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Sea bed provides information about present climatic change

By [ScienceMode](#) on Jan 22nd, 2009 in [Headlines](#), [SM](#) | [Add story link to StumbleUpon](#)

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Lately, every drought, flood or hurricane which happens in the planet is connected with climatic change, and therefore the interest of society and scientists is getting to know this phenomenon better.

Climatic change is connected at present with the phenomenon of global warming. This is characterized by the increase of carbon dioxide (CO₂ gas), which produces the reduction of heat emission to the space and provokes a higher global warming.

Although gases in the atmosphere tell us about this greenhouse effect, oceans have accumulated information for million years which allow us a better understanding of this phenomenon.

The past lets us know the present

In this process, which involves a better knowledge of carbon cycle in the sea, **David Gallego Torres**

developed the research work “Acumulación y preservación de materia orgánica en sedimentos marinos: implicaciones en los ciclos del carbono y nutrientes” (Accumulation and preservation of organic matter in marine sediments: implications in the cycles of carbon and nutrients), under the supervision of Professors **Francisca Martínez Ruiz** and **Miguel Ortega Huertas** of the [University of Granada](#) ([Andalusian Institute of Earth Sciences](#), [CEAMA](#) and [Department of Mineralogy and Petrology](#)).

“Oceans may act as a drain of carbon, in the way of inorganic carbonates or as organic matter settled in sediments”, says Gallego Torres, who did research, among other phenomena, into the accumulation of organic matter in the geological past (Pliocene-Holocene), in the East of the Mediterranean.

According to the researcher, “for the carrying out of this work we applied different techniques of geochemical analysis, mineralogy and isotopic analysis of organic matter for the reconstruction of the paleoceanographic conditions which induced to the accumulation of organic matter in marine sediments (sapropels), its implications in the carbon cycle and, consequently, in the climatic variation in the Mediterranean area and in the African craton, the main source of nutrients of these sediments”.

Professor Francisca Martínez Ruiz highlights that the analysis research line of the climatic variability in the geological past “provides scenes of climatic changes which help us to understand the answers of the components of the climatic system in future”.

Conclusions

Doctor David Gallego Torres says that one of the main conclusions of his research is that “climatic fluctuations affect the marine environment in such a way that there may be a carbon taking by organic matter, due to these changes in marine environment’s oceanography, in such a way that the organic matter would remain accumulated again in the earth’s crust of sediments and would remain there for a while”.

Other conclusions are:

- the accumulation of organic matter in marine sediments is mainly connected with an intensification of marine productivity;
- anoxic conditions (without oxygen) of the sea bed favour the preservation of such organic matter, but they can not produce an enrichment in the sediment by themselves;
- anoxia causes nutrients’ recycling maintaining a high productivity, in such a way that the interaction between primary high productivity and anoxia may promote the accumulation of organic matter in sediments.
- Such fixing of organic carbon in the lithosphere is connected with the climatic system, as high concentrations of CO₂ in the atmosphere facilitate a high productivity, due to an excess of carbon. Such CO₂ is later fixed, in the way of organic matter, and removed of the atmospheric reservoir inducing a fall in Earth’s superficial temperature.

Source: Universidad de Granada

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