REPUBLIC OF SOUTH AFRICA

OPERATION PHAKISA
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Offshore Oil and Gas Environmental Research Collaboration Project

Research Catalogue and Gap Analysis Report

Final Report

14 October 2015

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REPUBLIC OF SOUTH AFRICA

NRF
National Research Foundation

NRF SAEON
National Research Foundation | South African Environmental Observation Network

Contents

1. Introduction

Offshore oil and gas exploration has the potential to provide a unique opportunity to gather important research information that would normally be difficult to obtain due to the expense of dedicated research voyages. Industry vessels and fixed platforms frequently put to sea and hence have the capacity to obtain and share such data. In turn, the marine research community has the knowledge and willingness to work with industry in order to get maximum potential from the data they are collecting.

The Offshore Oil and Gas Environmental Research Collaboration Project is a project to implement Operation Phakisa's Offshore Oil and Gas Exploration Initiative B3: Exploiting the broader research opportunities presented by offshore oil and gas exploration.

The overall objective of the project is to support the inclusive process of development of the **South African Marine Research and Exploration Forum (SAMREF)**. SAMREF will be a multi-sector forum, inclusive of public and private sectors that would:

- Identify and take advantage of opportunities provided by oil and gas exploration activities and platforms, to gather important marine ecosystem data which would otherwise be difficult and expensive to obtain.
- Facilitate new collaborative offshore studies that would increase South Africa's state of knowledge of the offshore marine environment, related to renewable energy potential, marine biodiversity and ecology, climate change and ecosystem functioning.

A Working Group consisting of various government departments and the private sector has been constituted with the overall responsibility of overseeing the implementation of the project. It is operationally supported by the Project Management Team that consists of the DST staff, the Working Group Secretariat and the scientific service provider that drives, coordinates and collates input for the development of SAMREF. The NRF-SAEON (National Research Foundation-South African Environmental Observation Network) through its Egagasini Node for Marine-Offshore Systems, has been contracted by the Department of Science and Technology as the scientific service provider. The Knowledge Fields Development (KFD) directorate of the NRF acts as the Secretariat for the project and Working Group.

Project objectives are the following:

Objective A – Effective management and stakeholder engagement

Project management structures are fully operational and all key stakeholders are actively participating in the project. A kick-start workshop will be held to introduce the project to stakeholders and get early feedback.

Objective B – Informed decision-making

Research Opportunity Exploitation (ROE) Reports are publicly available in respect of, but not limited to, ocean-related climate change, marine environment, biological resources and renewable energy research focus areas. These reports are informed by desktop study and engagement with stakeholders in all sectors.

Objective C – Stakeholder agreement and project launch

Data gathering and data management structures and systems agreements will be agreed, and SAMREF launched at a high profile event.

Objective D – On-going opportunity exploitation

Throughout the project duration, all opportunities to exploit the broader research opportunities presented by offshore oil and gas exploration will be efficiently and effectively exploited in order to contribute to the overall project objective and to provide practical input into the other project immediate objectives.

The objectives of this Research Catalogue and Gap Analysis (RC&GA) report, in providing a reference document for SAMREF, and a basis for the Research Opportunity Exploitation (ROE) Report, is outlined in the Terms of Reference for the project. Text from the terms of reference is presented below, and mapped across to Chapters in this report.

1.1.1 Output B.1: The Research Catalogue and Gap Analysis (RC&GA) Report will provide information on, at least:

(i) what research is already taking place and what data is collected during typical oil and gas exploration activities; **Chapter 6 of this report**

(ii) how the data that is already being collected (i) could also be of value to the ocean-related climate change, marine environment, biological resources and renewable energy research focus areas **Chapter 6 of this report**

(iii) what ocean-related climate change, marine environment, biological resources and renewable energy research activities are already taking place; **Chapter 7 of this report**

(iv) how the research activities described in (iii) could be enhanced, enriched, extended, scaled-up, replicated and/or generally improved through collaboration with oil and gas exploration activities; **Chapter 8 of this report (research requests)**

(v) what new ocean-related climate change, marine environment, biological resources and renewable energy research could be undertaken if the research opportunities presented by oil and gas exploration activities were fully exploited. **Chapter 9 of this report (Research opportunities)**

(vi) The RC&GA Report should also clearly identify who is doing what as further input into the stakeholder database **Chapters 7 and 10 of this report**

The DST 3 feet plan also outlines certain deliverables that are met by this report.
7.1 Confirm data custodians and users **Chapters 6, 7 and 8 of this report**
7.2 Compile data management norms, standards and SOPs **Chapter 6 of this report**
8.1 Confirm data gathering partners **Chapter 6 and 10 of this report**
8.2 Compile data gathering norms, standards and SOPs **Chapter 6 of this report**

In addition, we have included some useful case studies from South African projects that have successfully taken advantage of private-public sector partnerships, as well as some leading international examples in this field. These case studies provide useful recommendations for SAMREF members going forward, and some options that SAMREF could consider pursuing in the future.

The baseline information provided in this report will be used as a basis for the next **(Research Opportunity Exploitation (ROE) Report)** which will expand on the new research opportunities identified by the project together with the private sector, and outline the full and detailed description of the various research opportunities that could be facilitated by SAMREF, as well as the process and mechanisms by which this could be done.

2. Kick-start meeting outcomes

The kick-start workshop for the project was held on 23 and 24 July 2015 at the Old Mutual Centre, Kirstenbosch, Cape Town.

Participation in the kick-start workshop was open to all parties (private sector / public sector / academic) who have an interest in offshore marine research and industry in South Africa, including those currently involved in offshore oil and gas exploration and ocean-related climate change, biodiversity, natural resource management, renewable energy or related activities.

The kick-start workshop was a multi-stakeholder (research through to industry) workshop with the following objectives; that all participants:

- share a common understanding of the Offshore Oil and Gas Environmental Research Collaboration Project and its objectives, limitations and opportunities,
- have a common general understanding of offshore research and exploration activities taking place in South Africa's EEZ,
- share a common understanding of government's broader Marine and Antarctic research programme and vision, and how Phakisa Project B3 fits into this vision,
- contribute to the design and establishment of the proposed South African Marine Research and Exploration Forum (SAMREF),
- have a chance to actively contribute to the stakeholder database and the general project approach, and
- clearly articulated their interest, desires, needs, concerns, commitment, role and/or responsibilities within the project context.

Notification about the project, and about the kick-start workshop, was sent out via the SANCOR mailing list, via the Project Working Group, via the Project Management Team and also via the Ocean Energy Network mailing list.

The project team contacted key stakeholders in advance of the meeting, and also set up:

- A stakeholder database
- An online RSVP system, specifically for the kick-start workshop
- A brief stakeholder questionnaire to collect information about the organisations in the stakeholder database, and to get some preliminary views from stakeholders on strengths, opportunities, weaknesses and threats facing the forum (see Annex 8).

The meeting was attended by 86 participants from government, the private sector, NGOs, universities and research institutions.

The group photograph may be downloaded from this link and the report from the meeting is available at this link.

The kick-start workshop report will be used in the lead up to the SAMREF launch, to guide further interviews with stakeholders. It will be used as one of the resources for the identification of opportunities for public-private cooperation, and also to recognise threats and weaknesses that need to be mitigated going forward. We envisage that the report will also be used as an information resource.

3. Research sector meeting outcomes

The research sector workshop for the project was held on 17 and 18 September 2015 at the Old Mutual Centre, Kirstenbosch, Cape Town.

Participation in the research sector workshop was also open to all parties (private sector / public sector / academic) who have an interest in offshore marine research and industry in South Africa, including those currently involved in offshore oil and gas exploration and ocean-related climate change, biodiversity, natural resource management, renewable energy or related activities.

The workshop focused on identifying and investigating opportunities for cooperation in more detail.
Prior to the meeting, two brief forms were circulated for

a) Researchers to outline the (potential) requests they had identified that could be taken forward for industry to respond to, and
b) Representatives from industry to identify opportunities that exist within their company or sector that could be taken up by researchers.

A stakeholder database and an online RSVP system were also set up.

In particular, the workshop aimed to:

1. Understand and capture the interests of the research community
2. Investigate the additional opportunities provided by the private sector, and understand the requirements in order for these opportunities to be taken up
3. Collect information to refine the design of SAMREF as a forum that can broker agreements between the private and public sectors.

The meeting was attended by 60 participants. Case studies were presented on local research that had already been successfully undertaken with industry partners, some of which are presented in Chapter 5 of this report.

The focus was on group work to allow for discussions around research opportunities and requests, and several were successfully identified.

The report for the research sector meeting will be made available online on the SAMREF website (http://samref.dirisa.org/).

4. International case studies

4.1 SIMORC

A System of Industry Metocean data for the Offshore and Research Communities (**SIMORC**) has been established to stimulate and support a wider application of industry metocean datasets. The initial development phase was 1st June 2005 till 1st December 2007, and was co-funded by the European Commission. From 1st December 2007 onwards the SIMORC service has been operated by the Marine Information Service (MARIS) and British Oceanographic Data Centre (BODC) in an arrangement with the International Association of Oil & Gas Producers (IOGP). The project is also supported by the Intergovernmental Oceanographic Commission of UNESCO (IOC-IODE).

The SIMORC service aims to improve a common awareness of available data sets and a systematic indexing and archival of these data sets within the industry. It also aims at improving reporting and access to these data sets and results of field studies for other parties, in particular the scientific community. For these purposes the SIMORC system consists of an index metadatabase and a database of actual data sets, that together are accessible through the Internet. The index metadatabase is public domain, while access to data is regulated by a dedicated SIMORC Data Protocol. This contains rules for access and use of data sets by scientific users, by oil & gas companies, and by third parties. All metocean data sets in the SIMORC system database undergo quality control and conversion to unified formats, resulting in consistent and high quality, harmonized data sets.

The specific objectives of the SIMORC project were:

- to create a central index and database of metocean data sets, collected by the oil & gas industry at various sites on the globe in the past and continuing at present
- to facilitate harmonisation in quality and formats, storing and retrieving of these industry metocean datasets for use by industry partners and scientific users
- to create a searchable overview of hindcast studies, performed under contract of the oil & gas industry at various sites on the globe
- to define and to establish arrangements for use, updating and long term operation of the SIMORC facility beyond the project period
- to promote and to disseminate the SIMORC facility in both the oil & gas industry and scientific communities to achieve an increasing number of contributing parties and users

The SIMORC service had its launch in March 2007. At present it covers more than 3600 data sets from Shell, Total and BP, covering more than 2000 years of observations of winds, waves, currents and sea level [2000 years of sea level information]. The SIMORC system is operational to serve users in identifying and getting access to data sets and aims to extend its coverage regularly with additional data sets from oil & gas companies. The IOGP coordinates participation by major oil & gas companies, bringing in their considerable data sets. IOGP also takes care of regular feedback to the oil & gas industry about progress and long term perspective, and stimulating further participation of additional companies, collecting and managing metocean data sets

The SIMORC project also has an advisory board representing key user communities of the service. These include representatives from: EuroGOOS (European Association of Agencies to further the goals of the Global Ocean Observing System), Eurogif (European oil and gas innovation forum), MFSTEP (Mediterranean Forecasting System Towards Environmental Predictions), EurOcean (European Centre for Information on Marine Science and

Technology), MerSea project (Marine Environment and Security for the European Area), UK Met Office and the NOCS (National Oceanography Centre, Southampton)

Index metadatabase:
The index metadatabase is public domain and has a user interface to identify and locate interesting data sets easily. The index format is ISO19115 compliant and provides information such as instrument and mooring details, data sampling / processing and data quality report to allow users to assess the relevance of the data sets and possible related study reports to its particular interest. Users can store selected metadata of interesting data sets in a Shopping Basket, that is used in the ordering process for submitting their data access requests.

Database:
Data sets undergo a standard quality control and are converted to unified file formats (NetCDF and ODV ASCII) before being stored in the SIMORC database. Data sets in the SIMORC database are and remain the property of SIMORC participants, who qualify data sets in the SIMORC database as "restricted" (status = RS) or "non-restricted" (status = LI) data sets. Access to data sets is regulated and only possible for registered users. Distinction is made into users from scientific and academic institutes and other users (non-scientific and non-academic). Detailed information and documentation about the formats, the XML schema and common vocabularies used are available on the SIMORC website.

Academic users
After registration, scientific and academic organisations can log in from the shopping basket and submit requests for downloading and using selected data sets for research and educational purposes. Each request should contain a motivation why the user wants to use the data sets. All requests are registered in the SIMORC transaction register.

In case of "**non-restricted (LI)**" data sets the registered user gets access to the data sets for downloading without further communication with the SIMORC participant, that is listed as owner of the data sets. All downloads are again registered in the SIMORC transaction register.

In case of "**restricted (RS)**" data sets the requests are transferred to the SIMORC participant, that is listed as owner or contact on behalf of multiple owners, for consideration. The SIMORC participant has the right to withhold data sets or to ask for additional information for considering the user request for data sets. Its decision (approval / non-approval) is included in the SIMORC transaction register.

As part of the User Licence Agreement users are requested to provide feedback on the use of the data sets provided by the SIMORC service. Where possible users are requested to provide results or publications as appropriate. In case of use of data sets for a thesis, a digital copy of the resulting thesis is requested for inclusion in the SIMORC service.

All data set requests and downloads are registered in the SIMORC transaction register, that is monitored by the SIMORC operator and open for browsing by SIMORC participants. The transactions are evaluated on a regular basis to verify that an inapproriate number of downloads or excessive volumes of data downloads are not being made by specific users. Such cases will be reported and discussed with the central contact person of the Research or Academic institute, holding the User Licence, to seek clarification.

Users from non-scientific / non-academic organisations:
Non-scientific and non-academic users can also search freely in the SIMORC metadatabase

and identify interesting data sets. For requesting access to data sets from the shopping basket these users are also required to register with the SIMORC service.

No matter the access restriction as indicated in the metadata (LI / RS) all requests for data access by non-scientific and non-academic users are **always** forwarded to the data set owners for consideration and possible negotiation. The owner can agree, but also deny access. The owner will communicate its decision (approval / non-approval) via the SIMORC Transaction Register.

SIMORC Data access principles:

	Scientific Users	**Non-Scientific Users**
Data sets labelled: **LI** = Available under licence	Direct access	Request forwarded to owner
Data sets labelled: **RS** = Restricted	Request forwarded to owner	Request forwarded to owner

Transaction register
The registered user should regularly check the SIMORC Transaction Register, which gives an overview of its submitted order requests, recent and historic, their status of processing, their approval / non-approval, and a unique URL per approved data set for downloading. Each URL is de-activated after successful downloading.

The SIMORC Transaction Register is also used by the SIMORC data owners to oversee order requests, that are specifically addressed to them, the status of processing, and to give in their approval / non-approval, including explanation, to specific requests. The SIMORC Transaction Register also provides the owners an overview of all downloads and their users.

Privileged access for data providers:
Staff from data providers has privileged access to their own data sets. Thus, staff from Shell, Total and BP have unrestricted access to the data sets in SIMORC that are originating from their companies. This way SIMORC not only functions as a clearing house for industry metocean data but also as company database system.

Training, education and data dissemination
The SIMORC data sets can be very useful to local and regional marine managers as complementary to their own observations. In case of many developing countries, the SIMORC data might provide even the only source of data. To support this aspect extra effort in the dissemination is dedicated to reaching oceanographers in developing countries worldwide.

SIMORC and SAMREF
SIMORC provides an excellent example of how a data brokering service can increase access to metocean data. Although the current focus is slightly different in that SAMREF doesn't aim to manage data sets on behalf of industry, several important principles can be carried over.
The SAMREF Project and SIMORC Service have been in contact to investigate how partnerships between the bodies could be mutually beneficial.

Contacts, and source of this information:
http://www.simorc.org

Tim Moltmann, IMOS
Dick Schaap, SIMORC Coordinator
Colin Grant, CG Metocean Consulting Limited

4.2 The SERPENT Project

SERPENT (Scientific and Environmental ROV Partnership using Existing iNdustrial Technology) is a global project hosted by the DEEPSEAS group, within Ocean Biogeochemistry and Ecosystems (OBE) at the National Oceanography Centre, Southampton (NOCS). The project has a growing network of UK and global partners. The project aims to make industrial ROV technology and data more accessible to the world's science community, share knowledge and progress deep-sea research. The programme interacts with science and conservation groups globally to communicate the project to the public, increasing the awareness of our fragile marine resources.

The project has two approaches, the first is to provide advice and tested mechanisms for ROV operators to become part-time marine biologists, and to encourage them to observe and film deep water biota. The value that the ROV professionals can add to our knowledge of deep water biodiversity is considerable. The database resource that is produced is useful for the operators themselves, the public and the marine science community.

The second approach involves the organisation of visits by SERPENT scientists to offshore oil and gas installations including survey vessels, semi-submersible drilling rigs or production platforms. Visits are usually one week in length and take place while ROVs are not required for industry operations on a continuous basis. Data are analysed by the National Oceanography Centre, Southampton (UK) with the aim of producing peer-reviewed publications.

Two fundamental principles of the SERPENT project are that all project activities must pose NO increased risk to safety, and no interference with operational work schedules.

During offshore visits, scientists work with the ROV operators in their control room with the aim of conducting valuable scientific research during periods of stand-by time. Samples may be processed in the ROV service area (remove animals / samples from small coring devices or sampling equipment). ROV deck procedures are always observed, and health/safety regulations are always stringently observed, including reporting mechanisms and work planning requirements. Scientists also give presentations on the rig about their work so that local personnel can engage with the project and gain a wider understanding of the environment that they are operating in.

An additional component of the SERPENT project is to increase the awareness of the project to scientific and non-scientific audiences. The website offers a constantly updated online resource and printed reports as well as newsletters are also produced.

Contact, and source of this information:
http://www.serpentproject.com

5. South African case studies

5.1 CSIR – PetroSA

Introduction

The Coastal Group in the Centre for industrial and Scientific Research (CSIR) was contracted by PetroSA to deploy and retrieve an ADCP on the Agulhas Bank for their operations. After the PetroSA operations were completed, the CSIR coastal group archived the data. Dr Marjolaine Krug in the Earth Observation group in the CSIR, through departmental communication, became aware of the ADCP data. After following the correct procedures, Dr Krug used it as a key part of her 2014 paper "Interactions between the Agulhas Current and the eastern margin of the Agulhas Bank".

Logistical Details

CSIR Coastal group was contracted by PetroSA to deploy an ADCP at 22°43'E and 35°10'S in 250m on the Agulhas Bank. The ADCP was processed and Quality controlled by CSIR for PetroSA. Once the data had served its purpose for PetroSA, the ADCP data was archived.

Outcomes of collaboration

The ADCP data formed a key role within the paper by Krug 2014 "Interactions between the Agulhas Current and the eastern margin of the Agulhas Bank". Through Dr Krug's in-depth analysis of the dataset, PetroSA gained a better understanding of the variability in the Agulhas Current in their area of interest and the potential impact on their operations.

Limitations encountered

A non-disclosure agreement was signed between the parties and the data was only granted to Dr Marjolaine Krug for the purpose of her research in the Agulhas Current. It could not be used for anything else without agreement from PetroSA.

Conclusion

Through interdepartmental communication between the Coastal Group and the Earth Systems group, Dr Krug gained access to a dataset owned by PetroSA that had been archived, but previously used and obtained for PetroSA's operations. The outcome of the collaboration resulted in the publication of a paper, contributes to a PhD project, and better understanding of the impact of ecosystem variability on the PetroSA operations. There still is a limitation in access to the dataset, and correct protocol needs to be followed to access it. Overall the interaction between CSIR and PetroSA was a success.

5.2 University of Pretoria – Petroleum Agency of South Africa (PASA)

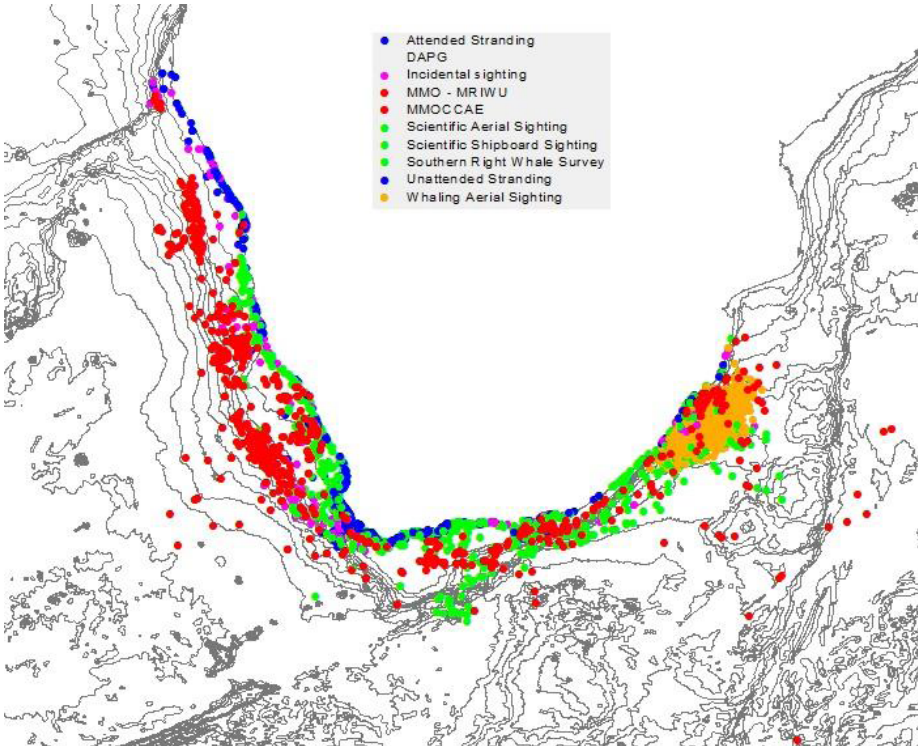
Ken Findlay & Jean Purdon, Mammal Research Institute Whale Unit, University of Pretoria

The aim of the collaboration was to use archived PASA MMO data to provide a knowledge base for both conservation and resource use management planning.

The MRI whale unit dataset currently contains 8800 records of some 270 000 cetaceans including records from 1. Research surveys (shipboard, aerial, shore) 2. Whaling Industry (sightings and catches) 3. Stranding Records 4. Incidental sightings 5. Industry (tourism, mining, military).

Data collected from incidental sightings has no indication of search effort (presence only data), so the application of these data are limited in some respects.

Marine Mammal Observer (MMO) data archived by PASA was applied for and received by the MRI WU to use for research purposes.



Since the MMO data do have some associated effort and can be analysed by presence – absence / relative density / encounter rate models, considerable value has been added to the understanding of the distribution and abundance of species by access to the PASA data. This clearly demonstrated the usefulness of the PASA MMO data for marine mammal research, and is an example of a successful collaboration, fully supported by PASA.

5.3 TEPSA and Nansen-Tutu

Introduction

Total Exploration and Production South Africa (TEPSA) approached Prof John Field from the University of Cape Town at the end of 2014 to enquire about the metocean conditions in the southern Agulhas Current. The effective planning for safe offshore operations and logistics is highly dependent on the accurate profiling, monitoring and forecasting of metocean conditions. TEPSA sought collaboration with local experts to further understand the Agulhas Current. Prof John Field contacted Prof Frank Shillington and Dr Bjorn Backeberg from the Nansen-Tutu Centre for Marine Environmental Research, who were familiar with the Agulhas Current.

Logistical Details

TEPSA engaged with local experts before and after their 2014 exploration operations to find out more about the strong local metocean conditions which needed to be considered for future operations.

Outcomes of collaboration

A 3-month internship was offered to a Nansen-Tutu Centre student to analyse data collected and produce metocean forecasts for the area of TEPSA operations. TEPSA gained a clearer understanding of the complex metocean conditions in their area of operations.

Limitations encountered

TEPSA is still in the process of releasing the observational data it acquired during its operations to the Nansen-Tutu Centre / research sector.

Conclusion/summary

A successful interaction occurred between TEPSA and the Nansen-Tutu Center. TEPSA gained access to expertise and insight concerning the potential impact of the Agulhas Current on their operations. TEPSA provided a metocean internship to a Nansen-Tutu Centre student, who further investigated the conditions. Experts from the Nansen-Tutu Centre (Dr Bjorn Backeberg and Prof Frank Shillington) were involved and offered guidance during the metocean internship. The TEPSA observations are still in the process of being made available to the Nansen-Tutu Centre.

5.4 Benthic Trawl Experiment – an industry-research collaboration

Compiled by Dr Lara Atkinson (SAEON)

Although the demersal trawl fishery in South Africa is considered to be well managed, very little is known about the effects of trawling on the biodiversity of deepwater habitats and biota and this remains a high research priority. As part of their commitment to retaining Marine Stewardship Certification (MSC) for the South African hake fishery, the South African Deep-Sea Trawl Industry Association (SADSTIA) are collaborating with researchers from SAEON, the University of Cape Town (UCT), the South African National Biodiversity Institute (SANBI) and the Department of Agriculture, Forestry and Fisheries (DAFF) in an experiment that aims to assess potential recovery of the seabed after more than 100 years of trawling.

The area set aside for the experiment to take place, lies 108 nm west of Groenriver mouth at depths between 360 and 510 m, adjacent to a submarine mound called Childs Bank. After several years of planning, the first baseline survey and samples were collected in February 2014 using SAEON's deep-sea SkiMonkey III camera system and a benthic grab deployed from the DAFF research vessel *Ellen Khuzwayo*. During this voyage, researchers successfully captured video footage and still images of the seabed in the experimental area which will be processed to provide information of epifauna (animals living on or above the seabed) in the area. Infauna (animals living within the sediment) and sediment samples were collected using a benthic grab.

The objective of this long-term monitoring research is to assess for changes in the benthic fauna (infauna, epifauna and fish) that may occur once habitat is no longer subjected to trawling. Subsequent to completion of the 2014 baseline survey, the industry stopped trawl fishing in designated portions of the experimental area for a period of at least four years, while trawling continues in adjacent demarcated lanes.

Late in January 2015, the second Benthic Trawl Experiment survey commenced with researchers from UCT, SAEON and SANBI onboard the DAFF research vessel, alongside industry representatives from Viking Fishing and SeaHarvest. The SkiMonkey III benthic camera system again successfully captured benthic imagery of the seabed and a benthic grab was used to collect samples. Processing imagery and samples is underway and the next survey is being planned for early 2016.

This is the first collaborative *in situ* experimental research being conducted between the trawl industry and scientists in South Africa. This research will enable both parties to improve understanding of trawl impacts and potential recovery from such disturbance and simultaneously advance knowledge about the benthic habitat in this area.

A short video of some of the highlights of the 2015 Benthic Trawl Experiment survey is available for download from: https://vimeo.com/123743027.

5.5 Research co-operation to build offshore biodiversity knowledge

Kerry Sink, South African National Biodiversity Initiative

Introduction

Key lessons were drawn from the work to plan a network of Offshore Protected Areas for South Africa (2006-2011) which has since been advanced through Operation Phakisa's Ocean Governance and Protection Lab. Co-operative research work was advanced through additional collaborations with two petroleum companies to refine and improve protected area boundaries. Multi-beam and seismic data were used to improve South Africa's National Marine Ecosystem Map and refine boundaries of proposed offshore Marine Protected areas. Related work included a research collaboration with PetroSA Project (2008-2010). Mutual understanding and collaboration was also supported through relationships developed through the Offshore Environment Forum (2010 – present), a multi-sector stakeholder forum.

The PetroSA project involved researchers from SANBI, SAEON, DEA and DAFF. The project aims included work to provide **baseline information** on colonization of existing petroleum infrastructure, assess whether benthic communities are **representative** of offshore benthic biodiversity of the Agulhas bank and identify any **vulnerable habitats and species** such as cold water coral reefs, sponge beds and other biogenic communities. A pilot study to investigate **potential benefits of fisheries exclusion** associated with petroleum infrastructure was undertaken and additional research advanced the understanding of potential impacts.

Logistics

Methods that were successfully employed included review of historical reports and literature and analysis of more than 50 hours of existing remotely operated vehicle (ROV) footage from FA & ORCA oil platforms. Field work included ROV surveys around infrastructure and in adjacent ecosystems on the sandy habitats and deep reefs of the Agulhas bank. Saturation diver collections were also undertaken to provide samples. Invertebrate and fish species lists were compiled from all available data. Limited fish sampling was conducted using fish and rock lobster with traps. Benthic macrofauna and sediments were sampled within and outside of the ORCA exclusion zone and analysed for geology and pollution indicators.

Outcomes

The highlights from this collaboration included

- First images of deep habitats on the Agulhas bank
- First saturation diver collections for science

- First in-situ South African assessment of potential pollution during drilling operations
- Motivation for continued use of water based drilling fluids
- Important information about introduced species

A technical report was produced. Results have been applied to improve biodiversity management in South Africa's offshore environment.

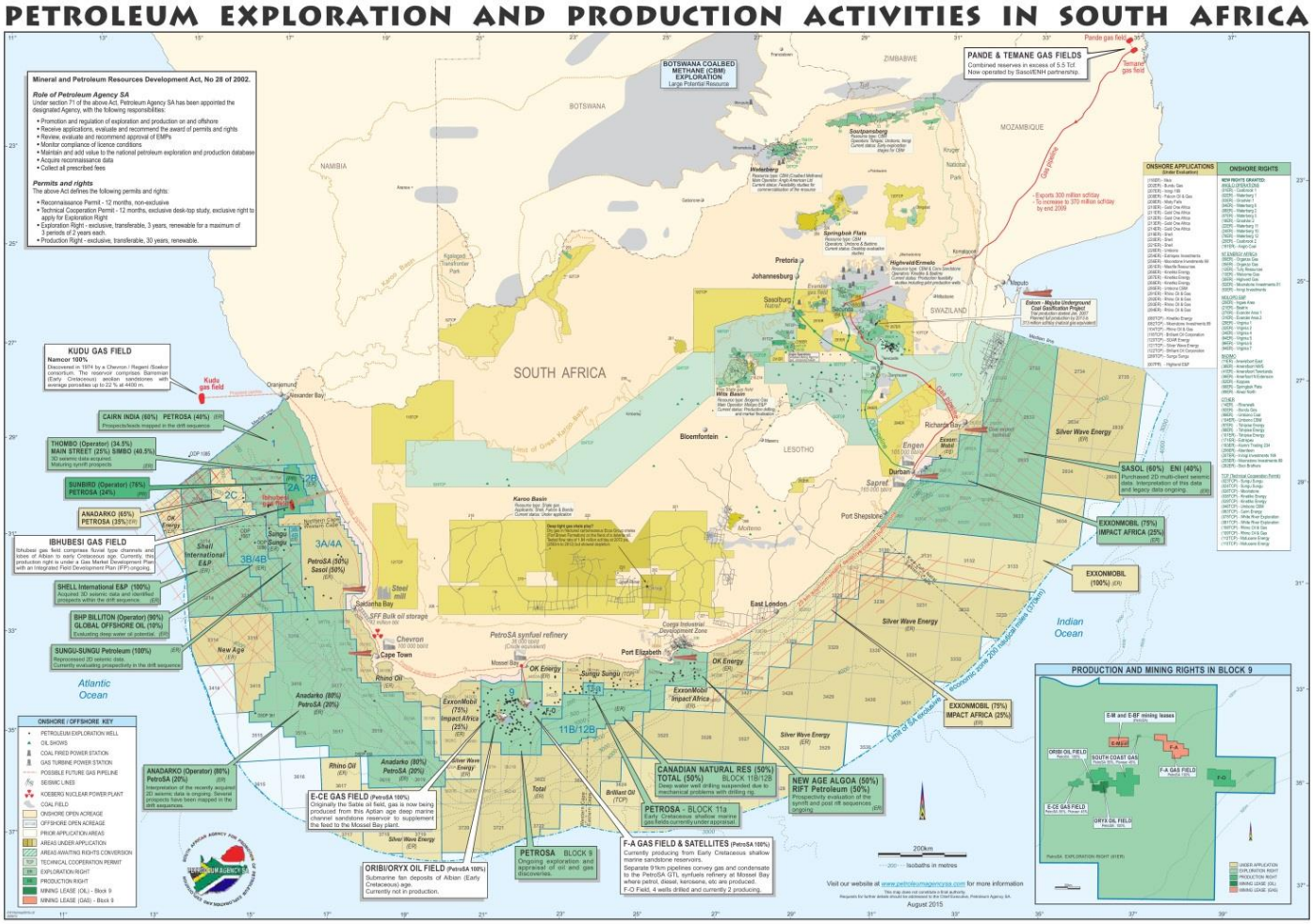
Limitations
Key challenges included those involving practical logistics and timing of operations, frequent adjustments to schedules, variance in expectations, operational and safety protocol differences between science and industry and unrealistic expectations.

Summary
The main enabling factors included mature relationships with industry and close co-operation with champions within the sector. Multi-stakeholder fora can enable the necessary relationships. Key recommendations include the need for clear roles and responsibilities, realistic expectations and a dynamic, flexible process. Students should not depend on projects until data is secured. It is important to ensure that research can be published. It is recommended that research that is otherwise impossible receives priority. Baseline surveys are valuable for impact and recovery studies and standardised surveys are beneficial where appropriate.

6. Data that are currently being collected during routine O&G operations

Whereas historically offshore activities in South Africa's waters mostly consisted of fishing and marine transport, the offshore oil and gas and mining industries are currently in a developing phase.

The Oil & Gas exploration phase provides scientists with a potential opportunity to collect baseline metocean data. The map of petroleum exploration and production activities in South Africa (PASA) shown below, indicates the current petroleum exploration and production concession areas in South Africa. From the map it can be seen that most of SA's EEZ has been or is under allocation to various O&G companies. Determining whether it would be profitable to start production operations may take a number of years (potentially 5-10 years) and during this time a variety of data would be collected in the field to complement existing data sets. Variables to be considered would include current systems, ocean weather, bathymetry and animal migratory patterns.



(source: The Petroleum Agency of South Africa)

Types of data collected

Data collected during the offshore oil & gas exploration phase includes:

- Prospective basin data synthesis and field work
- Seismic acquisition, processing and interpretation
- Bathymetric surveys
- Met-Ocean data collection and analysis
- Environment baseline studies
- Exploration drilling, logging and coring
- Marine fauna observations

Data management and protocols

The Petroleum Agency of South Africa (PASA) is responsible for the archiving and management of the national hydrocarbon exploration database and has catalogued all of the data and reports resulting from the drilling of more than 300 offshore boreholes. The PASA exploration database also include seismic field and processed data for more than 300 000 line km's of 2D and 40 000 km² of 3D seismic data that was acquired offshore. Permit or rights holders that carry out exploration or production activities, are required by law to supply all new, reprocessed data, results and information at relinquishment to the Agency for incorporation into the National Database. All hydrocarbon exploration data belongs to the State.

Environmental data not considered to have commercial value can be requested through the PAIA (Promotion of Access to Information Act, 2000) process; and environmental data which forms part of technical data that may have commercial value has to be retained for 4 years before it can be released to the external parties upon request.

The following process applies:

- Interested parties, including potential license or permit holders, clients, academic institutions or anybody interested in making use of existing South African upstream oil and gas exploration data, can potentially obtain access to available data.
- Data catalogues, on available data for a specific geographical area, can be provided on request.
- Data can be viewed in the Data Room Facilities at the Petroleum Agency SA offices in Bellville through booking and requesting the service.
- All parties obtaining access to use the viewing facility have to sign a Confidentiality Undertaking
- A geoscientist from the promotional team shall supervise, advice and control the process of viewing data in the Data Room.
- Data may be purchased:
- Commercial tariffs apply to potential clients, like potential permit/rights owners and companies or individuals who use the data to do an investigation or evaluation with the purpose of selling such products for financial gain. An exception to this applies to onshore data acquired prior to 1980, where the quality of such data does not warrant commercial tariffs. In such instances copy cost rates will apply.
- Copy cost rates apply to existing permit holders, SA Governmental Bodies and academic institutions.
- All interested parties, who requires access to data, needs to sign a confidentiality agreement (CA). Confidentiality undertakings or contracts may differ depending on the nature or the use of such data.
- Once a permit has been granted, all available technical data applicable to the permit area can be provided to the permit holder at copy cost rates.

- Copies of data can be supplied at "copy cost" rates where a permit holder needs to obtain duplicates for partners.
- The requestor of data will carry the cost for any courier or shipment cost plus a 10% handling fee.

(http://www.petroleumagencysa.com)

Data gathering standards
Permit or rights holders that carry out exploration or production activities are required to supply all new, reprocessed data, results and related information to the Petroleum Agency SA on a regular basis. This includes data required as part of the approved Environmental Management Programmes and Environmental Authorisations.

Data Gathering Norms and Standard Operating Procedures
Currently there are no specific standards for data gathering or operating procedures set by PASA. The collection of environmental data is usually aligned with the approved Environmental Management Programmes and work programmes. The type of data gathered is dependent on the type of operation occurring. Thus, ocean current data would be collected over time for an area that has been identified for drilling and marine mammal data would be collected when seismic surveying occurs.

Currently marine animal observers can receive JNCC (UK) and/or BOEM&BSEE (USA) certification to be able to work on exploration vessels and so follow the guidelines set by these programmes.

A report by the JNCC on guidelines for minimising the risk of injury and disturbance to marine mammals from seismic surveys, with further links to data collection spreadsheets, can be found here (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/50005/jncc-seismic-guide.pdf).

A report by BOEM on seismic survey mitigation measures and marine mammal observer reports, which includes examples of the data collection spreadsheets used, can be found here (http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5177.pdf).

The O&G industry collect a number a various data sets during normal operations either to ensure the health and safety of crew and equipment or to mitigate against environmental impacts. In most cases this data is not linked to prospective hydrocarbon resources and may therefore not have such strict confidentiality limitations. In some cases, data are routinely supplied to PASA along with geophysical data, while in other cases metocean data are saved for a short period of time to comply with health and safety legislation, but not actually archived anywhere in the long term. These data represent a possible source of information to which SAMREF could facilitate access.

Bathymetric surveys
These are usually conducted using sonar to measure depth. This could be used by industry to map features which might interfere with drilling operations or the laying of pipelines. For researchers these data could be used as a baseline layer for GIS analyses, marine spatial planning, and bathymetry data with sediment / seafloor data could in certain cases be used to give an indication of habitat type.

Seismic acquisition, processing and interpretation
Seismic surveys are conducted during the oil and gas exploration phase. Seismic data are used to determine whether drilling would be economically feasible and to quantify the resource that would be available for exploitation.

Environmental baseline studies
These studies are done to provide a description of the environment (biotic and abiotic) before any operations occur and to determine if there are any sensitive habitats or species present. These data could be used to monitor changes which might occur during the exploration or production phases. This could be further used to determine if there are any changes in the ecosystem e.g. changes in species composition, nutrient levels or heavy metal traces.

Metocean data collection and analysis
This refers to meteorological (air temperature, wind speed etc.) and oceanographic (sea surface temperature, salinity etc.) data which may be collected during surveys, from drifters/gliders or moorings. This could be used to conduct met-ocean studies e.g. develop a wind energy atlas for the SA offshore environment, further the understanding of the variability of the Agulhas Current etc.

Exploration drilling, logging and coring
Exploration drilling is conducted to quantify the hydrocarbon reserve present in the area of interest. Collection of sediment cores could also be useful in monitoring for contaminants from the drilling or production phase or other anthropogenic impacts.

Marine fauna observations
Marine faunal observations are in most cases only required during seismic operations. Surveys for marine mammals, specifically cetaceans, are conducted as these animals use sound to communicate, feed and hunt and may be seriously impacted by seismic surveys. These observations are either done by trained observers (during the day) or passive acoustic monitoring (at night). In some cases there additional recording of seabird or turtle observations. These observations could be utilised to provide better understanding of habitat use, migratory paths or marine fauna atlases.

7. Organisations undertaking marine research activities in South Africa

This chapter provides an introduction to some of the public-sector research organisations in South Africa. It is beyond the scope of this document to review the entire spectrum of offshore marine research in South Africa, so this is certainly not an exhaustive list. Key organisations were invited to present an overview of their activities at the kick-start workshop for the project, and this chapter contains a summary of those presentations. For more information, enquiries should be directed to organisations involved. Many of these existing research activities could be enhanced or improved through collaboration with the private sector.

Department of Science and Technology (DST)
The mandate of the Department of Science and Technology is to develop, coordinate and manage the national system of innovation by providing policy leadership and creating an enabling environment. The work of the Department is informed by the 1996 White Paper on Science and Technology, which introduced the concept of a National System of Innovation (NSI). The DST, as the custodial coordinator for the development of the NSI, influenced this system through key strategies such as the National Research and Development Strategy (NRDS) and the Ten-Year innovation.

The DST is leading the Marine and Antarctic Research Strategy. The aim of the strategy is to understand:

- the role of biodiversity in maintaining ecosystem functionality,
- the relationships between human pressures and ecosystems, and
- the impact of global climate change on marine ecosystems.

The Strategy has 5 priority areas:

Oceans and Marine Ecosystems Under Global Change:
• Understanding modes of ocean variability across temporal and spatial scales
• Developing a regional observations network
• Developing end-to-end modelling and operational prediction capabilities
• Establishing global, regional and coastal system indicators
• Delivering robust &useful information to society
• Reconstructing past climate changes

Earth Systems Observations:
• Usage of South African space science in Antarctica, as a window into geospace
• Understanding the links between ocean-atmospheric physics, ocean iron availability, trace element biogeochemistry and ocean productivity
• Understanding large scale ocean circulation and global climate

Ecosystems, Biodiversity and Biodiscovery:
• Understanding modes of ocean variability across temporal and spatial scales
• Developing a regional observations network
• Developing end-to-end modelling and operational prediction capabilities
• Establishing global, regional and coastal system indicators
• Delivering robust &useful information to society
• Reconstructing past climate changes

Innovation and Development:
• Sustainable coastal and ocean development
• Oil& Gas, Fisheries, Mining and Mariculture

• Energy management
• Development of technology and vessel design
• Development of energy exploration capacity
• Development of links to ecotourism
• Antarctic Waste management

Human Enterprise:
• Geopolitics, international and national law and policy
• To develop and refine human History and Paleosciences
• Antarctic arts, architecture and literature
• Social Adaptation and Human Impact

Department of Environmental Affairs: South African Weather Service and Ocean & Coasts (DEA:SAWS, DEA:O&C)
The Department of Environmental Affairs is mandated to give effect to the right of citizens to an environment that is not harmful to their health or wellbeing, and to have the environment protected for the benefit of present and future generations. To this end, the department provides leadership in environmental management, conservation and protection towards sustainability for the benefit of South Africans and the global community.

Primary involvement with offshore research is through the Ocean and Coasts Branch and the South African Weather Service.

The DEA has several focus areas which include:
- supporting marine resources,
- climate variability and global change (salt and heat exchange),
- the effects of ocean dynamics to citizens,
- weather (detecting cold fronts while still at sea), and
- ocean acidification (effects on marine organisms, resources and ecosystems/habitats).

Possible areas of collaboration with the Oil & Gas industry include:
• Monitoring Ecosystem Health
• Marine Spatial Biodiversity
• Operational and Observational Oceanography
• Ecosystem Processes and Global Change
• Data and Information: Generation, Analysis, and management

Department of Agriculture, Forestry and Fisheries (DAFF)
The mandate of the Department of Agriculture, Forestry and Fisheries is to ensure food security through sustainable production and management of natural resources and the development of all categories of producers in all three sectors under DAFF. Primary involvement with offshore industry is through the Fisheries sector.

Department of Mineral Resources (DMR)
The legislative mandate of the Department is to ensure transformation, economic growth, health, safety and sustainability of the minerals and mining sector with the vision of sustainable development through mineral resources for the benefit of all South Africans. Its mission is to ensure responsible exploration, development, processing, utilisation and management of mineral resources. It further ensures that all South Africans derive sustainable benefit from the country's mineral wealth.

Department of Energy (DoE)

The mandate of the DoE is to ensure secure and sustainable provision of energy for socio-economic development. The department has the vision to improve the energy mix by having 30% clean energy by 2025. When it comes to renewable resources, the vision of the Department of Energy (DoE) is to make adequate and affordable energy available to developing communities through a mix of providing alternative energy resources at a reasonable cost. The aim is to satisfy the basic needs of the developing sector and at the same time promote the effective utilisation of South Africa's vast alternative energy sources.

Council for Scientific and Industrial Research (CSIR)
The CSIR's mandate is stipulated in the Scientific Research Council Act. The CSIR makes use of a number of research platforms and programmes including:

- Centre for High Performance Computing (CHPC), global and regional high resolution modelling
- Ocean robotics
- Satellites
- Polar research vessel

Current marine research includes:

- Development of a cube-based Variable Resolution Earth System Model
    - Key applications:
        - Simulation of SH climate dynamics
        - Simulations of the carbon cycle of the SH oceans and southern African landmass
        - Seasonal forecasting
        - Projections of future climate change (CMIP6/AR6)
- Satellite observations used for pollution (oil spill) tracking, fishery predications, potential illegal vessel tracking, detection of HAB
- Ocean robotics, R&D, fish migration patterns, fish identification
- Ocean profiling (ship-based)
- Ocean CO2 chemistry and gas fluxes
- Ocean bio-optics
- Ocean productivity
- Ocean iron and trace metal chemistry

International Large Scale Ocean-Climate Programmes
A number of Collaborative Large Scale Ocean-Climate Programmes have taken place or are on-going. This includes both fixed (e.g. mooring) and moving (e.g. polar vessel) platforms:

- PIRATA
- SAMBA (AX08 and AX18)
- SOCCO-SOSCEX
- Good Hope
- ASCA
- ARC
- RAMA
- MESOBIO
- ACEP/MESOBIO II
- Crossroads 2013

National Research Foundation (NRF)

The mandate of the NRF is to promote and support research through funding, human resource development and the provision of the necessary research facilities in order to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including indigenous knowledge, and thereby contribute to the improvement of the quality of life of all South Africans.

South African Environmental Observation Network (SAEON)
SAEON's vision is to create a sustained, coordinated, responsive and comprehensive South African in-situ environmental observation network that delivers long-term reliable data for scientific research and informs decision-making for a knowledge society and improved quality of life. The mandate of SAEON is derived from the Science and Technology White Paper of 1995 and the National Research and Development Strategy of 2003 and is further expressed in the context of the National Global Change Research Plan.

SAEON has six nodes spread throughout South Africa, each responsible for monitoring a different type of environment. The two SAEON marine Nodes, namely the Egagasini and Elwandle Nodes, work closely on many of their respective projects, in particular the Algoa Bay sentinel site, as these are often complimentary in nature.

The Egagasini Node for Marine Offshore Systems, based in Cape Town, contributes to building knowledge in long-term ocean monitoring programs in and around South Africa, and participates in a range of existing programs and initiatives. Scientific expertise within the offshore Node currently focus on research broadly relating to physical oceanography, mapping and monitoring offshore benthic biodiversity, ecosystem impacts and recovery and ocean system modeling.

The Elwandle Node for Marine coastal systems, is based in Port Elizabeth and undertakes long-term monitoring and research in South Africa's coastal zone. The coastal node research is largely focused within and around Algoa Bay where a network of more than 40 permanently moored infrastructure provide a wealth of physical oceanographic data. Several components of the Algoa Bay marine environment are monitored as part of ongoing programmes, including the pelagic ecosystem, coastal upwelling, physical oceanography, tufa stromatolite ecosystems and sandy beach, rocky shore and subtidal habitats. Additionally, the Elwandle Node also conducts monitoring in 11 Marine Protected Areas throughout South Africa and participate in an estuary monitoring programme. SAEON's mandate includes a strong focus on data collation, digitization, archiving and dissemination, activities in which all Nodes actively participate.

South African Institute for Aquatic Biodiversity (SAIAB)
SAIAB's vision is research excellence for the sustainability of Africa's aquatic environments, with the mission to serve the nation through the generation, dissemination and application of knowledge to understanding and solving problems on the conservation and wise use of African aquatic biodiversity.

SAIAB has a number of key research areas. These include:

- Test and validate offshore habitat classification of the National Biodiversity Assessment
- Elucidate the key drivers of offshore biodiversity patterns
- Fine scale habitat mapping
- Identification and mapping of habitat types to improve National Biodiversity Assessment
- Canyon ecology studies
- Understand industry impacts on habitats

- Support MPA design
- Refinement of biodiversity targets
- Pelagic biodiversity patterns and ecosystem processes
- Line-fish stock assessment and recovery
- Marine geoscience

It is therefore involved in a number of research projects, namely the:

- LTER Sentinel Site, PE (>100 in situ instruments)
- SA National Coastal Temperature Network
- National Estuaries Network
- MPA LTER Network
- ATAP Network
- Research Platforms (ACEP vessels) , sampling done to shelf edge
- SMCRI (in situ and satellite)
- National HF Radar
- Data management (DST/NRF)
- Stereo BRUVs platform and stereo-BRUVs monitoring network
- ACEP (research vessels and equipment, Sentinel Site research sites, funding)

Projects Awarded for 2016/17:

- Influence of the Agulhas Current oceanography on the biodiversity of the Transkei shelf
- Deep secrets: the outer shelf and slope ecosystems of the Eastern Cape

South African National Energy Development Institute (SANEDI)
The vision of SANEDI is to serve as a catalyst for sustainable energy innovation, transformation and technology diffusion in support of sustainable development that benefits our nation. The mission is to advance innovation of clean energy solutions and rational energy use that effectively supports South Africa's national energy objectives and the transition towards a sustainable low carbon energy future.

Nansen-Tutu Centre (NTC)
The aim of the NTC is to make a significant contribution to developing and implementing operational oceanography and data assimilation methods around southern Africa including the South Atlantic and Indian Oceans, and the Southern Ocean, with a focus on ocean state, marine environmental and ecosystem modelling, research and capacity building, including their roles in climate and global teleconnections. The NTC is based at the University of Cape Town.

Centre for Renewable and Sustainable Energy Studies (CRSES)
The CRSES acts as a central point of entry into Stellenbosch University for the general field of renewable energy. Some contract research projects are completed within CRSES while others end up in the other academic departments or research entities of the University. Stellenbosch University has a Division for Research Development that, in cooperation with the Finance and Legal Departments, manages all larger research contracts in the University, including those of CRSES.
There are currently only two ocean related energy devices being tested in South Africa.
These are the:

- ShoreSWEC (Stellenbosch wave energy converter), and
- Hermanus overtopping device.

Questionnaire results

A short questionnaire was circulated to SAMREF stakeholders prior to the kick-start meeting. Information about the types of data being collected and used by the various organisations, as submitted, is presented below.

Government Departments and Agencies:

Organisation	Organisation Mandate	Research Interests	Data Storage	Type of data	Data processing and Analyses
Department of Environmental Affairs: Oceans and Coasts	- Setting the national agenda for monitoring and research - Custodians of long-term monitoring efforts and data management - Providing value-added knowledge products	- Research and monitoring of ocean environment. - Pollution monitoring - Ecosystem health research	Yes	Marine environmental data	Yes. Project based and long-term monitoring for analysis, creating climatologies, and derivation of environmental indices and indicators for advising resource management.
Department of Environmental Affairs: South African Weather Service	- Weather warnings and forecasts - Real time data collection - Manufacturing of equipment and product development - Air quality services	- Atmospheric research	Yes	- Atmospheric data - SST data	Yes
Petroleum Agency SA	- Government State Oil company with equity rights to natural minerals - Oil and Gas Regulatory and promotional Agency - Petroleum /Gas exploration and development - Technical data management	- Refining technology F1 gas to liquids specialization - Marine / coastal development factors for potential infrastructural and logistical development purposes.	Yes	- Oil and gas exploration and production data - Offshore pipeline emissions data - Quality records for rig operations	Yes. All Oil and gas exploration data that is used in resource evaluation and future exploration activities.

Universities:

Organisation	Research Interests	Data Storage	Type of Data	Data processing and Analyses
Cape Peninsula University of Technology	- Marine ecotoxicology - Biomonitoring	Yes		
Stellenbosch University	- Renewable energy - Climate change impacts	Yes	- Wave data - Current data	Yes
University of KwaZulu Natal	Yes - a wide range of scientific research across all fields			Yes. Individual researchers analyse a variety of biological data sets
University of Cape Town	-Fisheries management - Ocean modelling and data assimilation - General marine research - Seabird Ecology.	Yes		Yes
University of Pretoria	- Cetacean Research - Effects of seismic surveying on marine mammals	Yes	- Distributional - Abundance - Trend - Acoustic - Behavioural - Taxonomic	Yes
University of the Western Cape	Yes	Yes	- Subsurface data in the Orange and Bredasdorp basins	Yes

Institutions:

Organisation	Organisation Mandate	Research Interests	Data Storage	Type of Data	Data processing and Analyses
Centre for Scientific and Industrial Research (CSIR)	- Innovation, research and human capital development	- Coastal research - Coastal erosion (morphology) and vulnerability studies - Water quality modelling - Wave energy studies - Costal management systems and tools	Yes	- Buoy - ADCP - Photographic - Weather station data	Yes
Ezemvelo KZN Wildlife	Marine Conservation Planning and MPA Expansion	- Biodiversity research - Marine conservation planning. - Ecosystem classification	Yes	- Marine biodiversity data for KZN	Yes
KwaZulu-Natal Museum	Marine mollusc diversity and systematics	- Taxonomy and systematics of marine Mollusca	Yes	- Database of marine molluscs	Yes. Mapping of molluscan distribution data
Oceanographic Research Institute (ORI)	Research in support of management of marine and coastal resources in their broadest sense	- Applied marine and coastal research	Yes	- Long term catch and effort fisheries data off KZN - Coral reef transect images	Yes. Analysis of fisheries trends; long-term changes in community composition
Port Elizabeth Museum	- Research - Conservation - Education	- Marine mammals	No		Yes

South African Environmental Observation Network (SAEON)	Long Term Ecological Research. Within SAEON, the Egagasini node focuses on offshore marine observations and the Elwandle Node focuses on coastal marine observations.	- LTER in estuaries - MPA's nearshore and shallow subtidal environments. - Long-term monitoring of the offshore marine environment. - Oceanographic and biodiversity research	Yes	- Coastal marine data - Oceanographic data - Biodiversity data	Yes
South African National Biodiversity Institute (SANBI)	To monitor and report on the state of biodiversity in South Africa's marine territory, co-ordinate research, provide knowledge and information, give planning and policy advice and pilot best-practice management models in partnership with stakeholders.	- Ecosystem mapping - Nearshore and offshore research, including habitat mapping, biodiversity surveys, species distribution patterns, ecological research	Yes	- Offshore biodiversity data	Yes. Datasets for biodiversity, environment and pressures on the marine environment

NGOs:

Organisation	Organisation Mandate	Research Interests	Data Storage	Type of data	Data processing and Analyses
BirdLife South Africa	BirdLife South Africa is a conservation NGO focused on protecting habitats and important bird sites, improving the conservation status of species, conserving biodiversity and integrating bird conservation into sustaining people's livelihoods	- Seabird conservation - Seabird-bycatch mitigation measures during - African penguin conservation.	Yes	Offshore seabird data	Yes. Both AS@S (Atlas of Seabirds at Sea) and the Albatross Task Force analyse offshore seabird data

8. Research requests

Prior to the Research Sector meeting, stakeholders were invited to submit requests or ideas for collaboration with the private sector. These were compiled into a database and discussed at the research sector meeting. Only the titles are presented below, because full content is available in a live database which can be continually updated and used as a reference for SAMREF.

The database of research requests may be accessed here:

Research ideas were requested by industry to enable them to consider and discuss how collaborations could be set up. Research Opportunities would be confirmed by industry as a response, and presented in the Research Opportunity Exploitation (ROE) Report.

Research Requests (project/question titles)
OBSERVATIONS/SURVEYS
Interactions between cetaceans and seismic surveys
To study floating oil rigs/drilling vessels as potential vectors for marine alien species
Distribution/presence of seabirds; data of AS@S (Atlas of Seabirds at Sea)
Habitat mapping for spatial planning - Benthic biodiversity surveys to assist with marine spatial planning.
Habitat mapping for ecological research and species distribution mapping.
Bathymetry data for navigational products
Extension of MMO mandate to include birds.
3 Monitoring lines off south coast collecting CTD, oxygen, ADCP and UTD data, Monitoring of HABS
Ad hoc benthic photographic sampling (during drifting). Foundational biodiversity, groundtruthing.
Establishment of potential fishery around fixed infrastructure.
Effects of deploying wave turbine in the offshore environment on the ecosystem.
Marine fauna observations by industry staff on supply/guard vessels.
Atmospheric data collection and analyses from offshore vessels.
DEPLOYMENTS
Argo, observational oceanography, ship-based training outside of current research fields - more in line with industry i.e. seafloor mapping and analysis, link into consultancy, parallel interest possibly to be served within the operational oceanography AMS degree as presented by M Vichi..
Deployment of observing systems on platforms. Deployment of lagrangian floats/drifters
Atmospheric observer / observation programme. Deployment of equipment on new vessels / bouys / rigs. To include synoptic wx observations and possibly air quality monitoring
Examine the potential for integrating fish farming and OG sector synergies (floating, mooring).
Collection of new abiotic and biotic data (dissolved O2 , temp, fluorescence, colour, plankton, fibre optics, optical plankton counters, turbidity sensors).
BASELINE SURVEYS
Spatial distribution of marine mammals
Reef fish and habitat surveys using baited remote underwater stereo-video systems (stereo-BRUVs) for environment baseline studies and ecological research
Baseline ambient noise data (reef noise, fish choruses etc.) and data on marine mammal distribution from the Wildcoast area prior to seismic exploration.
Marine spatial planning with conservation of benthic and pelagic biodiversity in mind.
Obtain historical data from Oil and Gas industry
Impact of artificial reefs on the environment. Change of community structure.
Updating baseline desktop data (oceanographic, benthos) for SA Coastline for OG, fishing sector. Collation of existing data locality specific EIAs. Up to date as possible. Consolidated report for data output.
Ambient acoustic monitoring around SA.
Update the Generic EMPr Generic Environmental Management Programme Report (EMPr) compiled for oil and gas exploration in South Africa (CCA & CMS 2001).

9. Research opportunities

While it is recognised that there are other platforms for creating collaborations (e.g. SANCOR), SAMREF will have a specific focus on facilitating access to data collected from the private sector platforms of the offshore Oil & Gas industry, Fisheries and Mining sectors. Research opportunities have been identified at the kick-start meeting, the research sector meeting, through direct interviews with companies and regulators, and some examples are presented here.

In most cases, further negotiation needs to take place before opportunities can be made public. Research opportunities will be the focus of the next report, the Research Opportunity Exploitation (ROE) Report. Some preliminary examples are presented below.

9.1 New at-sea Research Opportunities

9.1.1 Oil and Gas Industry

Possible data acquisition platforms for researchers include:

- Drilling vessels
- Support/supply vessels Personnel transporters
- Data acquisition vessels (surveys)
- ROV
- Met-Ocean buoys
- Sampling (gliders, CTDs)

As these platforms are already being utilised by the O&G industry, it would minimise the costs of collecting data for researchers. However, the O&G industry is still relatively new in SA, and no exploration activities are currently taking place, so opportunities for at-sea research are limited. The status of O&G exploration and production activities in South Africa are presented below. As the table highlights, there are currently no at–sea exploration activities to engage in but there would be in the near future. In the meantime it could potentially be possible to investigate opportunities provided by existing production platforms.

The status of O&G exploration and production activities in South Africa.

	Current	Planned	Other
West coast	Static and dynamic reservoir model building and simulations	Possible acquisition of geophysical data (seismic and airborne gravity)	4 separate EIA studies underway for potential exploration drilling production operations
	Interpretation of various datasets and prospectivity evaluation		
South Coast	Maturation of prospects		
	Post drilling engineering studies		
	Production of gas and condensate in 3 production fields via FA Platform		
East Coast	Interpretation of acquired seismic data	Possible acquisition of	

		seismic survey data (+/- 2 yrs)	

9.2 New Opportunities based on historical data

9.2.1 Oil and Gas Industry

Several opportunities are available based on historical metocean datasets kept by offshore vessel companies, and data of non-commercial interest archived by PASA.

During O&G surveys, examples of other data collected are marine mammal observations, current data, CTD data and underway data (conductivity, depth soundings and surface temperature data). These data could possibly be used for new desktop studies e.g. ocean circulation patterns around the coast of SA, marine fauna distribution patterns, wind energy resources, benthic habitat mapping and the validation of satellite data and models. SAMREF could assist with guidelines and standards for data collection and documenting the location of such data for future access.

An opportunity has been raised for the development and or expansion of the upstream training trust for training beyond the geosciences.

9.2.2 Fisheries sector

Several opportunities have been raised by the fisheries sector for the collection of underway data on commercial fishing vessels. There is potential to link up with similar science programmes in other areas and with other organisations, for example the Coalition of Legal Toothfish Operators (COLTO). The South African Demersal Trawl Industry Association (SADSTIA) has also expressed willingness to cooperate on joint research projects.

These opportunities will be pursued and expanded on in the ROE report.

10. Stakeholder database

First Name	Surname	Organisation
Nazmi	Adams	Thombo Thombo
Rob	Anderson	Department of Agriculture, Forestry and Fisheries
Marc	Andrioli	NECSA
Isabelle	Ansorge	UCT Oceanography
Shankar	Aswani	Rhodes University, Anthropology Department
Lara	Atkinson	South African Environmental Observation Network
Colin	Attwood	University of Cape Town
Thomas	Auf der Heyde	Department of Science and Technology
Johann	Augustyn	SADSTIA
Bjorn	Backeberg	Nansen-Tutu Centre for Marine Environmental Research, UCT
Brian	Balazs	UNX Energy
Richard	Ball	SA Patagonian Toothfish Assn
Jaco	Barendse	
Will	Barker	Sunbird Energy (Ibhubesi) (PTY) Ltd
Paul	Barrett	OK Energy
Mieke	Barry	Aurecon
Doug	Bells	Cheseapeake
Andrei	Belopolsky	Premier Oil
Selwyn	Bergman	Dept. Environmental Affairs
Anthony	Bernard	SAEON
Ric	Bernard	Rhodes University
Sidney	Bilski	Metocean Services International
Jane	Blomkamp	Bowman Gilfillan
Paul	Board	Robertson
Mpumzi	Bonga	The Department of Mineral Resources
Tommy	Bornman	South African Environmental Observation Network
MICHAEL	BOTHA	GSIG
Alan	Boyd	Department: Environmental Affairs
Sokari P.	Braide	UWC
Andrew	Brierley	University of St Andrews
Erika	Brown	Anchor Environmental
Serge	Brun	Schlumberger
Geoff	Brundrit	
Jacques	Burgers	Seiche Measurements
Doug	Butterworth	University of Cape Town
Deirdre	Byrne	DEA
Matthew	Carr	UCT
Barry	Clark	Anchor Environmental Consultants
Marthinus	Cloete	Council for Geoscience
Linda	Clokie	private
Andy	Cockcroft	Department of Agriculture, Forestry and Fisheries
Janet	Coetzee	Department of Agriculture, Forestry and Fisheries
Rob	Coles	CNR
Charine	Collins	SAEON
Kyle	Cooper	SAEON
Robert	Cooper	Department of Agriculture, Forestry and Fisheries
Melleney	Cope	Department of Agriculture, Forestry and Fisheries
Jessica	Courtoreille	PetroSA

Robert	Crossley	Robertson CGG
Jock	Currie	South African Environmental Observation Network
Charlene	da Silva	Department of Agriculture, Forestry and Fisheries
Hunter	Danque	Anadarko
Johannes	de Goede	Department of Agriculture, Forestry and Fisheries
Answa	de Lange	PetroSA
Stephanie	de Villiers	DEA: Oceans and Coasts Research
Henry	Delafon	TOTAL - Total E&P South Africa
Eric	Deliac	Halliburton/Landmark
Roseanne	Diab	Academy of Science of South Africa
Matt	Dicken	KZN Sharks Board
Firoze	Din	Corelab
Xolisa	Dlomo	SAEON
Mbulelo	Dopolo	South African National Parks
Chris	Drage	PGS
Kirsten	Du Plessis	I&J
Nicole	du Plessis	SAEON
Derek	Du Preez	Coastal and Marine Research Institute, NMMU
John	Duncan	WWF-SA
Christopher	Duncombe Rae	DEA: Oceans and Coasts
Deon	Durholtz	Department of Agriculture, Forestry and Fisheries
Andrew	Dymond	Afren plc
Jan Willem	Eggink	Shell
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