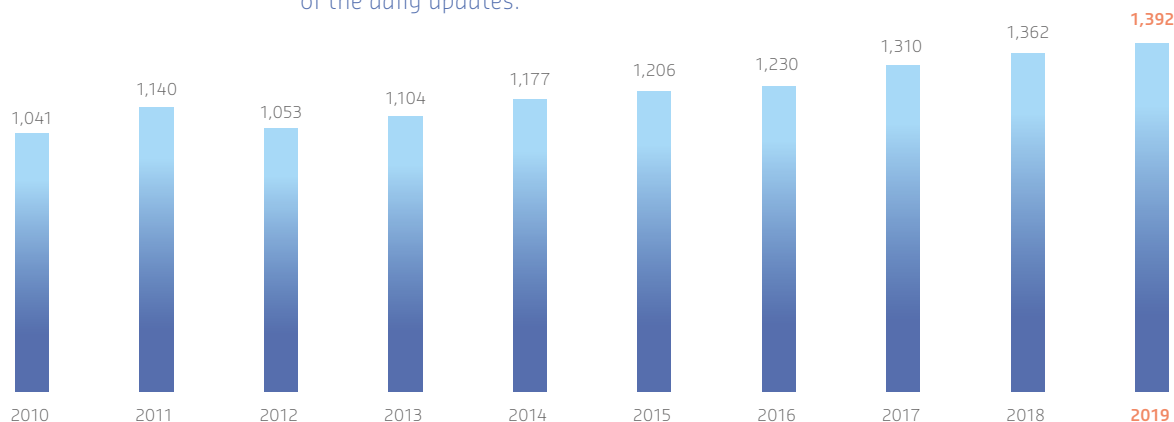


# 1,392



## SUBSCRIBERS TO VLIZINE

The number of subscribers to VLIZINE (since 1999), including 1,392 recipients of the monthly updates, 336 recipients of the weekly updates and 115 recipients of the daily updates.



# LECTURES

2019

# 2,224

## GENERAL PUBLIC REACHED BY INFORMATIVE LECTURES <sup>(1)</sup>

Members of the general public reached by means of 49 informative lectures on the VLIZ premises and elsewhere.



# SOCIAL MEDIA REACH

2019



## TWITTER <sup>(2)</sup> (@jmeesvliz)

VOLGERS	TWEETS
3,980	8,971

3,980

8,971



## YOUTUBE <sup>(3)</sup>

VOLGERS	POSTS
206	453

206

453



## FACEBOOK VLIZ (@VLIZnieuws) <sup>(4)</sup>

FOLLOWERS	POSTS
2,079	513

2,079

513

## RV Simon Stevin <sup>(5)</sup> (@rvsimonstevin)

FOLLOWERS	POSTS
1,792	774

1,792

774



## LINKEDIN <sup>(6)</sup>

FOLLOWERS	POSTS
1,400	130

1,400

130



## INSTAGRAM <sup>(7)</sup>

FOLLOWERS	POSTS
607	50

607

50

<sup>(1)</sup> in 2018: 2,614 members of the general public reached by means of 45 informative lectures

<sup>(2)</sup> in 2018: 3,540 followers; 7,780 tweets

<sup>(3)</sup> in 2018: 143 followers; 405 posts

<sup>(4)</sup> In 2018: 1,477 followers; 381 posts

<sup>(5)</sup> In 2018: 1,731 followers; 749 posts

<sup>(6)</sup> In 2018: 853 followers; 65 posts

<sup>(7)</sup> In 2018: 293 followers; 28 posts

# GROWTH OF THE LIBRARY COLLECTION

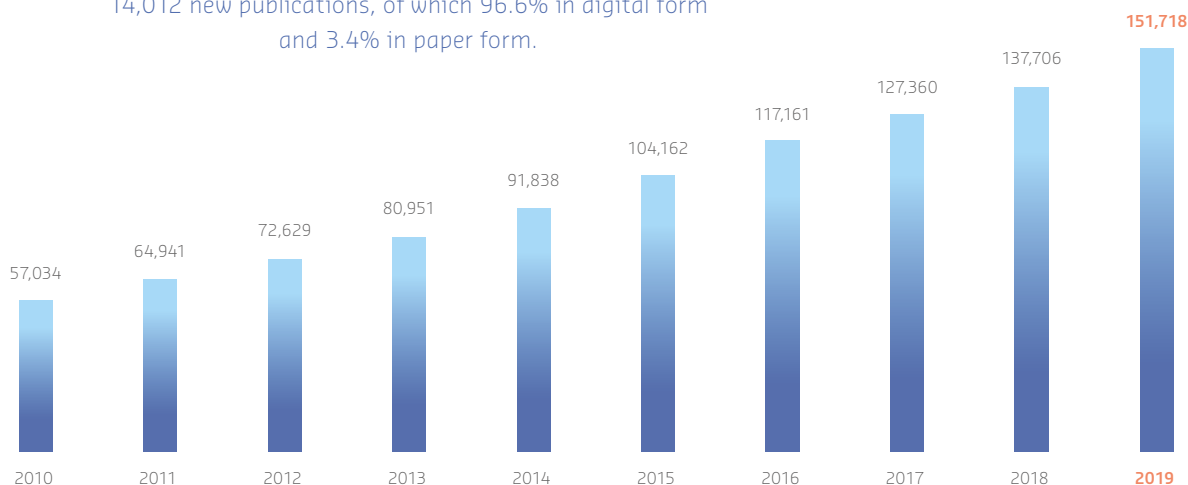
2019

# 151,718



**PUBLICATIONS**

The total number of (paper and digital) publications in the library, i.e. the cumulative growth of the paper and digital collection. In 2019, the collection was expanded with 14,012 new publications, of which 96.6% in digital form and 3.4% in paper form.



# VLIZ PUBLICATIONS

2019

# 110



**PUBLICATIONS<sup>(1)</sup>**

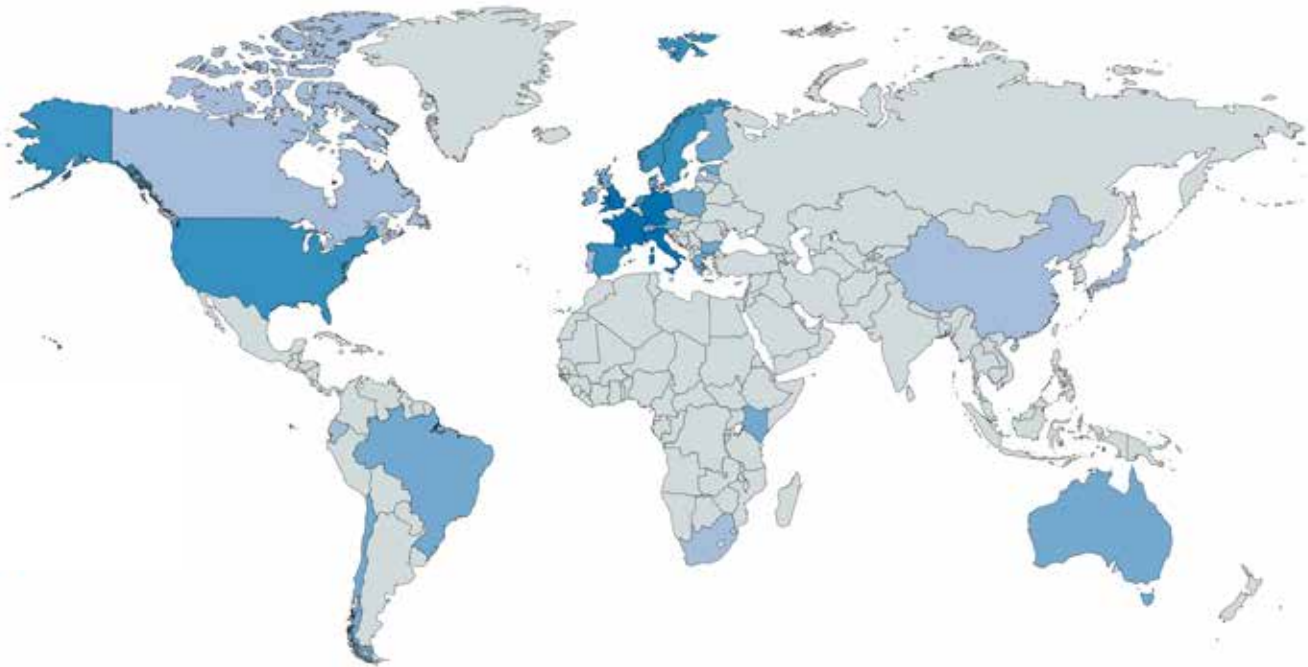
with at least one author affiliated to VLIZ or published by VLIZ.

<sup>(1)</sup> in 2018: 102



# RESEARCHERS AND RESEARCH GROUPS IN A1 PUBLICATIONS

2019



Distribution of the 220 international researchers across all A1 publications authored by a VLIZ employee from 2019 (KPI 1 p. 38) per country.

- >20
- 5-20
- 2-4
- 1

Created with mapchart.net ©

# 290

## RESEARCHERS IN A1 PUBLICATIONS <sup>(1)</sup>

The number of researchers in all A1 publications authored by a VLIZ employee (KPI 1 p.38), including 74 Belgian and 220 international researchers (see world map).

# 179

## RESEARCH GROUPS IN A1 PUBLICATIONS <sup>(2)</sup>

The number of research groups in A1 publications authored by a VLIZ employee, including 29 Belgian and 150 international research groups.

<sup>(1)</sup> In 2018: 265 researchers incl. 59 Belgian and 212 international researchers

<sup>(2)</sup> In 2018: 183 research groups, incl. 25 Belgian and 158 international research groups

# CITATIONS

2019

# 1,061

CITATIONS <sup>(1)</sup>

The number of citations of A1 publications authored by a VLIZ employee.



# PUBLICATIONS ON VLIZ RESEARCH FACILITIES

SINCE 2001

# 536

PUBLICATIONS ON VLIZ RESEARCH FACILITIES <sup>(2)</sup>

A total of 34 new publications on VLIZ research facilities appeared in 2019, including 25 on RV Simon Stevin, 1 on RV Zeeleeuw and 8 on the VLIZ equipment.



RV SIMON STEVIN

191



RV ZEE-LEEUW

296



VLIZ EQUIPMENT

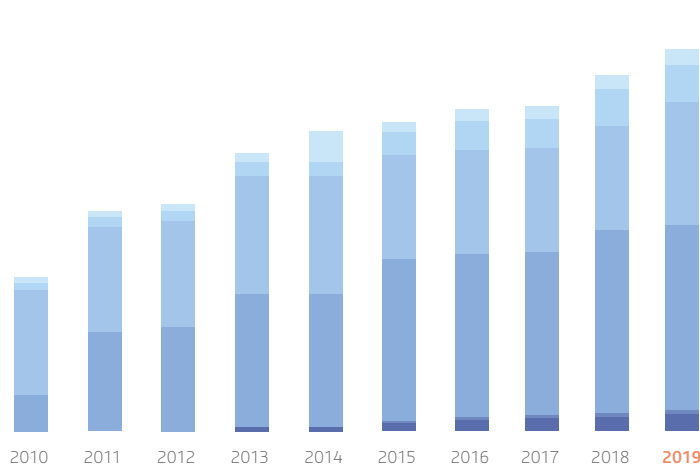
25

<sup>(1)</sup> in 2018: 804 citations

<sup>(2)</sup> the number of publications on VLIZ research facilities that have appeared since 2001 includes 296 publications on RV Zeeleeuw, 191 publications on RV Simon Stevin, 31 publications on the greenhouses at De Haan, 16 publications on ROV Zonnebloem (formerly called 'Genesis'), 25 publications on VLIZ equipment, 3 publications on the Marine Station Ostend and 1 publication on the ICOS research infrastructure.

# INFORMATION PRODUCTS

SINCE 1999



- Beleidsinformerende Nota's (BIN)
- Policy Informing Briefs (PIB)
- Informatieve fiches
- Indicator-fiches
- Boeken
- Webapplicaties

The number of information products since 1999. In 2019, there were 34 new information products, including 5 policy informing briefs (BINs/PIBs), 28 indicator sheets, and 1 book.



# 532

## INFORMATION PRODUCTS

The number of information products since 1999.

# NEW COMPENDIUM FOR COAST AND SEA INFORMATION PRODUCTS

2019



# 0

COMPENDIUM FOR  
COAST AND SEA <sup>(1)</sup>



<sup>(1)</sup> In 2018: 427 new information products created, including 321 (updated) fact sheets of marine research groups, 32 (updated) thematic chapters and 74 (updated) fact sheets on laws/treaties.

# VISITORS TO THE VLIZ WEBSITES

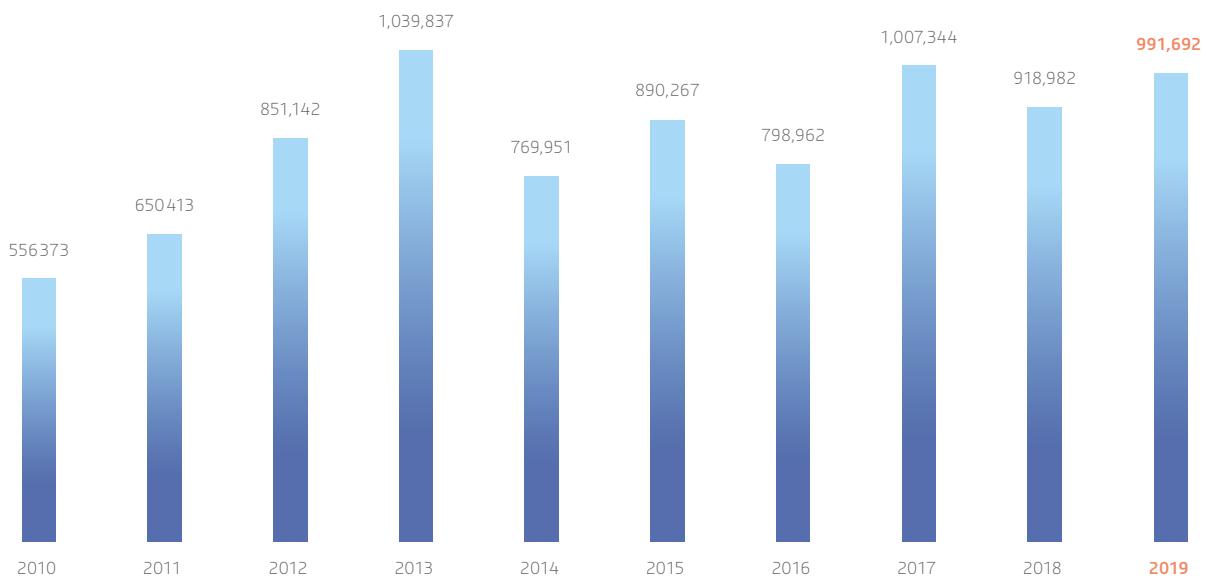
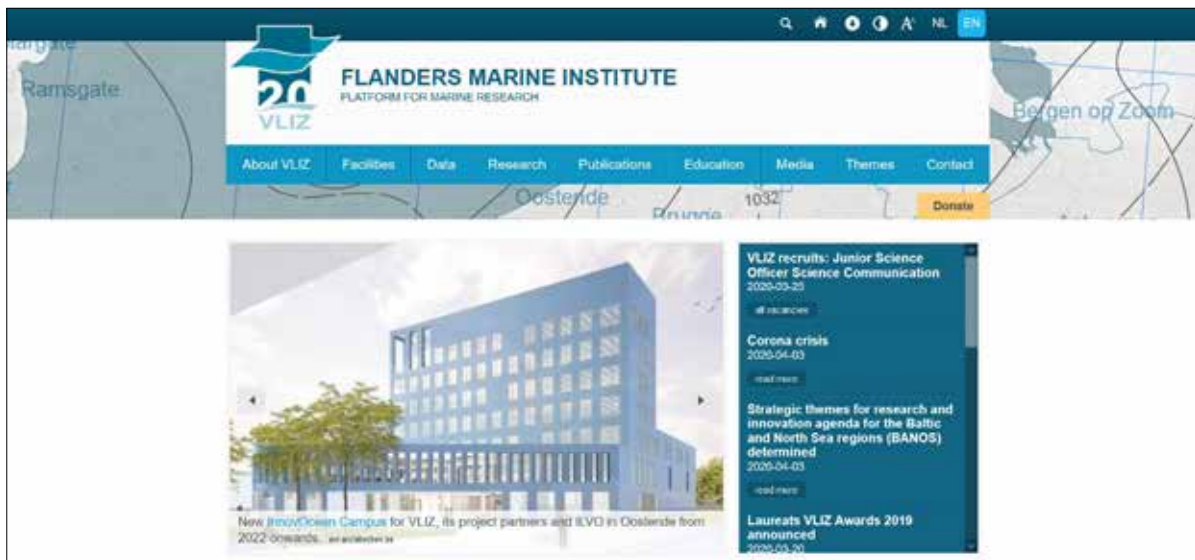
2019

# 991,692

UNIQUE VISITORS



The number of unique visitors to the informative websites managed by VLIZ (url: www.vliz.be).





# DOWNLOADS

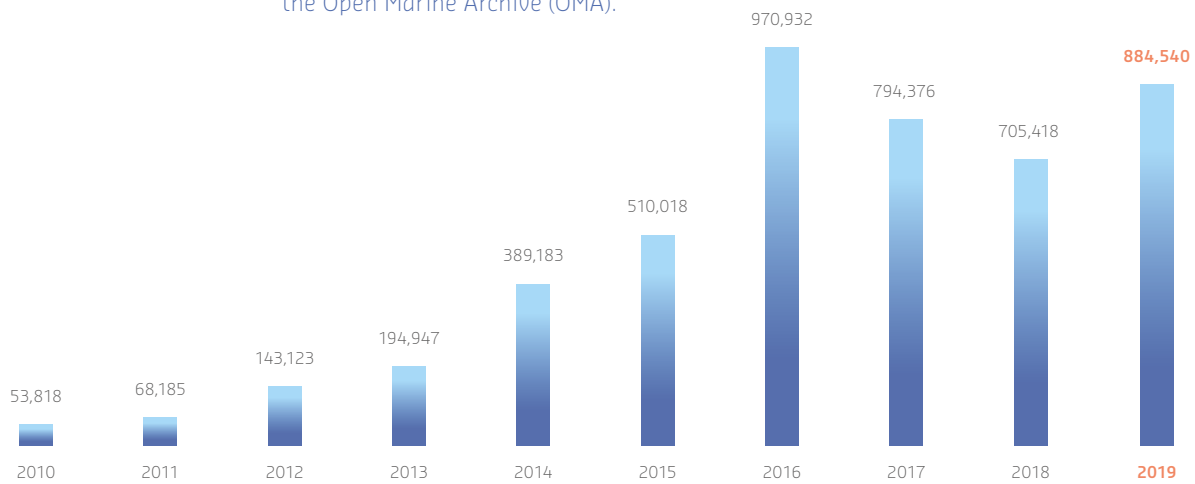
2019

# 884,540



## DOWNLOADS OPEN MARINE ARCHIVE

Total number of downloads from the Open Marine Archive (OMA).



# 26,513

## UNIQUE TITLES DOWNLOADED <sup>(1)</sup>

Unique titles downloaded from the Open Marine Archive.

# 39,982

## UNIQUE OPEN ACCESS TITLES <sup>(2)</sup>

Number of unique Open Access titles downloaded from the library collection.

# 1,298,274

## OPEN ACCESS TITLES <sup>(3)</sup>

Total number of Open Access titles downloaded from the library collection.



<sup>(1)</sup> in 2018: 24,262; <sup>(2)</sup> in 2018: 23,612; <sup>(3)</sup> in 2018: 684,954

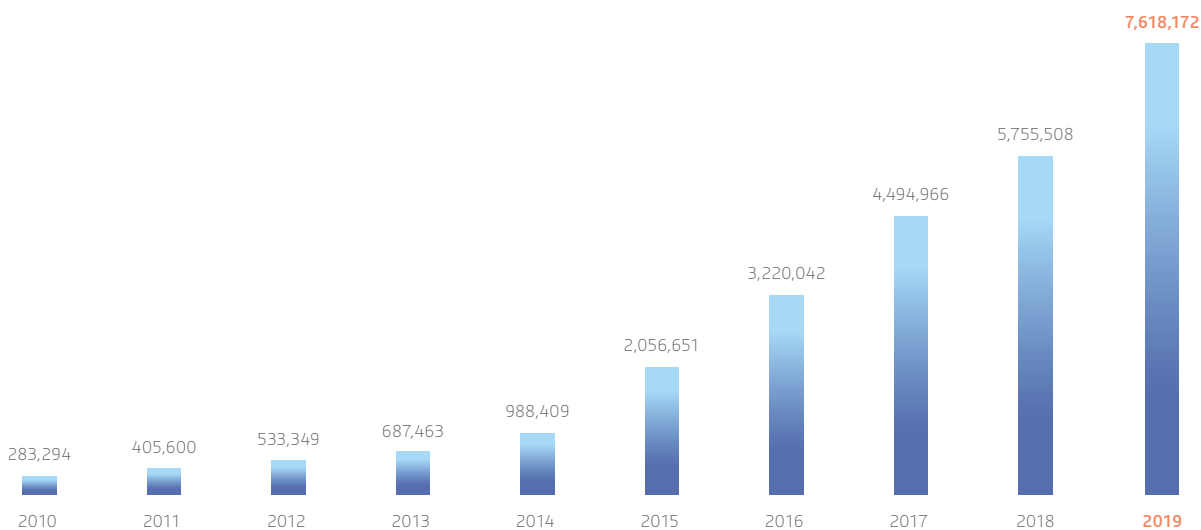
# DATA-DOWNLOADS

2019

# 7,618,172

NUMBER OF DATA DOWNLOADS SINCE 2006

In 2019, the number of data downloads was 1,862,622.



Cumulative figures

## DATA DOWNLOADS

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Flemish Banks Monitoring Network	-30,780	-21,508	-18,858	-12,820	-1,623	262	230	220	73	43
Sluice Dock	-13,873	-10,387	-9,381	-12,550	-4,240	4,414	3,979	5,336	-5,014	1,676
IOC Sealevel monitoring facility	-16,954	-85,538	-92,516	-119,348	-284,518	-1,052,948	-1,145,428	-1,248,812	-1,237,284	-1,839,158
Marine Regions	-3,430	4,339	6,291	7,944	9,087	9,628	12,743	16,633	19,715	20,706
WoRMS	NA	75	121	183	224	53	118	129	106	230
EMODnet	NA	210	373	700	780	797	776	831	-1,052	644
ScheldeMonitor	NA	249	209	569	474	140	159	87	174	165
<b>TOTAL</b>	<b>-65,037</b>	<b>-122,306</b>	<b>-127,749</b>	<b>-154,114</b>	<b>-300,946</b>	<b>-1,068,242</b>	<b>-1,163,433</b>	<b>-1,272,048</b>	<b>-1,263,418</b>	<b>-1,862,622</b>

# DOWNLOADS OF INFORMATIVE PRODUCTS

2019



## TEACHING PACKAGES

320  
downloads in 2019 <sup>(1)</sup>



## DE GROTE REDE

61,930  
downloads in 2019 <sup>(2)</sup>



## ZEEKRANT

1,319  
downloads in 2019 <sup>(3)</sup>



## VIDEOS

747,950  
downloads since 2005



## PHOTOGRAPHS

32,070,708  
downloads since 2005



## COMPENDIUM PRODUCTS

4,374  
downloads since 2015

<sup>(1)</sup> in 2018: 7,663, 2013: 376, 2008: N/A

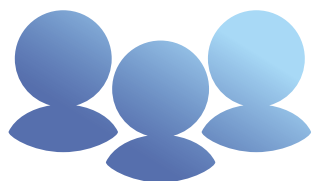
Since mid-2018, visitors have no longer been required to log in so as to download educational packages, which may explain the decrease in the number of downloads in 2019.

<sup>(2)</sup> in 2018: 61,335; 2013: 54,942; 2008: 30,463

<sup>(3)</sup> in 2018: 1,035; 2013: 2,339; 2008: 514

## REGISTERED USERS OF VLIZ DATABASES

2019



4,305

### REGISTERED USERS <sup>(1)</sup>

The number of registered users of databases managed by VLIZ.

## SUPPLIED DATA

2019



336

### DATA REQUESTS <sup>(2)</sup>

The number of data requests (via [data@vliz.be](mailto:data@vliz.be)).

## SCIENTIFIC PROJECTS

SINCE 1999

178

### SCIENTIFIC PROJECTS <sup>(3)</sup>

which have made use of RV Simon Stevin / RV Zeeleeuw since 1999. Due to a correction of the counting method for scientific projects, this figure is lower than in 2018.

See page 54 for a list of the research projects which made use of RV Simon Stevin in 2019.



<sup>(1)</sup> in 2018: 3,798

<sup>(2)</sup> in 2018: 282

<sup>(3)</sup> in 2018: 181

# MASTER THESES, PHDs AND INTERNSHIPS

2019



## MASTER THESES, PHDs AND WORK PLACEMENTS <sup>(1)</sup>

The number of master theses (9), PhDs (4) and internships (23) of which VLIZ is the (co-) supervisor.

See p. 51 for an overview of the master theses and internships in 2019.

# ABSTRACTS AND LECTURES BY INVITATION

2019



## ABSTRACTS AND LECTURES BY INVITATION <sup>(2)</sup>

The number of abstracts and lectures by invitation on research.

<sup>(1)</sup> In 2018: 24 incl. four master thesis, two PhDs and 18 work placements

<sup>(2)</sup> In 2018: 22



# NUMBER OF DAYS SPENT AT SEA

2019

# 255

SAILING DAYS



## NUMBER OF DAYS SPENT AT SEA

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
RV Simon Stevin	N/A	N/A	100	147	183	176	184	168	169	182
RV Zeeleeuw	151	152	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RIB Zeekat	57	40	37	5	17	21	18	12	28	28
ROV Zonnebloem (ex. Genesis)	N/A	N/A	6	26	20	4	3	11	10	11
derde schepen	84	73	110	42	48	50	36	43	63	34
<b>TOTAAL</b>	<b>292</b>	<b>265</b>	<b>310</b>	<b>220</b>	<b>268</b>	<b>251</b>	<b>241</b>	<b>234</b>	<b>270</b>	<b>255</b>

# SAILING DAYS WITH INTERNATIONAL PARTICIPATION

2019

# 20

SAILING DAYS<sup>(1)</sup>



The number of days spent at sea in foreign waters and/or with the participation of international research groups.

<sup>(1)</sup> In 2018: 29

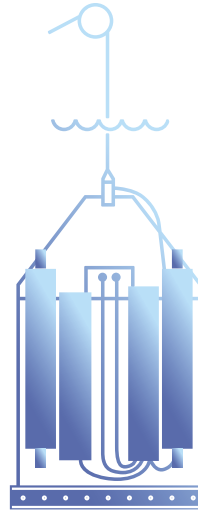
# BORROWING OF VLIZ EQUIPMENT

2019

33

**BORROWS<sup>(1)</sup>**

The number of times that VLIZ equipment was borrowed.



WP2 plankton net on RV Simon Stevin © VLIZ (Decombel)

<sup>(1)</sup> In 2018: 41



## OTHER ANNEXES

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An overview of the national and international networks in which VLIZ participates, projects for which VLIZ receives external funding, the scientific equipment and infrastructure made available by VLIZ, the events (co-)organised by VLIZ and the publications published by VLIZ.



# NETWORKS

2019

## NATIONAL NETWORKS AND ADVISORY AND CONSULTATIVE COMMITTEES

This list of national networks and (temporary or project-related) advisory and consultative committees in which VLIZ participates is not exhaustive.

- Advisory Committee of VNR Knokke-Heist & Westkust (ANB)
- Administrative consultations about deep-sea mining
- Policy committee of the Complex Project Coastal Vision (Kustvisie)
- Covenant for Sustainable Fisheries – WG Coast – SWG Education and Training
- The Blue Cluster (Board of Directors, steering committee and scientific advisory board)
- Infrastructure expert group – TUA West
- Flanders Environmental Library Network (FELNET)
- IkHebEenVraag.be consortium (RBINS)
- KULeuven Industrial Advisory Board
- KVAB science communication awards (KVAB)
- National and Flemish working group on Marine Litter
- NAVIGO scientific advisory group (NAVIGO)
- Network of the Liaison Agency Flanders-Europe (VLEVA)
- Consultation on sustainable coastal management by the province of West Flanders
- Board of Directors of the Port of Oostende
- North Sea and Oceans Steering Committee (MNZ)
- Surveillance, early warning and rapid response – Invasive Alien Species steering committee
- Strategic steering committee of the Flemish Aquaculture Platform (SSAQ)
- Think Tank North Sea: steering committee and working groups
- Flemish Europe Platform (VEP)
- Flemish Association for Libraries, Archives and Documentation Centres (VVBAD)
- Coast Working Group
- Science Information Network of the Flemish government (WIN)

## INTERNATIONAL NETWORKS AND ADVISORY AND CONSULTATIVE COMMITTEES

This list of international networks and advisory and consultative committees in which VLIZ participates is non-exhaustive and alphabetically ordered and does not include any steering committees and working groups linked to the implementation and management of project activities.

- Catalogue of Life Global Team, Editorial Board, Board of Directors (Catalogue of Life)
- Coastal Wiki Editorial Board (Coastal Wiki)
- Deep history collaborative network (University of Bradford, University of Leeds, TNO, UGent, NIOZ, VLIZ)
- Editorial board of Global Ocean Science-II Report van IOC-UNESCO (GOSR)
- Ethic Ocean (ex. 'SeaWeb Europe') - Jury concours Olivier Roelinger (SeaWeb)
- European Aquatic Animal Tracking Network – COST
- European Association of Aquatic Sciences Libraries and Information Centres (EURASLIC)
- European Census of Marine Life (EuroCoML)
- European Centre for Information on Marine Science and Technology (EurOcean)
- European Marine Biodiversity Observatory System (EMBOS)
- European Marine Board Communications Panel (EMBCP)
- European Marine Board (representative of the Research Foundation – Flanders) (EMB)
- European Marine Board working group on underwater noise
- European Marine Data and Observation Network – Biology Lot (EMODNnet)
- European Marine Research Network (EuroMarine)



- European Marine Science Educators Association (EMSEA)
- European Network of Marine Research Institutes and Stations (MARS)
- European Regions Research and Innovation Network (ERRIN)
- European Research Vessel Organisation (ERVO)
- Executive Committee of the European Register of Marine Species (ERMS)
- Executive Council and General Assembly of the Intergovernmental Oceanographic Commission (IOC) of UNESCO
- Global Sea Level Observing System Network (GLOSS)
- Group of European Data Experts in Research Data Alliance (GEDE-RDA)
- ICES - IOC Working Group on Harmful Algal Bloom Dynamics (ICES-WGHABD)
- ICES Data and Information Group (ICES - DIG)
- ICES Working Group on Biodiversity Science (ICES - WGBIODIV)
- ICES Working Group on Biological Effects of Contaminants (ICES-WGBEC)
- ICES Working group on machine learning in marine science (ICES-WGMLEARN)
- ICES Working Group on Marine Litter (ICES - WGML)
- ICES Working Group on Marine Sediments in Relation to Pollution (ICES-WGMS)
- ICES Working Group on Recreational Fisheries Surveys (ICES - WGRFS)
- ICES Working Group on the History of Fish and Fisheries (ICES - WGHIST)
- ICES Working Group on Zooplankton Ecology (ICES-WGZE)
- INSPIRE Thematic Working Group on Biogeographical Regions, Habitats and Biotopes and Species Distributions (INSPIRE)
- Integrated Carbon Observation System Marine Station Assembly (ICOS)
- Integrated Carbon Observation System Oceanographic Thematic Centre meeting (ICOS)
- International Coastal Atlas Network (ICAN)
- International Research Ship Operators (IRSO)
- IOC Group of Experts on Capacity Development (GE-CD)
- IODE Group of Experts on Biological and Chemical Data Management and Exchange Practices (IODE - GE-BICH)
- IODE Network of National Oceanographic Data Centres (IODE NODC)
- Joint IAMSLIC/IODE Group of Experts on Marine Information Management (IAMSLIC/ IODE GE-MIM)
- Joint Programming Initiative Healthy and Productive Seas and Oceans (JPI Oceans)
- JPI Oceans reference expert group on marine spatial planning (JPI Oceans) (non-active)
- JPI Oceans working group on Underwater Noise (JPI Oceans)
- LifeWatch National Centers network (LifeWatch - LiNC)
- Marine Observation and Data Expert Group (MODEG) within the European Marine Observation and Data Network (EMODnet)
- National Marine Educators Association US (NMEA)
- News & Information Group of the Partnership for Observation of the Global Oceans (POGO - News & Information Group)
- Ocean Biogeographic Information System (OBIS)
- Oceans Past Initiative (OPI)
- Ocean Tracking Network (OTN)
- Partnership for Observation of the Global Oceans (POGO)
- Prize papers collaborative network (University Oldenburg, Kew National Archives, VLIZ)
- Sea Data Network (SeaDataNet II)
- Scientific Committee of Oceanic Research (SCOR), International Science Council
- Society of Environmental Toxicology and Chemistry, Science committee and awards committee (SETAC)
- Species 2000 (Species 2000)
- Steering Committee of the European Marine Biological Resource Centre (EMBRIC)
- Steering Committee of the Flanders UNESCO Trust Fund (FUST)
- Steering Committee of the World Register of Marine Species (WoRMS)
- Vlaams-Nederlandse Scheldecommissie m.e.r. (VNSC), Werkgroep O&M
- Working Group on Invasive Alien Species (WGIAS)
- World Data System of the International Council for Science (ICSU - WDS)

VLIZ participates in steering committees of (research) projects in interface with the blue economy, such as SCAPE – Shaping Climate Change Adaptive Places (pilot sites for developments on the Flemish coast, Interreg V 2 Seas, 2016-2020), SARCC – Sustainable and Resilient Coastal Cities (pilot sites for development of dunes as seawalls on the Flemish coast, Interreg V 2 Seas, 2019-2022), TOPSOIL – salinification of the coastal zone (Interreg North Sea Region, 2015-2020) and Electric Pulse Fishing at the Flemish Coast – Part I.

# PROJECTS

## EXTERNAL FINANCING

---

**VLIZ RECEIVED EXTERNAL FINANCING FOR COORDINATION, COMMUNICATION AND/OR DATA MANAGEMENT WITHIN THE SCOPE OF 50 PROJECTS IN 2019. MOST OF THESE PROJECTS WERE CARRIED OUT IN COOPERATION WITH RESEARCH GROUPS.**

### EU

---

**AQUA-LIT** – *Preventive measures for averting the discarding of litter in the marine environment from the aquaculture industry*

Duration: 01.01.2019 – 31.12.2020

<https://aqua-lit.eu/>

AQUA-LIT aims to provide the aquaculture sector with a sustainable toolbox to limit marine littering in 3 ways: prevention and reduction; monitoring and quantification; and removal and recycling. In addition, AQUA-LIT will evaluate the current policies and make policy recommendations to improve the decision-making process in the aquaculture sector.

**ASSEMBLE Plus** – *Association of European Marine Biological Laboratories Expanded*

Duration: 01.09.2017 – 30.09.2021

[www.assembleplus.eu/](http://www.assembleplus.eu/)

ASSEMBLE Plus operates under the umbrella of the European Marine Biological Resource Centre (EMBRC) and integrates 32 marine biological research stations worldwide. It provides scientists from academia, industry and policy with a high-quality programme of transnational and virtual access to marine biological research facilities, historical observation data and advanced training opportunities. VLIZ provides transnational access to the infrastructure offered within EMBRC and manages a work package concerning the improvement of virtual access to marine biological data, information and knowledge. UGent acts as a subcontractor of VLIZ for specific activities.

**AtlantOS** – *Optimizing and Enhancing the Integrated Atlantic Ocean Observing System*

Duration: 01.04.2015 – 01.07.2019

[www.atlantos-h2020.eu](http://www.atlantos-h2020.eu)

The overall objective of AtlantOS is to evolve from a poorly coordinated series of existing ocean observations to a sustainable, efficient and fit-for-purpose Integrated Atlantic Ocean Observing System (IAOOS). The AtlantOS consortium consists of 62 partners from 18 countries. VLIZ takes part in work package 7: data flow and data integration.

**BANOS CSA** – *'Towards a Baltic and North Sea research and innovation programme'*

Duration: as from 2018-11-01

The general aim of BANOS CSA is to develop the necessary conditions for long-term coordination of joint research and innovation efforts in the countries surrounding the Baltic Sea and the North Sea through the setup of a joint research and innovation framework programme. BANOS CSA is coordinated by BONUS EEIG (TFEU Art 185) and represents the leading research and innovation funders of the states surrounding the Baltic Sea and the North Sea.

**BASTA** – *Boost Applied munition detection through Smart data integration and AI workflows*

Duration: 01.12.2019 – 30.11.2022

The focus of this proposal is on cost-efficient detection and identification of sea-dumped munition (whether buried below the seabed or not), both for regional scale reconnaissance (typical size of several km<sup>2</sup>) and for local scale surveys of known dump sites (verification of munition). The project is a collaboration between 2 research institutes and 2 industrial partners with a view to maximising the value of the research results.

**Blue-Cloud** – *Piloting innovative services for Marine Research & the Blue Economy*

Duration: 01.09.2019 – 31.08.2020

The project implements a practical approach to address the potential of cloud based open science to develop a set of services that demonstrate the potential of the Pilot Blue Cloud as a thematic EOSC cloud to support ocean research through a set of five pilot Blue-Cloud demonstrators.

**COASTAL** – *Collaborative land sea integration platform*

Duration: 01.05.2018 – 30.04.2022

<https://h2020-coastal.eu/>

COASTAL is a multi-actor project involving stakeholders in the development of business roadmaps and policy solutions for enhancing coastal and rural collaboration and synergies by combining local knowledge and scientific expertise in a co-creation process.

**COST-ETN** – *The European Aquatic Animal Tracking Network*

Duration: 05.01.2019 – 30.04.2020

This COST Action is aimed at integrating all independent regional telemetry initiatives into a pan-European biotelemetry network embedded in the international context of existing initiatives.

**CSA Oceans 2** – *JPI Oceans Preparatory Action*

Duration of phase 1: 01.09.2012 - 31.08.2015

Duration of phase 2: 01.03.2016 - 28.02.2019

[www.jpi-oceans.eu/csa-oceans-2](http://www.jpi-oceans.eu/csa-oceans-2)

CSA Oceans 2 is aimed at facilitating and supporting the implementation of JPI Oceans' Strategic Research and Innovation Agenda (SRIA). CSA Oceans 2 will continue to build on the outcomes of the FP7 CSA Oceans project and will be linked closely to the JPI Oceans structures. Its principal activities are: 1) deal with the implementation of joint transnational activities; 2) maintain and further develop the relationships between JPI Oceans and different relevant actors; 3) support the implementation of the SRIA; and 4) deliver the necessary tools for information management as well as outreach and dissemination (VLIZ). The CSA Oceans 2 project will be implemented by a consortium of funding, coordinating and research organisations.

**EMODnet** – *European Marine Observation and Data Network*

Duration: continually since 2014

[www.emodnet.eu](http://www.emodnet.eu)

The European Marine Observation and Data Network (EMODnet) develops a data infrastructure to make marine data available so as to support scientists, policy makers and other end users within the scope of the new European maritime policy. VLIZ is responsible for the biological pilot project ([www.emodnet-biology.eu](http://www.emodnet-biology.eu)). It will use the existing European atlas with distribution data of marine species (EurOBIS) as a basis and complete it. VLIZ is also involved in the chemical project of EMODnet and the Data Ingestion initiative. In addition, VLIZ is expanding the EMODnet Central Portal ([www.emodnet.eu](http://www.emodnet.eu)), which is intended to provide access to the data products and data collected within the EMODnet thematic networks. The EMODnet Secretariat is located at the InnovOcean site in Ostend.

**ENVRI FAIR** – *ENVironmental Research Infrastructures building Fair services Accessible for society, Innovation and Research*

Duration: 01.01.2019 – 31.12.2022

<http://envri.eu/envri-fair/>

ENVRI-FAIR is the connection of the Cluster of Environmental Research Infrastructures (ENVRI) to the European Open Science Cloud (EOSC). Participating research infrastructures (RI) cover the subdomains Atmosphere, Marine, Solid Earth and Biodiversity/Ecosystems. The overarching goal is that at the end of the proposed project, all participating RIs have built a set of FAIR data services which enhances the efficiency and productivity of researchers, supports innovation and enables data- and knowledge-based decisions.

**EOSC-LIFE** – *Providing an open collaborative space for digital biology in Europe*

Duration: 01.03.2019 – 28.02.2023

EOSC-Life brings together the 13 Biological and Medical ESFRI research infrastructures (BMS RIs) to create an open collaborative space for digital biology. The project aims to respond to the challenge of analysing and reusing the prodigious amounts of data produced by life-science. By publishing data and tools in a Europe-wide cloud, EOSC-Life aims to bring the capabilities of big science projects to the wider research community.

**Eurofleets+**

Duration: 01.02.2019 – 31.01.2023

Coordinated by IM (Ireland), the Eurofleets+ project brings together over 20 scientific institutions to take the first steps towards a coordinated European research fleet and associated infrastructure.

**GEANS** – *Genetic tool for Ecosystem health Assessment in the North Sea region*

Duration: 01.03.2019 – 28.02.2022

GEANS is aimed at harmonising and consolidating existing DNA-based methods to ensure their application for assessing ecosystem health in the North Sea environment. A DNA sequence reference library will be compiled, current methods will be optimised and standardised, genetic indicators will be developed and a roadmap for management implementation will be provided.

**JERICO NEXT** – *Joint European Research Infrastructure network for Coastal Observatory - Novel European eXpertise for coastal observatories*

Duration: 01.09.2015 - 01.09.2019

[www.jerico-fp7.eu](http://www.jerico-fp7.eu)

JERICO-NEXT is the continuation of the JERICO project. One of the project's objectives is to establish a pan-European network of marine observatories. In this context, alignment takes place with ongoing initiatives such as the pan-European Infrastructure for Ocean and Marine Data Management (SeaDataNet) and the European Global Ocean Observing System (EuroGOOS). Within the scope of JERICO-NEXT, VLIZ will take part in Work Package 5, in which data management standards will be set, the quality and quantity of biological, chemical and physical data within the infrastructure will be increased, and the project's impact on ongoing initiatives such as Copernicus, EMODnet and OBIS will be examined. In 2020, JERICO NEXT will be succeeded by JERICO S3.

**MARINERG-i**

Duration: Januari 2017 - December 2019

[www.marinerg-i.eu](http://www.marinerg-i.eu)

MARINERG-i will produce a scientific and business plan for an integrated European Research Infrastructure designed to facilitate the future growth and development of the Offshore Renewable Energy sector. This plan will ensure that the MARINERG-i Research Infrastructure model attains the criteria necessary for being successful in an application to the European Strategy Forum on Research Infrastructures (ESFRI) roadmap in 2020. The MARINERG-i project is a first step in forming an independent legal entity of distributed testing infrastructures, united to create an integrated centre for delivering Offshore Renewable Energy. By consolidating expertise, investment and access to infrastructures, the MARINERG-i Research Infrastructure will foster innovation across a variety of Offshore Renewable Energy technologies and stages of development.

**Marine Regions** – *Towards a standard for georeferenced marine names*

Duration: since 2011

[www.marineregions.org](http://www.marineregions.org)

Marine Regions is a standardised geographic data system which makes geographic information on marine place names and maps freely available. It integrates geographic information on seas, oceans and undersea features, and indicates the boundaries of various marine areas throughout the world. 'Marine Regions' integrates the data and information from the VLIMAR Gazetteer (place name register) and the MARBOUND database (EEZ boundaries). Both global data systems have been developed by the Flanders Marine Institute and have demonstrated their added value for many users over the past few years. The combination of both databases is intended to benefit the different target groups.

**North Sea Wrecks** – *An opportunity for blue growth (NSW)*

Duration: 01.11.2018 – 31.10.2022

The project will provide the tools required by planners, response organisations, economic actors and other stakeholders to assess the risks posed by shipwrecks and ammunition in the North Sea and propose risk mitigation solutions.

**SeaBioComp** – *Development and demonstrators of durable biobased composites for a marine environment*

Duration: 01.05.2019 – 01.08.2022

SeaBioComp will develop demonstrators using innovative bio-based thermoplastic composite materials with the following characteristics: (1) mechanical properties that are at least equivalent to the ones of conventional oil-based composites, (2) tailored durability according to the specific application (2 to >20 years), (3) reduced CO2 emission (30%) and reduced ecotoxic impact (due to microplastics).

**SeaDataCloud** – *Further developing the pan-European infrastructure for marine and ocean data management*

Duration: 01.11.2016 - 30.10.2020

SeaDataCloud is a continuation of SeaDataNet, where professional data centres from 35 countries collaborate to make the data sets collected by the pan-European oceanographic research fleet and the new automated observation systems available within one efficiently distributed data system. SeaDataCloud aims at considerably advancing SeaDataNet services and increasing their usage, adopting cloud and HPC technology for better performance. SeaDataCloud is developing a Virtual Research Environment (VRE) to provide researchers with various functionalities to calculate oceanographic data products on the basis of in situ observations and remote sensing data.

**WECANET** – *A pan-European Network for Marine Renewable Energy*

Duration: 12.09.2018 – 11.09.2022

[www.wecanet.eu](http://www.wecanet.eu)

This pan-European network focuses on an interdisciplinary approach to marine wave energy that will contribute to large-scale WEC Array deployment by addressing the current bottlenecks.

**FLEMISH GOVERNMENT, FLEMISH GOVERNMENT COORDINATION UNIT (CORVE) AND EWI****EOSC ESFRI RDM** – *Implementing EOSC: ESFRI driven Open Science*

Duration: 01.04.2019 – 31.03.2020

This project will make it possible to build expertise and knowledge across ESFRIs, expedite adoption of the VSC cloud resources by other scientific domains and allow ESFRIs to provide services to their communities within the context of the European Open Science Cloud (EOSC). It combines two ESFRI coordinating institutes (VIB and VLIZ) which did not collaborate at a Flemish level before. The project explores synergies in research infrastructures and possible collaborations.

**WILOD** – *Wetenschap & Innovatie Linked Open Data*

Duration: doorlopend sinds 2012

The *Wetenschap en Innovatie Linked Open Data* (WILOD) project is aimed at developing an Open Data platform which brings together and discloses a variety and multiplicity of research information. The goal is to promote multidisciplinary research, to maximise disclosure of research data, to develop innovative products and services, and to increase the strategic intelligence within the policy area of Science and Innovation.



**FLEMISH GOVERNMENT, WATERWEGEN EN ZEEKANAAL (W&Z)**

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**OMES** – *Research on the environmental effects of the SIGMA plan*

Phase III: 16.07.2008-15.10.2009

Phase IV: 01.10.2009-01.10.2010

Phase V: 01.02.2011-30.04.2012

Phase VI: 01.02.2012-30.04.2013

Phase VII: 01.02.2013-30.04.2014

Phase VIII: 01.02.2014 -30.04.2015

Phase IX: 01.02.2016-30.04.2017

Phase X: 01.02.2017-30.04.2018

Phase XI: 01.02.2018-30.04.2019

Phase XII: 01.02.2020-30.04.2021

[www.omes-monitoring.be/en](http://www.omes-monitoring.be/en)

The OMES consortium has implemented this multidisciplinary monitoring programme, which was commissioned by Waterwegen en Zeekanaal, since 1995. Various components of the ecosystem are sampled: water quality, carbon cycle, phytoplankton, zooplankton, microphytobenthos, primary productivity and sediment characteristics. VLIZ is responsible for the integrated OMES database and ensures its dissemination through the OMES website ([www.vliz.be/projects/omes](http://www.vliz.be/projects/omes)).

**FLEMISH GOVERNMENT, MARITIME ACCESS DIVISION**

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**ScheldeMonitor** – *Flemish-Dutch knowledge platform for research and monitoring of the Scheldt estuary*

Duration of current phase: 01.01.2015 - 31.12.2020; started in 2010

[www.scheldemonitor.org](http://www.scheldemonitor.org)

ScheldeMonitor is a Flemish-Dutch knowledge and information system for research and monitoring of the Scheldt estuary. This portal provides an overview of publications, institutions, projects, datasets, etc. related to research and monitoring in the Scheldt estuary as well as access to measurements and data products such as maps, charts and indicators.

**ERDF FLANDERS**

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**Blue Accelerator**

Duration: 01.05.2018 – 30.04.2021

The Blue Accelerator project is aimed at creating so-called living labs where testing is possible under real marine conditions. The principal focus is on the development of an offshore test location (incl. platform) off the coast of Ostend.

**FEDERAL GOVERNMENT, BELSPO**

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**AQUALOOKS** – *Improving atmospheric correction and aquatic particle retrieval with bidirectional remote sensing data*

Duration: 01.06.2019 – 01.12.2022

This project mainly has remote sensing objectives (development of algorithms and validation of in situ data for multi-look satellite missions), but is also aimed at refining and further developing the autonomous radiometry platform PANTHYR, which was developed by VLIZ in the course of the HYEPRMAQ project.

**HyperMaq** – *Hyperspectral and multi-mission high resolution optical remote sensing of aquatic environments*

Duration: 01.12.2016 – 30.11.2019

In the HyperMaq project, hyperspectral satellite images will be calibrated. In partnership with the Directorate Natural Environment (OD Nature), VLIZ will conduct field measurements during regular and project campaigns. In addition, VLIZ ensures the development of a rotating platform to remotely position spectroradiometer systems for the calibration of light measurements during satellite passages.

**NewSTHEPS** – *New Strategies for monitoring and risk assessment of Hazardous chemicals in the marine environment with passive samplers*

Duration: 01.12.2014 – 03.08.2019

[www.belspo.be/belspo/brain-be/projects/NEWSTHEPS\\_en.pdf](http://www.belspo.be/belspo/brain-be/projects/NEWSTHEPS_en.pdf)

In this project, novel and integrated passive sampling techniques will be developed in marine waters. The focus is on the quantification of micropollutants and metals. VLIZ acts as subcontractor for the creation of a website and the data management activities relating to the further development of the INRAM and ENDIS-RISKS database.

**PERSUADE** – *ExPERimental approaches towards Future Sustainable Use of North Sea Artificial HarD SubstratEs*.

Duration: 01.01.2018 – 30.04.2020

The project is aimed at the construction of an in-situ underwater hard-substrate garden where organisms will be collected for mesocosm experiments. The marine food chain near offshore artificial hard substrates will be imitated in the seawater tanks of the Marine Station Ostend (MSO). VLIZ supports the development of the underwater garden and provides technical assistance for the setup of the experiments.

**TIMBERS** – *3D Turbidity assessment through Integration of MultiBeam Echo-sounding and optical Remote Sensing*

Duration: 01.01.2019 – 30.09.2022

The goal of this project is to produce 3D turbidity profiles for seawater by combining remote sensing with multi-beam echo-sounding (MBES). A method will be developed to deduce vertical turbidity profiles from measured MBES backscatter values and combine them with turbidity data from the top layer of the water column on the basis of satellite observations.

**TriAS** – *Tracking Invasive Alien Species: Building a data-driven framework to inform policy*

Duration: 01.01.2017 – 31.12.2021

[www.belspo.be/belspo/brain-be/projects/TriAS\\_en.pdf](http://www.belspo.be/belspo/brain-be/projects/TriAS_en.pdf)

TriAS is primarily aimed at the establishment of a data mobilisation framework for alien species on the basis of different data sources. The combination of these data with a Belgian checklist of alien species will feed indicators for the identification of emerging species, their level of invasion in Belgium, changes in their invasion status and the identification of areas and species of concern that could be negatively impacted. The second objective is to develop data-driven procedures for risk evaluation based on risk modelling, risk mapping and risk assessment.

## FEDERAL GOVERNMENT, MARINE ENVIRONMENT DIVISION

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**Lead Alternative Fishing Weights**

Duration: 24.09.2019 – 30.06.2019

This project aims to test lead alternative fishing weights and sinkers in collaboration with the marine recreational fishing community (cf. MSFD programme of measures, 29D).

**RecVis** – *Marine recreational fisheries monitoring*

Duration: 01.05.2016 – 31.12.2021

[www.recreatievezevisserij.be](http://www.recreatievezevisserij.be)

Development and implementation of a protocol for systematic monitoring of the recreational fishing sector (fishing effort, location, catches, etc.).

## PROVINCIE

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### **STEM4sea**

Duration: 01.09.2019 – 30.06.2021

In partnership with the St.Lodewijkscollege primary school in Bruges, VLIZ is developing a set of STEM activities on ocean topics for teachers in primary education. With the support of the province of West Flanders.

### **Zeekrant**

Duration: Since June 2007

Annual publication of VLIZ with all sorts of facts on the sea and beach. After 10 editions, an updated version of Zeekrant was released in partnership with the province of West Flanders.

## FWO (FORMER HERCULES FOUNDATION)

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### **LifeWatch** – *Flemish contribution to LifeWatch.eu*

Duration: continually since 01.04.2012

[www.lifewatch.be](http://www.lifewatch.be)

The Flemish contributions to the LifeWatch infrastructure are coordinated by the Research Institute for Nature and Forest (INBO) and, as far as the marine component is concerned, by the Flanders Marine Institute (VLIZ). Flanders contributes to the central LifeWatch infrastructure with a taxonomic backbone which is developed through various projects, including the World Register of Marine Species or WoRMS ([www.marinespecies.org](http://www.marinespecies.org)) and EurOBIS ([www.eurobis.org](http://www.eurobis.org)). WoRMS aims to provide an authoritative and comprehensive list of names of marine organisms, including information on synonyms. EurOBIS is a distributed system which makes it possible to simultaneously search for biogeographic information on marine organisms in various data sets. EurOBIS has been developed within the MarBEF network and serves as the European node of OBIS. As part of LifeWatch, Marine Regions is a standardised geographic data system which makes geographic information on marine place names and maps freely available. It integrates geographic information on seas, oceans and undersea features, and indicates the boundaries of various marine areas throughout the world. Marine, freshwater and terrestrial observatories are developed regionally within LifeWatch, as are different biodiversity data systems, web services and models.

### **EMBRC** – *European Marine Biological Resource Centre*

Duration: 1 January 2015 – 31 December 2020

[www.embrc.eu](http://www.embrc.eu)

EMBRC will be a distributed infrastructure for research and training at leading marine research stations in Europe. It constitutes a virtual network of marine stations for the study of marine species, biodiversity and ecosystem functioning, developmental biology and evolution, biogeochemistry, global change, biomedical sciences and marine products. EMBRC will provide end users from SMEs, academia and industry with access to marine biodiversity, associated metadata and extractable products. Services include access to marine species (model species), biobanks, dedicated 'omics' platforms, structural biological facilities and imaging (microscopy, cytometry, etc.). The Flemish contribution is coordinated by the Marine Biology Laboratory (Ghent University) and VLIZ, with VLIZ making seagoing and land-based facilities available and providing technical support.

### **ICOS** – *Integrated Carbon Observing System*

Duration: 01.01.2012 – 31.12.2020

[www.icos-infrastructure.eu](http://www.icos-infrastructure.eu)

ICOS provides the long-term observations required to understand the present state and predict future behaviour of the global carbon cycle and greenhouse gas emissions. VLIZ performs the oceanographic measurements which Flanders will transfer to ICOS through the University of Antwerp. VLIZ performs measurements aboard RV Simon Stevin to this end. Within the scope of ICOS, VLIZ collaborates with NIOZ-Yerseke and the University of Liège (Alberto Borges).

### **INTERTIDE** – *INTERcomparison of TIDal Estuaries in NW Europe*

Duration: 01.01.2018 – 31.12.2020

INTERTIDE focuses on an inter-estuarine comparison of both abiotic and biotic parameters to get insight into fundamental relations underlying the development of these systems.

**Marine Robotics Centre**

Duration: as from 01.01.2018

VLIZ develops a Marine Robotics Centre to promote innovative marine research activities by means of autonomous platforms.

**Creating negative CO<sub>2</sub> emissions via enhanced silicate weathering (ESW) – Negatieve CO<sub>2</sub> emissies door verhoogde silicaatverwerking**

Duration: February 2019 – January 2023

This SBO project will tackle the problem of climate stabilisation by examining the feasibility of an innovative negative emission technology called 'Enhanced Silicate Weathering' (ESW) integrated into coastal zone management. The goal is to perform fundamental research into efficiency, mutual benefits and environmental impact of the technique in order to examine if and how it can be developed into a sustainable and cost-effective approach to the evaluation of negative emissions.

**WOG – Next generation animal tracking**

Duration: 01.09.2019 – 31.08.2023

A multidisciplinary consortium regarding animal tracking was established so as to (1) solve the methodological problem posed by 'big data'; (2) gain insight into the factors that play a role in the decision-making process, and (3) understand how individuals respond to changes in their environment.

**UNESCO****GLOSS – Sea Level Station Monitoring Facility**

Duration: continually since 2008

[www.ioc-sealevelmonitoring.org](http://www.ioc-sealevelmonitoring.org)

A worldwide service for real-time sea level monitoring by means of measuring stations in cooperation with GLOSS (Global Sea Level Observing System) and IOC (Intergovernmental Oceanographic Commission).

**VLAIO (FORMER IWT – STRATEGIC BASIC RESEARCH)****Coastbusters 2.0**

Duration: 01.10.2019 – 01.10.2022

An innovative collaboration between public and private parties, Coastbusters 2.0 will implement various reef facilitating systems to induce the formation of a biogenic mussel bed in an early stage and to achieve a nature inspired design (NID) for coastal defence.

**CREST – Climate resilient coast. Wave action in a changing climate: effects on the dynamics of the coast and implications for future safety. Een veerkrachtige kustzone.**

Duration: 01.11.2015 – 31.10.2019

[www.crestproject.be](http://www.crestproject.be)

In the CREST project, research is conducted to gain a better understanding of the littoral processes resulting from currents, waves and wind so as to better assess the impact of future coastal safety measures and developments along the coastline (e.g. Flanders Bays). All results are analysed by a Guidance Committee comprised of governmental bodies, market players and ecological experts. In addition, interim feedback is organised with technical experts from Belgium and abroad. The consortium consists of experts with an academic background in the field of physical aspects of coastal processes (waves, currents, sediment dynamics) and with experience in scientific research, and more specifically representatives from KU Leuven, Ghent University, VUB, Flanders Hydraulics Research, Maritime Access division, RBINS-Directorate Natural Environment and VLIZ supplemented with valorisation partners (IMDC and Fides Engineering). VLIZ is responsible for the support activities relating to data management and communication.

**PROBIO** – *PROspection for BIOactive compounds in the North Sea*

Duration: 01.11.2019 – 30.04.2022

Marine environments offer a wide variety of bioresources containing potential bioactive compounds. This project wants to unravel the underexplored potential of a selection of local organisms by screening their bioactive compounds. This project will generate an essential knowledge base to identify possible uses in commercial applications, which will trigger further research to foster new commercial developments in various sectors.

**TOERISME VLAANDEREN****Operation North Sea 1944-45 exhibition**

Duration: 20.09.2018 – 30.11.2020

This exhibition, held at Seafront Zeebrugge, deals with the liberation of Walcheren on 1 November 1944 by Canadian, Polish, British, French, Norwegian, Dutch and Belgian troops. This project is conducted in collaboration with the War Heritage Institute, Westtoer, the Flemish government and Nationale Loterij/Loterie Nationale.

**FUST - FLANDERS UNESCO TRUST FUND FOR SCIENCE****OTGA** – *Ocean Teacher Global Academy*

Duration: since 2005

The OceanTeacher Global Academy (OTGA) project aims at building equitable capacity related to ocean research, observations and services in all IOC Member States. UNESCO/IOC's International Oceanographic Data and Information Exchange (IODE) programme has built a comprehensive Learning Management System (OceanTeacher) that, in combination with classroom training, has trained nearly 2000 students from 120 countries since 2005. This success demonstrates the expertise within IODE and its potential to expand the use of this methodology to other IOC programmes. The OTGA project will complement other existing training programmes of the IOC.

**JOINT INDUSTRY PROGRAMME ON E&P SOUND AND MARINE LIFE****PCAD4COD** – *Impact of airgun sound exposure on fish: integrating population-level modelling and collection of empirical data*

Duration: 01.04.2017 - 03.09.2019

The PCAD4COD project is an integrated set of studies into the impact of airgun sounds on fish which combines different models with the collection of field data on behaviour, physiology, growth and maturation. VLIZ is involved in the collection of field data by means of acoustic telemetry.



# TRAINEES AND MASTER STUDENTS

SUPERVISED BY VLIZ IN 2019

NAME	DIVISION	SCHOOL/UNIVERSITY
Baten Axel	MSc student Research	Ghent University
Bukelic Ivana	Trainee Policy Information	Vrije Universiteit Brussel
Claes Jolien	Trainee Data Centre	Vrije Universiteit Brussel
Crabeels Laura	Trainee Science Communication	Ghent University
Decruw Cedric	Trainee Data Centre	Howest
Dewilde Bowie	Trainee Science Communication	Ghent University
D'Hondt Guillaume	Trainee Science Communication	Ensorinstituut Ostend
Dockx Karel	Trainee Data Centre	University of Antwerp
Fojtek Christian	MSc student Research	Ghent University
Gopalakrishnan Lavaniadevi	MSc student Research	Vrije Universiteit Brussel
Grahovac Els	Trainee Science Communication	Howest
Gyzels Brian	MSc student Research - Data Centre	KU Leuven
Hallewaert Bruce	Trainee Science Communication	Artesis Plantyn Hogeschool Antwerp
Henkens Symine	Trainee Research	Ghent University, NIOZ
Isabeau Vel	Trainee Research	Hogeschool Utrecht
Keulers Justine	Trainee Science Communication	Howest
Lagaisse Rune	MSc student Research - Data Centre	Ghent University
Lambert Elke	Trainee Research	Vrije Universiteit Brussel
Lescroart Celie	Trainee Science Communication	VIVES Kortrijk
Lewyllie Nele	MSc student Research	Ghent University Campus Kortrijk
Maekelberg Daan	MSc student Research	Ghent University
Niu Zhiyue	Trainee Research	University of Wageningen (The Netherlands)
Özmeriç Semih	MSc student Research	KU Leuven
Piasecka Magdalena	Trainee Research	University of Warsaw, Poland
Rukavina Iva	Trainee Research	Ghent University
ter Bruggen Daisy	Trainee Data Centre	Van Hall Larenstein Hogeschool, The Netherlands
Van Den Steen Thijs	MSc student Research	Ghent University
Van Hecke Bert	Trainee Data Centre	Ghent University
Van Hee Francine	Trainee Science Communication	Van Hall Larenstein Hogeschool, The Netherlands
Van Maldeghem Laurian	Trainee Science Communication	Ghent University
Vanhooren Lore	Trainee Research	Ghent University
Verkinderen Antoon	Trainee Science Communication	VIVES, Bruges

# STUDENT EMPLOYEES

ACTIVE AT VLIZ IN 2019

NAME			
Bossuyt Astrid	Desmet Sam	Lips Jonas	Van de Walle Emma
Bouwens Jan	Devos Eli	Nair Thiviya	Van den Steen Thijs
Brenan Aisling	d'Hondt Guillaume	Ortega Calvo Marina	Van Maldeghem Laurian
Callewaert Celine	Fernandes João	Perneel Michiel	Vanhooren Lore
Candelario Erika	Henkens Symine	Piasecka Magdalena	Versteeg Jeroen
De Buyser Silke	Josphat Nguu	Poffyn Gizem	Vukelic Ivana
De Caluwé Yani	Kumari Alka	Roobrouck Lotte	Wittoeck Janne
Debergh Reinout	Laethem Marlies	Schols Ruben	Wittoeck Karlien
Defever Justin	Lampe Seppe	Stubbe Liesje	Wyns Liam
Dekeyser Emma	Lescroart Celie	Tuytens Kimberly	Zaman Zehlia

# SCIENTIFIC EQUIPMENT AND INFRASTRUCTURE

2019

## OVERVIEW OF SCIENTIFIC EQUIPMENT AND INFRASTRUCTURE FOR SCIENTIFIC RESEARCH MADE AVAILABLE BY VLIZ

### WATER SAMPLING AND CHARACTERISATION EQUIPMENT

- Acoustic current meter (ADCP) and speed log
- Dissolved inorganic carbon analysis system
- System for oxygen analysis by means of Winkler titration
- Seawater acidity analysis system
- Aquadopp current profiler (ADCP)
- Carrousel 6 x 4 litre Niskin bottles
- CTD equipped with sensors for:
  - Photosynthetically active radiation (PAR)
  - Dissolved oxygen and redox potential (ORP)
  - Turbidity
  - Chlorophyll a
- Aeolian sand transport monitoring network
- Fluorometer
- 10 litre GO-FLO bottle
- Methane sensor
- Multibeam sonar
- 5 litre Niskin bottle
- Nutrient analysis system
- Underway data acquisition system on board RV Simon Stevin with:
  - Thermosalinograph
  - Fluorometer
  - Atmospheric pCO<sub>2</sub> analysis system
  - Oxygen sensor
  - Turbidity sensor
- Secchi disk
- Total alkalinity sensor
- LISST-100X and LISST-200X turbidity meter

### BENTHIC SAMPLING AND SEAFLOOR MAPPING EQUIPMENT

- Bowers & Connelly multi-corer
- Cohesive Strength Meter (CSM)
- Hamon grab
- Multibeam sonar
- Multibeam sonar system for shallow areas
- Multi-transducer sub-bottom echosounder
- Reineck Box Corer
- Sediment Profile Imaging (SPI) system
- Singlebeam sonar
- Van Veen grab
- Sparker
- Gilson dredge
- Vibrocorer

**BIOLOGICAL SAMPLING EQUIPMENT**

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- Bat recorder
- Bongo net
- Beam trawl
- Otter trawl
- Pelagic otter trawl
- Bowers and Connelly multi-corer
- Porpoise detectors – C-PODs
- Fast repetition rate Fluorometer (FrrF)
- FlowCam
- Flow cytometer
- Fluorometer
- Gilson dredge
- Hamon grab
- Hydrophone
- Hyperbenthic sledge
- MIK net
- Neuston net
- Sieving table
- Apstein plankton net
- CalCoFi plankton net
- Vertical plankton net – WP2
- Plankton pump
- Reineck Box Corer
- Sediment Profile Imaging (SPI) system
- Sensor network for large birds
- Van Veen grab
- VEMCO fish acoustic receiver network in the Western Scheldt and coastal waters
- Video plankton recorder
- Wilson auto-siever
- Zooscan

**MISCELLANEA**

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- Augmented reality sandbox
- Biological laboratory
- Bird tracking camera
- Chemical laboratory
- Compressor for filling diving cylinders
- Core repository – cold store for drill cores
- DGPS hand-held unit
- Freezers
- Weather station on board RV Simon Stevin:
  - o Atmospheric pCO<sub>2</sub>
  - o Wind speed
  - o Wind direction
  - o Temperature
  - o Atmospheric pressure
- Microscopes
- Mini ROV
- Molecular laboratory
- Underwater camera
- RIB Zeekat
- ROV ‘Zonnebloem’ (former ‘Genesis’)
- AUV ‘Barabas’
- USV ‘Adhemar’
- Video frame
- Water tanks for marine organisms
- Web cameras

# RESEARCH PROJECTS

WHICH MADE USE OF RV SIMON STEVIN IN 2019

## RESEARCH PROJECTS RV SIMON STEVIN

MARINE RESEARCH GROUP	PROJECT
FPS Economy – Continental Shelf Service	Monitoring of sand and gravel extraction
ILVO - Fisheries	IAPF
ILVO - Fisheries	Release living rays
ILVO - Fisheries	Coastbusters
ILVO - Fisheries	Combituig
ILVO - Fisheries	Demersal Young Fish Survey (DYFS)
ILVO - Fisheries	Monitoring of sand and gravel extraction
ILVO - Fisheries	Flatfish in windmill farms
INBO	Monitoring of seabirds
RBINS	Monitoring porpoises
RBINS	JOMOPANS
RBINS	Monitoring in windmill farms
Directorate Natural Environment & UGent - Marine biology	PERSUADE
Directorate Natural Environment & UGent - Marine biology & ILVO & Ulg - MAST	Face-It
RCMG & KBIN	INDI69
Ugent - CMET	Hardwiring the ocean floor
Ugent - Veterinary Medicine	Anisakidae in Belgian fish
Ugent - GhEnToxLab	Community Transcriptomics
Ugent - GhEnToxLab	Temora metabolisme
Ugent - Marine biology	Sea bass
Ugent - Morphology	Flatfish injuries
Ulg	Mixotrophy in ecosystem dynamics
VLIZ	North Sea Wracks
VLIZ	Fish migration in coastal areas
VLIZ	Bedforms in the Dover Strait
VLIZ	ICOS
VLIZ	Assemble+
VLIZ	Multibeam survey
VLIZ	LifeWatch measurement campaigns
VLIZ	JERICO-Next
VLIZ	Paleo landscapes in the Southern North Sea
VLIZ	AUV Campaigns
VLIZ	Paleo landscape of the Scheur
VLIZ	TIMBERS
VLIZ	BeRMS2020
VLIZ	BioComp
VLIZ	PlaneetZee
VUB - Chemistry	NewSTEPS
Flanders Hydraulics Research	Evolution of beach nourishment

In 2019, RV Simon Stevin was used for 39 projects (including 13 new ones), amounting to a total of 182 days at sea. A total of 178 unique projects have made use of RV Simon Stevin since 2000. Due to a correction of the counting method for scientific projects, this figure is lower than in 2018.

# RESEARCH PROJECTS

WHICH MADE USE OF THE MARINE STATION OSTEND IN 2019

## RESEARCH PROJECTS MARINE STATION OSTEND

MSO INFRASTRUCTURE USED	REASON	MARINE RESEARCH GROUP
Water tanks for marine organisms	PERSUADE experiments	Directorate Natural Environment & UGent - Marine biology
Base of operations	Project Mahi	
Core repository	Analysis or collection of drill cores	DEME/UGent - RCMG
Mesocosms	Enhanced Silicate Weathering	VLIZ, Universiteit Antwerpen
Lab infrastructure	ICOS	VLIZ
Lab infrastructure	LifeWatch	VLIZ

The Marine Station Ostend was used for marine scientific projects, educational purposes, visits, meetings and open house days for 205 days in 2019.



# EVENTS (CO)ORGANISED BY VLIZ

IN 2019

## EVENTS (CO)ORGANISED BY VLIZ IN 2019

DATE	TITLE	LOCATION	ROLE OF VLIZ	NUMBER OF PARTICIPANTS	KPI12 EVENT
17.01.2019	JPI Oceans seminar	KVAB, Brussels	organiser	108	
13.02.2019	GSTD shell training course	InnovOcean site, Ostend	organiser	35	✓
13.03.2019	2019 VLIZ Marine Science Day	MEC Staf Versluys, Bredene	organiser	366	✓
16.03.2019	Big Shell Counting Day	10 Flemish coastal municipalities	co-organiser	880	✓
29.03.2019	Think Tank North Sea working groups kick-off	RBINS, Brussels	co-organiser	60	
24-26.04.2019	VI International conference on the Governance of Atlantic Ports (XIV <sup>th</sup> -XXI <sup>th</sup> Centuries)	InnovOcean site, Ostend	co-organiser	55	
24.04.2019	Zeebad seminar 'Use of the Sea'	Mercator Maritime Institute	co-organiser	34	
24.04.2019	'Use of the Sea' seminar	InnovOcean site, Ostend	organiser	33	✓
26.04.2019	Test of mini ROVs	MSO, Ostend	organiser	18	
08.05.2019	Marine Science meets Maritime Industry	CC De Grote Post, Ostend	co-organiser	103	
15-17.05.2019	EMODnet Biology final meeting	Lisbon, Portugal	co-organiser	57	
20-22.05.2019	POGO 3-day workshop	InnovOcean site, Ostend	co-organiser	55	
20-22.05.2019	Pint of Science - World Oceans Day 2019	Kaap   Vrijstaat O., Ostend	organiser	150	✓
23.05.2019	UPV day of the sea	InnovOcean site, Ostend	organiser	50	✓
24.05.2019	2 <sup>nd</sup> EMODnet Open Sea Lab: kick-off event	Royal Museums of Fine Arts of Belgium, Brussels	co-organiser	24	
04-06.06.2019	EuroMarine hyperspectral satellite observation foresight workshop	InnovOcean site, Ostend	co-organiser	38	
04-05.06.2019	Aquabotz Workshop	MSO, Ostend	co-organiser	27	
08.06.2019-03.01.2021	Operation North Sea 1944-45 exhibition	Seafront, Zeebrugge	co-organiser	8,247	✓
13-14.06.2019	ASSEMBLE Plus workshop	InnovOcean site, Ostend	organiser	24	
21.06.2019	VLIZ members' day	MSO, Ostend	organiser	159	
25.06.2019	Symposium: Sea level rise in the Flemish-Dutch Delta Region	Greenbridge, Ostend	co-organiser	114	
01-05.07.2019	Course: Zeeweek, alles van de zee (sea week, everything from the sea)	Horizon Educatief, Ostend	co-organiser	25	✓
03-06.09.2019	2 <sup>nd</sup> EMODnet Open Sea Lab: Hackathon	Zebrastraat, Ghent	co-organiser	103	
17.09.2019	Press conference on the VLIZ Marine Robotics Centre	MSO, Ostend	organiser	46	✓
26.09.2019	CREST final conference	Greenbridge, Ostend	organiser	124	✓
27.09.2019	VLIZ neighbourhood day	MSO, Ostend	organiser	122	✓
23.10.2019	Presentation of KustINzicht 2019	CC De Grote Post, Ostend	co-organiser	70	
25.10.2019	Vissen in het Verleden (Fishing in the past)	Navigo, Oostduinkerke	co-organiser	132	✓
28-31.10.2019	LifeWatch-WoRMS workshop: Compositae	InnovOcean site, Ostend	organiser	12	
8.11.2019	Contact day "Maritime Heritage & Museology"	ABC Cruise Terminal, Zeebrugge	co-organiser	82	✓
8.11.2019	Bat migration seminar	InnovOcean site, Ostend	co-organiser	95	
18-20.11.2019	North Sea Palaeolandscapes Conference	Media Plaza, Utrecht, the Netherlands	co-organiser	134	

**EVENTS (CO)ORGANISED BY VLIZ IN 2019** (CONTINUED)

DATE	TITLE	LOCATION	ROLE OF VLIZ	NUMBER OF PARTICIPANTS	KPI12 EVENT
19-20.11.2019	LifeWatch Users & Stakeholders Meeting	RBINS, Brussels	organiser	68	
20.11.2019	G-STIC - OECD Workshop	Brussels Expo	co-organiser	50	
21.11.2019	G-STIC - open theme session	Brussels Expo	co-organiser	130	
24.11.2019	Science Day 2019	MSO & RV Simon Stevin, Ostend	organiser	1,200	✓
25-28.11.2019	Lifewatch/Worms: Register Antarctic Species	InnovOcean site, Ostend	organiser	18	
26.11.2019	Aqua-Lit Learning Lab	InnovOcean site, Ostend	organiser	25	
28.11.2019	Solemn ceremony for VLIZ's 20 <sup>th</sup> anniversary	KVO Oostende	organiser	326	✓
29.11.2019	Fish Welfare Symposium	InnovOcean site, Ostend	co-organiser	92	✓
07.12.2019	Seminar for coastal guides	De Panne town hall	co-organiser	161	✓
19.12.2019	Think Tank North Sea	InnovOcean site, Ostend	organiser	70	

42 events with a total of 13,722 participants

# PUBLICATIONS

2019

## DE GROTE REDE

- Issue 49 (June 2019) with leading articles on: from seawater to drinking water; unwanted fish; and the DNA of the sea. Number of copies: 9,000 **(KPI12 publication)**
- Issue 50 (November 2019) with leading articles on: anniversary of De Grote Rede; nature conservation and development in the dunes; and the sea of the future. Number of copies: 10,000 **(KPI12 publication)**

## VLIZINE

A total of 12 issues of the e-newsletter 'VLIZINE' appeared in 2019, including a total of 181 articles. **(KPI12 publication)**

## VLIZ LIBRARY ACQUISITIONS

A total of 35 Library Acquisitions lists were forwarded by e-mail in 2019.

## ZEEKRANT

Seys, J.; Bogaert, K.; Belpaeme, K.; De Smet, B (Eds.) (2019). *Zeekrant 2019*: annual publication of the Flanders Marine Institute and the province of West Flanders, Ostend. 8 p. Number of copies: 70,000. **(KPI12 publication)**

## BOOKS

A selection of books (co-)written or contributed to by VLIZ employees

- Devos, S. (2019). *Het zeeboek*. Manteau/Standaard Uitgeverij: Antwerp. ISBN 978 90 223 3645 8. 191 p.

## VLIZ SPECIAL PUBLICATIONS

- Nr. 83: Mees, J.; Seys, J. (Ed.) (2019). *Book of abstracts - VLIZ Marine Science Day*. Bredene, Belgium, 13 March 2019. *VLIZ Special Publication*, 83. Vlaams Instituut voor de Zee - Flanders Marine Institute (VLIZ): Ostend. 165 + ix p.

## VIDEO AND AUDIO

- De Smet, B.; Fockedey, N.; Seys, J. (2019). *20 year VLIZ* (NL + EN versie). Executive producer: Moonshot. VLIZ: Ostend. 2:19 min. **(KPI12 publication)**
- De Smet, B.; Wittoeck, J.; Fockedey, N.; Seys, J. (2019). *Marine Robotics Centre*. Video (4:13 min). Flanders Marine Institute (VLIZ): Ostend.
- De Smet, B.; Fockedey, N.; Roobrouck, L.; Lips, J.; Seys, J. (2019). *Audio series '20 years of VLIZ'*. Series of 20 Dutch-language and English-language audio sequences. Flanders Marine Institute (VLIZ): Ostend.

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- Dannheim, J.; Bergström, L.; Birchenough, S.N.R.; Brzana, R.; Boon, A.R.; Coolen, J.W.P.; Dauvin, J.-C.; De Mesel, I.; Derweduwē, J.; Gill, A.B.; Hutchison, Z.L.; Jackson, A.C.; Janas, U.; Martin, G.; Raoux, A.; **Reubens, J.**; Rostin, L.; Vanaverbeke, J.; Wilding, T.A.; Wilhelmsson, D.; Degraer, S. (2019). Benthic effects of offshore renewables: identification of knowledge gaps and urgently needed research. *ICES J. Mar. Sci./J. Cons. int. Explor. Mer Accepted*. <https://hdl.handle.net/10.1093/icesjms/fsz018>
- **De Winter, W.** (2019). Southern-Netherlandish observations and knowledge production of naturalia on the seas: The writings of Michael de Febure (1721). *EMLC* 3(2): 265-282. <https://hdl.handle.net/10.18352/emlc.113>
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- Delerue-Ricard, S.; Stynen, H.; Barbut, L.; Morat, F.; Mahé, K.; **Hablützel, P.I.**; Hostens, K.; Volckaert, F.A.M. (2019). Size-effect, asymmetry, and small-scale spatial variation in otolith shape of juvenile sole in the Southern North Sea. *Hydrobiologia* 845(1): 95-108. <https://hdl.handle.net/10.1007/s10750-018-3736-3>
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- **Dierssen, H.M.**; Bostrom, K.J.; Chlus, A.; Hammerstrom, K.; Thompson, D.R.; Lee, Z. (2019). Pushing the limits of seagrass remote sensing in the turbid waters of Elkhorn Slough, California. *Remote Sens.* 11(14): 1664. <https://hdl.handle.net/10.3390/rs11141664>
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- Kitidis, V.; Shutler, J. D.; Ashton, I.; Warren, M.; Brown, I.; Findlay, H.; Hartman, S. E.; Sanders, R.; Humphreys, M.; Kivimäe, C.; Greenwood, N.; Hull, T.; Pearce, D.; McGrath, T.; Stewart, B. M.; Walsham, P.; McGovern, E.; Bozec, Y.; Gac, J.-P.; van Heuven, S. M. A. C.; Hoppema, M.; Schuster, U.; Johannessen, T.; Omar, A.; Lauvset, S. K.; Skjelvan, I.; Olsen, A.; Steinhoff, T.; Körtzinger, A.; Becker, M.; Lefevre, N.; Diverrès, D.; **Gkritzalis, T.**; Cattrijsse, A.; Petersen, W.; Voynova, Y. G.; Chapron, B.; Grouazel, A.; Land, P. E.; Sharples, J.; Nightingale, P. D. (2019). Winter weather controls net influx of atmospheric CO<sub>2</sub> on the north-west European shelf. *NPG Scientific Reports* 9(1): 20153. <https://hdl.handle.net/10.1038/s41598-019-56363-5>

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2019 (CONTINUATION)

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#### A1 PUBLICATIONS BY VLIZ EMPLOYEES (KPI1) (continuation)

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