Evaluation 2011-2016

NIOZ

Royal Netherlands Institute for Sea Research

't Horntje, 13 October 2017

NWO Netherlands Organisation for Scientific Research

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Content

1 Introduction

1.1 Scope and context of this review

This evaluation concerns the overall performance of the Royal Netherlands Institute for Sea Research (NIOZ) for the period 2011-2016. The evaluation was commissioned and organised by the Netherlands Organisation for Scientific Research (NWO) and supported by Dialogic Innovation & Interaction and Birch Consultants. The external evaluation follows the Standard Evaluation Protocol 2015-2021 (SEP, amended version September 2016). It is the protocol for research assessment in the Netherlands as agreed upon by NWO, the Royal Netherlands Academy of Arts and Sciences (KNAW) and the Association of Universities in the Netherlands (VSNU). The primary aim of the assessment procedure is to reveal and confirm the research quality, relevance to society and viability and to provide recommendations to improve these aspects. In addition, the procedure includes considerations with regard to PhD programmes, the research integrity and diversity of the (scientific) staff.

An international Evaluation Committee was established and asked to produce a reasoned evaluation of the institute and its research programmes, in accordance with the SEP. Prior to the external evaluation, NIOZ submitted a self-assessment document covering the period 2011-2016 including a strategic forward look. This report was approved by the NWO Executive Board on the 5th of July 2017. The self-assessment report and addendum included a SWOT analysis and a full set of statistics at institute and programme level concerning input (finances, funding and staff) and output (refereed articles, books, PhD theses, conference papers, publications aimed at the general public, and other output) for the six years prior to the evaluation. A number of tables were included about research staff, main categories of research output, funding, and PhD candidates (see SEP appendix D, D3). The self-assessment report therefore offered a concise picture of the institute and research groups' work, ambitions, output and resources in accordance with the guidelines provided by the SEP. A site visit formed an important part of the evaluation and included interviews with the management of the institute, the programme coordinators, other levels of staff, and a tour of the laboratories and facilities.

1.2 The Evaluation Committee

The Evaluation Committee was appointed on 10th of October 2017 by NWO Executive Board. Its members were:

- Dr. Hessel Speelman (chair) – Wadden Academy, NL
- Dr. Justus van Beusekom – Helmholtz Zentrum Geesthacht (HZG), DE
- Prof. Dr. Nicole Dubilier – Max Planck Institut für Marine Mikrobiologie, Bremen, DE
- Prof. Dr. Katherine Freeman – PennState, NAS USA
- Prof. Dr. Michael Schulz – MARUM, University of Bremen, DE
- Prof. Dr. David Sims – National Oceanography Centre Southampton, University of Southampton, UK

A short curriculum vitae of each of the members is included in Annex 1. The Evaluation Committee was supported by NWO (Dr. ir. Dorien Kool) and Dialogic Innovation & Interaction (Leonique Korlaar MSc).

Prior to the site visit all members of the Evaluation Committee signed the NWO Code of Conduct, by means of which they declared that their assessment would be free of bias and

without regard to personal interest, and that they had no personal, professional or managerial involvement with the institute or its research programmes. It was concluded that the Evaluation Committee had no conflicts of interest.

1.3 Data supplied to the Committee

Six weeks prior to the site visit the Evaluation Committee received the self-assessment report of NIOZ together with the site visit programme and an accompanying letter. The documentation supplied to the Evaluation Committee included all the information required by the SEP as well as by the additional questions raised by NWO.

Prior to the site visit the Evaluation Committee was informed about the Dutch science policy and the organisation of scientific research in the Netherlands, about (the transition of) NWO and the governance structure of the NWO research institutes.

1.4 Procedures followed by the Evaluation Committee

The Evaluation Committee proceeded in accordance with the Standard Evaluation Protocol 2015-2021. The assessment was based on the NIOZ self-assessment report (2011-2016) and other documentation provided by NWO, the institute, and the interviews during the site visit (from 10-13 October 2017). The programme of the visit is included in Annex 2.

The Evaluation Committee met on the afternoon and evening preceding the site visit to discuss the topics (and specific questions) for the different interviews. Moreover, the Evaluation Committee agreed on procedural matters and aspects of the assessment as described in the following paragraphs.

All interviews were conducted by the entire Evaluation Committee. After completing the interviews, the Evaluation Committee discussed the scores and comments on the institute and its research programmes and determined the final assessment.

At the end of the site visit, a meeting was held with the NIOZ management to report the Evaluation Committee's preliminary findings.

On the 5th of December 2017 a draft version of this report was sent to the NIOZ director for factual correction and comments. The report was subsequently submitted to the NWO Executive Board.

1.5 Aspects and assessment scale

The Standard Evaluation Protocol 2015-2021 required the Evaluation Committee to assess three main aspects of the institute and its research. These are (as described in the SEP):

1. *Research quality.* The Evaluation Committee assesses the quality of the institute's research and the contribution that research makes to the body of scientific knowledge. The Evaluation Committee also assesses the scale of the institute's research results (scientific publications, instruments and infrastructure developed by the institute, and other contributions to science).
2. *Relevance to society.* The Evaluation Committee assesses the quality, scale and relevance of contributions targeting specific economic, social or cultural target groups, of advisory reports for policy, of contributions to public debates, and so on. The point is to assess contributions in areas that the institute has itself designated as target areas.

3. *Viability.* The Evaluation Committee assesses the strategy that the institute intends to pursue in the years ahead and the extent to which it is capable of meeting its targets in research and society during this period. It also considers the governance and leadership skills of the institute's management.

These three main evaluation criteria were rated according to a four-category scale, as specified in the SEP. The verdict was given in qualitative form, though a quantitative figure should be added. The scale is as follows: 1. World leading/excellent; 2. Very good; 3. Good; 4. Unsatisfactory (see Annex 4).

The Evaluation Committee considered three additional topics. These are:

1. *PhD programmes.* The Evaluation Committee considered the supervision and instruction of PhD candidates.
2. *Research integrity.* The Evaluation Committee considered the institute's policy on research integrity and the way in which violations of such integrity are prevented.
3. *Diversity*. The Evaluation Committee considered the diversity of the institute. It is precisely the presence of mutual differences that can act as a powerful incentive for creativity and talent development in a diverse institute.

These topics were considered in qualitative terms (instead of using the four-category scale).

In addition to the topics above NWO formulated three questions for all NWO institutes:

1. What is the institute's added value in the national context and its international position?
2. How does the institute stimulate and facilitate knowledge utilization and open access?
3. How does the institute's structure, size and financial policy contribute to its mission?

In addition, one specific question was formulated for NIOZ:

4. How has the institute fulfilled its mission related to the successful exploitation and operation of the national marine research infrastructure?

2 Institutional framework of NIOZ

The Royal Netherlands Institute for Sea Research (NIOZ) is an institute of NWO and performs fundamental, process-oriented and sea going marine research addressing scientific and societal questions pertinent to the functioning of oceans and seas.

2.1 Mission

Over the past years NIOZ was reorganised, and its mission, strategy, and research focused adapted. By 2017 NIOZ has a threefold mission statement:

1. It performs academically excellent multidisciplinary fundamental and frontier applied marine research.
2. It serves as national marine research facilitator for the Dutch scientific community.
3. It stimulates and supports multidisciplinary fundamental and frontier applied marine research, education and marine policy development in the (inter)national context.

2.2 Research

The research at NIOZ is inspired by three notions: (1) oceans as unknowns, (2) oceans in trouble, and (3) oceans as opportunity. In the science plan 2014-2020 these issues were addressed in two broad research themes:

- The changing ocean system, past, present, future
- Adaptability of marine ecosystems in a changing world

Within these themes selected, focused research topics are defined. NIOZ calls it their *Mission Blue Planet*, referring to excellent marine research for society.

2.3 Organisational structure

NIOZ was founded as the Dutch Zoological Station in 1876. Since 2012, NIOZ operates from two locations with its main centre on the Isle of Texel, and a subsidiary centre in the town of Yerseke on the border of the Eastern Scheldt.

During 2012-2013, NIOZ was confronted with a difficult financial situation and concomitant managerial issues, including serious funding problems related to maintaining the seagoing capability and the consequences of the merger with KNAW-NIOO-CEME Yerseke in 2012. These challenges required the institute to reconsider its mission and overall strategy, and adapt its structure and stakeholder relations accordingly. Concomitantly, a new NIOZ board was installed in 2014, and a new strategic and financial plan emerged.

NIOZ was restructured into a set of three, thematic multidisciplinary scientific departments: Estuarine and Delta (EDS), Coastal (COS) and Ocean (OCS) systems research (OCS). These departments are complemented by an interconnecting and overarching Marine Microbiology and Biogeochemistry (MMB) department. Science support units were regrouped as well. All units formerly associated with the national marine research equipment, and marine technology facilities, are now grouped under the National Marine research Facilities (NMF). All other units are grouped under general support (NIOZ-GES) (see Figure 1).

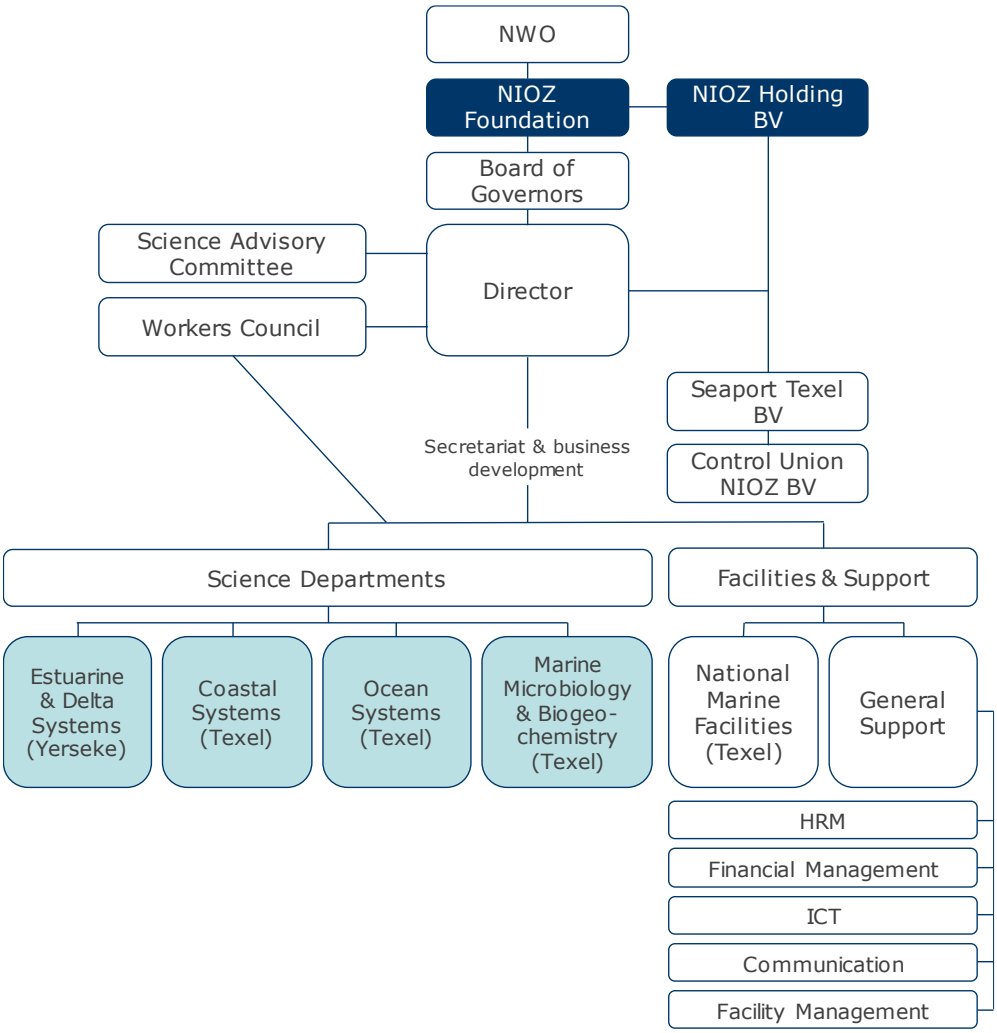

Figure 1. Organisation of NIOZ 2.0

NIOZ 2.0 formally started February 1st, 2016. The restructuring involved participation of Utrecht University[1] and an initial reduction of ~20% fte permanent staff. Expertise in relatively isolated fields as marine toxicology were discontinued and concentrated/augmented in other fields such as marine microbiology and biogeochemistry; fte's of scientific staff remained the same. Eventually, the reorganisation will comprise an overall reduction of ~10% in permanent, notably supporting staff by the end of 2017.

2.4 Financial matters

NIOZ overall annual turnover, on average lies around ~30 M€/yr (see Figure 2). Its primary source of basic funding is NWO (with ~16 M€). This includes operation of NIOZ NMF involving ocean going scientific expeditions and charters. Since 2016 also Utrecht University is a long-term financial partner, contributing ~12 M€ over the period 2016-2020.

[1] In 2015 a new agreement was signed between NIOZ, NWO and Utrecht University (UU). Important aspect is that researchers at NIOZ will be formally affiliated with UU from 2016 onwards for an initial phase of 10 years, and that UU will provide substantial financial resources dedicated to the development of a joint research programme in the area of (fundamental) marine sciences for this period, in order to strengthen the cooperation between NIOZ and UU.

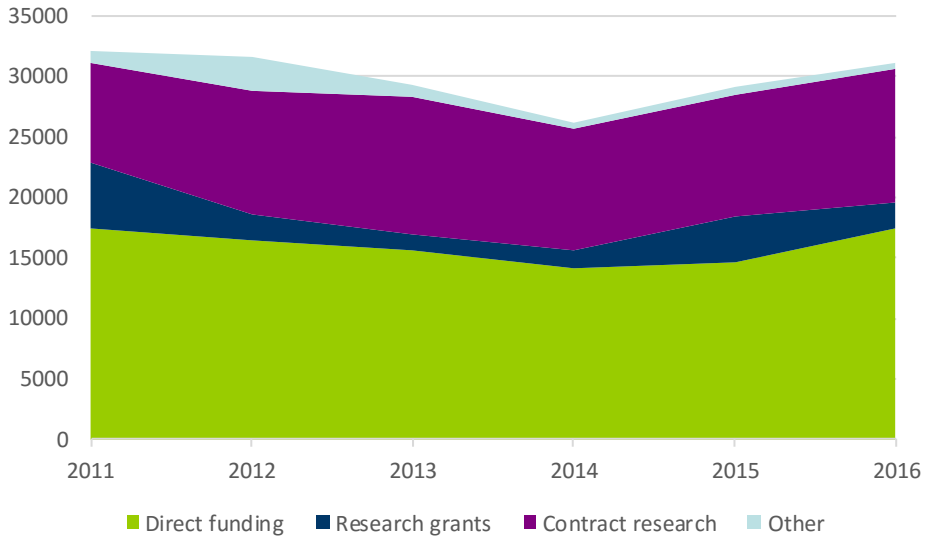

Figure 2. Funding of the running budget (k€)

2.5 Staff

By 2016, NIOZ, with ~50 tenured scientists (SP), and ~55 technicians (NSP) on a total of ~180 permanent staff, operates from two locations with its main centre on Texel and a subsidiary centre in Yerseke. The total number of staff dropped from 311,2 fte in 2012 to 244,3 fte in 2016 (see Figure 3).

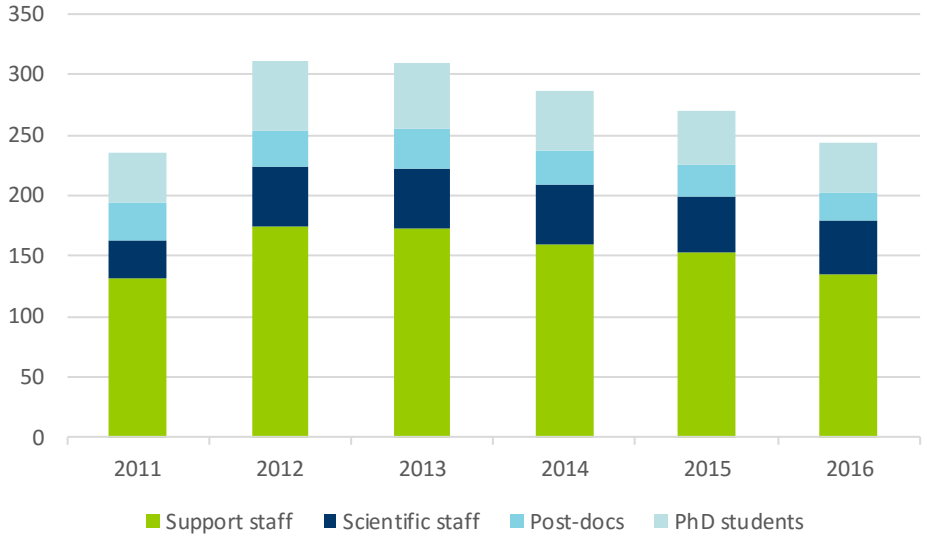

Figure 3. Numbers of staff (fte) (2011 figures excluding NIOZ-Yerseke)

3 Assessment of the institute NIOZ

3.1 Strategy and targets NIOZ

As described in chapter 2, NIOZ adapted its mission, strategy and research focus in the previous period. The research of NIOZ is now built on its natural and unique national role, which entails performing and facilitating multidisciplinary high quality sea going, in situ observational and measurement-based actuo- and paleo- marine research, combined with experimental and modelling efforts of key aspects of global marine systems.

The SEP Evaluation Committee is pleased to see that the organisational structure followed the new mission and strategy. NIOZ 2.0 consists of three thematically oriented departments (EDS, COS and OCS), each having its own specific role and mission. These departments are complemented by an interconnecting and overarching MMB department. Also, the science-supporting units were effectively restructured into two units: NMF and GES (see also chapter 2 for an overview of the organisational structure). The EDS research department is housed at Yerseke, the others on the Island of Texel. In the view of the commission, both locations have unique profiles that are highly complementary.

Overall, the Evaluation Committee is of the opinion that 'NIOZ 2.0' has placed itself as a truly national research institute with very strong ties to all relevant universities in the Netherlands as well as to a wide range of stakeholders and the maritime sector. From an international perspective, NIOZ is the clear focal point of marine research in the Netherlands.

3.2 Research quality

NIOZ provides fundamental and essential contributions to our scientific knowledge of the oceans and their impact on the health and well-being of our planet and its inhabitants. Internationally recognized as one of the leading marine academic institutes in the world, NIOZ conducts excellent research in fields ranging from physical oceanography, modelling and geology to biogeochemistry, microbiology, and marine ecology. Using multidisciplinary and cutting-edge approaches, researchers at NIOZ explore, examine and investigate environments relevant for basic and applied marine research, such as the deep sea, the Arctic and Antarctic, and coastal and estuarine areas in the Wadden Sea and North Sea.

NIOZ is clearly one of most influential oceanographic research institutes world-wide and produces excellent science based on the following criteria:

1. *Publications:* Bibliometric analyses of research focus on publications as the primary form of scientific output and quality. The bibliometric indices of NIOZ are outstanding, and as high, or higher than other world-leading oceanographic institutes. Considering the profound internal re-organisation and change in staffing that came with the transition towards NIOZ 2.0, the institute has delivered cutting-edge and integrated science at the highest level. Indeed, the transition and temporary reduction in research staff has left only a moderate imprint on the scientific output (as indicated by the bibliographic analysis), attesting to the fruitfulness of the new structure and the leadership skills to keep motivation high.

   Between the years available for analysis, 2011 – 2014, publications by NIOZ researchers performed 53% higher in terms of impact than publications in similar fields (Mean Normalized Citation Score of 1.53). Furthermore, NIOZ papers appeared in journals with impact factors that were 48% higher than the world average. Also

highly impressive is that nearly 20% of NIOZ publications belong to the top 10% of the most highly cited papers worldwide, nearly double what would be expected for comparable research institutes. Finally, it is notable that this high level of excellence is relatively similar throughout all four NIOZ departments, with researchers across all departments publishing in highly-ranked scientific journals such as Nature, Science, PNAS, etc. This is particularly impressive in light of the recent restructuring of research units at NIOZ.

The excellence of NIOZ is, however, visible in many more aspects beyond bibliometrics.

2. *External research funding (beyond NWO base funding*): The achievements of NIOZ researchers in obtaining external research funds are outstanding: nearly 50% of the NIOZ budget between 2011 – 2016 came from external funds. Three ERC Advanced Grants and two ERC Junior Grants highlight the international excellence and visibility of NIOZ researchers. The attractiveness of NIOZ for young and gifted scientists is apparent in the large number (eight) of EU Marie Curie grantees at the institute. Other impressive funding achievements from international sources include numerous EU grants within the EU programmes. NIOZ researchers were also successful in obtaining highly competitive national funding, as visible in eight NWO Veni/Vedi/Vici grants, and most recently, a WISE award.

3. *Prizes:* NIOZ researchers received several prestigious prizes in recognition of their scientific excellence. In 2012, the Geochemical Society's Clair C. Patterson Award, which recognizes an innovative breakthrough of fundamental significance in environmental geochemistry, went to Stefan Schouten. And in 2014, the Royal Netherlands Academy of Arts and Sciences awarded the Heineken Prize for Environmental Sciences to Jaap Sinninghe Damsté, and the highest award in Dutch science, the NWO Spinoza Award went to Theunis Piersma.

4. *Instruments and infrastructure:* NIOZ has been able to develop outstanding research facilities. The MMB department houses e.g. state of the art microbiology facilities and a top-class molecular biology and biogeochemical lab. The OCS department houses several excellently equipped laboratories, which can also be used by researchers from other departments. COS has developed several excellent tools for combining physical/ecological observations, experiments and modelling exercises. In Yerseke, the EDS department has developed a unique flume facility, state of the art climate rooms, a greenhouse and a seaweed centre (the latter housed on Texel). In addition, the fleet of research vessels, operated by NMF, enables NIOZ to perform world-leading research.

Overall, the Evaluation Committee is of the opinion that NIOZ is a world-leading marine research institute producing excellent research (score 1).

3.3 Relevance to society

Natural and anthropogenic changes are impacting the oceans and the food and ecosystem services they provide to society, highlighting the burgeoning need for timely provision of new knowledge to enable policymakers and other stakeholders to meet the demands of a changing world. NIOZ makes an outstanding contribution to society by producing excellent fundamental knowledge that is proactively applied to societal challenges (e.g. sea level rise).

NIOZ is e.g. active in research underlying coastal management including the so-called *Building with Nature* programme, environmental monitoring, planning and instalment of marine protected areas, Wadden Sea restoration, monitoring of the Delta Estuary, Wadden Sea and

North Sea in the framework of reducing anthropogenic stress on the ecosystem, and ecosystem approaches in fisheries management. In addition, NIOZ has established multidisciplinary virtual centres of excellence on broad topics of societal and industrial interest, such as the Netherlands Deep Sea Science and Technology Centre, the Wadden Systems Research Centre, the Seaweed Research Centre, NIOZ Sea Level Centre and the Ecosystem-Restoration for Coastal Protection Centre.

NIOZ has highly productive government, industry and non-governmental partnerships in many key areas including sea-level rise, environmental pollution, food production, coastal protection, habitat conservation and renewable energy. Since 2013 NIOZ collaborates with e.g. WMR, Deltares and TNO within the MUST consortium (Netherlands Marine Consortium of Science and Technology – for Global Ocean Innovation), among others, responsible for the major national four-year deep sea mining research project 'TREASURE'. The partnerships, actively fostered by NIOZ, have achieved excellent applied outcomes including important contributions to high profile policy reports. Central to the success is the excellent two-way exchange of personnel and knowledge between NIOZ and industry. Overall, it is evident that science for societal relevance is integral to how NIOZ 'thinks' as an organisation.

Providing knowledge to the general public is key to facilitating a broader understanding of issues facing the oceans and the important role for science in providing advice and determining policy. NIOZ has a very active programme of public outreach by each of the four departments with excellent impact in the Netherlands and the European Union. For example, using RV *Pelagia* to engage with the public on important marine science issues is an excellent way to reach out to the general public. Extending the reach of NIOZ science to be regularly seen at the international level is an opportunity that is currently being addressed through a new NIOZ communications strategy.

Considering all this, the Evaluation Committee is of the opinion that NIOZ makes an outstanding contribution to society with its research activities (score 1).

3.4 Viability

The NIOZ is in an excellent position to lead marine sciences in the Netherlands into a productive future and to continue delivering fundamental knowledge of very high societal relevance about the ocean and seas. The Evaluation Committee is convinced that without NIOZ there would be no significant marine research left in the Netherlands.

The NIOZ 2.0 structure with its four departments is ideal for performing transformative marine research. The combination of outstanding senior scientists, with similarly outstanding newly hired (junior) researchers is highly favourable for attaining the ambitious strategic goals and continuing to deliver output of excellent scientific quality as well as for societal needs. Careful planning and monitoring is advised to integrate the new research staff into the existing NIOZ structure and to ensure a consistent and synergetic research programme in the future. The Evaluation Committee is convinced that diversity is key for reaching the institutional goals, and to maintain the vibrant and world-leading research environment. The international experience of the newly hired staff offers a great opportunity to further the diversity culture within NIOZ (e.g. by supporting mid-career female scientists in their career development).

The Evaluation Committee is certain that the new NIOZ 2.0 structure needs time to unfold its full potential. In this context, the two locations of NIOZ are complementary assets with regard to field studies and interactions with stakeholders. The Evaluation Committee recognizes that the geographic setting of NIOZ provides challenges and it strongly urges the NIOZ management team to continue monitoring the progress of the interactions between the

Yerseke and Texel branches and to implement additional measures to strengthen it. The latter can be achieved, for example, by providing incentives to foster collaborations between departments (e.g. through small funds).

As a sea-going institution, access to ship time and availability of state-of-the-art sea-going equipment is mandatory. The Evaluation Committee is very concerned that the financial need for chartering the vessels to external users has already reached a critical level and has begun to affect the sea-going research of NIOZ and its partners in the Netherlands.

In our view, NIOZ has made every feasible step towards setting up an efficient structure for the NMF department. To maintain the level of world-leading research at NIOZ, it is of utmost importance to renew the ageing research fleet within the next few years – the underlying decisions are clearly beyond the scope of NIOZ.

Moreover, the Evaluation Committee recognizes the necessity to provide sufficient funding for the sea-going research and to decouple the operational, maintenance, and renewal costs for large-scale sea-going equipment from the NIOZ core funding. Seagoing vessels are not only vital for NIOZ, but serve as a backbone for the excellent Dutch marine research community in times of global change. Without the research fleet and sufficient funding for their use, the Netherlands will disappear from the map of international marine research.

Despite the uncertainty regarding funding for renewing the research fleet within the next few years, the Evaluation Committee is of the opinion that NIOZ has done everything within its power to solve this issue. Therefore, the Evaluation Committee assesses the future strategy of NIOZ and the extent to which it is capable of meeting its future targets in research and society as excellent (score 1).

3.5 Considerations regarding organisation, management policies and staffing

3.5.1 PhD programme

The institution has a large and vibrant community of graduate students, even though NIOZ does not have its own graduate programme. Students are enrolled and earn their graduate degrees at universities in the Netherlands, and beyond. Many NIOZ researchers have adjunct or professorial appointments with these universities, which is generally necessary for students to study at NIOZ under their guidance.

At both Yerseke and Texel, graduate students shared their research with the Evaluation Committee members, assisted with tours, and engaged in conversations about their experiences and the quality of their education. The Evaluation Committee members found the students were genuinely quite positive about the opportunities at NIOZ for research, and about the mentoring provided by the scientific staff. The Evaluation Committee commends NIOZ for the strong representation of women and international scholars in the graduate population.

Although the allied universities are responsible for the graduate-level education of the students, NIOZ researchers provide vital training in research methods, scientific communication, and other skills needed for a successful professional career in science. There are numerous ad hoc opportunities for training in research and professional skills. The Evaluation Committee commends these offerings, and suggests the institute could work to expand and coordinate short courses and workshops to the entire graduate population on a regular basis. This would ensure greater access to important professional development resources, while also strengthening students' sense of community and value to the institution.

3.5.2 Research integrity policy

The structures and procedures put in place to safeguard the integrity of research are crucial to the success of an institution and its staff. The NIOZ structures and procedures in place appear generally fit for purpose. However, it was evident that they are not sufficiently well documented, not well known by staff across the institution, and can be better communicated. For example, although an ombudsman is in place to hear potential grievances and help settle disputes between parties, it was not generally known who this person(s) was or the procedure for engaging with them. Similarly, it was not evident that a 'whistle-blower' policy was in place to help maintain research integrity by enabling, for example, confidential early warning of issues such as data falsification, data manipulation, or potential bullying of individuals by others. Improvements should be made by NIOZ Management to strengthen the set of policies, ensuring they are applied with transparency, and by effective communication of them to all staff and students.

Public funding is used to support the research enterprise at NIOZ to a large degree. In light of this, public trust in the scientific enterprise benefits from transparency in the means, methods, and results of research. Data should be fully available, both for re-use by others, and for maximising its benefits to society. The task facing marine institutions in data archiving to make their data discoverable and accessible is daunting, given the volume and complexity of different data types collected and the need for detailed metadata. NIOZ has put in place a Research Data Management (RDM) strategy for this purpose by emphasising data quality assurance, future-proof archiving, data discoverability and open access to users. An important aspect of the strategy is that each research department has taken responsibility for implementation of its own data management policy to reflect the different research data collected and archived by each group. Development of a new in-house database and software is particularly valuable as it is being used across several departments thus providing considerable cost saving by avoiding duplication of effort. However, the timeline for implementation of the policies is very ambitious and will be challenging to achieve at the current staffing level. The Evaluation Committee commends the efforts that are underway, and encourages the institution to set clear expectations for the pace and extent of progress and to align resources to enable success of this important undertaking.

3.5.3 Diversity

NIOZ values a good Human Resource Management policy and expresses commitment to the success of a diverse scientific community. Currently, the proportion of women is high among students, postdocs, and tenure-track scientists. However, a sharply decreasing trend is noted for the more senior ranks. Seeking to improve the balance, NIOZ has successfully participated in the NWO Women in Science Excel (WISE) programme. On a positive note, the NIOZ staff is very international (21 nationalities) and much effort is made to support integration.

The Evaluation Committee recognized two significant challenges faced by the institute as they seek to build and strengthen a diverse community.

First, there is an absence of females in the institute leadership. The Evaluation Committee encourages the now reorganized institution to create a culture of greater transparency about emerging leadership opportunities. Importantly, the institute is encouraged to develop both strategies and resource investments that promote the professional success of mid-career scientists, and provide leadership opportunities for all.

A second, and significant challenge is a result of the relatively remote locations, both in Texel and Yerseke. The isolated geographic location of both facilities make it difficult to accommodate partner careers, a problem that can impact the hiring of men and women alike.

Nevertheless, it is well documented that partner career concerns are more acute problem for the attraction and retention of female professionals.

Diversity of the NIOZ faculty compares reasonably well to national data for Dutch science communities. However, the Evaluation Committee encourages the institution to re-envision its diversity goals and aim to exceed these relatively low marks, and set sights on becoming a national leader. The institution has the capacity to set a bold course to foster diversity and excellence as paired ambitions at all levels, particularly for faculty and leadership appointments.

3.6 Supplementary questions by the NWO Executive Board

3.6.1 Generic questions

1. What is the institute's added value in the national context and its international position?

The added value of the NIOZ in the national context is undoubtedly its unique contribution to the Dutch academia and society in advancing the marine sciences. NIOZ is involved in all university activities in the marine sciences, and enables the Dutch coastal and ocean research by providing ship time and dedicated large equipment including personnel. NIOZ research extends at the highest international level the knowledge base needed to deal with pressing societal issues like sea level rise, coastal protection, nature protection and a sustainable use of marine resources. NIOZ stimulates the national maritime sector by sharing its know-how for instance within the MUST consortium.

Internationally, the position of NIOZ is best characterized by an excellent publication output showing a ranking above comparable European institutions, by several highly recognized prizes and by several prestigious international research grants (see paragraph 3.2). In addition, NIOZ leads several EU Projects, is a recognized contributor to the European Marine Board and POGO, and well-linked through MoU's with European partner institutions.

2. How does the institute stimulate and facilitate knowledge utilization and open access?

As an NWO institute, NIOZ adheres to the 'Netherlands Code of Conduct for Scientific Practice' and to the 'Dutch National Plan Open Science'. These guidelines promote the online access and exchange of data. To this end, NIOZ strives to follow the FAIR guiding principles: research data should be Findable, Accessible, Interoperable and Reusable. That NIOZ has actively stimulated open access publication during recent years, can be seen in the increase of open access papers from 9% in 2011 to 66% in 2016. Open access is facilitated and promoted among others by new arrangements made by universities with several publishers.

NIOZ research data comprises a very wide range of data types, formats and volumes. For each department a description of their research data handling and policy is in place. The organisation of research data management (RDM) differs per department: some have assigned a data manager per department, some per project. The research data management is continuously being improved to accommodate the diverse nature of original data. See also paragraph 3.5.2.

In addition, strategic alliances with applied marine research institutes and through the MUST consortium stimulate knowledge utilization.

3. How does the institute's structure, size and financial policy contribute to its mission?

NIOZ consists of four research departments and the National Marine Research Facility. Three departments focus on 1) estuaries and deltas, 2) coastal systems and 3) ocean systems. A fourth department has a focus on cross-cutting microbial and biogeochemical themes.

Ocean- and sea-going expeditions are facilitated for both the NIOZ and the wider Dutch marine academic community. The four departments are well equipped both in terms of personnel and infrastructure to enable complementary views of the effects of global change effects on marine ecosystems. The institute is excellently prepared for this task including state of the art sea-going equipment and ships run by a dedicated department. The financial policy enables it to maintain the facilities at a high level. However, large investments like a new ocean-going research vessel are beyond the control of NIOZ. Therefore, it is of utmost importance for the viability of the Dutch marine science community that appropriate political steps are taken that guarantee ocean and sea-going expeditions in general in the future.

3.6.2 Institute specific questions

4. *How has NIOZ fulfilled its mission related to the successful exploitation and operation of the national marine research infrastructure?*

The NMF department consists of four groups dedicated to vessel operations, maintenance and support of the national equipment pool, development of specialized equipment and data management. NMF is embedded, among others, in the European Ocean Facilities Exchange Group (OFEG) for exchanging ship time and large sea-going equipment and instruments. The success of this infrastructure is visible in almost 200 publications that resulted from RV *Pelagia* cruises. Part of the funding needed to support these activities is from charter earnings, amounting to almost 8 Mio € in the period 2011-2016. Given that NWO investments have decreased in the review period to (500 K€) in 2015, financing the facilities is becoming increasingly dependent on the charter of ship time and equipment. Past years have indicated that this is not always feasible, plus it interferes with National marine research priorities and planning.

4 Conclusions and recommendations

4.1 Conclusions

Over the past evaluation period NIOZ has been thoroughly reorganised. Its mission, strategy, and research programme were sharply focused to deliver excellent multidisciplinary basic and frontier applied marine research, to serve as a national marine research facilitator for the Dutch scientific community, and to stimulate and support education and marine policy development at the national and international level. The Evaluation Committee is impressed with the enormous transition that the organisation has undergone and what has already been achieved in such a short period. The Evaluation Committee congratulates the entire organisation for its flexibility and adaptability.

The Evaluation Committee finds that NIOZ is a world-leading marine research institute producing excellent science. The four marine research departments are all world-leading as measured by the highest quality research output, award of major prizes, and an outstanding record of external research funding. This all makes it evident that NIOZ is one of the most influential oceanographic research institutes world-wide.

NIOZ makes an outstanding contribution to society through its highly productive research collaborations with government, industry and non-governmental partners in key areas such as sea-level rise, environmental pollution, food production, coastal protection, habitat conservation and renewable energy. The Evaluation Committee is impressed that science for societal relevance is integral to how NIOZ 'thinks' as an organisation.

The NIOZ 2.0 structure with its four marine research departments and linked infrastructure facilities is ideal for performing cutting-edge research. It is capable of meeting its future targets in research and society. The Evaluation Committee is convinced that NIOZ makes a unique and indispensable contribution to Dutch academia and society: without NIOZ there would be no marine research of significance left in the Netherlands. The Evaluation Committee recognises that large investments like a new ocean-going research vessel are essential for guaranteeing the future success of NIOZ. However, securing these investments is beyond the control of NIOZ. Renewing the ageing research fleet within the next few years is of the utmost importance for maintaining the level of world-leading research at NIOZ.

NIOZ is a well-organised institution with committed and enthusiastic staff. The institution has a large and vibrant community of graduate students that are very positive about their research opportunities. The structures and procedures put in place to safeguard the integrity of NIOZ research are generally fit for purpose, including an ambitious Research Data Management strategy that, when fully implemented, will provide data quality assurance, future-proof archiving, data discoverability and open access to users.

The Evaluation Committee found that NIOZ expresses commitment to the success of a diverse scientific community and is very international (21 nationalities), with much effort expended to support integration. The Evaluation Committee recognises, however, that there is an absence of females in the institute leadership.

The Evaluation Committee praises the success of the National Marine Facilities infrastructure. It is recognised, however, that NWO investments have decreased in the review period to (500 K€) in 2015. As a consequence, financing the facilities is becoming increasingly dependent on the charter of ship time and equipment. Past years have indicated that this is not always feasible, plus it interferes with National marine research priorities and planning.

4.2 Recommendations

The Evaluation Committee finds that NIOZ is a world-leading marine research organisation, and acknowledges that aspects of 'NIOZ 2.0' are the development and/or implementation phase. To provide a helpful focus to the planned progress of NIOZ the Evaluation Committee recommends the following:

- NIOZ can be proud of its excellent group of senior scientists, who helped make the transition to NIOZ 2.0 possible. Whilst strengthening the institution with newly hired staff, the Evaluation Committee also encourages NIOZ leadership to maintain their support for the experienced group of senior NIOZ scientists through transparent processes for allocating internal funds and providing access to technicians and infrastructure.

- The NIOZ personnel appear to fully understand the fact that the transition from NIOZ 1.0 to NIOZ 2.0 required strong leadership and that the acting director mastered the profound transition remarkably well. Given that the transition is starting to realise its full potential, the Evaluation Committee recommends to address the need for optimising information exchange within the new structure. This may be achieved by increasing governance transparency and clearly communicating the rationale behind important decisions within NIOZ, which will benefit decision-making processes.

- While the Evaluation Committee is aware of the general gender imbalance within the sciences in the Netherlands, it encourages NIOZ in its role as a national institute to spearhead efforts to claim the national vanguard on this important issue. Specifically, the Evaluation Committee recommends that NIOZ leadership prioritises the fostering of a culture of gender awareness and addresses unconscious biases in decision-making processes, to ensure that (gender) diversity is increased in all ranks among faculty appointments and in leadership positions. The Evaluation Committee feels that an equal-opportunity officer, who receives sufficient support to fulfil her/his task, would be central for furthering gender diversity at NIOZ.

- Dual-career couples pose an important challenge to human-resource management within institutes in most countries. Given the challenging geography of the two NIOZ locations, the Evaluation Committee recommends the development of an institutional 'road map' that specifically addresses and supports the recruitment of dual-career couples.

- NIOZ is to be congratulated for developing an institutional policy for Research Data Management (RDM), which can be considered a role model for other institutions. Based on the Findable, Accessible, Interoperable and Reusable (FAIR) principles, the NIOZ Research Data Policy is a significant advance towards "open science" and "open data". Given the complexity and wide range of scientific data generated across NIOZ, the department-specific data-management plans are very appropriate. To ensure that these cutting-edge developments continue to be successful, the Evaluation Committee recommends close monitoring of the implementation of the RDM plan with the potential for additional staff where needed for this important task. Furthermore, the Evaluation Committee encourages institutional level training on RDM for early-career scientists to make this strategy future proof.

- NIOZ is well prepared for frontier oceanographic science including state-of-the-art sea-going equipment and research vessels run by a dedicated department. Given that much-needed large investments such as a new ocean-going research vessel are beyond the control of NIOZ, the Evaluation Committee recommends NWO to take all

appropriate political steps to guarantee the viability of the Dutch marine science community in order to secure ocean and sea-going expeditions for the Netherlands in the future.

Annex 1. Curricula Vitae of Evaluation Committee Members

Dr. Hessel Speelman (Chair NIOZ Evaluation Committee 2017)

Hessel Speelman received his academic education at Groningen University (BSc geology/geophysics; 1971), Leiden University (geophysics/sedimentology) and the Vrije Universiteit Amsterdam (MSc hydrogeology; 1974). Then he did geological research in Indonesia and worked as a researcher at the Vrije Universiteit Amsterdam. After obtaining his PhD (Amsterdam; 1979) he worked as a hydrogeologist in Colombia. In 1982 he was appointed geoscientific expert at TNO in The Netherlands. From 1988 to 2005 he held senior management positions of geoscientific knowledge institutions (i.e. general director of the Netherlands Institute of Applied Geoscience TNO – National Geological Survey). In addition, he held board positions from the early 1990s onwards at institutions which are part of the Dutch knowledge infrastructure related to earth and life sciences (including KNAW, NWO, and universities) and at organisations related to geo-information and at European geoscientific associations and the EU. From 2005 to 2008 he worked – affiliated with the Netherlands Innovation platform – on developing ideas for improving the public knowledge infrastructure of The Netherlands. From 2008 to 2012 he was advisor 'renewal public knowledge infrastructure', board member (portfolio: geoscience) of the Wadden Academy KNAW and chairman/member of supervisory boards. Since 2013 he is vice-chairman and geoscientist of the Wadden Academy, chairman of scientific committees (e.g. on subsidence) in the Wadden Sea Region and chairman of supervisory boards in the field of earth and life sciences. From 1998 – 2015 he participated/participates in audits and reviews to assess research [programmes and institutions] in the EU.

Dr. Justus van Beusekom (member NIOZ Evaluation Committee 2017)

Van Beusekom's research interest is on Long-Term Ecological Change in the Wadden Sea and North Sea. He focuses on changes in riverine nutrient loads and climate and their effect on the dynamics of nutrients, suspended matter and phytoplankton in the Wadden Sea. This involves understanding the interactions between the North Sea as a major driver of the organic matter and suspended matter dynamics in the Wadden Sea. Despite the international character of the Wadden Sea most research has a local focus related to the vicinity of research stations. A major challenge is to understand the regional differences observed within the Wadden Sea. This is a prerequisite for a successful international management of the Wadden Sea.

Prof. Dr. Nicole Dubilier (member NIOZ Evaluation Committee 2017)

Nicole Dubilier is a marine biologist and deep-sea explorer. She explores symbioses between bacteria and invertebrate marine life. Her research has made an essential contribution to an understanding of the close interaction between the partners of such symbiosis and their importance for the marine ecosystem. Her research interests are biology, diversity and ecology of the communities formed by bacteria and eukaryotes. The focus of her research is on marine invertebrates that live in chemosynthetic habitats such as hydrothermal vents, cold

springs and sulphide-rich coastal sediments. Primarily, Molecular Methods such as metagenomics and proteomics are used to investigate the symbioses.

Prof. Dr. Katherine H. Freeman (member NIOZ Evaluation Committee 2017)

Katherine H. Freeman is the Evan Pugh University Professor at The Pennsylvania State University. Her research interests include organic geochemistry, isotopic biogeochemistry, paleoclimate and astrobiology. She is recognized for her research on molecular stable isotope analyses and their application to reconstruct past climates and environments. She is co-Editor of the journal *Annual Reviews in Earth and Planetary Sciences*. Freeman is a fellow of numerous professional organisations, including the American Geophysical Union, and The Geochemical Society and European Association of Geochemistry. She was elected to membership in the National Academy of Sciences in 2013.

Prof. Dr. Michael Schulz (member NIOZ Evaluation Committee 2017)

Michael Schulz leads the research group on Geosystem Modelling at Bremen University and he is the director of MARUM - Centre for Marine Environmental Sciences. His research interests focus primarily on using numerical models of varying complexity to study the origin of climate variations at millennial-to-interdecadal timescales, Neogene climate evolution and climate-change effects in coastal areas and secondly on software development for time-series analysis of unevenly spaced data.

Prof. Dr. David Sims (member NIOZ Evaluation Committee 2017)

David Sims is a British marine biologist, a Senior Research Fellow and Deputy Director for Research at the Laboratory of the Marine Biological Association (MBA) in Plymouth, and a Professor of Marine Ecology in the National Oceanography Centre Southampton at the University of Southampton, UK. He works in the field of behavioural ecology researching animal movement and dispersal processes, particularly of marine predators such as sharks. Research has identified common patterns of behaviour across phyla and informed conservation of threatened species. He is known for satellite tracking sharks and for discovering Lévy scaling laws in the search behaviour of diverse marine predators. Professor Sims has received numerous awards for research including the Fisheries Society of the British Isles Medal in 2007 for "exceptional advances in fish biology and/or fisheries science". He was elected a Member of Academia Europaea in 2016.

Annex 2. Programme of the Site Visit 10 – 13 October 2017

Tuesday October 10 2017 Bergen op Zoom:

15.00 Arrival at Stadparkhotel Bergen op Zoom

16.00 Kick-off: Welcome, installation of panel by Wim van der Doel NWO governing board, introductions by Dialogic & NWO

17.00 First closed meeting

19.00 Welcome Dinner in restaurant La Pucelle (closed meeting)

Wednesday October 11 2017 NIOZ Yerseke:

07:30 Breakfast at Stadparkhotel Bergen op Zoom

08:15 Transport to NIOZ Yerseke

09:00 Welcome and brief introduction NIOZ by Henk Brinkhuis (director NIOZ)

- 09:00 Welcome and introduction by Henk Brinkhuis
- 09:15 Interview & discussion

09:30 Interview NIOZ board (Harry Baayen)

- 09:30 Introduction by Harry Baayen, followed by discussion
- 10:20 Internal discussion (closed session, wrap up and preparation following interviews)

10:30 Tour of NIOZ YE (EDS), labs and facilities. Tour guide: Klaas Timmermans

11:30 Interview Klaas Timmermans (head research dept EDS)

- 11:30 Presentation/pitch by Klaas Timmermans, followed by discussion
- 12:00 Internal discussion (closed session, wrap up and preparation following interviews)

12:15 Lunch with management and EDS PIs

13:00 Interviews selected research staff EDS

- 13:00 5 min pitch by Karline Soetaert, followed by discussion/interview
- 13:20 5 min pitch by Tjeerd Bouma, followed by discussion/interview
- 13:40 5 min pitch by Bert Vermeersen, followed by discussion/interview
- 14:00 5 min pitch by Johan van de Koppel, followed by discussion/interview

14:25 Poster session with PhD students and postdocs

~15:20 Departure from Yerseke by bus (closed session in bus)

18:30 Ferry from Den Helder to Isle of Texel

19:15 Arrival hotel Opduin, Texel

19:30 Dinner in hotel Opduin

Thursday October 12 2017 NIOZ Texel:

07:30 Transport by taxi from Hotel Opduin to NIOZ

08:00 Breakfast at NIOZ

08:30 Closed session to prepare following interviews

08:45 Arrival, welcome by Henk Brinkhuis and dept heads

09:00 Interviews research dept. COS

- 09:00 Presentation/pitch by Henk van der Veer, followed by discussion
- 09:30 Internal discussion (closed session)
- 09:40 5 min pitch by Katja Philippart, followed by discussion
- 10:00 5 min pitch by Allert Bijleveld, followed by discussion
- 10:20 5 min pitch by Paolo Stocchi, followed by discussion
- 10:40 5 min pitch by Jan van Gils, followed by discussion

11:00 Guided tour of NIOZ Texel part 1 (labs and facilities, dept. COS, incl. birdlab, MMB, OCS, Seaweed centre). Tourguides: department heads

12:15 Lunch with members of SAC *(Jef Huisman, Henk Dijkstra, Han Olff, Susanne Hulscher)*

13:05 Closed session to prepare following interviews

13:20 Interviews research dept. OCS

- 13:20 Presentation/pitch by Gert-Jan Reichart, followed by discussion
- 13:50 Internal discussion (closed session)
- 14:00 5 min pitch by Jan-Berend Stuut, followed by discussion
- 14:20 5 min pitch by Furu Mienis, followed by discussion
- 14:40 5 min pitch by Lous Gerringa, followed by discussion
- 15:00 5 min pitch by Rob Middag, followed by discussion

15:20 (Coffee) break, closed session

15:40 Q&A with NIOZ supporting staff (Peter Smit cs)

16:15 Poster session with PhD students and postdocs (incl. drinks, also with management and dept PIs)

17:15 Closed session Committee

18:20 Transport to restaurant

19:00 Dinner at restaurant Paal 17, together with NIOZ MT

Friday October 13 2017 Texel:

07:45	Transport by taxi from Hotel Opduin to NIOZ
08:00	Breakfast at NIOZ & closed session to prepare following interviews
08:30	Welcome and Q&A with Henk Brinkhuis
09:00	Interviews research dept MMB
09:00	Presentation/pitch by Stefan Schouten
09:10	Interview and discussion
09:30	Internal discussion (closed session)
09:40	5 min pitch by Laura Villaneuva, followed by discussion
10:00	5 min pitch by Anja Spang (WISE), followed by discussion
10:20	5 min pitch by Corina Brussaard, followed by discussion
10:40	5 min pitch by Henk Bolhuis, followed by discussion
11:00	(Coffee) break, closed session
11:10	Interviews with National Marine Facilities (NMF) dept
11:10	Introduction/pitch by Thomas de Greef (head NMF)
11:10	Discussion with head NMF and staff (continues during subsequent tour)
11:20	Guided tour of NIOZ Texel part 2 (NMF, workshop, Seaport Texel, Ships). Tour guide: Thomas de Greef
12:30	Closed lunch & working session Committee (on board RV Pelagia)
15:15	Return from RV Pelagia to institute
15:30	Communication preliminary findings for NIOZ management
16:00	Concluding drinks for entire institute, including brief communication of preliminary findings of the evaluation by chairman Evaluation Committee
16:45	Transport to Schiphol Airport Amsterdam

Annex 3. Quantitative data composition and financing

Funding and expenditures

in k€	2011	2012	2013	2014	2015	2016
Funding:						
Direct funding (1)	17.476	16.501	15.665	14.058	14.620	17.397
Research grants (2)	5.454	2.095	1.224	1.627	3.856	2.210
Contract research (3)	8.274	10.291	11.406	9.989	10.076	11.059
Other (4)	886	2.830	1.057	558	675	409
Total funding	**32.090**	**31.717**	**29.352**	**26.232**	**29.227**	**31.075**
Expenditure:						
Personnel costs	15.225	20.223	20.366	20.032	19.548	16.784
Other costs	12.586	14.220	14.792	13.472	15.670	14.291
Endowment personnel costs	188	345	272	384	10.558	69
Total expenditure	**27.999**	**34.788**	**35.430**	**33.888**	**45.776**	**31.144**
Financial income and expenses	20	22	-428	76	77	-425
Result before profit appropriation	**4.072**	**-3.093**	**-5.651**	**-7.732**	**-16.626**	**356**
Profit appropriation	-3.921	1.623	4.055	7.280	5.802	2.836
Result after profit appropriation	**150**	**-1.470**	**-1.596**	**-452**	**-10.824**	**3.192**

Note 1: Direct funding ('basisfinanciering' / lump-sum budget)

Note 2: Research grants obtained in national scientific competition (e.g. grants from NWO and the Royal Academy)

Note 3: Research contracts for specific research projects obtained from external organisations, such as industry, government ministries, European organisations and charitable organisations

Note 4: Funds that do not fit into the other categories

Research staff

NIOZ	2011	2012	2013	2014	2015	2016
Scientific staff	3	48,3	49,9	49,1	47,3	44,0
Post-docs	3	29,9	33,3	28,7	26,4	24,2
PhD students	4	58,0	53,5	49,6	44,5	41,2
Total research staff	**10**	**136,1**	**136,6**	**127,3**	**118,2**	**109,4**
Support staff	13	175,1	172,4	159,2	152,6	134,9
Visiting fellows (only #)		18,0	40,0	73,0	121,0	143,0
Total support staff	**13**	**175,1**	**172,4**	**159,2**	**152,6**	**134,9**
Total staff	**23**	**311,2**	**309,0**	**286,6**	**270,8**	**244,3**

* 2011 figures excluding NIOZ-Yerseke

PhD candidates

Enrolment			Succes rates				Total		
Starting year	Enrol-ment (male/ female)	Total (male+ female)	Gradu-ated after (≤) 4 years	Gradu-ated after (≤) 5 years	Gradu-ated after (≤) 6 years	Gradu-ated after (≤) 7 years	Total gradu-ated	Not yet finished	Discon-tinued
2008	2 / 8	10	2/20%	2/20%	1/10%	2/20%	7/70%	2/20%	1/10%
2009	6 / 14	20	2/10%	7/35%	1/5%	5/25%	15/75%	1/5%	4/20%
2010	8 / 6	14	1/7%	4/28,5%	2/14%		7/50%	7/50%	
2011	4 / 13	17	2/12%	3/17,5%			5/29,5%	10/59%	2/11,5%
2012	3 / 5	8	1/12,5%				1/12,5%	7/87,5%	
2013	3/ 7	10						10/100%	
2014	4 / 10	14						14/100%	
2015	2 / 10	12						12/100%	
2016	6 / 6	12						12/100%	

Research Output

Research output	2011	2012	2013	2014	2015	2016
Peer Reviewed Articles	185	255	264	307	271	289
PhD Dissertations	8	9	10	6	12	13
Open Access Papers	9%	11%	22%	54%	57%	66%
Other Output (e.g. instruments, designs)	4	6	6	4	6	4
Scientific impact, total citations	3139	3581	2288	1627	n.a.	n.a.
Scientific impact, normalized average citations	1.6	1.6	1.5	1.5	n.a.	n.a.
Scientific impact, PP (top 10%)	22%	21%	17%	18%	n.a.	n.a.
Major Awards/Prizes	1	1	1	4	2	3
Major Individual Research Grants	5	9	2	3	2	2
NIOZ PIs in Scientific Committees	126	214	211	186	143	148
NMF NIOZ/NL/EU science (Pelagia days)	266	120	258	186	197	178
NMF NIOZ science barterdays EU ships	75	6				33
NMF NIOZ/NL science (Navicula days)	175	170	176	155	170	163

Other output

Other output	2011	2012	2013	2014	2015	2016
Professional reports	30	62	66	21	21	16
Publications aimed at Public	28	29	12	21	9	25
Media releases/activity	444	450	740	876	704	703
Other output, e.g. instruments, designs	2	2	4	6	3	5
General outreach (public lectures)	40	33	51	84	43	82
Capacity building (courses)	6	19	19	12	2	31
Capacity building internships (BSc + MSc students)	54	82	89	103	148	131
Symposia by NIOZ	3	3	7	2	2	8
NMF use by public partners (charters/ days)	40	96	17	97	109	115
PPS projects, numbers	14	28	40	42	47	57
PPS projects, M€€	n.a.	2.3	3.7	3.2	3.3	2.7
Contract research M€€	8.3	10.3	11.4	10.0	10.1	11.1
Spin off/spin out companies				2		1
NIOZ PIs in Societal advisory bodies	14	10	19	8	6	6

Annex 4. Explanation of the categories

The Committee assesses the institute on the three assessment criteria: research quality, relevance to society and viability. These criteria are assessed both in qualitative terms (with arguments) and quantitative terms (in one of the four categories, see the table below).

Table 1. Meaning of categories in SEP 2015-2021

Category	Meaning	Research quality	Relevance to society	Viability
1	World leading / excellent	The institute has been shown to be one of the few most influential research groups in the world in its particular field.	The institute makes an outstanding contribution to society.	The institute is excellently equipped for the future.
2	Very good	The institute conducts very good, internationally recognised research.	The institute makes a very good contribution to society.	The institute is very well equipped for the future.
3	Good	The institute conducts good research.	The institute makes a good contribution to society.	The institute makes responsible strategic decisions and is therefore well equipped for the future.
4	Unsatisfactory	The institute does not achieve satisfactory results in its field.	The institute does not make a satisfactory contribution to society.	The institute is not adequately equipped for the future.

In addition to the three criteria, every assessment also considers at least three further aspects: PhD programmes, research integrity, and diversity. These aspects are only assessed in qualitative terms.

Annex 5. Terms of Reference

The board of The Netherlands Organisation for Scientific Research (NWO) hereby issues the following Terms of Reference to the assessment Committee of NIOZ, chaired by Prof. Dr. Hessel Speelman.

Topic	Description
Title	External evaluation of NIOZ of the period 2011 – 2016
Why	NWO organizes periodic evaluations of each research institute within the organisation every six years. This is part of the standing agreement with the Ministry of Education, Culture and Science. Together with the Royal Netherlands Academy of Arts and Sciences (KNAW) and the Association of Universities in the Netherlands (VSNU), NWO has stated to conduct these evaluations according to the Standard Evaluation Protocol (SEP). The goal of the periodic assessments is primarily to identify the quality of the research and the societal relevance and secondly to - partly on the basis of the assessment results - determine the mission and the basic funding for the next six years (2018-2023).
What	The assessment Committee evaluates the quality and the relevance to society of the research conducted by the institute, as well as its strategic targets and the extent to which it is equipped to achieve them. The Committee does this by judging the institute's performance on the three SEP assessment criteria, taking into account current international trends and developments in science and society in the analysis. Each criterion should receive a ranking in one of the four categories in accordance with the SEP guidelines. The Committee also ensures that the qualitative assessment (text) and the quantitative assessment correspond. Furthermore, the Committee should give recommendations for improvement. **The three SEP assessment criteria are**: - **Research quality** - **Relevance to society** - **Viability.** The assessment Committee also gives a qualitative evaluation on three **additional aspects**: - **PhD programmes** - **Research Integrity** - **Diversity** Further information about the criteria and additional aspects can be found in chapter 2 of the Standard Evaluation Protocol (SEP). **In addition to the topics above NWO has formulated three questions**: 5. What is the institute's added value in the national context and its international position? 6. How does the institute stimulate and facilitate knowledge utilization and open access? 7. How does the institute's structure, size and financial policy contribute to its mission? **For this particular institute NWO has also formulated the following specific topic**:

	- How has the institute fulfilled its mission related to the successful exploitation and operation of the national marine research infrastructure?
For whom	- The researchers themselves in order to establish where they stand, how they can improve and what the research should aim for. - The management of the institute who wishes to track the impact of their policy. - The board of NWO who decides on the accountability of the institute and the support for the institute. - Other stakeholders from, for example, the society and private sector. - The Ministry of Education, Culture and Science has requested a portfolio analysis of all the research institutes of NWO and the Royal Netherlands Academy of Arts and Sciences in 2018. The results of the SEP-evaluations will act as input for this portfolio analysis.
Who	The independent assessment Committee consists of 4-7 renowned international experts within the realm of the institute. Each Committee member signs a statement of impartiality and confidentiality.
How	The assessment Committee will be supported by a liaison officer from NWO and an independent secretary. The necessary documentation to conduct the assessment will be made available to the Committee one or two months before the site visit. This documentation includes at least a self-evaluation by the institute, a strategy document of the institute and the conclusions and recommendations from the previous assessment. If feasible the institute may provide a bibliometric analysis or a different study of its own choice to support the self-evaluation. The assessment Committee will be invited to the institute for a site visit of two days during which the institute will present itself in short lectures and interviews by the Committee. The assessment Committee will deliver a draft evaluation report to the NWO board no later than eight weeks after the site visit and a final version no later than 12 weeks after the site visit. Finally, the NWO board will publish the assessment report on the website accompanied by a public statement.
When	The site visit will take place in September or October 2017. NWO distributes the necessary information and documents to the Committee 1 or 2 months in advance of the site visit. For further information on the general time schedule please refer to the attached Standard Evaluation Protocol.
Contact	Leonique Korlaar MSc (Dialogic) and Drs. Raymond Schorno (NWO)

Necessary documents that were made available to the assessment Committee:

- Self-evaluation 2011-2016
- Strategy document
- Further description of what the Committee needs to know about the scope/context, assessment questions, method, time schedule, final report
- Programme of the site visit
- Standard Evaluation Protocol (SEP)
- Conclusions and recommendations from previous evaluation
- Response NWO to the previous evaluation report
- <optional> Bibliometric analysis