Supplementary Material

**Supplementary material 1**. Details of pelagic trawl deployments during the three cruises and corresponding bottom and sampling depths (Geoffroy et al., 2019).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cruise | Station | Date | Towing time (min) | Position | Bottom depth (m) | Sampling depth (m) |
| 1 | S1 | 14.01.2016 | 80 | 80o 50’N17o 26’E | 206 | 150 |
|  | S2 | 16.01.2016 | 20 | 80o 38’N13o 33’E | 420 | 350 |
|  | S3 | 16.01.2016 | 31 | 80o 25’N13o 03’E | 216 | 143 |
|  |  |  |  |  |  |  |
| 2 | S1 | 27.08.2016 | 20 | 80o 17’N22o 15’E | 268 | 145 |
|  | S2 | 27.08.2016 | 23 | 80o 48’N18o 31’E | 137 | 35 |
|  | S3 | 28.08.2016 | 20 | 80o 54’N17o 20’E | 430 | 120 |
|  | S4 | 28.08.2016 | 27 | 80o 59’N16o 41’E | 966 | 320 |
|  | S5 | 28.08.2016 | 29 | 80o 49’N15o 52’E | 1746 | 500 |
|  | S6 | 29.08.2016 | 23 | 80o 41’N14o 49’E | 729 | 560 |
|  |  |  |  |  |  |  |
| 3 | S1 | 11.01.2017 | 24 | 80o 38’N13o 48’E | 199 | 155 |
|  | S2 | 11.01.2017 | 20 | 80o 38’N12o 48’E | 1055 | 245 |
|  | S3 | 13.01.2017 | 20 | 81o 21’N14o 40’E | 2267 | 200 |
|  | S4 | 14.01.2017 | 25 | 80o 56’N17o 36’E | 363 | 220 |
|  | S5 | 14.01.2017 | 20 | 80o 19’N22o 13’E | 223 | 90 |
|  | S6 | 16.01.2017 | 20 | 79o 43’N11o 05’E | 215 | 112 |

**Supplementary material 2**. Pairwise difference in biodiversity index values between different stations within each cruise. Error bars represent 95% confidence intervals (CIs). Red circles and corresponding CIs highlights significant difference between the two stations, whereas green circles and their CIs represent stations without significant difference in biodiversity index values.

Chart, scatter chart

Description automatically generated

**Supplementary material 3**. Pairwise difference in dominance curves between the stations within cruise 1. Dashed lines are 95% confidence intervals.

Chart, line chart

Description automatically generated

**Supplementary material 4**. Pairwise difference in dominance curves between the stations within cruise 2. Dashed lines are 95% confidence intervals.

Diagram, engineering drawing

Description automatically generated

**Supplementary material 5**. Pairwise difference in dominance curves between the stations within cruise 3. Dashed lines are 95% confidence intervals.

Diagram, engineering drawing

Description automatically generated

**Supplementary material 6.** Species dominance values *dij* according to species dominance patterns (Eq.(8)) for each station of cruise 1. Values in parentheses represent 95% confidence intervals.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Species ID** | **Species name** | **Station 1** | **Station 2** | **Station 3** |
| 1 | *Acanthostepheia malmgreni* | - | - | - |
| 2 | *Actozenus risso* | - | - | - |
| 3 | *Aglantha digitale* | - | - | - |
| 4 | *Anarhichas lupus* | - | - | - |
| 5 | *Boreo cucumis* | - | - | - |
| 6 | *Boreogadus saida* | 0.38 (0.21-0.57) | 0.5 (0.13-1.01) | 0.12 (0-0.35) |
| 7 | *Clione limacina* | - | - | - |
| 8 | Unidentified ctenophores | - | - | 1.62 (0.81-2.54) |
| 9 | *Cyanea capillata* | 0.49 (0.3-0.7) | 2.14 (1.13-3.15) | - |
| 10 | *Euchirella maxima* | - | - | - |
| 11 | *Gadus morhua* | - | - | 0.12 (0-0.35) |
| 12 | *Gammarus wilkitzkii* | - | - | - |
| 13 | *Gonatus fabricii* | 0.04 (0-0.11) | 0.25 (0-0.63) | - |
| 14 | *Icelus bicornis* | - | - | - |
| 15 | Unidentified isopod | 0.02 (0-0.06) | - | 0.12 (0-0.35) |
| 16 | *Lebbeus polaris* | 0.02 (0-0.06) | - | - |
| 17 | *Leptagonus decagonus* | - | - | - |
| 18 | *Leptoclinus maculatus* | 0.57 (0.36-0.78) | 0.5 (0.13-1.01) | - |
| 19 | *Liparis* spp. | - | - | - |
| 20 | *Mallotus villosus* | 0.49 (0.32-0.7) | - | - |
| 21 | *Meganyctiphanes norvegica* | - | 76.8 (73.77-79.7) | - |
| 22 | *Melanogrammus aegelfinus* | - | 0.25 (0-0.63) | - |
| 23 | *Mertensia ovum* | - | - | - |
| 24 | *Myctophidae* sp. | 0.13 (0.04-0.23) | 1.13 (0.5-2.02) | 0.12 (0-0.35) |
| 25 | *Onisimus* sp. | - | - | - |
| 26 | *Pasiphaea* sp. | - | - | - |
| 27 | *Pandalus borealis* | 0.21 (0.08-0.34) | - | - |
| 28 | *Pasiphaea multidenta* | - | 0.25 (0-0.76) | - |
| 29 | *Reinhardtius hippoglossoides* | - | - | - |
| 30 | *Sebastes* spp. | 21.15 (20.03-22.31) | 9.33 (7.44-11.48) | 22.63 (19.86-25.64) |
| 31 | *Eusergestes arcticus* | - | - | - |
| 32 | Siphonophore | 0.02 (0-0.06) | - | - |
| 33 | *Themisto abyssorum* | 2.64 (2.22-3.11) | 4.04 (2.65-5.55) | 3.12 (2.08-4.39) |
| 34 | *Themisto libellula* | 3.43 (2.92-3.91) | 4.79 (3.28-6.31) | 5.2 (3.81-6.7) |
| 35 | *Thysanoessa* spp.(mainly *T. inermis*) | 70.42 (69.13-71.73) | - | 66.97 (63.63-70.09) |
| 36 | *Triglops murrayi* | - | - | - |
| 37 | *Catablema multicirratum* | - | - | - |
| 38 | *Clupea harengus* | - | - | - |
| 39 | *Periphylla* | - | - | - |
| 40 | *Apherusa glacialis* | - | - | - |
| 41 | *Hyperia galba* | - | - | - |
| 42 | Unidentified decapod | - | - | - |
| 43 | *Anonyx* sp. | - | - | - |
| 44 | *Sabinea septemcarinata* | - | - | - |

**Supplementary material 7.** Species dominance values *dij* according to Eq.(8) for each station of cruise 2. Values in parentheses represent 95% confidence intervals.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Species ID** | **Species name** | **Station 1** | **Station 2** | **Station 3** | **Station 4** | **Station 5** | **Station 6** |
| 1 | *Acanthostepheia malmgreni* | - | - | - | - | - | - |
| 2 | *Actozenus risso* | - | - | 0.01 (0-0.02) | 0.02 (0.01-0.03) | 0.02 (0-0.03) | - |
| 3 | *Aglantha digitale* | - | 1.47 (0.59-2.5) | - | - | - | 0.02 (0.01-0.03) |
| 4 | *Anarhichas lupus* | 0.1 (0.05-0.18) | 0.44 (0-1.03) | - | 0 (0-0.01) | 0 (0-0.01) | - |
| 5 | *Boreo cucumis* | - | - | - | - | - | - |
| 6 | *Boreogadus saida* | 0.81 (0.65-1.01) | 2.95 (1.77-4.27) | 0.15 (0.1-0.21) | 0.07 (0.05-0.1) | 0.08 (0.05-0.12) | 0.02 (0.01-0.03) |
| 7 | *Clione limacina* | 0.07 (0.02-0.14) | 0.29 (0-0.74) | - | - | - | 0.01 (0-0.02) |
| 8 | Unidentified ctenophores | - | - | - | - | - | - |
| 9 | *Cyanea capillata* | - | 2.36 (1.18-3.53) | 0.01 (0-0.02) | - | - | 0.06 (0.05-0.08) |
| 10 | *Euchirella maxima* | - | - | - | - | - | - |
| 11 | *Gadus morhua* | - | - | 0.08 (0.04-0.12) | 0 (0-0.01) | 0.01 (0-0.03) | - |
| 12 | *Gammarus wilkitzikii* | - | - | - | - | - | - |
| 13 | *Gonatus fabricii* | 0.36 (0.24-0.49) | 0.29 (0-0.74) | 0.01 (0-0.02) | 0.01 (0-0.03) | 0.06 (0.03-0.09) | 0 (0-0.01) |
| 14 | *Icelus bicornis* | 0.05 (0-0.09) | - | 0.01 (0-0.03) | - | - | 0.07 (0.05-0.08) |
| 15 | Unidentified isopod | - | - | - | - | - | - |
| 16 | *Lebbeus polaris* | - | - | - | - | - | - |
| 17 | *Leptagonus decagonus* | - | 0.15 (0-0.44) | - | - | - | - |
| 18 | *Leptoclinus maculatus* | 11.76 (11.06-12.45) | 4.12 (2.8-5.74) | 0.04 (0.01-0.07) | 0.05 (0.03-0.08) | - | - |
| 19 | *Liparis* spp*.* | - | - | - | - | - | 0.01 (0.01-0.02) |
| 20 | *Mallotus villosus* | - | - | - | - | - | - |
| 21 | *Meganyctiphanes norvegica* | - | 0.44 (0-0.88) | 15.6 (15.02-16.13) | 2.76 (2.59-2.92) | 42.64 (42.03-43.23) | 0.11 (0.09-0.13) |
| 22 | *Melanogrammus aegelfinus* | 0.33 (0.22-0.45) | 0.29 (0-0.74) | 0.01 (0-0.02) | 0.02 (0.01-0.04) | 0.01 (0-0.02) | - |
| 23 | *Mertensia ovum* | 0.46 (0.33-0.61) | - | - | - | - | - |
| 24 | *Myctophidae* sp*.* | - | 0.15 (0-0.59) | 0.16 (0.11-0.23) | 0.09 (0.06-0.12) | 0.32 (0.25-0.39) | - |
| 25 | *Onisimus* sp*.* | - | - | - | - | - | - |
| 26 | *Pasiphaea* sp*.* | - | - | - | 0.02 (0.01-0.03) | - | - |
| 27 | *Pandalus borealis* | - | - | - | 0 (0-0.01) | - | - |
| 28 | *Pasiphaea multidenta* | - | - | - | - | - | - |
| 29 | *Reinhardtius hippoglossoides* | 0.35 (0.24-0.49) | 1.47 (0.74-2.5) | 0.02 (0-0.04) | 0.02 (0-0.03) | 0.01 (0-0.02) | 0.02 (0.01-0.03) |
| 30 | *Sebastes* spp*.* | 0.22 (0.12-0.32) | 0.29 (0-0.74) | 0.15 (0.1-0.21) | 0.23 (0.19-0.28) | 0.02 (0-0.03) | - |
| 31 | *Euergestes arcticus* | - | - | - | - | - | - |
| 32 | Siphonophore | - | - | - | - | - | - |
| 33 | *Themisto abyssorum* | - | - | 1.64 (1.46-1.83) | - | - | 0.81 (0.75-0.88) |
| 34 | *Themisto libellula* | 85.47 (84.71-86.22) | 84.09 (81.15-86.75) | 81.73 (81.15-82.35) | 93.68 (93.45-93.91) | 50.78 (50.22-51.41) | 0.84 (0.78-0.91) |
| 35 | *Thysanoessa* spp*.* (mainly *T. inermis*) | - | 1.18 (0.44-1.91) | 0.39 (0.31-0.49) | 3.02 (2.85-3.18) | 6.04 (5.75-6.33) | 98 (97.9-98.09) |
| 36 | *Triglops murrayi* | 0.02 (0-0.06) | - | - | - | - | - |
| 37 | *Catablema multicirratum* | - | - | - | - | - | 0.02 (0.01-0.03) |
| 38 | *Clupea harengus* | - | - | - | - | - | - |
| 39 | *Periphylla* | - | - | - | - | - | - |
| 40 | *Apherusa glacialis* | - | - | - | - | - | - |
| 41 | *Hyperia galba* | - | - | - | - | - | - |
| 42 | Unidentified decapod | - | - | - | - | - | - |
| 43 | *Anonyx* sp*.* | - | - | - | - | - | - |
| 44 | *Sabinea septemcarinata* | - | - | - | - | - | - |

**Supplementary material 8.** Species dominance values *dij* according to Eq.(8) for each station of cruise 3. Values in parentheses represent 95% confidence intervals.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Species ID** | **Species name** | **Station 1** | **Station 2** | **Station 3** | **Station 4** | **Station 5** | **Station 6** |
| 1 | *Acanthostepheia malmgreni* | 1.11 (0.6-1.79) | - | - | - | - | - |
| 2 | *Actozenus risso* | - | - | - | - | - | - |
| 3 | *Aglantha digitale* | - | - | - | - | - | - |
| 4 | *Anarhichas lupus* | - | - | - | - | - | - |
| 5 | *Boreo cucumis* | 0.09 (0-0.26) | 0.15 (0-0.36) | - | - | - | - |
| 6 | *Boreogadus saida* | 0.17 (0-0.43) | - | - | - | 0.1 (0.06-0.14) | 9.03 (6.67-11.83) |
| 7 | *Clione limacina* | - | 1.24 (0.66-1.9) | - | 0.53 (0.18-0.94) | 0.39 (0.3-0.47) | 2.15 (0.86-3.44) |
| 8 | Unidentified ctenophores | - | - | - | - | - | - |
| 9 | *Cyanea capillata* | 0.17 (0-0.43) | 0.07 (0-0.22) | - | 2.18 (1.47-2.89) | - | - |
| 10 | *Euchirella maxima* | - | - | 0.09 (0-0.22) | - | - | - |
| 11 | *Gadus morhua* | - | - | - | - | - | 0.43 (0-1.08) |
| 12 | *Gammarus wilkitzkii* | - | 0.07 (0-0.22) | - | 0.88 (0.47-1.36) | 0.02 (0-0.05) | - |
| 13 | *Gonatus fabricii* | - | - | 0.22 (0.04-0.44) | 0.35 (0.12-0.71) | - | - |
| 14 | *Icelus bicornis* | - | - | - | - | - | 0.22 (0-0.65) |
| 15 | Unidentified isopod | - | - | - | - | - | - |
| 16 | *Lebbeus polaris* | - | - | - | - | - | 2.8 (1.51-4.3) |
| 17 | *Leptagonus decagonus* | - | - | - | - | - | - |
| 18 | *Leptoclinus maculatus* | 4.25 (3.15-5.44) | 2.26 (1.53-3.21) | - | - | 2.8 (2.57-3.03) | 26.45 (22.37-30.54) |
| 19 | *Liparis spp.* | 0.09 (0-0.26) | - | - | - | 0.04 (0.01-0.07) | 0.43 (0-1.08) |
| 20 | *Mallotus villosus* | - | - | - | 0.12 (0-0.29) | - | 16.56 (13.33-20) |
| 21 | *Meganyctiphanes norvegica* | - | - | 31.1 (29.3-33.03) | - | - | - |
| 22 | *Melanogrammus aegelfinus* | - | - | - | - | - | 0.43 (0-1.08) |
| 23 | *Mertensia ovum* | - | 0.15 (0-0.36) | 1.84 (1.27-2.37) | - | - | - |
| 24 | *Myctophidae* sp*.* | - | 0.51 (0.15-0.95) | 0.88 (0.53-1.27) | 0.06 (0-0.18) | - | - |
| 25 | *Onisimus sp.* | - | 0.15 (0-0.36) | - | - | 0.01 (0-0.02) | - |
| 26 | *Pasiphaea sp.* | - | - | - | - | - | - |
| 27 | *Pandalus borealis* | 5.44 (4.17-6.72) | 1.09 (0.58-1.68) | - | 0.24 (0.06-0.47) | - | 24.95 (21.29-28.82) |
| 28 | *Pasiphaea multidenta* | - | - | - | - | - | - |
| 29 | *Reinhardtius hippoglossoides* | - | - | - | - | 0 (0-0.01) | - |
| 30 | *Sebastes spp.* | 5.02 (3.83-6.21) | 1.39 (0.88-2.04) | 0.83 (0.53-1.23) | 2.01 (1.36-2.65) | 4.18 (3.9-4.46) | 7.31 (4.95-9.68) |
| 31 | *Euergestes arcticus* | - | - | 0.13 (0-0.31) | - | - | - |
| 32 | Siphonophore | - | - | - | - | - | - |
| 33 | *Themisto abyssorum* | 4.25 (3.15-5.44) | 2.84 (1.97-3.79) | 9.07 (7.84-10.29) | 4.01 (3.13-4.96) | - | - |
| 34 | *Themisto libellula* | 1.87 (1.11-2.72) | 17.87 (15.83-19.91) | 55.85 (53.79-57.86) | 12.39 (10.8-14.04) | 1.6 (1.44-1.78) | 0.22 (0-0.65) |
| 35 | *Thysanoessa spp. (mainly T. inermis)* | 77.55 (75.09-79.85) | 72.21 (69.8-74.62) | - | 77.23 (75.1-79.17) | 90.77 (90.36-91.17) | - |
| 36 | *Triglops murrayi* | - | - | - | - | - | - |
| 37 | *Catablema multicirratum* | - | - | - | - | - | - |
| 38 | *Clupea harrengus* | - | - | - | - | 0.02 (0-0.04) | 5.59 (3.44-7.74) |
| 39 | *Periphylla* | - | - | - | - | 0 (0-0.01) | - |
| 40 | *Apherusa glacialis* | - | - | - | - | 0.04 (0.01-0.07) | - |
| 41 | *Hyperia galba* | - | - | - | - | 0.02 (0-0.05) | - |
| 42 | Unidentified decapod | - | - | - | - | - | 1.08 (0.22-2.15) |
| 43 | *Anonyx sp.* | - | - | - | - | - | 0.43 (0-1.08) |
| 44 | *Sabinea septemcarinata* | - | - | - | - | - | 1.94 (0.86-3.23) |