Supplementary Material

**Supplementary information 1** List of specimens analyzed in this study, collected during the cruises SO276/MerMet17-6 (IceAGE 3) and MSM75 (IceAGE RR)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample ID | Station | Gear | Study ID | Subclass | Area | Station date | Latitude | Longitude | Depth [m] |
| 580 | 54 | ROV | IA3 cor01 | Octocorallia | 3A | 04.07.2020 | 64.84360 | -9.61298 | 2040.8 |
| 586 | 54 | ROV | IA3 cor02 | Octocorallia | 3A | 04.07.2020 | 64.84360 | -9.61298 | 2040.8 |
| 591 | 54 | ROV | IA3 cor03 | Octocorallia | 3A | 04.07.2020 | 64.83467 | -9.62867 | 1837 |
| 617 | 54 | ROV | IA3 cor04 | Octocorallia | 3A | 04.07.2020 | 64.84682 | -9.60657 | 2034.8 |
| 699 | 64 | ROV | IA3 cor05 | Octocorallia | 3B | 05.07.2020 | 64.87425 | -9.62720 | 1021 |
| 737 | 66 | ROV | IA3 cor06 | Octocorallia | 5 | 06.07.2020 | 64.06320 | -14.29050 | 302.4 |
| 739 | 66 | ROV | IA3 cor07 | Octocorallia | 5 | 06.07.2020 | 64.05240 | -14.26162 | 207.1 |
| 749 | 66 | ROV | IA3 cor08 | Octocorallia | 5 | 06.07.2020 | 64.06320 | -14.29048 | 225.3 |
| 973 | 86 | BC | IA3 cor09 | Octocorallia | 4 | 07.07.2020 | 64.45860 | -11.38795 | 412 |
| 975 | 86 | BC | IA3 cor10 | Octocorallia | 4 | 07.07.2020 | 64.45860 | -11.38795 | 412 |
| 978 | 92 | ROV | IA3 cor11 | Hexacorallia | 5 | 08.07.2020 | 63.85415 | -13.74887 | 666.6 |
| 980 | 92 | ROV | IA3 cor13 | Hexacorallia | 5 | 08.07.2020 | 63.85532 | -13.75845 | 583.8 |
| 981 | 92 | ROV | IA3 cor14 | Hexacorallia | 5 | 08.07.2020 | 63.85630 | -13.75845 | 583.9 |
| 1011 | 97 | ROV | IA3 cor15 | Octocorallia | 5 | 09.07.2020 | 63.87340 | -14.00258 | 295.1 |
| 1015 | 97 | ROV | IA3 cor16 | Octocorallia | 5 | 09.07.2020 | 63.87340 | -14.00258 | 295.1 |
| 1019 | 97 | ROV | IA3 cor17 | Octocorallia | 5 | 09.07.2020 | 63.87340 | -14.00258 | 295.1 |
| 1023 | 97 | ROV | IA3 cor18 | Octocorallia | 5 | 09.07.2020 | 63.87340 | -14.00258 | 295.1 |
| 1027 | 97 | ROV | IA3 cor19 | Octocorallia | 5 | 09.07.2020 | 63.87340 | -14.00258 | 295.1 |
| 1028 | 97 | ROV | IA3 cor20 | Hexacorallia | 5 | 09.07.2020 | 63.88035 | -13.98273 | 315.1 |
| 1032 | 97 | ROV | IA3 cor21 | Octocorallia | 5 | 09.07.2020 | 63.53880 | -14.00827 | 275 |
| 1034 | 97 | ROV | IA3 cor22 | Hexacorallia | 5 | 09.07.2020 | 63.88207 | -13.97753 | 301.3 |
| 1035 | 97 | ROV | IA3 cor23 | Hexacorallia | 5 | 09.07.2020 | 63.88207 | -13.97755 | 300 |
| 1056 | 97 | ROV | IA3 cor24 | Hexacorallia | 5 | 09.07.2020 | 63.87340 | -14.00258 | 295.1 |
| 1168 | 103 | ROV | IA3 cor25 | Hexacorallia | 7 | 12.07.2020 | 60.23327 | -29.14312 | 662.5 |
| 1222 | 106 | ROV | IA3 cor27 | Octocorallia | 7 | 13.07.2020 | 60.23208 | -29.14878 | 660 |
| 1223 | 106 | ROV | IA3 cor28 | Octocorallia | 7 | 13.07.2020 | 60.23260 | -29.14910 | 665.1 |
| 1224 | 106 | ROV | IA3 cor29 | Octocorallia | 7 | 13.07.2020 | 60.23172 | -29.14610 | 655.5 |
| 1226 | 106 | ROV | IA3 cor30 | Octocorallia | 7 | 13.07.2020 | 60.23160 | -29.14570 | 667.9 |
| 1231 | 106 | ROV | IA3 cor31 | Octocorallia | 7 | 13.07.2020 | 60.23252 | -29.15007 | 659.3 |
| 1562 | 54 | ROV | IA3 cor32 | Octocorallia | 3A | 04.07.2020 | 64.83555 | -9.62535 | 1872 |
| 1605 | 112 | ROV | IA3 cor33 | Octocorallia | 7 | 14.07.2020 | 60.23377 | -29.14178 | 657.5 |
| 1637 | 97 | ROV | IA3 cor34 | Hexacorallia | 5 | 09.07.2020 | 63.88207 | -13.97753 | 301.3 |
| 1643 | 97 | ROV | IA3 cor36 | Hexacorallia | 5 | 09.07.2020 | 63.88073 | -13.98258 | 314.3 |
| 1649 | 106 | ROV | IA3 cor37 | Hexacorallia | 7 | 13.07.2020 | 60.23230 | -29.14930 | 661.9 |
| 1651 | 56 | BC | IA3 cor38 | Octocorallia | 3B | 04.07.2020 | 64.89185 | -9.63415 | 680 |
| 2239 | 54 | ROV | IA3 cor39 | Octocorallia | 3A | 04.07.2020 | 64.83465 | -9.62868 | 1837 |
| 253 | 149 | ROV | IARR cor253 | Octocorallia | 107 | 28.07.2018 | 59.25123 | -30.485033 | 867 |
| 258 | 149 | ROV | IARR cor258 | Octocorallia | 107 | 28.07.2018 | 59.25123 | -30.485016 | 867 |
| 260 | 149 | ROV | IARR cor260 | Octocorallia | 107 | 28.07.2018 | 59.25108 | -30.488866 | 869 |
| 267 | 161 | ROV | IARR cor267 | Hexacorallia | 107 | 29.07.2018 | 59.32401 | -30.550716 | 1226 |
| 271 | 149 | ROV | IARR cor271 | Octocorallia | 107 | 28.07.2018 | 59.24786 | -30.488983 | 869 |
| 286 | 188 | ROV | IARR cor286 | Octocorallia | 106 | 01.08.2018 | 60.23713 | -29.136116 | 681 |
| 251 | 149 | ROV | IARR cor251 | Octocorallia | 107 | 28.07.2018 | 59.24786 | -30.488983 | 869 |
| 550 | 80 | ROV | IARR cor550 | Octocorallia | 107 | 17.07.2018 | 59.25991 | -30.4432 | 1001 |
| 403 | 80 | ROV | IARR cor403 | Hexacorallia | 107 | 17.07.2018 | 59.26088 | -30.44675 | 966 |
| 329 | 67 | ROV | IARR cor329 | Octocorallia | 106 | 13.07.2018 | 60.24765 | -29.1379 | 718 |
| 326 | 67 | ROV | IARR cor326 | Octocorallia | 106 | 13.07.2018 | 60.24765 | -29.1379 | 718 |
| 527 | 111 | ROV | IARR cor527 | Octocorallia | 107 | 20.07.2018 | 59.2898 | -30.446966 | 980 |
| 561 | 127 | ROV | IARR cor561 | Hexacorallia | 108 | 24.07.2018 | 57.68811 | -32.729483 | 1579 |

**Supplementary information 2** List of determined families, genera, and species by in situ images, colony shape, BLASTN matches and metadata of the samples

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sample ID | Study ID | Subclass | Family | Genus | Species |
| 580 | IA3 cor01 | Octocorallia | Nephtheidae | *Gersemia* | *sp. 1* |
| 586 | IA3 cor02 | Octocorallia | Nephtheidae | *Gersemia* | sp. 1 |
| 591 | IA3 cor03 | Octocorallia | Nephtheidae | Unidentified | sp. 1 |
| 617 | IA3 cor04 | Octocorallia | Nephtheidae | *Gersemia* | sp. 1 |
| 699 | IA3 cor05 | Octocorallia | Nephtheidae | Unidentified | sp. 2 |
| 737 | IA3 cor06 | Octocorallia | Primnoidae | *Primnoa* | cf. *resedaeformis* |
| 739 | IA3 cor07 | Octocorallia | Primnoidae | *Primnoa* | cf. *resedaeformis* |
| 749 | IA3 cor08 | Octocorallia | Primnoidae | *Primnoa* | cf. *resedaeformis* |
| 973 | IA3 cor09 | Octocorallia | Nephtheidae | Unidentified | sp. 3 |
| 975 | IA3 cor10 | Octocorallia | Nephtheidae | *Gersemia* | sp. 2 |
| 978 | IA3 cor11 | Hexacorallia | Caryophylliidae | *Desmophyllum* | *pertusum* |
| 980 | IA3 cor13 | Hexacorallia | Caryophylliidae | *Desmophyllum* | *pertusum* |
| 981 | IA3 cor14 | Hexacorallia | Caryophylliidae | *Desmophyllum* | *pertusum* |
| 1011 | IA3 cor15 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 1015 | IA3 cor16 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 1019 | IA3 cor17 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 1023 | IA3 cor18 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 1027 | IA3 cor19 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 1028 | IA3 cor20 | Hexacorallia | Caryophylliidae | *Desmophyllum* | *pertusum* |
| 1032 | IA3 cor21 | Octocorallia | Primnoidae | *Primnoa* | cf. *resedaeformis* |
| 1034 | IA3 cor22 | Hexacorallia | Oculinidae | *Madrepora* | *oculata* |
| 1035 | IA3 cor23 | Hexacorallia | Oculinidae | *Madrepora* | *oculata* |
| 1056 | IA3 cor24 | Hexacorallia | Parazoanthidae | *Savalia* | *savaglia* |
| 1168 | IA3 cor25 | Hexacorallia | Oculinidae | *Madrepora* | *oculata* |
| 1222 | IA3 cor27 | Octocorallia | Paragorgiidae | *Paragorgia* | *arborea* |
| 1223 | IA3 cor28 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 1224 | IA3 cor29 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 1226 | IA3 cor30 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 1231 | IA3 cor31 | Octocorallia | Clavulariidae | *Clavularia* | cf. *borealis* |
| 1562 | IA3 cor32 | Octocorallia | Nephtheidae | Unidentified | sp. 1 |
| 1605 | IA3 cor33 | Octocorallia | Clavulariidae | *Clavularia* | cf*. borealis* |
| 1637 | IA3 cor34 | Hexacorallia | Oculinidae | *Madrepora* | *oculata* |
| 1643 | IA3 cor36 | Hexacorallia | Oculinidae | *Madrepora* | *oculata* |
| 1649 | IA3 cor37 | Hexacorallia | Caryophylliidae | *Desmophyllum* | *dianthus* |
| 1651 | IA3 cor38 | Octocorallia | Nephtheidae | *Gersemia* | sp. 3 |
| 2239 | IA3 cor39 | Octocorallia | Nephtheidae | *Gersemia* | sp. 4 |
| 253 | IARR cor253 | Octocorallia | Paragorgiidae | *Paragorgia* | *arborea* |
| 258 | IARR cor258 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 260 | IARR cor260 | Octocorallia | Anthothelidae | Unidentified | sp. |
| 267 | IARR cor267 | Hexacorallia | Caryophylliidae | *Desmophyllum* | *pertusum* |
| 271 | IARR cor271 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 286 | IARR cor286 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 251 | IARR cor251 | Octocorallia | Paragorgiidae | *Paragorgia* | *arborea* |
| 550 | IARR cor550 | Octocorallia | Plexauridae | *Paramuricea* | *placomus* |
| 403 | IARR cor403 | Hexacorallia | Leiopathidae | *Leiopathes* | sp. |
| 329 | IARR cor329 | Octocorallia | Paragorgiidae | *Paragorgia* | *arborea* |
| 326 | IARR cor326 | Octocorallia | Paragorgiidae | *Paragorgia* | *arborea* |
| 527 | IARR cor527 | Octocorallia | Acanthogorgiidae | *Acanthogorgia* | sp. |
| 561 | IARR cor561 | Hexacorallia | Caryophylliidae | *Desmophyllum* | *pertusum* |
| Total | 49 | 2 | 11 | min. 12 | 17 |



**Supplementary information 3** The phylogenetic tree of Octocorallia and Scleractinia based on Bayesian analysis of concatenated sequence data from 41 specimens for the mitochondrial genes mtMutS and COI. Bayesian posterior probabilities are indicated above the branches. The tree is intended to indicate the different relationship of the Nephtheidae as opposed to the maximum likelihood analysis, which is why the remaining individuals of Octocorallia and Scleractinia are shown in collapsed branches.