



200 HUNDRED years ago...

The Malaspina expedition (1789-1794), led jointly by Alejandro Malaspina and the navigator and politician José Bustamante, was Spain's most significant contribution to the Enlightenment's great voyages of discovery.

The expedition set sail from Cadiz on 30 July 1789 in two frigates, the *Atrevida* and the *Descubierta*. On board were some of the Spanish navy's leading astronomers and hydrographers, such as Dionisio Alcalá Galiano, José Espinosa and Juan Gutiérrez de la Concha, accompanied by a number of outstanding naturalists, doctors and draftsmen. After five years at sea, and extensive scientific field work in the Americas, Asia and Oceania, the expedition returned to Spain on 21 September 1794 with a treasure trove of information concerning natural history, cartography, astronomy, hydrography and medicine –all of which were geopolitically extremely important fields of knowledge at the time– together with insights into the political, economic and social dimensions of the territories visited. The bulk of the materials produced or collected are now in the *Museo Naval de Madrid*, the *Real Observatorio de la Armada*, the *Real Jardín Botánico* and the *Museo Nacional de Ciencias Naturales*, where they continue to be studied by historians and biologists.



Consolider-Ingenio 2010
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MANAGEMENT

Consejo Superior de Investigaciones Científicas (CSIC)

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PARTICIPATING INSTITUTIONS

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- Instituto Andaluz de Ciencias de la Tierra
- Instituto de Diagnóstico Ambiental y Estudios del Agua
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www.expedicionmalaspina.es



Circumnavigation expedition MALASPINA

Global change and exploration
of the ocean's biodiversity



www.expedicionmalaspina.es

THE MALASPINA CIRCUMNAVIGATION EXPEDITION is an interdisciplinary research project whose overall goals are to assess the impact of global change on the oceans and explore their biodiversity. The 250 scientists on board the *Hespérides* and *Sarmiento de Gamboa* are embarking on a nine-month expedition combining pioneering scientific research with training for young researchers, while advancing marine science and fostering the public understanding of science.

The project is under the umbrella of the **Consolider – Ingenio 2010** programme and is led by the Spanish National Research Council (CSIC) with the support of the Spanish Navy. It is named after the Italian-born Spanish naval officer, Alejandro Malaspina, who commanded Spain's first voyage of scientific discovery in the 18th century and who died 200 years ago.



MALASPINA in numbers

- A multidisciplinary team of **250 researchers** from **27 research groups**
- **42,000 nautical miles** travelled by the ships *Hespérides* and *Sarmiento de Gamboa*
- Over **300 stations sampled while at sea**, down to depths of 5,000 metres
- **70,000 samples** of air, water and plankton
- **5,500 GB of disk storage** space for the data produced
- **6 million euros** in funding from the Ministry of Science and Innovation's Consolider-Ingenio 2010 programme with additional support from the BBVA Foundation, the CSIC, the *Instituto Español de Oceanografía*, the Government of the Basque Country, AZTI Foundation and the Universities of Cadiz and Granada

objectives

Two centuries after Malaspina, the need for a large-scale survey circumnavigating the globe has once again arisen, this time to address the following objectives:

1. Assessing the impact of global change on the oceans

Global change relates to the impact of human activities on the functioning of the biosphere. These include activities which, although performed locally, have effects on the functioning of the earth's system as a whole.

The ocean plays a central role in regulating the planet's climate and is its biggest sink of CO₂ and other substances produced by human activity.

The project will put together *Colección Malaspina 2010*, a collection of environmental and biological data and samples which will be available to the scientific community for it to evaluate the impacts of future global changes. This will be particularly valuable, for example, when new technologies allow levels of pollutants below current thresholds of detection to be evaluated.

2. Exploring the biodiversity of the deep ocean

Half the Earth's surface is covered by oceans over 3,000 metres deep, making them the biggest ecosystem on the planet. Nevertheless, due to the limitations of the technology available until just recently, the oceans remain something of a mystery. Indeed, it is often said

that we know more about the Moon or Mars than Earth's oceans.

The development of new genomic techniques has now made it possible to explore life's diversity in the sunless depths of the oceans and assess the metabolic potential of the life they conceal. Exploring biodiversity in the ocean's depths could also yield important discoveries with applications in biotechnology.

The expedition's research work is subdivided into 11 blocks

Thematic blocks

- Physical oceanography: changes in the physical properties of the ocean
- Ocean biochemistry: carbon, nutrients and trace gases
- Atmospheric deposition and organic pollutants
- Optics, phytoplankton, production and metabolism
- Microbiological diversity and ecological function
- The distribution and role of zooplankton in the world's oceans
- The Malaspina expedition. Science and politics on the other side of the ocean

Horizontal blocks

- Coordination
- Science and society
- Training
- Integration

3. Assessing the impact of the original Malaspina expedition

Using sources in the countries visited, the project also aims to assess the socio-political impact of the Malaspina expedition in the regions it explored, and review the biography and historiography of Alejandro Malaspina, with particular emphasis on the work done in the wake of the expedition.

4. Promoting marine science in Spain and public understanding of issues in marine sciences

Spain has played a leading role in the exploration of the planet's resources, and remains a benchmark in international oceanographic research. The project aims to foster platforms for cooperation within the marine research community in Spain, and to bring science and research on global change closer to the public through various outreach activities, such as exhibitions, lecture series, etc.

5. Raising the interest for marine sciences within the youth and training young scientists in a global perspective to ocean sciences

The project will be a unique opportunity to promote the training of young researchers in marine sciences. Four post-graduate programmes have jointly coordinated a training module, included in the FBBVA-CSIC's Malaspina Expedition Doctoral Programme, financed by the BBVA Foundation and the CSIC. The high point of this training module will be the use of the *Sarmiento de Gamboa* as a teaching vessel on the leg of the journey between Miami and Las Palmas.



ROUTE TAKEN BY THE EXPEDITION

The Malaspina expedition, taking place between December 2010 and July 2011, will involve two oceanographic research vessels: The *Hespérides*, operated by the Spanish Navy, which will circumnavigate the globe, and the *Sarmiento de Gamboa*, operated by the CSIC, which will sail from Las Palmas to Santo Domingo and then return to Las Palmas, where it will host a 'floating university' providing oceanographic training for a group of master's degree students.

