Supplementary data 5. Results of the three-way PERMANOVA (Permutational multivariate analysis of variance) analysis and p-values of pairwise comparisons on the diet composition of a dominant prey item (fishes) of *Dissostichus mawsoni* caught in the research block 88.3\_4 of Southern Ocean, considering the factors fishing seasons, sampling depth classes, and size classes.

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| **(A) Three-way PERMANOVA** |  |  |  |  |  |
| **Source** | **df** | **MS** | **Pseudo-F** | **COV** | **P (perm)** |
| Fishing season | 4 | 1207.3 | 1.636 | 8.118 | 0.115 |
| Depth | 2 | 3038.2 | 4.117 | 17.607 | **0.003** |
| Size class | 2 | 2349.9 | 3.185 | 15.568 | **0.012** |
| Fishing season ⅹ Depth | 4 | 996.8 | 1.351 | 8.398 | 0.199 |
| Fishing season ⅹ Size class | 7 | 434.0 | 0.588 | -9.894 | 0.881 |
| Depth ⅹ Size class | 4 | 1935.1 | 2.623 | 17.728 | **0.008** |
| Fishing season ⅹ Depth ⅹ Size class | 5 | 720.5 | 0.976 | -3.086 | 0.506 |
| **(B) Pairwise comparisons** |  |  |  |  |  |
| **Depth (m)** | **Size class (cm, TL)** | | | | |
| **<120** | | **120-160** | **≥160** | |
| <1,200 v. 1,200-1,600 | 0.069 | | 0.706 | 0.158 | |
| <1,200 v. ≥1,600 | **0.037** | | **0.043** | 0.167 | |
| 1,200-1,600 v. ≥1,600 | 0.346 | | **0.001** | **0.031** | |
| **Size class (cm, TL)** | **Depth (m)** | | | | |
| **<1,200** | | **1,200-1,600** | **≥1,600** | |
| <120 v. 120-160 |  | | 0.105 | 0.261 | |
| <120 v. ≥160 |  | | 0.168 | **0.028** | |
| 120-160 v. ≥160 |  | |  | **0.010** | |