# *Arquipelago Life and Marine Sciences* 1980-2024: 44 years promoting marine and terrestrial science from the Azores

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*Arquipelago. Life and Marine Sciences*, a scientific journal of the University of the Azores, has been published since 1980. The first serial of this journal published, until 1985, five regular volumes and the proceedings of an international symposium on geology. With a restricted circulation, the journal published 62 articles dealing with agriculture and animal production, others on biodiversity and ecology from the Azores, and various theoretical essays. The authors were mainly from the University of the Azores and more than 55% of the papers were written in Portuguese. With the second serial (1990–2024), the journal evolved from a local publication into a peer-reviewed international journal focused on marine and terrestrial ecosystems. The 31 volumes published contained 302 contributions from 495 authors of 28 different nationalities. About 64% of the studies focused on marine science, covering biodiversity, fisheries biology, deep-sea ecology, and oceanic research, particularly in Azores and Macaronesia. Fish, cephalopods, and cetaceans were among the most studied groups. Terrestrial studies (34%) emphasized biodiversity, biogeography, and conservation, with a strong focus on arthropods and plants in native and human-modified habitats. While 38% of the authors were affiliated with the University of the Azores, many contributions came from international collaborations, strengthening the journal's global reach. Despite its scientific impact, *Arquipelago* faces challenges in visibility and competitiveness. To ensure sustainability, a transition to thematic issues and editorial reconstruction would be necessary. This review highlights the legacy of the journal and its future prospects.

*Key words: Arquipelago. Life and Marine Sciences, historical review, scientific themes, geographical coverage, ecosystems and habitats investigated, taxonomic groups studied, authors.*

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## INTRODUCTION

*Arquipelago* is a scientific journal of the University of the Azores, first published in 1980, three years after the foundation of the Azorean Academy. The first volume was titled *Arquipélago. Revista do Instituto Universitário dos Açores*, but that name was changed the year after when the Instituto Universitário attained university status, and the following volumes were published as *Arquipélago. Revista da Universidade dos Açores*.

During its early years, *Arquipélago* encompassed several thematic series, such as *Ciências da Natureza*, *História*, *Filosofia*, *Línguas e Literatura*, and *Ciências Sociais e Educação*, all published in Portuguese

(see *Repositório da Universidade dos Açores: ARQUIPÉLAGO - Revista da Universidade dos Açores* [uac.pt]). However, only the *Ciências da Natureza* series (under different names) has continued to be published regularly to this day.

A brief history of this scientific journal is detailed in two editorial notes published in Volumes 27 and 38 (*Martins, 2010; Gonçalves, 2020*) on the occasions of the journal's 30th and 40th anniversaries.

## METHODOLOGICAL NOTE

This review of the scientific journal presently named as *Arquipelago, Life and Marine Sciences,* is based on a comprehensive inventory of all papers and short communications published between 1980 and 2024 across two distinct serials. The first serial is used here to identify the collection of the first six volumes, published between 1980 and 1985; the second serial includes all *Arquipelago* issues published since 1990. The dataset includes bibliographic information (serial, volume, type of publication, title, language, and authors), along with a classification system for each contribution. This classification covers ecosystem, habitat, region, keywords (main subject), and taxa (at four taxonomic levels). An author list is also provided, detailing affiliations and *Arquipelago* authorship data (serial, number of publications, and major ecosystems). Both datasets are publicly accessible by demanding to the author.

## THE FIRST SERIALS: ARQUIPÉLAGO. CIÊNCIAS DA NATUREZA (1980–1985)

*Arquipélago. Ciências da Natureza* serial was established to publish research conducted by scientists and technicians from the University of the Azores. The journal primarily focused on biology and geology, but also included studies in ecology, agricultural sciences, and fundamental sciences such as mathematics, physics, and chemistry.

The first editors, José Ávila Martins and Vasco Garcia, were founding professors at the Azorean Academy. The printed volumes did not feature an editorial board or a list of collaborators. The publication had a monochromatic cover and was formatted in C5 size, resembling a book (see Figure 1).

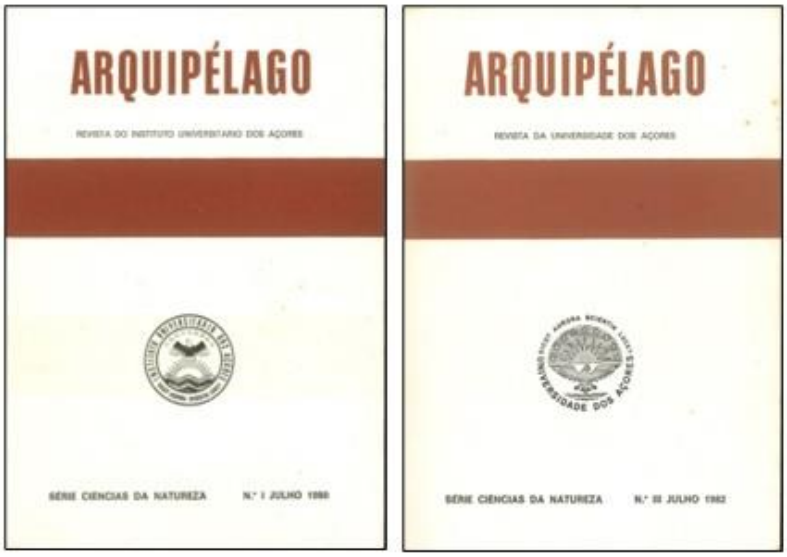


Fig. 1 – Cover of volumes I and III of *Arquipélago*. Revista da Universidade dos Açores. Série Ciências da Natureza.

Papers were not subject to peer review. As indicated in the preliminary statement of Volume I, authors were solely responsible for the content of their contributions (*O conteúdo dos artigos é da inteira responsabilidade dos autores*).

Volume III was dedicated to the proceedings of the International Symposium on the Activity of Oceanic Volcanoes (see Box 1). The remaining five regular volumes included 67 papers by 64 authors.

**Research Areas, Habitats, Taxonomic Groups, and Regions**

Most studies (68%) focused on terrestrial species, habitats, or ecosystem services, only a small proportion addressed marine and freshwater species (see Figure 2A).

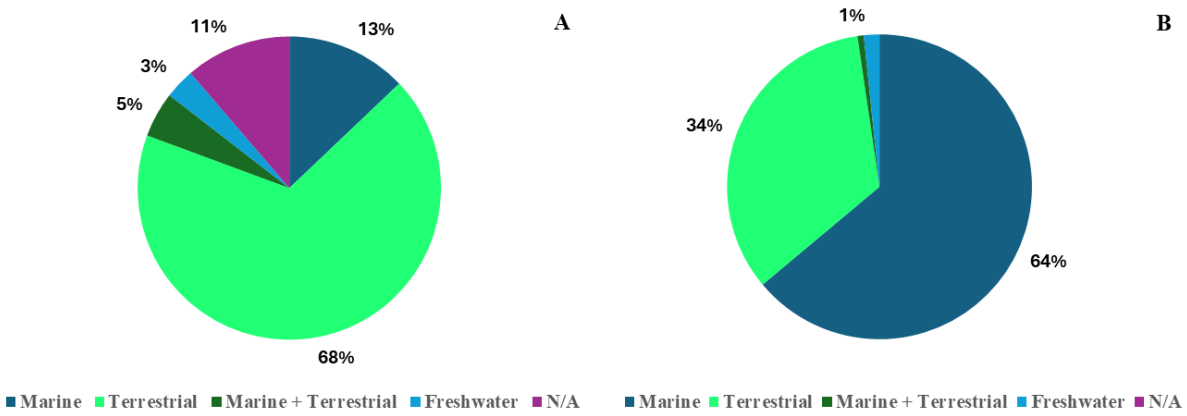


Fig. 2 – Distribution of papers published in *Arquipelago* per major ecosystem: A) Series 1 (n=62); B) Series 2 (n=302)

Agriculture was the dominant theme of the publication, with contributions covering biological and pest control, applied biotechnology, fruit farming, and horticulture. Topics related to animal production included cattle feeding, reproduction, and dairy production. Approximately a third of the content was devoted to ecology, biodiversity, biogeography, taxonomy, and ethology, while geology and palaeontology accounted for 12%. Other subjects included theoretical physics, chemistry, electrical engineering, pharmacology, anthropology, demography, and tourism.

A notable proportion of the studies could not be associated with a specific habitat (see Figure 3A), as they were theoretical or conducted in laboratory settings. However, field studies in terrestrial ecosystems frequently focused on human-modified habitats (such as pastures, agricultural fields, gardens, orchards, and greenhouses) as well as native or semi-natural landscapes (including valleys and mountains). Aquatic studies were carried out in freshwater lakes, coastal waters, and pelagic marine zones.

The primary taxonomic groups investigated were arthropods (of which 91% were Lepidoptera and Coleoptera insects), plants (various taxa), birds (including checklists and ecology of some Passeriformes), and mammals (with 95% focused on cattle) (see Figure 4A).

Reflecting the scope of the publication, more than three-quarters of the papers focused on the Azores islands, with a smaller number from Madeira, Macaronesia islands, and Germany (see Figure 5A).

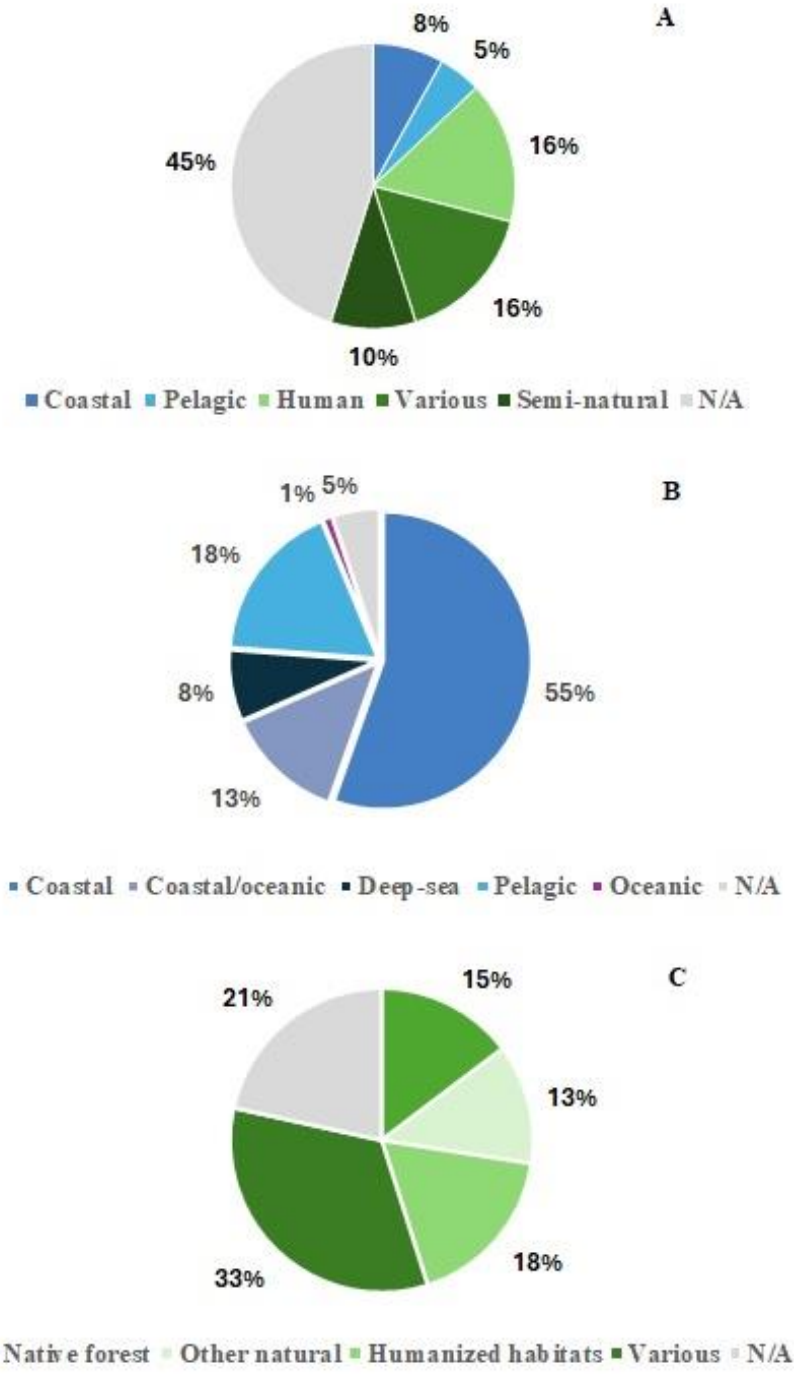


Fig. 3 – Distribution of papers published in *Arquipelago* per habitat. A) Series 1 (n=62); B) Series 2, marine (n=193); C) Series 2, terrestrial (n=102)

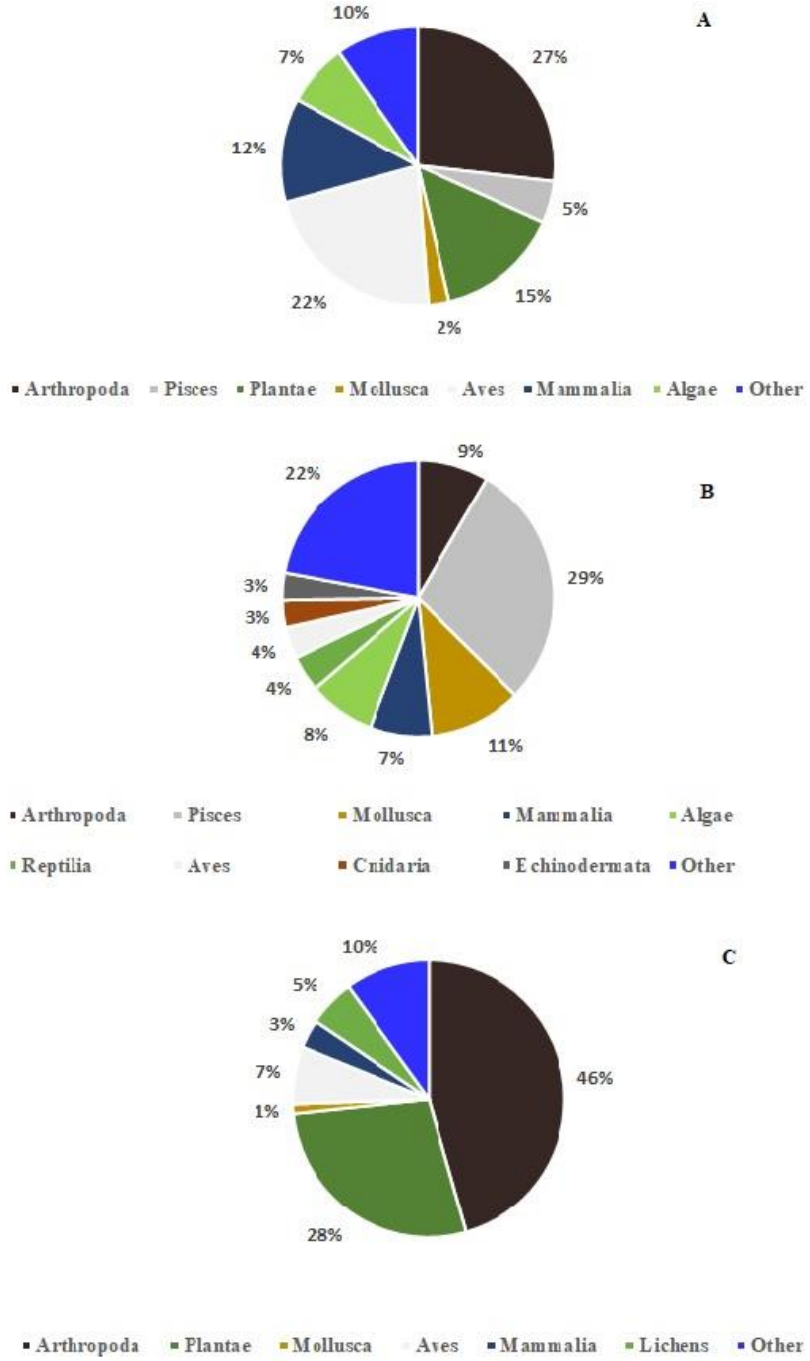


Fig. 4 – Distribution of papers published in *Arquipelago* per main taxonomic group. A) Series 1 (n=41); B) Series 2, marine (n=190); C) Series 2, terrestrial (n=90)

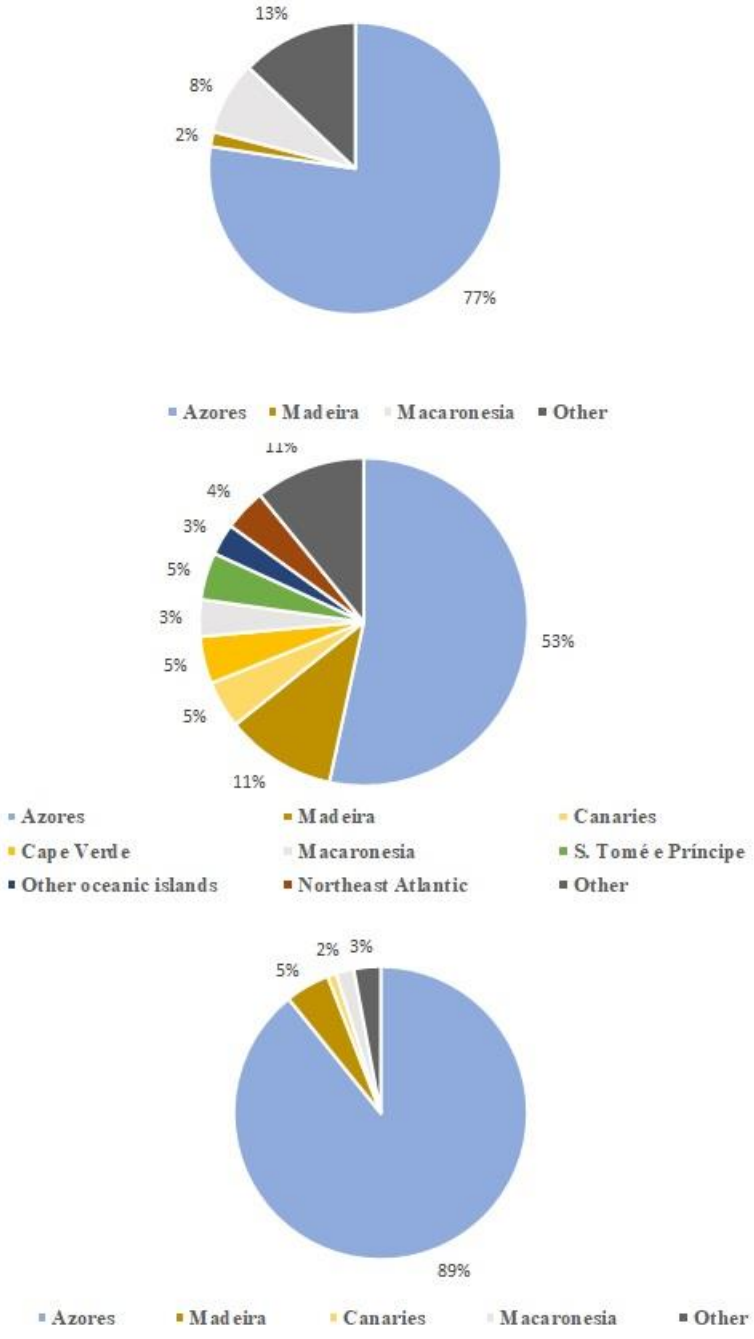


Fig. 5 – Distribution of papers published in *Arquipelago* per geographical region. A) Series 1 (n= 62); B) Series 2, marine (n=193); C) Series 2, terrestrial (n=102)

**Authorship**

Most authors were affiliated with universities (80%) and public institutes (8.5%), with relatively few coming from the private sector (see Figure 6A). Seventy-five percent of them were based in Portuguese institutions, the majority of whom affiliated with the University of the Azores (58% of the total), with others from the University of Lisbon (6.5%) and various other entities, including the National Agronomic Station.

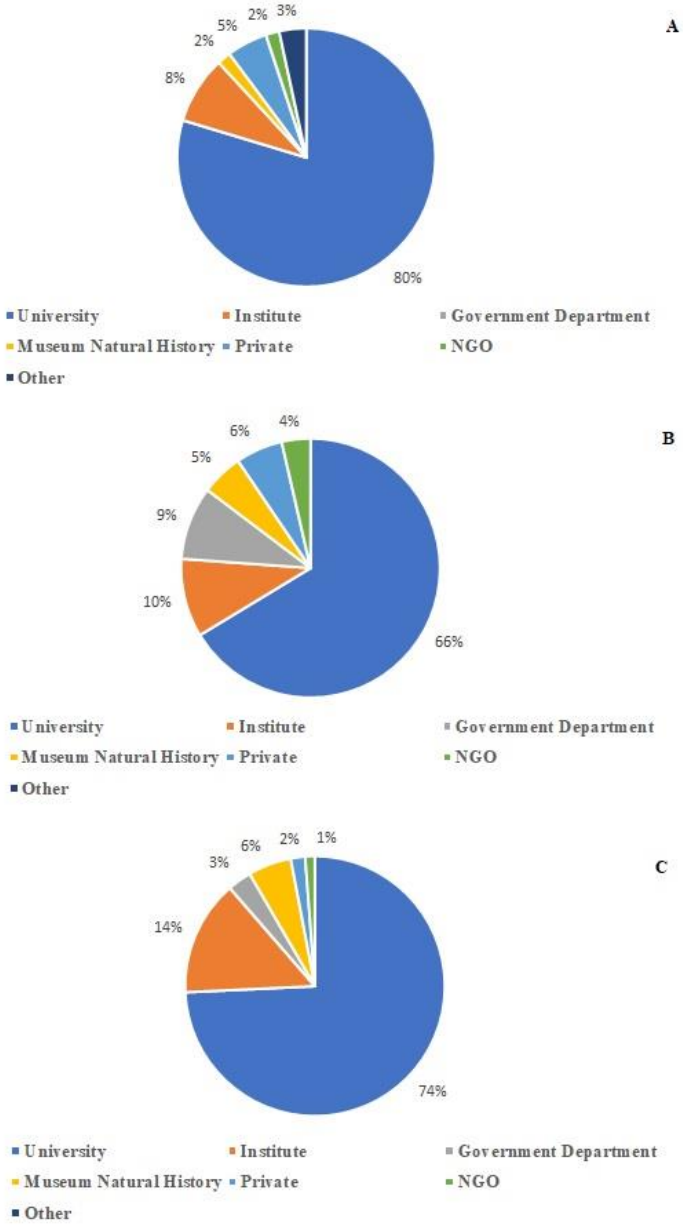


Fig. 6 – Distribution of authors from *Arquipelago* per main institution type of author affiliation. A) Series 1 (n= 59); B) Series 2, marine (n=306); C) Series 2, terrestrial (n=167)

Most papers from the University of the Azores (71%) were authored by researchers from the former Laboratory of Applied Ecology, which later became the Department of Biology on São Miguel campus. Contributions from the Department of Agricultural Sciences (Terceira Island) and the Department of Oceanography and Fisheries (Faial Island) were notably less, each accounting for about 15% of the publications.

Foreign authors from Germany (9.7%; Universität des Saarlandes; Ruhr-Universität Bochum), the USA (8.1%; Woods Hole Oceanographic Institution; Saint Louis University; University of New Hampshire), and France (8.1%; CNRS) were involved in scientific collaborations with Azorean academy colleagues. Interestingly, one article was authored by a researcher from Bangladesh, affiliated with Petrobangla, a private company.

Most papers (67.2%) were written by a single author. Gérard Le Grand, Vasco Garcia, and João Tavares, all from the Laboratory of Applied Ecology, were the most prolific authors, with 10, 4, and 4 papers, respectively.

*Arquipélago. Ciências da Natureza* first serial was discontinued in 1985.

***BOX 1 - Proceedings of the International symposium on the activity of the oceanic volcanoes*** (Figure 1)

Azorean geologists Frederico Machado, José Ávila Martins, and Victor Hugo Forjaz hosted the event at the University of the Azores. Hans-Ulrich Schmincke, Peter E. Baker, and Victor H. Forjaz edited *Arquipélago. Ciências da Natureza* Volume III.

The 39 scientific contributions in this volume centred on volcanology, petrology, and geochemistry, with a particular emphasis on marine geology and geothermal production. Case studies from 18 geographical regions were presented, most notably from the Azores (8), Iceland (6), and the Canary Islands (3).

Contributions relating to the Azores focused on the Água de Pau and Nordeste volcanoes on São Miguel Island, the Capelinhos volcano on Faial Island, and the geodynamics of the Azorean islands. A report summarized research on thermal manifestations in São Miguel. The symposium also included field trips to the islands of São Miguel, Terceira, Faial, and Pico.

The volume featured 60 authors, of which only two were Portuguese (F. Machado and J. A. Martins). Authors represented 14 nationalities, with British, Russian, Italian, North American, Icelandic, and German contributors making up approximately 80% of the participants. The symposium was sponsored by the International Association of Volcanology and Chemistry of the Earth's Interior, in collaboration with the University of the Azores.

## THE SECOND SERIAL: ARQUIPÉLAGO. LIFE AND MARINE SCIENCES (1990–2024)

By the late 1980s, Helen Rost Martins, a pioneering researcher at the Department of Oceanography and Fisheries of the University of the Azores (DOP/UAç), was invited to edit *Arquipélago. Ciências da Natureza*. The goal was to modernize the journal and broaden its appeal to an international scientific audience.

The journal was renamed *Arquipélago. Bulletin of the University of the Azores. Life and Earth Sciences* (*Boletim da Universidade dos Açores. Ciências da Natureza*, in Portuguese). The first volume of this new

serial was published as number 8, as Volume 7 of the previous serial had been in preparation but was never finalized. In 1993 (Volume 11), the name was changed again to *Arquipélago. Bulletin of the University of the Azores. Life and Marine Sciences* (*Boletim da Universidade dos Açores. Ciências Biológicas e Marinhas*). Between 1993 and 2006 volume numbers were followed by an A (i.e., 11A, 12A, etc.) based on the decision that a new B series dedicated to earth sciences would be published. However, this never happened, and the A vanished after volume 24. In 2007, the title was shortened and retained only in English. In 2011, the accent in *Arquipélago* was eliminated and it became *Arquipelago.* Life and Marine Sciences, the name kept to this day.

*Arquipelago* published original scientific papers, short communications, and reviews on natural sciences, with a particular focus on marine and terrestrial biology and ecology. Its geographic coverage expanded from the Azores to include other Atlantic regions, including the Macaronesia archipelagos. After 2007, the scope broadened further to encompass oceanic islands and seamounts.

Manuscripts submitted to *Arquipelago* underwent peer review. Helen Martins corresponded with at least 292 international scientific reviewers from 29 countries, playing a key role in creating an international journal and promoting the science conducted in and about the Azores.

An Editorial Board, led by the Editor, was supported by an Editorial Secretariat and an Editorial Committee. In 2018 the figure of Technical Editor was created. After 2020, the Editorial Board was restructured to include the competences and members of the Editorial Committee and the Advisory Board.

The design of the publication was modernized to align with international standards following the models of the former *Sarsia*, together with *Ophelia*, now *Marine Biology Research,* and *Journal of the Marine Association of the United Kingdom*. Formatting was standardized through the *Instructions to Authors* (revised in 2009). The glossy paper and graphically compact volumes enhanced the visual appeal. Since 2007 (Volume 24), the covers featured wildlife photographs related to a paper in the volume (see Figure 7).


Fig. 7 – Covers of selected volumes of *Arquipelago*

Initially, 1,000 copies were printed per issue, but this number gradually decreased to 300 as digitalization advanced. The distribution was supported by exchange agreements with scientific publishing houses and institutions worldwide. By 2010, 46 scientific journals from 18 countries were received at the DOP/UAç library.

In 1997, the first of 14 supplements of *Arquipelago* was published (see section *Arquipelago Supplements* below and Table 2).

*Arquipelago* is indexed in major bibliographic systems related to marine sciences, biology, and zoology. It has Open Access since its inception and is fully available online at OKEANOS web page (https://www.okeanos.uac.pt/) and at the repository of the University of the Azores at https://repositorio.uac.pt/home.

**Financing**

Throughout the second serial, funding sources for editing and printing shifted frequently. Initially supported by the National Board for Scientific and Technological Research (JNICT; Vols. 13A to 15), the journal later received funding from the Portuguese Foundation for Science and Technology (FCT; Vols. 16A to 26). Additional support came from the Regional Secretariat for Science, Technology and Equipment of the Azorean Government (SRCTE; Vols. 26, 32, 34–38), Regional Fisheries Directorate (Vols. 35–36), the IMAR Institute of Marine Sciences (Vols. 26–29, 33–37), the Observatório do Mar dos Açores (OMA; Vols. 30–33), the OKEANOS and the Institute of Marine Sciences, University of the Azores (Vols. 36–38)

Table 2 –Supplements of *Arquipelago*. Life and Marine Sciences published with information about authorship or guest editors, type of publications, number of contributions and authors on each proceedings.

| Suppl. Number | Year | Title | Authors / Guest Editors | Type | Contributions (n) | Authors (n) |
|---|---|---|---|---|---|---|
| 1 | 1997 | Marine Fishes of the Azores. Annotated Checklist and Bibliography | Santos, RS, Porteiro, FM, Barreiros, JP | Checklist | | |
| 2 | 2000 | Fauna and Flora of the Atlantic Islands, Proceedings of the 3rd Symposium, Ponta Delgada, 21-25 September - Part A | Press, JR (Ed) (co-Editor: Bolten, M) | Proceedings | 15 papers | 31 |
| | 2001 | Fauna and Flora of the Atlantic Islands, Proceedings of the 3rd Symposium, Ponta Delgada, 21-25 September - Part B | Press, JR (Ed) | Proceedings | 12 papers + 4 short comm. | 37 |
| 3 | 2002 | Towards planning of the seafloor observatory programs for the MAR region. Proceedings of the II MoMAR Workshop. Horta (Azores, Portugal) 14-17 June 2002 | Santos, RS, Escartín, J, Colaço, A & Adamczewska, A (Eds) | Proceedings | 2 paper + 25 abstracts | 122 |
| 4 | 2003 | Management of Deep-sea Hydrothermal Vent Fields MPA in the Azores Triple Junction. Proceedings of the Workshop. Horta 18-20 June 2002 | Santos, RS, Colaço, A, Christiansen, S (Eds) | Proceedings | Reports | |

| Suppl. Number | Year | Title | Authors / Guest Editors | Type | Contributions (n) | Authors (n) |
|---|---|---|---|---|---|---|
| 5 | 2003 | Ecology of Aphidophaga: Biology, Ecology and Behaviour of Aphidophagous Insects. Proceedings of the 8th International Symposium. Ponta Delgada, 1-6 September, 2002 | Soares, AO, Ventura, MA, Garcia, V & Hemptinne, J-L (Eds) | Proceedings | 16 papers | 42 |
| 6 | 2008 | Applied Aspects of Marine Parasitology. Proceedings of the International Workshop on Marine Parasitology. Horta, 21-24 May 2006 | Afonso-Dias, I, Menezes, G, MacKenzie, K & Eiras, JC (Eds) | Proceedings | 6 papers + 7 abstracts | 15 |
| 7 | 2008 | Developing a Sustainable Aquaculture Industry in the Azores. Proceedings of the International Workshop, Horta 2-5 junho 2008 | Pham, CK, Higgins, RM, De Girolamo, M & Isidro, E (Eds) | Proceedings | 23 extended abstracts | 39 |
| 8 | 2014 | The sea of the Azores: scientific forum for decision support. I - Horta, 12-19 January 2011. II - 9-10 July 2012 | Carreira, GP, Higgins, RM, Cardigos, F & Porteiro, FM (Eds) | Proceedings | 19 extended abstracts | 56 |
| 9 | 2016 | 2nd International Conference on Island Evolution, Ecology and Conservation: Island Biology 2016, 18-22 July 2016, Angra do Heroísmo, Azores, Portugal. | Gabriel, R, Elias, RB, Amorim, IR & Borges, PAV (Eds) | Proceedings | 423 abstracts (92 from posters) | 1692 |
| 10 | 2017 | Fishes of the Northern Mid-Atlantic Ridge collected during the MAR-ECO cruise in June-July 2004 | Porteiro, F, Sutton, T, Byrkjedal, I, Orlov, A, Heino, M, Menezes, G & Bergstad, OA / Bergstad, OA (Ed) | Checklist | | |

| Suppl. Number | Year | Title | Authors / Guest Editors | Type | Contributions (n) | Authors (n) |
|---|---|---|---|---|---|---|
| 11 | 2019 | Ocean Governance in Arquipelagic Regions. Internatinal Conference 7-10 October, 2019, Faial, Azores, Portugal. | Rodrigues, L. & Garcia Guerreiro, A (Eds) | Proceedings | 28 extended abstracts (bilingual) | 141 |
| 12 | 2020 | Synopsis of the biological, ecological and fisheries-related information on priority marine species in the Azores region | Santos, R, Medeiros-Leal, W & Pinho, MR / Santos R. (Ed) | Review | | |
| 13 | 2022 | Updated checklist of the marine macroalgae of the Azores archipelago | Neto, AI, Moreu, I, Cacabelos, E & Parente, MI / Parente, MI (Ed) | Checklist | | |
| 14 | 2024 | Production of marine invertebrates at early stages – Manual for best practices | De Girolamo, M, Courtois de Viçose, G., Andrade, C. & Isidro. E. | Technical Manual | 6 papers | 12 |

***BOX 2* – Editorial structure and composition of *Arquipelago*. Life and Marine Sciences**

**Editor in Chief (1990–present):** Helen Rost Martins.
**Editorial Secretariat (1990–2018):** Ten collaborators from DOP/UAç including João M. Gonçalves (Vols. 8 to 23A), José Nuno Gomes-Pereira (Vols. 24 to 34), Emanuel Arand (Vols. 24 to 35), Helen R. Martins (Vols. 24 to 35), and Paula Lourinho (Vols. 33 to 34).
**Technical Editor (2018-present):** José Nuno Pereira (Vol. 35) and Paula Lourinho (Vols. 36 to 38).
**Editorial Committee (1990–2018):** Three members, one per campus of the University of the Azores. Most relevant contributors included Paulo A.V. Borges (Terceira, 18 years), João M. Gonçalves (Faial, 11 years), José M.N. Azevedo (São Miguel, 10 years), and Ricardo Serrão Santos (Faial, 10 years).
**Advisory Board (1990–2021):** Twenty-nine international researchers from Portugal (9), the UK (8), the USA (4), the Netherlands (2), Canada, Germany, Ireland, Norway, Spain, and Sweden (1 each). Notable members (20 or more years): Alan B. Bolten, Erik Sjögren, Miguel Angel Alcaraz, António Bivar de Sousa, Richard D.M. Nash, Malcolm R. Clarke, and Charles H.J.M. Fransen.
**Reviewers (1990–2021):** 292 scientists from 29 countries. Most (90.7%) reviewed just one or two manuscripts. Most active reviewers (number of papers reviewed) included Joel Bried (8), Charles H.J.M. Fransen (7), Malcolm R. Clarke (7), Erik Sjögren (6), Filipe M. Porteiro (6), and Paulo A.V. Borges (6).
**Indexed Bibliographic Systems:** Aquatic Science and Fisheries Abstracts (ASFA), BIOSIS Previews, Current Awareness in Biological Sciences, Zoological Records, Marine Science Content Tables, Biological Abstracts, and, more recently, the Directory of Open Access Journals, the Web of Science, and ISI Web of Knowledge.
***Arquipelago* ISSN:** Before 1996 (to Vol. 14A): ISSN 0870-4704; from 1996 onwards: ISSN 2182-9799 (when the journal changed its name).

**A survey of the 2nd Serial of *Arquipelago***

Between 1990 and 2020, *Arquipelago* published 31 volumes, containing 302 contributions (198 papers and 69 short communications) written by 495 authors. The journal also published three *In Memoriam* items, two book reviews, and several editorial notes, primarily acknowledging the reviewers of the manuscripts and the financial support. As mentioned earlier, Helen Martins (Volume 27, 2010) and João Gonçalves (Volume 37, 2020) published two editorial notes celebrating, respectively, the 30th and 40th anniversaries of *Arquipelago*.

Volume 22 (2005) includes 12 extended abstracts from the *1st International Workshop in Marine Molecular Phylogenetics – Use of Molecular Markers for the Study of Marine Biodiversity*. The editorial decision to publish proceedings of a scientific event in a regular issue was an exception, as proceedings from other scientific meetings were typically published as *Arquipelago* supplements.

On average, the volumes contained nine papers/short communications, ranging from 5 to 14 (or 17, counting the extended abstracts in Volume 22).

**Ecosystems Covered**

About two-thirds (64%) of the articles focused on marine species, habitats, and resources, with most of the remaining contributions centred on terrestrial ecosystems (Figure 2B). Freshwater habitats and species were a minor subject (5 contributions), and the two bibliographic lists from São Tomé, Príncipe,

and Annobón islands included both marine and terrestrial faunas. Only five of the 31 volumes contained more contributions on terrestrial research compared to marine research.

**Geographical Coverage**

The majority of the 302 contributions (66%) investigated habitats and species from the Azores (Figure 5A, B). Papers from other oceanic islands such as Madeira (21), the Canaries (9), Cabo Verde (9), São Tomé and Príncipe (11), Saint Helena and/or Ascension (5), and São Pedro and São Paulo rocks (1) were less frequent. Collectively, the Macaronesia islands accounted for 83% of the published works. The journal also published 24 papers from mainland Portugal, the shores of Western Africa, Patagonia, and the North and Northeast Atlantic open ocean.

**Authorship**

The 495 authors who published in *Arquipelago.* Life and Marine Sciences were predominantly scientists working at universities and public research institutes (79%). Some were affiliated with natural history museums, botanical gardens, governmental departments, and NGOs (16%) (Figure 6A, B). A small number of contributors (26) were from the private sector. Only fourteen authors published in both serial 1 and serial 2 of *Arquipelago*.

The authors of *Arquipelago* belong to 28 different nationalities. Nearly two thirds were from Portugal (13 of whom also affiliated with non-Portuguese institutions). Of the 312 Portuguese authors, two-thirds were from the Azores, a quarter from mainland Portugal, and fewer than 10% from Madeira institutions. About 93% of the Azorean authors were affiliated with the University of the Azores.

Non-Portuguese authors were primarily from the UK (9.1%), Spain (7.9%), and the USA (4.3%). Along with scientists from German and French institutions, these authors account for approximately 90% of the total foreign authors. The 42 UK authors include 6 from Ascension Island and 3 from the Falkland Islands. Most of the 39 Spanish authors are affiliated with institutions based in the Canary Islands.

The percentage of authors from universities and research institutes is higher (88%) among those who published on terrestrial subjects. Proportionally, the number of Portuguese authors is also higher among terrestrial scientists.

**Authors from the University of the Azores**

The 189 authors from the University of the Azores represent 38% of the total. Of these, 40% belong to the campus in S. Miguel Island (Ponta Delgada), 38% to Faial Island (Horta) and the remaining 22% to Terceira Island campus.

Authors from Ponta Delgada were primarily affiliated with the former Department of Biology, as well as the Department of Technological Sciences and Development. They are now part of the Faculty of Sciences and Technology, and members of various research centres such as CIRN, CE3C, CIBIO, CITA-A, CVARG, and CHAM. Many authors from the former Department of Oceanography and Fisheries (DOP), now Institute of Marine Sciences, OKEANOS were also affiliated with IMAR – Institute of the Sea, a management entity associated with DOP/OKEANOS. Researchers from Terceira are members of the Department of Agricultural and Environmental Sciences (now Faculty of Agricultural and Environmental Sciences) and many are associated with the CE3C, CITA-A, and CIRN research centres.

Scientists from Ponta Delgada published slightly more papers (51%) on terrestrial ecosystems, those from Terceira Island primarily on terrestrial studies (87%), while researchers from Horta focused on marine themes (92%).

Some authors from the University of the Azores were also affiliated with institutions in France, Finland, UK, Mexico, USA, or other Portuguese institutions (MARE, University of Algarve, Nova University of Lisbon, Task Group for the Extension of the Continental Shelf, ARDITI).

**Marine Studies**

Seventy-three thematic keywords were used to classify the scientific contributions on marine science (Figure 8). Most of them fit into biodiversity, biology, and ecology. Checklists and reports on new records and occurrences of invertebrate and fish species in specific Atlantic regions represent 30%.

Fishery biology, taxonomy, ethology, genetics, and biotechnology were also important subjects under investigation. Monitoring and citizen science programmes, oceanographic methodologies and data, ecotoxicology, animal health, ecological associations, cetacean strandings, and physical oceanography (remote sensing) were minor subjects.


Fig. 8 – Word clouds based on all key words used to classify the contributions published in *Arquipelago*. a) marine studies; b) terrestrial studies

The research published primarily considered coastal species and habitats (56% of the contributions; Figure 3B). Between 1992 and 1996, numerous studies emerged from the *Expedition Azores 1989*, a significant marine research initiative by the University of the Azores involving a substantial group of international partners. The remaining articles relate to marine fauna occurring both in coastal and oceanic waters (14%), exclusively in the open ocean (18%), and in deep-sea (8%) ecosystems.

Contributions to *Arquipelago* dealing with marine research were conducted in about 20 geographical regions (Figure 5B). Naturally, most were from the Azores (54%), followed by those from Madeira (10.8%). Three-quarters were dedicated to the four Macaronesia archipelagos. The studies extended to São Tomé e Príncipe, other Atlantic oceanic islands, and the wide North and Northeast Atlantic (5.6%).

Fish were the main taxonomic group targeted in both coastal and oceanic studies (55) (Figure 4B). The papers focused mainly on bony fish; a few (8), however, investigated sharks and rays. A significant emphasis was placed on fish biodiversity, with the publication of various checklists by family (e.g., Labridae or Blennidae) and region (e.g., demersal and coastal fish from Cabo Verde and São Tomé, respectively), as well as reports on new records and occurrences of fish species in various oceanic regions. Fish studies also included taxonomic, biological, and ethological approaches to notable species, such as the Azores endemic blue wrasse and the dusky grouper. Other papers describe Azores coastal fish assemblages (e.g., sandy beaches and tide pools) and symbiotic relationships between fish and invertebrates. Fisheries biology, stock assessments, and trends in the landings of commercially important pelagic and demersal fish species were important contributions to the understanding of those stocks in Azores and Madeira (Table 1).

Molluscs were the second most studied taxonomic group. New occurrences and records of coastal sea slugs *(*Heterobranchia) from the Azores dominated the contributions on gastropods. Papers dealing with cephalopods include new records and checklists of squid and octopus from the Azores and from other oceanic archipelagos. A comprehensive revision of the diversity and distribution of oceanic pelagic cephalopods in the Northeastern Atlantic is a highlight of this journal. Other contributions focus on reproductive ecology and ecotoxicology of commercial cephalopods.

Papers on arthropods (16) were primarily dedicated to crustacean decapod biodiversity, but also to mysids and barnacles, including checklists of these groups and occurrences of rare species in specific archipelagos. Oceanic studies on crustaceans include an evaluation of the fishery potential of deep-sea crabs and an extensive ecological study of pelagic shrimp in the Northeast Atlantic, along with a description of a new species (*Lysmata olavoi*).
Regarding algae studies, four checklists from the Azores and one from Cabo Verde were published. Other contributions include taxonomic revisions, biotechnological screening, and ecological studies of intertidal pool algal assemblages and trophic pathways in upper coastal habitats of the Azores.

Papers on cetaceans (15) include a comprehensive checklist from the Azores, new species records, and ecological studies examining diving behaviour, species distributions, and population genetics. The information published on cetacean strandings helped establish the Azores Cetacean Stranding Network, and approaches to cetacean monitoring promoted the sustainability of whale-watching activities.

Studies on marine turtles (8) explored nesting and reproductive behaviours of various turtle species, juvenile distribution patterns, and turtle by-catch by pelagic fisheries, among other subjects. A review of turtle research in the Azores highlighted the fruitful collaboration between the University of Florida and the University of the Azores.

Research developed methodologies to monitor seabirds (7) at sea and documented their feeding, growth, and reproductive behaviour, population structure, and conservation of various emblematic species.

Biodiversity contributions included new records, taxonomic revisions, and checklists of diverse marine organisms, including Protozoa, Porifera, Cnidaria, Nematoda, Nemertea, Annelida, and Echinodermata, mostly from Atlantic islands.

A collection of papers (19) addressed more than one taxonomic group (e.g., arthropods and cnidarians, fish and crustaceans, cetaceans and cephalopods, etc.), mixed invertebrate groups (13) and lesser-known taxa (Protozoa, Porifera, Cnidaria, Nematoda, Nemertea, Annelida). Other contributions examined deep-sea megafauna occurrence and ecology, such as cold-water corals, echinoderms, and brachiopods, and results from plankton surveys.

The top five of the 305 authors contributing the most to marine studies include four from the University of the Azores: Ricardo Serrão Santos (17), Helen R. Martins (13), and Filipe M. Porteiro (10) from DOP/OKEANOS and IMAR at the Faial Island campus; and Ana Neto from the Faculty of Sciences and Technology and the research centres CE3C and GBA at the São Miguel campus. However, the most prolific author was Peter Wirtz (40), a marine biologist and underwater photographer affiliated with the University of Madeira and the University of Algarve, Portugal, who contributed with many papers on new records and occurrences of coastal species throughout the eastern Atlantic islands, from the Azores to São Tomé and Príncipe Islands.

Table 1. Inventory of fishery biology studies published in *Arquipelago* Life and Marine Sciences, between 1990 and 2024 (see *Arquipelago*. Life and Marine Sciences index file for authors and other details)

| Species | Subject | Region |
|---|---|---|
| *Beryx decadactylus* | Age and growth | Azores, Madeira and Canary Islands |
| *Scomber colias* | | Madeira |
| *Trachurus picturatus* | | Madeira, Azores |
| *Dentex gibbosus* | | Madeira |
| *Pagrus pagrus* | | Azores |
| *Helicolenus dactylopterus* | | Azores |
| *Xiphias gladius* | Age | Azores |
| *Scomber colias* | Age, growth and reproduction | Azores, Madeira |
| *Dentex gibbosus* | Reproduction | Madeira |
| *Pagellus bogaraveo* | | Azores |
| *Centrophorus squamosus* | Biology | Madeira |
| *Phycis phycis* | Feeding | Azores |
| *Conger conger* | | Azores |
| *Xiphias gladius* | | Azores |
| *Prionace glauca* | | Azores |

**Terrestrial Studies**

Publications on terrestrial ecosystems accounted for 102 contributions and were classified using fifty-five keywords (Figure 8). More than half of these papers focused on biodiversity and ecology, many of which were applied to conservation and biogeographic analysis (within the Azores and across Macaronesia islands). Biodiversity studies include checklists and new records of species and occurrences. Non-indigenous species, bioinvasions, and pest control were addressed in about 10% of the papers. Contributions focusing on agriculture, animal production (feed and feeding), and biotechnology (bioprospecting, dairy production) were less prominent.

Most of the studied floras and faunas inhabit a mosaic of natural and human-altered habitats (33.3%; Figure 3C). Some contributions focused on native forests (14.7%), while others investigated mountains, coastal areas, islets, volcanic caves, marshes, and wetlands (12.7%). A few were dedicated to agriculture, grasslands, gardens, and orchards (17.6%). Some studies did not fit into any specific habitat category (21.6%).

Terrestrial papers and short communications were predominantly focused on the Azores (89%), with a few works dealing with Madeira (5%), the Canaries, and Macaronesian archipelagos in general (Figure 5C).

Arthropods were by far the most studied taxonomic group (46% of contributions), with insects from 8 orders accounting for 83% those (Figure 4C). These papers include taxonomic checklists, new records, and occurrences of native (and endemic) butterflies, flies, bugs, and beetles (Lepidoptera, Diptera, Hemiptera, Coleoptera), along with other insects. These studies often discuss biogeographic affinities and include ecological and biological observations. Bioinvasions and pests affecting fruit and vegetable production, pasture, and wood (e.g. termites) were also subjects of several publications.

Another significant group of papers (28%) was dedicated to plants. The ecology of bryophytes, based on complete species inventories across the Azores archipelago, was exhaustively presented. This highly speciose plant group has been long-term monitored and used to assess ecological hypotheses. Studies on vascular plants (16) include several papers on the propagation of endemic species (e.g., *Picconia azorica*) and ecological assessments of native and invasive species across elevational gradients. Some studies focused on the biology and ecology of invasive species (e.g., *Hedychium gardnerianum*) and on bioprospecting and biotechnology applied to agriculture and cattle feeding.

Ecological studies (4) focused on plant and insect assemblages and associations. Investigations on birds (6) reported on biology of endemic species (e.g., Azores bullfinch and wood pigeon), the occurrence of occasional migrant species, and predation on seabirds by land birds. Other contributions include studies on the biodiversity and biogeography of lichens, the biology of an endemic gastropod, and the occurrence of one non-native amphibian and one reptile.

Among the 169 researchers who contributed to terrestrial ecosystem studies, the five most prolific were all from the University of the Azores: Paulo Borges (20), Rui Elias (9), and Rosalina Gabriel (8) from the Terceira campus, affiliated with the Faculty of Agrarian and Environmental Sciences and research centres CE3C and CITA-A; and Vergílio Vieira (12) and Luis Silva (9) from the Department of Biology at the São Miguel campus. Heino Schäfer (5) from Universität Regensburg, Germany, and Erik Sjögren (4) from Uppsala University, Sweden, were the two botanists who made notable contributions on the flora of the Azores.

## ARQUIPELAGO SUPPLEMENTS

Between 1997 and 2024, fourteen supplements of *Arquipelago.* Life and Marine Sciences were published (Table 2). These supplements were printed irregularly to accommodate works that did not fit the regular publication format due to their length or because they were proceedings from scientific events not subject to peer review. Notably, the *Acta* of the *1st International Workshop in Marine Molecular Phylogenetics*

was published in 2005, volume 22, and *The Proceedings of the International Symposium on the Activity of Oceanic Volcanoes* appeared in volume III of the first *Arquipelago* serial.
The supplements include three exhaustive checklists of highly diverse marine biological groups. The first is an annotated list of marine fishes from the Azores, which remains a key reference for the region's marine fauna. A recent supplement presents a comprehensive revision of the macroalgae occurring in the Azores, complete with synonyms and references by island. This monumental work, authored posthumously by Ana Neto, a distinguished professor of coastal ecology at the University of the Azores, will undoubtedly guide future research on macroalgae in the region. Another checklist provides a detailed list of fish from the Mid-Atlantic Ridge, between Iceland and the Azores, collected during the Mar-Eco 2004 cruise as part of the Census of Marine Life initiative. Supplement 12 compiles fact sheets with critical biological, ecological, and fishery data on the most commercially important marine organisms from the Azores, establishing a baseline for future stock assessments of these species.

The supplements also include proceedings from several marine-related workshops, focusing on specialized topics such as deep-sea hydrothermal observation and conservation, marine aquaculture in the Azores, and marine parasitology. Two additional supplements report on contributions from policy-scientific *fora* designed to inform political decision-making on marine affairs in the Azores and Macaronesia, covering topics like fisheries, blue socioeconomics, ocean literacy, marine protected areas, and marine spatial planning. Other proceedings include two international symposiums: one a broader event on the Fauna and Flora of the Atlantic Islands (published in two volumes, covering both marine and terrestrial contributions from the Azores and beyond), and another more specialized symposium dedicated to the *Ecology of Aphidophaga*, highlighting the importance of controlling bioinvasions.

In 2016, the 9th supplement of *Arquipelago* published the proceedings of the *2nd International Conference on Island Evolution, Ecology, and Conservation: Island Biology 2016*, one of the largest and most attended scientific events in the Azores, organized by the University of the Azores at the Terceira campus. The last supplement, published in 2024, is an aquaculture manual for production of marine invertebrates at early stages resulting from applied research developed at Macaronesia. Supplements 9 and 14 were the only that were not printed.

Together, the supplements published in *Arquipelago* include 586 scientific contributions (mainly abstracts) from 2175 authors. However, the I*nternational Conference on Island Evolution, Ecology, and Conservation* represents 72% of the contributions and 76% of the authors.

## DISCUSSION

The initiative to publish *Arquipélago. Revista do Instituto Universitário* was based on the practice of most Portuguese public universities publishing their own scientific bulletins. The first serial of *Arquipélago. Ciências da Natureza* reflected the scientific interests established in the early stages of the newly founded Azores Academy. The challenge was to consolidate a body of researchers in areas considered essential for the progress of a remote and impoverished archipelago such as the Azores (i.e. agriculture and animal production), but also to attract scientists dedicated to geology, a key subject for these volcanic and seismic islands. Volume III, the Proceedings of the International Symposium on the Activity of Oceanic Volcanoes, shows the importance of geology for the Academy and the international reputation of the former geologists who founded the institution (i.e. Professors José Ávila Martins and Frederico Machado). Biology, ecology, biodiversity, biogeography and taxonomy also emerged as relevant subjects. Because of their importance for agriculture, most of the biological research focused on insects living in the terrestrial, human-modified and semi-natural habitats of the Azores. These former terrestrial researchers, mainly from the University of the Azores at S. Miguel campus, dominated the list of authors of the first *Arquipélago* serial, along with a few colleagues from national and international institutions (i.e. Germany, USA and France), who established scientific partnerships with the Azorean

scientific community. Only a few researchers from the Terceira campus were involved in scientific publishing. Researchers based in Faial campus, dedicated to oceanography and fisheries, were still in the process of paving the way for the future, so papers dealing with marine science were only a small part of the papers published in the first serial of *Arquipélago*. The journal
also gave professors the opportunity to publish more theoretical articles, probably to support the first students at the University of the Azores. At a time when most researchers did not have access to computers or the Internet, *Arquipélago* was modest in scope, content, audience and design.

The decision to transfer the editorial office of *Arquipélago. Ciências da Natureza* to the DOP/UAç (now the Institute of Marine Sciences OKEANOS) for modernisation was a successful strategy. The journal became an attractive platform for both established and early-carriers' scientists, contributing to the internationalisation of the University of the Azores. By creating a dedicated editorial secretariat, implementing a peer review system, incorporating a strong international advisory board, broadening the journal's scope, adopting English as its primary language and adhering to international publishing standards, *Arquipelago*. Life and Marine Sciences became accepted by and accessible to a global scientific audience.

To date, and not including Volume III (see Box 1) and the 14 printed supplements (see Table 2), *Arquipélago. Ciências da Natureza* and *Arquipelago.* Life and Marine Sciences (first and second serials) has published 37 (5+31) volumes with 369 (67+302) contributions by 559 (64+495) authors.
From the beginning, the second serial of *Arquipelago* was considered to be a journal of an academic institution, not in competition with other well-established international journals issued by scientific publishers. The aim was to publish one issue per year, with a variety of papers. The scope was changed to focus on life and marine sciences, leaving geology behind. The extension of the geographical scope to other Atlantic islands and seamounts attracted authors to publish from other regions. However, most papers continued to focus on Azores (followed by other Macaronesia archipelagos). Contrary to the first serial, authors from the Azores academy represented only 38% of the total number, reflecting the internationalization of the journal and the interest it had generated among researchers from other national and foreign institutions. The number of authors per campus of the University of the Azores was relatively evenly distributed.

As a result of the decision to establish the editorial office on the Faial campus, marine sciences became a central theme, defining, after 1993, the secondary title of *Arquipelago*. Life and Marine Sciences. DOP/UAç, together with the affiliated Institute of Marine Research - IMAR,
was fully dedicated to oceanography, marine biology and fisheries research. The *1989 Azores Expedition* involved a large group of national and international partners, along with colleagues from the Biology Department in S. Miguel campus, who from that time have continued to publish in the *Arquipelago*, especially on coastal marine species and habitats. During the 90s of the last century, DOP/UAç also hosted many students, mainly from the University of the Algarve (to do their thesis), and early career scientists, who also benefited from the opportunity to publish their first scientific contributions in *Arquipelago*.

At the turn of the century, research at DOP/UAç gradually moved towards deep-sea (hydrothermal and seamounts) and open ocean ecosystems, benefiting from international doctoral programs and newly established partnerships with major European marine research institutions; as a result, local researchers began to publish more in international journals with higher impact, often as co-authors with colleagues from these institutions. Nevertheless, the *Arquipelago* continued to be inviting for publication of biodiversity (checklists and new records and occurrences) and biology studies from the Atlantic islands, by local and international researchers visiting the oceanic archipelagos. Fish biology studies have been developed mainly by local researchers, reflecting the importance of the subject for the institution in supporting the Government of the Azores (and Madeira) in fisheries policy.

Contrary to the first serial of the *Arquipélago Ciências da Natureza*, agriculture and animal production were no longer the predominant subjects of terrestrial studies. This may be because agricultural and animal production researchers were more involved in higher education and in solving concrete problems

of the real economy than in publishing contributions about their scientific activity. The papers on terrestrial ecosystems published on the second serial of *Arquipelago* were mainly devoted to biodiversity and ecology (including non-indigenous species and bio-invasions) in a range of natural to human-modified and urban habitats. From a conservation perspective, these papers highlight the fragility of island ecosystems and the need to monitor and implement sound environmental policies to protect endangered species and habitats. Arthropods (especially insects) and flora were the main biological groups studied. The former because of their great biodiversity, high level of endemism and ecological role in the dynamics of the ecosystems, and the latter because of their structural function in shaping the ecological systems of the islands or, in the case of bryophytes, their usefulness as bioindicators of the health of natural ecosystems. Terrestrial environmental studies were published mainly by a highly productive scientific team that emerged at Terceira campus and from many contributors from S. Miguel campus. The Arquipelago journal published many relevant studies by an international group of eminent scientists who had their own research programmes on the islands or were involved in partnerships with local scientists. Their contributions provided critical insights into the biodiversity of the islands, particularly of key taxonomic groups such as algae, bryophytes, insects, oceanic cephalopods, shrimps and fish.

## CONCLUSION

Helen R. Martins led *Arquipelago* with professionalism, ethics, and persistence for over three decades. Under her leadership, the journal became an international vital repository of scientific knowledge on the marine and terrestrial ecosystems of the Northeast Atlantic islands, particularly the Azores.

At the present, *Arquipelago*. Life and Marine Sciences faces significant challenges due to increasing competition in the scientific publishing world. Unfortunately, due to the nature of the journal and logistical constraints, *Arquipelago* does not have the high citation impact which is an essential feature in attracting submissions. To continue, the journal will have to re-consider its publication strategy, perhaps evolving into a non-periodic publication, with a focus on thematic issues. In parallel, it must change its editorial structure and improve its IT infrastructure. The future of *Arquipelago.* Life and Marine Sciences deserves further discussions.

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