



**RAPPORT DU 40^e CONGRÈS
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Ce volume présente sous la forme d'articles synthétiques toutes les communications scientifiques présentées lors du 40ème Congrès de la CIESM. Les articles incluent chacun un résumé et des références bibliographiques. Comme ce sont plus de 900 chercheurs originaires de 40 pays qui se sont rassemblés en octobre 2013 à Marseille, l'ensemble offre un vaste panorama, très représentatif des recherches marines menées actuellement en Méditerranée et en mer Noire.

Les articles présentés dans le cadre des six comités scientifiques sont édités sous la responsabilité du Président de comité concerné. Seules les communications physiquement présentées par leur auteur lors du Congrès ont été retenues pour cette publication. Pour leur part, les rapports des modérateurs des sessions ont été édités par mes soins.

*Frédéric Briand
Directeur Général, CIESM*

Editeurs scientifiques

Les Présidents des comités scientifiques de la CIESM, 2010-2013

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Milton da Costa (Microbiologie et biotechnologie marines),

Ferdinando Boero et Cemal Turan (Ecosystèmes marins et ressources vivantes),

Enric Sala (Systèmes côtiers)

Réalisation

Michèle Barbier, Annelise Gastaldi, Valérie Gollino, Paula Moschella, Kaveh Rassoulzadegan

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CIESM

16, bd de Suisse MC 98000 – Monaco

Tèl. : +377 9330 3879 Fax : +377 9216 1195

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COMITÉ 1

Géosciences marines

Président : Gert J. de Lange

Rapports des modérateurs

Biogeochemical cycles, past and present

Maria Triantaphyllou, Greece

Résumé

A short introduction to the subject was given by the moderator, mainly addressing a series of questions that are featured in current research on biogeochemical cycles, dealing with how the geosphere and biosphere have evolved through time and the role of humans in pushing the geochemistry and geobiology of the Earth Surface System towards a potential tipping point.

A 30 minute debate followed the interesting 3 min presentations of the participants. During this fruitful and frank discussion between speakers and audience, a series of questions were addressed focused on: the timing of Black Sea inflow in the Mediterranean, carbonate chemistry within sapropel S1 deposition, physics of anoxia during S1 deposition, productivity and preservation during sapropel times, amount of total organic carbon accumulated during the S1 anoxic event in various Mediterranean basin depths, carbonate chemistry effects and the role of possibly limiting factors (temperature, salinity, depth) on coral growth in Mediterranean sites, coccolithophore flux variability in Mediterranean basins and possible occurrence of different *Emiliania huxleyi* morphotypes in the Black Sea coccolithophore assemblages.

Deep Sedimentary Processes

Stéphanie Dupré, Ifremer, France

Résumé

The 'Deep Sedimentary Processes' session with 8 presentations covered a wide range of geological setting from lacustrine to marine environments. Challenges in studying deep sedimentary processes imply the best view of the depth window which is involved, and this from the seabed expressions to the deeper signatures. The time window of these processes is obviously crucial, and complex to approach when combining geological and human time scales, the case for climate issues. Most of the presented studies concern natural resources (water, oil and gas) and risks (water pollution, landslides). A key player in these processes, to be considered as the sediments are, is the fluid (e.g. water, gas). Some of the discussions focused on the importance of the deep -tectonic- control of seabed manifestations, e.g. the role of the Messinian salt layer in relation with fluid systems initiation and occurrence, namely the Eastern Mediterranean Sea (e.g. the Nile Deep Sea Fan) versus the Western Mediterranean Sea. The wide panel of geographic studied sites, the Dead Sea, Bafa Lake, the Black Sea, the Mediterranean Sea (Western and Eastern Mediterranean and Adriatic seas) did put in light the relevance to study deep sedimentary processes in 'enclosed' areas.

Geo-archeology and sea level change

Hulya Caner, Turkey

Résumé

Four speakers intend in the session of geo-archeology and sea level change . Name of speakers ;

Nathaniel Bensoussan, Stello Petrakis, Matteo Vacchi, Hulya Caner

First presentation is about potential impacts of climate change on coastal benthic ecosystems and developed an original strategy for the definition of warming scenarios in coastal habitats. At the same time their potential impacts on key benthic species.

Second presentation is about AKTAIA research project which aims to investigate the impacts of climate change upon the coastal zone.

Other presentation is about the MEDFLOOD project . Main objectives of this project are

- to forecast future climate trends
- to examine the climate change impact
- to develop new methods
- possible socio-economic change

The last presentation is about paleoenvironmental changes and the cultural sequence of the ancient Theodosius Harbor (Istanbul Marmaray tube tunnel) using palynology . Flash presentations admitted more time to discussions and efficiently.

Marine canyons

Sandro Carniel, CNR-ISMAR, Venice, Italy

Résumé

Following the communications, a general, active discussion started. About 50 people were present at that time, and about 10 participants were involved in the question time and discussion, which concerned the following topics :

- possible links between the cascading processes and the deep water formation in the Eastern Mediterranean basin;
- relations between small scale processes and larger scale phenomena in marine canyons (e.g. cascading processes);
- new concepts emerging from recent advances on sea technology (high-resolution measurements multibeam, ROV, AUVs?);
- availability of new coupled numerical models linking atmospheric-oceanic-wave processes and their capability in describing spatial-temporal scale of cascading events and depicting bottom features;
- need of more objective ways to measure bottom sediment resuspension;
- origin and evolution of marine canyons;
- canyons development speed during the Messinian period;
- case studies in the Med area and their peculiarities with respect to ocean regions;
- quantitative estimate of the transfer of organic matter to the deep sea.;role of measurements and modeling;
- link between physical/abiotic processes and biogeochemical/biotic aspects;

Marine Geohazards

Stéphanie Dupré, Ifremer, France

Résumé

The entire Mediterranean Sea from its western to eastern shores and to the Sea of Marmara is characterized by natural risks involving catastrophic tsunamis, earthquakes and major landslides. These phenomena are well known through the entire human history. Geohazards are the subject of numerous studies as attested by CIESM workshops - see CIESM Workshop Monograph n°42 (192 p.) "Marine geo-hazards in the Mediterranean?"; or CIESM Workshop Monograph n°24 (152 p.) "Human records of recent geological evolution in the Mediterranean Basin - historical and archaeological evidence".

In order to better understand the geological processes that lead to these short-term duration risk-associated events and to better define the triggers, the analytical approach requires a multi-data and multi-parameter integration, e.g. including the meteorological input into the sedimentary system and cycle or questioning the role of fluid migration with regard to sedimentary instabilities and earth-shaking. Combining onland and offshore studies is definitively an asset as looking at past activity of risks-associated events together with most recent ones. Assessing natural risks is a very challenging issue.

Marine organic pollutants

N/A

Résumé

Modérateur absent

Messinian salinity crisis

Johana Lofi, France

Résumé

About 6 million years ago the Mediterranean Sea was transformed into a giant saline basin. This event, commonly referred to as the Messinian salinity crisis (MSC), changed the chemistry of the global ocean and had a permanent impact on both the terrestrial and marine ecosystems of a huge area surrounding the Mediterranean area. Since the first MSC scenario has been proposed following DSDP Leg XIII in the 1970s the Messinian event remains one of the longest-living controversies in Earth Science. A few years ago a deep revision of our knowledge of the Messinian event was performed during a CIESM Workshop (The Messinian Salinity Crisis from megadeposits to microbiology - A Consensus report, 2008. N° 33 in CIESM Workshop Monographs (F. Briand Ed.), 168 pages, Monaco). A number of open questions were identified concerning the cause, nature, timing and consequences of the Messinian Salinity Crisis.

This session embraced several of these open questions through oral presentations. Thanks to a new multidisciplinary study on the DSDP Leg 23 cores, Caruso et al. proposed that the Red Sea and the Mediterranean Sea were still connected during the Late Messinian. De Lange et al. presented a mechanism in which gypsum formation and preservation occurred in shallow sedimentary settings while anoxic organic matter degradation processes in the deep basin formed dolomite. A series of presentations were also dedicated to the record of

the MSC event, thanks to seismic reflexion and borehole data. On the Egyptian margin, Abdel-Fattah et al. recognized downstepping fluvial terraces that can be used to reconstruct a relative sea level curve during the MSC. On the Eastern Sardinia margin, Lymer et al. mapped the MSC seismic markers, allowing to reconstruct the paleo-geography of the area ~5.6 My ago and to refine the timing of the rifting in this area. Driussi et al. also used these seismic markers to assess the post-MSC tectonic deformation of the Balearic promontory. Lofi presented the publication project of a second volume of a "Seismic atlas of the Messinian Salinity Crisis markers in the Mediterranean and Black seas?". The MSC session concluded by a presentation by Camerlenghi et al. of the DREAM project (Deep-sea Record of Mediterranean Messinian events) dedicated to the drilling of the MSC offshore records in the Mediterranean basin.

A general, constructive discussion followed the presentations, addressing the various topics presented and in particular the implications of a possible connection with the Red Sea during the Messinian, and the use of the MSC markers to assess the post-Messinian deformation due to tectonics. Since we are lacking at present stratigraphic and lithological control on up to 95% of the offshore Messinian records, the participants also discussed the critical need of offshore drillings in the deep basins (including the Black sea) to answer some questions still open concerning the Messinian event.

Metal distribution in sediments

Mohamed Bouhamadouche, Faculté des Sciences de la Terre, USTHB, Alger, Algérie

Résumé

The theme of the session was very well identified and nine communications presented the extent of metal occurrence (Cr, Mn, Cd, Al-, Co, Nor, Cu, Zn, Mb, and Pb) in various areas where they can reach worrying, if not alarming, levels, particularly in certain regions of Algeria, Turkey, or Egypt.

The contamination level of heavy metals was assessed by using the Igeo geoaccumulation index and metallic pollution indicators (MPI). A question particularly discussed was the particle size fraction of the marine sediment most affected by heavy metals pollution.

The debate that followed the communications was a good initiative as it has enriched several talks, concerning future methods and approaches such as the systematic study of metal isotopes, or metal contamination of major fouling species such as barnacles with interesting recommendations to be taken in future studies.

Sedimentary and chemical processes

N/A

Résumé

Modérateur absent

Shoreline dynamics

Muhammet Duman, Turkey

Résumé

This session on Shoreline Dynamics successfully unfolded, covering a diversity of topics that ranged from shoreline activities, modeling, hydrodynamics, Holocene deposits, deltaic structures, and seabed features. For young scientists this was a valuable and often the first opportunity to present their findings in front of an international audience.

The general debate saw specific questions and more general concluding remarks mainly on shoreline activities, hydrodynamics and seabed features.

HIGH RESOLUTION GEOPHYSICAL TECHNIQUES FOR AN INSIGHT TO THE FORMATION OF THE DUNE FIELD OF THE CENTRAL KYPARISSIAKOS GULF, (GREECE).

J. D. Alexopoulos¹, S. Dilalos¹, S. Poulos^{2*}, G. Ghionis², S. Petrakis², D. Giannouli² and D. Michelioudakis¹

¹ University of Athens, Faculty of Geology and Geoenvironment, Department of Geophysics-Geothermy

² University of Athens, Faculty of Geology and Geoenvironment, Department of Geography and Climatology - poulos@geol.uoa.gr

Abstract

The scope of the present contribution is to investigate the formation and evolution of the Kyparissiakos coastal dune field, during the last transgression (Holocene), on the basis of geophysical techniques (ERT, VES), detailed morphological mapping and existing geoenvironmental information.

Keywords: Geophysics, Coastal processes, Shoreline evolution, Lagoons, Ionian Sea

Introduction

The Kyparissiakos Gulf is part of the western coast of Peloponnesus (Greece), facing the Ionian Sea and has a total coastline length of approximately 70 km. The coastal zone is composed of sandy or gravelly sandy sediments, backed by coastal dunes and alluvial plains that have formed on a post-Alpine (i.e. Neogene and Quaternary) siliclastic sequence, which locally exceeds 400 m in thickness [1]. The upper part of this sequence (Upper Pliocene) is composed of alluvial and lacustrine sediments that have accumulated mainly in the central part of the Kyparissiakos Gulf. The transition from Pliocene to Pleistocene occurred without any interruption of sedimentation and, therefore, it is very difficult (in some cases, impossible) to differentiate between the relevant deposits [1].

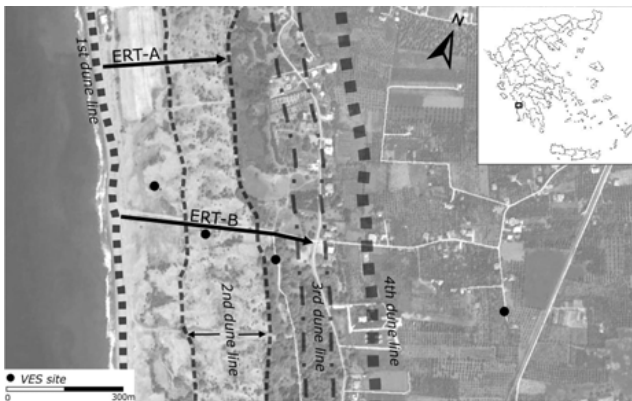


Fig. 1. Satellite image of the study area with annotation showing the dune lines, the geophysical sections and soundings.

The dune field of Kyparissiakos Gulf includes four dune lines (Fig.1) that lie at distances of 650m (4th), 450-470 (3rd), 140-180m (2nd) and 30-40m (1st) from the shoreline. Elevations in the dune field vary between 2 m and 13 m, with the highest corresponding to the 3rd dune line. With the exception of the most recently formed 1st dune line which is a typical foredune, the rest of the dune lines present characteristics similar to those of parabolic dunes, aligned to the prevailing onshore W and SW winds [2], [3].

Methodology

For the needs of the present investigation, a geophysical survey was carried out with the application of geoelectrical methods. Two (2) resistivity sections (ERT) were carried out, perpendicular to the general direction of the dune lines, to provide detailed information of the subsurface resistivity distribution up to 40-50m depth. In addition, four (4) geoelectrical soundings (VES) were carried out, for a deeper investigation of the subsurface lithological structure [4] (for locations see Figure 1).

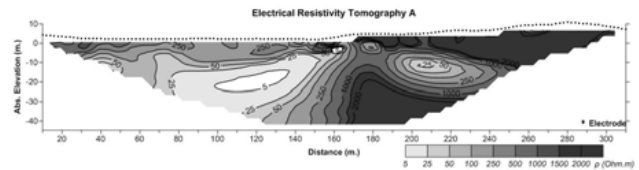


Fig. 2. Electrical Resistivity Tomography A (inversion model)

A detailed morphological map of the dune field was also produced using the technique of high-accuracy real-time kinematic differential GPS.

Discussion

The dune field consists of medium sand, well sorted due to its Aeolian origin [2]. The dune field has developed on the top of an extensive complex of beach barriers incorporating shallow lagoons. These upper Holocene formations, that are regarded as the base on top of which the dune field has been developed, overly an Upper Pleistocene formation of shallow marine/lagoonal deposits; which incorporates layers rich in beach material (i.e. sand, pebbles, gravels) and sandy clay. The geophysical survey indicates that this formation, having an average thickness of 35 m, should have been exposed to subaerial erosion during the last regression of sea level (prior to 21.000 years BP). In addition, this formation, which overlies non-permeable marly Pleistocene deposits, hosts fresh water aquifers that vary in volume seasonally.

The analysis and evaluation of the results of the geophysical survey in the dune field area, has provided information capable of adumbrating these aquifers (5-100 Ohm.m) under the 1st and 2nd dune lines (Fig. 2). As a result, it is concluded that the depicted geophysical structures are equivalent to the previously mentioned lagoonal deposits.

Finally, on the basis of morphological measurements and comparison with previously collected data, it seems that the 1st dune line is under erosion, mainly due to storm wave activity.

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