Chapter

Deep Sea Biodiversity on the Continents, How It Happens?

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Abstract

Recent studies in the ocean depths have discovered a large number of organisms and microorganisms that live in extreme environments of hydrothermal vents and cold seeps obtaining their energy through anaerobic oxidation of methane (AOM) process through a microbial consortium capable of reducing sulfate and oxidizing methane simultaneously. On the surface, the fossil record of this type of chemosynthetic community has made it possible to establish the link between the tectonic plate dynamics with the origin of mineral deposits or sediments formed on the oceanic ridges and attached to the continents. The foregoing could be supported by the ^{13}C and ^{18}C stable isotopes analysis that has been carried out in the fossil record of rocks and sediments attached to the continents and the study of stable isotopes that is currently carried out in submersibles at mid-ocean ridges around the world. The relationship between current values and the fossil record is key to understanding, among others, the methane contribution to the environment and its variation throughout time. Cerro Matoso is a recent case that permitted linked the recent hydrothermal activity in the mid-ocean ridge, with those of the ancient ones.

Keywords: vent-cold seep, mid-ocean ridges, tectonic plates, vent communities, anaerobic methane oxidation

1. Introduction

The evolution of the oceans is linked to the origin and geological evolution of the continents. The Plate Tectonics theory, which led to the understanding of the continental margin's evolution and the constant generation of oceanic crust of slow and ultra-slow spreading along different oceanic ridges, has been supported by the discovery and identification onshore of mantle and marine sedimentary rocks attached to the continents and exposed in impressive outcrops that show the impressive terrestrial dynamics.

As an example, one of the most important events in the geological record is related to the early Cambrian biological evolution, time during which the intracontinental extension was intensively dealing with hydrothermal activity in submarine settings [1] and black shale with multi-metal beds was formed and deposited around the world, are represented today with oceanic sediments attached to the continents and exposed on surfaces mainly in Asia and Europe. A series of hydrothermal vent community discovered at the Cambrian base in black shales indicated that