# Annual Report 2011

**ANTABIF – the Antarctic Biodiversity Information Facility**

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# 1. Introduction

ANTABIF answers the urgent need to provide access to scientifically sound information on the current state of Antarctic communities and their diversity.
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). ANTABIF (www.antabif.be) expands SCAR-MarBIN beyond the marine realm, by providing access to all Antarctic Biodiversity information, through a single webportal, in tight collaboration with the Australian Antarctic Data Center (AADC).

The objective of this report is to give an overview of the SCAR-MarBIN and ANTABIF networks, their objectives, activities, results and perspectives, as well as how they are interrelated.
SCAR-MarBIN has been maintained and developed beyond the end of its funding by the Belgian Science Policy Office, as the marine pillar of ANTABIF. ANTABIF completely relies on the integration SCAR-MarBIN data and technologies, hence, results for both networks are presented in this report.

## 2. ANTABIF staff

- 1 project promoter: Hendrik SEGERS (RBINS)
- 1 project manager: Bruno DANIS (RBINS)
- 1 scientific coordinator: Anton VAN DE PUTTE (RBINS)
- 1 IT developer: Nabil YOUDJOU (RBINS)

## 3. Progress of activities

### Databases

As mentioned in previous reports, SCAR-MarBIN reached a series of tangible results, giving free and open access to relevant baseline data. Focusing on this primary objective, SCAR-MarBIN made significant advances regarding the completion of the first Register of Antarctic Marine Species (RAMS), which now represents the most comprehensive resource on the taxonomy of Antarctic marine species. RAMS offers authoritative information on over 17,000 taxa (including more than 9,000 species). The information made available through SCAR-MarBIN 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), as well as publishing data in a series of thematic portals. In conjunction to RAMS, biogeographic information has also been compiled, allowing users to access baseline data on occurrence, abundance, and genetics of over 5,200 taxa. The ANTOBIS geodatabase, which forms the Antarctic node of the Ocean Biogeographic Information System (OBIS) has now reached 1,275,799 records from 189 interoperable databases. This wealth of baseline data is further accessible through partner webportals such as the Ocean Biogeographic Information System (OBIS; www.iobis.org), or the Global Biodiversity Information Network (GBIF; www.gbif.org). It is envisioned that more and more thematic/regional portal will be developed, using SCAR-MarBIN/ANTABIF webservices. Since its inception, in September 2005, the SCAR-MarBIN website has reached over 800,000 visitors, and 6,500,000 hits.
ANTABIF is designed to integrate what has been learnt during the SCAR-MarBIN phase, and to build upon the marine experience. Technically, the ANTABIF databases are built through a dynamic connection to SCAR-MarBIN V2 webservices for different kind of resources (occurrence, taxonomy) and to other webservices (AAD_EBA database (terrestrial data,...) to aggregate the final content which will be served through the ANTABIF dataportal. Details are given below, on the architectural design, technologies used and data content already gathered.

## *Networks*

SCAR-MarBIN has built a complex and evolutive ecosystem of computers, servers, systems, institutes, individuals and organizations. The founding partners of SCAR-MarBIN have remained deeply involved, and many others have joined since the beginning of the project. ANTABIF is still in a transitional phase, but is benefiting from this patiently built ecosystem, with the intention of going well beyond SCAR-MarBIN's achievements. Within this framework the project is actively involved in the launch of a Belgian node of the Association of Polar Early Career Scientists (APECS-Belgium). This will allow the development of a better network of polar scientist in Belgium and allow better interaction with these scientists who are important data providers and data users.

## *Webpresence*

A series of websites are used to publish primary data and information updates about the SCAR-MarBIN and ANTABIF networks:

www.scarmarbin.be: up since September 2005, >800k visits, SCAR-MarBIN V1 dataportal

data.scarmarbin.be: SCAR-MarBIN V2 dataportal, to be deployed early 2012

dev.scarmarbin.be: SCAR-MarBIN development site (prototyping)

afg.scarmarbin.be: up since December 2010, not officially launched, interactive Antarctic Field Guides

www.biodiversity.aq: up since May 2010, semi-static website, providing basic information on ANTABIF.

share.biodiversity.aq: filesharing webspace, offers free and open access to original datasets, documents, code, GIS layers,...

afg.biodioversity.aq: up since December 2010, not yet officially launched, interactive Antarctic Field Guides

ipt.biodiversity.aq: Integrated Publishing Toolkit for ANTABIF. Allows end-users to manage, clean, standardize and publish their own occurrence data, and to generate a Data Paper

## Buy-in

SCAR-MarBIN succeeded in mobilizing the Antarctic scientific community, and building momentum towards a shift in the norms towards data usage and sharing. Thanks to the impulse of the IPY and the Census of Marine Life (CoML), these norms have started to change towards considering the publication of raw data through recognized networks as a valuable contribution to science. ANTABIF is building on this momentum, and expanding the interests of SCAR-MarBIN by including the terrestrial and limnetic realms. This effort is coordinated within the Antarctic community by emerging initiatives such as the Polar Information Commons (www.polarcommons.org) or SCAR's Standing Committee on Antarctic Data Management (scadm.scar.org). The long-term vision is to build an open, virtual repository for vital scientific data and information, providing a shared, community-based cyber-infrastructure fostering innovation, improved scientific understanding, and encourage participation in research, education, planning, and management in the polar regions.

## Technological developments

ANTABIF IT developer, Ir Nabil Youdjou, has made considerable progress on the exploration and implementation of the new IT architecture for ANTABIF. The philosophy of this new architecture is to offer an added value to the user and partners, by integrating the best available resources, such as SCAR-MarBIN V2, building upon webservice-oriented, dynamic, GBIF-compliant technologies. Using this approach, the networks will be interoperable with many entities, allowing the publication of the data in many different contexts, in a distributed fashion.
A prototype of the data portal is visible at the following address: data.biodiversity.aq.

ANTABIF technological ecosystems:
Language: Ruby
Design patterns: MVC-ORM
Framework: Rails(ActiveRecord) and YUI
Search engine: Full text (Elasticsearch-Lucene)
Database: PostGresql
GIS server: Geoserver
Spatial database: PostGIS
Mapping client: OpenLayers
Web services: RESTish (all resources)
Protocoles/Standards: DIF, darwincore, dwc archive, Tapir, biocase, digir, EML, OGC…etc
GBIF tools : Harvesting anf Indexing Toolkit (HIT), Integrated Publishing Toolkit (IPT.biodiversity.aq)
OS: FreeBSD

Hosting: Belgian Biodiversity Platform  (ULB/VUB joint IT Center)
Metadata systems: GCMD (using APIs)

## ANTABIF infrastructure prototype: status

| | Status | comments |
|---|---|---|
| Metadata | Installed | created a GCMD model for the ANTABIF database |
| | Installed | design of a GCMD client service, communication through API |
| | Installed | Model (metadata_inventories) as minimalistic approach |
| Occurrence | Installed | based on HIT for harvesting data from providers |
| | Installed | ETL scripts created to synchronize HIT with ANTABIF database |
| Taxonomic Register | Installed | webservices developed for RAMS, CoL, GNI to retrieve taxonomic data |
| | Ongoing | implementation of the webservices to retrieve the DNA from GenBank |
| | Ongoing | creation of a local DNA database for using BLAST (sequence alignement) |
| Data exploration | Installed | geoserver for managing is installed and configured |
| | Installed | data model (geospatial, temporal, biodiversity richness of the locality, ..etc) is implemented. |
| | Installed | test proof |
| Search engine | Installed (except DNA) | based on full text search coupled with context_scope (taxonomy, DNA,  spatial, temporal, metadata) |
| | | installed index server (Elasticsearch node ) |
| | Installed | designed search model |
| | Installed | implementation of script related to create and update indexes based on context (test phase) |

## *Federation and Networking*

Since its inception, SCAR-MarBIN has been seeking to federate as many partners as possible, at the national and international levels, and to mobilize the energy and competences of all the potential players, in a positive way. This approach is taken further by the ANTABIF project.

It is very important to note that SCAR-MarBIN has built its networks on trust and commitments from its partners and community. The data and information published through the different web platforms, as well as the technology used are now part of the public domain, in agreement with the Antarctic Treaty (Art. III.1.c). ANTABIF progressively follows this path.

SCAR-MarBIN and ANTABIF are deeply involved in many networks which share similar objectives and long-term vision on raw data access and publication, and adopting a collaborative approach. A few examples of these open networks include:

OBIS: Ocean Biogeographic Information System, (www.iobis.org). SCAR-MarBIN 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). ANTABIF and SCAR-MarBIN compose the Antarctic Node of GBIF, publishing all available data. SCAR is the Associate Partner of GBIF for Antarctic resources.

SCAR: Scientific Committee on Antarctic Research, (www.scar.org). SCAR-MarBIN is an Action Group of SCAR. SCAR provides a direct connection with the Antarctic scientific community, and provides data and strategic advice to SCAR-MarBIN and ANTABIF.

GEO-BON: the Group on Earth Observations - Biodiversity Observation Network (www.earthobservations.org/geobon.shtml). ANTABIF is invited to play the role of Antarctic Node for GEO-BON.

EoL: the Encyclopedia of Life (www.eol.org). SCAR-MarBIN provides material directly to EoL (taxonomy, pictures, distribution) on over 5,000 species, through the webportal, and also through the new Antarctic Field Guides (afg.biodiversity.aq).

SOOS: the Southern Ocean Observing Systems (www.scar.org/soos). SCAR-MarBIN is the biodiversity node for SOOS.

AntECO: State of the Antarctic Ecosystem (AntECO). A new SCAR biology-program Expected duration: 8 years (2012-2020). ANTABIF coordinating the Data Management package.

AnTERA: Antarctic Thresholds - Ecosystem Resilience and Adaptation (AnT-ERA) A new SCAR biology-program Expected duration: 8 years (2012-2020). ANTABIF coordinating the Data Management package.

SCADM: the Standing Committee on Antarctic Data Management (scadm.scar.org). ANTABIF project manager acts as Deputy Chief Officer.

*It is envisioned that many new combinations will arise, along with new biodiversity informatics technologies and standards being developed at an exponential speed. The multiplicity of contexts in which the data is made available is a very healthy sign, and will accelerate far-seeing shifts in science, conservation and management.*

*Publications*

## In international scientific journals and books

- Parsons M et al., 2011. "Data for modern, complex, interdisciplinary science—another dimension of the Fourth Paradigm". Journal of Information Science 37 (6): 555-569
- Gutt J et al., in press. "Correlative and dynamic species distribution modelling for ecological predictions in the Antarctic: a cross-disciplinary concept". Polar Research.
- Danis B et al., in prep. "Sharing biodiversity data during the IPY: towards ePolarScience" in di Prisco G, Walton D, Kallenborn R (Eds), "From Pole to Pole: Polar Environmental Research during the International Polar Year 2007 – 2009". Springer book series.

## Electronic publications

- Danis B, De Broyer C, Clarke A, Schiaparelli S (Eds), 2011. The SCAR Antarctic Field Guides. World Wide Web electronic publication. Available online at http://afg.biodiversity.aq and http://afg.scarmarbin.be

- De Broyer C, Danis B (Eds), 2011. SCAR-MarBIN: The Antarctic Marine Biodiversity Information Network. World Wide Web electronic publication. Available online at http://www.scarmarbin.be/

- De Broyer C, Clarke A, Koubbi P, Pakhomov E, Scott F, Vanden Berghe W and Danis B (Eds), 2011. The SCAR-MarBIN Register of Antarctic

Marine Species (RAMS). World Wide Web electronic publication. Available online at http://www.scarmarbin.be/scarramsabout.php

- Jangoux M, De Broyer C, Clarke A, Koubbi P, Pakhomov E, Scott F, Vanden Berghe W and Danis B (Eds), 2011. The SCAR-MarBIN Register of Antarctic Marine Species (RAMS): Asteroidea. World Wide Web electronic publication. Available online at http://www.scarmarbin.be/ramsAsteroidea.php

## Scientific services

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

## Meetings Participation/organization

In Belgium

- Belgian Young Researchers Antarctica Day workshop, 1st December 2011 (co-organization)
- ANTABIF training workshop (Brussels, Belgium). 27th October (organization)
- Van de Putte A., Danis B., Les réseaux d'information pour comprendre et sauvegarder la biodiversité Antarctique. Collège de Belgique (Namur, Belgium). Upon invitation (presentation)

International meetings

- SCADM workshop (Palma de Mallorca, Spain), 7-9th September (co-organization)

- SCAR-MarBIN workshop (Aberdeen, Scotland), 30th September (organization).
- ANTABIF workshop (Aberdeen, Scotland), 1st October (organization).
- Danis B., SCAR-MarBIN and ANTABIF : Free and Open Access to Antarctic Biodiversity data. Biosystematics conference 2011 (Berlin, Germany) (presentation).
- Danis B, Parsons M., Biodiversity information networks: dataflows for interdisciplinary science. World Conference on Marine Biodiversity (Aberdeen, Scotland) (presentation).
- Vanden Berghe E, Grassle JF, Bailly N, Claereboudt M, Danis B *et al*., Integrating biogeographic data in OBIS: challenges in standardisation of taxonomic names. World Conference on Marine Biodiversity (Aberdeen, Scotland) (presentation).
- Danis B., SCAR-MarBIN and ANTABIF: free and open access to Antarctic Biodiversity information. 8th Symposium on Polar Studies (Palma de Mallorca, Spain). Upon invitation (presentation).
- Danis B., ANTABIF Status Report. Scientific Committee on Antarctic Data Management Workshop (Palma de Mallorca, Spain) (presentation).
- Danis B., An overview of Antarctic Biodiversity Networks. GBIF science symposium (Buenos Aires, Argentina). Upon invitation (presentation)
- Danis B., ANTABIF : progress report. OBIS Managers meeting (Oostende, Belgium). Upon invitation (presentation)
- IOC's International Oceanographic Data and Information Exchange (IODE) Programme 50th anniversary conference (Liège, Belgium) (attendance).
- SCAR Crosslinkages workshop (Ottawa, Canada). Upon invitation (attendance).
- GBIF governing board (Buenos Aires, Argentina). Upon invitation (attendance).
- GBIF global Nodes meeting (Buenos Aires, Argentina). Upon invitation (attendance).