SCIENTIFIC EXPEDITION TO THE GORRINGE SEAMOUNT

THE TALLEST MOUNTAIN IN EUROPE

OCEANO AZUL
foundation

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GOAL

Perform a scientific assessment and provide recommendations for protection aimed at supporting the Portuguese Government towards the 30x30 target.

ABOUT THE EXPEDITION

Oceano Azul Foundation, together with national partners, namely ICNF - Instituto da Conservação da Natureza e das Florestas, IPMA - Portuguese Institute for Sea and Atmosphere, CCMAR - Centre of Marine Sciences, CIBIO - Research Centre in Biodiversity and Genetic Resources, SPEA – Portuguese Society for the Study of Birds, AIMM – Marine Environment Research Association, CESAM – Centre for Environmental and Marine Studies, IH – Hydrographic Institute, Oceanário de Lisboa, and international partners, namely University of Western Australia, Moss Landing Marine Laboratories and Bioacoustic Applications Laboratory of the Polytechnic University of Barcelona, is conducting a three-week expedition in September 2024 to **assess the health status** of the tallest mountain in Western Europe, the **Gorringe Seamount**. Through the combination of different methodologies and complementary expertise of several partner institutions, this expedition´s goal is to provide a **scientific assessment and recommendations for protection** aimed at supporting the Portuguese Government towards the 30x30 ocean protection target.

EXPEDITION VESSEL

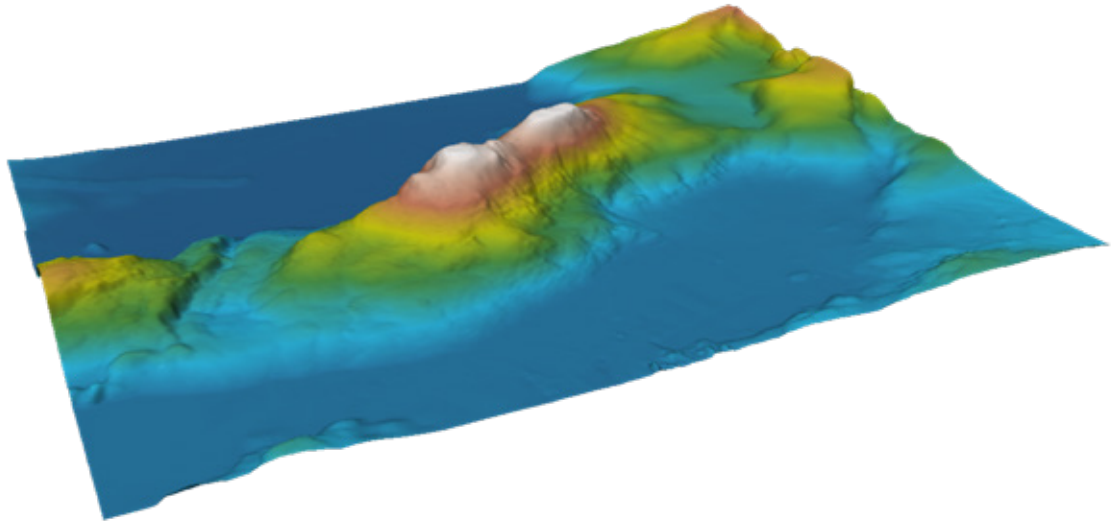
This campaign will be developed onboard the ***Santa Maria Manuela*** sailing ship which, after operating in the cod fisheries in Newfoundland and Greenland during the mid-twentieth century, was subject to an extensive renovation and became a renowned platform for ecotourism trips and scientific expeditions, backed up by an experienced crew.

Santa Maria Manuela ship; photo source: https://www.santamariamanuela.pt/

THE GORRINGE SEAMOUNT

LOCATION, TOPOGRAPHY, AND GEOLOGICAL FEATURES

The Gorringe is a large seamount, around 200 Km long and 80 Km wide, located over 200 Km off Cape São Vicente (south-west coast), within the Portuguese Exclusive Economic Zone (EEZ). This tectonic seamount has a NE-SW orientation and rises between the Tagus and the Horseshoe Abyssal Plains, where depths reach 5.000 meters[1]. Its two peaks, the Ormonde (33-46 m; 36°42'N, 11°09'W) and the Gettysburg (20-28 m; 36°31'N, 11°34'W), are separated by 20nm and an 800 meters depth saddle[12].



3D representation of the Gorringe Seamount; map Source: Hydrographic Institute

As a large topographic barrier, the Gorringe interacts with ocean currents (namely the Azores current, Portugal current and the Mediterranean outflow), causing current deflections, eddies, and local upwelling of deep nutrient-rich waters[3]. This increases the primary production around the seamount[4], which attracts ocean predators (including migratory species) and promotes the occurrence of high levels of endemism[25].

Other factors contributing to a high biodiversity of benthic fauna observed in this seamount[6] are the shallow summits within the euphotic zone (where light penetrates) and the hard substrata steep slopes, which mainly consist of lithospheric mantle rocks, resulting from the Eurasian and African plates convergence[7]. Owing to these particularities, **the Gorringe seamount has been often described as a biodiversity hotspot and oceanic oasis**, which may act as a steppingstone for fauna long-distance dispersal within the Macaronesia and Iberian biogeographic regions.

NATURAL VALUES

Previous oceanographic campaigns and scientific expeditions conducted in the Gorringe seamount have provided evidence about its **uniqueness, vulnerability, and high ecological value**. Around

1 Alteriis G et al 2003. Mar. Geophys. Res. 24: 223-244.
2 Xavier J and van Soest R 2007. J. Mar. Biol. Ass. U.K. 87:1643-1653
3 White M and Mohn C 2004. OASIS EU Project Report, 37 pp.
4 Oliveira AP et al 2016. J. Mar. Syst. 164: 13–29.
5 Correia MA 2013. Masters Thesis in Marine Ecology, University of Lisbon, Portugal.
6 Oceana 2014. The seamounts of the Gorringe Bank. Oceana, Madrid.
7 Gamboa D et al 2021. EPSL. 559: 116772

850 species have been reported, mostly during underwater surveys, either by scuba divers or remotely operated vehicles (ROV). Among these species, some are considered threatened according to the IUCN Red List, such the orange roughy, *Hoplostethus atlanticus*, the loggerhead turtle, *Caretta caretta* and the green turtle, *Chelonia mydas*.

Several habitat-forming species are included in the OSPAR list of threatened and/or declining species and habitats, such as kelp forests (*Saccorhiza polyschides* and *Laminaria ochroleuca*), maerl beds (*Lithothamnion corallioides),* deep-sea sponge aggregations (*Asconema setubalense*), cold-water corals (*Lophelia pertusa*), sea-pen and burrowing megafauna (*Funiculina quadrangularis* and *Pennatula phosphorea*) and coral gardens (e.g., black coral: *Antipathes subpinnata* and *Antipathella wollastoni*, which are also listed in CITES).

Marine mammals such as minke whales, fin whales, Atlantic spotted dolphins, striped dolphins, common dolphins and Risso's dolphins, have been reported, as well as some shark species such as the shortfin mako, the bird beak dogfish and the arrowhead dogfish. However, the pelagic megafauna (marine mammals and large predatory fish, including sharks) aggregating around this seamount is largely understudied. Seabird species listed under the EU Birds Directive, such as the Arctic tern, the storm-petrel, the European storm petrel and Cory´s shearwater, are known to use the water column around Gorringe as a feeding ground.

THREATS AND CONSERVATION CHALLENGES

Fishing activity around the Gorringe seamount is poorly assessed, but evidence suggests that this fishing ground is used by Portuguese and foreign vessels (mainly Spanish), licensed for bottom and drifting longlines[8]. Swordfish and shortfin mako (*Isurus oxyrinchus* listed in CITES) are often the main targets of drifting longline, whereas European conger and morays prevail in bottom longline. Lost fishing gear is also a potential threat[9], which may damage habitat-forming organisms and associated assemblages[10][11]. Assessing the impacts of human activities on the seamount natural values is also a goal of this initiative.

CONSERVATION STATUS

Gorringe is designated as a Special Area of Conservation (SAC) included in the European Natura2000 network, since 2020, and the elaboration of its management plan is listed in the Prioritized Action Framework for the Natura2000 network for 2021-2027. Additionally, the Madeira – Tore geological complex (which includes both the Ormonde and Gettysburg peaks and 15 other neighbor seamounts), was considered as an ecologically or biologically significant marine area (EBSA) in the North-East Atlantic Ocean, in 2022.

SCIENTIFIC ASSESSMENT

The surveys planned to assess the species and habitats during this expedition can be grouped into three categories: 1) open water assessments; 2) shallow benthic communities (between the seamount summits and 200m); and 3) slope and deep-sea environments (between 200m and 5.000m).

Open water assessments directed at pelagic species, namely megafauna attracted to this oceanic oasis, will use three methodologies: seabirds and marine mammals' surveys, drifting baited remote underwater video (BRUV) and bioacoustics. Shallow benthic biodiversity will be assessed using scuba diving surveys at the seamount summits and, to explore deeper areas within the euphotic zone (40-200 m), a remotely

8 Campos A et al 2023. Mar. Policy. 147: 105356
9 Vieira RP et al 2015. J. Sea Res. 100: 91–98.
10 Althaus F et al 2009. Mar. Ecol. Prog. Ser. 397: 279–94.
11 Williams A et al 2010. Mar. Ecol. 31: 183–199.

operated vehicle (ROV) is planned to be used, along with the deployment of benthic BRUV. The use of methodologies, as Video Landers, are being evaluated to assess areas between 200 m and abyssal plains at 5.000 m. There are only a few deep ROV dives that were performed in this seamount (e.g. 1.960 m during the MEDWAVES cruise, and 3.000 m during the NA017 expedition), and so the deep parts of the seamount are largely unexplored.

EXPEDITION FILM

A documentary will be produced during the expedition to promote the unique natural richness of this area, as well as engage civil society and decision makers on the need of protecting it effectively. Communication opportunities are key to engage civil society and to inform decision makers, increasing the success of ocean conservation measures. The engagement of journalists, schools and media outlets are ways to achieve this goal.

Focusing on the natural values, scientific assessment and collaborative work, this documentary will bring this seamount existence and importance to the spotlight as a magnet for marine life. The film will reveal the aggregated biodiversity around the two shallower peaks (Ormonde and Gettysburg), and also the fascinating open ocean ecosystems populated by sharks, marine mammals, and seabirds. The deep-sea ecosystems found in the steep slopes and abyssal plains, such as sponges and coral gardens, will also be featured, depending on the methods and partners that will participate. Most of these ecosystems are largely unknown and storytelling is key to display all these natural values. This film aims to contribute to **promoting the implementation of this large offshore marine protected area within the Portuguese EEZ.**

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