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%) |