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06 August 2008 Fossil and molecular evidence reveals the history of major marine biodiversity hotspots

- International experts have described three major marine biodiversity hotspots in the last 50 million years, from the oldest, peaked in southwest Europe and northwest Africa, to the the modern Indo-Australian Archipelago hotspot.  
- The birth, evolution and death of such hotspots are a product of ecological processes operating over geological time scales of millions of years.  
- To what extent is human activity speeding the evolutionary process of the focus with the highest level of biological diversity, the coral reef ecosystems?

The journal Science has published in the issue of the 1st of August the results of a detailed research work about the evolution of marine diversity all through the last 50 million years. The study has been carried out with the participation of scientists from Australia, Spain, USA, UK, Holland, Malaysia and Panama.

The results obtained prove that the main concentrations of biodiversity have been located in the last 50 million years in a line, from west to east, from southwest Europe and northwest Africa to the Indo-Australian Archipelago, and along the eastern shore of the Arabian Peninsula, Pakistan, and West India.

The researchers, among which is the Professor of the University of Granada (Spain) Juan Carlos Braga, have based this work on the study of the combination of molecular evidence and the fossil record.

At present, the Indo-Australian Archipelago (IAA) is the tropical center of maximum diversity since the Miocene and in the last 20 million years, as the record of large benthic foraminifera, mangrove pollen types, gastropods, and corals has shown.

The research proves the amazing antiquity of the IAA focus, which provides a new understanding of biodiversity hotspots, product of ecological processes operating over geological time scales of millions of years with their timing and locations coinciding with major tectonic events. The birth and death of successive hotspots highlights the link between environmental change and biodiversity patterns..

### Vulnerability of coral reef ecosystems

A synthesis of the paleontological and molecular data, interpreted in an ecological context, has enabled the scientists to understand the true antiquity of hotspots and their component species. However, future studies are clearly needed as global threats to marine biodiversity put the spotlight on the vulnerability of coral reef ecosystems.

We now realize that human-induced changes are operating on time scales far removed from those that have created these hotspots. An improved understanding of the nature of biodiversity hotspots, be they terrestrial or marine, will require a clearer understanding of the Geographic and environmental context of taxonomic turnover driving the origination, maintenance, and diminution of hotspots over extensive time scales.

REFERENCE: Prof. Juan C. Braga. E-mail. [jbraga@ugr.es](mailto:jbraga@ugr.es).

Reference URL

<http://prensa.ugr.es/prensa/research/index.php>

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