Since their discovery in 1984, biological communities sustained by cold (especially methane) seepage have been described from different oceans and seas. Modern seep environments have a direct relationship with the calcium carbonate precipitation, which is induced by the increased alkalinity produced by both methane oxidation and sulfate reduction induced by specific microbial consortia. The rapid mineral precipitation observed in modern seep environments enhances the possibility of fossilization for some of their biological, chemical, and sedimentary attributes. The comparative analysis between modern and ancient cold-seep ecosystems has allowed the selection of useful criteria for their recognition in the geological (especially Paleozoic) record, including when erosive and deformation processes or lack of sufficient exposure may limit the understanding of the geological context. The microbial activity of a cold-seep ecosystem can deliver to the fossil record a number of microbial fossils and the structures produced by their metabolic processes. This activity occurs at varying scales. In the field, a bacterial-related activity visible with the naked eye can be documented by laminations of the carbonate rock, interpreted as a product of bacterial mats. The strongest evidences, however, come from light and scanning electron microscopes observation, and include morphologies and mineral products of microbiological origin. In this study we present a selection of textures and morphologies, such as bacterial cell colonies, complex three-dimensional structures, biofilms, clotted morphologies and other, induced by microbes in carbonate paleoseep bodies from different geological contexts and ages, from the Recent down to the oldest-known seep-derived carbonate accumulation.

8-9 Orale Guido, Adriano

10.1474/Epitome.01.0165.Geoitalia2005

PRESENCE OF SEDIMENTARY ORGANIC MATTER IN THE MESSINIAN "CALCARE DI BASE" FORMATION: INDEX OF BIOTIC GENESIS AND PALEOENVIRONMENTAL CONDITIONS

GUIDO Adriano[1], GAUTRET Pascale[2], LAGGOUN-DÉFARGE Fatima[2], MASTANDREA Adelaide[1], RUSSO Franco[1]
1 - Dipartimento di Scienze della Terra, Università della Calabria, Via Bucci Cubo 15b I-87036 Rende (CS) - Italy
2 - ISTO, UMR 6113 - Université d'Orléans, Bâtiment Géosciences, BP 6759, F 45067 ORLEANS Cedex 2 - France

Presenter e-mail: aguido@unical.it

Key terms: Calcare di Base; Organic Matter; Biomineralization; Messinian

Organic geochemical and petrographic study have been carried out on the Messinian "Calcare di Base" formation cropping out in northern Calabria and in Sicily. The main aim of this research concerns the deposition causes of this peculiar formation, up to now interpreted as essentially evaporitic limestone. Thin section observations put in evidence that carbonate layers are characterized by a peloidal fabric and the absence of any kind of metazoan skeletons. The prevailing fabric is characterized by dark peloid clusters, cylindrical or subcylindrical in shape, patchily dispersed into a lighter matrix. The shape, mineral composition, dimensions and context suggest that many elongate bodies can be interpreted as fecal pellets of unknown organisms. In addition carbonate layers show two other facies types: i) a detrital, very finely gradated layer, and ii) a microbialitic, sometimes with stromatolitic fabric. The bright UV-epifluorescence suggests a high content of organic matter in both fecal pellets and stromatolitic fabric.
The study of carbonaceous remains emphasized a great variety of the organic input. Geochemical data (Rock-Eval pyrolysis) indicate a mixed (marine and continental) organic input. These data have been confirmed by organic petrographic observations (palynofacies) which revealed the presence of phytoclasts derived from continental plant tissues, amorphous organic matter, and variable proportions of zooclasts, pollens, spores, phytoplanktonic organisms and filaments presumably attributable to cyanobacteria.
Preliminary results from organic geochemistry and petrography could suggest that the depositional environment became more and more restricted, allowing the survival of organisms adapted to extreme conditions, only. These enigmatic organisms have not been observed yet, however their biological signatures in the sediments are testified by the geochemistry data and palynofacies observation. Moreover, the presence of well preserved and bright-fluorescent spores and pollens indicate that these elements did not undergo degradation and oxidation, suggesting a sedimentary environment characterized by a stratified water column with bottom anoxic conditions.
Such context, combining a good preservation state of organic matter and a typified character (nearly extreme conditions) of the environment, reveals highly favorable for undertaking the biochemical study of organic compounds associated with these sedimentary deposits. The amino-acid analysis of peptide remains may help to understand the influence of soluble macromolecules (mainly derived from microbial EPS) in the formation of authigenic carbonates. We can also expect the GC-MS detection of preserved lipidic biomarkers, providing the molecular signature of microscopically non-identifiable (non-preserved) organisms.
Bellanca A., Caruso A., Ferruzza G., Neri R., Rouchy J.M., Sprovieri M., Blanc-Valleron M.M. (2001). Transition from marine to hypersaline conditions in the Messinian Tripoli Formation from the marginal areas of the central Sicilian Basin. Sedimentary Geology, 140, 87-105.
Decima A., McKenzie J.A. & Schreiber B.C. (1988). The origin of "evaporative" limestones: an example from the Messinian of Sicily (Italy). Journal of Sedimentary Petrology, 58, 256-272.
Durand,B. (1980): Kerogen - Insoluble organic matter from sedimentary rocks. Paris: Technip 519 pp.
Espitalié J., Deroo G. & Marquis F. (1985). La pyrolyse Rock-Eval et ses applications. Rev. Inst. Fr. Pétrole, Technip, Paris, a: 40, 5, pp. 563-579; b: 40, 6, pp.755-784.
Tyson,R.V. (1995): Sedimentary organic matter - Organic facies and palynofacies. London: Chapman & Hall. 615 pp.

8-10 Orale Romano, Carmen

10.1474/Epitome.01.0166.Geoitalia2005

A UPPER MIOCENE PORITES-DOMINATED BUILDUP (VIBO VALENTIA, CALABRIA): BIOFACIES AND SKELETAL TISSUE DIAGENESIS

ROMANO Carmen[1], NERI Claudio[1], RUSSO Antonio[2], RUSSO Franco[1], STOLARSKI Jaroslaw[3]
1 - Dipartimento di Scienze della Terra, Università della Calabria, Via Bucci Cubo 15b I-87036, Rende, Cosenza, Italy
2 - Dipartimento del Museo di Paleobiologia e Orto Botanico, Università degli Studi di Modena e Reggio Emilia, via Università 4, 41100 Modena, Italy
3 - Instytut Paleobiologii PAN, Twarda 51/55, 00-818 Warszawa, Poland

Presenter e-mail: cromano@unical.it

Key terms: Calabria; Upper Miocene; Coral reef; Diagenesis; Microstructure

Buildups that developed in the late Miocene in the Mediterranean area are characterized by a low diversity of bioconstructors and a significant input of siliciclastic sediments. The aim of the present study is to outline the main phases of development of a coral-dominated buildup cropping out near the military airport of Vibo Valentia (Calabria) and to assess diagenetic processes that affected original biomineral composition of the primary framework builders.
The succession of the Vibo Valentia buildup starts with seven meters of coralligenous breccia followed by six meters of arenitic massive beds. These layers contain echinoids, bivalves, benthic forams, and ostracods with the marker Pokornyella italica, indicating an Upper Miocene ("Sahelian") age. Upward it crops out the main bioconstruction, with a maximum thickness of about 30 meters. The primary framework consists of scleractinian corals (Porites sp. and, subordinately, Tarbellastraea reussiana and Siderastraea sp.); encrusting organisms are represented by red algae that also grew as nodules (rhodolites). The bioconstruction is characterized by low diversity coral fauna, and by the presence of sand-sized siliciclastic-carbonate mixed sediments rich in forams, bivalve's shell fragments, echinoid spines, and bryozoans. This datum suggests a low temperature of sea water, as previously stated by Rosen (1999) and Bosellini et al. (2001, 2002) for the Miocene of the Mediterranean area.
After a few meters cover it follows a marine arenitic unit, ten meters thick, rich in echinoids, brachiopods, bryozoans and benthic microfauna.
The degree of diagenetic alteration of the main framework builders (corals) was assessed through thin-section microscopy, SEM observations of the polished and etched samples and EDS microanalyses. All coral samples are strongly affected by the diagenesis, especially the coralla of Porites sp. The skeletal structure of the fossil Porites sp. consists mostly of late calcite replacing the original needle-like aragonite crystallites. On the other hand, the recrystallized coralla of Siderastraea and Tarbellastraea reussiana preserve traces of the original microstructural fabric, especially in the inner zone of septa and the wall (e.g., distinct boundaries of the "calcification centers" and fibrous organization of the mineral phase comparable to the modern counterparts).
The EDS microanalyses revealed considerable amount of strontium in the skeleton pointing to its original aragonite mineralogy. We assume that particularly strong diagenetic alteration of the Porites sp. skeleton is strictly linked with its highly porous structure that allowed the penetration by the diagenetic fluids. We also observed that late calcite cements are usually affected by dissolution, but in some scattered and isolated areas ferroan calcite remains may still be observed.
Bosellini F., Russo A. & Vescogni A., 2001. Messinian reef-building assemblages of Salento Penisula (Sourthen Italy): palaeobathymetric and palaeoclimatic significance. - Palaeogeogra., Palaeoclim., Spec.Issue, 175/1-4, 7-26.
Bosellini F., Russo A. & Vescogni A., 2002. The Messinian Reef-complex of Salento Penisula (Southern Italy): Stratigraphy, facies and Paleoenviromental Interpretation. - Facies, 47, 91-112.
Rosen, B. R., 1999. Palaeoclimatic implications of the energy hypothesis from Neogene corals of the Mediterranean region. In: Agusti, J., Rook, L., Andrews, P. (Eds.), The Evolution of Neogene Terrestrial Ecosystems in Europe. Cambrige University Press, Cambrige, pp. 309-327.

8-11 Orale Lirer, Fabrizio

10.1474/Epitome.01.0167.Geoitalia2005

INTEGRATED STRATIGRAPHY (CYCLOSTRATIGRAPHY AND BIOCHRONOLOGY) OF LATE MIDDLE MIOCENE DEPOSITS IN THE MEDITERRANEAN AREA AND COMPARISON WITH THE NORTH AND EQUATORIAL ATLANTIC OCEANS: SYNTHESIS OF THE MAJOR RESULTS

LIRER Fabrizio[1], IACCARINO Silvia Maria[2]
1 - Istituto per l'Ambiente Marino Costiero (IAMC) - CNR, Geomare di Napoli, Calata Porta di Massa, Interno Porto di Napoli, 80133 Napoli
2 - Dipartimento di Scienze della Terra - Università di Parma, Parco Area delle Scienze 157/A, 43100 Parma

Presenter e-mail: fabrizio.lirer@iamc.cnr.it

Key terms: Middle Miocene; Integrated Stratigraphy; Biochronolgy; North and Equatorial Atlantic Ocean; Mediterranean Area

The stratigraphic correlation of north (ODP Leg 162-Site 982B) and equatorial Atlantic (ODP Leg 154-Site 926) Ocean records with Mediterranean astronomically tuned sections reveals the diachrony of several planktonic foraminiferal bioevents, but shows the possibility to adopt the Mediterranean biostratigraphy in North Atlantic records.
The ODP Hole 982B, drilled in the North Atlantic, contains a complete late-Middle Miocene
stratigraphic record, where abundant, well-preserved planktonic foraminifera allowed us to
recognise eight important bioevents, well calibrated and widley used in the Mediterranean
correlation (Hilgen et al., 2000, 2003; Iaccarino et al., 2004).
These bioevents represent the first data set which allow the direct correlation between the
Mediterranean and North Atlantic records as tropical and subtropical zonations cannot be applied to
high latitudes due to the absence of many warm-water index taxa. The stratigraphic order and the
position of the planktonic foraminiferal bioevents (LO of Globorotalia peripheroronda, AB of Paragloborotalia siakensis, FO and LO of P. partimlabiata, FO and LO of P. mayeri, FO of Neogloboquadrina acostaensis and FO of N. a. praeatlantica), has led us to propose a tentative age-model for the North Atlantic sequence in the absence of more constrained calibrated data.
This age-model for the late-Middle Miocene time interval is supported by the correlation of North
Atlantic stable isotope data (Hodell et al., 2001; Anderson and Jansen, 2003) with those of the

Epitome

Volume 1 - Anno 2005

Periodico della FIST, Federazione Italiana di Scienze della Terra
Journal of the Italian Federation of Earth Science (FIST)

Obiettivi del periodico *Epitome*

Epitome è un periodico della Federazione Italiana di Scienze della Terra (FIST) destinato alla pubblicazione degli atti di convegni promossi o patrocinati dalla FIST. Epitome potrà ospitare riassunti o raccolte di lavori.
La valutazione dei manoscritti è responsabilità dei coordinatori dei singoli volumi e dei revisori da loro scelti.

Aims and scope of Epitome

Epitome *is an interdisciplinary journal of the Italian Federation of Earth Science (FIST) devoted to the publication of collections of papers on Earth sciences presented at scientific meetings organised by the FIST.*
The evaluation of the manuscripts is under the responsibility of Guest-Editors (the convenors of a session of a conference or the organisers of a meeting or workshop) and of their chosen referees.

Indirizzo della redazione: Prof. Grazia Martelli, Dipartimento di Georisorse e Territorio, Via Cotonificio, 114, 33100 Udine. e-mail: epitome@geoitalia.org