



**Agenda and Abstracts**  
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LA PROVENANCE CLASTIQUE DES SUCCESSIONS TURBIDITIVES OLIGO-MIOCENES DES DOMAINES INTERNES DE LA CHAÎNE BÉTICO-RIFAINE (ARC DE GIBRALTAR, MÉDITERRANÉE OCCIDENTALE); IMPLICATIONS PALEOGÉOGRAPHIQUES RESULTANTS DE LA COMPARAISON AVEC L'ARC CALABRE-PELORITAIN 30

Dans l'Arc de Gibraltar, la Chaîne Rifaine (Maroc septentrional) partage avec les Cordillères Bétiques (Espagne méridionale) la plupart de ses unités internes, qui appartiennent au Bloc d'Alboran. Elles sont subdivisées en trois groupes d'unités continentales: de haut au bas, les Unités Ghomarides-Malaguides, les Septides-Alpujarrides et les Unités de la Dorsale Caïraie, respectivement en Maroc et en Espagne. Les modes détritiques des suites gréseuses Oligo-Miocènes qui reposent en discordance sur les nappes mentionnées ci-dessus de la Chaîne Bético-Rifaine, montrent une provenance liée à des secteurs principalement formés par des couvertures sédimentaires carbonatées Mésozoïques et Tertiaires et par des roches épimétamorphiques. Leur composition, en fait, correspond à celle des litharenites et, localement, au clan des calcilithites ( $Q_{36.6+57.1}$   $F_{2.2+5.0}$   $L_{10.6+60.6}$ ) sont les variations des pourcentages de Quartz-Feldspaths-Fragments des Roches). En revanche, les grès des successions turbiditiques Oligo-Miocènes équivalentes qui se trouvent dans l'Arc Calabre-Peloritain (Italie méridionale et Sicile nord-orientale) en discordance sur les nappes du socle péloritain (terrains métamorphiques et paléozoïques, à l'origine attaché avec les zones internes de la Chaîne Bético-Rifaine, Bloc AlKaPeCa Auct., Al=Alboran, Espagne Méridionale et Maroc septentrionale, Ka= Kabylides, Algérie et PeCa= Arc Calabre-Peloritain), sont très différents. Ces roches semblent être principalement issues de l'érosion de sources cristallines formées par des roches plutoniques et métamorphiques du haut degré, qui peuvent être identifiées avec le socle Hercynien, qui forme les unités tectoniques plus élevées de cet orocline. L'attribution de ces grès au groupe des arkoses (abondance de feldspaths et pénurie de carbonates et des roches épimétamorphiques,  $Q_{56.3+66.9}$   $F_{21.3+40.3}$   $L_{3.4+18.9}$ ), témoignent que la provenance clastique est principalement liée à la contribution de roches gneissiques et/ou granitiques. Ces provenances différentes peuvent être justifiées en admettant que les Domaines Internes, qui ont joué le rôle des sources du détrit, par suite de leur lithologie différente, ne pourraient pas avoir appartenu au même bloc d'AlKaPeCa, ou bien ils ont été séparés à la suite d'une précoce dilacération et fragmentation, entamées avant l'Oligocène Supérieur (âge de la base des dépôts sédimentaires étudiés) et préparent l'ouverture de nouveaux secteurs océaniques (Bassin Algero-Provençal).

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COMPARATIVE STUDY OF SELECTED MARINE QUATERNARY DEPOSITS OF EASTERN MEDITERRANEAN

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Fossiliferous marine terraces are a valuable tool for understanding the implications of climatic changes and the tectonic activity of the continuously evolving eastern Mediterranean. The Molluscan fauna of selected Upper Quaternary deposits is compared in order to depict faunal differences and similarities among these localities but also among layers of one locality. The rich and well preserved molluscan fauna of Perachora sections (Corinth) have been studied in detail during the last years. The faunal composition of the Arvi at Southern Crete (Gr) and Akamas, Coral Bay and Palaeokastro (Cy) Quaternary marine terraces were examined and identification of the typical taxa and paleoecologic and paleobiogeographic aspects of the them are given. The above studies offer the necessary background for the comparisons. The diversity and composition of the fauna, the altitude of the fossiliferous layers or destructive terraces, observations on the influence of tectonic activity, the recent marine fauna of Greece and Cyprus and the bathymetry at the moment of the deposition at each fossiliferous section, are discussed. Special emphasis is given to the existing unconformities and depth indicators which turn up the marine terraces to an extremely sensitive, accurate but overlooked the recorder of climatic and palaeogeographic changes. It seems that climatic changes have some times, stronger influence on deposition than tectonics.

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LATE QUATERNARY PALAEOENVIRONMENTAL EVOLUTION OF THE NORTH EVOIKOS GULF FROM PALAEOONTOLOGICAL, SEDIMENTOLOGICAL AND MINERALOGICAL DATA.

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A (micro)-palaeontological and sedimentological investigation of two gravity cores recovered from the south shelf of the North Evoikos Gulf, a land-locked, 450 m deep, semi-enclosed basin connected to the Aegean Sea via the 45 m deep Oreos Strait and to the South Evoikos through the 10 m deep Euripus Channel, elucidated the palaeoenvironmental evolution of the area during the last 40 kyr. Both cores are characterized by a pronounced unconformity that divides the sedimentary column into a: 1- Lower salty water strictly lacustrine sequence that is dominated by carbonate lithofacies characterized by aragonite chemical precipitation. This sequence also hosts a tephra layer probably linked to the North Evoikos Likhades islands active volcanic center. This interval is characterized by the abundance of peloids, the lack of benthic foraminifera and other invertebrates except the specific gastropod assemblage of *Hydrobia* sp., which suggest hypersaline conditions. 2- The upper marine sequence that starts with a sharp erosional surface, mostly characterized by the presence of shell debris, and the appearance of few shallow marine benthic foraminifera and abundant peloids- the latter are absent records upwards the drastic dominance of terrigenous, mostly clay mineral input, brought by a local river pluvial phase. A benthic foraminifera assemblage, dominated by *Bulimina marginata* and *H. balthica*, as well as a mollusc assemblage dominated by *Corbula gibba*, further supports an increase in refractory organic matter at the sea floor and within the sediment, presumably being brought to the area mainly by river runoff.

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**PETROGRAPHY OF THE METAMORPHIC ROCKS FROM THE AGORDO AREA BEARING LATEST CAMBRIAN, AERONIAN AND DEVONIAN FOSSILS (SOUTHALPINE METAMORPHIC BASEMENT OF THE EASTERN ALPS, ITALY)**

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Recently, in the Agordo area, some unquestionable fossils have been described: 1) Latest Cambrian acritarchs, within trivial black, fine grained phyllites (Col di Foglia); 2) Aeronian graptolites, within boudins along a recrystallised shear zone cutting low-grade metapelites (Ponte Alto); 3) Middle Devonian *Rugosa* corals, within metalimestone boudins along the mentioned shear zone. These fossil findings are unique in the metamorphic basement of the Southern Alps. Therefore, the rocks containing them deserve a careful petrographic characterization. The most interesting rocks are those bearing well preserved graptolites. They consist of quartz, fluorapatite (up to 70 %), carbonaceous matter, local ankeritic (Ca, Fe, Mg, Mn) carbonate, scanty small V-rich muscovite flakes, sulfides. The measured values of the total organic matter (TOC) are in the range 10-12% both in these boudins and in the close black carbonaceous phyllites. The abundance of fluorapatite is related to that of *Muellerisphaerida*, the test of which originally consisted of apatite, as known in the literature. These coral-bearing meta-limestones are greyish black to black in color due to the abundance of permeating carbonaceous matter. Although strongly recrystallised, corals are nearly undeformed. They are intensively permeated by carbonaceous matter, which also makes up relatively thick films within the inter-coral spaces. Dealing with the carbonate, EDAX data by SEM indicate high Ca, Fe and Mg contents and the presence of Mn in it.

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**LATEST CAMBRIAN, AERONIAN AND DEVONIAN FOSSILS RECENTLY FOUND IN THE SOUTHALPINE METAMORPHIC BASEMENT OF THE EASTERN ALPS (ITALY): A REVIEW**

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The Alps consists of four main structural domains. Before continent-continent collision: (i) Helvetic and Penninic zones were in the southernmost parts of the European margin; (ii) the overlying ophiolitic units are fragments of the Tethyan ocean; (iii) the Austroalpine and Southalpine zones derived from the African margin. The various ages of metamorphisms and deformations are the reason why Early Palaeozoic fossils are scanty and often questionable in the basement rocks. The considered area falls in the easternmost part of the south Alpine zone. This basement is affected by Variscan, multistage, regional metamorphism and deformation. Due to lack in fossils in it, its lithostratigraphy was only roughly outlined by geometric relationships and long distance speculative correlations. Recently, in the Agordo area, some unquestionable fossils have been described. 1) Latest Cambrian acritarchs, within low-grade metapelites (Col di Foglia); 2) Aeronian graptolites, within boudins along a recrystallised shear zone cutting the low-grade metapelites (Ponte Alto); these boudins consist of fluorapatite-rich black meta-mudstone and bear abundant *Muellerisphaerida*; 3) *Rugosa* corals, within metalimestone boudins along the same shear zone; comparisons with the Carnic Alps suggest a Middle Devonian age. These fossil findings are unique in the metamorphic basement of the Southern Alps. The Latest Cambrian acritarchs are the oldest unquestionable, recently assessed, biostratigraphic dating in the entire Alps, as well as in Italy.

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**EARLY Tortonian PALEOCEANOGRAPHIC RECONSTRUCTION OF THE EASTERN MEDITERRANEAN SEA BASED ON FORAMINIFERA STABLE ISOTOPE ANALYSIS**

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Early Tortonian marine deposits from Manassi section, located in Levkas Island, Ionian Sea, consist of blue grey marls and clays with some fine grained sandstone interbeds. The intercalations of these thin, clastic beds and especially of positively graded sandstones in the studied succession reflect the influence of density currents, which supplied coarser material from a distant hinterland. Planktonic and benthic foraminifera provide detailed analysis of paleo-oceanographic conditions due to their habitat in surface and deep water reservoirs. Carbon and oxygen isotope analysis from foraminifera are used to reconstruct paleo-oceanographic conditions including ocean circulation, biological marine productivity, precipitation-evaporation rates, salinity, global ice volume, and paleotemperatures. In this study, carbon and oxygen isotope analyses of *G. obliquus* and *C. kullenbergi* from Manassi section indicated the following paleo-oceanographic implications. The time interval studied is characterized by high fluctuations in  $\delta^{18}\text{O}$  from -3.89‰ to 0.19‰. The most negative  $\delta^{18}\text{O}$  values could be referred to periods of sensible inflow of continental waters and the transition towards more positive values could be referred to a decreasing inflow of continental water or, alternatively, to an increasing evaporation effect. The positive relationship existing between the plankton  $\delta^{18}\text{O}$  and  $\delta^{13}\text{C}$ , in most of the record, well agrees with the hypothesis of a variable contribution of runoff. In three stratigraphic levels, samples record high deep water  $\delta^{18}\text{O}$  and  $\delta^{13}\text{C}$  values and low surface  $\delta^{18}\text{O}$  values, representing a wet, warm, estuarine climate with a stratified water column. In two stratigraphic levels, samples are low in  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  surface and deep water values. These two samples represent wet, warm climates with some ocean mixing and stratification. The paleoenvironments derived from stable isotope analysis in this study are interpreted as responses to African and Asian monsoon intensities during the Early Tortonian within the Mediterranean Sea. From the limited data of the samples analyzed in this study, no correlations can be made.