Supplementary data 4. Results of the three-way PERMANOVA (Permutational multivariate analysis of variance) analysis, pairwise comparisons, and SIMPER (Similarity percentages) on the diet composition of a dominant prey item (fishes) of *Dissostichus mawsoni* caught in the research block 88.3\_3 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 | 1797.8 | 2.189 | 12.392 | 0.055 |
| Depth | 2 | 4211.8 | 5.127 | 19.680 | **0.004** |
| Size class | 2 | 1456.2 | 1.773 | 9.716 | 0.179 |
| Fishing season ⅹ Depth | 4 | 1135.7 | 1.383 | 12.216 | 0.269 |
| Fishing season ⅹ Size class | 4 | 607.3 | 0.739 | -12.456 | 0.589 |
| Depth ⅹ Size class | 3 | 1023.7 | 1.246 | 13.146 | 0.321 |
| **(B) Pairwise comparisons and SIMPER** |  |  |  |  |  |
| **Depth (m)** | **P (perm)** | **Contribution (%) of dissimilarity** | | | |
| <1,200 v. 1,200-1,600 | **0.033** | Nototheniidae (23%), Channichthyidae (22%), Macrouridae (20%) | | | |
| <1,200 v. ≥1,600 | **0.003** | Nototheniidae (21%), Channichthyidae (18%), Macrouridae (16%), Anotopteridae (15%), Paralepididae (9%) | | | |
| 1,200-1,600 v. ≥1,600 | **0.047** | Channichthyidae (23%), Nototheniidae (22%), Anotopteridae (20%), Macrouridae (18%) | | | |