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Fossil And Molecular Evidence Reveals The History Of Major Marine Biodiversity Hotspots

ScienceDaily (Aug. 7, 2008) — 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 modern Indo-Australian Archipelago hotspot and along the eastern shore of the Arabian Peninsula, Pakistan, and West India.

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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?

New research reviews the evolution of marine diversity through the last 50 million years to gain insights.

The study was carried out with the participation of scientists from Australia, Spain, USA, UK, Holland, Malaysia and Panama. The

researchers, including Professor Juan Carlos Braga of the University of Granada (Spain), have based their study on both 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 new research shows 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.

Scientists 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.

This research was published in the journal *Science* August 1, 2008.

Adapted from materials provided by *Universidad de Granada*, via *EurekAlert!*, a service of AAAS.

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