

1st METECH WORKSHOP - from deep-sea to coastal zones: Methods & Techniques for studying Palaeoenvironments

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Preface

Reconstructing past climate and past ocean circulation demands the highest possible precision and accuracy which urges the scientific community to look at different sediment records such as the ones from coastal zones to deep-sea with a more complete set of technical and methodological tools. However, the information given by each tool varies in precision, accuracy and in significance according to their environmental settings. It is therefore essential to compare tools. With that in mind and as part of the International year of Planet Earth, a workshop entitled “From deep-sea to coastal zones: Methods and Techniques for studying palaeoenvironments” took place in Faro (Portugal), from February 25th to 29th of 2008 in order to:

- present several methods and techniques that can be used for studying sediments from deep-sea to coastal zones, namely for reconstructing palaeoenvironments in order to document past climatic changes and short to long-term environmental processes;
- allow cross experience between different fields and specialties, either from deep-sea to coastal zones or from micropaleontology to geochemistry;
- give the opportunity to students from different universities and countries to attend the workshop;
- publish a special volume on the presented methods and techniques during the workshop.

The workshop was organized in four non-parallel sessions dealing with the use of micropaleontology, isotopes, biogeochemistry and sedimentology, as tools for palaeoenvironmental studies. The present *IOP Conference Series: Earth and Environmental Science* proceedings reflect this organisation and papers are published in each theme. The papers are either short reviews or case studies and are highlighted below.

The remains of microorganisms found in sediments are the main proxies used in micropaleontological studies. However, the link between fossilized remains and their living origin is not easy to reconstruct only based on the geologic/sedimentary record. Accordingly, Barbosa presents a review of the actual

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knowledge of living phytoplankton dynamics and the processes, or environmental conditions, which could contribute to the production of fossilized biogenic remains. In the next paper, de Vernal presents a review, based on several case studies, on how palynological fossils observed in sediments are used in tracing biogenic fluxes, characterizing sedimentary environments, or even reconstructing hydrographical conditions and productivity. The two other papers presented in the micropaleontological proxy section are case studies on the use of dinoflagellates (Rochon) and calcareous plankton remains (Guerreiro et al.), respectively, to better understand their local or regional environmental living characteristics and therefore their specific interpretation for palaeoenvironmental reconstruction at a regional scale.

Isotopic proxies can be used either as provenance tracers or as chronometers of different processes. Once again, each study can provide a very specific framework of the proxies' use and it is very important to know and evaluate the limits of these tools in each environment and/or type of analyzed material. Accordingly, the two first articles deal with the study of organic carbon either by carbon and oxygen stable isotopes (Hélie) or by radiocarbon (Mollhenhauer and Rethemeyer) analysis. The two other articles of this section deal with the use of radioisotopes. Ghaleb reviews the methods for measuring short-lived radionuclides in sediments, giving examples of their use for estimating recent sedimentary accumulation rates; whereas Hillaire-Marcel reviews the potential use of U-series isotopes as radiochronometers in biogenic carbonates.

Geochemistry groups more than one field of expertise. However, in the present section, inorganic geochemistry is not treated and both articles present work on a very specific, and at the same time very complex compound of the organic matter realm: black carbon. As such, Veilleux et al. present a density fractionation method for isolating the small quantities of soot-like and graphitic material usually found in natural samples, whereas González-Vila et al. illustrate the potential of the combined use of analytical pyrolysis and solid state ^{13}C NMR to determine the presence of black carbon and to characterize the refractory organic matter in marine sediments from the Gulf of Cadiz (Spain).

In the last section, two papers are presented and discuss sedimentological proxies. In their paper, using diffuse spectral reflectance data, Veiga-Pires and Mestre try to determine if "twinning cores" (or paired cores) can be used as duplicate records to increase the volume of sediments collected in the field, whereas Drago et al. discuss the use of fish remains in sediments for the reconstruction of paleoproductivity.

Each of the above papers benefited from the constructive comments of at least two reviewers and we wish to sincerely thank the reviewers for their timely evaluation. We also thank the participants, volunteers and organizers of the workshop for their implication, making this first workshop on Methods and Techniques for studying palaeoenvironments (METECH) a success. The workshop and this proceeding would not have been possible without the financial and logistical support of GEOTOP, CIMA, the Portuguese Foundation for Science and Technology (FACC07/1/1315) and IOP Conference Series.

The second METECH workshop should take place in Canada in the forthcoming year.



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