Meeting of Experts on the finalization of the Classification of benthic marine habitat types for the Mediterranean region and the Reference List of Marine and Coastal Habitat Types in the Mediterranean

Rome, Italy, 22-23 January 2019

Agenda item 5: Draft Updated Reference List of Marine Habitat Types for the Mediterranean region

Draft Updated Reference List of Marine Habitat Types for the Mediterranean region

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Draft Updated Reference List of Marine Habitat Types for the Mediterranean region
LITTORAL

MA1.5 Littoral rock

MA1.51 Supralittoral rock

MA1.51a Supralittoral euryhaline and eurythermal pools (enclave of mediolittoral)

MA1.51b Wracks of dead leaves of macrophytes

MA1.52 Mediolittoral caves

MA1.53 Upper mediolittoral rock

- MA1.531 Association with encrusting Corallinales (e.g. belts of *Lithophyllum bissoides*, *Neogoniolithon* spp.)
- MA1.533 Facies with the Bivalvia *Patella ferruginea* or *Patella nigra*

MA1.54 Lower mediolittoral rock

- MA1.541 Association with encrusting Corallinales (e.g. belts of *Lithophyllum bissoides*, *Neogoniolithon* spp.)
- MA1.542 Association with Fucales
- MA1.544 Facies with *Pollicipes pollicipes*
- MA1.545 Facies with Vermetidae (*Dendropoma* spp.) (vermetid reefs)
- MA1.54a Mediolittoral euryhaline and eurythermal pools (enclave of infralittoral)

MA2.5 Littoral biogenic habitat

- MA2.51 Lower mediolittoral biogenic habitat
  - MA2.511 Association with encrusting Corallinales (platforms)
  - MA2.512 Facies with *Sabellaria* spp. (reefs of *Sabellaria*)
  - MA2.513 Facies with Vermetidae (*Dendropoma* spp.) (vermetid reefs)
  - MA2.51a Banks of dead leaves of macrophytes (*banquette*)

MA3.5 Littoral coarse sediment

- MA3.51 Supralittoral coarse sediment
  - MA3.511 Association with macrophytes
  - MA3.51a Banks of dead leaves of macrophytes (*banquette*)

- MA3.52 Mediolittoral coarse sediment
  - MA3.521 Association with marine angiosperms
  - MA3.52a Banks of dead leaves of macrophytes (*banquette*)

MA4.5 Littoral mixed sediment

- MA4.51 Supralittoral mixed sediment
  - MA4.511 Association with macrophytes
  - MA4.51a Banks of dead leaves of macrophytes (*banquette*)

- MA4.52 Mediolittoral mixed sediment
MA4.521 Association with marine angiosperms
MA4.52a Banks of dead leaves of macrophytes (*banquette*)

MA5.5 Littoral sand
MA5.51 Supralittoral sands
MA5.511 Association with macrophytes
MA5.51a Banks of dead leaves of macrophytes (*banquette*)
MA5.52 Mediolittoral sands
MA5.521 Association with marine angiosperms
MA5.52a Banks of dead leaves of macrophytes (*banquette*)

MA6.5 Littoral mud
MA6.51 Supralittoral mud
MA6.511 Association with macrophytes
MA6.52 Mediolittoral mud
MA6.52a Lagoons and estuaries
MA6.521a Association with halophytes (*Salicornia* spp.) or marine angiosperms
(e.g. *Zostera noltei*, *Ruppia maritima*)

**INFRALITTORAL**

MB1.5 Infralittoral rock
MB1.51 Algal-dominated infralittoral rock
MB1.51a Well illuminated infralittoral rock, exposed
MB1.511a Association with Fucales
MB1.513.a Association with the encrusting Corallinales *Titanoderma trochanter* or *Tenarea tortuosa*
MB1.514a Association with indigenous Mediterranean *Caulerpa* spp.
MB1.516a Facies with Scleractinia (e.g. *Cladocora caespitosa*)
MB1.51b Moderately illuminated infralittoral rock, exposed
MB1.512b Association with indigenous Mediterranean *Caulerpa* spp.
MB1.515b Facies with Scleractinia (e.g. *Astroides calycularis*)
MB1.51c Well illuminated infralittoral rock, sheltered
MB1.511c Association with Fuales
MB1.514c Association with indigenous Mediterranean *Caulerpa* spp.
MB1.516a Facies with Scleractinia (e.g. *Cladocora caespitosa*)
MB1.51d Moderately illuminated infralittoral rock, sheltered
MB1.512d Association with indigenous Mediterranean *Caulerpa* spp.
MB1.514d Facies with Alcyonacea (e.g. *Eunicella* spp.)
MB1.51e Lower infralittoral rock moderately illuminated

MB1.511e Association with Fucales
MB1.512e Association with Laminariales (kelp beds)
MB1.513e Association with indigenous Mediterranean Caulerpa spp.
MB1.515e Facies with Alcyonacea (e.g. Eunicella spp.)
MB1.516e Facies with Scleractinia (e.g. Cladocora caespitosa)

MB1.52 Invertebrate-dominated infralittoral rock

MB1.52a Moderately illuminated infralittoral rock, sheltered

MB1.521a Association with indigenous Mediterranean Caulerpa spp.
MB1.523a Facies with Scleractinia (e.g. Astroides calycularis, Cladocora caespitosa, Polycyathus muellerae, Pourtalosmilia anthophyllites)
MB1.524a Facies with Alcyonacea (e.g Eunicella spp., Paramuricea clavata, Corallium rubrum)

MB1.53 Infralittoral rock affected by sediments

MB1.531 Facies with large and erect sponges (e.g. Axinella polypoides, Axinella cannabina)
MB1.532 Facies with Scleractinia (e.g. Cladocora caespitosa)
MB1.533 Facies with Alcyonacea (e.g. Eunicella spp., Leptogorgia spp.)

MB1.54 Euryhaline and eurythermal lagoons

MB1.541 Association with Fucales

MB1.55 Coralligenous (enclave of circalitoral, see MC1.51)
MB1.56 Semi-dark caves and overhangs (see MC1.53 for examples of reference associations and facies)

MB2.5 Infralittoral biogenic habitat

MB2.51 Reefs in algal-dominated habitat

MB2.511 Facies with Vermetidae (Dendropoma spp.) (vermetid reefs)

MB2.52 Reefs on fine sand in very shallow waters

MB2.521 Facies with Sabellaria spp. (reefs of Sabellaria)

MB2.53 Seagrass meadows

MB2.531 Posidonia oceanica meadow on rock
MB2.532 Posidonia oceanica meadow on matte
MB2.533 Posidonia oceanica meadow on sand, coarse or mixed sediment
MB2.534 Dead matte of Posidonia oceanica
MB2.535 Fringing reef, barrier reef, atolls of Posidonia oceanica
MB2.536 Association of *Posidonia oceanica* with *Cymodocea nodosa* or *Caulerpa* spp.
MB2.537 Association of *Cymodocea nodosa* or *Caulerpa* spp. with dead matte of *Posidonia oceanica*
MB2.538 Facies with the Bivalvia *Pinna nobilis*

**MB3.5** Infralittoral coarse sediment
- **MB3.51** Infralittoral coarse sediment mixed by waves
  - **MB3.511** Association with rhodolithes
- **MB3.52** Infralittoral coarse sediment under the influence of bottom currents
  - **MB3.521** Association with maërl (e.g. *Lithothamnion* spp., *Neogoniolithon* spp., *Lithophyllum* spp., *Spongites fruticulosa*)
  - **MB3.522** Association with rhodolithes

**MB5.5** Infralittoral sand
- **MB5.52** Well sorted fine sand
  - **MB5.521** Association with marine angiosperms
- **MB5.53** Fine sand in sheltered waters
  - **MB5.531** Association with marine angiosperms
  - **MB5.532** Association with indigenous Mediterranean *Caulerpa* spp.
  - **MB5.538** Facies of *Tritia neritea* and nematodes (in hydrothermal vents)

**MB5.4** Euryhaline and eurythermal lagoons
- **MB5.541** Association with marine angiosperms or other halophyta
- **MB5.542** Association with Fucales

**MB6.5** Infralittoral mud sediment
- **MB6.51** Euryhaline and eurythermal lagoons
  - **MB6.511** Association with marine angiosperms or other halophyta

**CIRCALITTORAL**

**MC1.5** Circalittoral rock
- **MC1.51** Coralligenous
  - **MC1.51a** Algal-dominated coralligenous
    - **MC1.512a** Association with Fucales or Laminariales
    - **MC1.514a** Association with *Ptilophora mediterranea* or *Schimmelmannia schousboet*
  - **MC1.51b** Invertebrate-dominated coralligenous
    - **MC1.512b** Facies with large and erect sponges (e.g. *Spongia lamella*, *Sarcotragus foetidus*, *Axinella* spp.)
MC1.514b Facies with Alcyonacea (e.g. *Eunicella* spp., *Leptogorgia* spp., *Paramuricea* spp., *Corallium rubrum*)
MC1.516b Facies with the Zoantharia *Savalia savaglia*
MC1.517b Facies with Scleractinia (e.g. *Dendrophyllia* spp., *Leptopsammia pruvoti*, *Madracis pharensis*)
MC1.518b Facies with Vermetidae and/or Serpulidae reefs
MC1.519b Facies with Bryozoa (e.g. *Reteporella grimaldii*, *Pentapora fascialis*)
MC1.51c Invertebrate-dominated coralligenous covered by sediment
   See MC1.51b for reference associations and facies

MC1.52 Shelf edge rock
   MC1.52a Coralligenous outcrops
      MC1.523a Facies with Alcyonacea (e.g. *Alcyonium* spp., *Eunicella* spp.,
      *Leptogorgia* spp., *Paramuricea* spp., *Corallium rubrum*)
      MC1.524a Facies with Antipatharia (black corals forest, e.g. *Antipathella subpinnata*)
      MC1.525a Facies with Scleractinia (e.g. *Dendrophyllia* spp., *Madracis pharensis*)
      MC1.526a Facies with Bryozoa (e.g. *Reteporella grimaldii*, *Pentapora fascialis*)
   MC1.52b Coralligenous outcrops covered by sediment
      See MC1.52a for reference associations and facies

MC1.52c Deep banks
   MC1.521c Facies with Antipatharia (black corals forest, e.g. *Antipathella subpinnata*)
   MC1.522c Facies with Alcyonacea (e.g. *Nidalia studeri*)
   MC1.523c Facies with Scleractinia (e.g. *Dendrophyllia* spp.)

MC1.53 Semi-dark caves and overhangs
   MC1.53a Walls and tunnels
      MC1.531a Facies with sponges (e.g. *Axinella* spp., *Chondrosia reniformis*, *Petrosia ficiformis*)
      MC1.533a Facies with Alcyonacea (e.g. *Eunicella* spp., *Paramuricea* spp., *Corallium rubrum*)
      MC1.534a Facies with Scleractinia (e.g. *Leptopsammia pruvoti*, *Phyllangia mouchezii*)
      MC1.536a Facies with Bryozoa (e.g. *Reteporella grimaldii*, *Pentapora fascialis*)
   MC1.53b Ceilings
      See MC1.53a for reference facies

MC1.53c Detritic bottom
See MC3.51 for reference associations and facies
MC1.53d Brackish water caves or caves subjected to freshwater runoff
   MC1.531d Facies with *Lithistida* spp. sponges

MC2.5 Circalittoral biogenic habitat
   MC2.51 Coralligenous platforms
      MC2.512 Association with Fucales
      MC2.515 Facies with large and erect sponges (e.g. *Spongia lamella*, *Sarcotragus foetidus*, *Axinella* spp.)
      MC2.517 Facies with Alcyonacea (e.g. *Alcyonium* spp., *Eunicella* spp., *Leptogorgia* spp., *Paramuricea* spp., *Corallium rubrum*)
      MC2.518 Facies with the Zoantharia *Savalia savaglia*
      MC2.519 Facies with Scleractinia (e.g. *Dendrophyllia* spp., *Madracis pharensis*, *Phyllangia mouchezii*)
      MC2.520 Facies with Vermetidae and/or Serpulidae reefs
      MC2.521 Facies with Bryozoa (e.g. *Reteporella grimaldii*, *Pentapora fascialis*)

MC3.5 Circalittoral coarse sediment
   MC3.51 Coastal detritic bottoms (without rhodoliths)
      MC3.511 Association with Laminariales
      MC3.512 Facies with Alcyonacea (e.g. *Alcyonium* spp., *Eunicella* spp., *Leptogorgia* spp.)
      MC3.513 Facies with Pennatulacea (e.g. *Pennatula* spp., *Virgularia mirabilis*)
      MC3.516 Facies with Bryozoa (e.g. *Tubricellepora incrassata*, *Frondipora verrucosa*, *Pentapora fascialis*)
      MC3.517 Facies with Crinoidea (e.g. *Leptometra* spp.)
   MC3.52 Coastal detritic bottoms with rhodoliths
      MC3.521 Association with maërl (e.g. *Lithothamnion* spp., *Neogoniolithon* spp., *Lithophyllum* spp., *Spongites fruticulosa*)
      MC3.522 Association with *Peyssonnelia* spp.
      MC3.523 Association with Laminariales
      MC3.525 Facies with Alcyonacea (e.g. *Alcyonium* spp., *Paralcyonium spinulosum*)
      MC3.526 Facies with Pennatulacea (e.g. *Veretillum cynomorium*)

MC4.5 Circalittoral mixed sediment
   MC4.51 Muddy detritic bottoms
      MC4.512 Facies with Alcyonacea (e.g. *Alcyonium* spp., *Spinimuricea* spp.)
      MC4.513 Facies with Pennatulacea (e.g. *Veretillum cynomorium*)

MC5.5 Circalittoral sand
MC5.513 Facies with Crinoidea (e.g. *Leptometra* spp.)

MC6.5 Circalittoral mud sediment

MC6.51 Coastal terrigenous muds

MC6.511 Facies with Alcyonacea (e.g. *Alcyonium* spp.)

MC6.512 Facies with Pennatulacea (e.g. *Pennatula* spp., *Virgularia mirabilis*)

**OFFSHORE CIRCALITTORAL**

MD1.5 Offshore circalittoral rock

MD1.51 Offshore circalittoral rock invertebrate-dominated

MD1.513 Facies with large and erect sponges (e.g. *Spongia lamella, Axinella* spp.)

MD1.514 Facies with Alcyonacea (e.g. *Alcyonium* spp., *Callogorgia verticillata, Ellisella paraplexauroides, Eunicella* spp., *Leptogorgia* spp., *Paramuricea* spp., *Swiftia pallida, Corallium rubrum*)

MD1.515 Facies with Antipatharia (black corals forest, e.g. *Antipathella subpinnata*)

MD1.516 Facies with Scleractinia (e.g. *Dendrophyllia* spp., *Madracis pharensis*)

MD1.518 Facies with the Zoantharia *Savalia savaglia*

MD1.522 Facies with Bryozoa (e.g. *Myriapora truncata, Pentapora fascialis*)

MD1.52 Offshore circalittoral rock invertebrate-dominated covered by sediments

See MD1.51 for reference associations and facies

MD1.53 Deep offshore circalittoral banks

MD1.531 Facies with Antipatharia (black corals forest, e.g. *Antipathella subpinnata*)

MD1.532 Facies with Alcyonacea (e.g. *Nidalia* spp.)

MD1.533 Facies with Scleractinia (yellow corals forest, e.g. *Dendrophyllia* spp.)

MD2.5 Offshore circalittoral biogenic habitat

MD2.51 Offshore reefs

MD2.511 Facies with Vermetidae and/or Serpulidae reefs

MD3.5 Offshore circalittoral coarse sediment

MD3.51 Offshore circalittoral detritic bottoms

MD3.512 Facies with the Bivalvia *Neopycnodonte* spp.

MD3.515 Facies with Crinoidea (e.g. *Leptometra* spp.)

MD4.5 Offshore circalittoral mixed sediment

MD4.51 Offshore circalittoral detritic bottoms on shelf edge

MD4.512 Facies with the Bivalvia *Neopycnodonte* spp.

MD4.515 Facies with Crinoidea (e.g. *Leptometra* spp.)
MD5.5 Offshore circalittoral sand
   MD5.512 Facies with the Bivalvia *Neopycnodonte* spp.
   MD5.515 Facies with Crinoidea (e.g. *Leptometra* spp.)

MD6.5 Offshore circalittoral mud
   MD6.51 Coastal terrigenous sticky muds
      MD6.511 Facies with Pennatulacea (e.g. *Pennatula* spp., *Virgularia mirabilis*)
      MD6.513 Facies with the Bivalvia *Neopycnodonte* spp.

**UPPER BATHYAL**

ME1.5 Upper bathyal rock
   ME1.51 Upper bathyal rock invertebrate-dominated
      ME1.512 Facies with large and erect sponges (e.g. *Spongia lamella, Axinella* spp.)
      ME1.513 Facies with Antipatharia (black corals forest, *Antipathes* spp., *Leiopathes glaberrima, Parantipathes larix*)
      ME1.514 Facies with Alcyonacea (e.g. *Acanthogorgia* spp., *Callogorgia verticillata, Placogorgia* spp., *Swiftia pallida, Corallium rubrum*)
      ME1.515 Facies with Scleractinia (yellow corals forest, e.g. *Madrepora oculata, Desmophyllum cristagalli, Lophelia pertusa, Madracis pharensis*)
      ME1.516 Facies with Cirripeda (e.g. *Megabalanus* spp., *Pachylasma giganteum*)
      ME1.517 Facies with Crinoidea (e.g. *Leptometra* spp.)
      ME1.518 Facies with the Bivalvia *Neopycnodonte* spp.
   ME1.52 Caves and ducts in total darkness (enclave of lower bathyal)
      ME1.52a Muddy bottom
      ME1.52b Walls and ceilings
      ME1.52c Walls and ceilings in anchialine environments

ME2.5 Upper bathyal biogenic habitat
   ME2.51 Upper bathyal reefs
      ME2.512 Facies with large and erect sponges (e.g. *Leiodermatium* spp.)
      ME2.513 Facies with Scleractinia (white corals forest, e.g. *Madrepora oculata, Desmophyllum cristagalli*)
      ME2.514 Facies with the Bivalvia *Neopycnodonte* spp.
      ME2.515 Facies with Serpulidae reefs (e.g. *Serpula vermicularis*)
   ME2.52 Thanatocoenosis of the white corals (on seamounts)
      See ME1.51 for reference facies

ME3.5 Upper bathyal coarse sediment
ME3.511 Facies with Alcyonacea (e.g. *Alcyonium* spp., *Chironephthya mediterranea*, *Paralcyonium spinulosum*, *Paramuricea* spp., *Villogorgia bebrycoides*)

ME4.5 Upper bathyal mixed sediment

ME4.511 Facies with the Bivalvia *Neopycnodonte* spp.

ME5.5 Upper bathyal sand

ME5.51 Upper bathyal detritic sand

ME5.512 Facies with Pennatulacea (e.g. *Pennatula* spp., *Pteroeides griseum*)

ME5.513 Facies with Crinoidea (e.g. *Leptometra* spp.)

ME5.515 Facies with the Bivalvia *Neopycnodonte* spp.

ME5.517 Facies with Bryozoa

ME6.5 Upper bathyal muds

ME6.512 Facies with Pennatulacea (e.g. *Pennatula* spp., *Funiculina quadrangularis*)

ME6.513 Facies with Alcyonacea (e.g. *Isidella elongata*)

ME6.514 Facies with Scleractinia (yellow corals forest, e.g. *Dendrophyllia* spp.; white corals forest, e.g. *Madrepora oculata*, *Desmophyllum cristagalli*)

ME6.516 Facies with Crinoidea (e.g. *Leptometra* spp.)

ME6.518 Facies with the Bivalvia *Neopycnodonte* spp.

ME6.521 Facies with Bryozoa (e.g. *Candidae* spp., *Kinetoskias* spp.)

ME6.522 Facies with giant Foraminifera (e.g. *Astrorhizida*)

**LOWER BATHYAL**

MF1.5 Lower bathyal rock

MF1.512 Facies with Alcyonacea (e.g. *Isidella elongata*)

MF1.513 Facies with Scleractinia (yellow corals forest, e.g. *Dendrophyllia* spp.; white corals forest, e.g. *Madrepora oculata*, *Desmophyllum cristagalli*, *Lophelia pertusa*)

MF1.52 Caves and ducts in total darkness

MF2.5 Lower bathyal biogenic habitat

MF2.51 Lower bathyal reefs

MF2.511 Facies with Scleractinia (yellow corals forest, e.g. *Dendrophyllia* spp.; white corals forest, e.g. *Madrepora oculata*, *Desmophyllum cristagalli*, *Lophelia pertusa*)

MF2.52 Thanatocoenosis of the white corals (on seamounts)

See MF1.5 for reference facies

MF6.5 Lower bathyal muds
MF6.51 Sandy muds
   MF6.512 Facies with Alcyonacea (e.g. *Isidella elongata*)
   MF6.514 Facies with Pennatulacea (e.g. *Pennatula* spp.)

MF6.52 Compact muds
   MF6.522 Facies with Alcyonacea (e.g. *Isidella elongata*)
   MF6.524 Facies with Pennatulacea (e.g. *Pennatula* spp., *Funiculina quadrangularis*)

**ABYSSAL**

MG1.5 Abyssal rock
   MG1.512 Facies with Alcyonacea

MG6.5 Abyssal mud
   MG6.512 Facies with Alcyonacea (e.g. *Isidella elongata*)

The following specific geomorphologic / hydrologic features were not considered in this list because their presence is independent from the depth zone and the substrate type:
A. Hydrothermal vents
B. Cold seeps (methane and sulfide)
C. Freshwater resurgences
D. Seamounts
E. Canyons