VI Convegno degli Ostracodologi Italiani
Trieste 20-21 aprile 2012
Programma e riassunti

a cura di
Deborah Arbulla,
Nevio Pugliese,
Gianguido Salvi

EUT EDIZIONI UNIVERSITÀ DI TRIESTE

indice

Presentazione

Il VI convegno degli ostracodologi italiani ha come sede Trieste. È l'occasione di ricordare Giuliano Ruggieri, Gioacchino Bonaduce, Maria Luisa Colalongo e Mario Masoli. Non serve scrivere molte parole. Molti di noi hanno attinto alla loro esperienza e simpatia e, probabilmente, non avrebbero avuto la possibilità di essere introdotti tra i grandi di questa disciplina.

Questo incontro triestino vede la partecipazione di una ventina tra giovani e meno giovani ostracodologi italiani, con l'aggiunta della gradita presenza di una giovane ricercatrice slovena. Siamo abbastanza numerosi e, sicuramente, sarà nostra intenzione di far diventare questo incontro un momento di confronto sulle nostre esperienze. Nelle 12 comunicazioni sugli ostracodi trovano spazio biologia, micropaleontologia, stratigrafia, evoluzione, genetica, geochimica, applicazioni verso l'archeologia ed il monitoraggio ambientale, valorizzazione del patrimonio naturalistico, ambienti marini e non marini. Questi temi, spesso, si incrociano nella stessa comunicazione, tanto che definire un ordine preciso nel programma degli interventi è difficile. È forse questo il miglior segnale che studiare gli ostracodi può dar spazio a nuove idee e progetti. È questo che dovrà emergere nella discussione finale. È questo un buon segno della nostra vitalità per la nostra partecipazione al Convegno Internazionale di Roma 2013!

Nevio Pugliese

Programma
20 Aprile 2012

Sede del convegno – Museo Nazionale dell'Antartide
Sezione di Trieste Via Weiss, 21
Sala conferenze - 1° piano

9.00 – 9.45 Registrazione

9.45 Inizio del convegno e saluti

10.00 – 11.20 Prima sessione comunicazioni con discussione finale

11.20 – 11.40 Pausa caffè

11.40 – 13.00 Seconda sessione comunicazioni con discussione finale

13.00 – 14.30 Pausa pranzo

14.30 – 16.00 Terza sessione comunicazioni con discussione finale

16.30 – 18.30 Sintesi e conclusione

Programma
21 Aprile 2012

8.30 – 16.30 Escursione alla Riserva Naturale Regionale "Foce dell'Isonzo - Isola della Cona": campionamenti degli ambienti umidi e osservazioni al microscopio.

Riassunti

Multidisciplinary approach to evaluate the environmental health Flegrea coast

Giuseppe Aiello[1], Diana Barra[1], Salvatore De Bonis[1], Marco Guida[2], Roberta Parisi[1], Maria Toscanesi[3], Marco Trifuoggi[1]

[1]Dipartimento di Scienze della Terra, Università di Napoli Federico II, L.go San Marcellino, 10 - 80138 Napoli, Italia; [2]Dipartimento delle Scienze Biologiche, Università di Napoli Federico II, via Mezzocannone, 8- 16 - 80134 Napoli, Italia; [3]Dipartimento di Chimica "Paolo Corradini", Università di Napoli Federico II, Via Cintia, 21 - 80126 Napoli, Italia

Campania is the Italian region displaying the highest percentage of heavy polluted coastal areas: 80 kilometres of coastlines, on a total of 512, have been seriously degraded by pollution and water quality parameters are above the standard for waters suitable for bathing and other economic activities. A management and restoration policy in relation to polluted areas has to be based on analysis, either chemical or microbiological, which concern the environmental "health" from the ecological point of view, and particularly the rich biodiversity of the area at stake.

The Domitio-Flegrea area, for its anthropic context, results to be highly significant for monitoring a marked environmental deterioration and change in the marine biotic communities structure.

A multidisciplinary approach is here used in order to evaluate the quality of Pozzuoli coastline waters by combining chemical and eco-toxicological analysis of the sediments to the systematic and ecological study to ostracod and benthic foraminifer assemblages. The analysis of both systematic groups provides data necessary to complete the water resources cognitive framework. The eco-toxicological analyses have been performed using organisms pertaining to different taxa, in order to allow a wide-ranging and more accurate evaluation of levels of pollution. The selected biomarkers are: *Vibrio fischeri* (bioluminescent Bacteria), *Dunaliella tertiolecta* (Clorophyta, unicellular green algae) and *Artemia salina* (Crustacea). Chemical analysis measured the concentration of PAHs (Polycyclic Aromatic Hydrocarbons) by SPE extraction and subsequent HPLC analysis.

The results allow to state that the evaluation of a marine ecosystem health has to consider the study on coastal sediments, and the different approaches here described provide more complete data on effects of human activities on natural systems.

Infralittoral ostracode fauna of Porto Puddu Rias (northern Sardinia)

Deborah Arbulla[1], Sandro De Muro[2], Daniele Manca[3], Maria Eugenia Montenegro[3], Nevio Pugliese[3], Gianguido Salvi[3]

[1]Museo Civico di Storia Naturale di Trieste; [2]Dipartimento di Scienze Chimiche e Geologiche, Università di Cagliari; [3]Dipartimento di Matematica e Geoscienze, Università di Trieste

The knowledge of the infralittoral ostracodes presents an increasing interest since it is an essential tool for several fields of research such as human impact of the coastal environments, including environmental monitoring, geoarchaeology and reconstruction of ancient shorelines.

The study of the infralittoral ostracode fauna of a small bay of northern Sardinia may represent an useful piece of this knowledge. This bay near Porto Puddu is characterized by shallow seafloors presenting wide vegetated areas, progression of the shoreline and seasonal strem (southern sector). Moreover, its water column is conditioned by winds along the year (Astraldi *et al*., 1980).

Within a survey in 1995-1996, the scuba-divers sampled there 22 bottom sediments which yielded a rich ostracode fauna consisting of 82 species.

Integrating sedimentological and geomorphological data, 7 bottom-facies were identified: *Posidonia oceanica* meadow (F1), *Posidonia oceanica* mattes (F2), *Posidonia oceanica* spots and *Caulerpa prolifera* (F3), *Caulerpa prolifera* meadow and dead *Posidonia oceanica* (F4), bed of dead *Posidonia oceanica* (F5), sand of channel with *Posidonia oceanica* mattes (F6), infralittoral sand (F7).

Several ostracode species were present in two or more facies. However, some species were found in only one facies:

F4: • *Semicytherura paradoxa*, *Semicytherura sulcata*.

F5: • *Aglaiocypris rara, Semicytherura* sp.1

F7: • *Leptocythere multipunctata, Urocythereis flexicauda*.

Applying Shannon Weaver (SW) index, the sampling stations have been subdivided into three categories, each one characterized by i) low SW values, ii) intermediate SW values and iii) high SW values. Most ostracode species occur in all the categories. Few species may record bad conditions (*Cytherois frequens*, *Loxoconcha ovulata*, *Paracytheridea* gr. *depressa*, *Propontocypris intermedia* and *Xestoleberis communis),* but they also are present in other categories.

On the contrary, other species seem to be exclusive of the best conditions (*Aglaiocypris rara*, *Loxoconcha rhomboidea*, *Paradoxostoma versicolor*, *Pontocypris acuminata*, *Pontocypris obtusa*, *Semicytherura* spp., *Xestoleberis* gr. *dispar*). However, the real position of these species in these categories shall be under discussion. For example, some species of *Semicytherura*, that here records good conditions, occur in stressed conditions otherwhere.

Thus, for the environmental monitoring it is preferable to use the structure of the ostracode assemblage, which includes both opportunists and equilibrium species. Assuming that low-to-high SW values represent unfavourable-to- favourable environmental conditions, the bottom facies may represent bad, intermediate and good life for the benthic ostracodes respectively.

The worst conditions are exclusively present in the bottom facies F4; the best conditions are recorded in the bottom facies F1, F4 and F5. Intermediate conditions occur in all the other facies. It is evident that several factors may influence the quality of the ostracode fauna. For example, F4 presents two environmental extremes: the worst one corresponding to the southern sector of the bay, within a sandy belt with the prograding shoreline and seasonal stream; the best one within a central close depression.

References

Astraldi, M., Bruschi, A., Buffoni, G., Esposito, A., Gasparini, G., Manzella, G., Meloni, R., Stocchino, C., 1980. Circolazione nei canali dell'Arcipelago della Maddalena. IV AIOL.

De Muro, S., Fanzutti, G. P., Camin, M., 2000. Carta Geomorfologica Terra-Mare del settore compreso tra Punta Don Diego e la Penisola di Coluccia Sardegna Nord Orientale Italia. 2° Convegno Nazionale sulle Scienze del Mare CONISMA - (Genova, Novembre 2000).

Late Miocene ostracods from the Solimões Formation (Western Amazonia): geochemical and palaeontological analyses

Marco Caporaletti[1], Martin Gross [2], Werner E. Piller[1]

[1]Institute of Earth Sciences, Karl-Franzens-Uviversität Graz, Heinrichstrasse 26, 8010 Graz, Austria; [2]Department for Geology & Palaeontology, Universalmuseum Joanneum, Weinzöttlstrasse 16, 8045 Graz, Austria

The Pebas system represents a huge inland water system that characterized Western Amazonia from the Oligocene-Miocene boundary (about 23 Ma) until the Late Miocene. The Andean uplift caused its disappearance and it was replaced by the onset of the modern Amazonia setting during the early Pliocene. The Late Miocene of the Pebas system presents interesting palaeobiogical peculiarities, with spectacular endemism and diversity. Among aquatic biota, gastropods and bivalves show noteworthy and well-studied speciation phenomena (e.g. Anderson *et al*., 2010). Ostracods are known by extensive radiations (in particular the genus *Cyprideis*) and a high degree of endemism, but their level of documentation and knowledge it is not as satisfying as for other organisms.

The environmental characteristics of the south-eastern edge (Eirunepé area) of the Pebas system were studied by a taxonomical and geo-

chemical analysis of the ostracod fauna. The aim was to provide a better comprehension of the palaeoenvironmental conditions with a particular focus on salinity conditions and the possible occurrence of marine ingressions in this area of the Pebas system.

Five outcrops belonging to the upper Solimões Formation (Upper Miocene) were studied (Gross *et al.*, 2012). Ostracod associations resulted to be highly endemic and characterized by a moderate diversity. A total of 19 species was recognized and about 60% of the ostracods are indicative of a freshwater environment (primarily *Penthesilenula* and *Cytheridella*). The taxa usually considered to be associated with a marginal marine setting (mainly *Cyprideis*) represent about 40%.

A total of 50 carbon and oxygen stable isotope measurements were carried out on five ostracod species (adult and juvenile specimens): *Cyprideis pebasae*, *Cyprideis graciosa*, *Rhadinocytherura amazonensis*, *Cytheridella danielopoli*, *Penthesilenula olivencae*. All the valves were well-preserved and not affected by diagenesis. All the isotopic analyses furnished very negative values with $\delta^{13}C$ ranging from -8.4‰ to -14.3‰ and $\delta^{18}O$ ranging from -6.5‰ to -9.8‰. Such negative values are compatible with the isotopic signatures of freshwater carbonates or lacustrine environments (Leng & Marshall, 2004) and are consistent with other carbon and oxygen stable isotopes results obtained in the Miocene of Pebas area (Wesselingh *et al*., 2006).

Considering both the taxonomical and geochemical analyses, there are no hints on the presence of brackish water or marine influxes in the study area (as already proposed in Gross *et al*., 2011): the taxa usually associated to marginal marine settings are probably successfully adapted to pure freshwater settings, which is also well documented for modern *Cyprideis* in other areas (Lake Tanganyika; Wouters & Martens, 2007).

References

Anderson, L.C., Wesselingh, F.P., Hartman, J.H., 2010. A phylogenetic and morphologic context for the radiation of an endemic fauna in a long-lived lake: Corbulidae (Bivalvia; Myoidea) in the Miocene Pebas Formation of western Amazonia. *Paleobiology*, 36, 534–554.

Gross, M., Piller, W.E., Ramos, M.I., Paz, J.D.S., 2011. Late Miocene sedimentary environments in south-western Amazonia (Solimões Formation; Brazil). *Journal of South American Earth Sciences*, 32, 169–181.

Gross, M., Ramos M.I., Caporaletti M., Piller, W.E., 2012. From the edge of the Pebas System - Ostracods (Crustacea) and their palaeoenvironmental implication (Late Miocene; Solimões Formation; Western Amazonia). *Submitted*.

Leng, M.J., Marshall, J.D., 2004. Palaeoclimate interpretation of stable isotope data from lake sediment archives. *Quaternary Science Reviews*, 23, 811–831.

Wesselingh, F.P., Kaandorp, R.J.G., Vonhof, H.B., Räsänen, M.E., Renema, W., Gingras, M., 2006. The nature of aquatic landscapes in the Miocene of western Amazonia: an integrated palaeontological and geochemical approach. *Scripta Geologica*, 133, 363–393.

Wouters, K., Martens, K., 2007. Three new species of the *Cyprideis* species flock (Crustacea, Ostracoda) of Lake Tanganyika (East Africa). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Biologie*, 77, 147–160.

Messinian paleoenvironmental changes in the easternmost Mediterranean: a case study in the Adana Basin (southern Turkey)

Costanza Faranda[1], Elsa Gliozzi[1], Francesco Grossi[1], Paola Cipollari[1], Domenico Cosentino[1], Güldermin Darbaş[2], Rocco Gennari[3], Kemal Gürbüz [4], Atike Nazik[4]

[1]Dipartimento di Scienze Geologiche, Università Roma Tre, L.go S. Leonardo Murialdo, 1, I-00146 Roma, Italy; [2]Jeoloji Mühendisliği Bolümü, Kahramanmaraş Sütçü İmam Üniversitesi, Avşar Kampüsü, 46100 - Kahramanmaraş Turkey; [3]Dipartimento di Scienze della Terra, Università di Parma, Parco Area delle Scienze 157A - 43100 Parma, Italy; [4]Jeoloji Mühendisliği Bolümü, Çukurova Üniversitesi, Mimarlık Fakültesi Maden Mühendisliği Bölümü 01330 Balcalı Adana, Turkey

For the Palaeo-Mediterranean Basin, the Messinian stage was a crucial event characterised by palaeoenvironmental changes linked to important palaeoceanographic modifications. In this paper we present the palaeoenvironmental reconstruction of the Adana Basin, south Anatolia (one of the easternmost Neogene sedimentary basin developed in the Palaeo-Mediterranean) during Messinian, through the paleontological

analyses of the sediments referable to the Kuzgun and the Handere formations. In particular mollusc, ostracod, planktonic and benthonic foraminifer, and calcareous nannofossil assemblages have been analysed from three stratigraphic sections at about 6 km NW of the city of Adana, in the vicinity of the Kabasakal village.

From the uppermost part of the Kuzgun Formation, two sedimentary successions were analysed: a) the 13 m thick section named Adana-1, that consists mainly of fine-grained silty deposits with the intercalation of two main massive sandy layers; b) the very close Semiramis section (21 m thick), already studied by Darbaş & Nazik (2010). Also at the Semiramis section, the Kuzgun Formation is characterized by fine-grained silty deposits with the intercalation of sandy layers. From the Adana-1 section, 22 samples (ADA-1 1-22) were collected, while 10 samples were analysed from Semiramis section by Darbaş & Nazik (2010). Biostratigraphical analyses carried out integrating biostratigraphic results from calcareous nannofossils, planktonic foraminifers and ostracods yielded a possible age interval of 7.226- 6.83 Ma for the Semiramis section and 7.226- 6.43 Ma for the Adana-1 section, both included in the early Messinian.

From the lowermost part of the Handere Formation, the 50 m-thick section of Adana was studied, which consists mainly of fine grained deposits (marls) and several thick layers of resedimented evaporites, mainly gypsum rudites, made up of fragments of selenite, different gypsum clast size, and huge blocks of banded selenite, suggesting debris-flow processes. From the Adana section, 42 samples (ADA 1-42) were collected for microplaeontological analyses. Stratigraphic and biostratigraphic analyses carried out on ostracods have suggested for the Adana section ages comprised between 5.60 and 5.55 Ma, during the step 2 of the Messinian Salinity Crisis (CIESM, 2008) corresponding to the deposition of the Resedimented Lower Evaporites and the lago-mare biofacies.

The palaeoenvironmental analyses on the three studied section showed that the Kuzgun Fm deposited in true marine conditions. The slightly most ancient Semiramis section documents a littoral open marine environment, characterised by the presence of abundant planktonic foraminifers among which warm water species of *Globigerinoides* and *Orbulina* are dominant, and by infralittoral ostracods accompanied by infra-circalittoral species such as *Occlusacythereis occlusa*, *Bairdoppilata subdeltoidea*, *Costa tricostata*, *Bosquetina carinella*, and *Ruggieria tetraptera*. The presence of spicules of siliceous sponges confirms an open external neritic environment. The slightly younger Adana-1 section records a very shallow coastal marine environment testified by the scar-

city of nannofloras and planktonic foraminifers and the low diversity of benthic foraminifers and ostracods. The presence of *A. beccarii,* (dominant among benthic foraminifers), *Neomonoceratina laskarevi* and *Phlyctenophora farkasi* (dominant among ostracods), typical of shallow water environments such as marshes, lagoons and estuary, together with accompanying *Cribroelphidium decipiens* testify an enclosed marine environment characterised by local sporadic freshwater inputs that lowered the salinity. There is no clear evidence for oxygen depletion, although *Ammonia beccarii* can tolerate abundant input of organic matter. Anyway, well-defined, even if limited, open-sea influx is documented in the lower portion of the section by the presence of abundant and well preserved nannofloras, more diversified ostracod and foraminifer assemblages (among which *Quinqueloculina* gr. is rather well represented) and by the presence of euhaline gastropods.

The Handere Fm, deposited unconformably over the Kuzgun Fm after a *iatus* of at least 830 kyr., documents a very unstable shallow brackish environment, characterised by high mesohaline salinity in the lower portion ("*Cyprideis-Ammonia* assemblage, Grossi *et al.* 2008) and mesohaline salinity in the upper portion ("*Cyprideis-Loxoconcha* assemblage", Grossi *et al.* 2008).

From the present study it is possible to conclude that the palaeoenvironmental changes occurred during the Messinian in the Adana Basin can be compared with the palaeoceanographic changes that affected the whole Palaeo-Mediterranean during the Messinian.

References

CIESM (Commission Internationale pour l'Exploration de la Mer Mediterranee, Monaco), 2008. The Messinian Salinity Crisis from Mega-Deposits to Microbiology: A Consensus Report. *CIESM Workshop Monograph*, 33, 1-168.

Darbas, G., Nazik, A., 2010. Micropaleontology and paleoecology of the Neogene sediments in the Adana Basin (South of Turkey). *Journal of Asian Earth Sciences*, 39, 136–147.

Grossi, F., Cosentino, D., Gliozzi, E., 2008. Palaeoenvironmental reconstruction of the late Messinian lago-mare successions in central and eastern Mediterranean using ostracod assemblages. *Bollettino della Società Paleontologica Italiana*, 47 (2), 131-146.

Palaeoenvironmental and palaeoclimatic evolution of the Shkodra Lake (Albania) during the last 4500 yr through ostracod proxies

Elsa Gliozzi, Ilaria Mazzini, Tatiana Concas

Dipartimento di Scienze Geologiche, Università Roma Tre. Largo S. Leonardo Murialdo, 1, I-00146 Roma, Italy

Lake Shkodra is the largest natural freshwater lake in the Balkan region. It is located at the Albania/Montenegro border, few tens of kilometers from the coastline. The Tarabosa and Rumia mountains, up to 1600 m high, separate it from the Adriatic Sea. The lake basin is a tectonic-karst depression located south of the Dinaric Alps. The lake is shallow, and has an average depth between 5 and 6 m with maximum depths around 9-10 m. In the Montenegro part, some karstic springs are located at 60 m of depth. The main tributary of the lake is the Moraca River, located in Montenegro. The Bojana River, located in Albania, is the only outflow towards the Adriatic Sea.

Three parallel overlapping cores down to the depth of 7.26 m have been drilled in the southern Albanian sector of the lake. Ostracod analyses as well palaeomagnetic, tephra, isotope, diatom, pollen, charophythes, and microcharcoal analyses have been performed on the re-

covered sediment cores. Van Welden *et al*. (2008) studied the last 500 yr of sedimentation of the lake and showed that it was characterised by undisturbed sedimentation of fine-grained material. The chronological framing of the sedimentary record, spanning approximately the last 4500 years, has been assessed using four radiocarbon dates and four well-known tephra layers (Sulpizio *et al*., 2010). Two tephras are from Somma-Vesuvius (Pollena, 472 A.D.; Avellino, ca. 3800 cal. years BP), one from Etna (FL, ca. 3300 cal. years BP) and one from Campi Flegrei (Agnano Mt Spina ca. 4400 cal. years BP).

Ostracods have been recovered from 336 muddy samples of 2cm^3 in volume, collected continuously along the cores. They are abundant and well preserved in all samples, represented by adults and juveniles. On the whole, 13 species have been recovered with different frequencies. Among them, some are endemic of the lake (*Candona montenigrina*, and *Limnocythere scutariense*), others were known from other Balkan lakes and are recorded for the first time in Shkodra (*Paralimnocythere georgevitschi* in Lake Ohrid, *Candona paionica* and *Candona "angulata" meridionalis* in Lake Dorjan). The remaining species (*Darwinula stevensoni*, *Pseudocandona marchica*, *Cypria ophthalmica*, *Ilyocypris gibba*, *Cypridopsis vidua*, and *Metacypris cordata*) are species widely distributed in central and southern Europe, but signalled for the first time in Albania. Finally, two more taxa were recovered, *Cyclocypris* sp. and *Zonocypris* sp. left in open nomenclature for their scarcity.

The faunal composition is quite homogeneous, only the percentages of the dominant species vary along the sediment core. Variations in the total ostracod frequencies well mirror the historical palaeoclimatic curve (Bradzil *et al*., 2005). Moreover, the percentages of smooth/tuberculated valves of *Ilyocypris* with increasing frequencies and tuberculated morphotypes coincide with the Medieval Warm Period and several pulses of low frequencies and smooth morphotypes correspond to the long Little Ice Age.

References

Bradzil, R., Pfister, C., Wanner, H., Von Storch, H., Luterbacher, J., 2005. Historical climatology in Europe – The state of the art. *Climatic Change*, 70, 363–430.

Sulpizio, R., van Welden, A., Caron, B., Zanchetta, G., 2010. The Holocene tephrostratigraphic record of Lake Shkodra (Albania and Montenegro). *Journal of Quaternary Science*, 25, 633-650.

Van Welden, A., Beck, C., Reyss, J.L., Bushati, S., Koci, R., Jouanne, F., Mugnier, J.L., 2008. The last 500 years of sedimentation in Shkodra Lake (Albania/Montenegro): paleoenvironmental evolution and potential for paleoseismicity studies. *Journal of Paleolimnology*, 40, 619–633.

Preliminary results on the post-evaporitic Messinian sequence of Eraclea Minoa (Sicily): biostratigraphy and palaeoenvironmental evolution

Francesco Grossi, Elsa Gliozzi

Dipartimento di Scienze Geologiche, Università Roma Tre, L.go S. Leonardo Murialdo, 1, I-00146 Roma, Italy

The Eraclea Minoa section, located on the south-western coast of Sicily, 33 km SE of the city of Sciacca, is a well known geological site as it is the type locality for the Messinian/Zanclean GSSP (Van Couvering *et al*., 2000), and also one of the most famous section for the study of the Messinian Salinity Crisis. Although numerous authors have studied the Eraclea Minoa section with a great detail from a sedimentological and stratigraphical point of view (see Roveri *et al*., 2006 for updated references), the paleontology of the post-evaporitic Messinian portion counts very few studies (Decima, 1964; Sgarrella *et al*., 1997; Bonaduce & Sgarrella, 1999).

Recently, the 258 m-thick sedimentary succession cropping out at Eraclea Minoa has been sampled again with a great detail (when possible every 1 meter), with the aim of carrying out multidisciplinary paleontological (benthic foraminifers, molluscs, ostracods, pollen, dinocysts) and geochemical (Sr, O, C stable isotopes and trace elements) in order to depict the palaeoenvironmental changes that occurred during the

lago-mare phase of the Messinian Salinity Crisis. In this communication we will present the preliminary results of the ostracod analyses.

The Messinian portion of the Eraclea Minoa succession is made up by eight (or ten) sedimentary cycles, each of which (except for cycles 6' and 6" in the 10-cycles option) starts with clays and marls interbedded with sands and thin layers of fine-grained carbonates and, in the upper part, is made of alternating layers of finely-laminated gypsum and gypsarenites. Paleontological samples were collected from each fine-grained portion of all the cycles.

The lowest three cycles crop out very badly. The few samples collected from Cycles 1 and 2 were sterile, while Cycle 3, completely barren at the base, yielded few ostracod valves in its upper silty portion, referable to *Cyprideis agrigentina* and *Loxoconcha mülleri*. This very scanty assemblage, to which few instars of Candoninae indet. are added, has been recognized also at the beginning of Cycle 4, but, going upwards, more diversified assemblages, although with low frequencies, have been recovered in the remaining portion of Cycle 4, and in Cycles 5 and 6. Together with *Cyprideis agrigentina* and *Loxoconcha mülleri* a progressively richer contingent of Paratethyan ostracod species appears along the section: *Loxocorniculina djafarovi*, *Loxoconcha eichwaldi*, *Loxocauda limata*, *Zalanyiella venusta*, *Loxoconcha kochi*, and *Amnicythere* spp. (among which *A. propinqua).* Cycle 7 (in the 10-cycles option, cycles 6', 6" and 7) marks an abrupt change of the assemblage that, for about 75m of thickness become monospecific, made only by abundant to very abundant *Cyprideis agrigentina*. In the upper portion of Cycle 7 and in the entire Cycle 8 (that in part includes the Arenazzolo Fm), the ostracod assemblages become diversified again, with the same species that occurred in the lower cycles, to which some other Paratethyan species are added, such as *Tyrrhenocythere pontica*, *Cytherura pyrama*, and *Euxinocythere (Maeotocythere) praebaquana*.

A first palaeoenvironmental interpretation based on the recovered ostracod assemblages would suggest, at the base of the post-evaporitic Messinian succession, the existence of a subaqueous environment characterised by physico-chemical parameters not suitable to host life. Going upwards, the first ostracods colonized the environment, *Cyprideis agrigentina* (which can withstand very huge salinity variations and low oxygen contents) and *Loxoconcha mülleri*, the first Paratethyan ostracod that it is supposed to inhabit brackish waterbodies up to mesohaline salinity). The environmental amelioration continued upsection, and the assemblages became more diversified, pointing to a brackish environ-

ment with salinities comprised in the mesohaline range. Abruptly, after the deposition of the selenitic gypsum that marks the end of Cycle 6, it is possible to suppose a remarkable palaeoenvironmental change towards and hyperhaline environment that, only at the end of Cycle 7 and during Cycle 8 was again diluted to oligo-mesohaline conditions. Such palaeoenvironmental interpretation is supported by the results of the percentage analyses of the sieve-pores on *Cyprideis agrigentina* valves carried out by Bonaduce & Sgarrella (1999) on two scattered samples along the Eraclea Minoa section, that gave salinity estimates around 50-70‰. Anyway, preliminary results on the percentage analyses of the sieve-pores carried on well-preserved valves of *Cyprideis agrigentina* collected in samples with monospecific assemblages from the base of Cycle 7 (cycles 6' and 6" in the 10-cycles option) do not show any hyperhaline condition, but gave salinity values around 8-11‰, in the mesohaline range, showing that the palaeoenvironmental history of the lago-mare facies at Eraclea Minoa is far more complicated than it was supposed.

References

Bonaduce, G., Sgarrella, F., 1999. Paleoecological interpretation of the latest Messinian sediments from southern Sicily (Italy). *Memorie della Società Geologica Italiana*, 54, 83-91.

Decima, A., 1964. Ostracodi del genere *Cyprideis* Jones del Neogene e del Quaternario italiani. *Palaeontographia Italica*, 57(1962), 81-133.

Roveri, M., Manzi, V., Lugli, S., Schreiber, B.C., Caruso, A., Rouchy, J.-M-, Iaccarino, S.M., Gennari, R., Vitale, F.P., Ricci Lucchi, F., 2006. Clastic vs. primary precipitated evaporites in the Messinian Sicilian Basins. R.C.M.N.S. *Interim Colloquium "The Messinian Salinity Crisis revisited-II" Post-Congress Field Trip, Acta Naturalia de "L'Ateneo Parmense",* 42 (4), 125-199.

Sgarrella, F., Sprovieri, R., Di Stefano, E., Caruso, A., 1997. Palaeoceanographic conditions at the base of the Pliocene in the Southern Mediterranean Basin. *Rivista Italiana di Paleontologia e Stratigrafia*, 103, 207-220.

Van Couvering, J.A., Castradori, D., Cita, M.B., Hilgen, F.J., Rio, D., 2000. The base of the Zanclean Stage and of the Pliocene Series. *Episodes*, 23 (3), 179-187.

Cryptic diversity in ancient lakes: The Cytherissa flock (Crustacea, Ostracoda) in Lake Baikal (Siberia)

Valentina Pieri, Koen Martens, Isa Schön

Royal Belgian Institute of Natural Sciences, Freshwater Biology, Vautierstraat 29, 1000 Brussels, Belgium

Lake Baikal, situated in the Great Eastern Siberian Rift, is the largest and the deepest of all extant ancient lakes. These lakes are natural laboratories for evolutionary research, because of their exceptionally high biodiversity, the large number of endemics, and the fact that most species are still found in the cradle where they first originated. The speciosity, and the variability in phenotypes and niche diversity of endemic species flocks in ancient lakes are spectacular. Such species flocks have often originated through explosive and adaptive radiations. However, also lacustrine radiations without apparent niche diversification and with putative non-adaptive components have been described. In recent non-marine ostracods, ancient lakes contain one quarter of all known species.

The *Cytherissa*-radiation (Ostracoda, Cytherideidae) from Lake Baikal is one of the richest species flocks and contains 47 (sub-) species. Preliminary results on genetic diversity, however, indicate that some of the

Cytherissa morphospecies are not monophyletic and might thus contain cryptic species.

Here, we describe our research on cryptic species in the Baikalian *Cytherissa* species flock which started at the end of 2010. The examined material was sampled during several expeditions, namely, in 1997, 1999, 2007, 2009 and 2011. Samples were taken randomly from boats by Ekman and PONAR grabs and Reineck boxcorers, and with hand nets during SCUBA diving.

Mazepova (1990) is still the only publication available to identify ostracods from Lake Baikal. Valves are routinely used to identify recent and fossil ostracods, while differences in hemipenis structure, which are subjected to sexual selection, can indicate reproductive isolation of recent species. New morphological data of *Cytherissa* species have been acquired by Scanning Electronic Microscopy (SEM) of valves and soft parts (especially hemipenis and chaetotaxy), the latter with 'critical point drying'. In addition, soft parts, and in particular the hemipenises have been drawn in detail with camera lucida.

The genetic identification of cryptic species is now in progress. New mitochondrial (COI and 16S) and nuclear (LSU) markers with higher resolution have been developed. DNA has been extracted from 100 individual ostracods and the nuclear LSU region and the mitochondrial markers COI and 16S are currently amplified by PCR and sequenced.

The obtained DNA sequence data will be used to estimate genetic diversities and phylogenetic relationships at the intra- and supraspecific level of selected morpho-species and these data will allow us to test whether there are indeed cryptic species in Baikalian *Cytherissa*.

Reference

Mazepova, G.F.1990. Rakuschkovye ratschki (Ostracoda) Baikala [Ostracoda of Lake Baikal]. Nauka, Novosibirsk, 470 pp (in Russian).

Ostracoda (Crustacea) as indicators for surface water quality: a case study from the Ledra River basin (NE Italy)

Valentina Pieri[1,2], Giada Rossi[2], Jochen Vandekerkhove[3], Daniele Goi[2]

[1]Royal Belgian Institute of Natural Sciences, Freshwater Biology, Vautierstraat 29, 1000 Brussels, Belgium; [2]Department of Department of Chemistry, Physics and Environment, University of Udine, via del Cotonificio 108, 33100 Udine, Italy; [3]European Commission - Joint Research Centre, Institute for Environment and Sustainability (IES - RWER unit), Building 30 (TP 300), Via Enrico Fermi 2749, Ispra (VA) I-21027, Italy

Wastewater discharges associated with urbanisations, farming activities and industry may dramatically reduce the ecological health of river ecosystems. Their efficiency is usually assessed through monitoring of the physical and chemical environment near the discharge point. However, discontinuous monitoring of the abiotic environment may fail to detect periodic malfunctioning and do not recognize indirect effects on the ecosystem.

We assessed the potential of an alternative approach to assess the impact of wastewater discharges, based on the monitoring of ostracod

density, richness and community composition. We linked community structure of Recent non marine ostracods (Crustacea: Ostracoda) with physical-chemical (altitude, water temperature, pH, total alkalinity, electric conductivity, chemical oxygen demand and concentrations of major ions and nutrients) and microbiological (total coliform bacteria and fecal coliform *Escherichia coli*) parameters at stations before and after wastewater treatment plants in a river basin.

The study area covers all the Ledra River basin (21 km long), localized in Friuli Venezia Giulia (NE Italy). This basin includes a variety of habitat typologies as lowland springs, channels and streams, with different levels of anthropogenic impact. In the study area 27 sampling stations were selected, 8 of these were located near the water treatment plant effluents in the main river course. All stations were visited twice a year from September 2008 until September 2011 and samples were drawn before and after the effluent flows.

The results indicate that monitoring ostracods is a potentially valuable approach, for two reasons. Communities appeared to be well differentiated even in the small spatial area of this study, indicating that they can provide sufficient resolution to pick up even minor impacts. Secondly, despite the seasonal succession in species composition, spatial differentiation was consistent over time, suggesting that ostracods provide a time-integrated picture of the water quality.

On the other hand, discharges did not affect the physical or chemical environment based on the repeated snapshot samplings. These results suggest that the monitoring of ostracods provides an integrated picture of the water quality of a lotic system, even on a very local scale.

What does egg size tell us about development and hatching time in *Heterocypris incongruens*?

Valeria Rossi[1], Matteo Zatorri[1], Alessio Perotti[2], Giorgio Benassi[1], Paolo Menozzi[1]

[1]Department of Environmental Sciences, University of Parma, Viale G.P Usberti 43124 Parma, Italy; [2]Dept. of Genetics, Anthropology, Evolution, University of Parma, Parco Area delle Scienze, 11/A, 43124 Parma

Colonisation of ephemeral ponds requires adaptations in life history and in hatching phenology: organisms must take advantage of ponds filling and "hedge their bets" for the possibility to complete their life cycle and produce resting stages that ensure that the population will not go extinct. The timing of many phenological events (e.g. egg hatching, beginning of development phases and reproduction) results from a complex interplay among organism genotype, environmental factors (e.g. temperature and photoperiod) and maternal effects. The relationship between egg size and development time is known and it is generally accepted that larger eggs take longer to develop than smaller ones. The production of eggs with variable size may represent a strategy by which

a mother spread the risk connected with life in a temporary habitat. In laboratory experiments carried out at 24 °C, we evaluated the effect of egg size on egg development time in a clonal lineage of *Heterocypris incongruens* typical of Northern Italy vernal pools. The lack of genetic variation expected among clonal organisms make them ideal material for investigating maternal effect (e.g. the environment the mother experienced). We measured the size of 50 eggs released at 12:12 L:D photoperiod, chosen as a proxy of favourable but unpredictable late winter-spring conditions, and 62 eggs at 16:8 L:D photoperiod, proxy of incoming a dry predictably unfavourable season inducing resting egg production. Each egg was identified, photo recorded, measured at different times from deposition for at least 200 days, for a total of 1841 measurements. At deposition, mean diameter was smaller in eggs released at 16:8 L:D (129.9 µm sd 7.69) than at 12:12L:D (133.1 µm sd 8.46) and, as expected, hatching percentage decreased from 52% at 12:12 L:D to 27% at 16:8 L:D. Egg diameter did not differ between resting (130.4 µm sd 8.13) and non resting eggs (133.0 µm sd 8.09) and did not affect hatching time that was highly variable (from 2 to 100 days) but did not vary with photoperiod. During our observation time, egg diameter increased 1.09-1.14 times following an asymptotic model. Size increment was higher (and slower) in eggs produced at 16:8 L:D than in eggs produced at 12:12 L:D. It was highly variable especially in resting eggs produced at 12:12 L:D, and was linked to the initial growth that occurred within 0-3 days from deposition. Our preliminary data show that, in *H. incongruens,* the egg size at deposition is affected by the environment the mother experienced*,* hatching time is not affected by egg size at deposition and early embryo developmental process occurs in resting eggs whose number of cells is about one hundred.

Ostracod fauna from the ancient Magdala harbor (Kinneret lake, Israel)

Veronica Rossi[1], Alessandro Amorosi[1], Irene Sammartino[1], Giovanni Sarti[2]

[1]Dipartimento di Scienze della Terra e Geologico-Ambientali, Università di Bologna, Via Zamboni 67, 40126 Bologna, Italy [2]Dipartimento di Scienze della Terra dell'Università di Pisa, via S. Maria 53 - 56126 Pisa, Italy

Abundance, species diversity and composition of ostracod assemblages, as well as the presence of ecophenotypical features on valves (nodes), are function of several environmental parameters, including water temperature and depth, salinity, hydrochemistry, oxygen, productivity and substrate (Holmes & Chivas, 2002). In this regard, ostracods are considered one of the most efficient biostratigraphical markers in ancient harbor sequences, as human activities can lead to notable modifications in productivity/trophic levels, bottom oxygenation and heavy-metal pollution (Marriner & Morhange, 2007).

At present a wide literature reporting the ostracod content of seaport sequences is available, while few studies only have focused on the ostracod fauna of lacustrine harbor successions. Around the freshwater

Kinneret Lake (north Israel) recent excavations performed within the framework of the "Magdala project" at the ancient city of Magdala (De Luca, 2009) have unearthed a harbor structure ranging in age from the late Hellenistic to middle Roman period (ca. 167 BC-270 AD). Quantitative ostracod analyses performed on two key stratigraphic sections, excavated in front of the Roman dock, provide insights into the palaeoenvironmental evolution of the harbor area (Sarti *et al*., 2012).

An olygotypic ostracod fauna, very similar to that observed within the present-day lake basin at ca. 5 m water depth (Mischke *et al*., 2010) and dominated by smooth and noded forms of opportunistic, true euryhaline species *Cyprideis torosa*, characterizes the sandy succession recorded at the bottom of the sections. This fauna composition reflects the capability of colonizing species *C. torosa* to tolerate high-energy sandy bottoms typical of beach environments.

Upwards, in correspondence of dark silty deposits *C. torosa*, mainly reported as noded form, is still the dominant species. However, an abrupt abundance increase of taxa preferring fine-grained substrates and high-organic stagnant waters, as *Pseudocandona albicans*, is coherent with the establishment of a protected basin, whose origin should be related to the construction of Magdala harbor during the late Hellenistic period ("anthropogenically forced sheltered basin"; *Sarti et al*., 2012). Although the origin of ecophenotypical nodes is still matter of debate, especially about the second controlling factor in addition to low salinity ("factor X" in van Harten, 2000), the higher proportion of noded forms of *Cyprideis torosa* within basin deposits, relative to the underlying beach sands, possibly reflects stressed environmental conditions connected to high pollution levels induced by harbor activities. This interpretation is supported by geochemical analyses on hosting sediments, which show anomalously high trace metal concentrations (Zn, Pb and Cu).

References

van Harten, D., 2000. Variable noding in *Cyprideis torosa* (Ostracoda, Crustacea): an overview, experimental results and a model from Catastrophe Theory. Hydrobiologia 419, 131–139.

Holmes, J.A., Chivas, A.R., 2002. *The Ostracoda: Applications in Quaternary Research. American Geophysical Union Monograph Series*, 131, 313 pp.

Marriner, N., Morhange, C., 2007. Geoscience of ancient Mediterranean harbours. *Earth-Science Reviews*, 80, 137–194.

De Luca, S., 2009. La città ellenistico-romana di Magdala/Taricheae. Gli scavi del Magdala Project 2007 e 2008: relazione preliminare e prospettive di indagine. *Liber Annuus* , 59, 343–562.

Mischke, S., Almogi-Labin, A., Ortal, R., Rosenfeld, A., Schwab, M.J., Boomer, I., 2010. Quantitative reconstruction of lake conductivity in the Quaternary of the Near East (Israel) using ostracods. *Journal of Paleolimnology*, 43, 667–688.

Sarti, G., Rossi, V., Amorosi, A., Bertoni, D., Ribolini, A., Sammartino, I., Zanchetta, G., 2012. Deciphering natural to anthropogenic control on sedimentation: the Late Holocene Magdala (Kinneret Lake, Israel) harbour history. *European Geosciences Union General Assembly 2012*, Vienna, Austria.

Freshwater ostracods fauna from Lago di Bordaglia (Friuli Venezia Giulia - NE Italy)

Gianguido Salvi[1], Nevio Pugliese[1], Deborah Arbulla[2], Giovanni Paolo Fanzutti[1]

[1]Dipartimento di Matematica e Geoscienze, Università degli studi di Trieste;
[2]Museo Civico di Storia Naturale di Trieste

The research on recent freshwater ostracods of Friuli Venezia Giulia region does not have a firm tradition, and available data mostly rely on occasional investigations (Colizza *et al*., 1987, 1990). Recently detailed accounts on taxonomy, ecology and geographic distribution of Italian ostracods have been published in Friuli Venezia Giulia (Pieri *et al*. 2009; Stoch 2003, 2004).

In the present study, we analyzed 45 bottom sediments collected in Lago di Bordaglia, a small glacial lake located in the northernmost sector of the Carnic Alps at altitudes of 1750 m a.s.l., during two different summer survey (1991-1992). Bathymetry, physical and hydrochemical variables were measured (pH, Oxygen, Carbonates), sedimentological (textural) analysis was also carried out.

Three ostracod species (*Cypria ophthalmica, Cypridopsis vidua* and *Candona candida*) were identified. The most abundant species are represented by *Cypria ophthalmica* followed by *Cypridopsis vidua*. The first results seems to indicate a major relationship between the highest values of carbonate and pH in sediments with high percentages of silt component and biocenosis, meanwhile Oxygen does not seem to indicate precise trends. Biocoenosis and thanatocoenosis indicate a preferential distribution (diffusion) in the southern part of the lake related to very shallow waters.

However, it should be noted the broad tolerance of freshwater ostracods in terms of the environmental and ecological variables combined with a high resilience to extreme environments, such could be considered the high mountain lakes.

References

Colizza, E., Fanzutti, G.P. & Pugliese, N., 1987. The diffusion of ostracode fauna in Lake Ragogna (Friuli, Italy). *Biogeography*, 13, 529-537.

Colizza, E., Fanzutti, G.P., Melis, R., Polano, S., Pugliese, N., 1990. Primi risultati sui sedimenti e sulle ostracofaune del lago di Cavazzo o dei Tre Comuni (Udine). Atti tavola rotonda "Ecologia e Paleontologia", *Quaderno del Museo Geologico e Paleontologico di Monfalcone*, 53-77.

Pieri, V., Martens, K., Stoch, F., Rossetti G., 2009. Distribution and ecology of non-marine ostracods (Crustacea, Ostracoda) from Friuli Venezia Giulia (NE Italy). *J. Limnol*. 68, 1-15.

Stoch, F., 2003. Indagini ecologiche e faunistiche sulla meiofauna (Acari e Crostacei) di alcune sorgenti del Parco Naturale delle Prealpi Giulie (Italia nord-orientale). *Gortania, Atti Mus. Friul. St. Nat*., Udine, 25, 239-250.

Stoch, F., 2004. Prime osservazioni sulla fauna delle acque carsiche sotterranee delle Alpi Carniche. *Mem. Ist. It. Spel*., s. II, 15, 87-95.

How to discuss on ostracodes along a nature trail: the project of "Risorgive dello Stella" (Udine, Friuli Venezia Giulia)

Sandra Scaini[1], Federico Forgiarini[2], Manuela Giovannelli[3], Nevio Pugliese[4], Rodolfo Riccamboni[5]

[1]Via della Roggia 13 Gradiscutta di Varmo, Udine; [2]Az. Agricola "Le fornaci del Zarnic"; [3]Museo Friulano di Storia Naturale; [4]Dipartimento di Matematica e Geoscienze, Università di Trieste; [5]Dipartimento di Scienze della Vita, Università di Trieste

After the Last Glacial Maximum, the continuous emergence of karstic waters coming from the Julian Alps produced wide wetlands (springs, peat-bogs, swamps, rivers) in the southern plain of Friuli. Most of these environments were widely present in the early last century. Subsequently, in the last century, the big reclamations of the '30s and the '50s have irreversibly compromised these areas and turned them into plantations of corns and hybrid poplar.

More recently, the spreading and the rise of a new environmental awareness have allowed local governments and some agricultural enterprises to implement project planning the objectives of the restoration and enhancement of these areas (parks, SIC, educational farms).

In this context the cultural tourism should become an essential tool for sustainable economy through the education of the environment. The knowledge of our environment and its respect may begin through natural itineraries close to home. A trail in the fresh water wetlands along the headwaters of the Stella river can become an useful tool for these objectives. Springs, peat-bogs and swamps may attract the visitors who are able to appreciate plants, cows and horses there grazing, and the typical biodiversity of these environments. Usually, the better known elements of the environment are those that are seen with the naked eye.

The first aim concerns the identification of the organisms there living. A simple determination key is proposed on the basis of their evident morphological features. The identification must reach a basic level so as to recognize a gastropod, a bivalve and so on.

The second aim plans to evidence the existence of the microscopic world, which is almost unknown to a wide. Yet, microscopic organisms are often abundant and probably have marked many milestones of the history of life. How much information can be gathered from their identification and their knowledge?

The key also requires the identification of ostracodes, thecamoebians, characean girogonites, etc. Once identified, the ostracodes might become useful tools to interpret the conditions of the environments. Depending of the season, the observation points of the springs of the Stella river trail present different conditions. Wintertime, wetlands show an ice cover; summertime, they may become dry. Sometimes, the environment may be stagnant or current. Thus, the trail can touch topics concerning a kind of extreme environment. What are the survival strategies of organisms? Ostracodes may present good examples to discuss the topic with the visitors and find a response. Ice cover allows a favorable temperature of the water below for the life; resistant eggs can overcome the dry conditions waiting for their hatching. Stagnant waters allow the life for good swimmers (i.e. *Cypria ophthalmica*, *Cypridopsis vidua*); current waters also present strictly benthic ostracodes (*Ilyocypris gibba*). Thus, the visitors can enter the field of ecology and evaluate the morphological adaptations to different environmental conditions. They can ask questions. What is the carapace shape of the ostracodes swimmers in stagnant waters? What is the shape of those strictly benthonic in current waters? They are able to give answers: rounded or subrectangular shape, respectively. Moreover, the visitors can enter the actuopalaeontological field. For the same environment, the adaptive strategies of the modern ostracodes repeat those of ancient and fossil species. This concept should open wide discussions which might be very attractive for the public.

Guida all'escursione Foce dell'Isonzo Nature Reserve 21 aprile 2012

Fabio Perco

Direttore scientifico Riserva Naturale Regionale "Foce dell'Isonzo - Isola della Cona", e-mail: fabio.perco@gmail.com

At the mouth of the River Isonzo in North Eastern Italy, a "Nature Reserve" was created in 1996 by the Regional Administration, recognizing the good results of a restoration project started in 1983. The main aims of this project are the conservation of some habitats in their current state (e.g. reedbeds, sand-dunes, mudflats and saltmarshes) and the restoration of formerly cultivated areas as freshwater marshes, with temporary wetlands and flooded meadows. At present, the Nature Reserve (2340 ha) works as a fully equipped "Wetland Centre" and it includes a museum and facilities for general visitors and researchers. The management of the area at "Isola della Cona", with the aim of increasing biodiversity, employs both domestic and wild herbivores, such as cows, Camargue horses and wild geese, reproducing the natural sequence of summer droughts and winter flooding. The biodiversity of the area as a whole, already great for a number of reasons including

its key position at the northernmost corner of the Adriatic Sea (and the Mediterranean), increased enormously from the first flooding of the experimental pools in the year 1989. The area's value for wildlife is of international importance, with more than 300 bird species until now recorded. The building of hides and an interpretation / research centre (Stazione Biologica Isola Cona – www.sbic.it) helps in the control of disturbance from a rapidly increasing number of visitors and allows for a wider knowledge of the results of the project.

Sessioni scientifiche
20 Aprile 2012

Prima sessione

10.00 – 10.15 Giuseppe Aiello, Diana Barra, Salvatore De Bonis, Marco Guida, Roberta Parisi, Maria Toscanesi, Marco Trifuoggi - **Multidisciplinary approach to evaluate the environmental health Flegrea coast**

10.15 – 10.30 Deborah Arbulla, Sandro De Muro, Daniele Manca, Maria Eugenia Montenegro, Nevio Pugliese, Gianguido Salvi - **Infralittoral ostracode fauna of Porto Puddu Rias (northern Sardinia)**

10.30 – 10.45 Marco Caporaletti, Martin Gross, Werner E. Piller - **Late Miocene ostracods from the Solimões Formation (Western Amazonia): geochemical and palaeontological analyses**

10.45 – 1.00 Costanza Faranda, Elsa Gliozzi , Francesco Grossi, Paola Cipollari, Domenico Cosentino, Güldermin Darbaş, Rocco Gennari, Kemal Gürbüz , Atike Nazik - **Messinian paleoenvironmental changes in the easternmost Mediterranean: a case study in the Adana Basin (southern Turkey)**

11.00 – 11.20 **Discussione**

Seconda sessione

11.40 – 11.55 Elsa Gliozzi, Ilaria Mazzini, Tatiana Concas - **Palaeoenvironmental and palaeoclimatic evolution of the Shkodra Lake (Albania) during the last 4500 yr through ostracod proxies**

11.55 – 12.10 Francesco Grossi, Elsa Gliozzi - **Preliminary results on the post-evaporitic Messinian sequence of Eraclea Minoa (Sicily): biostratigraphy and palaeoenvironmental evolution**

12.10 – 12.25 Valentina Pieri, Koen Martens, Isa Schön - **Cryptic diversity in ancient lakes: The *Cytherissa* flock (Crustacea, Ostracoda) in Lake Baikal (Siberia)**

12.25 – 12.40 Valentina Pieri, Giada Rossi, Jochen Vandekerkhove, Daniele Goi - **Ostracoda (Crustacea) as indicators for surface water quality: a case study from the Ledra River basin (NE Italy)**

12.40 – 13.00 **Discussione**

Terza sessione

14.30 – 14.45 Valeria Rossi, Matteo Zatorri, Alessio Perotti, Giorgio Benassi, Paolo Menozzi - **What does egg size tell us about development and hatching time in *Heterocypris incongruens*?**

14.45 – 15.00 Veronica Rossi, Alessandro Amorosi, Irene Sammartino, Giovanni Sarti - **Ostracod fauna from the ancient Magdala harbor (Kinneret lake, Israel)**

15.00 – 15.15 Gianguido Salvi, Nevio Pugliese, Deborah Arbulla, Giovanni Paolo Fanzutti - **Freshwater ostracods fauna from Lago di Bordaglia (Friuli Venezia Giulia - NE Italy)**

15.15 – 15.30 Sandra Scaini, Federico Forgiarini, Manuela Giovannelli, Nevio Pugliese, Rodolfo Riccamboni - **How to discuss on ostracodes along a nature trail: the project of "Risorgive dello Stella"(Udine, Friuli Venezia Giulia)**

15.30 – 16.00 **Discussione**

16.30 – 18.30 **Sintesi e conclusione**

Partecipanti

DANIA ALBINI - Dipartimento di Scienze Ambientali, Università di Parma ,Parco Area delle Scienze 11/A, 43124 Parma (Italy); e-mail: dania.albini@studenti.unipr.it;

DEBORAH ARBULLA - Museo Civico di Storia Naturale di Trieste, via dei Tominz, 34100 Trieste, Italy; e-mail: ARBULLA@comune.trieste.it;

MARCO CAPORALETTI - Institute of Earth Sciences, Karl-Franzens-Uviversität Graz, Heinrichstrasse 26, 8010 Graz, Austria; e-mail: marco.caporaletti@unigraz.at;

SIMONE COMINELLI - Dipartimento di Scienze Ambientali, Università di Parma, Parco Area delle Scienze 11/A, 43124 Parma (Italy); e-mail: simone.cominelli@studenti.unipr.it;

TATIANA CONCAS - Dipartimento di Scienze Geologiche, Università Roma Tre, L.go S. Leonardo Murialdo, 1, I-00146; e-mail: tatianaconcas@libero.it;

DOMENICO COSENTINO - Dipartimento di Scienze Geologiche, Università Roma Tre, L.go S. Leonardo Murialdo, 1, I-00146; e-mail: cosentin@uniroma3.it;

CAROLINA D'ARPA - Dipartimento di Scienze della Terra e del Mare - Museo Geologico G. G. Gemmellaro, Università di Palermo, Corso Tukory, 131, 90134 Palermo; e-mail: carolina.darpa@unipa.it;

COSTANZA FARANDA - Dipartimento di Scienze Geologiche, Università Roma Tre, L.go S. Leonardo Murialdo, 1, I-00146; e-mail: costanza.faranda@gmail.com;

FEDERICO FORGIARINI - Az. Agricola "Le fornaci del Zarnic", Via Petrarca 10 - Flambruzzo di Rivignano, Udine; e-mail: info@lefornacidelzarnic.it;

MANUELA GIOVANNELLI - Museo Friulano di Storia Naturale , via Marangoni nn. 39 e 41 - 33100 Udine; e-mail: manuela.giovannelli@comune.udine.it;

ELSA GLIOZZI - Dipartimento di Scienze Geologiche, Università Roma Tre, L.go S. Leonardo Murialdo, 1, I-00146; e-mail: gliozzi@uniroma3.it;

FRANCESCO GROSSI - Dipartimento di Scienze Geologiche, Università Roma Tre, L.go S. Leonardo Murialdo, 1, I-00146; e-mail: fgrossi@uniroma3.it;

MARIA EUGENIA MONTENEGRO - Dipartimento di Matematica e Geoscienze, Università di Trieste, 34128 Trieste, Italy; e-mail: mmontenegro@units.it;

ROBERTA PARISI - Dipartimento di Scienze della Terra, Università di Napoli Federico II, L.go San Marcellino, 10 - 80138 Napoli, Italia; e-mail: robertaparisi@unina.it;

NEVIO PUGLIESE - Dipartimento di Matematica e Geoscienze, Università di Trieste, 34128 Trieste, Italy; e-mail: pugliese@units.it;

VALENTINA PIERI - Royal Belgian Institute of Natural Sciences, Freshwater Biology, Vautierstraat 29, 1000 Brussels, Belgium; e-mail: valentina.pieri@gmail.com;

VALERIA ROSSI - Department of Environmental Sciences, University of Parma, Viale G. P Usberti 43124 Parma, Italy; e-mail: valeria.rossi@unipr.it;

VERONICA ROSSI - Dipartimento di Scienze della Terra e Geologico - Ambientali, Università di Bologna, Via Zamboni 67, 40126 Bologna, Italy; e-mail: veronica.rossi4@unibo.it;

RODOLFO RICCAMBONI - Dipartimento di Scienze della Vita, Università di Trieste, Via Giorgieri 10; e-mail: rriccamboni@units.it;

ANTONIO RUSSO - Viale Muratori 225, 41124 Modena, Italy; e-mail:antonio.russo@unimore.it;

GIANGUIDO SALVI - Dipartimento di Matematica e Geoscienze, Università di Trieste, 34128 Trieste, Italy; e-mail: museo@units.it;

SANDRA SCAINI – Via della Roggia 13, Gradiscutta di Varmo, Udine; e-mail: s.scaini@libero.it;

MARINA VESEL-LUKIĆ - Gelogical Survey of Slovenia, Dimičeva ul. 14, 1000 Ljubljana, Slovenia; e- mail: marina.vesel@gmail.com

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