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**  |