**Supplemental 1: EMU distribution**

a

b

Figure S1: a) Map of EMUs in the Pacific with a close up of Hawaii. b) Subset of EMUs highlighting their distribution across the Pacific.

**Supplemental 2: Datasets**

Table S2.1: List of the datasets that have provided octocoral data to the Deep Sea Coral Data Portal (DSCDP)

|  |  |
| --- | --- |
| **Data Source from DSCRDP** | **# Records** |
| Monterey Bay Aquarium Research Institute | 56244 |
| NOAA, Southwest Fisheries Science Center, Santa Cruz | 13556 |
| Hawaii Undersea Research Laboratory | 12052 |
| NOAA, Alaska Fisheries Science Center | 5553 |
| NOAA, Olympic Coast National Marine Sanctuary | 4850 |
| NOAA, Northwest Fisheries Science Center | 3596 |
| NOAA, Deep Sea Coral Research & Technology Program and Office of Ocean Exploration and Research | 2526 |
| Smithsonian Institution, National Museum of Natural History | 1539 |
| Pante, Eric | 785 |
| NOAA, Office of Ocean Exploration and Research | 514 |
| NOAA, Southwest Fisheries Science Center, La Jolla | 463 |
| NOAA, Center for Coastal Monitoring and Assessment | 392 |
| NOAA, Cordell Bank National Marine Sanctuary | 359 |
| Oceana and Marine Applied Research & Exploration (MARE) | 281 |
| California Academy of Sciences | 219 |
| NOAA, Channel Islands National Marine Sanctuary | 158 |
| Bishop Museum, Invertebrate Zoology Collection | 83 |
| NOAA, Gulf of Farallones National Marine Sanctuary | 45 |
| New Zealand National Institute of Water and Atmospheric Research (NIWA) | 31 |
| Thoma, Jana | 31 |
| Santa Barbara Museum of Natural History | 25 |
| Museum of Comparative Zoology, Harvard University | 22 |
| Ocean Biogeographic Information System, USA | 18 |
| Washington State University | 17 |
| SeamountsOnline (Seamount Biota) | 12 |
| Santiago, Herrera | 2 |
| National Museum of Natural Science, Taichung, Taiwan (NMNS) | 1 |

Table S2.2: List of the datasets that have provided octocoral data to OBIS

|  |  |
| --- | --- |
| **Dataset Name from OBIS** | **# Records** |
| Vulnerable marine ecosystems in the South Pacific Ocean region | 2880 |
| NMNH Invertebrate Zoology Collections | 1197 |
| Video Annotation and Reference System (VARS) database | 1069 |
| Hexacorallians of the World | 150 |
| Ocean Genome Resource | 133 |
| DFO Pacific Groundfish Synoptic Trawl Surveys | 115 |
| SeamountsOnline (Seamount Biota) | 95 |
| NORFANZ Biological Survey, Tasman Sea, Australia - New Zealand 2003 | 84 |
| SOMBASE BIOCONSTRUCTORS | 82 |
| Bishop Museum Data (OBIS distribution) | 70 |
| CSIRO, Cruise SS200702, Marine Biodiversity Survey, Southeast Australia, 2007 | 70 |
| Cold water corals | 54 |
| Benthic species from the tropical Pacific surrounding New Caledonia | 29 |
| COMARGIS: Information System on Continental Margin Ecosystems | 24 |
| New Zealand fish and squid distributions from research bottom trawls 1964-2008 | 18 |
| CSIRO, Cruise SS200001, Marine Biodiversity, South and Southeast Australia, 2001 | 17 |
| CSIRO, Cruise SS199701, Marine Biological Survey, South Tasmania, Southeast Australia, 1997 | 15 |
| CSIRO Survey TT200801 - ROV Jason cruise tn228: South and East of Tasmania | 11 |
| Gwaii Haanas Invertebrates | 11 |
| Asia-Pacific Dataset | 10 |
| Biological observations from the Discovery Investigations 1925-1952 | 8 |
| Records from the NIWA AllSeaBio database | 8 |
| EPA'S EMAP Database | 5 |
| CRED Rapid Ecological Assessments of Coral Population in the Pacific Ocean 2007-2010 | 3 |
| ChEssBase | 1 |
| Marine biological observation data from coastal and offshore surveys around New Zealand | 1 |
| Museums Victoria Marine Invertebrates Collection | 1 |

**Supplemental 3: List of Genera**

Table S3: List of Genera with the number of records for each

| **Genus** | **# of Records** |
| --- | --- |
| Heteropolypus | 38223 |
| Funiculina | 21098 |
| Swiftia | 20711 |
| Umbellula | 17496 |
| Paragorgia | 17259 |
| Anthomastus | 10435 |
| Halipteris | 9280 |
| Corallium | 8026 |
| Narella | 6357 |
| Plumarella | 6128 |
| Isidella | 5893 |
| Parastenella | 5141 |
| Anthoptilum | 4338 |
| Gersemia | 3234 |
| Pennatula | 3079 |
| Callogorgia | 2737 |
| Chrysogorgia | 2625 |
| Acanthogorgia | 2474 |
| Lepidisis | 2429 |
| Primnoa | 2331 |
| Calibelemnon | 2255 |
| Thouarella | 2174 |
| Keratoisis | 1931 |
| Acanella | 1545 |
| Calcigorgia | 1128 |
| Calyptrophora | 1000 |
| Paracalyptrophora | 857 |
| Stylatula | 727 |
| Clavularia | 691 |
| Metallogorgia | 661 |
| Arthrogorgia | 601 |
| Paracis | 557 |
| Muriceides | 551 |
| Psammogorgia | 548 |
| Chromoplexaura | 510 |
| Ptilosarcus | 411 |
| Pseudoanthomastus | 400 |
| Eunicella | 366 |
| Virgularia | 340 |
| Bebryce | 339 |
| Paracorallium | 323 |
| Iridogorgia | 274 |
| Siphonogorgia | 254 |
| Anthothela | 213 |
| Keroeides | 202 |
| Kophobelemnon | 178 |
| Alcyonium | 151 |
| Anthomuricea | 146 |
| Dendronephthya | 140 |
| Sibogagorgia | 138 |
| Veretillum | 132 |
| Acanthoptilum | 120 |
| Bathyalcyon | 119 |
| Alaskagorgia | 115 |
| Adelogorgia | 114 |
| Candidella | 114 |
| Tokoprymno | 96 |
| Telestula | 88 |
| Distichoptilum | 86 |
| Euplexaura | 81 |
| Perissogorgia | 80 |
| Rhodaniridogorgia | 79 |
| Taiaroa | 76 |
| Bellonella | 74 |
| Hemicorallium | 74 |
| Radicipes | 73 |
| Villogorgia | 73 |
| Paramuricea | 72 |
| Viminella | 67 |
| Telesto | 66 |
| Pleurocorallium | 64 |
| Nicella | 54 |
| Minuisis | 52 |
| Mopsea | 50 |
| Protoptilum | 45 |
| Primnoisis | 42 |
| Rhodelinda | 42 |
| Nidalia | 39 |
| Primnoella | 39 |
| Scleronephthya | 38 |
| Gyrophyllum | 35 |
| Orstomisis | 33 |
| Stachyptilum | 33 |
| Cryogorgia | 32 |
| Placogorgia | 32 |
| Sarcodictyon | 31 |
| Thesea | 30 |
| Chathamisis | 29 |
| Melithaea | 29 |
| Echinoptilum | 28 |
| Annella | 25 |
| Sinularia | 25 |
| Pterostenella | 24 |
| Astrogorgia | 23 |
| Chironephthya | 22 |
| Convexella | 22 |
| Junceella | 21 |
| Eleutherobia | 20 |
| Iciligorgia | 20 |
| Muricella | 20 |
| Isidoides | 19 |
| Cyclomuricea | 14 |
| Pseudothesea | 13 |
| Echinisis | 12 |
| Metafannyella | 12 |
| Victorgorgia | 12 |
| Leptogorgia | 11 |
| Paralemnalia | 11 |
| Cyathopodium | 10 |
| Klyxum | 10 |
| Microprimnoa | 10 |
| Xenia | 9 |
| Briareum | 8 |
| Cladiella | 8 |
| Dichotella | 8 |
| Gorgonia | 8 |
| Sarcophyton | 8 |
| Solenocaulon | 8 |
| Paraminabea | 7 |
| Pteroeides | 7 |
| Sclerisis | 7 |
| Cespitularia | 6 |
| Chelidonisis | 6 |
| Dasystenella | 6 |
| Ellisella | 6 |
| Hicksonella | 6 |
| Isis | 6 |
| Menella | 6 |
| Pseudochrysogorgia | 6 |
| Pseudoplumarella | 6 |
| Capnella | 5 |
| Cornularia | 5 |
| Litophyton | 5 |
| Primnoeides | 5 |
| Verrucella | 5 |
| Ainigmaptilon | 4 |
| Callozostron | 4 |
| Echinogorgia | 4 |
| Eugorgia | 4 |
| Fannyella | 4 |
| Gorgonisis | 4 |
| Homophyton | 4 |
| Lissopholidisis | 4 |
| Myriozotisis | 4 |
| Plumigorgia | 4 |
| Protodendron | 4 |
| Pseudothelogorgia | 4 |
| Tubipora | 4 |
| Acanthoprimnoa | 3 |
| Anthelia | 3 |
| Anthogorgia | 3 |
| Circinisis | 3 |
| Drifa | 3 |
| Heteroxenia | 3 |
| Paracanthoisis | 3 |
| Parisis | 3 |
| Rumphella | 3 |
| Sclerobelemnon | 3 |
| Subergorgia | 3 |
| Tanyostea | 3 |
| Acanthoisis | 2 |
| Briareopsis | 2 |
| Cavernulina | 2 |
| Chondronephthya | 2 |
| Chunella | 2 |
| Ctenocella | 2 |
| Dentomuricea | 2 |
| Duva | 2 |
| Echinomuricea | 2 |
| Eknomisis | 2 |
| Heliania | 2 |
| Heliopora | 2 |
| Ktenosquamisis | 2 |
| Lemnalia | 2 |
| Lepidomuricea | 2 |
| Minabea | 2 |
| Muricellisis | 2 |
| Nephthyigorgia | 2 |
| Notisis | 2 |
| Peltastisis | 2 |
| Renilla | 2 |
| Rhytisma | 2 |
| Stereonephthya | 2 |
| Tesseranthelia | 2 |
| Trimuricea | 2 |
| Alertigorgia | 1 |
| Coronephthya | 1 |
| Discogorgia | 1 |
| Epiphaxum | 1 |
| Jasminisis | 1 |
| Muricea | 1 |
| Narelloides | 1 |
| Pleurogorgia | 1 |
| Pteronisis | 1 |
| Scleracis | 1 |
| Stephanogorgia | 1 |
| Versluysia | 1 |

**Supplemental 4  
List of genera within provinces**

Table S4.1: Number of genera in each MEOW Ecoregion

| **ECOREGION** | **# of genera** |
| --- | --- |
| Outside of MEOW regions | 79 |
| Hawaii | 65 |
| Northeastern New Zealand | 55 |
| Central New Zealand | 50 |
| Chatham Island | 48 |
| Lord Howe and Norfolk Islands | 45 |
| Torres Strait Northern Great Barrier Reef | 39 |
| Northern California | 38 |
| New Caledonia | 35 |
| Three Kings-North Cape | 35 |
| Mariana Islands | 33 |
| Southern California Bight | 33 |
| Kermadec Island | 32 |
| Oregon, Washington, Vancouver Coast and Shelf | 30 |
| Aleutian Islands | 28 |
| Eastern Philippines | 28 |
| Banda Sea | 26 |
| Bassian | 23 |
| Bounty and Antipodes Islands | 22 |
| Central Kuroshio Current | 22 |
| Line Islands | 21 |
| Eastern Galapagos Islands | 19 |
| Eastern Bering Sea | 18 |
| North American Pacific Fijordland | 18 |
| Channels and Fjords of Southern Chile | 17 |
| Gulf of Alaska | 17 |
| Macquarie Island | 17 |
| Palawan/North Borneo | 17 |
| Marshall Islands | 16 |
| Snares Island | 16 |
| Halmahera | 15 |
| Lesser Sunda | 15 |
| Auckland Island | 13 |
| Cape Howe | 13 |
| Coral Sea | 13 |
| South New Zealand | 13 |
| Sulawesi Sea/Makassar Strait | 13 |
| Cortezian | 12 |
| South Kuroshio | 11 |
| Western Galapagos Islands | 10 |
| Bismarck Sea | 9 |
| Central and Southern Great Barrier Reef | 7 |
| West Caroline Islands | 7 |
| Central Chile | 6 |
| Kamchatka Shelf and Coast | 6 |
| East China Sea | 5 |
| Fiji Islands | 5 |
| Vanuatu | 5 |
| Central Peru | 4 |
| Cocos Islands | 4 |
| Sea of Japan/East Sea | 4 |
| Sea of Okhotsk | 4 |
| Solomon Archipelago | 4 |
| Solomon Sea | 4 |
| South China Sea Oceanic Islands | 4 |
| Tweed-Moreton | 4 |
| Papua | 3 |
| Araucanian | 2 |
| Guayaquil | 2 |
| Samoa Islands | 2 |
| Bonaparte Coast | 1 |
| Campbell Island | 1 |
| Chiapas-Nicaragua | 1 |
| East Caroline Islands | 1 |
| Humboldtian | 1 |
| Juan Fernandez and Desventuradas | 1 |
| Magdalena Transition | 1 |
| Mexican Tropical Pacific | 1 |
| Northeastern Honshu | 1 |
| Northern Galapagos Islands | 1 |
| Society Islands | 1 |
| Southern China | 1 |
| Southern Cook/Austral Islands | 1 |

Table S4.2: Number of genera in each Lower Bathyal Province

|  |  |
| --- | --- |
| **Lower Bathyal Province** | **# of genera** |
| 12 | 124 |
| 6 | 121 |
| 14 | 67 |
| 3 | 58 |
| 10 | 52 |
| 7 | 29 |
| 8 | 29 |
| 5 | 2 |

Table S4.3: Number of genera in each Mesopelagic Province

|  |  |
| --- | --- |
| **Mesopelagic Provinces** | **# of genera** |
| Southern Central Pacific | 86 |
| Tasman Sea | 84 |
| Northern Central Pacific | 83 |
| Coral Sea | 81 |
| Indo-Pacific Pocket Basins | 54 |
| Circumglobal Subtropical Front | 51 |
| California Current | 48 |
| Subantarctic | 47 |
| Pacific Subarctic | 39 |
| Eastern Tropical Pacific | 28 |
| Equatorial Pacific | 12 |
| Peru Upwelling/Humboldt Current | 9 |
| South China Sea | 9 |
| Sea of Japan | 5 |

Table S4.4: Number of genera in each EMU

|  |  |
| --- | --- |
| **Ecological Marine Units** | **# of genera** |
| Outside EMUs | 189 |
| 3 | 44 |
| 8 | 53 |
| 10 | 59 |
| 11 | 28 |
| 13 | 5 |
| 19 | 49 |
| 24 | 3 |
| 26 | 35 |
| 30 | 6 |
| 31 | 3 |
| 33 | 81 |
| 35 | 1 |
| 36 | 75 |
| 37 | 63 |

**Supplemental 5:   
Depth distribution of Octocoral genera**



Figure S5: Distribution of the number of the records of Upper Bathyal Octocoral genera by depth

**Supplemental 6**

ab 

c d 

e f 

g h 

i j 

Figure S6: Distribution of top 10 most recorded octocorals in the Pacific: Anthomastus (a), Corallium (b), Funiculina (c), Halipteris (d), Heteropolypus (e), Narella (f), Paragorgia (g), Plumarella (h), Swiftia (i), Umbellula (j)

**Supplemental 7  
Full dendrogram of MEOW ecoregion clustering**



Figure S7: Hierarchical clustering of the MEOW Ecoregions using Sorensen’s index of similarity based on genera of octocorals. Dashed red lines on tree represent non-significant clustering and solid lines represent significant clusters (SIMPROF test with 5% significance

**Supplemental 8: MEOW Provinces**



Figure S8: Map of the main MEOW provinces in the Pacific (from Spalding et al., 2007)