

FOREIGN SCIENTIFIC RESEARCH VESSELS IN WATERS UNDER PORTUGUESE SOVEREIGNTY OR JURISDICTION

OS CRUZEIROS DE INVESTIGAÇÃO CIENTÍFICA ESTRANGEIROS NAS ZONAS MARÍTIMAS SOB SOBERANIA OU JURISDIÇÃO PORTUGUESA

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Abstract

Portugal has sovereignty and jurisdiction rights over vast maritime spaces with enormous economic and strategic value. These territories are attracting growing interest by foreign actors, due to the fact that the scientific knowledge therein derived is a decisive factor for the achievement of their interests. In this study we analyse the context of the activity of foreign scientific research vessels in Portuguese maritime spaces, an activity to which Portugal must pay attention to, in order to preserve its interests. Therefore, we begin by considering the knowledge we acquired on the value of the resources of the Portuguese sea. We then proceed to analyse the evolution of the activity of foreign scientific research vessels in national waters, as well as its legal framework. Finally, in the fourth part, we propose courses of action to be developed in order to improve control over the activities conducted by other countries in the Portuguese maritime waters. The analysis we developed allowed us to identify some vulnerabilities and gaps which need to be eliminated or reduced. In this sense, we formulated and described possible lines of action, with the protection of national interests in mind.

Keywords: Scientific research vessels, marine resources, marine resources patents, national interest.

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Resumo

Portugal exerce direitos de soberania e jurisdição sobre vastos espaços marítimos, de enorme valor estratégico e económico, que estão a ser objeto do interesse crescente de atores estrangeiros, sendo o conhecimento científico um fator decisivo para a consecução dos interesses respetivos. Neste trabalho, é analisado o quadro em que decorre a atividade dos cruzeiros de investigação científica estrangeiros nos espaços marítimos nacionais, atividade à qual Portugal tem que prestar especial atenção, de modo a preservar os seus interesses. Para tal, numa primeira parte considera-se o conhecimento adquirido sobre o valor dos recursos existentes no mar português. Na segunda parte, é analisada a evolução da atividade dos cruzeiros de investigação científica estrangeiros em águas nacionais, enquanto na terceira é examinado o normativo legal que a enquadra. Finalmente, na quarta parte, é proposto o desenvolvimento de diversas linhas de ação, com o intuito de melhorar o controlo sobre as atividades desenvolvidas por outros Estados nas zonas marítimas portuguesas. A análise desenvolvida permitiu identificar vulnerabilidades e lacunas que importa colmatar, concluindo-se que deverão ser formuladas linhas de ação que permitam salvaguardar os interesses nacionais.

Palavras-chave: Cruzeiros de investigação científica, recursos marinhos, patentes de recursos marinhos, interesse nacional.

1. Introduction

The United Nations Convention on the Law of the Sea (UNCLOS), held in 1982 in the city of Montego Bay, Jamaica, and ratified by Portugal in October 1997, gave the Portuguese State sovereign rights or jurisdiction over a vast maritime space. This space has been attracting the attention of other actors, in many cases having in mind the identification of natural resources with economic potential. The effective exploitation of the Portuguese sea is dependent on the knowledge acquired about its marine resources, and for that reason Portugal should pay special attention to activities carried out by those actors in national waters, in order to protect its interests. In this situation, the UNCLOS awards a major role to the coastal State, determining that it has the competency to establish the guidelines for the marine scientific research to be developed in the waters under its jurisdiction.

Under these circumstances, the present study aims to analyze the framework for the activity of foreign scientific research vessels in sea areas under Portuguese sovereignty or jurisdiction, in order to formulate courses of action that will help improve the knowledge of the activity carried out on Portuguese territorial waters, Exclusive Economic Zone (EEZ) and continental shelf.

Therefore, the work is structured into four main parts. In the first part, we seek to identify the value of the mineral, energy and biogenetic resources of the Portuguese sea. In the

second part, we treated the statistical data on foreign scientific research vessels, provided by Comando Naval (Fleet Headquarters) (COMNAV), the navy body in charge of navigation control. Through this analysis, we intend to determine the evolution of the interest of other actors in the Portuguese waters, for the period between 2003 and 2012. We also seek to establish a link between the actors who have conducted scientific research in national waters and countries holding patent applications of marine genetic resources. In the third part, we analyze the current legal framework in order to identify any vulnerabilities and gaps in the licensing procedure for conducting marine scientific research activities in Portugal. Finally, in the fourth part, we propose the development of several courses of action in order to strengthen control over the scientific research activities conducted by other States in maritime areas under national sovereignty or jurisdiction.

2. Knowledge of the value of natural resources of the portuguese sea

The discovery of natural resources with economic potential has been the theme for the scientific research projects conducted in the maritime areas under national sovereignty or jurisdiction. In certain situations, which will be described below, initial expectations were confirmed, with the identification of mineral, energy and biogenetic resources in the Portuguese sea.

Upon reflection on the mineral resources of the deep sea, it becomes apparent that those which have attracted more interest are the polymetallic sulfides and nodules, and cobalt-rich ferromanganese crusts.

According to data from the International Seabed Authority (ISA) (Figure 1), there have been occurrences of polymetallic nodules south-southwest of the Azores and west of the Portuguese mainland, both rich in copper and zinc, in the maritime areas mentioned above. These findings have not yet been the object of the study required to assess the existence of conditions conducive to the economic viability of their exploitation. Manganese, cobalt, nickel and copper are the constituents of the polymetallic nodules with greater economic and strategic value¹.

With regard to polymetallic sulfides, occurrences have been identified in the Continental EEZ, in the area between the EEZ of mainland Portugal and EEZ of the Azores (within the extended continental shelf claimed by Portugal), south of the island of São Miguel, next to Banco D. João de Castro (located between the island of São Miguel and Terceira Island) and the Mid-Atlantic Ridge. In two of the existing hydrothermal fields in this ridge, Lucky Strike and Rainbow, metal resources with economic value were discovered. According to the information available, the Lucky Strike field should contain around 1.13% copper, 6.73% zinc, 0.08% lead and 102 g/t silver, while the Rainbow hydrothermal field should have in its

¹ To get an idea of the value of these metals, we may take into account, for example, that the manganese is used in the manufacture of metal alloys and in the production of the steel used for armor-plating, that cobalt is used in the construction of parts operating at high temperatures such as jet engines and gas turbines, that nickel is essential for the production of stainless steel and circuitry, and that copper is used in the manufacture of electrical wires (ISA, 2004, pp. 23, 24).

composition around 10.92% copper, 17.74% zinc, 0.04% lead, 40 g/t gold and 221 g/t silver (Matias, 2009, p. 29)².

Concerning the cobalt-rich ferromanganese crusts, deposits were identified on the extension of the northern boundary of the Continental EEZ, on the Madeira-ToreRidge, north of Madeira and on the Mid-Atlantic Ridge, near the southwest boundary of the AzoresEEZ. In addition to cobalt, the crusts are an important potential source of metal elements and rare earth elements, such as titanium, cerium, nickel, platinum, manganese, phosphorus, thallium, tellurium, zirconium, tungsten, bismuth and molybdenum. Cobalt is the element with the highest economic value, followed by titanium, cerium, zirconium and nickel (ISA, 2008).

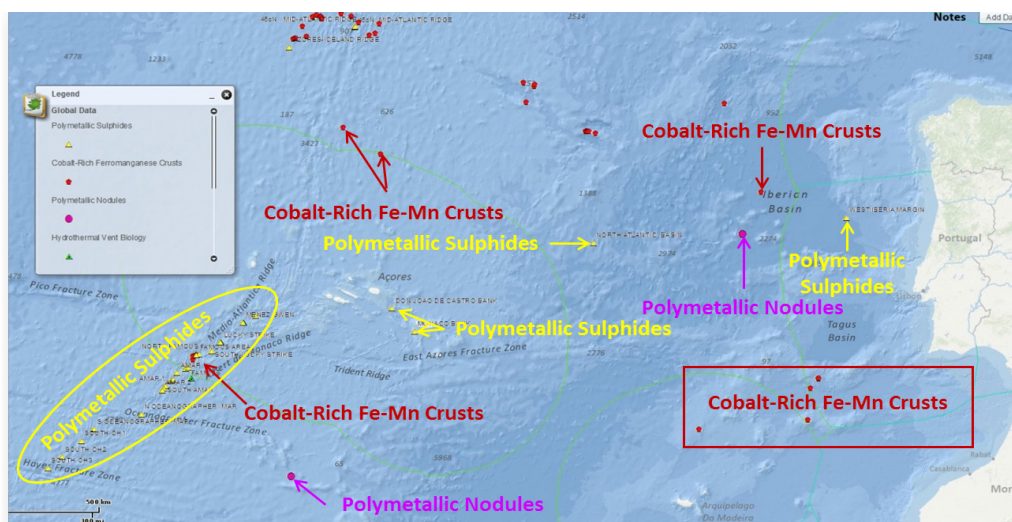


Figure1 – Metallic mineral resources in Portuguese waters

Source: Adapted by the author from ISA (2014)

Following a preliminary study to assess the economic viability of exploiting these crusts, theoretical modeling was carried out by the Task Group for the Extension of the Continental Shelf. Encompassing an area of 1600 km², the results of the study indicated that the total investment would be recovered after four years of production and, from then on, annual net capital gains of around 300 million euros can be expected (Abreu, et al., 2012, pp. 168, 169), which corresponds to half of the income of the Neves Corvo mine, located in the municipality of Castro Verde, Beja district, one of the largest copper mines in the world.

A new geological structure has been discovered south of the Azores, named by the national research team that discovered the Fried Egg, whose origin, yet to be established,

² The economic value of the mineral resources in these hydrothermal fields cannot be calculated, due to the fields being identified as points in the files in the databases of the Estrutura de Missão para a Extensão da Plataforma Continental (Task Group for the Extension of the Portuguese Continental Shelf). Still, even if a polygon existed that could describe them, their economic value would not be easy to calculate, as the elements are distributed discontinuously along the fields due to the precipitation of metals from the black smoker chimneys not presenting a consistent pattern.

can be of great scientific and economic importance, as it has, for example, very similar geomorphological parameters to the mud volcanoes in southern Algarve, whose potential as an energy resource is very high (Abreu, 2011).

With regard to energy resources, the studies carried out indicate that there are favorable conditions in Portugal for the formation and accumulation of hydrocarbons, especially in the deep and ultra-deep offshore of mainland Portugal. However, to date, deposits have not yet been identified whose exploitation would be viable from an economic point of view. Nevertheless, it is worth noting that the prospecting activity conducted was relatively limited, which means that one cannot exclude the possibility of oil deposits of economic interest in unexploited areas being discovered (EMEPC, 2014, p. 75).

Seeking to fill that gap, prospecting, research, development and production of oil in deep offshore rights have been awarded within the area corresponding to the Continental EEZ. These concessions started being granted in 2005, but in 2006 only the company Mohave Oil & Gas Corporation operated in Portugal.

In 2007 there was a significant increase in the concessions granted, with 12 new contracts signed. Of these contracts, five were concluded with the company Mohave Oil & Gas (concession areas: “Cabo Mondego 2”, “São Pedro Muel 2”, “Aljubarrota 3”, “Rio Maior 2” and “Torres Vedras 3”), four with the Petrobras/Galp/Partex consortium (concession areas: “Camarão”, “Ameijoa”, “Mexilhão” and “Ostra”) and three with the Hardman/Galp/Partex consortium (concession areas: “Lavagante”, “Santola” and “Gamba”). In 2010, the Hardman/Galp/Partex consortium areas were transferred to the Petrobras/Galp consortium, through the transmission of contractual positions.

In 2011, new contracts were signed with the Repsol/RWE Dea consortium, for work taking place in the Algarve deep offshore. The Petrobras/Galp consortium developed research work in the “Gamba” and “Santola” areas, while Mohave Oil & Gas began prospecting operations in the areas “Aljubarrota 3”, “Torres Vedras 3”, “Cabo Mondego 2” and “São Pedro Muel 2”.

In 2012, the Petrobras/Galp consortium completed the research started in 2011, on the “Santola” concession area, while the Repsol/RWE consortium began prospecting in areas “Lagosta” and “Lagostim”. In May that same year, concession contracts were signed for the Lusitanian Basin (areas “Peniche” and “Zambujal”) with the Mohave Oil & Gas company and, in September, through addenda to contracts, the “Aljubarrota 3” concession was granted to the Galp/Mohave consortium, while areas “Lagosta” and “Lagostim” were now held by the Repsol/Partex consortium.

In February 2013, the “Barreiro” area (in the Lusitanian Basin) was granted to the company Oracle Energy Co. and, in May, through addenda to contracts, the areas “Camarão”, “Ameijoa”, “Mexilhão” e “Ostra” were granted to the Repsol/Galp/Partex consortium.

Also worth noting is that the Repsol/Partex consortium requested the grant of two further concessions, through direct negotiation, in the deep offshore of the Algarve Basin

and, in that same basin, the company Panoceanic Energy Ltd. also requested an preliminary evaluation license, through direct negotiation (DGEG, 2015)³.

Figure 2 shows the allocated concessions and licenses in May 2015.

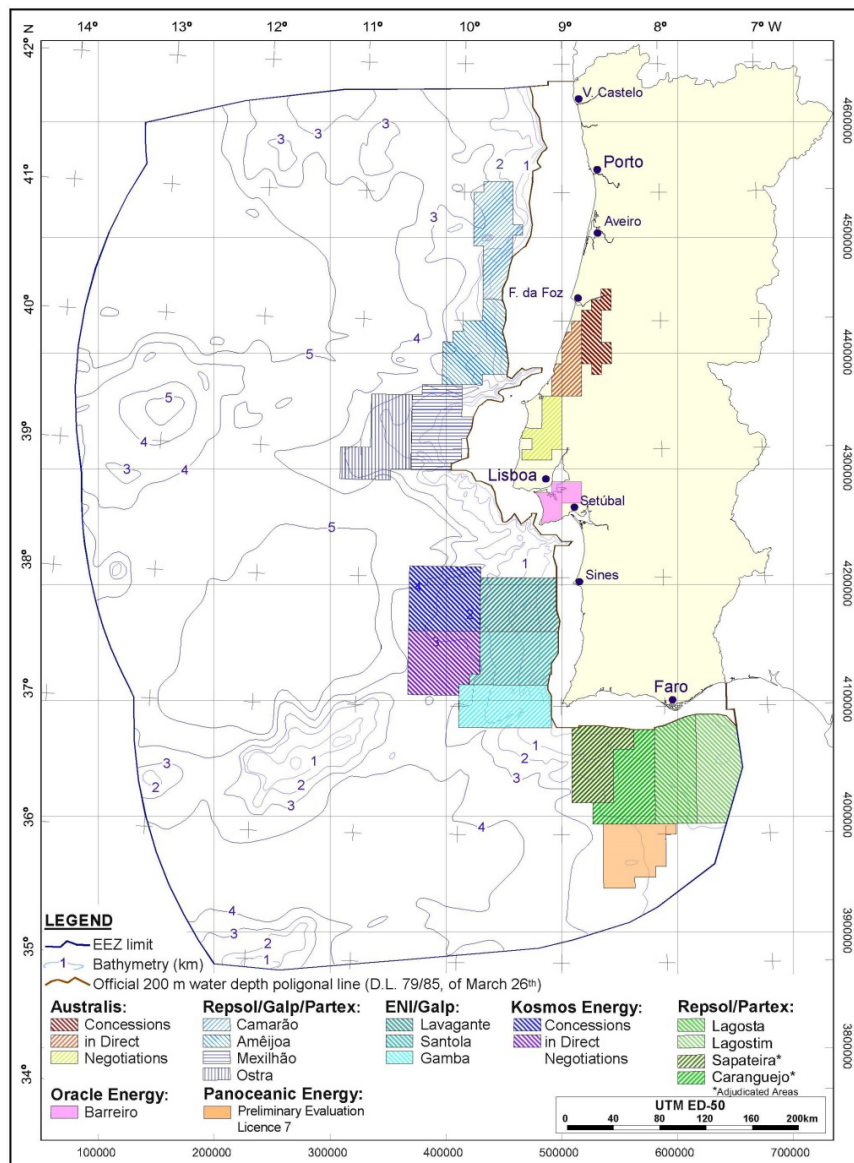


Figure 2 – Concession and license areas in May 2015

Source: DGEG (2015)

³ The Mohave Oil & Gas Corporation is owned by the Canadian Porto Energy Corp., Petrobras is a Brazilian company, the Partex Oil and Gas (Holdings) Corporation is an oil company belonging to the Calouste Gulbenkian Foundation, Hardman Resources Ltd. is a subsidiary of Tullow Oil Plc, a multinational founded in Ireland and headquartered in London, Repsol is a Spanish company, RWE Dea is an international company with headquarters in Hamburg, Oracle Energy Co. is a Canadian company, and Panoceanic Energy Ltd. is a UK company.

The studies conducted since 1999 in the Gulf of Cadiz revealed the existence of several structures associated with fluid seepage rich in hydrocarbons, with special emphasis on methane. 60 mud volcanoes and underwater chimneys associated with this phenomenon were discovered (EMEPC, 2014, p. 49), with six (*Bonjardim*, *Olenin*, *Carlos Ribeiro*, *Cornide*, *Gades* and *Cibeles*) located in the Portuguese continental shelf, at depths between 400 and 3200 meters. Methane hydrates were recovered from the *Bonjardim* volcanoes, in the Portuguese section (Abreu, et al., 2012, p. 173), *Ginsburg*, on the Moroccan bank and “*Captain Arutyunov*,” on the Spanish side. The composition of the gases forming the hydrates reveals other heavier counterparts, in addition to methane, suggesting the presence of hydrocarbons at depth (Pinheiro et al., 2004, p. 150). This evidence raises legitimate hopes about the possibility of discovering methane hydrates and hydrocarbons with economic interest.

The scientific research vessels have also made possible the discovery of biological resources in submarine hydrothermal systems and in the abyssal plain, living in conditions of absence of light and extreme pressure. The discovery of these organisms, called extremophiles due to the extreme circumstances in which they live, is a major scientific finding of our time, because under such conditions life is not expected to develop. The scientific and economic importance of these organisms is already indisputable, as the biomolecules drawn from them are coveted resources by the pharmaceuticals and biotechnology industries (Barriga & Santos, 2010, p. 90).

In this respect, attention has focused on the analysis of the enzymes present in extremophiles, which, unlike most bacteria in the terrestrial environment, withstand extremely high temperatures. Their study has enabled the conduction of biochemical reactions at high temperatures, helping to ensure that the genetic mixings are pure. Companies have been competing to isolate, clone and sell these organisms’ extremely stable enzymes, enabling the development of biotechnology and other related sciences (Correia, 2010, pp. 116, 117).

The applications for the genetic resources of the deep ocean are constantly increasing, especially in recent years, as evidenced by the evolution of marine biogenetic resource patents registration. Between 1973 and 1992 only nine patents were registered, against 136 recorded in the period between 1993 and 2007 (Figure 3).

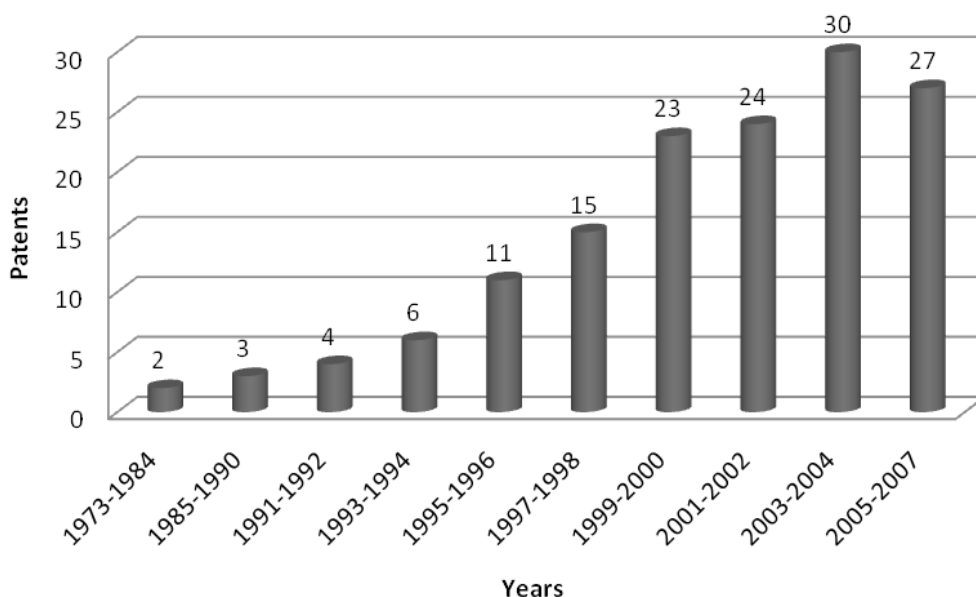


Figure 3– Evolution of the registration of marine biogenetic resource patents

Source: Leary, Vierros, Hamon, Arico, & Monagle (2009, p. 189)

Registered patents have an application in the fields of chemistry, pharmacology, cosmetics, food and agriculture, as well as a number of other areas, which are represented in Figure 4, under the category “other” (Leary, et al ., 2009, pp. 189, 190).

The research is of special importance in the creation of anti-inflammatory and anti-cancer substances, in the treatment of AIDS, malaria and cardiovascular diseases, in the development of antibiotics and antifungals, of anticoagulant agents and tissue regeneration, in the diagnosis of life sciences, particularly polymerases deoxyribonucleic acid (DNA), and in combating pollution by bioremediation of heavy metals.

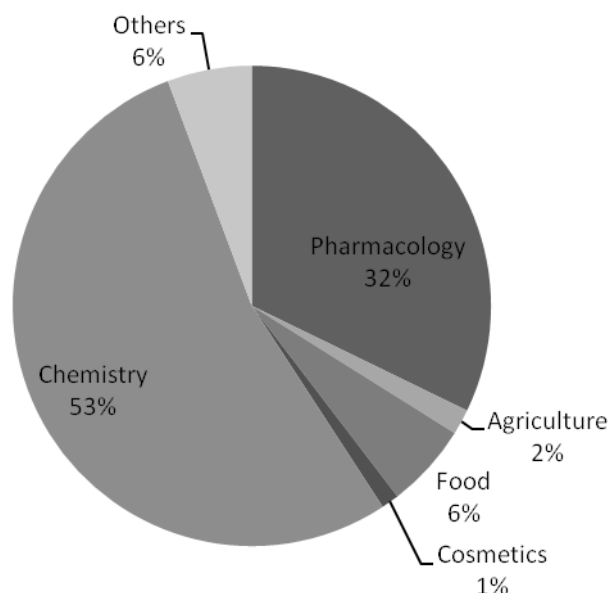


Figure 4 – Patenting of marine biogenetic resources by sector

Source: Leary, Vierros, Hamon, Arico, & Monagle (2009, p. 190)

The economic interests associated with the exploitation of marine biogenetic resources are quite clear. In 2002, it was estimated that the sale of anticarcinogens, antivirals and antibiotics derived from marine biogenetic resources has yielded 2.4 billion dollars. In 2005, a sea sponge used to treat herpes yielded profits between 50 and 100 million dollars, while earnings from an anticarcinogen derived from marine organisms have been estimated at around one billion dollars. That same year, Retrovir, a drug for the treatment of AIDS, earned 23 million dollars, while in 2006, Zovirax, a drug for the treatment of herpes, earned 237 million dollars. In 2007, sales of Prialta, an analgesic of marine origin, earned 12.3 million dollars, and the enzyme industry was estimated to grow 7.6% per year, reaching 6 billion dollars in 2011 (Leary et al., 2009, pp. 190, 191).

For all these reasons, there is no doubt that resources with economic potential exist in the waters under national sovereignty or jurisdiction. However, it is important to understand that the existing wealth in the vast Portuguese sea area is not known in detail, and that this knowledge is only being built as research is conducted in those areas. In this context, strictly monitoring the scientific research activity carried out by other States in national maritime areas is necessary, as a first step to adequately defend our interests.

3. The scientific research activities developed by other states in the portuguese sea

To study the scientific research activity carried out in Portuguese waters, the period between 2003 and 2012 was analyzed, as it was deemed a sufficiently representative timeframe of developments. The data collected by COMNAV were analyzed for the timeframe in question, as this entity is responsible for controlling the movement of scientific research vessels.

As shown by an analysis of the data on scientific research activities carried out by other countries in the maritime areas under national sovereignty or jurisdiction, 289 scientific surveys took place during the period in question, resulting in 7619 mission days at sea. This means that, over the 10 years analyzed, an average of two foreign ships per day were investigating national maritime waters.

The number of research vessels decreased between 2003 and 2006, and from that year on (with the exception of 2009), there was a progressive increase in missions, up to a maximum of 37 missions in 2010. 2011 saw a new decrease in missions, but in 2012 the number of vessels increased again, reaching a level close to that of 2010 (Figure 5).

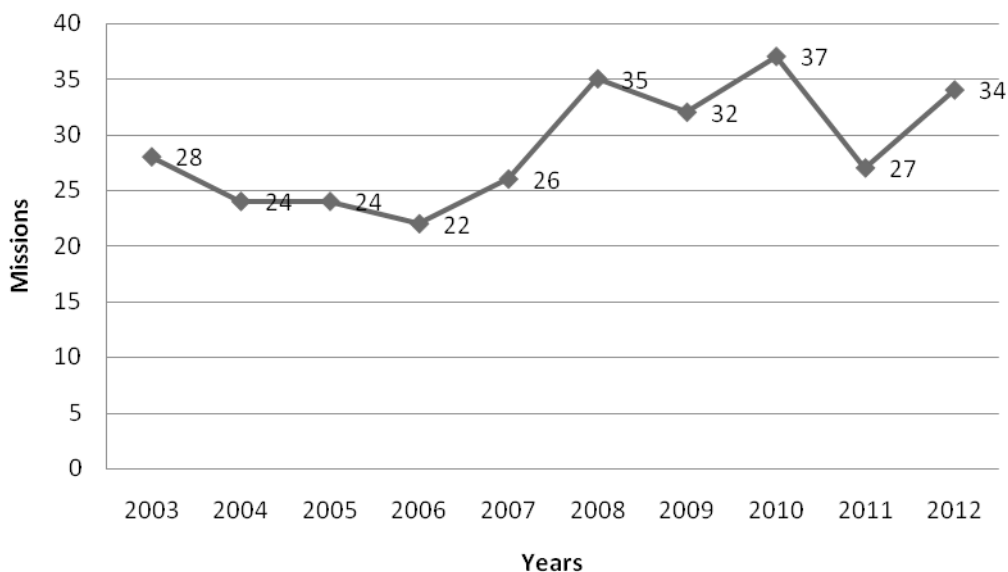


Figure 5 – Number of missions between 2003 and 2012

Source: Prepared by author

With regard to mission days, there was a significant increase from the 431 days reported in 2004 to 1299 days in 2008. From that year on, there has been a decrease in the mission days of research vessels to a minimum of 633 days in 2011. This decline may have been due to the global economic and financial crisis of 2008, which certainly has affected the financing of scientific research activities. In 2012 there was a further rise in mission days, which may indicate that, as some countries have overcome the crisis, a new cycle of growth in the number of missions and days at sea is beginning (Figure 6).

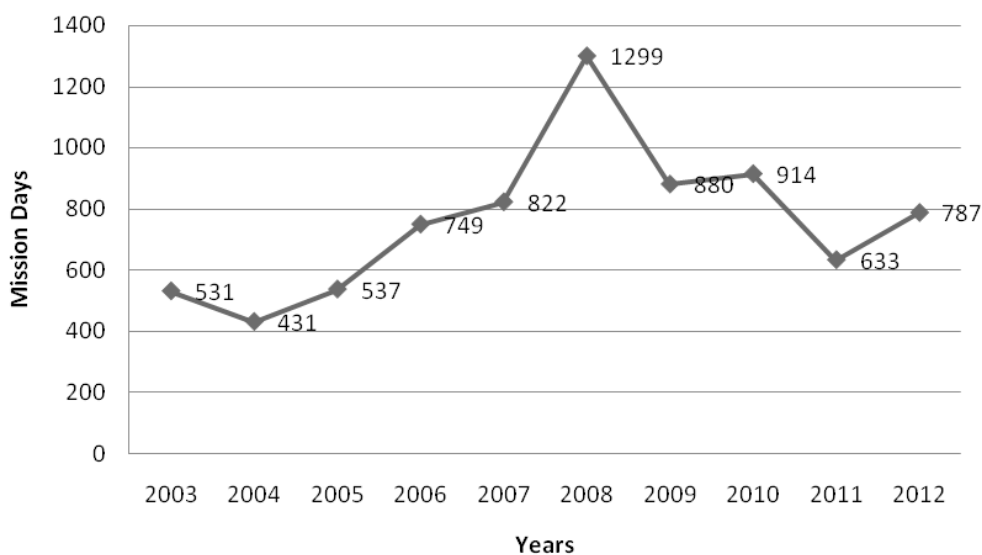


Figure 6 –Number of mission days between 2003 and 2012

Source: Prepared by author

During the period examined, 14 countries were found to have conducted operations in the Portuguese sea, with an annual presence by Germany, France and the UK. Spain was absent only in 2003, while the Netherlands have always been present, with the exception of 2012⁴.

Germany was the country that most developed research activity in the Portuguese maritime areas, followed closely by the UK, Spain and France. This is not strange, especially if we take into account that Spain is our neighbor and the remaining countries are States with large economic, scientific and technological capacity. Together, these four countries account for around 79% of the missions and 75% of missiondays of foreign ships in our sea (Figures 7 and 8).

⁴ See table 3 in the Annex.

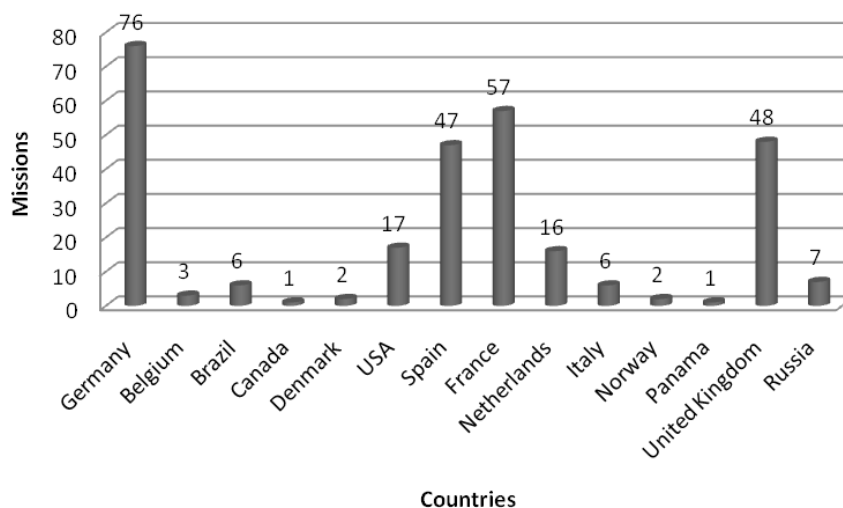


Figure 7 – Missions conducted by country between 2003 and 2012

Source: Prepared by author

The regular presence in our waters of Holland, a state with a strong maritime tradition, must also be mentioned, coming in sixth place in number of missions and mission days, behind the United States of America (USA). This is indicative of the interest that this country continues to take in the sea, and is thus an example for Portugal to follow.

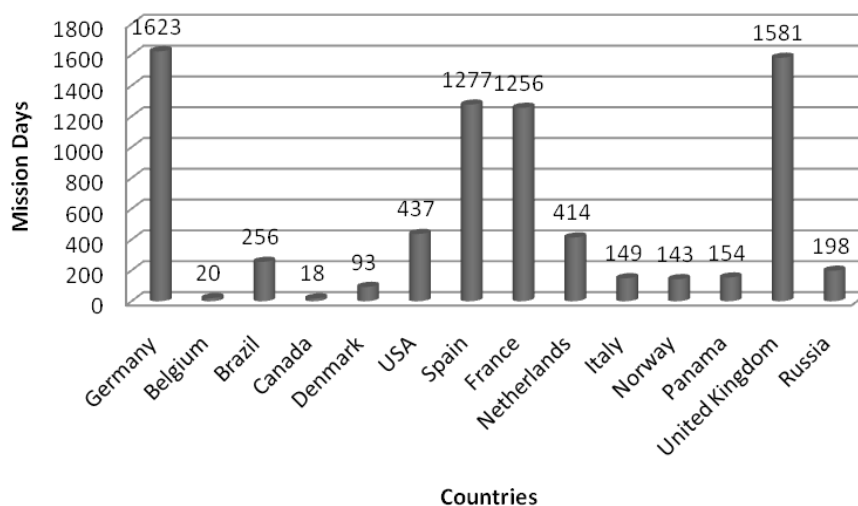


Figure 8 – Mission days per country between 2003 and 2012

Source: Prepared by author

Despite the clarity of the graphics, next we will highlight the data deemed more relevant for the Portuguese situation.

To that end, Table 1 shows the States occupying the top ten positions in the list of countries with registered patents of marine genetic resources. The relative positions of Italy, Canada, Spain and Russia are also highlighted, as these were, among the States who have conducted scientific research surveys in domestic waters, those that also have marine patents registered.

Table 1 – Patenting of marine biogenetic resources by country

Order	Country	Registered Patents
1st Place	USA	199
2nd Place	Germany	149
3rd Place	Japan	128
4th Place	France	34
5th Place	United Kingdom	33
6th Place	Denmark	24
7th Place	Belgium	17
8th Place	Netherlands	13
9th Place	Switzerland	11
10th Place	Norway	9
(...)	(...)	(...)
12th Place	Italy	7
13th Place	Canada	6
(...)	(...)	(...)
15th Place	Spain	5
(...)	(...)	(...)
19th Place	Russia	2

Source: Arnaud-Haond, Arrieta, & Duarte (2011)

Of the 193 Member States of the United Nations, only 31 have patents of marine biogenetic resources. Ten countries have 90% of the patents registered, while 70% belong to the first three. These 10 countries account for only 20% of the world's coastline, but benefit from having access to the necessary technologies to explore the deep ocean. The profits from these patents allow them to continue to invest in developing the necessary technology for marine bioprospecting, thus increasing the gap between countries (Arnaud-Haond, et al., 2011, p. 1521).

According to that same source, there were 677 marine biogenetic patents registered in 2011. Considering that, until 2007, only 145 patents had been registered, it is apparent that between the years 2007 and 2011 532 patents were registered, which paints a portrait of the exponential growth in recent years.

Although the place of capture of the biogenetic resources that led to the patents registered is not known, it is believed that a high number of patents are registered in different places from the waters where they were discovered. This can raise issues of biopiracy and possible illegal appropriation of resources, something which the international community should pay close attention to, and legislate accordingly.

Attention is drawn to the fact that Switzerland, a small country without direct access to the sea, occupies the 9th place on the list of countries with registered marine resource patents, admitting, however, the possibility of all these resources having been captured outside the maritime spaces under the sovereignty or jurisdiction of coastal States.

Correlating the data from foreign scientific research vessels operated in Portuguese waters with the information on registered marine biogenetic patents, it appears that among the countries listed in the top 10 of the list of registered marine patents, only Japan and Switzerland did not conduct any research in national waters. Germany, the country that most explored our waters, comes in second place with regard to registration of patents, just behind the United States, the country with more patents registered. The United Kingdom, the second country in terms of days spent exploring national waters, comes fifth in the patent registration list, while France ranks fourth in both. Table 2 depicts the countries that have performed scientific research in national maritime spaces.

No references were found in any of the sources consulted to Portuguese registered patents of marine biogenetic resources, which may be indicative of the lack of national capacity in this field.

With regard to the national maritime areas, it can be seen that, in the years analyzed, the Continental EEZ has consistently been the maritime zone that has been of most interest to the international scientific community, having been the subject of research on 216 occasions, which represents about 62% of the missions. In turn, the EEZ of the Azores received 77 surveys, while the EEZ of Madeira received 56, corresponding respectively to 22% and 16% of all missions conducted in national maritime zones (Figures 9 and 10).

Table2 – Comparison between the number of days of research in national maritime zones and the number of registered marine biogenetic patents

Country	Mission days in national waters	Relative position in the patents list	Number of patents
Germany	1623	2nd Place	149
United Kingdom	1581	5th Place	33
Spain	1277	15th Place	5
France	1256	4th Place	34
USA	437	1st Place	199
Netherlands	414	8th Place	13
Brazil	256	-	-
Russia	198	19th Place	2
Panamá	154	-	-
Italy	149	12th Place	7
Norway	143	10th Place	9
Denmark	93	6th Place	24
Belgium	20	7th Place	17
Canada	18	13th Place	6

Source: Prepared by author

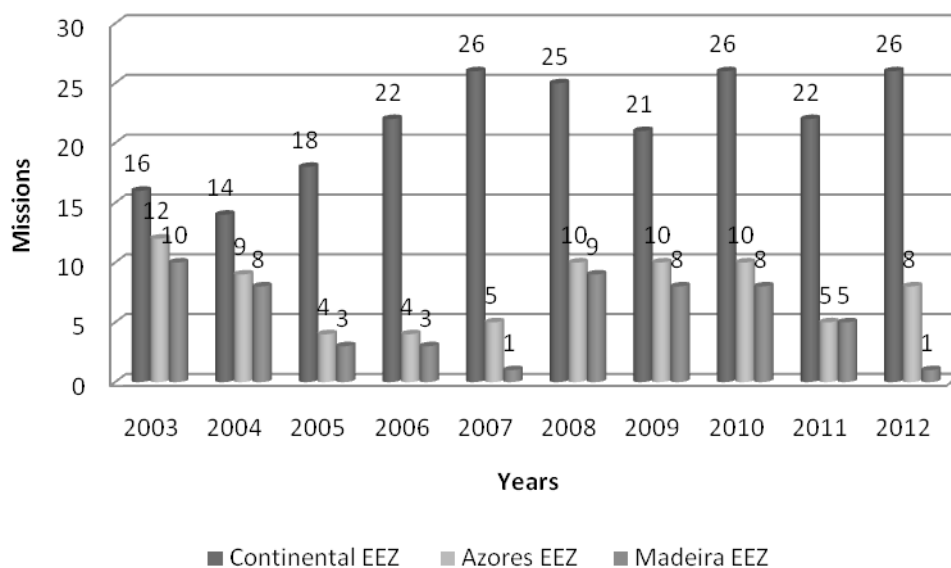


Figure 9 – Missions in the various national maritime zones between 2003 and 2012

Source: Prepared by author

These data contradict the idea that, given its size and its already identified natural resources, the EEZ of the Azores would naturally be the Portuguese maritime zone most interest the international scientific community. However, it may be possible that the Continental EEZ has recorded the highest number of missions due to the fact that ships conduct research activities while passing through this maritime space during transit between ports or areas of interest.

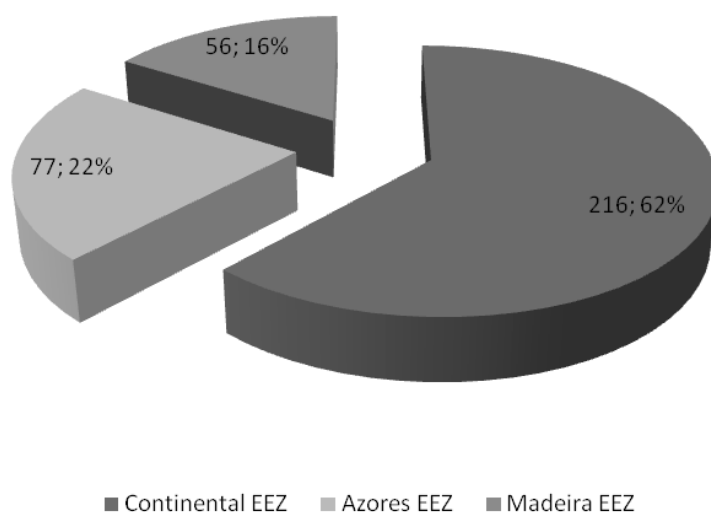


Figure 10 – Missions per national maritime zone between 2003 and 2012

Source: Prepared by author

Having established the evidence of interest by foreign actors in the national maritime space, we will now analyze the legal mechanisms available to the Portuguese State to control scientific research activities by those actors in national waters.

4. Legal framework of foreign scientific research vessels

The UNCLOS is the main regulatory instrument for matters of International Maritime Law, giving the coastal State the right to regulate and authorize marine scientific research in its EEZ, as well as on its continental shelf⁵.

Therefore, the Portuguese State established by Decree-Law N. 2/81, of January 7, the conditions under which other states, public and private foreign entities, or international organizations can conduct scientific research activities in the national EEZ. However, in 1982, through Resolution N. 30/82 of January 27, this Decree was declared unconstitutional by the Conselho da Revolução (Council of the Revolution).

⁵ Under paragraph 1 of article 246 of the UNCLOS.

In 1985, Decree-Law N. 52/85, of March 1 defined the authorization procedures for activities of exploration and scientific research in the territorial sea, in internal waters and the EEZ, as well as the rules for the management, conservation and exploitation of the living resources in those spaces.

Later, Decree-Law N. 278/87, of 7 July was published, solely aimed at defining the legal framework for the exercise of sea fishing activities and culture of marine species, making no mention of a regime for marine scientific research activities, and, in Article 35, paragraph 1, expressly repeals Decree-Law N. 52/85, which, as previously noted, had a more comprehensive legislative goal. However, paragraph 2 of Article 35 of Decree-Law N. 278/87 states that, pending the publication of new regulations, the legislation in force is to be followed, provided it does not conflict with the present law. In fact, the contents of Decree-Law N. 278/87 refer, at least in three precepts, to technical regulations regarding fishing and culture of marine species, and it is to these regulations that the aforementioned paragraph 2 of Article 35 refers to. That is, in wishing to safeguard the repealing rule set out in paragraph 1 of Article 35, the legislator sought to ensure that there would be no legal vacuum while new technical regulations on marine fishing and culture were not developed, for which reason the legislation published prior to Decree-Law N. 278/87 would remain in force.

In this context, as paragraph 1 of Article 35 establishes that “all legal provisions contrary to the provisions of this law are repealed, namely: (...) Decree-Law N. 52/85, of March 1”, the 1985 law, for the sections that do not concern fishing regulations and marine culture is, by that means, repealed. Nevertheless, it is also possible to infer that only laws contrary to the requirements established by Decree-Law N. 278/87 are repealed, and Decree-Law N. 52/85 is in force for the section on marine scientific research activity.

Asto obtain authorization to conduct scientific research in the Portuguese maritime areas, the relevant national authorities will take into account the requirements of Decree-Law N. 52/85 - as evidenced by Circular N. 74/2003-BB of 24 January 2003, the Directorate-General of the Maritime Authority (DGMA) - an analysis will be made of the provisions of that law regarding the subject at hand.

Therefore, scientific research conducted in Portuguese maritime waters by other States, foreign entities or international organizations is subject to authorization from the Ministry of Foreign Affairs (MFA), after obtaining the assent of the Ministry of Defense (MoD) and other directly related government departments. Should the application concern the EEZ of Madeira or the Azores, assent from the respective regional government should also be obtained⁶.

Following the restructuring of the Ministry of Foreign Affairs in 2012, the Overflights and Naval Stopovers Unit (ONSU) was created and integrated in the Directorate-General for External Policy (DGEP). This unit was tasked with examining the requests for use of the national airspace and maritime areas by foreign ships and aircraft.

The application for authorization must be delivered to the Ministry of Foreign Affairs by the embassy representing the interested entity, up to six months prior to the date scheduled

⁶ Under paragraphs 2 and 4 of Article 18 of Decree-Law N. 52/85, March 1.

for the start of work, accompanied by a full description of the work to be conducted, and must describe the following: (i) the nature and objectives of the research; (ii) the method and means to be used, including a description of the vessels' main features and of their scientific equipment; (iii) the geographical areas where the work will be conducted, and the national ports intended as stopovers; (iv) the expected dates of arrival and departure of the research vessels, or of the installation and removal of equipment; (v) the identification of the sponsoring institution, of its director and project manager; and (vi) an indication of the availability for the participation of Portuguese scientists and technicians in the survey⁷. It is worth noting that the application for authorization is usually generic with regard to the geographical area where the work will be conducted, indicating only whether it will take place in the EEZ of the Continent, Madeira or the Azores.

Upon receiving the request for authorization to conduct the survey, the Overflights and Naval Stopovers Unit sends it to the Ministry of Defense and to the Intersectorial Oceanographic Commission (IOC). As mentioned above, if the intention is to conduct the survey in the EEZ of the Azores or Madeira, the request is also sent to the respective Regional Government.

The Intersectorial Oceanographic Commission, an entity attached to the Minister of Education and Science to assist in the coordination of activities in marine science and technology, will then contact the national scientific community to deliver their opinion. If the entities contacted express interest in boarding the ship or in gaining access to reports or to research data, the Intersectorial Oceanographic Commission transmits their intent to the Ministry of Foreign Affairs.

In turn, the Ministry of Defense forwards the request to the Navy Chief of Staff/National Maritime Authority (NMA), which then sends it to the Directorate-General of the Maritime Authority. This entity is responsible for coordinating the process within the Navy/NMA, for ascertaining the opinions of the other responsible bodies and issuing the final opinion of the Navy/NMA.

The Navy General Staff (NGS), COMNAV and the Hydrographic Office (HO) are consulted in that respect. The Submarine Squadron (SUBSQD) and the Maritime Departments (MD) responsible for the area where the survey will be conducted are then notified of applications.

The Navy General Staff indicates only whether the vessel requesting the survey is a warship or similar. This issue is relevant due to the fact that warships benefit from courtesies not afforded to other ships, not being asked, for example, to take national scientists on board, or for the identification of the project manager.

The COMNAV checks whether the research conflicts with any underwater navigation that may be scheduled and requests that the ship make a daily statement indicating its position, course and speed, the ongoing activity and the positions where equipment is anchored, as well as its intentions for the next 24, 48 and 72 hours.

⁷ Under paragraph 1 of Article 19 of Decree-Law N. 52/85, March 1.

If the survey is of interest to the Hydrographic Office mission, that entity requests the delivery of results and research findings. For the promulgation of notices to mariners, it must be informed 72 hours in advance of any changes to ship planning.

After collecting the opinions of the abovementioned entities, the Directorate-General of the Maritime Authority communicates the opinion of the Navy/NMA to the Ministry of Defense and Overflights and Naval Stopovers Unit, giving notice of that advice to other Navy entities involved and asking to be informed in case the survey is not authorized.

Finally, where applicable, the Regional Governments contact the regional scientific communities in order to issue their opinion, and usually request to have scientists on board.

Requests for permission may only be considered as long as the work is conducted in waters not previously selected for purposes of defense, prospection or environmental protection reserve, as long as they pursue peaceful goals, and the scientific and technical methods do not interfere with the preservation of the aquatic environment, its resources and the underwater archaeological heritage⁸.

If any of the entities listed above expresses an unfavorable opinion, the Ministry of Foreign Affairs does not authorize the research vessel, notifying the embassy that issued the request and the Directorate General of the Maritime Authority.

If the opinion of the Ministry of Defense, the Intersectorial Oceanographic Commission and, where applicable, the Regional Governments, is favorable, the Ministry of Foreign Affairs informs the Embassy of the applicant entity that the request for authorization was granted.

The granting of authorizations requires the investigating authority to ensure, whenever requested, the participation of Portuguese scientists and technicians in the project, to provide preliminary reports to the Portuguese State and, once research is completed, the results and final conclusions. Access to data and samples resulting from the project must also be provided, as well as an assessment of those data and samples, and assistance to the Portuguese State in their assessment or interpretation⁹.

The figure below displays the flowchart of authorization requests submitted by foreign entities, to conduct scientific research surveys in national maritime areas.

⁸ Under paragraph 2 of Article 19 of Decree-Law N. 52/85, of March 1.

⁹ Under paragraph 2 of Article 20 of Decree-Law N. 52/85, of March 1.

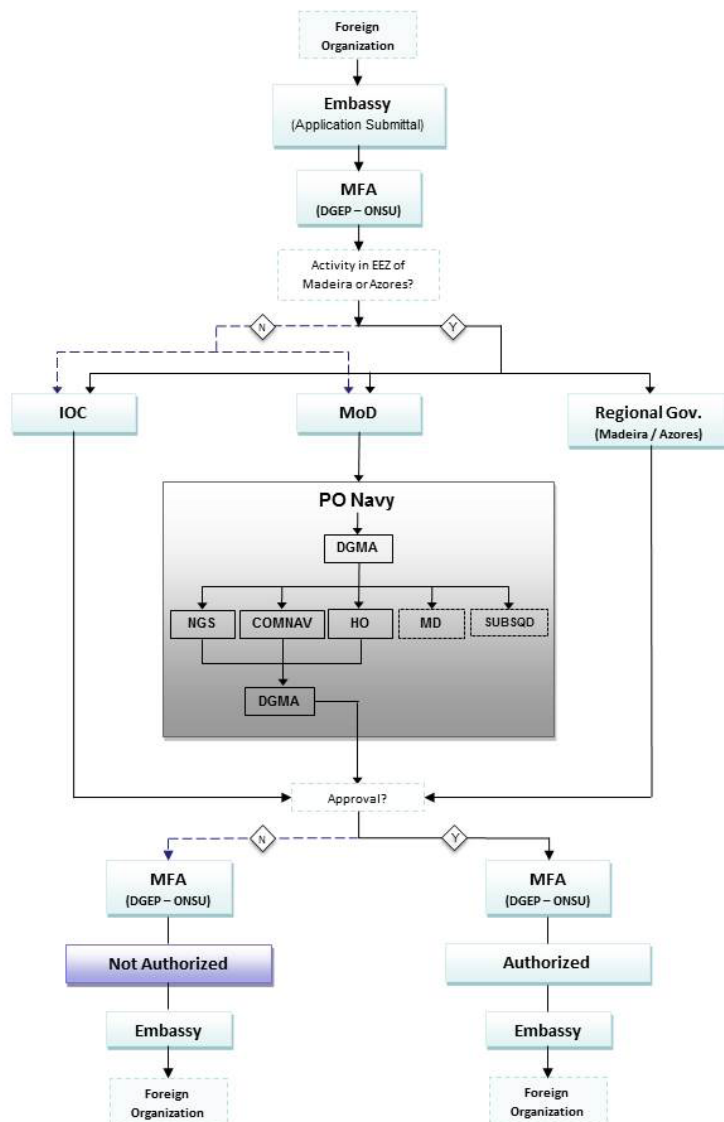


Figure 11 – Flowchart of applications for operating foreign scientific research vessels

Source: Prepared by author

In this examination of the authorization process for operating scientific research vessels in the Portuguese maritime areas, an entity responsible for leading the process could not be clearly identified. The existence of an entity with those duties would address weaknesses in the process of effective control over the delivery to the Portuguese State of the reports, findings and conclusions of the research project by the entity authorized to operate the scientific

vessel. It would also minimize vulnerabilities in the dissemination of these same reports and results, on the part of interested national organizations.

Simultaneously, and even though there is a significant number of agencies with responsibility of issue an opinion in the context of their specific expertise, it appears that the national authorities responsible for the conservation of underwater cultural heritage and living and non-living resources are not heard throughout the process.

On the other hand, failure to comply with the conditions set for the operation of the scientific research vessel results in the entity detecting the offense sending a notice of the occurrence to Overflights and Naval Stopovers Unit. In turn, the Ministry of Foreign Affairs presents a protest to the applicant embassy, asking for their cooperation in acquiring further information on the incident. However, national legal policies do not predict any penalties for the offender.

Once analyzed the framework for marine scientific research activities conducted by foreign vessels in national maritime waters, the courses of action to be developed in order to strengthen control over this activity will be identified.

5. Proposed courses of action to improve control over foreign scientific research vessels

Given that Portugal is unlikely to gather, on its own, the scientific, technological and financial resources required for the independent exploration of its sea, it will need to establish partnerships or develop concession or licensing models to take advantage of the natural resources in their maritime spaces. To negotiate with the interested parties, it is essential to be aware of the potential wealth of the space in question; otherwise the best compensatory measures may not be guaranteed. Thus, it is essential to monitor the research activities conducted in national waters, as only in this will ensure that, at the very least, we possess the same information as possible partners.

To achieve this goal, we must begin by clarifying the situation of the legal regime governing scientific research in maritime areas under Portuguese sovereignty or jurisdiction and simultaneously promote their adequacy to national and international realities. Thus, given the current governmental organization and the various competing interests in the maritime space, the Ministry of Foreign Affairs would be advised, for the purpose of granting authorization to operate research vessels, and in addition to the entities that are currently queried, to consult also: (i) the Directorate-General of Natural Resources, Safety and Maritime Services, which will issue an opinion regarding living and genetic resources; (ii) the Directorate-General of Energy and Geology, which will advise on non-living resources; and (iii) the Institute for the Management of Architectural and Archaeological Heritage, which will issue an opinion concerning underwater cultural heritage.

On the other hand, it is apparent that there is currently no entity responsible for effectively controlling or monitoring foreign scientific research vessels operated in national waters. Thus, it is advisable that the competencies and the human and financial resources required to

control the process of scientific research in the Portuguese maritime spaces is attributed to a State organization. Among the duties of this entity, the most relevant will be: (i) coordinating the authorization process; (ii) monitoring the activities conducted during the research; (iii) suspending the authorization granted in the case of non-compliance with the pre-established conditions; (iv) collecting data and samples resulting from the project, as well as the preliminary report and the final results and conclusions; (v) preparing a consolidated report of the activities conducted by foreign scientific research vessels in national waters, to be disseminated by the relevant national authorities; and (vi) to accompany the publication of scientific articles by the scientists on board.

The authorization process should be centralized in a platform accessible to all entities involved, thus speeding up the licensing process. Simultaneously, the platform should allow all entities interested in the survey results to request access to project data and samples.

For the effective monitoring of the activities developed during the survey, it is crucial to act at several levels. First, considering that national interests are above the private interests of Portuguese scientific research institutions, the request for data, samples and conclusions of the project cannot be left to the discretion of the latter, and must always be subject to a request.

Simultaneously, it should be required that all researchers on board be indicated on the occasion of the request for authorization to carry out the survey, rather than the current procedure of only requesting the identification of the institutions sponsoring the survey, the respective director and the project manager. Thus, it will be possible to follow the publication of scientific articles of researchers on board, which could be another way to confirm the research activity developed during the scientific research survey.

Concurrently, participation of national researchers should become mandatory, authorization being granted only to vessels offering places to Portuguese scientists, recruiting from a group of researchers to be created for this purpose. These researchers, duly aware of safeguarding national interests, must ensure strict monitoring of scientific research activities on board and afterwards must send a detailed report of the work done on board to the organization responsible for control of marine research activities. Simultaneously, these researchers will benefit from the contact with the best marine scientific research practices, which will enable the transfer of knowledge and the corresponding strengthening of national capacity in this field.

For an effective control of the ship's movements, the navigation records should be required, recorded by the Electronic Chart Display and Information System (ECDIS), or a similar system¹⁰. In ships that are not equipped with these systems, automatic registration of the positions indicated by the GPS will be required. In another level of control, if it is deemed beneficial to know the ships' movements in real time, a device to enable the ongoing monitoring of the vessel's position, similar to what currently exists for fishing vessels, should

¹⁰ The ECDIS is a navigation system for visually representing the information in an electronic navigation chart, integrating it with data from positioning systems or, optionally, other sensors, such as radars and echo sounders. It adheres to the requirements of the International Maritime Organization, so that it can be used as an alternative to traditional paper charts. It is capable of recording the navigation made.

be installed on board. The equipment must be installed by national technicians and should, at the mission's conclusion, be removed and made available for the next ship. The ship may also be tracked by the Automatic Identification System (AIS), while it is within range of coastal monitoring stations¹¹.

From another perspective, mechanisms should be created to allow the imposition of sanctions in case of breach of the conditions set for the operation of the vessel. Currently, in the event of failure to comply, the Portuguese State may immediately suspend the authorization granted¹², without sanctioning, however, the offender with any penalty. The creation of tools to enable the application of sanctions is deemed appropriate, that will constitute a deterrent to possible infractions.

6. Conclusions

In the course of several scientific research projects conducted in the maritime areas under national sovereignty or jurisdiction, it has been possible to identify marine resources with economic potential. With regard to mineral resources, there is overwhelming evidence of their existence, and studies must be conducted to assess the economic viability of their exploration. Concerning energy resources, despite the high cost associated with the exploration of hydrocarbons, the Portuguese sea is increasingly attracting attention, which positively affects the possible identification of economically viable deposits. The field of biogenetic resources is the area of marine resources in which the economic benefit is more evident, due to its multiple applications in pharmaceuticals, food processing and chemical industries. However, it appears that it is possible to register patents for marine genetic resources in locations different from the capture zone, which can present situations of illicit ownership transfer. Thus, this situation should be the object of legislative attention by the international community, under penalty of the most capable countries continuing to seize all that is not denied them.

This analysis resulted in the discovery of, over the period analyzed, 14 countries having conducted scientific research activities in maritime areas under national sovereignty or jurisdiction. Of these, Germany, the UK, Spain and France, showed the greater interest in the Portuguese maritime spaces. The maritime zone most surveyed by the international scientific community was the Continental EEZ, followed by the EEZ of the Azores and Madeira. Correlating these data with registered patents of marine biogenetic resources, it appears that most countries with vessels in the Portuguese maritime spaces have patents of this kind. The resulting economic benefits allow these countries to continue to invest in developing technology for marine prospection and exploration, thus increasing the gap between the capacities of the different States in this field.

¹¹ The AIS is a device that allows the transmission and reception, via radio, of relevant information on the vessels equipped with the system. The information transmitted is divided into three categories: (i) dynamic data (position, positioning accuracy, course, heading, speed and yaw motion); (ii) static data (name of vessel, international number, call sign, length, width and type of vessel); and (iii) data related to the journey (draft, type of cargo, port of destination and estimated date and time of arrival).

¹² Under Article 21 of Decree-Law N. 52/85 of 1 March.

As Portugal does not possess the ability to independently explore its vast maritime areas, it will have to establish partnerships or develop concession models to take advantage of its marine resources. In these circumstances, it is crucial to ensure a close monitoring of the activities conducted by other states in the national maritime areas. Only in this way may Portugal ensure that it will be able to possess, at least, equal knowledge on the potential of those spaces, thus not entering negotiations at a disadvantage. In this sense, the proposed measures are deemed to contribute for greater control of the activities conducted by foreign entities in the maritime areas under national sovereignty or jurisdiction.

In this study, to identify the actors interested in the Portuguese maritime areas, only the nationalities of ships with scientific research vessels was considered. In future studies, it is advisable to identify the sponsoring entities of the project because, as is known, these entities are supranational and are present in various countries and continents. The sensors used and the parameters collected during the investigation should also be analyzed. This will enable a more realistic idea of the competing interests in the Portuguese sea.

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Annex

Foreign Scientific Research Ships

Table 3 – Summary of scientific research activities carried out in maritime

	2003		2004		2005		2006		2007		
	Days	Missions	Days	Missions	Days	Missions	Days	Missions	Days	Missions	
Germany	197	10	92	6	96	4	197	7	116	5	
Belgium					11	1			9	2	
Brazil											
Canada											
Denmark							45	1			
USA	57	3							20	1	
Spain			10	2	14	1	76	2	270	3	
France	64	5	69	5	153	5	106	4	120	6	
Netherlands	80	3	38	2	26	1	25	1	52	2	
Italy	16	1	16	1	60	2			22	1	
Norway			42	1							
Panama											
United Kingdom	111	5	158	6	201	9	199	5	176	5	
Russia	6	1	6	1	12	1	101	2	37	1	
TOTAL	531	28	431	24	573	24	749	22	822	26	

Source: Prepared

areas under Portuguese sovereignty or jurisdiction, between 2003 and 2012

	2008		2009		2010		2011		2012		TOTAL	
	Days	Missions	Days	Missions	Days	Missions	Days	Missions	Days	Missions	Days	Missions
	192	7	218	9	333	16	116	6	66	6	1623	76
											20	3
							98	1	158	5	256	6
									18	1	18	1
					48	1					93	2
	64	2	72	3	75	2	120	3	29	3	437	17
	92	6	120	8	174	9	115	7	406	9	1277	47
	210	7	132	6	222	6	120	6	60	7	1256	57
	61	2	72	2	12	1	48	2			414	16
	35	1									149	6
	101	1									143	2
	154	1									154	1
	354	7	266	4	50	2	16	2	50	3	1581	48
	36	1									198	7
	1299	35	880	32	914	37	633	27	787	34	7619	289

by author