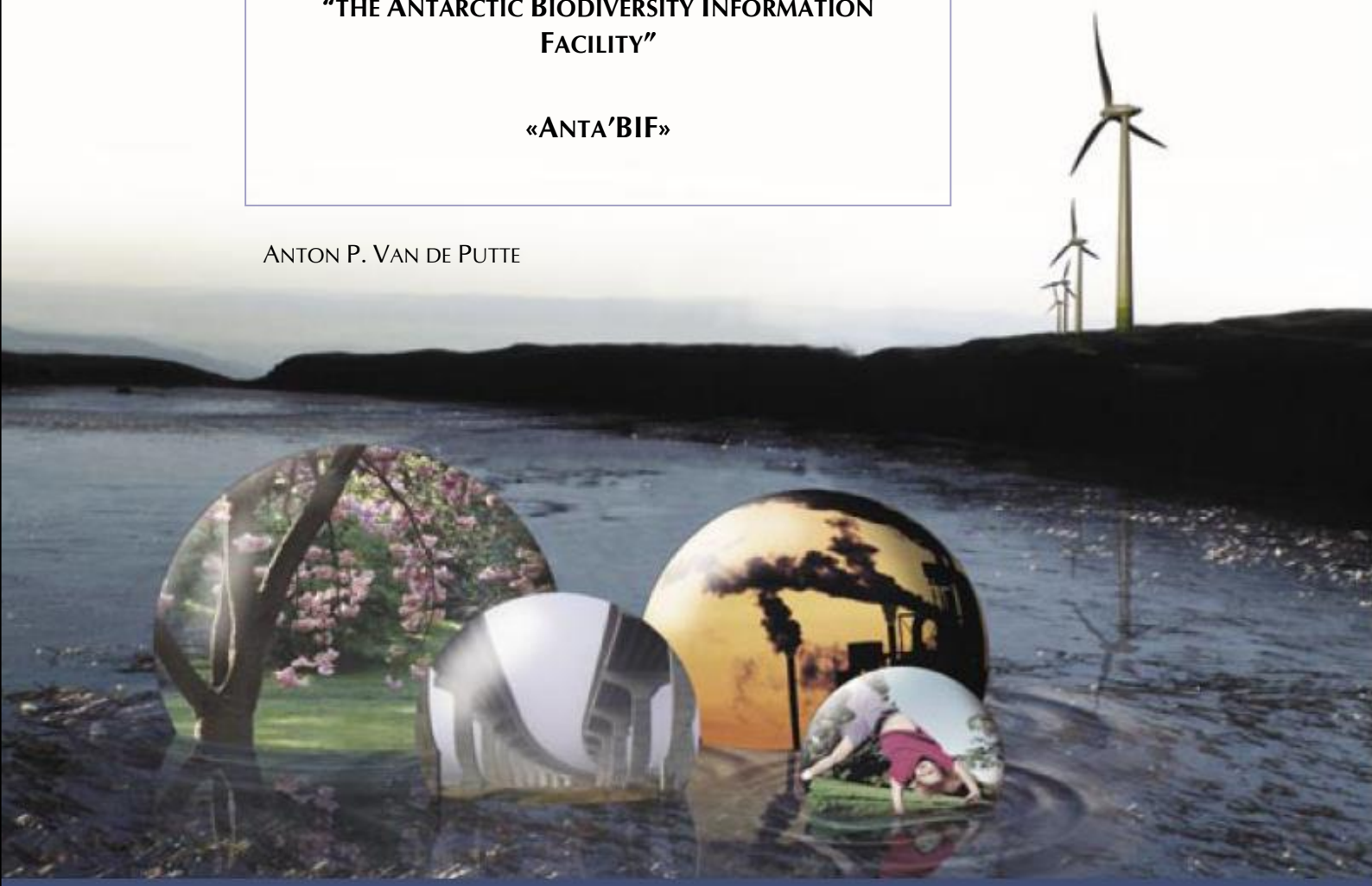
SSD

SCIENCE FOR A SUSTAINABLE DEVELOPMENT

"THE ANTARCTIC BIODIVERSITY INFORMATION FACILITY"

«ANTA'BIF»

ANTON P. VAN DE PUTTE



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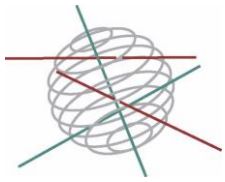

Biodiversity - Antarctica

FINAL REPORT

THE ANTARCTIC BIODIVERSITY INFORMATION FACILITY "ANTA'BIF"

SD/BA/856

Promotors

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museum
Operational Directorate Natural Environment
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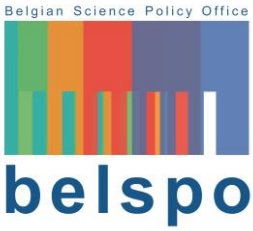

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SUMMARY

A. Context

As a region of the planet with some of the world's most pristine ecosystems, the Antarctic is home to unique flora and fauna. New species are being discovered here continuously. These organisms are fascinating objects of study, as they teach us a lot about Antarctic ecosystems and how these respond to extreme environmental conditions. Many Antarctic species, such as krill and various species of fish, are also important living resources that have significant economic value.

Understanding biodiversity - the variety of organisms and the ecosystems in which they live - is important for maintaining healthy and stable ecosystems. For this purpose it is important that relevant scientific knowledge is made universally available.

Funded by the Belgian Science Policy Office, ANTABIF has constructed a dedicated Antarctic biodiversity data portal giving access to a distributed network of contributing database, according to the principles of the Global Biodiversity Information Facility, in the framework of the International Year of Biodiversity 2010. It will build upon two complementary networks and will expand these by linking with other potential data resources. It integrates SCAR-MarBIN (Scientific Committee on Antarctic Research - Marine Biodiversity Information Network), with the databases network managed by the Australian Antarctic Division. Whereas the former focuses on marine data, the latter consists of numerous linked datasets, mostly on terrestrial biodiversity related to the former SCAR EBA (Evolution and Biodiversity in Antarctica) programme ant current AntECO and ANTERA scientific research programmes.

B. Objectives

The goal of ANTABIF was to use the best available technology to integrate, share and disseminate all available information on Antarctic Biodiversity. By using global standards for data and metadata the project aims at mobilising Antarctic Biodiversity data and making these available for science, policy and the public at large?

Subtasks include:

1. **Develop a dedicated GBIF thematic node and portal, in close partnership with the Australian Antarctic Division, which already expressed approval of this proposition, and the Global Biodiversity Information Facility, by linking existing networks and constructing a portal that provides direct access to information, and by assisting in the development of new participating databases;**
2. **Networking of Antarctic biodiversity scientists and institutes, with a special focus on Belgians, as potential data providers and experts assisting in the construction of Anta'BIF**
3. **Develop an authoritative register of Antarctic biodiversity, including marine, limnetic, terrestrial and micro-organisms;**
4. **Publish and mobilize Belgian data (historic and recent) and promote integrated data management for biodiversity research carried out at the Princess Elisabeth station, contributing to the management of the Station's surroundings and its impact on the Antarctic environment;**
5. **Develop initiatives to ensure the long-term continuation of the Anta'BIF information network.**

C. Conclusions

During the period of the project Antabif has been able to extend it's network and has positioned it more cleary towards scientist and the policy level. Also it has been made clear that the most strategic position for the project is to focus on the projects core buisness, Antarctic biodiversity data freely and openly available. The main audience is the scientific community and possibly the Scientific Commitee of Managment operations such as CCAMLR. Policy level support will be provide through supporting researcher in making optimal use of the data.
The main focus of the project was the development op the data publishing portal (ipt.biodiversity.aq) and the data retrieval portal (data.biodiversity.aq)
A number of interconnected and dedicated Portals has been developed to answer specific needs of the Antarctic Biodiversity Community. Dedicated project that were developed in this way include the Atlas Project and the Microbiaol Antarctic Project.

D. Contribution of the project in a context of scientific support to a sustainable development policy

The data portal has been used for the developpement of the Biogeographic Atlas of the Southern Ocean a benchmark document for scientists and policy makers. Furthermore data aggregated through the data portal has been used in the context op the Marien Protected Areas planning of the Comission for the Conservation of Antarctic Marine Living Resources (CCAMLR)

E. Keywords

Antarctic, Biodiversity,

1. INTRODUCTION

As one of the twelve the first signatories of the Antarctic Treaty during the International Geophysical Year of 1957-1958 Belgium has a strong link to the Antarctic. This treaty sets aside Antarctica as a scientific preserve, establishes freedom of scientific investigation and bans military activity on the continent and would serve as an example for various other international agreements.

Of particular relevance to the AntaBIF project is article III of the treaty: *"In order to promote international cooperation in scientific investigation in Antarctica… ….Scientific observations and results from Antarctica shall be exchanged and made freely available".*

As a region of the planet with some of the world's most pristine ecosystems, the Antarctic is home to unique flora and fauna. New species are being discovered here continuously. These organisms are fascinating objects of study, as they teach us a lot about Antarctic ecosystems and how these respond to extreme environmental conditions. Many Antarctic species, such as krill and various species of fish, are also important living resources that have significant economic value.

Understanding biodiversity - the variety of organisms and the ecosystems in which they live - is important for maintaining healthy and stable ecosystems. For this purpose it is important that relevant scientific knowledge is made universally available.

Antarctic flora and fauna are highly adapted to their unique environment and are highly vulnerable to environmental change. A growing body of scientific evidence indicates that the Antarctic environment is changing rapidly. These changes pose a serious threat to ecosystems, as these are affected in their normal functioning as well as in their capacity to provide resources and regulate earth's climate. While scientists have learned a lot about Antarctic ecosystems and biodiversity, especially during the International Polar Year 2007-2008, there is still a great deal more to explore and learn.

Polar regions experience faster rates of climate change than any other region in the world, as noted in 2007 by the Intergovernmental Panel on Climate Change (IPCC) and subsequent reports. Because of the growing realization of the potential impact of global environmental change on the Antarctic ecosystems and the services they provide, it is crucial to establish robust and comprehensive baseline information on the Antarctic biodiversity as a sound benchmark against which future change can reliably be assessed.

SCAR-MarBIN (www.scarmarbin.be), started in 2005 to build the first comprehensive assessment of Antarctic Marine Biodiversity, to better understand the actual diversity and status of Antarctic marine life. These activities took place in the context of the International Polar Year (IPY), and of the Census of Antarctic Marine Life (CAML). SCAR-MarBIN was funded by the Belgian Science Policy office (BELSPO) until September 2009.

Starting in 2009 and supported by BelSPO, the Belgian Biodiversity Platform constructs an Antarctic Biodiversity Information Facility (AntaBIF: www.biodiversity.aq), building upon its experience as Belgian national node to the Global Biodiversity Information Facility (GBIF: www.gbif.org) and its work on the Marine Biodiversity Information Network (SCAR-MarBIN: www.scarmarbin.be). The success of the facility depends largely on its extensive collaboration with networks of scientists involved in Antarctic research (e.g., the Scientific Committee on Antarctic Research (SCAR, www.scar.org) and the Southern Ocean Observation Network (SOOS, www.soos.aq) and an active international community of IT experts underpinning its work. In accordance with the Antarctic treaty, the facility has succeeded not only to promote

the management, publication and open access of vast collections of biodiversity data related to Antarctic marine and terrestrial ecosystems, but has demonstrated the power of web-based applications and IT tools in the analysis and modelisation of these data and information, for a wide range of users.

2. METHODOLOGY AND RESULTS

AntaBIF staff

project promoter:	**Hendrik SEGERS (RBINS, 2009-2014)**
project manager:	**Bruno DANIS (RBINS, 2009-2012)**
	Anton VAN DE PUTTE (RBINS 2012-2014
scientific coordinator:	**Anton VAN DE PUTTE (RBINS 2011-2014)**
1 IT developer:	**Nabil YOUDJOU (RBINS, 2010-2014)**

AntaBIF structure

In 2012 there was an external review of the AntaBIF Project. One of the main recommendations was the integration of SCAR-MarBIN into AntaBIF into one single portal. From a communication standpoint communication starting 2013 have focused on using the name of the portal biodiversity.aq rather than the names of the specific projects. Biodiversity.aq completely relies on the integration SCAR-MarBIN an AntaBIF data and technologies, hence, results for both networks are presented in this report.

The central core of AntaBIF is formed by the integrated Publishing Toolbox and the data portal. Besides that there is a modular ecosystem of websites that provide acces to Antarctic Biodiveristy data. Each website has a specific toolset and targets a specific audience. All thse websites are linked through a central portal: and form the Antarctic Biodiversity Portal (www.biodiveristy.aq).

The Data Portal (DATA.biodiversity.aq)
The ANTABIF Data Portal (data.biodiversity.aq) allows the discovery and visualisation of biodiversity data for *use in scientific research*. It focuses on taxonomy, occurrence and metadata. Its design includes innovative search engines and machine learning, and accommodates, environmental, geographic, expeditions and natural history collections data.

The integrated Publishing Toolkit (IPT.biodiversity.aq)

The Antarctic Fieldguides AFG.biodiversity.aq
The Antarctic Field Guides (afg.biodiversity.aq) allows *everyone interested in Antarctic flora and fauna* to build a custom guide, to be taken in the field or simply browsed and shared. The pages are generated dynamically from the contents of authoritative, quality controlled data sources (AntaBIF, the register of Antarctic Marine Species RAMS, and GBIF).

The Biogeographic Atlas of the Southern Ocean (BASO) (ATLAS.biodiversity.aq)

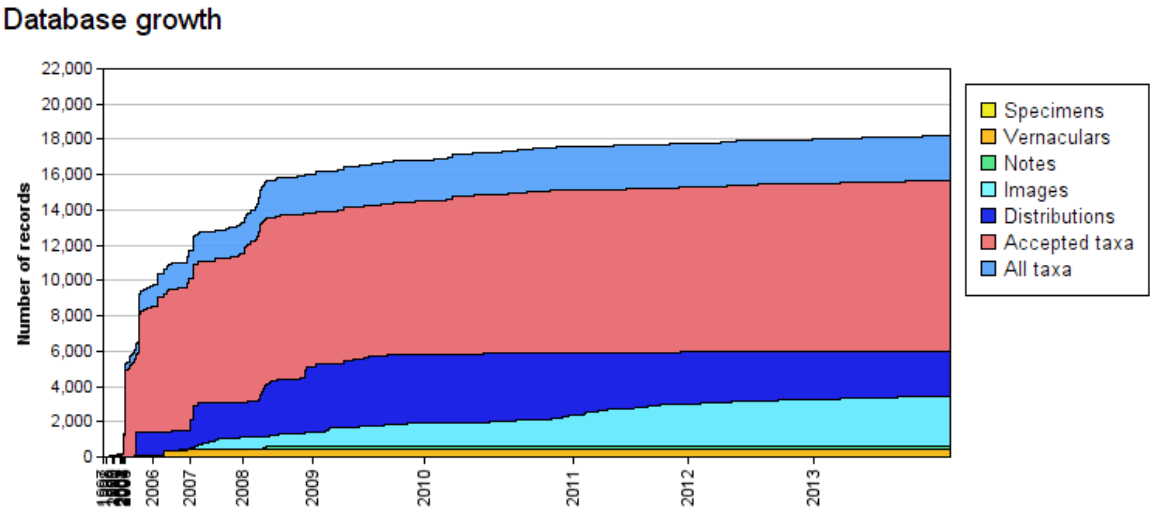
This printed Atlas of the distribution of organisms in the Southern Ocean will be published in 2014 and will provide an up-to-date synthesis of Antarctic and sub-Antarctic biogeographic knowledge. It constitutes a major scientific product based on biodiversity data gathered in the framework of the Census marine life and the International Polar Year, and fulfills the needs of biogeographic information for science, conservation, monitoring and sustainable management of the changing Southern Ocean. The Atlas not only benefits the scientific community but also to the Antarctic Treaty and associated bodies such as the Convention for the Conservation of Antarctic Marine Living Resources.

The AntaBIF project has been strongly involved in the data management aspects of the BASO and Dataset will be made available after publication of the printer version.

The Microbial Antarctic Resource System (mARS.biodiversity.aq)

The Microbial Antarctic Resources System (mARS) is envisioned as an open information system dedicated to facilitate the discovery, access and analysis of geo-referenced, molecular microbial diversity (meta)data generated by Antarctic researchers. It will allow to link microbial diversity data to environmetna data by linking international data standards. The scope of diversity will encompass all free-living and host-associated virus, Bacteria, Archaea, and singled-celled Eukarya. This initiative will allow the Antarctic microbial research community to better coordinate efforts and will provide a more integrated perspective on Antarctic Microbial diversity. Within the framework of AntaBIF this mARS was envisioned as a proof of concept, which will be further developed in the near future.

Register of Antarctic Marine Species (RAMS) **- While other components of SCAR-MarBIN have been transferred to the biodiversity.aq portal. RAMS being an integral component of WORMS will remain at the VLIZ servers. Over the past years significant advances regarding the completion of the first Register of Antarctic Marine Species (RAMS) have been made (Fig. 1). It now represents the most comprehensive resource on the taxonomy of Antarctic marine species. RAMS offers authoritative information on over 18,000 taxa (including more than 10,000 species). The information made available through RAMS further contributes to other global efforts, such as the World Register of Marine Species (WoRMS; www.marinespecies.org), the Catalogue of Life (CoL; www.catalogueoflife.org) and the Encyclopedia of Life (EoL;www.eol.org).**



Networking: AntaBIF in an Global context

AntaBIF is deeply involved in many networks which share similar objectives and long-term vision on raw data access and publication, and adopting a collaborative approach to improve Antarctic science and to help conservationnists and environmental managers. A few examples of these open networks include:

OBIS: Ocean Biogeographic Information System, (www.iobis.org). AntaBIF is the Antarctic Node of OBIS. OBIS is the information component of the Census of Marine Life.

GBIF: Global Biodiversity Information Facility, (www.gbif.org). is the Antarctic Node of GBIF, publishing all available data. Members of the AntaBIF project act as SCAR is the Associate Partner of GBIF for Antarctic biodiversity information.

SCAR: Scientific Committee on Antarctic Research, (www.scar.org).
AntaBIF was strongly embedded in an number of SCAR Expert Groups (Bidrs and Marine Mammals, Biodiversity Informatics) and has been developing a close collaboration with the (Biological) Scientific Research Programmes such as AntECO and AntERA.

CoML: the Census of Marine Life (www.coml.org). Project officially ended in 2010, SCAR-MarBIN played the role of data component for the Antarctic project of the Census, CAML.

CAML: the Census of Antarctic Marine Life (www.caml.aq). The Antarctic project of the Census of Marine Life. SCARMarBIN and subsequently AntaBIF as it's replacement form the sister project of CAML, as its data management arm. Still a lot of data to be published, and various subnetworks still kept alive through ongoing project, such as the Biogeographic Atlas of the Southern Ocean (see details below).

CCAMBIO: This Belspo funded Research programme unites the Belgian Microbial Community and the mayor Belgian community doing Biodiversity research at the Princess Elisabeth Station.

Scientific services

- **Co-editor of the Register of Antarctic Marine Species (RAMS)**
- **Collège de Belgique: Professeur invité**
- **Expert Group on Birds and Marine Mammals (SCAR-EGBAMM): Member of Steering Committee**
- **Group on Earth Observations - Biodiversity Observation Network (GEOBON): Antarctic Node manager**
- **Head of Delegation (SCAR rep) at GBIF Governing Board**
- **Member of the OBIS Managers Committee**
- **SCAR - Action Group manager for SCAR-MarBIN**
- **SCAR - Standing Committee on Antarctic Data Management (SCADM): Deputy Chief Officer -Belgian Delegate (AVdP)**
- **ICSU/CODATA Task Group on Polar Data Management Coordination: Member**

APECS Belgium vice-President

3. POLICY SUPPORT

The AntaBIF project has a strong policy relevant component. Data aggregated through the data partal and in the context of the BASO. Is used by within the context of the Comission for the Conservation of Antarctic Marine wildlife. For this members of the AntaBIF project have been actively involved in a number of CCAMLR workshop aimed at gathering and useing data for the evaluation of Marine Protected Areas in the Southern Ocean. The AntaBIF team has provided input and expertise for the Belgian government within the framework of CCAMLR ant the Antarctic treaty Consultative Meeting.

ATCM
Participation to prepatory meetings for the ATCM
Participation to 36th ATCM meeting (Brussels, Belgium) 22-29 may]

CCAMLR
Participation to prepatory meetings for the CCAMLR

CCAMLR Circumpolar Gap Analysis Marine Protected Areas (MPAs) Technical Workshop (Brussels, Belgium) 10 - 14 September [co-organization]
CCAMLR Workshop on Marine Protected Areas (Brest, France) 29 August – 2 September
Weddell Sea International expert workshop (Bremerhaven, Germany) April 7-9

4. DISSEMINATION AND VALORISATION

Meetings

2014
SOOS Southern Ocean Ecosystem Essenstial Ocean Variables workshop (New Brunswich, USA) 18-21 March
Digital Biogeographic Atlas of The Southern Ocean workshop (Brussels, Belgium) 25-28 March [organization]
Weddell Sea International expert workshop (Bremerhaven, Germany) April 7-9
Technical Meetting Marine Lifewatch (Heraklion, Crete) 2-6 june

2013
BASO Mapping workshop (Brussels, Belgium) 19-21 February [organization]
36th ATCM meeting (Brussels, Belgium) 22-29 may [member of Belgian Delegation]
FADA workshop (Oostende, Belgium) 18-20 june
APECS Spain, career development workshop, (Barcelona, Spain) 14 July [Invited mentor]
XIth SCAR Biology Symposium (Barcelona, Spain) 15-19 July [Poster + oral presentations]
AntaBIF workshop/Steering committee meeting (Barcelona, Spain) [organization]
mARS workshop (Barcelona, Spain)
Biodiversity Informatics Horizons 2013 (Rome, Italy) 3-6 september [participant]
GBIF Nodes Training Course (Berlin, Germany) 4-5 October [participant]
12th GBIF Global Nodes Meeting (Berlin, Germany) 6-7 October [participant]
20th meeting of the GBIF Governing Board (Berlin, Germany) 8-10 October [participant]
SCADM 17th Annual Meeting (Tokyo, Japan) 13-14 October [presentation
1st Polar data Forum(Tokyo, Japan) 15-16 October [presentation]
TDWG 2013 Annual Conference (Florence, Italy) 28 October -1 November

2012
SCAR X-Linkages meeting (Modena, Italy) 15-18 January [presentation]
Regional Nodes Meeting of The GBIF Participant Nodes In Europe (Berlin, Germany) 27-29 March [presentation]
MARS workshop, (Brussels, Belgium) 7-11 May [organization]
Modelisation workshop for the Biogeographic Atlas of the Southern Ocean (Villefranche-sur-Mer, France) 25-29 June [organization]
SCADM 16th annual meeting, (Portland, Oregon) 13-25 July [co-organizer]
XXXII SCAR and Open Science Conference (Portland, Oregon) 13-25 July, 2012 [presentation] also
AntaBIF workshop/Steering committee meeting (Portland, Oregon), [organization]
mARS workshop (Portland, Oregon), [organization]
CCAMLR Circumpolar Gap Analysis Marine Protected Areas (MPAs) Technical Workshop (Brussels, Belgium) 10 - 14 September [co-organization]
External evaluation of the *Antarctic Biodiversity Information Facility project*
APECS BeNeLux Symposium (Gent, Belgium) 11-12 October [organization]
2nd OBIS Steering Group Meeting, (Oostende, Belgium) 19-21 November
CCAMBIO Workshop 'next generation sequencing at the poles, (Liège, Belgium) 21-23 November.
SCAR EG-ABI-BAMM Tracking Data workshop (Strassbourg, France) 10-13 December [organizer]

2011
MPA/Biogeographic Atlas workshop (Brest, France). [co-convening]
Biosystematics conference 2011 (Berlin, Germany). [presentation]

IOC's International Oceanographic Data and Information Exchange (IODE) Programme 50th anniversary conference (Liège,
Belgium). [participation]
SCAR 4th Cross Linkages Meeting (Ottawa, Canada) 5-6 May [presentation]
CCAMLR Workshop on Marine Protected Areas (Brest, France) 29 August – 2 September
SCADM workshop, (Palma de Mallorca, Spain), 7-9 september [co-organizer]
World Conference on Marine Biodiversity (Aberdeen, Scotland), 26-30 September [presentations]
SCAR-MarBIN workshop (Aberdeen, Scotland), 30 September [organization]
AntaBIF workshop/Steering committee meeting (Aberdeen, Scotland), 1 October [organization]
18th GBIF Governing Board (GB18) (Buenos Aires, Argentina) Meeting 4-6 October
PES Biodiveristy Data Workshop (Brussels belgium) 27 October [organization]

2010
ANTABIF kickoff meeting (Buenos Aires, Argentina) [organization + oral presentations]
Polar Macroscope Synthesis workshop (Brussels, Belgique) [organization]
Polar Information Commons (PIC) meeting (Paris, France) [oral presentation]
IPY Science Conference (Oslo, Norway) [oral presentation]
SCAR Open Science conference (Buenos Aires, Argentina) [keynote]
Joint ANTABIF-AMBIO meeting (Liège, Belgium) [oral presentations]
CAML biogeography workshop (Villefranche-sur-Mer, France) [oral presentation]
Belgian IPY symposium (Brussels, Belgium) [oral presentation]
SCAR Life Science Standing Scientific Group meeting (Buenos Aires, Argentina). [presentation]
SCADM Meeting (Buenos Aires, Argentina) [oral presentation]
CAML SSC (Buenos Aires, Argentina) [oral presentation]
EG-BAMM kickoff meeting (Buenos Aires, Argentina) [oral presentation]
OLA-CAML workshop (Buenos Aires, Argentina) [oral presentation]
CoML Grand Finale meeting (London, UK) [participation, press]
OBIS Steering Group meeting (Oostende, Belgium),18-19 November [oral presentation]
Positive Visions for Biodiversity conference (Brussels, Belgium) 16-17 November [participation]

5. PUBLICATIONS

AntaBIF constantly seeks direct contact with the scientific community, in order to ensure that the current developments answer the needs of the community it is serving and are inline with best available technologies and standards. It allows determining the best options, and choose priorities for future developments. Scientific publication is used as a means to maintain credibility and ensures that SCAR-MarBIN and AntaBIF are cited in the influential literature and embedded in strategic documents on Antarctic Research (eg SCAR strategic plan 2011-2016, and SCAR AntETR programme 2012-2022).

AntaBIF in Scientific Publications

To date, SCAR-MarBIN or AntaBIF derived products are mentioned in ca. 250 publications (as found through a Google scholar search) (Fig X).
Some publications are completely based on data available through the webportals. A recent example is the following book chapter:
Bluhm, B, D. Watts, and F. Huettmann (2010). Free Database Availability, Metadata and the Internet: An Example of Two High Latitude Components of the Census of Marine Life. Chapter 13, pp. 233 – 244. In: S. Cushman and F. Huettmann Spatial Complexity, Informatics and Wildlife Conservation. Springer Tokyo, Japan. Pp. 233-244

Gutt, J., Zurell, D., Bracegridle, T. J., Cheung, W., Clark, M. S., Convey, P., Danis, B.... & Grimm, V. (2012). Correlative and dynamic species distribution modelling for ecological predictions in the Antarctic: a cross-disciplinary concept. Polar Research, 31.

Moreau, C., Linse, K., Griffiths, H., Barnes, D., Kaiser, S., Glover, A., ... & Geissler, P. (2013). Amundsen Sea Mollusca from the BIOPEARL II expedition. ZooKeys, (294), 1.

Kaiser, S., Brandão, S. N., Brix, S., Barnes, D. K., Bowden, D. A., Ingels, J., ... & Yasuhara, M. (2013). Patterns, processes and vulnerability of Southern Ocean benthos: a decadal leap in knowledge and understanding. Marine Biology, 1-23.

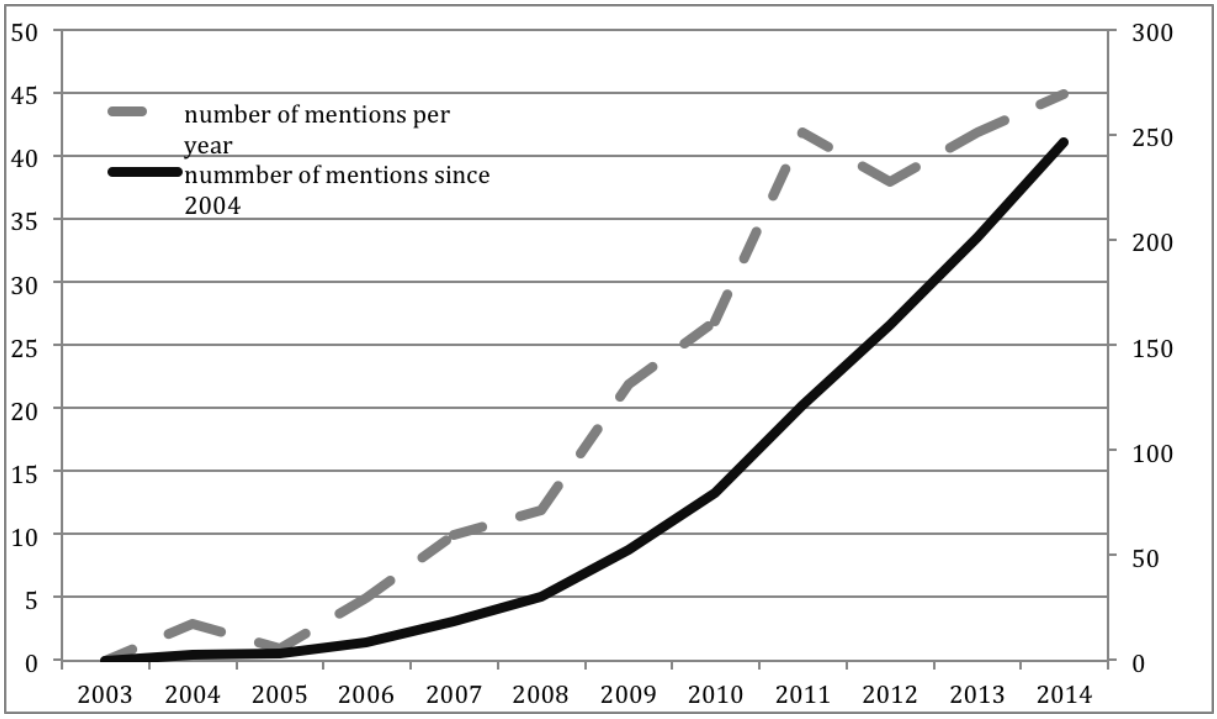


Figure X. Number of publications that mention SCAR-MArbin or AntaBIF.

Publications of the teams

Peer Review

2013

Schiaparelli S, Danis B, Wadley V, Michael Stoddart D. The Census of Antarctic Marine Life: The First Available Baseline for Antarctic Marine Biodiversity. In: Verde C, di Prisco G, editors. Adaptation and Evolution in Marine Environments, Volume 2. From Pole to Pole: Springer Berlin Heidelberg; 2013. p. 3-19.

Danis B, Van de Putte A, Renaudier S, Griffiths H. Connecting Biodiversity Data During the IPY: The Path Towards e-Polar Science. In: Verde C, di Prisco G, editors. Adaptation and Evolution in Marine Environments, Volume 2. From Pole to Pole: Springer Berlin Heidelberg; 2013. p. 21-32.

Gutt J, Barnes D, Lockhart SJ, van de Putte A. Antarctic macrobenthic communities: A compilation of circumpolar information. Nature Conservation. 2013;4:1-13.

2012

Danis B, Jangoux M, Wilmes J. Antarctic Starfish (Echinodermata, Asteroidea) from the ANDEEP3 expedition. Zookeys. 2012(185):73-8.

Gutt J, Zurell D, Bracegridle TJ, Cheung W, Clark MS, Convey P, et al. Correlative and dynamic species distribution modelling for ecological predictions in the Antarctic: a cross-disciplinary concept. 2012. 2012.

Volckaert FM, Rock J, Van de Putte A. Connectivity and Molecular Ecology of Antarctic Fishes. In: di Prisco G, Verde C, editors. Adaptation and Evolution in Marine Environments, Volume 1. From Pole to Pole: Springer Berlin Heidelberg; 2012. p. 75-96.

Flores H, Atkinson A, Kawaguchi S, Krafft BA, Milinevsky G, Nicol S, et al. Impact of climate change on Antarctic krill. Marine Ecology Progress Series. 2012;458:1-19.

Griffiths H, Danis B, Clarke A. Quantifying Antarctic marine biodiversity: The SCAR-MarBIN data portal. DSR II. 2011;58(1-2):18-29.

De Broyer C, Danis B,. How many species in the Southern Ocean? Towards a dynamic inventory of the Antarctic marine species. DSR II. 2011;58(1-2):5-17.

2010

Parsons MA, Godoy O, LeDrew E, de Bruin TF, Danis B, Tomlinson S, et al. A conceptual framework for managing very diverse data for complex, interdisciplinary science. Journal of Information Science. 2011;37(6):555-69.

2009

Danis B, Griffiths H. Polar science: bid for freely accessible biodiversity archive. Nature. 2009;458(7240):830.

Others

2013

- ***Van de Putte AP**, Segers H, (2013) www.biodiversity.aq Gateway to Antarctic Biodiversity data. Science Connection 41, 16-19*
- *Volckaert FAM, **Van de Putte AP** (2013) Pelagic fish of the Southern Ocean. Science Connection 41, 24-27*
- *Tavernier I, Obbels D, **Van de Putte AP** (2013) APECS BeNeLux United we stand, divided we fall. Science Connection 41, 57-59*

6. ACKNOWLEDGEMENTS

We would like to thank Belspo for supporting this project and especially M. Vancauwenberghe and A. van der Werf. This project also received strong Support from the SCAR secretariat and many SCAR member countries and individual researchers in Belgium and around the world.

7. REFERENCES

ANNEX 1: COPY OF THE PUBLICATIONS
ANNEX 2: MINUTES OF THE FOLLOW-UP COMMITTEE MEETINGS