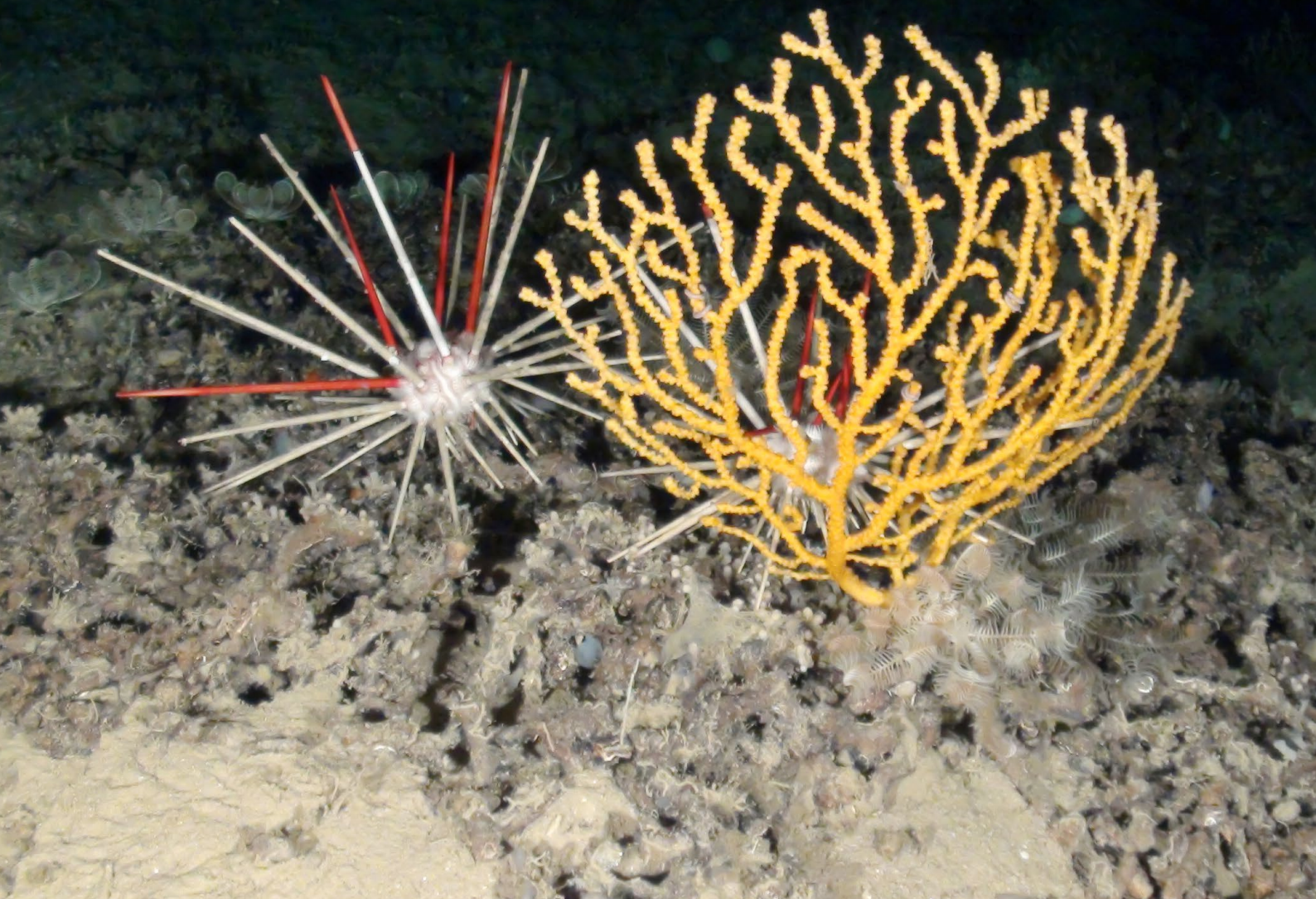




The Mediterranean
Biodiversity
Centre

2nd MEDITERRANEAN SYMPOSIUM ON THE CONSERVATION OF DARK HABITATS

BOOK OF ABSTRACTS



ANTALYA, TURKEY, 16 JANUARY 2019

Technical partner



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**2nd Mediterranean Symposium on the
conservation of Dark Habitats**

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PROGRAMME

Wednesday 16 January 2019

14:00-14:15 **Opening of the Symposium**

14:15-14:45 Keynote conference: "The bathymetric distribution of fish and other key benthic species and communities in Lebanese submarine canyons" by Ricardo AGUILAR, GARCIA S., PERRY A.L., ALVAREZ H., BLANCO J., G. BITAR.

14:45-15:15 Keynote conference: "Ramoge explorations 2015 and 2018: a cross-border experience of deep oceanographic explorations" by Boris DANIEL, TUNESI L., AQUILINA L., VISSIO A.

15:15-15:45 Keynote conference: "Status of knowledge on marine cave environments of the Croatian Adriatic coast" by Donat PETRICIOLI, BAKRAN-PETRICIOLI T.

Session 1: **Current Knowledge of the deep habitats**

15:45-16:00 "Deep-sea habitats and communities in the Aeolian Islands (North Sicily)" by Ricardo AGUILAR, GARCIA S., PERRY A.L., ALVAREZ H., BLANCO J. CHIMIANTI G., MONTESANTO F., MASTROTOTARO F.

16:00-16:15 "Join the dark side: Mediterranean cold-water corals " by Giovanni CHIMIANTI, BO M., MASTROTOTARO F.

16:15-16:30 Discussion

Session 2: **Current Knowledge of undersea caves**

16:30-16:45 "Preliminary data on the distribution of marine caves along the Tunisian coast" by Akrem DRIDI, ZRIBI I., MNASRI I., ACHOURI M.S., ZAKHAMA-SRAIEB R.

16:45-17:00 "A preliminary study on the macrobenthic organismal cover in an underwater cave in Gökçeada Island (North Aegean sea, Turkey)" by Bülent TOPALOĞLU

17:00-17:15 "Undisclosed bryodiversity of submarine caves of the Aegean sea (Eastern Mediterranean)" by Antonietta ROSSO, GEROVASILEIOU V., SANFILIPPO R., GUIDO A.

17:15-17:30 "Long-term spatio-temporal dynamics of sessile benthos in a shallow marine submerged cave in the Western Mediterranean sea" by Juan SEMPERE-VALVERDE, SABINO L.A., ESPINOSA F., GEROVASILEIOU V., SÁNCHEZ-TOCINO L., NAVARRO-BARRANCO C.

17:30-17:45 Discussion

17:45-18:00 **Poster Session**

18:00-18:15 **Closure of the Symposium**

KEYNOTE CONFERENCES

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THE BATHYMETRIC DISTRIBUTION OF FISH AND OTHER KEY BENTHIC SPECIES AND COMMUNITIES IN LEBANESE SUBMARINE CANYONS

*The Lebanese marine environment is characterised by many transversal submarine canyons, along the entire coast, that reach more than 1600 m depth. During 2016, Oceana, in collaboration with the Ministry of Environment of Lebanon (MoE), CNRS, IUCN and SPA/RAC, carried out an expedition in this area to survey five submarine canyon complexes, ranging in depth from 50 to 1000 m. The aim of this research was to describe the key habitats and communities at different depths, as well as the species associated with those ecosystems. Using an ROV, a Van Veen grab, and a CTD to film, sample, and collect oceanographic data, the results provided a list of more than 600 identified taxa. Of these organisms, 95 were fishes, with 84 identified species, and 11 further taxa identified to the genus level. The most common fishes were macrourids, which were widely distributed in all the surveyed canyons, with species such as *Nezumia* spp., *Coelorinchus caelorhincus* and *Hymenocephalus italicus*. Some species of chondrichthyans were also documented, such as the small deep-sea shark *Etmopterus spinax*, the ray *Dipturus oxyrinchus* and the rabbit fish *Chimaera monstrosa*. Other important biological groups and phyla observed were crustaceans (due to their high abundance), echinoderms (because of the presence of some rare species), cnidarians (with the first record of a gorgonian in Lebanese waters), sponges (including hexactinellids), and molluscs (the most biodiverse group with more than 170 species documented).*

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RAMOGE EXPLORATIONS 2015 AND 2018: A CROSS-BORDER EXPERIENCE OF DEEP OCEANOGRAPHIC EXPLORATIONS

*In the framework of the international agreement RAMOGE, as follow up of the work done in 2014 to identify Ecologically or Biologically Significant Marine Areas (EBSAs) in the RAMOGE area, a first oceanographic exploration campaign was carried out in 2015 by means of the ISPRA research vessel (Italy). The campaign ran from August 16 to 23 between France (Cogolin), Monaco and Italy (San Remo). The main objective of the RAMOGE_Explo_2015 campaign was to explore the depth range 50-400 meters in order to study some relevant sites to establishing an inventory of habitats, protected and commercial species and anthropogenic pressures. To this purpose, six areas of ecological interest have been selected, two per member country. The collected information represented a significant contribution, both in terms of knowledge of biodiversity and the pressures exerted by human activities and have also been used for the development of local management framework documents, such as Marine Protected Areas. Following the same approach, a second campaign, "RAMOGE_Explo_2018", was carried out in summer 2018, thanks to the means of IFREMER (France). The stakes of this new field activity were centered on habitat, species and marine litter in the depth range 2000-3000 m, focusing on seamounts and to verify the presence of a facies of *Isidella elongata* recorded in the sixties.*

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STATUS OF KNOWLEDGE ON MARINE CAVE ENVIRONMENTS OF THE CROATIAN ADRIATIC COAST

There are more than a thousand semi- and entirely submerged caves, underwater passages and cold-water pits along the eastern karstic coast of the Adriatic Sea which belongs to the Republic of Croatia. They are inhabited by, up to now, poorly investigated, fragile and long-living communities of semi-dark caves, completely dark caves and cold-water pits with bathyal elements. Marine caves are endangered marine habitats according to the NATURA 2000 classification (submerged and partly submerged marine caves, code 8330). Most caves are located within the Ecological Network of the Republic of Croatia (NATURA 2000 Network). Although Croatian coasts are considered among the most studied Mediterranean areas concerning geology and biodiversity of marine and anchialine caves, comprehensive and quantitative studies were only done on a small number of Croatian caves. There is an urgent need for systematic research and monitoring of marine caves in Croatia. Threats to which marine caves are subjected today are numerous. A considerable number of Croatia's marine caves face an upcoming or rising danger of damage to their living communities and/or their geomorphological features due to intense commercial use (SCUBA diving, nautical, and individual tourism). Our experience suggests that it is currently impossible to control the vast and often remote areas encompassing submerged caves in Croatia. Therefore, some of Croatia's most valuable caves are possibly exposed to over exploitation and poor management or no management at all. Croatia's submerged karst deserves particular consideration and valorisation.

ORAL COMMUNICATIONS

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DEEP-SEA HABITATS AND COMMUNITIES IN THE AEOLIAN ISLANDS (NORTH SICILY)

During May-June 2018, Oceana carried out a research expedition in the volcanic archipelago of the Aeolian Islands, to the north of Sicily, to document benthic communities and species down to a depth of 1000 metres. A total of 51 ROV dives were carried out, across six survey areas with differing geological and bathymetric characteristics, including a seamount, continental shelf, sharp slopes, and flat deep-sea beds. Community types observed ranged from seagrass meadows in the shallowest areas surveyed, to coralligenous and maërl beds on the continental shelf, and facies of hexactinellid sponges (Farrea bowerbanki) on the deepest rocky slopes studied. Detritic bottoms hosted aggregations of oysters (Neophycnodonte spp.) and tube anemones, while muddy bottoms were characterised by various communities of sponges (Thenea muricata, Aaptos aaptos, and Cladorhiza abyssicola), carnivorous sea squirts (Dicopia antirrhinum), and extensive colonies of bamboo corals (Isidella elongata), among many other species. On rocky bottoms, both soft and stony corals were common, including Bebryce mollis, Swiftia dubia, Villogorgia bebrycoides, Callogorgia verticillata, Viminella flagellum, Caryophyllia spp., Dendrophyllia cornigera, and Thalamophyllia gasti. Gardens of the black corals Antipathes dichotoma, Antipathella subpinnata, Leiopathes glaberrima and Parantipathes larix were also documented, together with sponge aggregations (Pachastrella monilifera, Haliclona spp. and Podospongia loveni). A total of close to 600 taxa have been observed, including rare, threatened and protected ones, some of which had never been recorded before from the study area.

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JOIN THE DARK SIDE: MEDITERRANEAN COLD-WATER CORALS

Cold-water corals (CWCs) are among the main habitat formers of the deep Mediterranean Sea, hosting a lush diversity of species and playing a crucial ecological role. The term CWC sensu lato groups taxa of cnidarians with a more or less pronounced frame-building ability with forest-forming organisms both on hard and soft bottoms. CWC species and their occurrence in the Mediterranean Sea are here reviewed and discussed from a biogeographic point of view, considering the geographical areas of occurrence and the bathymetric ranges of distribution. Due to the interaction between particular topography and a combination of cold, oxygenated and trophic-carrying water masses, CWCs communities develop in a mosaic-like situation along the main paths that such currents follow within the basin. This would help to have a comprehensive knowledge about features and processes governing CWC habitats in the Mediterranean Sea, for proper management strategies needed in the near future.

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**PRELIMINARY DATA ON THE DISTRIBUTION OF MARINE CAVES
ALONG THE TUNISIAN COAST**

According to the EU Habitats Directive (92/43/EEC), marine caves are considered habitats of high priority in the Mediterranean Sea. These ecosystems are of great scientific interest for the study of marine life, since they are well known for their rich and unique biodiversity. Nevertheless, Tunisian marine caves were almost left out from any scientific study. This is proved by the scarcity of any bibliographic information from national documents or/and scientific publications about these key habitats. The aim of this study was to provide a first database on marine caves along the Tunisian coast. We combined information published in scientific and 'grey' literature, including presentations at scientific meetings, university theses, websites as well as personal observations. In addition, we conducted a questionnaire survey, with a compilation of 20 questions, to collect information about the location, morphology, depth and uses of marine caves in Tunisia. This survey was addressed to fishermen, recreational and professional divers, scientific divers, and local people who can provide reliable data about marine caves. A total of 32 marine caves and tunnels were identified. Most of those habitats were located in the northern coasts of Tunisia. A map of the distribution and characteristics of each marine cave was compiled. This preliminary database will be a useful tool in future studies on the biodiversity of marine caves in Tunisia.

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**UNDISCLOSED BRYODIVERSITY OF SUBMARINE CAVES OF THE AEGEAN SEA
(EASTERN MEDITERRANEAN)**

*Bryozoan diversity from the eastern Mediterranean basin is still poorly known, especially in dark cave and deep-water habitats. Examination of samples collected from two submarine caves in Lesvos Island, Aegean Sea, revealed 74 bryozoan taxa. Most taxa (67) occurred with living and dead colonies, whereas 7 were exclusively recorded with dead colonies. Cheilostomes (59 species) outnumbered cyclostomes (14 species) and ctenostomes (1 species). Unilaminar-multilaminar encrusters prevailed; runners, spots and erect colonies were subordinate to rare. Most taxa, but 6, were already known from present-day Mediterranean. These are *Palmiskenea sp. 1*, *Schizomavella sp. 1*, *Fenestrulina sp. 1*, *Rhynchozoon sp. 1*, *Setosella sp. 1*, and *Onychocellidae sp. 1*. The last two taxa are new species, whose description is under way. The former four taxa could be either new or non-indigenous species. Assessments about their status, however, require comparison with several species distributed worldwide. Indeed, except for the genera *Palmiskenea* (known with 7 species, 2 from the Mediterranean), *Fenestrulina*, *Schizomavella*, and *Rhynchozoon*, are very rich in species in the world ocean (70, 71 and 88 species, respectively) and in the Mediterranean Sea (4, 22, and 6, respectively). To date, only one species of the above genera, *R. larreyi*, has been recorded as non-indigenous in the eastern Mediterranean Sea (Lebanon). The finding of 6 new taxa in two neighbouring sites supports that a considerable number of species await to be discovered from understudied sectors and habitats of the Mediterranean Sea, and especially from dark habitats. Knowledge of this diversity is crucial for monitoring and conservation initiatives.*

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LONG-TERM SPATIO-TEMPORAL DYNAMICS OF SESSILE BENTHOS IN A SHALLOW MARINE SUBMERGED CAVE IN THE WESTERN MEDITERRANEAN SEA

Submarine caves are considered priority habitats according to the Barcelona Convention and the EU Habitat Directive, yet they have received relatively low research effort when compared to other Mediterranean coastal habitats. This paper provides information about the long-term spatio-temporal observations of sessile benthos along the exterior-interior axis of Cerro-Gordo marine cave (Granada, Spain) from 2007 to 2016. Using feeding strategies and morphological descriptors, significant temporal variations of sessile community were recorded in both external and internal sectors, in spite of the higher confinement of the inner parts of the cave. In the inner cave sector, the use of feeding strategies revealed community variability through time and between opposite cave walls. On the other hand, the use of morphological descriptors proved to better depict variability in the outer cave sector, where the community was more heterogeneous. These results provide valuable information that could be included in future monitoring programs of these endangered and protected habitats.

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A PRELIMINARY STUDY ON THE MACROBENTHIC ORGANISMAL COVER IN AN UNDERWATER CAVE IN GÖKÇEADA ISLAND (NORTH AEGEAN SEA, TURKEY)

In this preliminary survey, the spatial variability of biotic cover was studied in an underwater cave. The studied cave is located in the Marine Park (MPA) of Gökçeada Island at 10 m depth. Sampling took place in May 2018. A total of 150 underwater photographs were taken from the external, entrance and internal zones of the cave. Each photograph was divided in 100 cells in order to determine the cover of the main taxonomic groups. Macroalgae covered the largest percentage of the surface area outside of the cave (95.5%), followed by sponges at the entrance of the cave (78.2%) and internal zones of the cave (75.1%). Other groups had much lower cover percentage, specifically Polychaeta (2.7%), Anthozoa (stony corals) (0.5%), Echinodermata (0.2%), and Cirripedia. In the outer part of the cave the substrate was completely occupied (95.5% by Algae) while the biotic coverage was 94.6% in the cave entrance (78.2% by sponges) and 81.7% inside the cave (sponges covered 78.2% and 75.1% of the substrate, respectively). The results of this preliminary work showed that the studied underwater cave is an important habitat for sponges, in terms of substrate cover, and provide a baseline for future studies in marine caves of Turkey.

POSTERS

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CHARACTERIZATION OF BENTHIC COMMUNITIES IN MARINE CAVES OF THE ISLAND-DOMINATED AEGEAN SEA (EASTERN MEDITERRANEAN)

The Aegean Sea hosts a considerable number of marine caves, the great majority of which are located in the island-dominated South Aegean region. Herein, nine marine caves from different Aegean islands were investigated for the first time by means of SCUBA diving and non-destructive sampling (photoquadrats). A total of 70 taxa belonging to 8 taxonomic groups were identified. Multivariate analysis revealed three main clusters of caves, reflecting primarily their geomorphologic character: a) deep (>10 m) submerged and semi-submerged caves, b) shallow semi-submerged caves (<6 m depth), and c) a semi-submerged cave with internal freshwater springs that was largely differentiated from all others. However, PERMANOVA results indicated significant differences between all caves suggesting a high level of individuality.

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MICROFACIES OF THE BIOTIC CRUSTS FROM TWO AEGEAN SUBMARINE CAVES (EASTERN MEDITERRANEAN)

This work extends the knowledge on bioconstructions growing in cryptic marine environments with the characterization of the biotic crusts found in the Eastern Mediterranean Sea. The walls and vaults of Fara and Agios Vasilios Caves (Lesvos Island, Greece) are covered with bryozoans, serpulids, coralline algae, scleractinian corals and sponges. Skeletons of these organisms are often cemented together to form small bioconstructions. Serpulids, bryozoans and sponges dominate the innermost dark cave sectors. Fine sediments (microcrystalline calcite) deposited via microbial metabolic processes, are a minor component, but testify the presence of bacteria in the crusts. The correlation between microbial activity and abundance of sponges could explain the development of the studied bioconstructions that have smaller sizes (few centimeters) in comparison to larger biostalactites common in other Mediterranean caves.



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