



# REDMIC

Canary Islands Integrated Marine Data Repository

© Fundación Observatorio Ambiental Granadilla (OAG)  
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[www.redmic.es](http://www.redmic.es)



## A long-term challenge

REDMIC (the Canary Islands Integrated Marine Data Repository, acronym in Spanish) is a permanent systematic system for the storage, safeguard and service of marine data, following the philosophy behind OpenData and OpenScience. It was specifically designed for the Canary Islands and, by extension, Macaronesia. However, it has been approached as a pilot project with the intention of reapplying it to other regions and, overtime, using it to manage a public repository as a registry for marine data.

REDMIC is different to others in that marine data of whatever kind (maritime transport, oceanography, biodiversity, fisheries, etc.) are introduced in an integrated manner in the same system of geographical information. Therefore, the effort to gather all data is only made once at the beginning, so they can be used and combined as often as necessary with the utmost speed. What is new in REDMIC is that its logic data model allows for such integration, being its development based on Arc Marine. It is like having one huge book instead of a library composed of a universe of smaller books (individual datasets).

REDMIC is inspired by the following principles:

*Exploitability*: facilitating the successive use of data.

*Generativity*: storing data by maximising its potential of use.

*Traceability*: providing data related to how the original data were obtained and allowing the knowledge of its modifications.

*Publicity*: publicly funded system for the safeguard, harmonisation and service of data.

*Replicability*: providing a model apt for use in other geographical areas.

*Versatility*: allowing for its use as a general repository (all kinds of data) or as an institutional repository (limited to a sort of information or product).





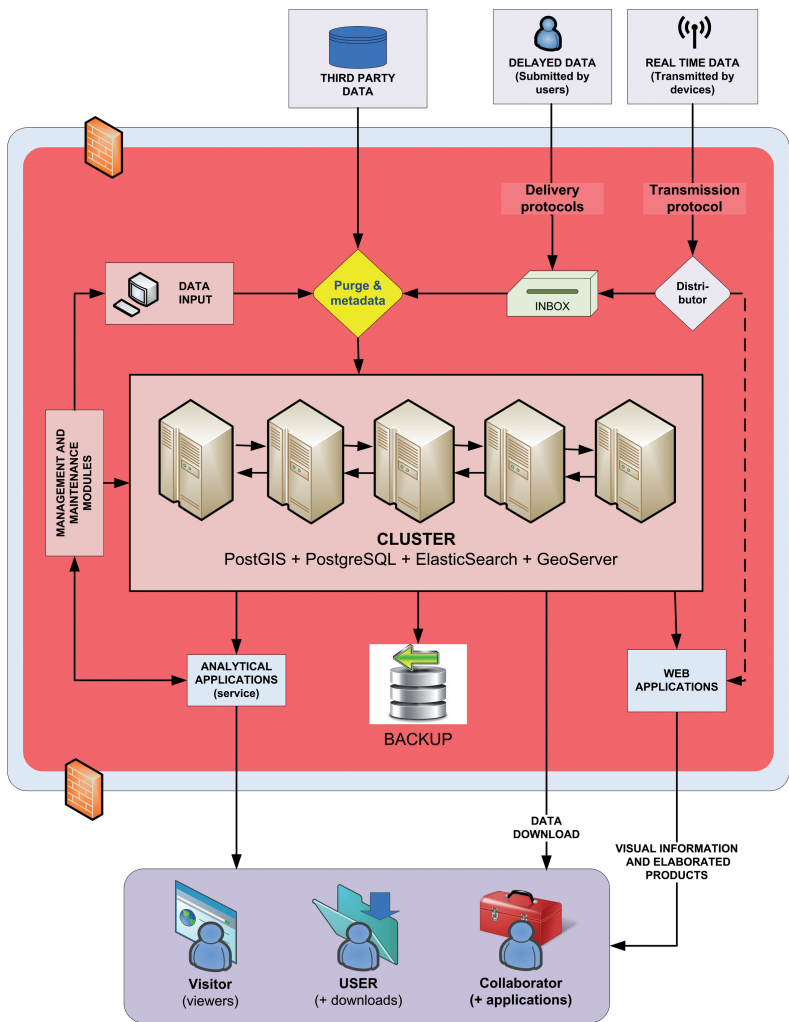
## Geometries

The universe of marine data is very wide, varied and complex. It comprises parametric data, counting, attributes, raster data, modelling data, and infrastructure data, among others. This universe is also dynamic, considering location dimensions (x, y, z, t). In order to introduce marine data in the geographic information system, Common Marine Data Types (Wright et al.2000) basic geometries have been used, complemented by OAG to REDMIC.

Feature Class		Marine features	Components	
Marine points	BP	Basic point	X, Y	
	PR	Point Radius	X, Y, Z and r (radius)	
	IP	- Instant point	X, Y, Z or ΔZ; m <sub>1</sub> ...m <sub>2</sub> , t, [Subtype]	Instantaneous point
	LS	- Location series	Δ X,Y; ΔZ; m <sub>1</sub> ...m <sub>2</sub> , t <sub>1</sub> ...t <sub>2</sub> , [Subtype]	
	SU	- Survey	[Subtype]	
	SO	- Sounding	[Subtype]	
	TS	Time series	X,Y; Z or ΔZ; m <sub>1</sub> ...m <sub>n</sub> ; t <sub>1</sub> ...t <sub>n</sub>	
Marine lines	PL	Profile line	X <sub>1</sub> -Y <sub>1</sub> , X <sub>2</sub> -Y <sub>2</sub> ...; M <sub>1</sub> ,M <sub>2</sub> ; Z <sub>1</sub> ,Z <sub>2</sub> ...	
	TR	Track	X <sub>1</sub> -Y <sub>1</sub> , X <sub>2</sub> -Y <sub>2</sub> ... M <sub>1</sub> -M <sub>2</sub> ; Z <sub>1</sub> ,Z <sub>2</sub> ... m <sub>1</sub> ,m <sub>2</sub> ..., t <sub>1</sub> -t <sub>2</sub> ...	
	FL	Feature line	X <sub>1</sub> -Y <sub>1</sub> , X <sub>2</sub> -Y <sub>2</sub> ... M <sub>1</sub> -M <sub>2</sub>	
	SL	Shoreline	X <sub>1</sub> -Y <sub>1</sub> , X <sub>2</sub> -Y <sub>2</sub> , Z, VDatum	
Marine areas	FA	Feature area	X <sub>1</sub> Y <sub>1</sub> , X <sub>2</sub> Y <sub>2</sub> ... X <sub>1</sub> Y <sub>1</sub> , Z, m	
	TA	Time duration area	X <sub>1</sub> Y <sub>1</sub> , X <sub>2</sub> Y <sub>2</sub> ... X <sub>1</sub> Y <sub>1</sub> , Z, m, t <sub>1</sub> ...t <sub>n</sub>	
Raster, grids & meshes	RG	Regular interpolated grid	Row <sub>1</sub> ,col <sub>1</sub> ...row <sub>n</sub> ,col <sub>n</sub> ; Z <sub>r,c1</sub> -Z <sub>r,cn</sub> , multipoint	
	IG	Irregular interpolated grid	Row <sub>1</sub> ,col <sub>1</sub> ...row <sub>n</sub> ,col <sub>n</sub> ; Z <sub>r,c1</sub> -Z <sub>r,cn</sub> , multipoint	
	MV	Mesh volume	X <sub>1</sub> Y <sub>1</sub> Z <sub>1</sub> , X <sub>2</sub> Y <sub>2</sub> Z <sub>2</sub> ... X <sub>1</sub> Y <sub>1</sub> Z <sub>1</sub> ; m or m <sub>1</sub> ...m <sub>n</sub> ; t or t <sub>1</sub> ...t <sub>n</sub>	
Special	DP	Derived or placeholders <sup>15</sup>	X <sub>1</sub> Y <sub>1</sub> Z <sub>1</sub> , X <sub>2</sub> Y <sub>2</sub> Z <sub>2</sub> ... X <sub>n</sub> Y <sub>n</sub> Z <sub>n</sub> ; t <sub>1</sub> ...t <sub>n</sub>	

# Structure of the system

The general architecture of the REDMIC system, with its entries and outlets, is shown in the following diagram, which shows the possible data flux. This outline has been migrated to the cloud to make the most of the accessibility and security of new technologies, as well as its mass data use.



## Types of information

REDMIC has been designed to be able to include marine data of various types, generated by various organisations and with various instruments (metadata). The work unit is the activity that generates data. Activities are managed depending on their type based on the nature of the datum and can be grouped in projects, and these, in turn, in programs. REDMIC considers the following types of activities:

### *1. Geological-geomorphologic data*

- Bathymetry
- Particle morphology and granulometry
- Mineralogical studies
- Seabed typology
- Stratigraphic profiles
- Seismicity

### *2. Climatological-hydrological data*

- Coastline
- Tide measurements
- Current measurements
- Swell measurements
- Displacement of water bodies
- Meteorological conditions
- Sedimentation and erosion rates

### *3. Physical-chemical data*

- On site measurements
- Water analysis
- Sediment analysis

### *4. Biological data*

- Microbiological analysis
- Species inventory and monitoring
- Genomic and molecular inventories
- Dumping of bibliographic references
- Collection registry

- Census and sightings
- Stocks localization
- Animal tagging
- Recuperation of injured animals
- Genetic, biochemical and toxicological analysis
- Biometrics and biological development
- Plankton studies
- Biological production
- Bionomical surveys
- Habitat inventories
- Red tide monitoring

#### *5. Anthropic elements*

- Territorial boundaries
- Protected areas
- Use zoning
- Infrastructures
- Archaeology
- Spills and discharges
- Waste
- Navigation
- Maritime transport

#### *6. Exploitation*

- Fishing and shellfish gathering
- Mariculture
- Sands, minerals and hydrocarbons

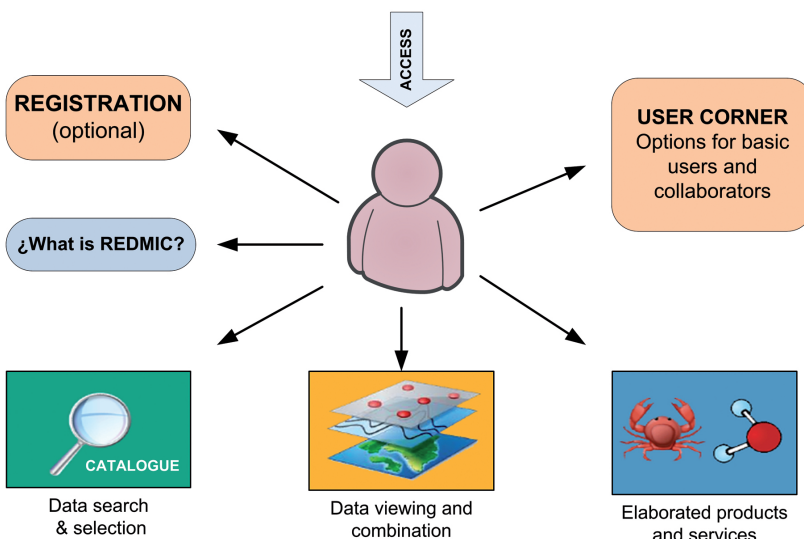
#### *7. Exceptional cases*

- Rare events
- Telemetry
- Image capture
- Sound registries
- Models
- Device status

## Types of users

Potential users of REDMIC are all people and institutions interested in the marine environment. The portal is of public access but it is required to sign up as a user if you wish to download data or use some specific functionalities. Signing up is important to guarantee that users accept REDMIC's data policy and the user licence that comes with it.

- **Visitor.** Visitors can access, consult and view all non restricted REDMIC content without being required to sign up. They can download maps, graphs and documents from the “Products” section, but not raw data or bibliographies (only references).
- **Basic user.** Basic users must sign up using an email address and accepting REDMIC's data policy. They can access download modules of bibliography and free data, as well as the alert module.



- **Data depositor.** They have the same rights as basic users, and they can also store their data in REDMIC. They will have to enter personal information (address, organisation, etc.), accept data use and, eventually, set a date of temporary seizure or claim prior consent, depending on the case. They can request a certificate for their data entries or a report of their use by third parties.
- **Collaborator.** Advanced users who sign a specific cooperation agreement with OAG. In addition to basic user rights and depositor rights, they will have access to the analytical modules and other REDMIC specific functionalities, upon agreement.

## Data policy

REDMIC's policy consists of taking data and, after going through homogenisation and quality control, placing them in the repository for other users to access and exploit them, following OpenData's philosophy. REDMIC's data have been compiled from public sources, provided liberally by their owners, or facilitated as a result of collaborative work between OAG and the entities generating the data. OAG merely provides the repository service and does not have any competence over third parties' rights. Data download, contribution and recuperation will be free.

## Accessibility levels

- *Free data:* They are included in the catalogue and viewers. They can be downloaded without any restrictions besides committing to giving credence to the source when they are used. *posteriormente.*
- *Embargoed data:* The system will offer researchers a mechanism for temporary seizure of their data to give them time to publish them. This mechanism is important if the disclosure of the data of

researches financed with public funds ever becomes mandatory. Data are not in the catalogue nor will they be available for viewing or downloading until the embargo is lifted.

- *Restricted data:* Data owned by individuals can only be downloaded with the source's express consent. They are in the general catalogue and will be available for viewing if it doesn't interfere with its restricted access. Public data under the confidentiality regime will also be restricted, as long as this regime is in place.

### ***Advantages to providing data to REDMIC***

- *For public authorities.* Administrations can find in this repository a great mean for data dissemination, or data grouping, leaving the door open for the signing of collaboration agreements and doing so in a regular and organized way. Public data will be freely accessible once they are validated, unless they are subject to any justified restrictions.
- *For private entities and individuals.* Individuals, who store their data in REDMIC and decide to facilitate their use by third parties, not only invoke the quality control process and make their work more visible, but by introducing their data in the repository, they can be combined and used to carry out correlation studies with other data through the analytical tools in service. Individuals can also retrieve reports of the use of their data by third parties.

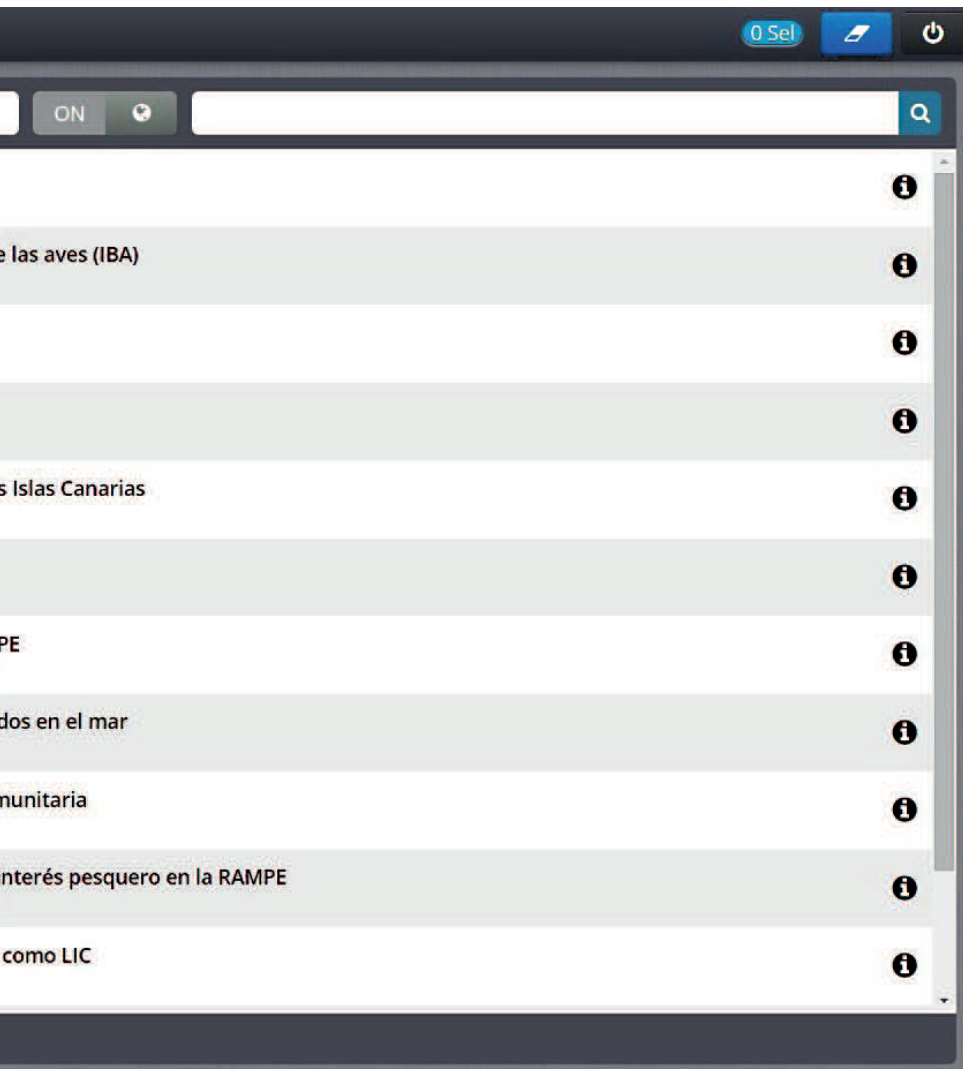
### ***Personal data***

Personal information stored in REDMIC's contact and user registry complies with the requirements and conditions set by the Spanish Organic Law 15/1999 of 13 December for the Protection of Personal Data.

## Products and services

- *Data storage and safeguard.* Users can upload their data if they wish for them to be homogenised and safeguarded. It is possible to apply temporary seizures of free access, and to give them to third parties with the express prior consent of the provider.
- *Data download.* Finding, selecting and downloading (free) data series according to activities, in standard formats.
- *Connection to data.* It allows any external user to access REDMIC via its application to use the data offered through this mean.
- *Map production.* The selected data can be combined and shown on several base maps with high flexibility. The result can be printed or saved.
- *Graphic data display.* Data series can be displayed using various types of graphs, which allow to interactively modify the time range.
- *Analytic tools.* Third party compatible apps, as well as apps developed by OAG for specific case studies.
- *Theme listings.* You can generate listings with additional information related to data (lists of species, bibliographic references, sea outfalls, etc.).
- *Marine bibliography.* Search for scientific publications stored in REDMIC and automatic alert for new publications added.
- *Documents and prepared maps.* Free download of listings and maps produced by REDMIC's managers on topics of special interest.





CITA

Catálogo

Visor

Productos

Bibliografía

Carga de datos

Metadatos

Manten.

Antonio

Volcado de citas del documento BibOAG-02803

Especies\*

Spadella lainezi

✕

▼

Spatial reference

Geographic coordinates

▼

Longitude (x)\*

-16

17

43,6250

Latitude (y)\*

28

25

6,21336

Depth (z)

Depth (z)

▲

▼

Precisión\*

100

Confiabilidad

Baja

✕

▼

Nota

Revisadas especies

Recolector

Nombre

Nombre del recolector

Fecha

Fecha de la recogida

▼

Especímenes

Número de ejemplares

Confiabilidad

Baja

✕

▼

Limpiar

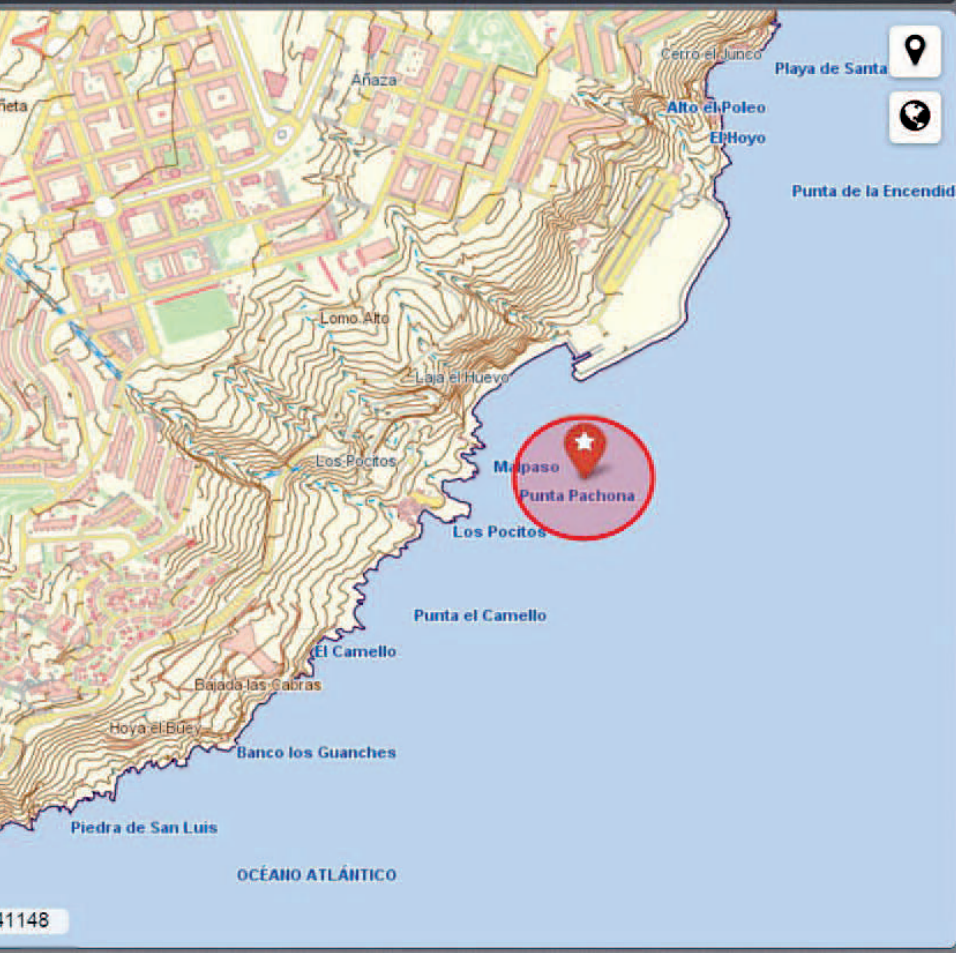
Cancelar

Añadir

Lng: -16,30305 Lat: 28,4

Entry of species locations extracted from bibliographic references

0 Sel



## Interoperability

Retrieving marine data is a costly process. Just to be efficient, the principle of obtaining a piece of data once and using it several times prevails, especially if it has been publicly funded. This can be organised within the same integrated repository, or facilitating access to data from other systems through interoperability protocols. REDMIC uses both options.

To this end, SeaDataNet standards (Pan-European Infrastructure for Ocean & Marine Data Management) have been chosen in the context of IODE (International Oceanographic Data and Information Exchange) in compliance with the INSPIRE Directive and EMODNET set by the new European Marine Strategy.

DarwinCore is the direct reference for species codes and taxonomic status, due to the fact that databases run on it and follow its standards. It is the most spread and it is used by WORMS (World Register of Marine Species). REDMIC is synchronised with this system online.

### *REDMIC adopted standards*

<b>Data</b>	<b>NetCDF Format (Network Common Data Format).</b>
<b>Metadata</b>	Standard ISO-19115:2003 and Standard ISO-19119:2005
<b>Services</b>	REST
<b>Geocode</b>	WGS84 EPSG 4326
<b>Vocabulary</b>	MMI (Marine Metadata Interoperability Semantic Framework)



“There is a great staff behind REDMIC”





*OAG is a State public foundation created in 2008 by the Port Authority of Santa Cruz de Tenerife and the Canarian Government as a result of the European Commission's opinion regarding the project for the new industrial port of Granadilla, in Tenerife. In addition to independently supervising the environmental repercussions of said port and the correct implementation of corrective and compensatory measures, OAG undertakes as a compensatory measure monitoring the state and trends of local marine biodiversity. To do so, and in collaboration with competent authorities, OAG has created and manages REDMIC, thus putting biodiversity in the context of its oceanographic environment. We believe that data obtained with public funds must be made available to the public, so that they can be used as often and as many times as possible. REDMIC is the instrument that must facilitate this task.*

*OAG was created in perpetuity and its future functioning will be guaranteed by the port of Granadilla as an environmental compensation. Giving REDMIC to the scientific community and marine users is a good use of this compensation*

## CONTACT

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