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PROGRAMME

Wednesday 29 October 2014

- 8:00-8:30** **Participants welcome and registration**
- 8:30-8:45** **Opening of the Symposium**
- 8:45-9:45** Keynote conference: **CIGESMED: Coralligenous based Indicators to evaluate and monitor the "Good Environmental Status" of the MEDiterranean coastal waters, a SEASERA project by Pr. Jean Pierre FERAL**
- Session 1: Knowledge of the Coralligenous communities and other calcareous bioconstructions**
- 9:45-10:00** “Unexpected artificial-reef-like effect due to a Mediterranean pipeline and the conservation of two circalittoral emblematic species: *Centrostephanus longispinus* and *Cystoseira zosteroides*” by Patrick BONHOMME, GOUJARD A., JAVEL A., GRONDIN J., BOUDOURESQUE C.F.
- 10:00-10:15** “Coralligenous: insights for a new geomorphological definition” by Valentina Alice BRACCHI, BASSO D., SAVINI A., MARCHESE F., CORSELLI C.
- 10:15-10:30** “Environmental factors explaining taxonomic heterogeneity of coralligenous outcrops across France (Northwestern Mediterranean)” by Florian HOLON, BOISSERY P., Julie DETER
- 10:30-10:45** Discussion
- 10:45-11:15** *Coffee break*
- Session 1: Knowledge of the Coralligenous communities and other calcareous (Continued) bioconstructions**
- 11:15-11:30** “New data concerning the coralligenous atolls of Cap Corse: an attempt to shed light on their origin” by Christine PERGENT-MARTINI, ALAMI S., BONACORSI M., CLABAUT P., DANIEL B., RUITTON S., SARTORETTO S., PERGENT G.
- 11:30-11:45** “Beta diversity patterns in Northern Adriatic coralligenous outcrops” by Massimo PONTI, FALACE A., RINDI F., FAVA F., KALEB S., Marco **ABBIATI**.
- 11:45-12:00** “An ecosystem-based approach to assess the status of the Mediterranean coralligenous habitat” by Sandrine RUITTON, PERSONNIC S., BALLESTEROS E., BELLAN-SANTINI D., BOUDOURESQUE C.F., CHEVALDONNÉ P., BIANCHI C.N., DAVID R., FÉRAL J.P., GUIDETTI P., HARMELIN J.G., MONTEFALCONE M., MORRI C., PERGENT G., PERGENT-MARTINI C, SARTORETTO S., TANOUE H., THIBAUT T., VACELET J., VERLAQUE M.
- 11:45-12:00** “Diversity and structure of coralligenous assemblages dominated by *Eunicella cavolini* (Koch, 1887) in the Aegean Sea” by Maria SINI, GARRABOU J., KOUTSOUBAS D.

12:00-12:15 “**Biodiversity patterns of coralligenous outcrops in the Western Mediterranean: first insights across temporal and spatial scales**” by Núria **TEIXIDÓ**, CASAS E., CEBRIAN E., KERSTING D., KIPSON S., LINARES C., OCAÑA O., VERDURA J., GARRABOU J.

12:15-12:30 Discussion

13:00-14:00 **Lunch**

14:00-15:30 *Round Table*

Updating the list of species to be considered as part of the mapping and monitoring of habitats by Christine **PERGENT-MARTINI**

Session 2: **Impact of climatic changes on Coralligenous community and other calcareous bioconstructions**

15:30-15:45 “**Long-term monitoring of *Cladocora caespitosa* reefs in the Columbretes Islands: from mapping to population dynamics and threats**” by Diego K. **KERSTING**, BALLESTEROS E., BENSOUSSAN N., CASADO C., DE CARALT S., TEIXIDÓ N., LINARES C.

15:45-16:00 “**Response of coralligenous to global change: evidences from field and experimental studies in gorgonian forests**” by Cristina **LINARES**, ARIZMENDI-MEJÍA R., BALLESTEROS E., CEBRIAN E., COMA R., DÍAZ D., HEREU B., KIPSON S., KERSTING D., LEDOUX J.B., TEIXIDO N., THANAPOULOU Z, GARRABOU J.

16:00-16:15 “**Impact of climate changes on coralligenous community in the Adriatic Sea**” by Petar **KRUŽIĆ**, RODIĆ P.

16:15-16:30 “**Long-term demographic traits of red coral populations in the NW Mediterranean: insights into management strategies**” by Ignasi **MONTERO-SERRA**, Cristina **LINARES**, GARCÍA M., PANCALDI F., FRLETA-VALIĆ M., LEDOUX J.B., ZUBERER F., MERAD D., DRAP P., GARRABOU J.

16:30-16:45 Discussion

16:45-17:15 *Coffee break*

17:15-18:15 **Poster Session (1 to 12)**

18:15-19:15 *Side Event*

“The impacts of acidification on biodiversity and other key Mediterranean ecosystems” by Patrizia **ZIVERI**

Thursday 30 October 2014

Session 3: **Mapping and monitoring of the Coralligenous community and other calcareous bioconstructions**

8:30-8:45 “**Cartography of main coastal ecosystems (Coralligenous and Rhodolith Beds) along the Corsican Coasts**” by Marina **BONACORSI**, ALAMI S., BREAND N., CLABAUT P., DANIEL B., PERGENT G., PERGENT-MARTINI C.

- 8:45-9:00** “**Coralligenous reefs in Liguria: distribution and characterization**” by **Almudena CÁNOVAS MOLINA**, MONTEFALCONE M., CANESSA M., COPPO S., DIVIACCO G., MORRI C., FERRARI M., CERRANO C., ARMSTRONG R., BIANCHI C. N., BAVESTRELLO G.
- 9:00-9:15** “**Assessment of coralligenous assemblages status in the Ligurian sea**” by **Carlo CERRANO**, BERTOLOTTO R., COPPO S., PALMA M., PANTALEO U., VALISANO L., BAVESTRELLO G., PONTI M.
- 9:15-9:30** “**Croatian coralligenous monitoring protocol: the basic methodological approach**” by **Silvija KIPSON**, KALEB S., KRUZIC P., RAJKOVIC Z., ZULJEVIC A., JAKLIN A., SARTORETTO S., RODIC P., JELIC K., KRSTINIC P., ZUPAN D., GARRABOU J.
- 9:30-9:45** “**A first insight into the coralligenous assemblages of the Western Sardinia Shelf (Italy)**” by **Simone SIMEONE**, GUALA I., CONFORTI A., INNANGI A., FERRIGNO F., TONIELLI R., DE FALCO G.
- 9:45-10:00** “**Using MaxEnt to understand and predict the distribution of coralligenous environments**” by **Paula A. ZAPATA-RAMIREZ**, HUETE-STAUFFER C., COPPO S., CERRANO C.
- 10:00-10:15** “**The resolution in benthic cartography: a detailed mapping technique and a Multiscale GIS approach with applications to coralligenous assemblages**” by Francesco PITITTO, TRAINITO E., MAČIĆ V., RAIS C., **Giovanni TORCHIA**
- 10:15-10:30** Discussion
- 10:30-10:45** *Coffee break*
- Session 4: Population Genetic of the Coralligenous community and other calcareous bioconstructions**
- 10:45-11:00** “**Genetic connectivity and conservation in the long-lived, harvested species *Corallium rubrum***” by **Marco ABBIATI**, COSTANTINI F., RUGIU L., CARLES I.
- 11:00-11:15** “**Population genetics of *Paramuricea clavata* (Risso, 1826) in the Eastern Adriatic Sea: implications for its conservation and management**” by **Maša FRLETA-VALIĆ**, KIPSON S., LINARES C., CEBRIAN E., ANTUNES. A, LEDOUX J.B.
- 11:15-11:30** “**Population genetics studies over contrasted spatial scales of two structural gorgonian species from the coralligenous: state-of-the-art and conservation implications**” by **Jean-Baptiste LEDOUX**, AURELLE D., ARIZMENDI-MEJIA R., FRLETA-VALIC M., LINARES C., MOKHTAR-JAMAÏ K., PRALONG M., ANTUNES A. GARRABOU J.
- 11:30-11:45** Discussion
- Session 5: Management of the Coralligenous community and other calcareous bioconstructions**
- 11:45-12:00** “**Remotely operated vehicles (ROVs) as powerful tools for the evaluation of the conservation status of deep red coral banks**” by **Giorgio BAVESTRELLO**, ABBIATI M., ANGIOLILLO M., BETTI F., BO M., CANESE S., CATTANEO-VIETTI R., CAU A., CORRIERO G., COSTANTINI F., GIUSTI M., PRIORI C., SALVATI E., SANDULLI R., SANTANGELO G., TUNESI L.

- 12:00-12:15** “**CIGESMED protocols: how to implement a multidisciplinary approach on a large scale for coralligenous habitats surveys**” by **Romain DAVID**, ARVANITIDIS C., ÇINAR M.E., SARTORETTO S., DOGAN A., DUBOIS S., ERGA Z., GUILLEMAIN D., THIERRY DE VILLE D’AVRAY L., ZUBERER F., CHENUIL A., FERAL J.P.
- 12:15-12:30** “**Visual and photographic methods to estimate the quality of coralligenous reefs under different human pressures**” by Luigi PIAZZI, CECCHI E., SERENA F., **Ivan GUALA**, CANOVAS MOLINA A., GATTI G., MORRI C., BIANCHI C.N., MONTEFALCONE M.
- 12:30-12:45** “**MEDTRIX: a cartographic database for marine ecology and anthropogenic pressures along the Mediterranean Coast**” by **Florian HOLON**, DELARUELLE G., BOISSERY P., DETER J.
- 12:45-13:00** Discussion
- 13:00-14:00** **Lunch**
- 14:00-14:15** “**Spatial allocation of fishing activity on coralligenous habitats in Portofino MPA (Liguria, Italy)**” by **Vasiliki MARKANTONATOU**, MARCONI M., CAPPANERA V., CAMPODONICO P., BAVESTRELLO A., CATTANEO-VIETTI R., PAPADOPOULOU N., SMITH C., CERRANO C.
- 14:15-14:30** “**An integrated approach to evaluate and monitor the conservation state of coralligenous bottoms: the INDEX-COR method**” by **Stéphane SARTORETTO**, DAVID R., AURELLE D., CHENUIL A., GUILLEMAIN D., THIERRY DE VILLE D’AVRAY L., FÉRAL J.P., ÇINAR M.E., KIPSON S., ARVANITIDIS C., SCHOHN T., DANIEL B., SAKHER S., GARRABOU J., GATTI G., BALLESTEROS E.
- 14:30-14:45** Discussion
- 14:45-16:15** **Poster Session (13 to 26)**
- 16:15-16:45** *Coffee break*
-
- 16:45-18:15** *Round-table*
- “**Protection of the Mediterranean coralligenous reefs: use of existing scientific knowledge & legislative framework to prevent further destruction of coralligenous habitats**” by **Anastasia MILIOU**, SENNI D., TSIMPIDIS T., TRAGANOS. D.
-
- 18:15-18:45** **Awards for best poster**
- 18:45-19:30** **Closure of the Symposium**
- 20h00** **Social Dinner**

PROGRAMME

Mercredi 29 Octobre 2014

- 8:00-8:30** **Accueil et Inscription des participants**
- 8:30-8:45** **Ouverture du Symposium**
- 8:45-9:45** Conférence Introductive: **CIGESMED: Coralligenous based Indicators to evaluate and monitor the "Good Environmental Status" of the MEDiterranean coastal waters, a SEASERA project** par Pr. Jean Pierre FERAL
- Session 1 :** **Etat des connaissances sur les formations coralligènes**
- 9:45-10:00** “Unexpected artificial-reef-like effect due to a Mediterranean pipeline and the conservation of two circalittoral emblematic species: *Centrostephanus longispinus* and *Cystoseira zosteroides*” par Patrick BONHOMME, GOUJARD A., JAVEL A., GRONDIN J., BOUDOURESQUE C.F.
- 10:00-10:15** “Coralligenous: insights for a new geomorphological definition” par Valentina Alice BRACCHI, BASSO D., SAVINI A., MARCHESE F., CORSELLI C.
- 10:15-10:30** “Environmental factors explaining taxonomic heterogeneity of coralligenous outcrops across France (Northwestern Mediterranean)” par Florian HOLON, BOISSERY P., Julie DETER
- 10:30-10:45** Discussion
- 10:45-11:15** *Coffee break*
- Session 1:** **Etat des connaissances sur les formations coralligènes**
(Suite)
- 11:15-11:30** “New data concerning the coralligenous atolls of Cap Corse: an attempt to shed light on their origin” par Christine PERGENT-MARTINI, ALAMI S., BONACORSI M., CLABAUT P., DANIEL B., RUITTON S., SARTORETTO S., PERGENT G.
- 11:30-11:45** “Beta diversity patterns in Northern Adriatic coralligenous outcrops” par Massimo PONTI, FALACE A., RINDI F., FAVA F., KALEB S., Marco **ABBIATI**.
- 11:45-12:00** “An ecosystem-based approach to assess the status of the Mediterranean coralligenous habitat” par Sandrine RUITTON, PERSONNIC S., BALLESTEROS E., BELLAN-SANTINI D., BOUDOURESQUE C.F., CHEVALDONNÉ P., BIANCHI C.N., DAVID R., FÉRAL J.P., GUIDETTI P., HARMELIN J.G., MONTEFALCONE M., MORRI C., PERGENT G., PERGENT-MARTINI C., SARTORETTO S., TANOUE H., THIBAUT T., VACELET J., VERLAQUE M.
- 11:45-12:00** “Diversity and structure of coralligenous assemblages dominated by *Eunicella cavolini* (Koch, 1887) in the Aegean Sea” par Maria SINI, GARRABOU J., KOUTSOUBAS D.

12:00-12:15 “**Biodiversity patterns of coralligenous outcrops in the Western Mediterranean: first insights across temporal and spatial scales**” par Núria **TEIXIDÓ**, CASAS E., CEBRIAN E., KERSTING D., KIPSON S., LINARES C., OCAÑA O., VERDURA J., GARRABOU J.

12:15-12:30 Discussion

13:00-14:00 **Déjeuner**

14:00-15:30 *Table ronde*

Actualisation de la liste des espèces à prendre en considération dans le cadre de la cartographie et du suivi des habitats par Christine **PERGENT-MARTINI**

Session 2 : **Impact des changements climatiques sur les formations coralligènes**

15:30-15:45 “**Long-term monitoring of *Cladocora caespitosa* reefs in the Columbretes Islands: from mapping to population dynamics and threats**” par Diego K. **KERSTING**, BALLESTEROS E., BENSOUSSAN N., CASADO C., DE CARALT S., TEIXIDÓ N., LINARES C.

15:45-16:00 “**Response of coralligenous to global change: evidences from field and experimental studies in gorgonian forests**” par Cristina **LINARES**, ARIZMENDI-MEJÍA R., BALLESTEROS E., CEBRIAN E., COMA R., DÍAZ D., HEREU B., KIPSON S., KERSTING D., LEDOUX J.B., TEIXIDO N., THANAPOULOU Z, GARRABOU J.

16:00-16:15 “**Impact of climate changes on coralligenous community in the Adriatic Sea**” par Petar **KRUŽIĆ**, RODIĆ P.

16:15-16:30 “**Long-term demographic traits of red coral populations in the NW Mediterranean: insights into management strategies**” par Ignasi **MONTERO-SERRA**, Cristina **LINARES**, GARCÍA M., PANCALDI F., FRLETA-VALIĆ M., LEDOUX J.B., ZUBERER F., MERAD D., DRAP P., GARRABOU J.

16:30-16:45 Discussion

16:45-17:15 *Pause-café*

17:15-18:15 **Session Posters (1 à 12)**

18:15-19:15 *Evènement parallèle*

“The impacts of acidification on biodiversity and other key Mediterranean ecosystems” par Patrizia **ZIVERI**

Jeudi 30 Octobre 2014

Session 3 : **Cartographie et Surveillance des habitats coralligènes et autres bioconcrétions**

08:30-08:45 “**Cartography of main coastal ecosystems (Coralligenous and Rhodolith Beds) along the Corsican Coasts**” par Marina **BONACORSI**, ALAMI S., BREAND N., CLABAUT P., DANIEL B., PERGENT G., PERGENT-MARTINI C.

- 8:45-9:00** “Coralligenous reefs in Liguria: distribution and characterization” par **Almudena CÁNOVAS MOLINA**, MONTEFALCONE M., CANESSA M., COPPO S., DIVIACCO G., MORRI C., FERRARI M., CERRANO C., ARMSTRONG R., BIANCHI C. N., BAVESTRELLO G.
- 9:00-9:15** “Assessment of coralligenous assemblages status in the Ligurian sea” par **Carlo CERRANO**, BERTOLOTTO R., COPPO S., PALMA M., PANTALEO U., VALISANO L., BAVESTRELLO G., PONTI M.
- 9:15-9:30** “Croatian coralligenous monitoring protocol: the basic methodological approach” by **Silvija KIPSON**, KALEB S., KRUZIC P., RAJKOVIC Z., ZULJEVIC A., JAKLIN A., SARTORETTO S., RODIC P., JELIC K., KRSTINIC P., ZUPAN D., GARRABOU J.
- 9:30-9:45** “A first insight into the coralligenous assemblages of the Western Sardinia Shelf (Italy)” by **Simone SIMEONE**, GUALA I., CONFORTI A., INNANGI A., FERRIGNO F., TONIELLI R., DE FALCO G.
- 9:45-10:00** “Using MaxEnt to understand and predict the distribution of coralligenous environments” by **Paula A. ZAPATA-RAMIREZ**, HUETE-STAUFFER C., COPPO S., CERRANO C.
- 10:00-10:15** “The resolution in benthic cartography: a detailed mapping technique and a Multiscale GIS approach with applications to coralligenous assemblages” by **Francesco PITITTO**, TRAINITO E., MAČIĆ V., RAIS C., **Giovanni TORCHIA**
- 10:15-10:30** Discussion
- 10:30-10:45** *Pause-café*
- Session 4 :** **Génétique des populations des formations coralligènes et autres bioconcretions**
- 10:45-11:00** “Genetic connectivity and conservation in the long-lived, harvested species *Corallium rubrum*” par **Marco ABBIATI**, COSTANTINI F., RUGIU L., CARLESI L.
- 11:00-11:15** “Population genetics of *Paramuricea clavata* (Risso, 1826) in the Eastern Adriatic Sea: implications for its conservation and management” par **Maša FRLETA-VALIĆ**, KIPSON S., LINARES C., CEBRIAN E., ANTUNES. A, LEDOUX J.B.
- 11:15-11:30** “Population genetics studies over contrasted spatial scales of two structural gorgonian species from the coralligenous: state-of-the-art and conservation implications” par **Jean-Baptiste LEDOUX**, AURELLE D., ARIZMENDI-MEJIA R., FRLETA-VALIC M., LINARES C., MOKHTAR-JAMAÏ K., PRALONG M., ANTUNES A. GARRABOU J.
- 11:30-11:45** Discussion
- Session 5 :** **Gestion des habitats coralligènes et autres bioconcrétions**
- 11:45-12:00** “Remotely operated vehicles (ROVS) as powerful tools for the evaluation of the conservation status of deep red coral banks” par **Giorgio BAVESTRELLO**, ABBIATI M., ANGIOLILLO M., BETTI F., BO M., CANESE S., CATTANEO-VIETTI R., CAU A., CORRIERO G., COSTANTINI F., GIUSTI M., PRIORI C., SALVATI E., SANDULLI R., SANTANGELO G., TUNESI L.

- 12:00-12:15** “**CIGESMED protocols: how to implement a multidisciplinary approach on a large scale for coralligenous habitats surveys**” par **Romain DAVID**, ARVANITIDIS C., ÇINAR M.E., SARTORETTO S., DOGAN A., DUBOIS S., ERGA Z., GUILLEMAIN D., THIERRY DE VILLE D’AVRAY L., ZUBERER F., CHENUIL A., FERAL J.P.
- 12:15-12:30** “**Visual and photographic methods to estimate the quality of coralligenous reefs under different human pressures**” par Luigi PIAZZI, CECCHI E., SERENA F., **Ivan GUALA**, CANOVAS MOLINA A., GATTI G., MORRI C., BIANCHI C.N., MONTEFALCONE M.
- 12:30-12:45** “**MEDTRIX: a cartographic database for marine ecology and anthropogenic pressures along the Mediterranean Coast**” par **Florian HOLON**, DELARUELLE G., BOISSERY P., DETER J.
- 12:45-13:00** Discussion
- 13:00-14:00** Déjeuner
- 14:00-14:15** “**Spatial allocation of fishing activity on coralligenous habitats in Portofino MPA (Liguria, Italy)**” par **Vasiliki MARKANTONATOU**, MARCONI M., CAPPANERA V., CAMPODONICO P., BAVESTRELLO A., CATTANEO-VIETTI R., PAPADOPOULOU N., SMITH C., CERRANO C.
- 14:15-14:30** “**An integrated approach to evaluate and monitor the conservation state of coralligenous bottoms: the INDEX-COR method**” par **Stéphane SARTORETTO**, DAVID R., AURELLE D., CHENUIL A., GUILLEMAIN D., THIERRY DE VILLE D’AVRAY L., FÉRAL J.P., ÇINAR M.E., KIPSON S., ARVANITIDIS C., SCHOHN T., DANIEL B., SAKHER S., GARRABOU J., GATTI G., BALLESTEROS E.
- 14:30-14:45** Discussion
- 14:45-16:15** Session Posters (13 à 26)
- 16:15-16:45** *Pause-café*
-
- 16:45-18:15** Table Ronde
- “**Protection of the Mediterranean coralligenous reefs: use of existing scientific knowledge & legislative framework to prevent further destruction of coralligenous habitats**” par **Anastasia MILIOU**, SENNI D., TSIMPIDIS T., TRAGANOS. D.
-
- 18:15-18:45** Remise du Prix du Meilleur Poster
- 18:45-19:30** Clôture du symposium
- 20h00** Dîner de Gala

KEYNOTE CONFERENCE

CONFERENCE INTRODUCTIVE

Jean-Pierre FERAL, ARVANITIDIS C., CHENUIL A., ÇINAR M.E., DAVID R., FREMAUX A., KOUTSOUBAS D., SARTORETTO S.

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**CIGESMED: CORALLIGENOUS BASED INDICATORS TO EVALUATE AND
MONITOR THE "GOOD ENVIRONMENTAL STATUS" OF THE
MEDITERRANEAN COASTAL WATERS, A SEASERA PROJECT
(WWW.CIGESMED.EU)**

Coralligenous is one the main shallow Mediterranean milieu generating structural complexity and biodiversity. It produces goods and services for several sectors. Pollution, anchors and trawling may cause its degradation, whilst traditional fishing as well as angling mainly affect target species. Diver frequentation is another cause of degradation. Coralligenous may also be susceptible to invasive alien species. These habitats, which are of great ecological, socio-economic and patrimonial importance, are also under the pressures caused by the global warming.

CIGESMED's (2013-2016) goal is to understand the links and consequences of natural and anthropogenic pressures to the functioning of these habitats and to define and maintain their Good Environmental Status (GES) in the Mediterranean Sea. Indexes, specific to coralligenous habitat, will be co-constructed and collectively tested by scientists, marine natural parks and reserves, through the implementation of a "citizen science" network. Among other methods, trees of knowledge will be experimented as tools to sort, organize and illustrate very large heterogeneous sets of data. CIGESMED outcome will be an integrative assessment of the GES within the Marine Strategy Framework Directive.

CIGESMED gathers scientists from France, Greece and Turkey, making it possible to access to sites and to work on the same issues in both the northwestern Mediterranean basin and the Aegean-Levantine one. Ten trained (scientific diving and ROV) laboratories of marine ecology are involved. A Committee of External Advisors (scientists, stakeholders and policy-makers), meeting at an annual basis, and aiming at providing advice on all aspects of the execution of the project is helping the scientific steering committee and is ensuring CIGESMED to meet its objectives.

ORAL COMMUNICATIONS

COMMUNICATIONS ORALES

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GENETIC CONNECTIVITY AND CONSERVATION IN THE LONG-LIVED, HARVESTED SPECIES *CORALLIUM RUBRUM*

Corallium rubrum is among the most valuable marine living resources and it has been harvested since thousands of years for the use of its calcareous skeleton in jewelry, traditional medicine, and tribal rituals. Overexploitation of the commercial banks led to depletion of the resource and decline of harvesting yields. In this study knowledge on genetic connectivity in *C. rubrum* populations is summarized, and application of genetic data to stock delineation, to a sound management policy and conservation strategies are discussed. Strong genetic structuring (including IBD patterns at regional scale) was revealed by microsatellite loci in shallow water populations of *C. rubrum* at Mediterranean scale; chaotic structuring was detected when downscaling the studies to very small spatial distances and along depth gradients. A boundary in the genetic structure of red coral populations was located across 40-50 m in depth. These results provide a clear evidence of limited connectivity, and suggest that deep coral bank can not act as refugia for shallow water populations, nor the reverse. Mitochondrial markers revealed unexpected phylogeographic patterns of structuring in deep-water populations, in contrast with shallow water ones. Red coral resources in the Mediterranean Sea consist of an array of metapopulations structured both geographically and in depth, each of which have to be considered as an evolutionary/management units. Therefore, management of the harvesting grounds has to be planned at a local scale, considering each bank as a self-recruiting population. Conservation of the resources requires the implementation of the Mediterranean Regional Management Plan, preservation of deep coral banks accessible only to ROV fishing, creation of networks of no take zones, both in shallow and in the deep sea.

Giorgio BAVESTRELLO, ABBIATI M., ANGIOLILLO M., BETTI F., BO M., CANESE S., CATTANEO-VIETTI R., CAU A., CORRIERO G., COSTANTINI F., GIUSTI M., PRIORI C., SALVATI E., SANDULLI R., SANTANGELO G., TUNESI L.

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REMOTELY OPERATED VEHICLES (ROVS) AS POWERFUL TOOLS FOR THE EVALUATION OF THE CONSERVATION STATUS OF DEEP RED CORAL BANKS

The management of the red coral, *Corallium rubrum* (L.), is an international issue still lacking of an effective solution in the Mediterranean Sea. The main goal of this research was the evaluation of the ROV efficiency as a monitoring non-destructive tool in studies concerning the conservation status of the deep red coral populations (living under 50 m depth). Both Ligurian Sea and Tuscan Archipelago are considered among the most important Italian historical sites of the red coral professional harvesting. Fishing effort in these areas is now decreased (in Liguria is virtually ceased) due to the drastic reduction of colonies of commercial size and thanks to conservation laws. Today, the protection of this natural resource has been directed mainly to coastal, shallow-water populations (living between 20 and 40 m depth), while the deeper banks, the main target of professional harvesting by technical scuba divers, still need dedicated management plans. ROV explorations allowed the identification of several deep red coral banks: in the Ligurian Sea, 6 out of 12 explored sites (50%) and in the Tuscan Archipelago, 7 out of 13 explored sites (50%). The banks may be considered almost "pristine" only around Montecristo Island. In the Ligurian Sea, the only deep population in a good conservation status is that of the Maledetti Shoal, off the Bergeggi Island MPA.

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CARTOGRAPHY OF MAIN COASTAL ECOSYSTEMS (CORALLIGENOUS AND RHODOLITH BEDS) ALONG THE CORSICAN COASTS

In the Mediterranean Sea, the improvement of knowledge on bio-concretion (bioconstructing) assemblages (coralligenous and rhodoliths beds) and particularly their distribution, is one of the priority actions identified in the Action Plan for the conservation of coralligenous and other bioconstructions in the Mediterranean. The various studies available show relatively recent and uneven knowledge across the basin regarding the distribution of coralligenous bioconstructions and very specific information about the distribution of rhodolith beds. In addition, while the methods for mapping infralittoral communities are now well mastered and standardized, methods and tools of investigation on settlements located at greater depths still require further development. A mapping program of the main assemblages and bottom types between 0 and 100 m depth has been carried out since 2010 on part of the coast of Corsica (e.g. Cap Corse, Bouches de Bonifacio). The mapped areas cover a 780 km² area of Cap Corse and 387 km² area of Bouches de Bonifacio. The available results show the significant distribution of rhodolith beds and the frequency of hard substrates, hosting coralligenous bioconstructions in the area of Cap Corse. On the contrary the area of Bonifacio would appear to be characterized by great richness in coralligenous bioconstructions but over a smaller area with regard to the rhodolith beds surface area. These results represent a significant contribution to the knowledge of the distribution of these assemblages in relation to the extent of the area occupied by the rhodolith beds in particular, and showed the importance of these two areas for conservation.

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UNEXPECTED ARTIFICIAL-REEF-LIKE EFFECT DUE TO A MEDITERRANEAN PIPELINE AND THE CONSERVATION OF TWO CIRCALITTORAL EMBLEMATIC SPECIES: *CENTROSTEPHANUS LONGISPINUS* AND *CYSTOSEIRA ZOSTEROIDES*

*The Gardanne alumina plant (western Provence, France) has since 1967 been discharging at sea bauxite residues through a pipeline with its outlet in the Cassidaigne Canyon (320 m deep), located in the Calanques National Park. Within the framework of the Barcelona Convention, discharging will end in December 2015. The question that arises is therefore: should these pipes be removed at the end of their exploitation? The two pipes were explored in May 2013 by means of a Remotely Operated Vehicle (ROV) equipped with a video camera. Outstanding species were identified and located. 344 individuals of the diadem sea urchin *Centrostephanus longispinus* were observed between 45 and 96 m depth along the pipelines. Such a high density has never been observed in the NW-Mediterranean. The brown alga *Cystoseira zosteroides* was common from the lower limit of the *Posidonia oceanica* seagrass meadow (30 m) down to 52 m depth, which represents one of the two most extensive populations within the Calanques National Park. The presence of significant populations of species of high heritage value (*C. longispinus* and *C. zosteroides*) in artificial habitats (subsea-pipelines), populations that may be more extensive than those located in natural habitats, raises questions with regard to the interest of these artificial habitats for conservation purposes, the justification for dismantling the unused pipes and the concepts of management and restoration of the marine environment.*

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CORALLIGENOUS: INSIGHTS FOR A NEW GEOMORPHOLOGICAL DEFINITION

Mediterranean marine benthic biologists refer to Coralligenous (C) de plateau as a circalittoral biocoenosis consisting of a biogenic framework forming a solid substrate settled on an originally mobile substrate. Pérès & Picard (1951) indicated that the true C de plateau develops from the coalescence of rhodoliths, although they already underlined the problem of the identification of its substrate. C de plateau falls into the “bank” category sensu Ballesteros (2006): flat frameworks mainly built over more or less horizontal substrate with lateral continuity. Actually few examples of C de plateau have been documented in literature, and present-day examples of C de plateau are much rarer than originally thought. Large areas along the Apulian coast have been investigated from the coastline down to 100 m water depth in the framework of BIOMAP project aimed at mapping the C habitat. Collected remote data have been ground-truthed by ROV and camera inspections. This large data set allowed the categorization of several morphologic types of C, all falling into the bank category: from smallest type forming isolated columns, to large platforms. Through a systematic analysis carried out on the acoustic data and thanks to the detailed scale of observation (i.e.: from 0.5 m up to tens of meters), a new morphological categorization to describe C frameworks found along the shelf is proposed.

Almudena CÁNOVAS MOLINA, MONTEFALCONE M., CANESSA M., COPPO S., DIVIACCO G., MORRI C., FERRARI M., CERRANO C., ARMSTRONG R., BIANCHI C. N., BAVESTRELLO G.
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CORALLIGENOUS REEFS IN LIGURIA: DISTRIBUTION AND CHARACTERIZATION

One of the major gaps concerning the current state of knowledge of coralligenous reefs, a key habitat in the Mediterranean Sea, is the scarcity of information on its geographical and bathymetrical distribution. This paper reviews and updates the existing knowledge on the coralligenous reefs of Liguria (NW Italy), as an essential step in view of management measures for their conservation according to the EU Marine Strategy Framework Directive. The existing information was collected from scientific publications, detailed acoustic mapping, grey literature and records of divers, to build a database on the distribution and typology (both geological and biological) of coralligenous reefs of Liguria. The database has been implemented on a GIS platform. A total of 18 coastal localities resulted to possess coralligenous reefs, ranging from 10 m to 113 m depth and covering in total an area of 146.9 ha. Seven localities are situated along the Eastern Ligurian Riviera, 11 along the Western Riviera; 41 ha (28%) are already included in marine protected areas. Three main geomorphotypes (cliffs, rockfalls and shoals) were recognized, and 13 different biological facies (6 of them not included in the EUNIS list) were identified. 61% of the localities with coralligenous reefs showed signs of impact by anchors, fishing activities, invasive species or occasional mucilaginous events. The major part of these coralligenous reefs have never been studied in detail; our preliminary inventory pointed to a major dearth of knowledge for the Western Riviera and to the need of updating the biological data for the whole Liguria.

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ASSESSMENT OF CORALLIGENOUS ASSEMBLAGES STATUS IN THE LIGURIAN SEA

The Action Plan for the conservation of coralligenous bio-constructions in the Mediterranean Sea requires widening of the inventories of sites and species, especially in deeper zones. Such data are of paramount importance and represent the baseline knowledge for the establishment of effective monitoring activities, that should be able to detect the possible effects of anthropic and natural threats. For this purpose, coralligenous assemblages in 10 sites along the Ligurian coasts were investigated by photographic and video sampling at three bathymetric ranges: 25-39, 40-70, 71-100 m. Epibenthic organisms were identified to the lowest possible taxonomical level and their abundance was estimated in terms of percent cover. Signs of injuries and diseases, as well as the presence of lost fishing lines and nets, were recorded.

Overall, 14 vegetal and 156 animal taxa were considered. Despite the assemblages were very heterogeneous, species composition varied according to geographical and bathymetrical gradients. In contrast to deep coralligenous assemblages, shallow assemblages showed higher abundance of bioconstructing species, suggesting more dynamic conditions. Deep-water assemblages revealed a higher coverage of sediment, greater signs of human impact, especially litter and lost nets and fishing lines. These results show that deep coralligenous assemblages are more vulnerable, suggesting the adoption of more stringent protective measures.

Romain DAVID, ARVANITIDIS C., ÇINAR M.E., SARTORETTO S., DOGAN A., DUBOIS S., ERGA Z., GUILLEMAIN D., THIERRY DE VILLE D'AVRAY L., ZUBERER F., CHENUIL A., FERAL J.-P.

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CIGESMED PROTOCOLS: HOW TO IMPLEMENT A MULTIDISCIPLINARY APPROACH ON A LARGE SCALE FOR CORALLIGENOUS HABITATS SURVEYS

*The European program CIGESMED addresses the Good Environmental Status of the coralligenous habitats. Its implementation on the field is firstly attempted by 4 protocols to be applied in France, Greece and Turkey. They have been tested in Marseille's region, since early 2014. These protocols are the following: (i) cartography of chosen coralligenous sites, (ii) spatial variability analysis by means of photo-quadrats and image processing, (iii) population genetics study of two common biobuilding species that may be cryptic (the bryozoan *Myriapora truncata*, and the rhodophyta *Lithophyllum cabiochiae*), and (iv) metagenomic approach of benthic species. The ultimate aim of these protocols is to link the results from the population genetics analysis and the spatial variability analysis to the sites' features thanks to the cartography. First results suggest that different clades exist for both complex of the previous species. Cartography forshadows models of repartition for species assemblages; they will then be compared between regions in the second part of the project.*

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**POPULATION GENETICS OF *PARAMURICEA CLAVATA* (RISSO, 1826)
IN THE EASTERN ADRIATIC SEA: IMPLICATIONS FOR ITS
CONSERVATION AND MANAGEMENT**

*The red gorgonian *Paramuricea clavata* is a long-lived and slow growing cnidarian. It is characterized by a fragmented distribution throughout the western Mediterranean, the Adriatic and the Aegean Sea including the neighbouring Atlantic Ocean. This species contributes significantly to the biomass and structural complexity of coralligenous assemblages. Over the last decade, *P. clavata* received particular attention due to ongoing threats that jeopardize its persistence, such as habitat destruction, invasive species, mucilaginous algal aggregates and global warming. In the western Mediterranean Sea, a global picture of the population genetic structure and diversity of the species is available. However, data is still deficient in the eastern Mediterranean region. To address this gap, we have studied for the first time the conservation genetics of *P. clavata* in the eastern Adriatic Sea. In particular, we assess genetic diversity, population genetic structure, patterns of gene flow and levels of connectivity among populations based on a hierarchical sampling scheme (13 populations belonging to 4 regions) and using seven microsatellites. Overall, our results are concordant with previous studies on *P. clavata* showing a significant pairwise genetic differentiation at the local scale in combination with isolation by distance and regional genetic clustering at the global scale. Nevertheless, we demonstrate the occurrence of four regional clusters and high and specific genetic diversity when compared to previously studied regions. Moreover, this study is among the first to furnish data on low dispersive species in the eastern Adriatic Sea, thus providing new perspectives for the creation and improvement of management plans for *Paramuricea clavata* and associated coralligenous communities in this part of the Mediterranean.*

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**ENVIRONMENTAL FACTORS EXPLAINING TAXONOMIC
HETEROGENEITY OF CORALLIGENOUS OUTCROPS ACROSS FRANCE
(NORTHWESTERN MEDITERRANEAN)**

Determining which environmental variables shape the assemblages observed at different sites remains a central question in ecology. Mediterranean coralligenous assemblages although comparable to tropical reef assemblages in terms of richness, biomass and production, are less known and studied, especially because of their presence in deep waters. Our goal is to investigate at a large scale the patterns of taxonomic diversity in relation to environmental and spatial factors. We used 120 stations sampled for sessile macro-organisms (vegetal and animal) with photographic quadrats all along the French Mediterranean coast (RECOR program). The influence of five physical environmental variables (longitude, latitude, surface temperature, turbidity, depth, sediment percent cover, crevice percent cover, biological remains percent cover) and three spatial variables (latitude, longitude, depth) was tested on the structure of taxa assemblages (relative abundance). In total, 173 taxa were identified. The species assemblages were explained at 28.75 % by the complete model: spatial factors explained 19.02 % of the variance while environmental factors explained 9.73 % of the remaining variance. The best model ($R^2=0.27$) included all the factors except two: longitude and crevice percent cover. The number of taxa was best explained by water turbidity while the shannon index was best explained by the crevice percent cover.

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MEDTRIX: A CARTOGRAPHIC DATABASE FOR MARINE ECOLOGY AND ANTHROPOGENIC PRESSURES ALONG THE MEDITERRANEAN COAST

*Biodiversity hotspot, commercial exchanges area and major touristic destination in the world, the Mediterranean sea concentrates important and paradoxical stakes. In this context, it is even more essential to analyze species and habitat distribution, environmental variables and human threats but also their correlates, and likely consequences. The spatial distribution of anthropogenic pressures is particularly interesting because this is the basis of numerous other studies: ecological indicators development, species distribution analysis, reserve design, conservation plan...But the data that we need in order to provide spatial resolution relevant for management considerations are still lacking or not easy to reach. Here we describe Medtrix (<http://www.medtrix.fr>), a cartographic platform that regroups different databases made available for marine professionals (scientists, managers, stakeholders). This meta-database is the first one available at such a good resolution (20 m for the anthropogenic pressures) all along the French Mediterranean coast and along some other countries (Tunisia, Italia). These cartographic data concern for the moment anthropogenic pressures (harbors, wastewater, population density, aquaculture), 1:5000 seabed habitat maps, marine mammals observations but also monitoring of the two most important ecosystems in Mediterranean sea: *Posidonia oceanica* seagrass (presence/absence, vitality) and coralligenous habitat (presence/absence and diversity data). The platform proposes different functionalities like editing maps but also to directly comparing sites. One of the databases is already the basis of a management tool: DONIA® application which helps yachtsmen to anchor in a safe (environment and security) way.*

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LONG-TERM MONITORING OF *CLADOCORA CAESPITOSA* REEFS IN THE COLUMBRETES ISLANDS: FROM MAPPING TO POPULATION DYNAMICS AND THREATS

*Cladocora caespitosa is the only zooxanthellate reef-building scleractinian coral endemic to the Mediterranean Sea. Today, living banks of this long-lived structural species appear to be restricted to few locations. The population of *C. caespitosa* in the Illa Grossa Bay (Columbretes Islands Marine Reserve, NW Mediterranean) has been studied and monitored continuously since 2002. The extensive field of colonies shows a cumulative cover of 2900 m² with a highly aggregated distribution and geographical isolation. Our results show that *C. caespitosa* exhibits highly parsimonious dynamics: slow growth (~2.5 mm yr⁻¹), low recruitment (~0.30 recruits m⁻² yr⁻¹) and natural mortality rates close to 1 %. The study of its reproductive biology shows that spawning occurs at the end of summer when algal cover is low, thus favouring coral larvae settlement. However, global change is rapidly altering Mediterranean marine habitats such as *Cladocora* banks, primarily through warming and the spread of invasive species. Positive thermal anomalies have severely impacted this population from 2003 to 2012, causing the necrosis of about 50 % of the area covered by this coral. On the other hand, invasive algae (*Lophocladia lallemandii* and *Caulerpa racemosa*) have overlapped their distribution with *C. caespitosa*. While no lethal effects of the invasions have been detected, sublethal effects on other stages of the corals life cycle cannot be disregarded. In long-lived corals such as *C. caespitosa*, recovery from impacts relies mostly on recruitment. However, the low recruitment rates are exceeded by the recurrent mortalities and both warming and invasive algae may have delayed and synergetic effects on the coral. These results highlight the endangerment of this species and its reefs facing rapid environmental changes.*

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CROATIAN CORALLIGENOUS MONITORING PROTOCOL: THE BASIC METHODOLOGICAL APPROACH

Development of the national coralligenous monitoring protocol has been recently initiated in Croatia in the framework of the MedMPAnet project, with intention to primarily fulfill reporting and monitoring requirements of the EU Habitat Directive (92/43/EEC). However, basic information on coralligenous habitat along the Croatian coast is still lacking, which hinders a fixed definition of the monitoring methods and metrics to be used. Instead, we propose the basic methodological approach that will enable gathering the information needed and that will serve as a basis for reformulation of the adopted methods. The proposed monitoring protocol is based on the most recent (although scarce) knowledge on the monitoring approaches for this habitat, the compilation of available information for the coralligenous thriving along the Croatian coast as well as on the results of the fieldwork devoted to testing of the monitoring methods within the project. At each site, photosampling of minimum of three areas of 2.5 m² (comprised of 10 contiguous photos of 50 x 50 cm quadrats to ensure species identification) will be combined with visual census along 10 m long horizontal transects, to gather information on habitat structure and function (species composition, habitat complexity, bioconcretion and bioerosion), as well as on the degree of impact of the main disturbances (mass mortalities, invasive species, sedimentation, mucilaginous aggregates, fishing gear). Down to 40 m depth this work will be carried out by SCUBA divers whereas the use of the Remote Operate Vehicles (ROVs) is envisaged at greater depths. The obtained information will both enhance knowledge on the coralligenous habitat along the Croatian coast and will provide an original data set to validate future indices of coralligenous health status, currently under development within other Mediterranean initiatives.

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IMPACT OF CLIMATE CHANGES ON CORALLIGENOUS COMMUNITY IN THE ADRIATIC SEA

Several episodes of mass mortalities, affecting populations of corals and other sessile invertebrates, have been recorded over the past 20 years in the eastern part of the Adriatic Sea. The coralligenous community, one of the most diverse in the Mediterranean Sea where suspension feeders are dominant, has been also strongly affected by these events. Current hypotheses about the causes of mass mortality events mostly focus on their relationship with the occurrence of distinctive climatic anomalies during the late summer and early fall, when the thermocline shifted to deeper areas, to more than 40 m depth. Their occurrence and characteristics differed among regions and years and were usually related to the local hydrological conditions. The species affected were mostly long-lived sessile epibenthic invertebrates, such as sponges, anthozoans, bivalves, bryozoans and ascidians. During the two large mass mortality events in 2003 and 2012 in the Adriatic Sea, sea temperatures reached up to 6°C above the average with prolonged water column stability during late summer, and affected approximately 30 marine species down to 40 m depth. The main goal of this study is to provide a comprehensive report on the impact of the mass mortality events by providing data on the species affected, the intensity of the impact, the depth range, and the timing of the event for three study areas in the eastern Adriatic Sea. According to the data obtained, the sites surveyed in the northern part of the Adriatic Sea were the least affected, while the sites in the central and southern Adriatic displayed the highest impact.

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POPULATION GENETICS STUDIES OVER CONTRASTED SPATIAL SCALES OF TWO STRUCTURAL GORGONIAN SPECIES FROM THE CORALLIGENOUS: STATE-OF-THE-ART AND CONSERVATION IMPLICATIONS

*The Mediterranean coralligenous is a striking example of the complex issues induced by global change. Numerous conservation biology studies using different approaches and covering various spatial, temporal and taxonomic scales have been developed in the last decades to understand the evolution of this community in the current environmental shift. In this study, we present the state-of-the-art combined with new results regarding the population genetics of two structural octocorals belonging to the coralligenous: the red coral, *Corallium rubrum*, and the red gorgonian, *Paramuricea clavata*. These two long-lived species display fragmented distributions and are characterized by a slow population dynamics and a restricted larval dispersal. Moreover, they are submitted to strong anthropogenic pressures. Our main aim here is to demonstrate how the study of neutral genetic polymorphism at different spatial scales can shed new lights on the conservation of the targeted species and associated community. First, we demonstrate the interest of comparative approaches between species at global scale (hundreds to thousands of km) to characterize the long-term evolutionary processes (gene flow and genetic drift). Then, focusing on a regional scale (tens of m to km) and combining population genetics and demographic studies, we disentangle the relative impacts of short-term evolutionary processes (connectivity and contemporary genetic drift) on the functioning of the populations studied. Finally, considering a local scale (cm to m), we further our understanding of the population biology of these species with a particular emphasis on their reproduction. We discuss the conservation implications of these results for: (i) the definition of management units (MU), (ii) the design of marine protected areas (MPA) within MUs and (iii) the restoration actions of populations within MPAs.*

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RESPONSE OF CORALLIGENOUS TO GLOBAL CHANGE: EVIDENCES FROM FIELD AND EXPERIMENTAL STUDIES IN GORGONIAN FORESTS

*Global change is one of the major concerns for the conservation of the rich biodiversity of coralligenous assemblages. In the Mediterranean Sea, there is a strong likelihood of increasing frequencies of mass mortality events linked to global warming and the spread of invasive species. Gorgonian forests, one of the most emblematic facies of coralligenous outcrops, are especially vulnerable to global change. The presentation will focus on the study of the responses of gorgonians, mainly the red gorgonian *Paramuricea clavata*, to warming and exotic algae invasions from observational and experimental approaches in NW Mediterranean Sea. Long-term monitoring of recurrent warming-induced mortalities in marine protected areas such as Cabrera Archipelago and Columbretes Islands showed that warming may act as an important driver for long-term shifts in the bathymetrical distribution of gorgonian forests. Aquaria experiments and field surveys indicate that thermal stress may also have important sublethal effects on the reproduction and the viability of early life stages of gorgonians. Additionally, manipulative experiments demonstrated that invasive algae, such as *Caulerpa cylindracea* and *Womersleyella setacea*, have the capacity to reduce gorgonian recruitment and juvenile survival. The final aim of the presentation is to discuss the future consequences of global change on the persistence and recovery of gorgonian forests, in particular, and of coralligenous assemblages in general.*

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SPATIAL ALLOCATION OF FISHING ACTIVITY ON CORALLIGENOUS HABITATS IN PORTOFINO MPA (LIGURIA, ITALY)

Coralligenous habitats are considered to be important for Mediterranean coastal biodiversity. One of the widely recognized principal threats to this habitat is recreational and artisanal fishing that may cause severe damage or mortality events to long-lived, key structural species. Consequently, the monitoring and sustainable management of fishing are the most important concerns when protecting vulnerable habitats and their biodiversity. The assessment of fishing activity in the Mediterranean region requires complicated approaches due to the increased heterogeneity and combination of gears, the variation of target species and the poor data availability. Therefore, common strategies in fisheries management have failed to capture this heterogeneity or improve understanding of fleet and effort allocation, and their impacts on benthic habitats. The present study identifies and describes the spatial and temporal patterns of selected recreational and artisanal practices having a direct physical impact on coralligenous habitats, such as nets and longlines, in Portofino MPA (Liguria Sea, Italy). Our results reveal areas vulnerable to the impact of overlapping fishing practices and may additionally provide baseline information on vulnerability and impact assessments, ecological and ecosystem modeling, fisheries resource management and conservation planning. Similar approaches could contribute to the decision-making process with regards to fishing activity and vulnerable habitats in Mediterranean MPAs.

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LONG-TERM DEMOGRAPHIC TRAITS OF RED CORAL POPULATIONS IN THE NW MEDITERRANEAN: INSIGHTS INTO MANAGEMENT STRATEGIES

*The Mediterranean red coral, *Corallium rubrum*, is an emblematic species of coralligenous assemblages which has been intensively harvested since antiquity. However, the lack of long-term studies over broad geographic scales hinders our understanding of the general dynamics of red coral populations. Based on long-term photographic series from nine populations separated from few to hundreds of kilometers across the NW Mediterranean, we estimated temporal stability, demographic traits and the main drivers of population recovery and persistence. Overall, the nine studied populations displayed a consistent pattern of high temporal stability regardless protection level and size-class distribution. The high temporal stability was driven by extremely high adult survival and low recruitment rates. Colonies suffering partial mortality from harvesting also displayed high survival rates and showed rapid signs of re-growth demonstrating a key role of this mechanism on the recovery processes of *C. rubrum*. However, despite of the persistence of the species, harvesting strongly reduced the biomass and triggered a general simplification of the affected populations. Our results demonstrate the ecological impacts of harvesting on this species and highlight the need to develop new regulations (especially in harvesting practices) to enhance the resilience of this emblematic species.*

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NEW DATA CONCERNING THE CORALLIGENOUS ATOLLS OF CAP CORSE: AN ATTEMPT TO SHED LIGHT ON THEIR ORIGIN

A new coralligenous morphotype named 'atolls' was discovered in 2011 in northern Cap Corse (Western Mediterranean Sea). With the aim of inventorying and characterizing these structures, and to attempt to shed light on their origins, two oceanographic campaigns (using e.g. side scan sonar, multibeam echosounder, sparker, ROV and submarine with 3D photogrammetry) were carried out in 2013 and 2014, in this sector, and in the south of the island in search of similar structures. Off Cap Corse, nearly one thousand atolls were identified between 105 and 130 m depth; the majority of them are situated between 110 and 125 m depth. These atolls are generally grouped (several tens to several hundred) and are to be found in two main sectors, situated between 22 and 31 km from the coast. They occur on subhorizontal bottoms, in rocky depressions occupied by coastal detritic bottom, and are 1 to 2 m thick. The average size of these atolls ranges from 20 to 25 m in diameter, but a few smaller or more extensive structures have been identified. The height of the central core ranges from 0.5 to 3.0 m, the intermediate zone, which surrounds this core, presents a width of about 10 m, and the exterior crown has a width of 1 to 5 m. No atoll was found along the south coast although the topography is similar (bathymetric patterns, presence of a seamount). Several typologies have been evidenced; these typologies could correspond to atolls at different stages of evolution in relation to phenomena of bioerosion or bioconstruction. Furthermore, the occurrence of 'fossil coralligenous' formations, between 138 and 140 m depth, with still living rhodoliths at the summit, might support the hypothesis of a biological origin, with the original formation occurring during a period when the sea level was lower, several thousand years ago.

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VISUAL AND PHOTOGRAPHIC METHODS TO ESTIMATE THE QUALITY OF CORALLIGENOUS REEFS UNDER DIFFERENT HUMAN PRESSURES

This paper aims at evaluating the effectiveness of some descriptors obtained from photographic methods and visual assessment techniques to detect changes in ecological quality of coralligenous habitat. From the photographic methods we obtained the following descriptors: i) mean number of the main taxa/morphological groups, ii) mean cover of the main taxa/groups iii). beta-diversity of assemblages. From the visual techniques we measured and estimated the following descriptors: i) mean thickness of the calcareous layer, ii) maximum height of gorgonians, iii) mean cover of the species characterizing the coralligenous upper layer, iv) percentage of epibiosis and/or necrosis in the upper layer. Surveys were carried out in sites subjected to different human-induced pressures in three areas of the north-western Mediterranean Sea, in order to evaluate effectiveness of the selected descriptors at large spatial scale (100s of kms). Results showed that some taxa identified from the photographic method decreased in sites subjected to high human pressure, while encrusting bryozoans and filamentous algae increased their abundance. From the visual technique, in the high human pressure sites, the mean thickness of the calcareous layer was lower, the abundance of some gorgonian species decreased, and some taxa/groups appeared, e.g. the erect and massive sponges. Descriptors applied with both methods were able to reveal differences across human pressure gradient and therefore could provide precious insights to determine the quality of coralligenous reefs.

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THE RESOLUTION IN BENTHIC CARTOGRAPHY: A DETAILED MAPPING TECHNIQUE AND A MULTISCALE GIS APPROACH WITH APPLICATIONS TO CORALLIGENOUS ASSEMBLAGES

Benthic maps are one of the most powerful tools of which a marine biologist may benefit. In the last decades several techniques (e.g. side scan sonar) became available at reasonable costs and allowed the total coverage of study areas. Biologists usually exploit these maps for several purposes, from biodiversity conservation to habitat modelling and forecasts. We present two case studies: the MedMPAnet study carried out in the Boka Kotorska Bay (Montenegro) and the detailed cartography of the MPA "Secche di Tor Paterno". We then illustrate a multi-zoom approach to map marine habitats and a new technique allowing to draw up high resolution cartographies (up to assemblages and species). The case studies and the acquired experiences demonstrated that the proposed approach and method are very powerful for the conservation and the management of both protected species and priority habitats (e.g. the coralligenous assemblages).

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BETA DIVERSITY PATTERNS IN NORTHERN ADRIATIC CORALLIGENOUS OUTCROPS

*Recent studies have investigated spatial and temporal variability of coralligenous assemblages on coastal rocky cliffs, while structure and variability of platform banks have been rarely investigated. In the northern Adriatic continental shelf, coralligenous biogenic reefs are scattered on sandy and muddy bottoms, and may be separated by a few tens of meters to tens of kilometres. Their benthic assemblages were investigated by photographic sampling in two main areas about 100 km away: off Chioggia-Venice and Grado-Trieste. Within each area six outcrops, 1-2 km away, were sampled. Assemblages on reefs closer to the coast were dominated by algal turfs and boring sponges, while offshore they were generally characterised by the richest and most diverse communities. Contributions to the total species richness increased with the investigated spatial scale up to areas, while variation in species diversity monotonically decreased by increasing distance. Dominant species, including the main reef builders (i.e. encrusting calcified Rhodophyta), spatially changed following a geographical pattern. Among others, coralline algae (e.g. *Lithophyllum incrustans*), sponges (e.g. *Chondrosia reniformis*) and colonial ascidians (e.g. *Polycitor adriaticus*) were the main species responsible for the observed spatial differences, in terms of species replacement (β diversity).*

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AN ECOSYSTEM-BASED APPROACH TO ASSESS THE STATUS OF THE MEDITERRANEAN CORALLIGENOUS HABITAT

Coralligenous outcrops are a Mediterranean sciaphilic habitat whose three-dimensionally layered communities develop on a basal biogenic concretion of calcareous red algae, along with a rich assemblage of sciaphilic sessile animals. The complexity of the evaluation of the ecological status of coralligenous is on a par with the complexity of this habitat. Biotic indices developed to implement the EU Water Framework Directive reflect the ecological status of the environment using species whose function, population or status depend on the quality of the water column. However, the state or achievement of good quality in a water body and the apparent health of some biological indicators are not always indicative of good structure and functioning of the whole ecosystem, even if they are key-species or ecosystem engineers. The new indices to be developed according to the Marine Strategy Framework Directive (MSFD) of the EU require an ecosystem approach, which takes into account the functioning of the ecosystem. Here, on the basis of a simplified conceptual model of the ecosystem, we propose an Ecosystem-Based Quality Index (EBQI) focused on the structure and functioning of coralligenous outcrops. The coralligenous EBQI is based upon (1) a set of representative functional compartments, (2) the weighting of these compartments and (3) the assessment of their quality by comparison with an assumed baseline. The implementation of the EBQI is non-destructive, relatively robust, according to the selection of the compartments and to their weighting, and is associated with confidence indices (both at the level of each compartment, and for the overall score), thus indicating possible weaknesses and biases in the data and therefore the need for further field data acquisition.

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AN INTEGRATED APPROACH TO EVALUATE AND MONITOR THE CONSERVATION STATE OF CORALLIGENOUS BOTTOMS: THE INDEX-COR METHOD

Coralligenous outcrops represent a "hotspot" of Mediterranean marine biodiversity. Algae and sessile invertebrate taxa (mainly sponges, cnidarians, bryozoans and tunicates) structure the associated benthic assemblages and constitute remarkable seascapes. Nevertheless, this fragile habitat is submitted to a wide array of human impacts such as sewage outfalls, eutrophication, physical impacts linked to fishing and diving activities, as well as global warming effects. The current European legislative context (EU WFD, EU Habitat Directive, EU MSFD) imposes to reach or maintain a good environmental status for marine ecosystems. In this context, the MPA stakeholders need to have robust and accessible tools allowing the evaluation of the conservation state of the habitats. Concerning coralligenous bottoms, we propose a new method based on an integrated approach taking into account (i) the ratio between sensitive and tolerant species according to human impacts, (ii) the richness of macrotaxonomic descriptors assessed from direct observation (in situ or from images) and (iii) their structural complexity (basal, intermediate and upper layers present in coralligenous bottoms). These three metrics are combined into a global index called INDEX-COR. Datasets were acquired along the French coasts. In each site, 2 transects 15m long were installed on the bottom. Along each transect, 15 photo quadrats (40 cm x 60 cm) and 1 video were recorded and notes were taken by a SCUBA diver-Observer. This method was applied between 15 and 50 meters depth and can be also performed by a ROV (Remotely Operating Vehicule) or an AUV (Autonomous Underwater Vehicle). INDEX-COR is intended to be applied to other Mediterranean areas using metrics and species lists adapted to the different regional contexts.

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A FIRST INSIGHT INTO THE CORALLIGENOUS ASSEMBLAGES OF THE WESTERN SARDINIA SHELF (ITALY)

In the context of Marine Strategy Framework Directive (MSFD, 2008/56/EC), coralligenous assemblages are considered as "special habitat type". The knowledge of their distribution and the assessment of their status can contribute to the definition of the environmental status of Mediterranean regions. Seafloor mapping was implemented through multibeam echosounder surveys and video transects in areas not formerly explored within the continental shelf along the north-western coast of Sardinia (Western Mediterranean). A high resolution digital model of the seabed (DTM) was obtained from multibeam data; the DTM was processed by using the tools of the terrain analysis to extract a number of derived variables of the seabed. Furthermore the analysis of the acoustic backscatter associated to multibeam data was used to evaluate the acoustic response of the seabed associated to different habitat types. The combination of those variables, allowed the development of maps of coralligenous distribution. The presence of coralligenous was validated in two sampling areas from 60 to 140 m depth. For each area, three random transects (about 150m length for each transect) were carried out by means of Remote Operating Vehicle (ROV) with high resolution camera. Video images were processed in order to describe the biotic component of dominant populations. The combined analysis of sonograms and video images provided information on the relevant aspects of the investigated seabeds, distinguishing between mineral and biogenic formations, highlighting their distribution, extent and conditions in terms of presence of typical species and communities. This paper reports the preliminary data of the whole study and contributes to the knowledge of deep coralligenous systems of western Sardinian coasts.

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DIVERSITY AND STRUCTURE OF CORALLIGENOUS ASSEMBLAGES DOMINATED BY *EUNICELLA CAVOLINI* (KOCH, 1887) IN THE AEGEAN SEA

*The diversity and structure of six coralligenous assemblages dominated by *Eunicella cavolini* (Octocorallia - Anthozoa) were studied in three localities of the Aegean Sea (NE Mediterranean). A standardized, rapid, non-destructive method was applied at depths ranging from 18 to 35 m. Within each site, a total area of 1.5 m² was sampled using photoquadrats (25 x 25 cm) over three 0.5 m² randomly placed transects. Number and percentage cover of conspicuous macrobenthic species were measured using the image segmentation tool provided by photoQuad. A total of 95 taxa belonging to 8 taxonomic groups were identified, with sponges and coralline algae being the dominant groups in terms of cover. Results suggest that coralligenous communities dominated by *Eunicella cavolini* of the Aegean Sea constitute a highly diverse habitat, presenting several similarities and peculiarities to their western Mediterranean counterparts. The baseline information provided in this study allows for future monitoring and comparisons at a Mediterranean-scale level.*

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BIODIVERSITY PATTERNS OF CORALLIGENOUS OUTCROPS IN THE WESTERN MEDITERRANEAN: FIRST INSIGHTS ACROSS TEMPORAL AND SPATIAL SCALES

Coralligenous outcrops are an important “hot spot” of Mediterranean biodiversity. Most of the benthic species inhabiting these outcrops are long-lived and slow-growing, thus making them especially vulnerable. The interaction between the climatic changes projected for the 21st century and other ongoing human-induced stressors, presents a major challenge to its biodiversity. Accurate studies on biodiversity over time and large spatial scales are thus required to know its current patterns, to detect changes, and to furnish predictions in developing future scenarios of biodiversity. Here, we present data from an ongoing study to estimate the diversity of macro-species of algae and invertebrates (mainly sponges, cnidarians, bryozoans and tunicates) through photographic surveys across large spatial (~36°- 43° latitude, > 1000 Km) and temporal scales (5 years). We used a hierarchical sampling procedure to measure species richness among regions, localities within regions, and sites within localities as a standardized monitoring network. The combination of large spatial and temporal approaches of this study provides an important baseline against which future effects of disturbances (e.g. warming-induced mortalities, invasive species, dramatic storms) can be assessed. Furthermore, the need for local to regional-scale biodiversity metrics and measurements, are crucial to document and assessing changes in marine biodiversity.

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USING MAXENT TO UNDERSTAND AND PREDICT THE DISTRIBUTION OF CORALLIGENOUS ENVIRONMENTS

The Marine Strategy Framework Directive (MSFD) defines monitoring goals for coralligenous environments as well as their good environmental status assessment within the Mediterranean by 2016. Developing methods to monitor and evaluate challenging ecosystems at multiple scales is a necessity and advance to achieve these goals. Habitat distribution modelling and remote sensing techniques are important tools for ecosystem based management, conservation planning and impact assessments. Therefore, we aimed to analyse the performance of the Maximum Entropy approach (MaxEnt freeware) for modelling the distribution of coralligenous habitats. We built the habitat suitability models using i) presence data collected in the Portofino Marine Protected Area (Ligurian sea) and, ii) geophysical substrate properties extracted from multibeam sonar measures (depth, slope, aspect, rugosity, and geomorphic zones) to allocate known coralligenous communities in the MPA and to forecast new undescribed areas. We conclude that predictions based on combined model results provide more realistic estimates of the core area suitable for coralligenous environments and should be the modelling approach implemented in conservation planning, monitoring activities and management.

POSTERS

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THE IMPORTANCE OF HIGH-RESOLUTION RHODOLITH BED MAPS IN THE PROTECTION OF HABITATS OF CONSERVATION VALUE

Identifying areas characterised by the presence of habitats of conservation value is crucial for the application of protection measures. The current lack of knowledge about the positioning of these areas must be addressed by producing good, up-to-date maps. For this purpose, a field survey was carried out with the aim of producing an up-to-date map of the Rhodolith beds in a pilot area selected on existing information. The survey utilized indirect (acoustic) and direct (ROV) methods. A total of 50 km² of multibeam data and 12 hours of video footage were collected. A preliminary map with four different classes of substratum was produced and result validation confirmed a good correspondence (about 60%) between the estimated habitat presence and ground-truth data. The combined MultiBeam Echo Sounder (MBES)/ROV approach allows to study wide areas in a timeframe of few days. The comparison between the obtained modelled map and the existing broad scale map shows that Rhodolith presence is not confirmed in all the zones indicated by previous cartography, and this shows the need for new high-resolution cartographies that will help to properly define where management actions should be enforced.

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MORPHO-STRUCTURAL CHARACTERIZATION OF A PARTICULAR VERMETID REEF IN NORTH OF TUNISIA

*Vermetid bioconstructions are present in the Mediterranean under different morpho-structural form among which the reef-type is the less common one and generally restricted to the eastern basin and the Sicily coasts. We report here the description of a *Dendropoma petraeum* (Monterosato) reef observed in the Cap Serat region, along the North Tunisian coasts. The described reef presents a peculiar shape linked to the particular ecological characters of the site. It occupies an ellipsoid area covering about 12 000 m² and it lies on the sandy bottom of a little bay, between 2.5 m and 4 m depth. Height of the reef is about 0.6 m at its upper limit and about 2 m at its lower one.*

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A PROTOCOL FOR THE MONITORING OF MEDITERRANEAN RHODOLITH BEDS

Mapping of Mediterranean rhodolith beds (RBs) should be focussed on areas of the seafloor with >10% cover of live calcareous red algae for a minimum surface of 500m², on 1:10000 scale. More detailed scales (at least 1:1000) should be used for monitoring selected RBs, in order to detect significant changes through time. Beside the location and areal extent, the description of a RB that could be provided by non-specialists should include the occurrence of macroscopic sedimentary structures of the seafloor, thickness of live cover, mean percentage cover of live thalli, and dominant morphologies of rhodoliths (unattached branches, pralines or boxwork rhodoliths). For the purpose of ecological status assessment and the evaluation of human-induced impacts, the protocol requires the support of specialists to add details on the assemblage composition.

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CORALLINE SPECIES COMPOSITION OF TYRRHENIAN MAERL BEDS (WESTERN MEDITERRANEAN)

The quantitative composition of three maerl beds of the Tyrrhenian Sea (Elba Is., Cilento, and Marettimo Is.) located at depth spanning 40 to 47 m, has been investigated by focussing on the volumetrically important taxa. Twelve species of corallines belonging to seven genera and two species of calcareous Peyssonnelia have been identified. The genus Lithothamnion is the richest in species and always dominant among corallines, with L. corallioides occurring at all sites. The Marettimo maerl bed hosts the highest coralline diversity.

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CHARACTERIZING CORALLIUM RUBRUM POPULATIONS OF TWO MEDITERRANEAN MPAS: STRUCTURING FACTORS AND DYNAMICS

In the frame of two MPA management (the recently enforced Calanques National Park and the 30 years-old Banyuls MPA) Corallium rubrum (Cnidaria) populations were studied in order to give managers useful data for population management. Data on morphology, recruitment and population size-structure were collected in both MPAs using novel photogrammetric methods allowing precise tridimensional measures. We assessed size structures and population dynamics and linked it to the protection levels of both MPAs. In Banyuls, morphometrics of populations revealed population characteristics typical of long lived individuals (mean colony height of 30 cm, basal diameter >2cm). Contrastingly Calanques National Park populations were characterized by biometrics typical of earlier developmental stage (e.g. smaller and thinner colonies).

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APPLICATION DE LA METHODE DE FUSION MULTI-CAPTEURS ET DE LA SISMIQUE UHR A LA CARTOGRAPHIE DU CORALLIGENE DE PLATEAU

Le concept de fusion des données multi-capteurs est innovant et très puissant. Il permet d'établir des cartographies extrêmement précises des biocénoses marines en minimisant les besoins en vérité terrain (plongeur, caméra, ROV). Les données surfaciques de micro-rugosité acoustique, l'imagerie sonar latéral HR-HP (haute résolution - haute précision) et la sismique UHR couplées aux données de classification constituent une approche surfacique innovante dans le domaine de la cartographie et l'imagerie structurelle du coralligène. Cette technique a été appliquée pour cartographier et caractériser le coralligène dans l'aire marine protégée de la côte agathoise (France) en Méditerranée Nord occidentale. La sismique UHR a permis d'imager la structure et le substrat sur lequel le coralligène se développe.

Cette approche ouvre de nouvelles perspectives pour une meilleure connaissance des surfaces, des hauteurs et du volume de l'habitat coralligène. Une étude de faisabilité est en cours afin de mesurer l'épaisseur des concrétionnements de coralligène à partir des profils sismiques.

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DISTRIBUTION AND CONSERVATION NEEDS OF A NEGLECTED ECOSYSTEM: THE MEDITERRANEAN VERMETID REEF

Vermetid reefs are a key intertidal habitat in the Mediterranean. Despite recent evidence of local extinction in the Eastern Mediterranean, their role as habitat engineers and the high numbers of ecosystem services they provide, vermetid reefs are among the least known marine habitats of the Mediterranean. Here we present a literature-based study to assess for the first time their distribution inside the basin and provide evidence of a general lack of protection at Mediterranean scale.

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MAPPING AND CHARACTERISATION OF CORALLIGENOUS BIOCONSTRUCTION USING ACOUSTIC AND VISUAL INTEGRATED APPROACH

An integrated approach, based on acoustic and visual survey techniques, has been used to map coralligenous bioconstructions along the Apulian coasts (Italy). The visual investigations proved to be essential for the identification and the characterization of such typical Mediterranean habitat.

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PRELIMINARY ASSESSMENT OF CORALLIGENOUS BENTHIC ASSEMBLAGES ACROSS THE MEDITERRANEAN SEA

*A preliminary study of coralligenous benthic assemblages was performed in 2013 at 20 sites in Turkey, Greece and France within the framework of the EU-funded project CIGESMED. At each area the most conspicuous species were recorded using in situ observations and photoquadrats. The survey revealed a total of 267 species belonging to 11 systematic groups. Within the sampled sites, algae ranked first in terms of species richness (83 species), followed by Porifera (55 species), Cnidaria (32 species), Bryozoa (22 species) and Echinodermata (21 species). A total of 172 species were encountered in France, 107 species in Turkey and 93 species in Greece. Six alien species, *Caulerpa cylindracea*, *Styopodium schimperi*, *Acrothamnion preissii*, *Womersleyella setacea*, *Amphistegina lobifera* and *Synaptula reciprocans*, were found at sampling sites. Taking into account the preliminary character of the performed surveys, the biodiversity reported herein is presumably underestimated. Species richness is expected to increase following the upcoming, more exhaustive CIGESMED surveys. The final species lists will later be critically evaluated to meet the needs for developing new biotic indices and also for applying already developed ones (e.g. Index-Cor) in order to be used by scientists, managers and stake holders for the effective monitoring and management of coralligenous communities.*

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TRAWLING IN THE STRAIT OF SICILY (CENTRAL MEDITERRANEAN SEA)... ABOVE AN UNEXPECTED MAËRL BED!

During 2012, twenty-seven hauls were randomly performed in an area of the Straits of Sicily, on board fishing vessels of Lampedusa bottom trawl fleet, at depths between 40-80 meters. The research was aimed at assessing the sustainability of the trawl fishery targeting cephalopods in the area. The retained fractions represented a small part of the total catch in weight (21%) and cephalopods represented the most abundant group reaching the 58% in weight of the retained fraction. Most of the discard, which represented almost the 80% in weight of the total catch, instead, was mainly composed by rhodoliths or Maërl (calcareous red algae) which constitute a priority habitat according to the SPA/BIO protocol (Barcelona Convention). Moreover, according to the regulation CE 1967/2006, fishing with trawl nets, dredges, shore seines or similar nets above maërl beds are prohibited. Based on the obtained results, the trawl fishery carried out in the area is not sustainable, both from an economic and ecosystem point of view. For these reasons, in our opinion, and according to the precautionary approach to fishery, further studies should be carried out in order to map this priority habitat, identify its boundaries, and then give precious information for the fishery management in the area.

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CIGESMED HABITAT'S CHARACTERIZATION: A SIMPLE AND REUSABLE TYPOLOGY AT THE MEDITERRANEAN SCALE

The so-called coralligenous makes Mediterranean marine habitats that are of the most important in terms of complexity and biodiversity. Coralligenous is formed by the development of several types of communities where bio-constructor, bio-eroder engineer and "habitat" species interact to build complex structures. The European program CIGESMED studies the Good Environmental Status (G.E.S.) of these habitats. Several protocols are implemented, in particular the cartography of abiotic context, and species observation by means of photo-quadrats. The cartography inventories the profiles types of the coralligenous sites with as robust as possible categories: depth, orientation, slope, roughness, and main coralligenous stands. The objective is to establish a link between the species occurrence features, and the profiles features in order to understand the "natural" spatial variability of coralligenous habitats.

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MACROALGAL COMPOSITION OF RHODOLITH BEDS IN A PILOT AREA OF THE TUSCAN ARCHIPELAGO (TYRRHENIAN SEA): PRIMARY ELEMENTS TO EVALUATE THE DEGREE OF CONSERVATION OF THIS HABITAT

*Multi-Beam Echo-Sound data, Remotely Operated Vehicle video-images and grab samples were collected, within the framework of the research project funded by the Italian Ministry in charge of fisheries management - MiPAAF, in order to improve the knowledge on the Italian Rhodolith Beds Habitat (RBs). The aim of this paper is to assess the composition of RBs and of their associate macroalgal epiphytes in the North Western Mediterranean Sea. The study sites are located in the Tuscan Archipelago (Tyrrhenian Sea), where RBs occur between 50 and 70 meter depth. The most frequent calcareous taxa were: *Phymatolithon calcareum*, *Lithothamnion minervae*, *Lithothamnion philippii*, *Lithophyllum racemus* and *Titanoderma pustulatum*. In all the sampled sites both the taxa of Annex V of the Habitat Directive, *P. calcareum* and/or *Lithothamnion corallioides*, were collected.*

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THE NEED OF CARTOGRAPHY FOR CORALLIGENOUS AND RHODOLITHS BEDS ALONG THE MEDITERRANEAN SEA: THE BALEARIC ISLANDS CASE

Coralligenous and rhodoliths beds are two types of biogenic habitats, structured by calcareous red algae. Widely distributed along the Mediterranean Sea, these formations create complex three-dimensional structures, where countless marine species –including those of high commercial value and endangered ones– feed, rest and nest. These characteristics confer the two habitats a great ecological and economic importance, which has motivated their protection under the European Union legislation and the development of an explicit action plan within the framework of the Barcelona Convention. During the past decades, dozens of scientific campaigns at sea have contributed to their knowledge, location and description, resulting in a substantial amount of available data about coralligenous and rhodoliths beds. The cartography of marine habitats is a necessary tool to apply certain specific conservation measures, like the closure to bottom trawling of the areas where these habitats are present (Regulation 1967/2006). Thus, the presence, characteristics and importance of these habitats are especially well known in the bottoms surrounding the Balearic Islands. A complete cartography was developed for these habitats in the Balearic area, coupling the best available scientific data (e.g. data published by the Spanish Oceanographic Institute) with the data compiled during Oceana expeditions carried out between 2006 and 2013.

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PREDICTING THE SUITABLE HABITAT OF THE RED CORAL, *CORALLIUM RUBRUM* (LINNAEUS 1758), IN RELATION TO BATHYMETRIC VARIABLES

*The red coral *Corallium rubrum* (Linnaeus, 1758) is a long-living octocoral occurring in the Mediterranean Sea and in the neighboring Eastern Atlantic Ocean on subtidal hard substrates at a depth range of 10-800 m. *C. rubrum*, due to its workable red axial calcareous skeleton, was harvested for a long time and, therefore, is nowadays considered in decline. During two combined Remotely Operated Vehicle (ROV) and Multi-Beam Echo-Sounder (MBES) surveys, held in 2012 in the Ligurian Sea and in the Tuscany Archipelago, several populations of this species were found between 50 and 200 m depth. High resolution multibeam data were analyzed and morphometric parameters were derived. These parameters were used in an Ecological Niche Factor Analysis (ENFA) to identify the most appropriate areas for coral colonization. A Terrain Suitability Map (TSM) was developed by means of the MAhalanobis DIstances Factor Analysis (MADIFA) to predict the optimal habitat. Models were applied to three sites. Rocky sites with high inclinations were identified as preferred habitat for red coral.*

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PRELIMINARY LIST OF TYPICAL/INDICATOR SPECIES WITHIN CROATIAN CORALLIGENOUS MONITORING PROTOCOL

Based on the list provided by UNEP-RAC/SPA (2011) and field data from 20 coralligenous sites along the Eastern part of the Adriatic Sea, a preliminary selection of typical/indicator species that should be monitored within the Croatian national protocol has been proposed. This list includes 37 species/categories: 2 algal builders, 13 animal builders, 2 agglomerative animals, 5 bioeroders, 13 species of particular importance and 2 invasive species/categories. To verify the existing list or to propose a more complete one, additional field research is needed, especially in the understudied southern part of the Croatian coast.

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RESPONSE OF SYMBIOTIC SCLERACTINIAN CORALS TO SEA TEMPERATURE ANOMALIES IN THE ADRIATIC SEA

*Mortality events of the corals *Cladocora caespitosa* (Linnaeus, 1767), *Madracis pharensis* (Heller, 1868) and *Balanophyllia europaea* (Risso, 1826) were recorded along the eastern coast of Adriatic Sea. Coral mortality resulted from polyp bleaching (massive zooxanthellae loss) and polyp tissue necrosis, leaving the calyx rim deprived of tissue coverage. The highest mortality rates were registered after the exceptionally hot summer of 2011, when about 30% of *C. caespitosa* and *M. pharensis* colonies were affected and more than 40% of the *B. europaea* species died, all caused by bleaching events. Similar events were found during late summers of 2003, 2007, 2008, 2009, 2011 and 2012. In most cases bleaching has been attributed to elevated temperature. Taking into account the global warming context in the Mediterranean Sea, monitoring programs of physical-chemical parameters and vulnerable coral populations should be rapidly set up.*

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RESULTS OF DIFFERENT ANTHROPIC USES ON THE STRUCTURE OF VERMETID REEFS

The biogenic vermetid reef is a key habitat of coastal ecosystems that modifies the shoreline morphology and increases the local biodiversity. Despite its ecological relevance, rarely it is subjected to an accurate management and is often exposed to several human activities.

This study aims to distinguish between the effects of different typologies of anthropic uses on the physical structure of the vermetid reef. A comparison between totally protected, partially protected and strongly anthropized reefs has been done and two variables have been analysed: the substratum complexity and the density of reef-building organism.

Both the variables show higher values in totally and partially protected reefs, demonstrating the importance of conservation strategies for the correct management of this important bioconstruction.

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GEOMORPHOMETRIC ANALYSIS OF CORALLIGENOUS HABITAT ALONG THE APULIAN CONTINENTAL SHELF: AN ASSESSMENT OF SEAFLOOR COVERAGE AND VOLUME

Within the framework of the BIOMaP Project (BIOcostruzioni Marine in Puglia, - P.O. FESR 2007/2013), promoted by Puglia region, Italy, new acoustic data were acquired in order to identify and locate Coralligenous Habitats along the Apulian continental shelf (South Adriatic Sea – Northern Ionian Sea), from 10 down to 100 meters of water depth, in 21 Site of Community Interest (SCI) and 3 Marine Protected Areas (MPA). The dataset covered an area of 1000 km² and was obtained through the use of MultiBeam Echosounder Systems (MBES) and Side Scan Sonars. Ground-truthing were collected by 3 ROV dives (Prometeo) and more than 30 underwater camera transects. We discovered that Coralligenous habitat covers a total area of roughly 450 km², representing the most relevant habitat within all the SCIs and MPAs of the Apulian continental shelf. The analysis of MBES dataset allowed us to identify several morphological expression of Coralligenous Habitat. Geomorphometric techniques (developed through proper GIS-based tools) have been thus applied on the MBES data in order to (1) figure out relationships between the observed morphologies and the associated habitat distribution and (2) quantify the total volume of selected Coralligenous build-ups. Our work underlines the importance of combining acoustic survey techniques and geomorphometric analysis in order to have a preliminary quantitative characterization of Coralligenous habitat distribution and its 3-dimensional extent. Our results offer relevant quantitative information which contribute in understanding the importance of Coralligenous habitat as carbonate deposits on the Mediterranean shelf (that has been probably underestimated, due to poor knowledge of their distribution).

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CORALLIGENOUS ASSEMBLAGES IN CABO TRES FORCAS (MOROCCO, MEDITERRANEAN)

The marine habitats surrounding Cabo Tres Forcas (Mediterranean coast of Morocco) was explored during September 2012 and 2013 in the framework of the MedMPAnet Project. The habitats distribution and its species composition were studied both by SCUBA diving and using Remote Operating Vehicle (ROV). Coralligenous assemblages were only observed below 20 meters depth in the east side of Cabo Tres Forcas, in the area of Farallones but not on the west side of the site where there are no hard bottoms below 10 m depth.. Among the most dominant and/or most emblematic species there was the cnidarians Eunicella sp., Paramuricea clavata and Savalia savaglia, which form the upper substrate. An interesting feature at Cabo Tres Forcas was the presence of coralligenous species and/or coralligenous assemblages in shallow waters. In this sense, the red gorgonian Paramuricea clavata and the gold coral Savalia savaglia were observed there from 18 m and 20 m depth, respectively.

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A NEW TOOL TO MEASURE THE 3D CORALLIGENOUS COMPLEXITY AT THE MICRON SCALE

Coralligenous bioconstruction, mainly built by overlaying calcareous algal thalli, are characterized by numerous crevices and holes hosting a high biodiversity. Here we show the internal coralligenous 3D complexity by using the X-ray computed microtomography technique and estimate its porosity. The analysed samples coming from the coralligenous of the Portofino Promontory (Ligurian Sea, Italy). We evaluate an average porosity comparable to that known for coral reefs. Moreover, a series of sections were used to evaluate the percentage of area occupied by the cryptic sponges inside the small cavities of the substrate that accounts for about 25% of the total surface of crevices. These results put in evidence how the coralligenous microcavities can actually host a rich fauna, suggesting an unexpected fundamental contribution of the cryptic community to the function of the coralligenous ecosystem.

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THE BIOGENIC FORMATION OF *CLADOCORA CAESPITOSA* (ANTHOZOA, SCLERACTINIA) DEAD CORALLITES IN THE SLOVENIAN PART OF THE GULF OF TRIESTE (NORTHERN ADRIATIC SEA)

*In the southern part of the Gulf of Trieste a biogenic plateau completely made of "subfossil" corallites of the Mediterranean stony coral (*Cladocora caespitosa*) has been recently discovered close to Cape Ronek (Slovenia). The plateau is characterized by the highest density of living coral colonies in waters off Slovenia. The preliminary data show that the biogenic formation is hosting an impressive benthic invertebrate biodiversity.*

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SIGNALISATION DE PAYSAGES MARINS REMARQUABLES DANS LES AIRES MARINES PROTÉGÉES D'ALGÉRIE : LES BIOCONCRÉTIONNEMENTS LITTORAUX

*Dans le cadre du développement des aires marines protégées le long du littoral est algérien, une évaluation du patrimoine biologique est effectuée dans les parties marines des parcs d'El Kala, Tazaet Gouraya. Les formations remarquables bioconstruites à *Lithophyllum byssoides* et à *Corallina elongata* y sont bien représentées. Tandis que dans la région de Tipaza-Chenoua, à l'ouest d'Alger, les bioconcrétions à *Dendropoma petraeum* sont bien représentées et à moindre degré les bourrelets à *Corallina elongata* et les encorbellements à *Lithophyllum byssoides*. Ces peuplements remarquables du médiolittoral devront faire l'objet d'une attention particulière dans le plan de gestion de ces parcs.*

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DISTRIBUTION OF *EUNICELLA CAVOLINI* (KOCH, 1887) ACROSS THE MEDITERRANEAN

The distribution of Eunicella cavolini (Anthozoa) was mapped based on scientific data and observers' information, in order to depict its geographical range across the Mediterranean. Moreover, an overview of scientific literature was realized to assess the current state of knowledge regarding its populations. Results show that E. cavolini displays an extensive distribution, from the Alboran to the Sea of Marmara, but is more common at the Italian, French, E Adriatic and N Aegean coasts. Populations were mainly recorded at depths of <10-40 m, but also in deeper waters up to 220 m. Although E. cavolini is regarded as one of the most common structural species of Mediterranean hard substrates, including coralligenous outcrops, scientific information regarding its population dynamics, ecology, and conservation status is very limited and restricted to certain regions of the northwestern and central Mediterranean.

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SUSPENSION FEEDER - DOMINATED CORALLIGENOUS COMMUNITIES IN THE LOWER SALINE LAYER OF THE MARMARA SEA: MAJOR OCTOCORAL ASSEMBLAGES

*This study was effectuated in the Marmara Sea where the Mediterranean waters are present after the halocline (approximately 20 m) formed by the strong salinity difference between the Aegean and Black Seas waters. Octocoral species present in the coralligenous communities were determined by scuba diving from the halocline to 40 m deep. Typical coralligenous species were found together with highly abundant atypical species: *P. macrospina* and *S. klavereni*. These two deep water Mediterranean endemic species are rarely encountered in the western Mediterranean, especially at the studied depth strate. Despite having Mediterranean waters down to 20 m, the Marmara Sea differs substantially from the Mediterranean by the constant temperature below 20 m (15°C), high turbidity and trophic regime. These characteristics and the relatively isolation of the Marmara Sea from the Mediterranean could be the factors that influence the observed differences in suspension feeder dominated coralligenous assemblages.*

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**TECHNIQUE FOR THE RAPID ASSESSMENT OF CORALLIGENOUS
FORMATIONS, COMBINING FISHERMEN KNOWLEDGE WITH BOAT-
BASED SURVEYS: AN EASTERN AEGEAN CASE STUDY**

Coralligenous reefs are a highly diverse and structurally complex habitat, which is of fundamental importance to the productivity and longevity of fish stocks. They are therefore protected by international conventions as well as EU and national legislation. Despite their protection status, the lack of mapping of their distribution in the majority of Mediterranean countries, including Greece, results in the inefficient enforcement of these laws. This pilot study aims to develop a rapid and cost effective technique for the mapping of coralligenous formations by combining the knowledge of local artisanal fishermen with boat-based surveys in the North Dodecanese region of the eastern Aegean Sea (eastern Mediterranean). A total of 73 coralligenous locations were identified and studied in a depth range between 50-87m over a seafloor area of 13.63km². The findings of this pilot methodology will allow the efficient enforcement of national and international legislation and help to promote the protection of this productive marine habitat.

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**FIRST FINDING OF A NEW ENCRUSTING CORALLINE ALGA IN THE
ADRIATIC SEA (MEDITERRANEAN)**

The genus Hydrolithon, together with Porolithon, is one of the most discussed groups of Corallinaceae, as well as one of the most poorly known. Morphological observations led to different interpretations mainly due to the lack of type material. Recently molecular surveys on the phylogeny of Corallinales supported the hypothesis of considering Hydrolithon and Porolithon as two distinct genera, but, up to now, several taxonomic questions remain partially unanswered. In this study we report the discovery of a new non-geniculate encrusting species found along the coast of Vis Island, Croatia, Adriatic Sea. Morphological observations suggest that the specimens could belong to the Hydrolithon/Porolithon complex. Molecular analyses based on the nuclear 18S rDNA (SSU) and the plastidial psbA markers were carried out. This finding represents the first report of this new coralline alga in the Mediterranean Sea.