

Grid

Correlations between summary stats

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In many of the tRFMO MSE Operating Models were developed as factorial designs, where scenarios corresponded to a number of factors with levels. For example difficult to estimate parameters such as steepness and natural mortality were fixed at a range of values and then all the possible combinations run. All the combinations are referred to as the Operating Model grid.

To explore the variability in the grids a variety of summary statistics were calculated using the Operating Model grids for East Atlantic and Mediterranean bluefin, Indian Ocean albacore and swordfish, and North Atlantic Ocean albacore and swordfish.

Summary statistics include MSY reference points, the production function and current stock status.

So that the main features in the grids could be summarised the correlations between the statistics were then estimated and used to order the statistics into similar groups. As well as using the raw correlations the absolute value of the correlation coefficient were used to group the variables to show the strength of the correlations.

For example **Figure 10** for bluefin shows that in the 2196 bluefin grid there are only 5 main features, namely

- i) steepness and */beta* parameter of the stock recruitment relationship
- ii) level of recruitment
- iii) production function
- iv) virgin biomass and */apha* parameter of the stock recruitment relationship
- v) Current status

Acceptance/Rejection of Runs

Need to validate SS assessments i.e.

- i) Are parameters actually estimated
- ii) Are parameters such as *r* and *K* within bounds
- iii) Has the model converged
- iv) Do residuals met runs tests

Correlations

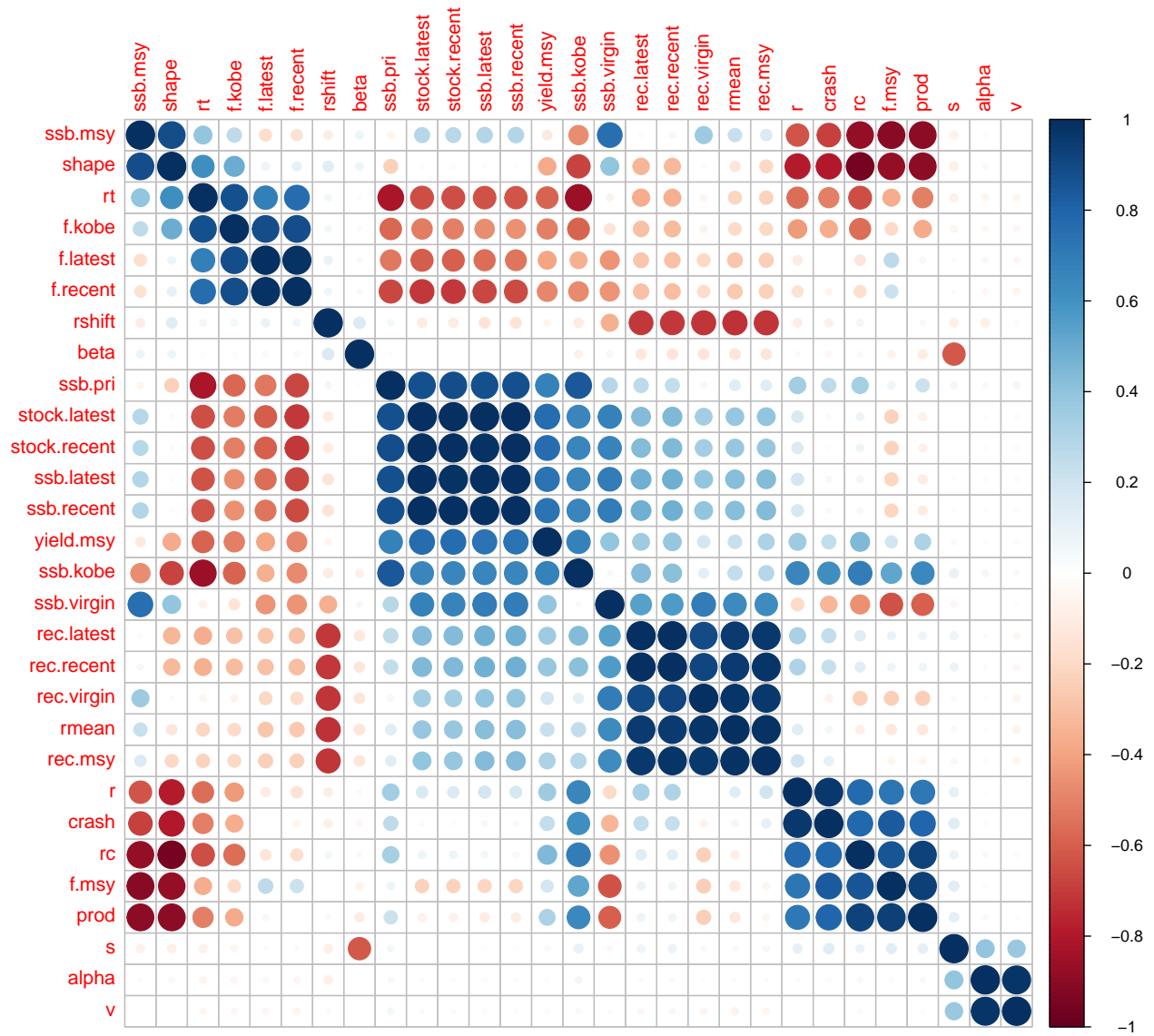


Figure 1 Bluefin correlation matrix.

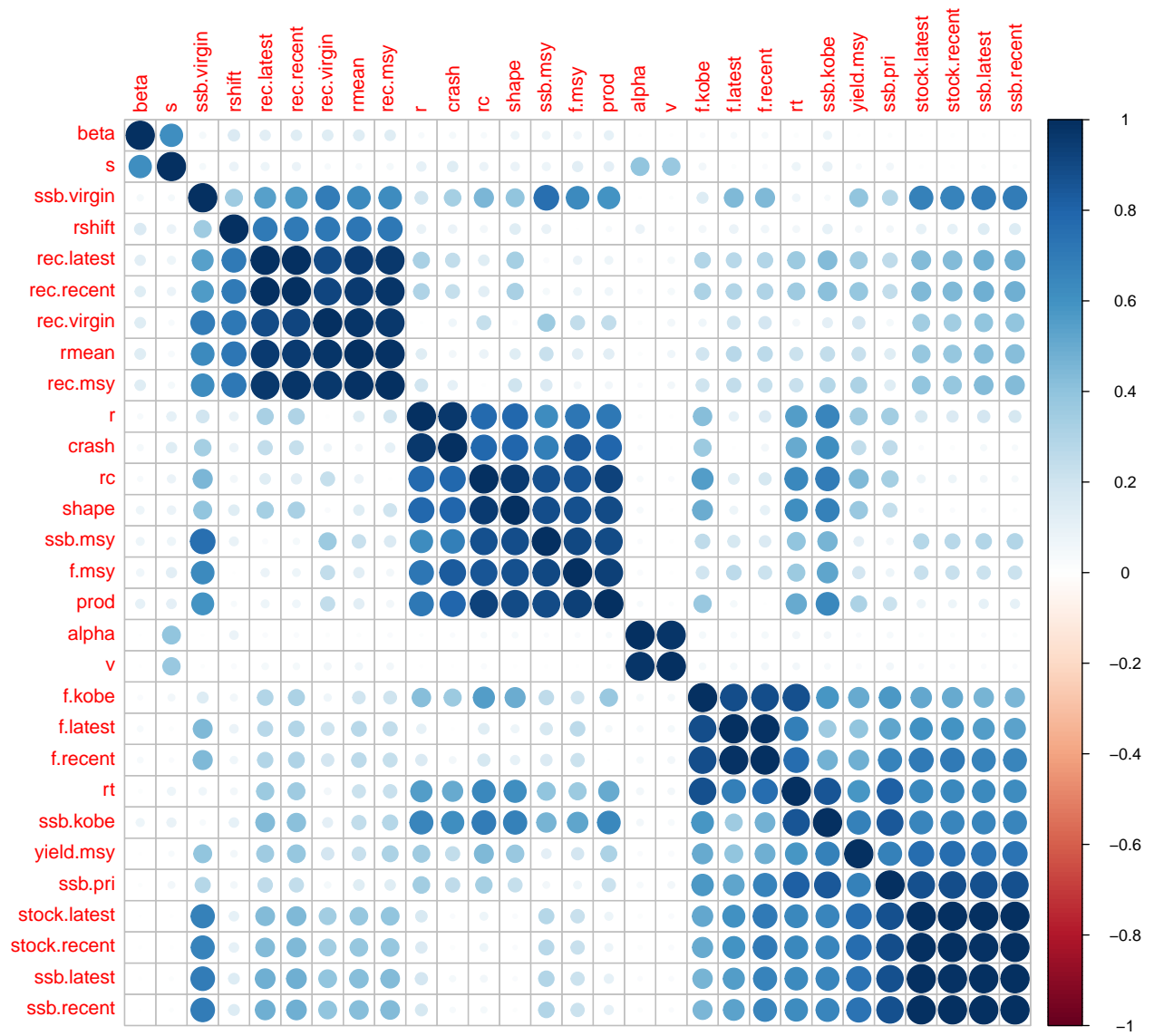


Figure 2 Bluefin correlation matrix, absolute values to show relationships

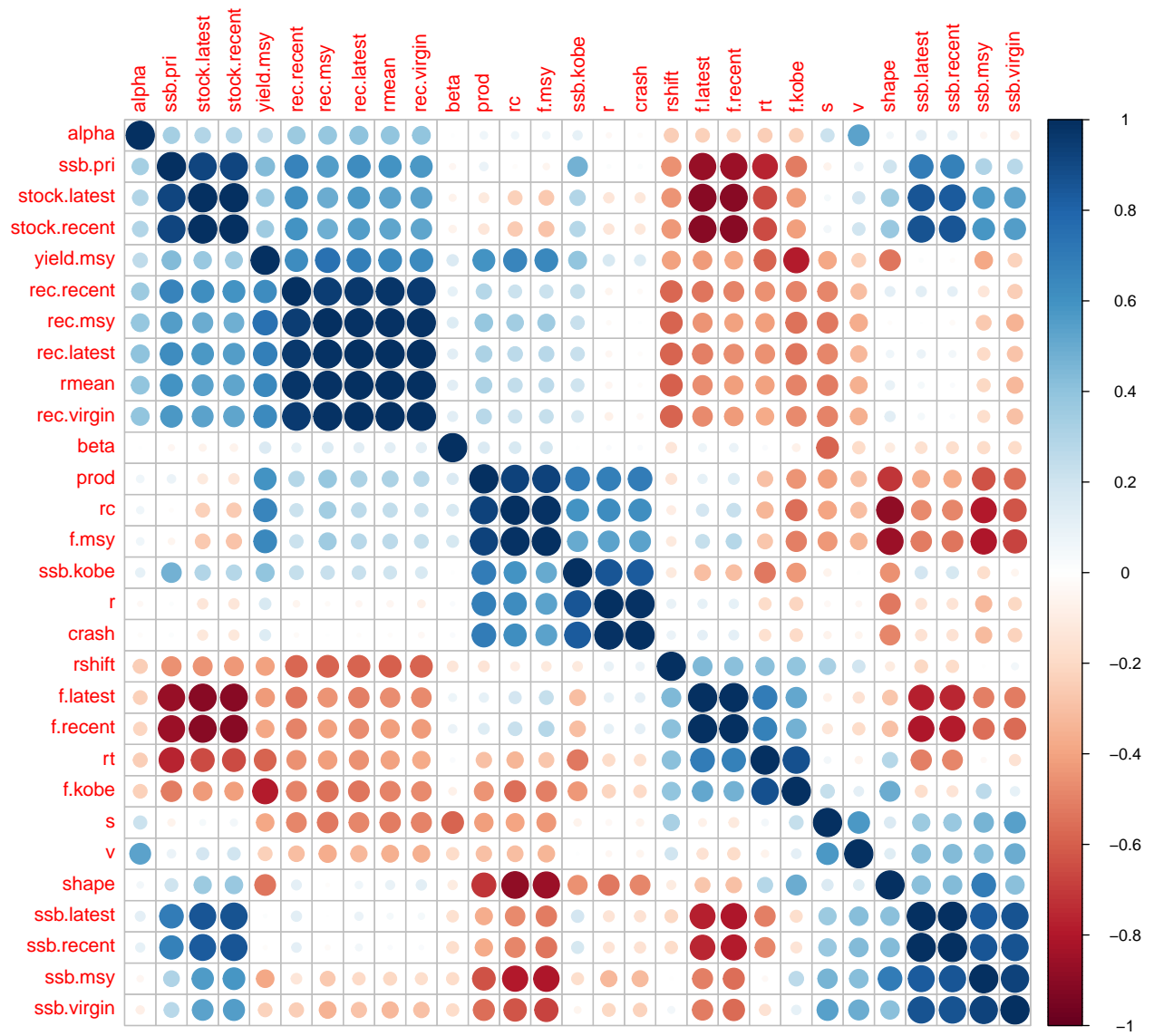


Figure 3 Albacore Indian Ocean correlation matrix.

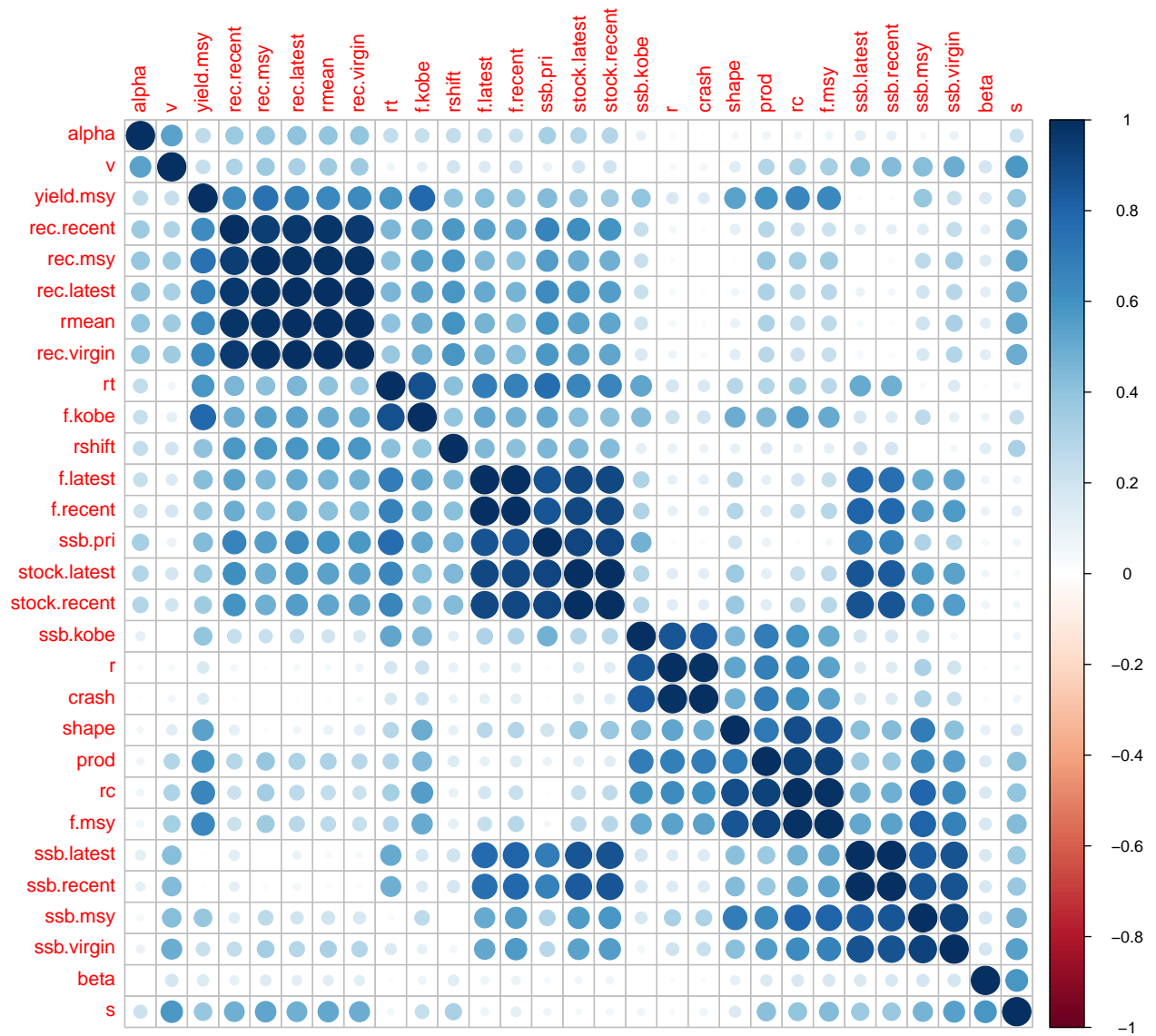


Figure 4 Albacore Indian Ocean correlation matrix, absolute values to show relationships

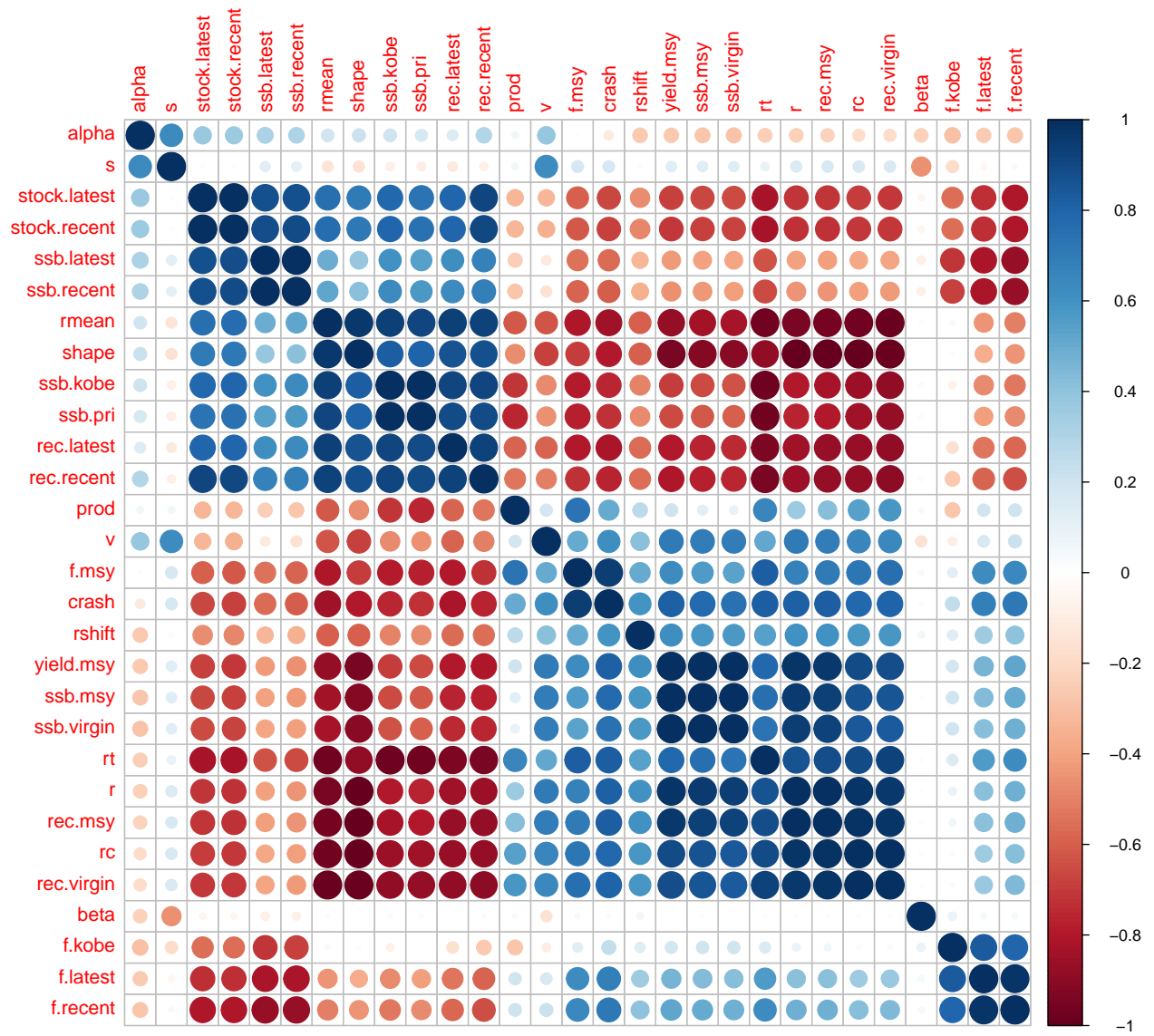


Figure 5 Albacore North Atlantic Ocean correlation matrix.

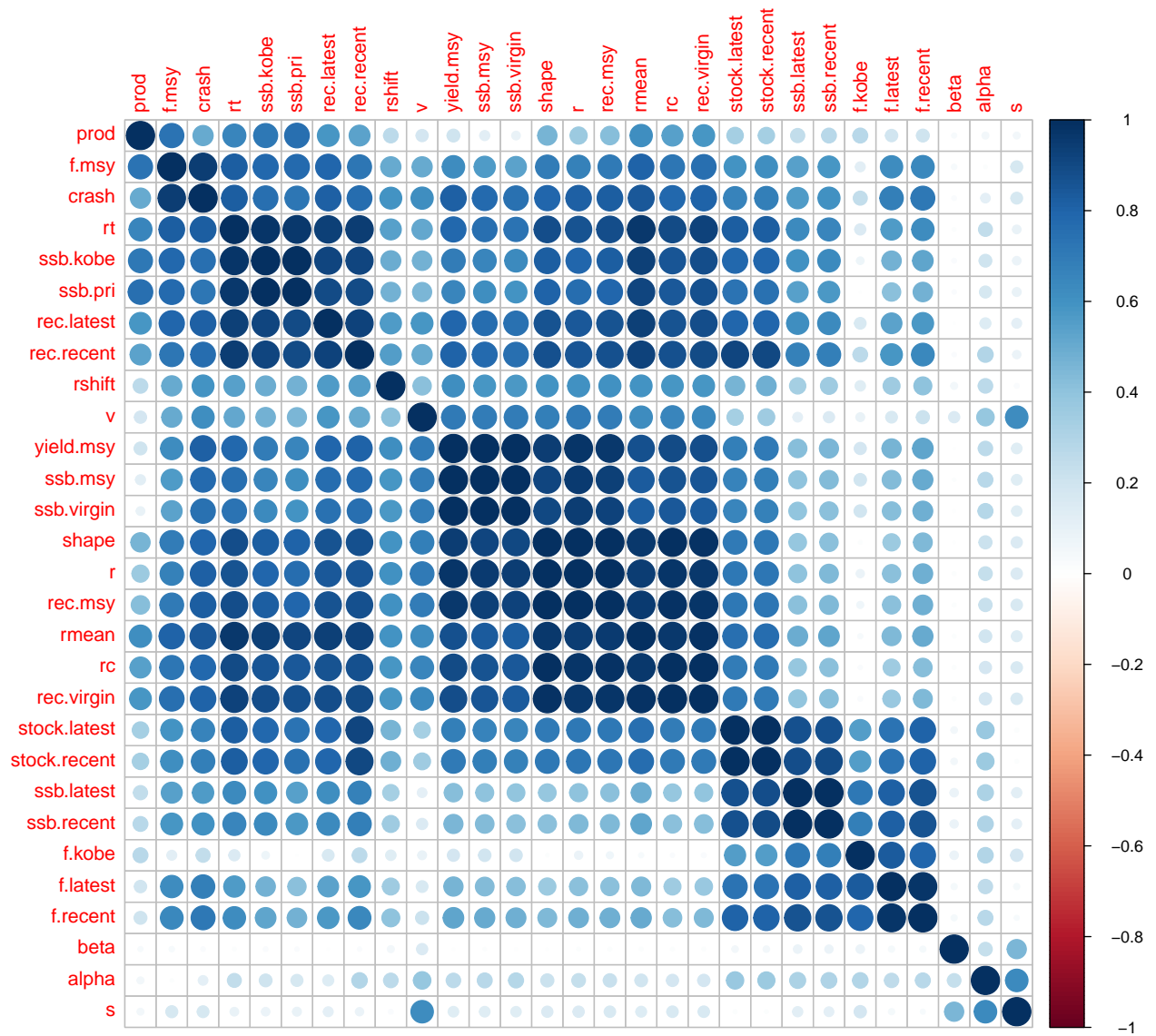


Figure 6 Albacore North Atlantic Ocean correlation matrix, absolute values to show relationships

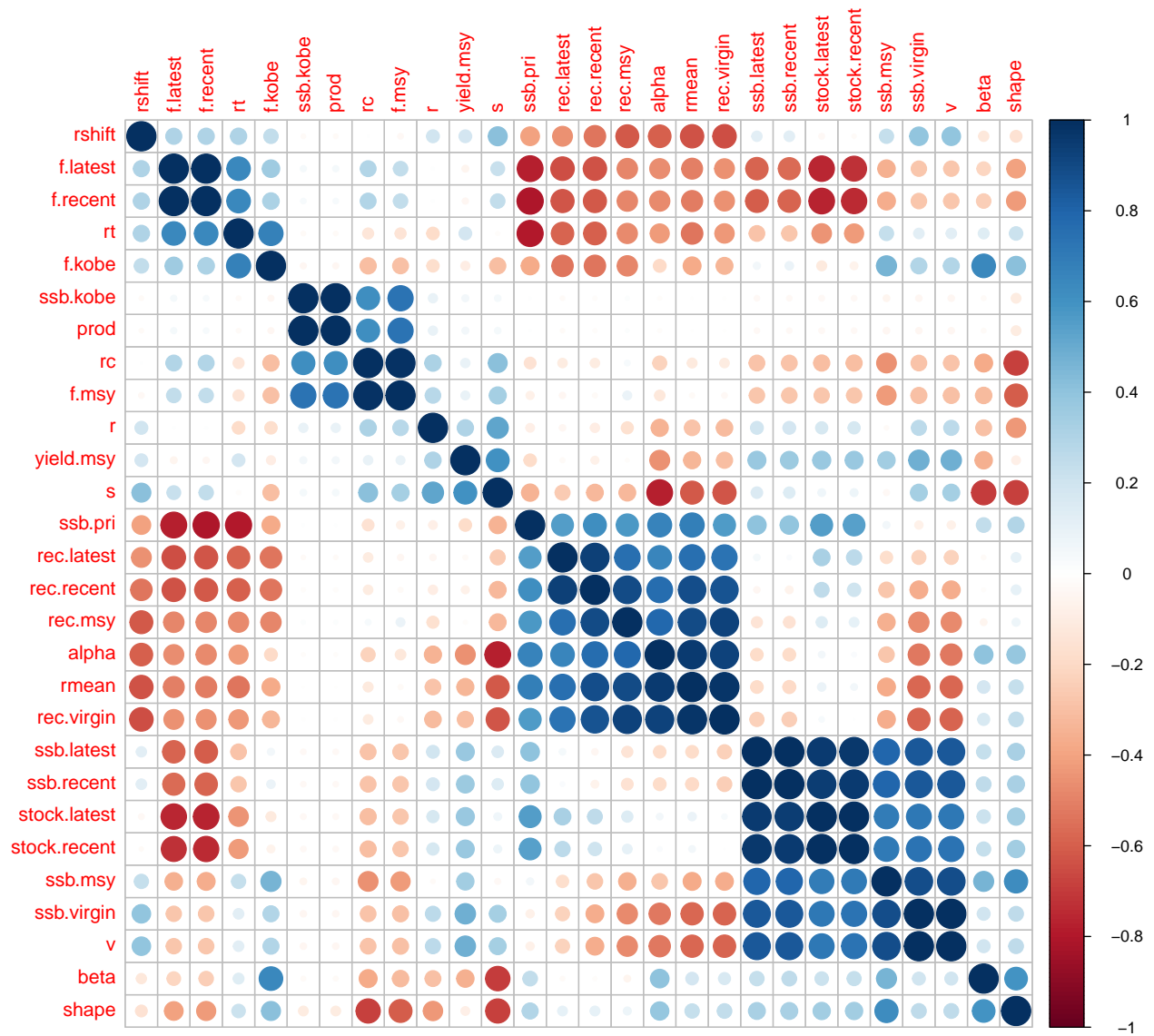


Figure 7 Swordfish Indian Ocean correlation matrix.

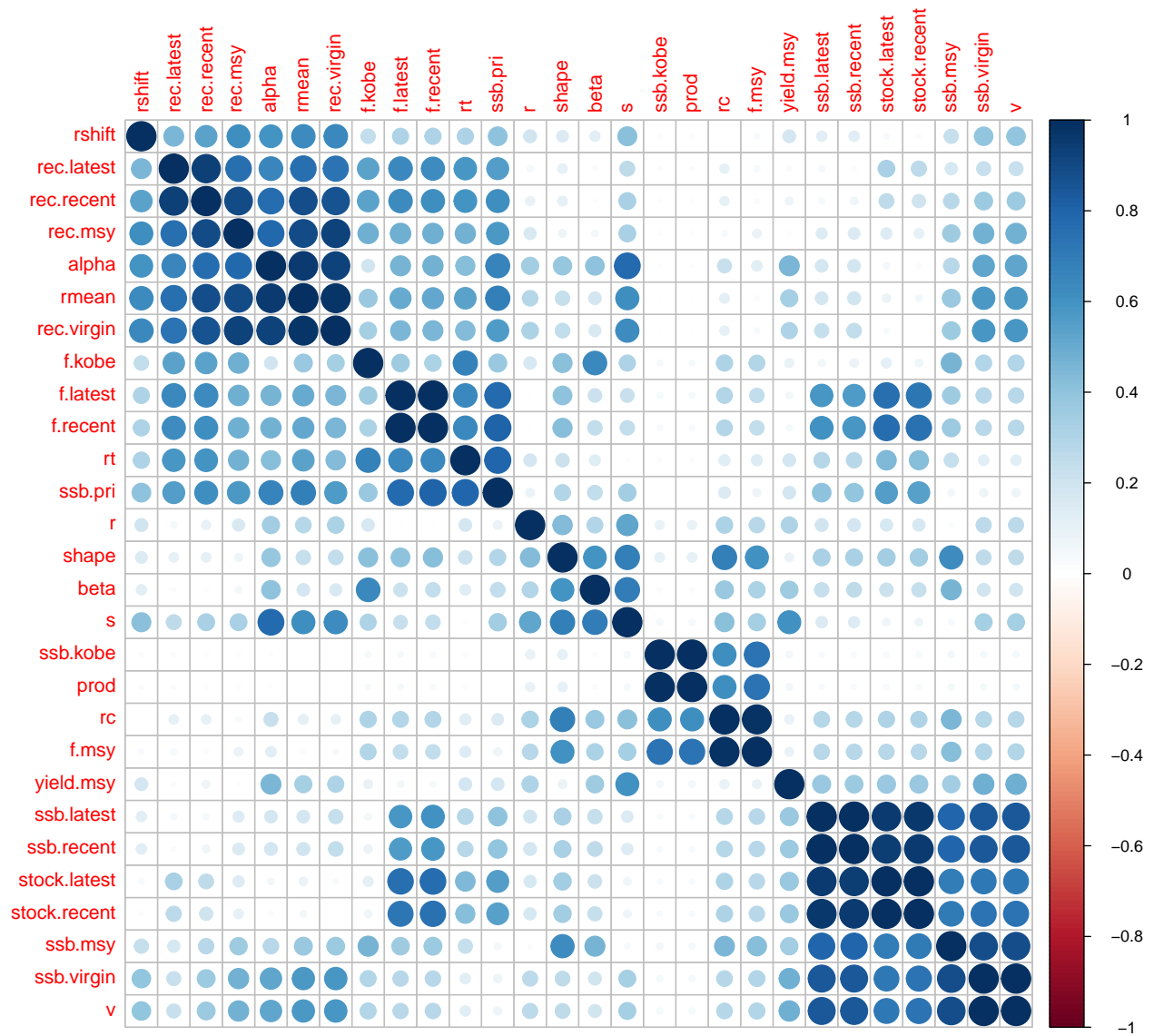


Figure 8 Swordfish Indian Ocean correlation matrix, absolute values to show relationships

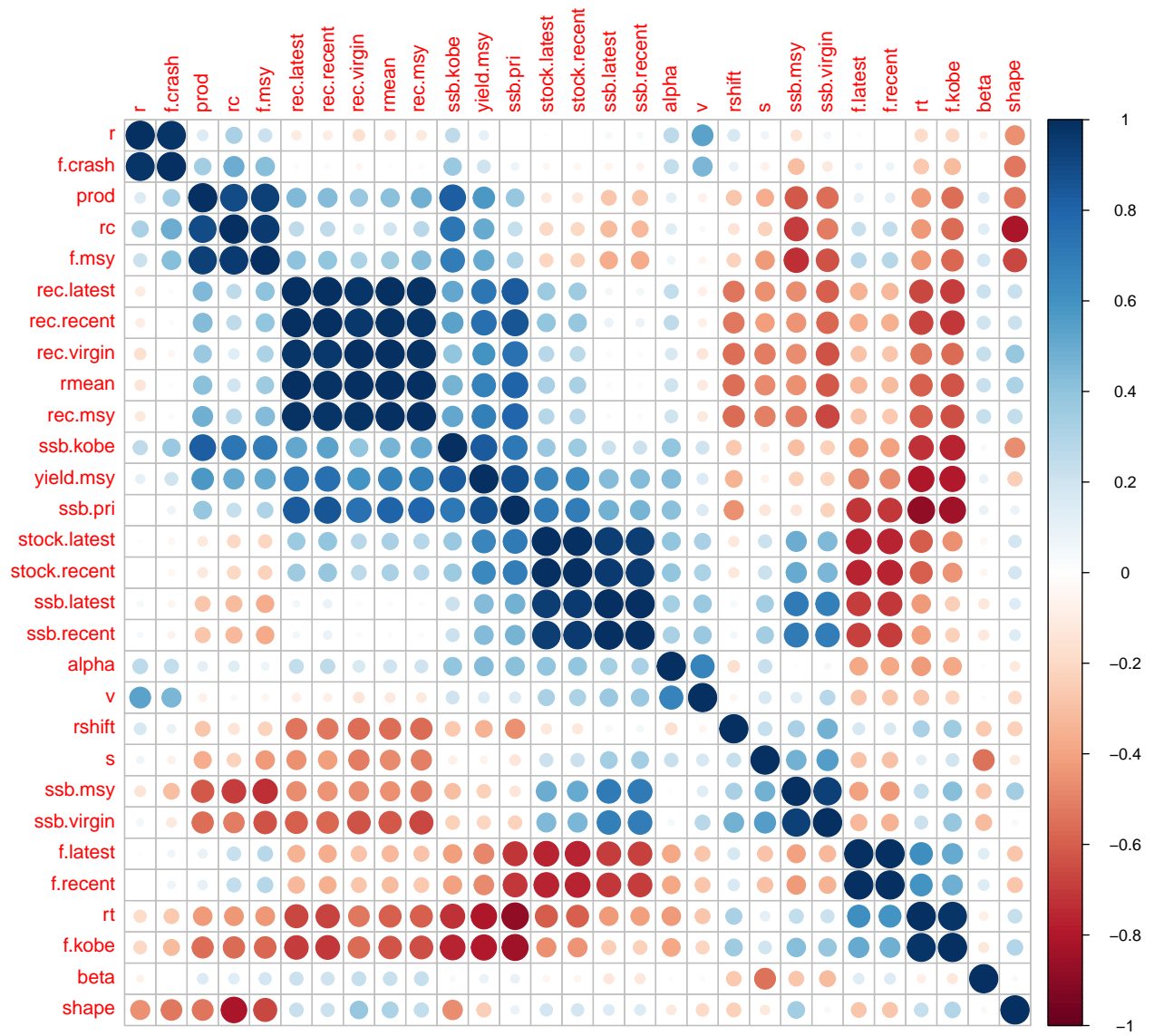


Figure 9 Swordfish North Atlantic Ocean correlation matrix.

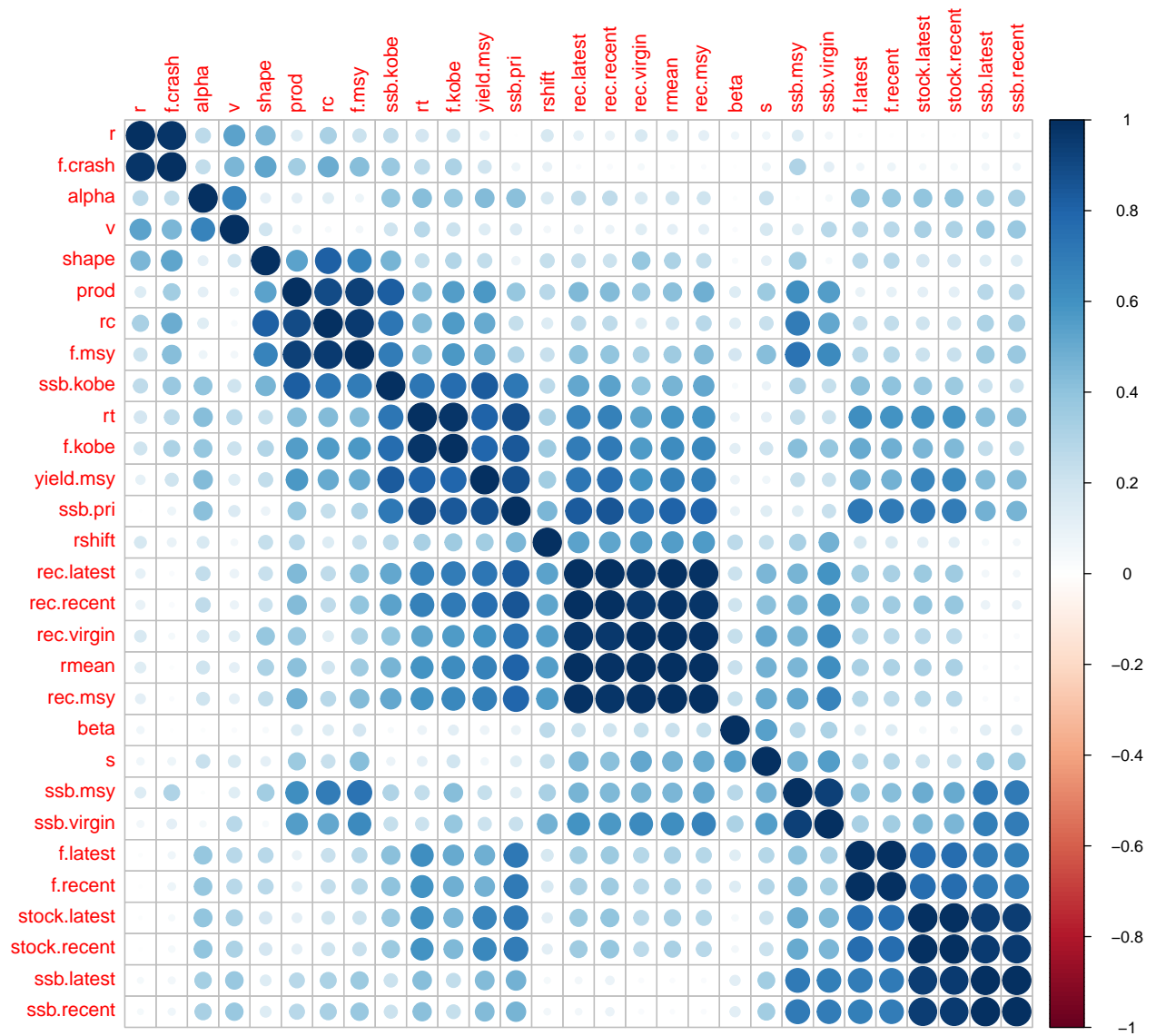


Figure 10 Swordfish North Atlantic Ocean correlation matrix, absolute values to show relationships

Clusters

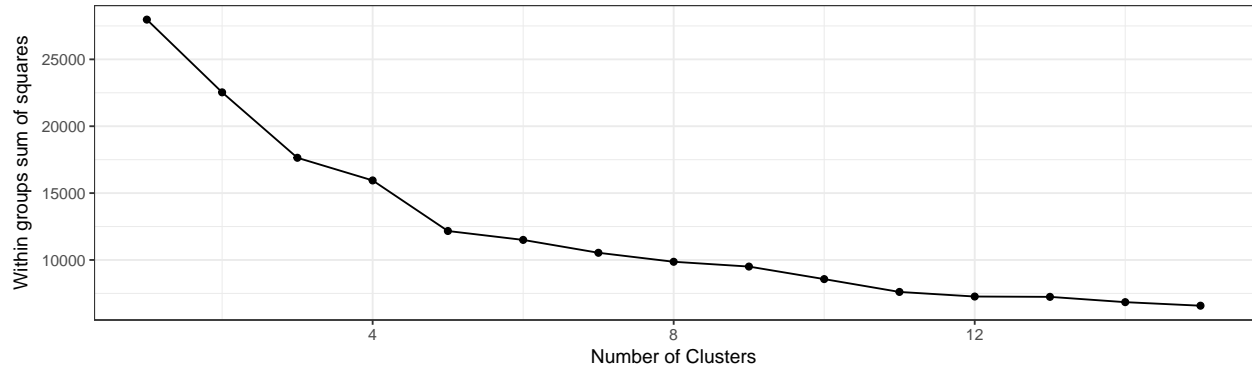


Figure 11 Bluefin cluster selection.

Cluster Dendrogram

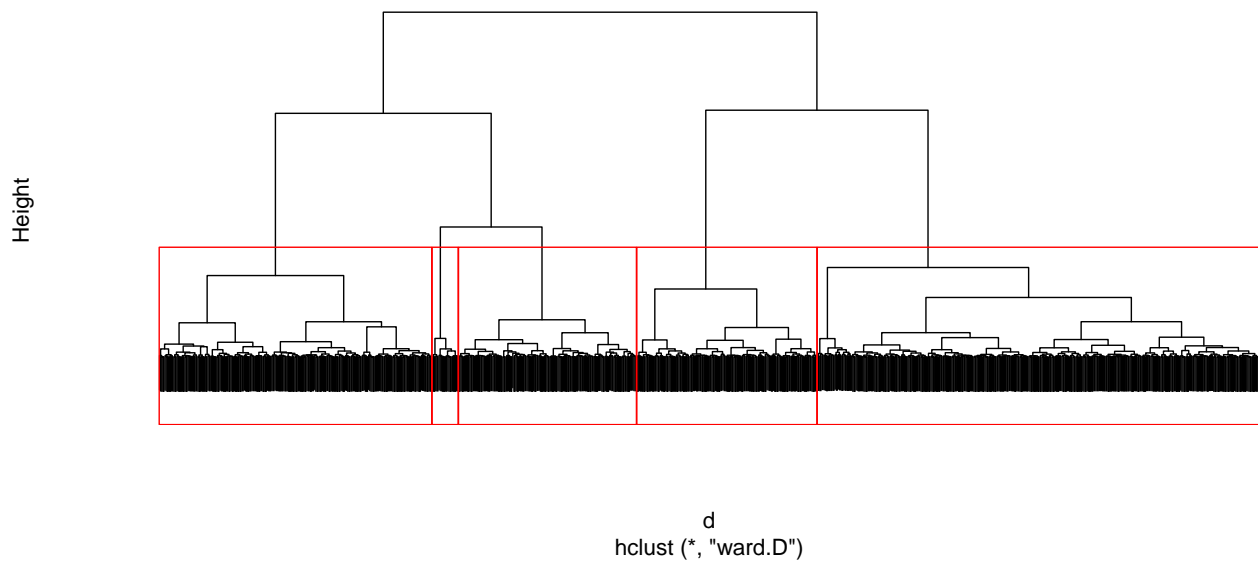


Figure 12 Bluefin Clusters

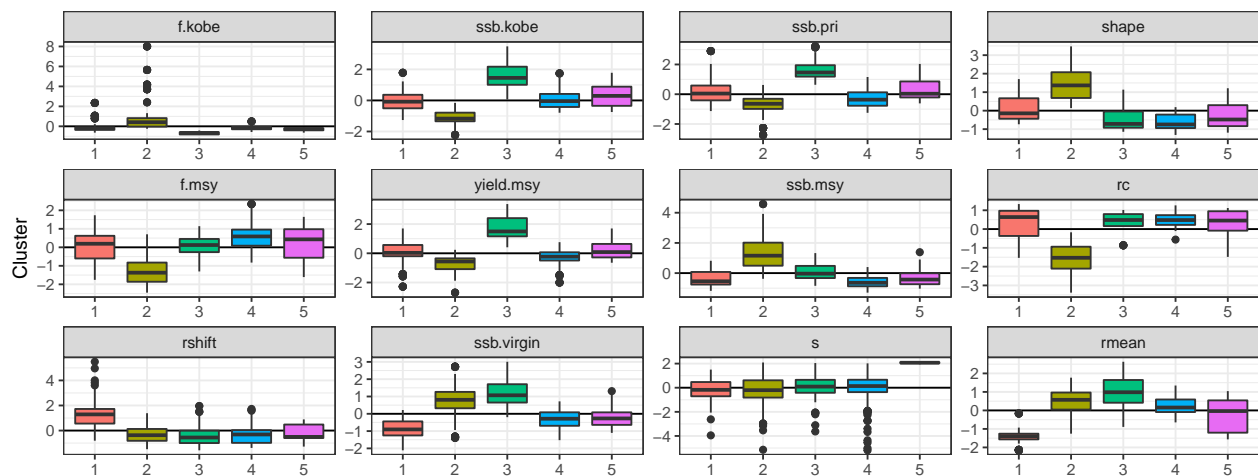


Figure 13 Bluefin Clusters

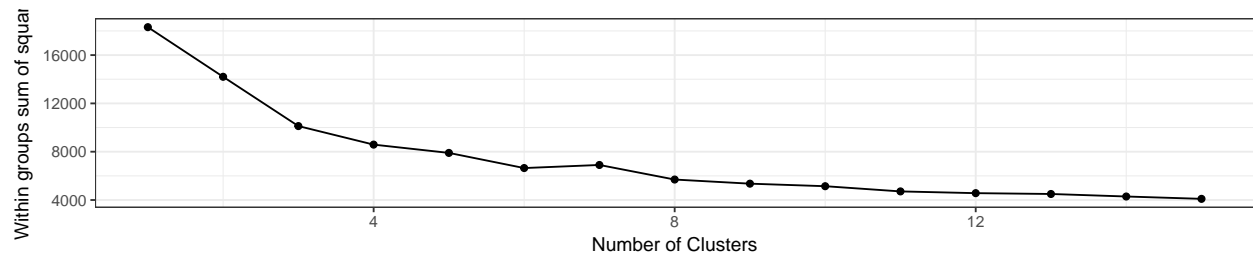


Figure 14 Albacore Indian Ocean cluster selection.

Cluster Dendrogram

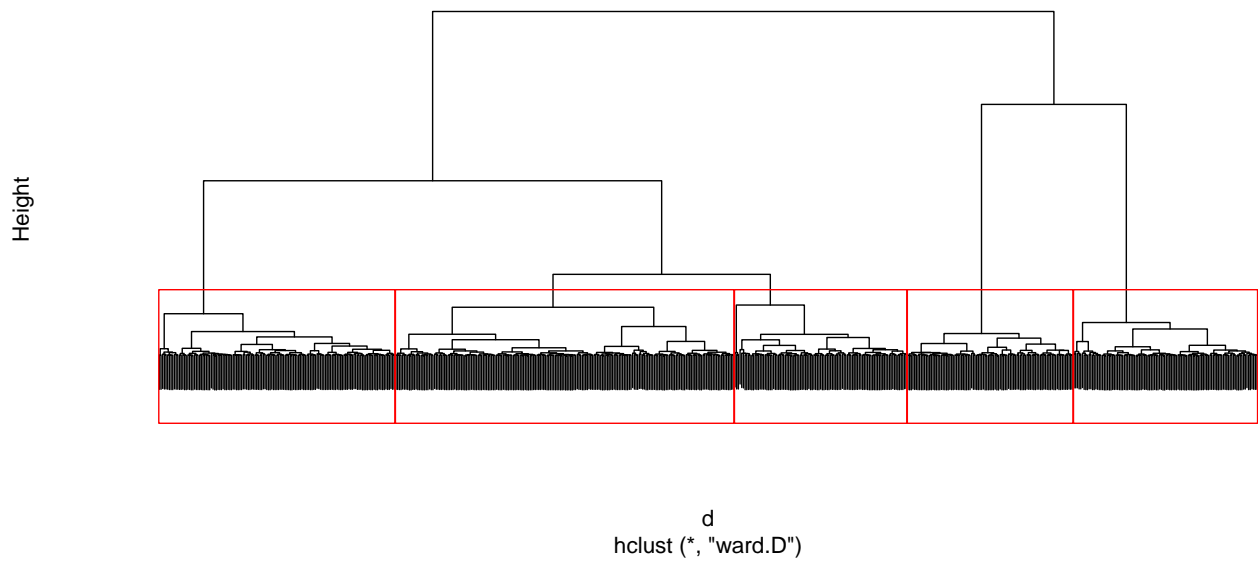


Figure 15 Albacore Indian Ocean Clusters

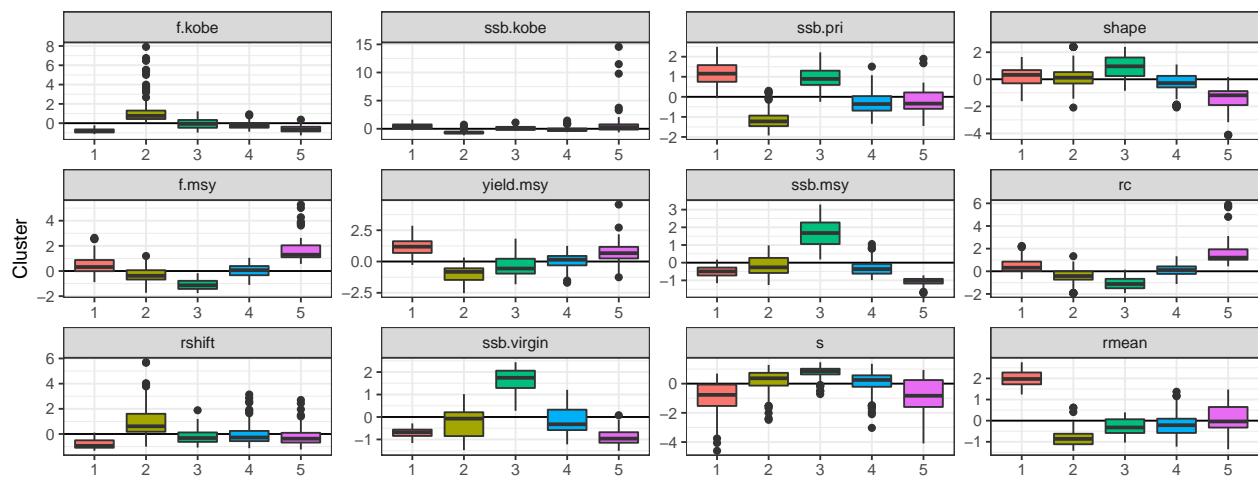


Figure 16 Albacore Indian Ocean Clusters

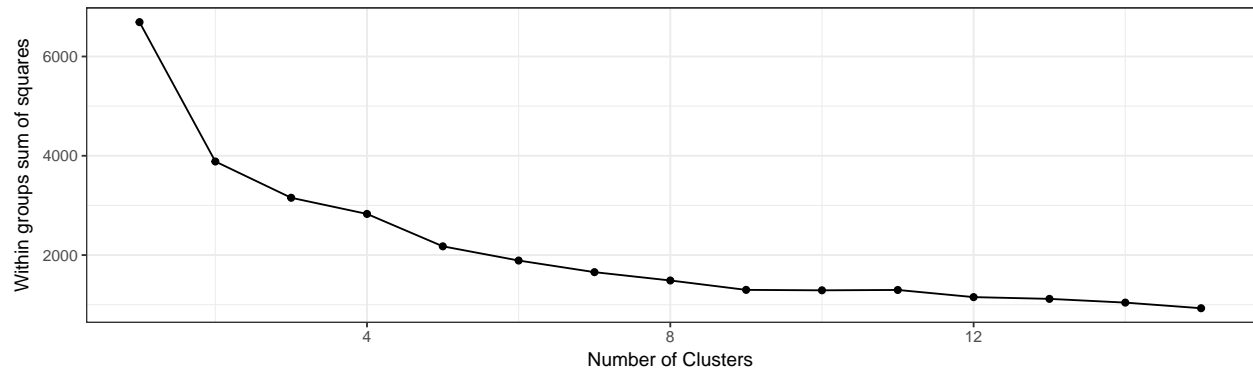


Figure 17 Albacore North Atlantic Ocean cluster selection.

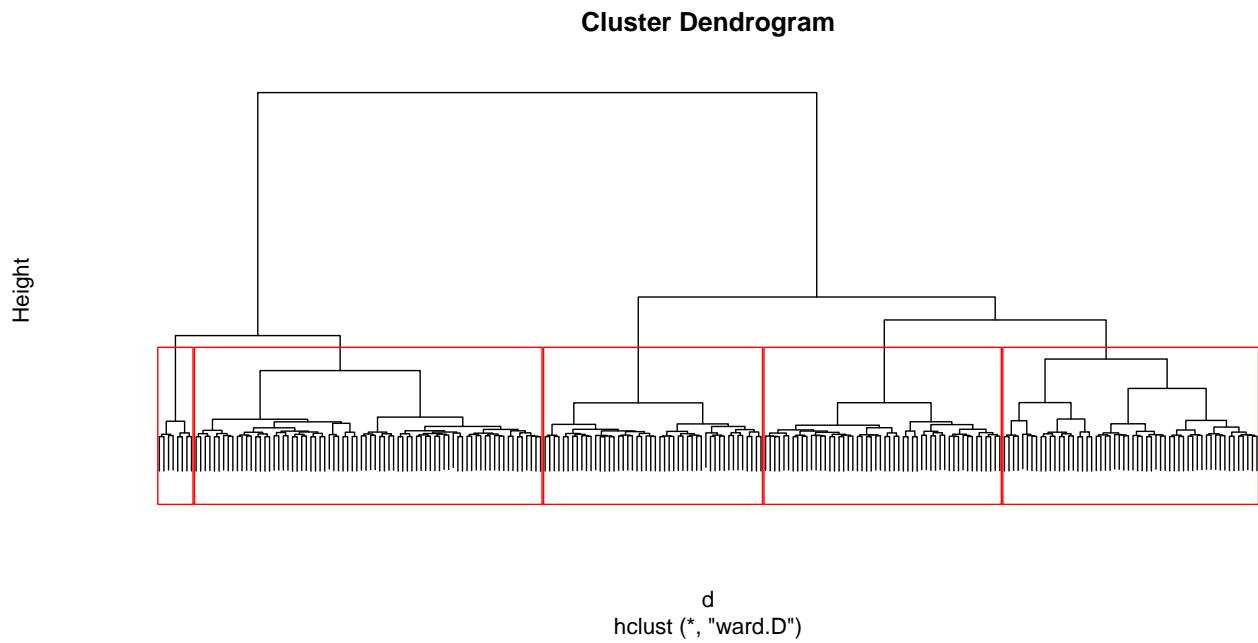


Figure 18 Albacore North Atlantic Ocean Clusters

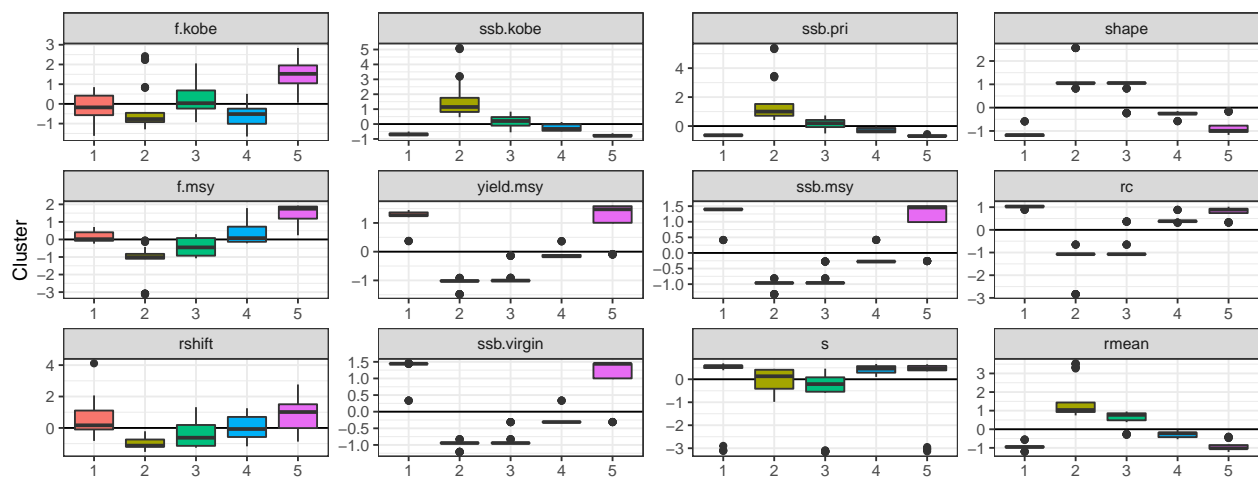


Figure 19 Albacore North Atlantic Ocean Clusters

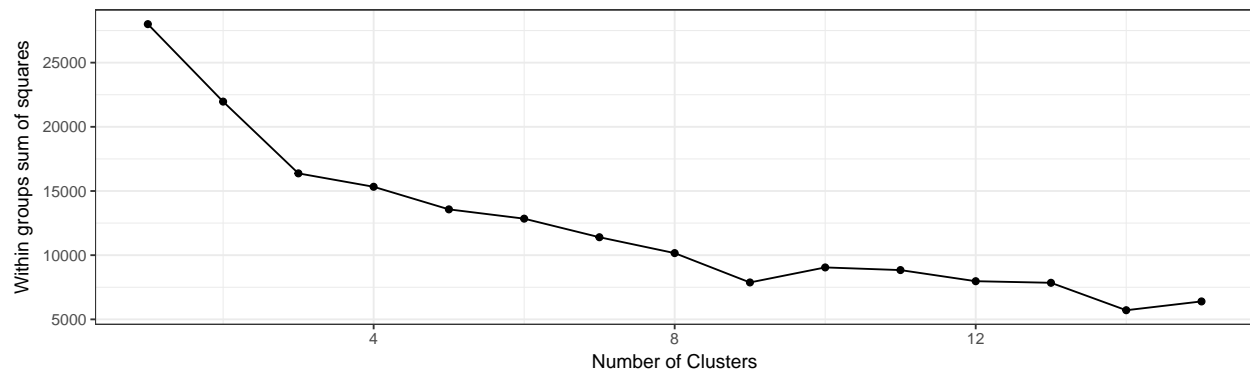


Figure 20 Swordfish Indian Ocean cluster selection.

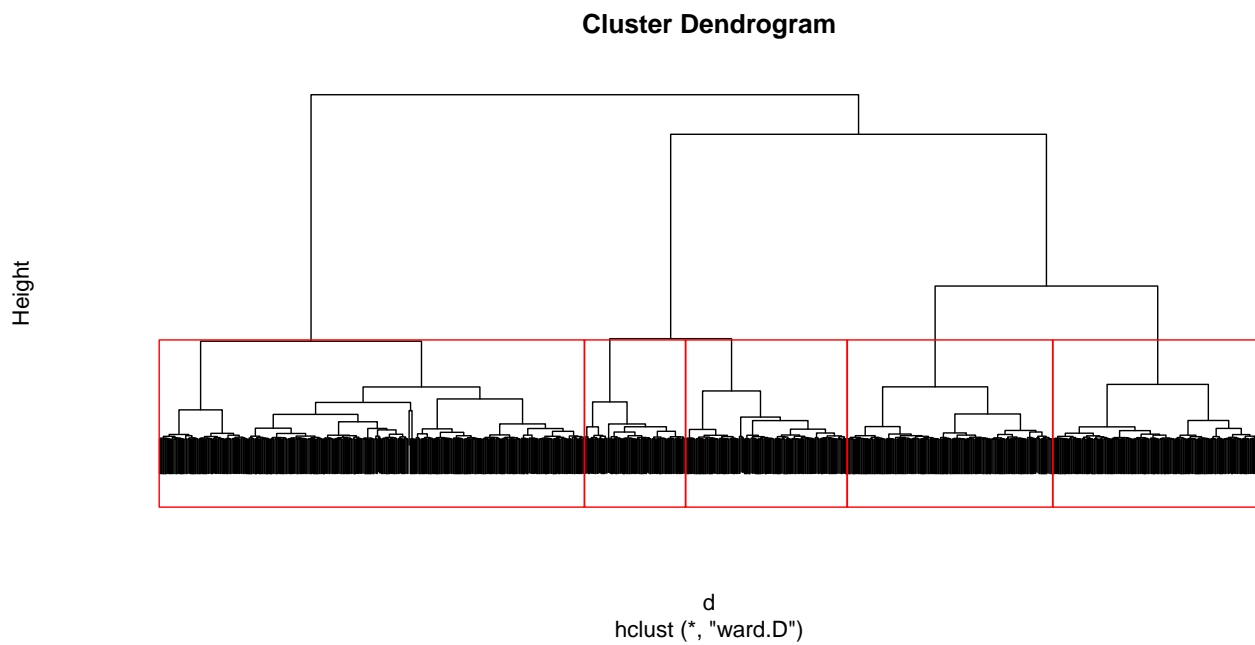


Figure 21 Swordfish Indian Ocean Clusters

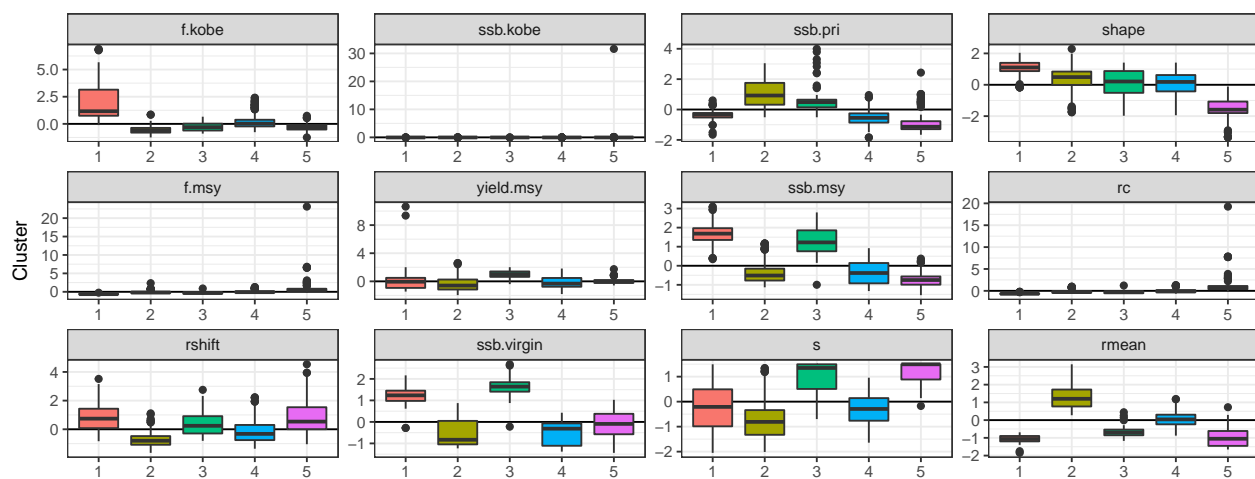


Figure 22 Swordfish Indian Ocean Clusters

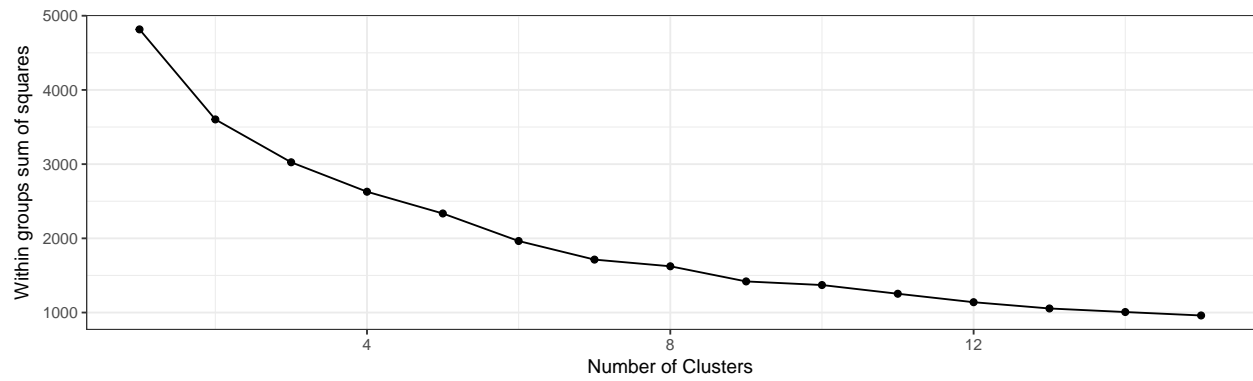


Figure 23 Swordfish North Atlantic Ocean cluster selection.

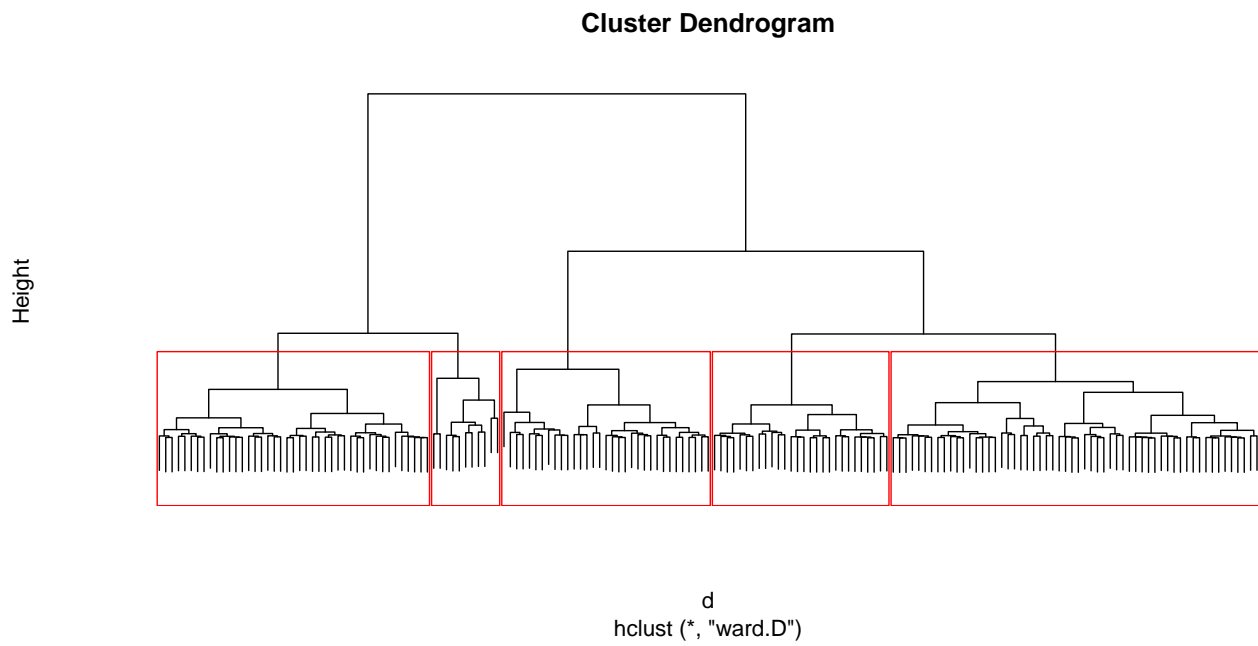


Figure 24 Swordfish North Atlantic Ocean Clusters

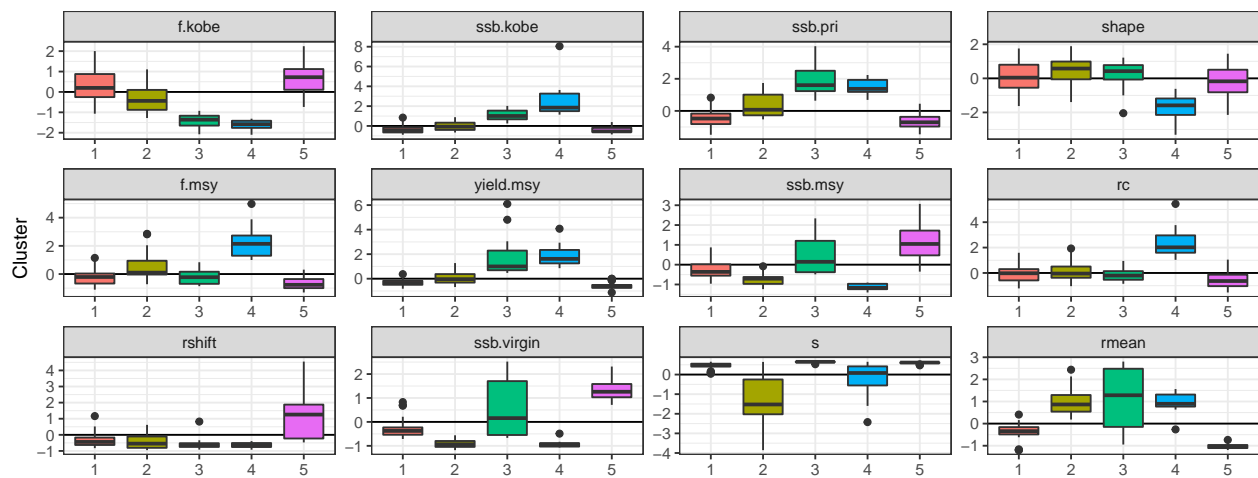


Figure 25 Swordfish North Atlantic Ocean Clusters

Time Series

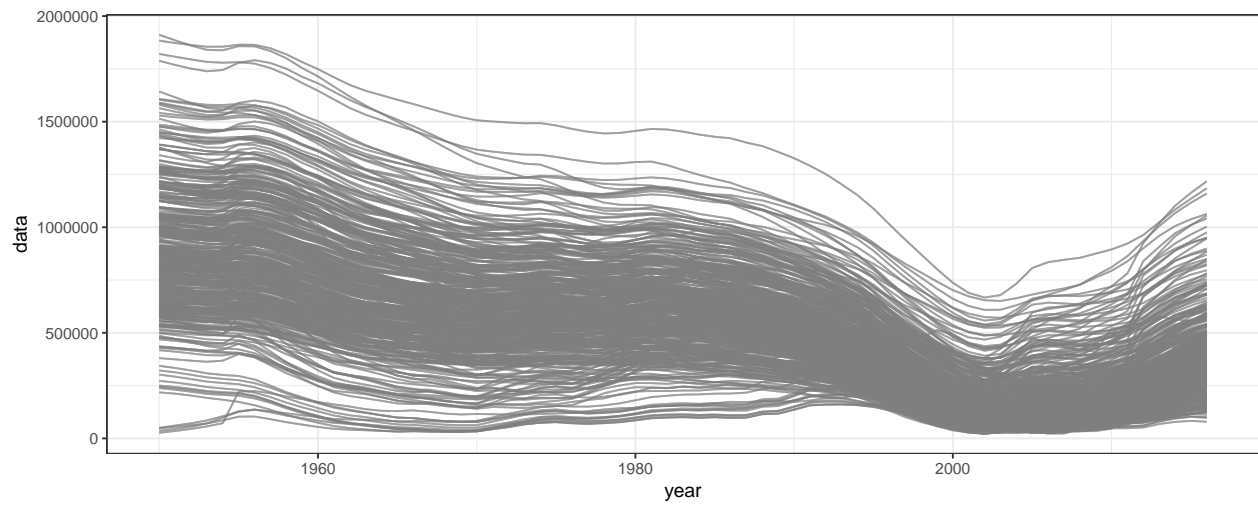


Figure 26 Bluefin SSB

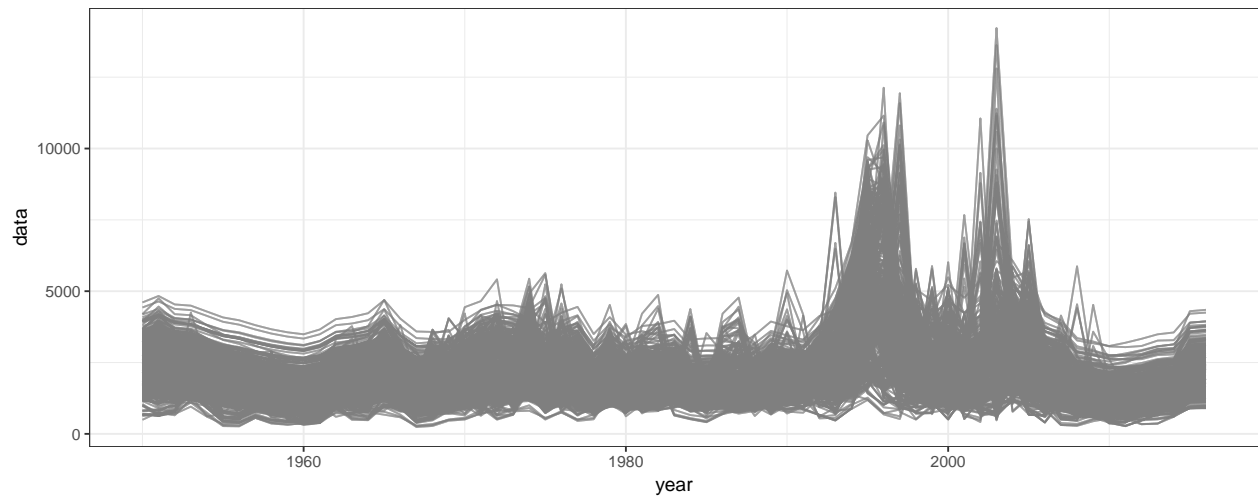


Figure 27 Bluefin recruits

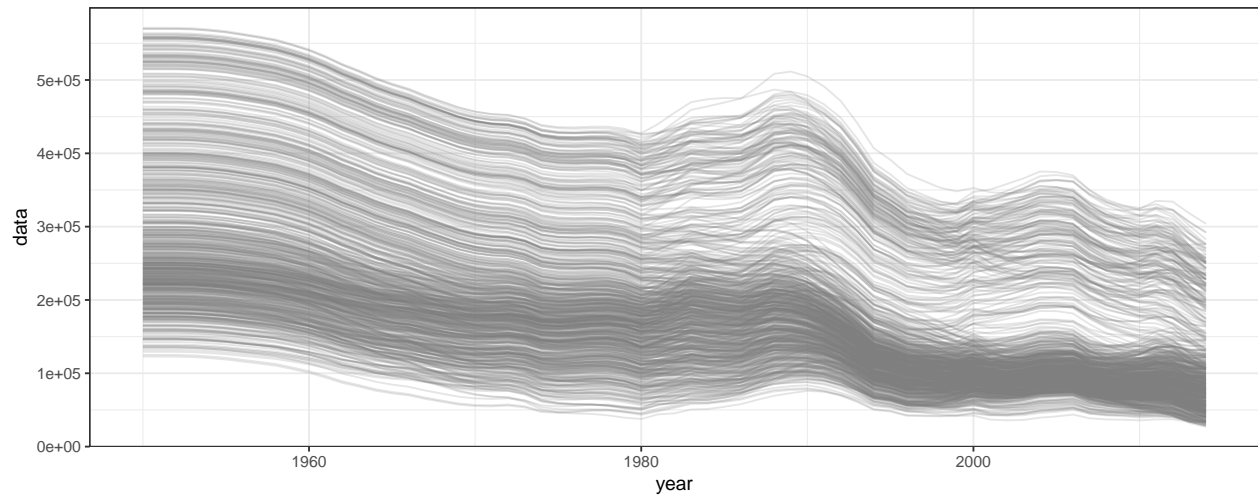


Figure 28 Albacore Indian Ocean SSB

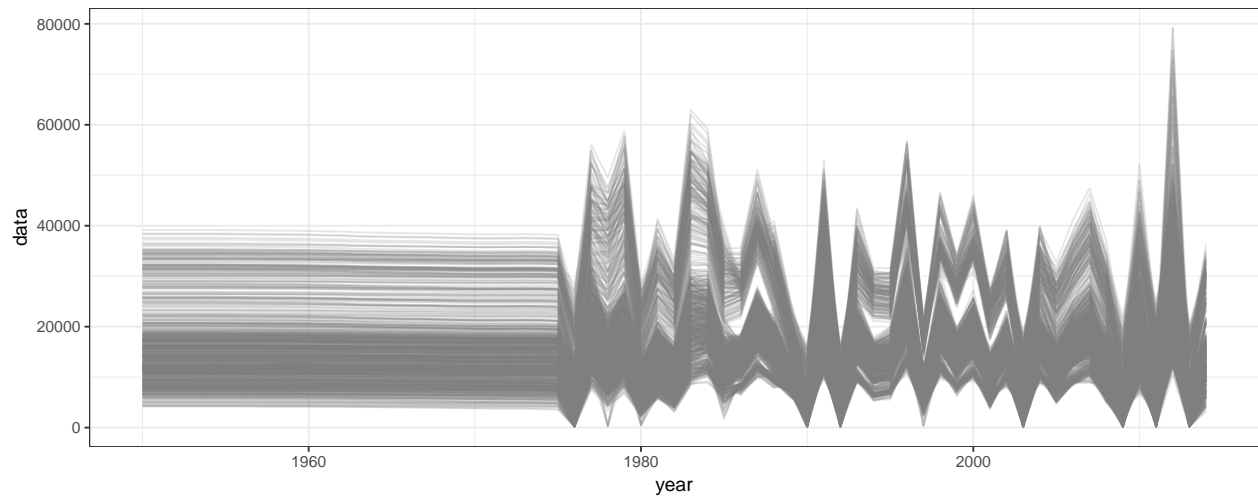


Figure 29 Albacore Indian Ocean recruits

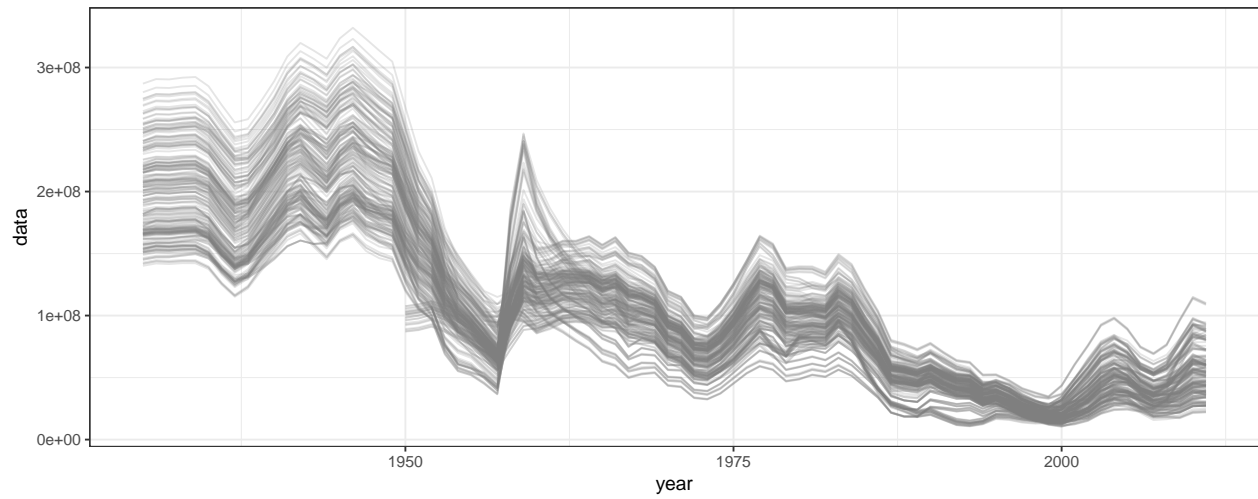


Figure 30 Albacore North Atlantic Ocean SSB

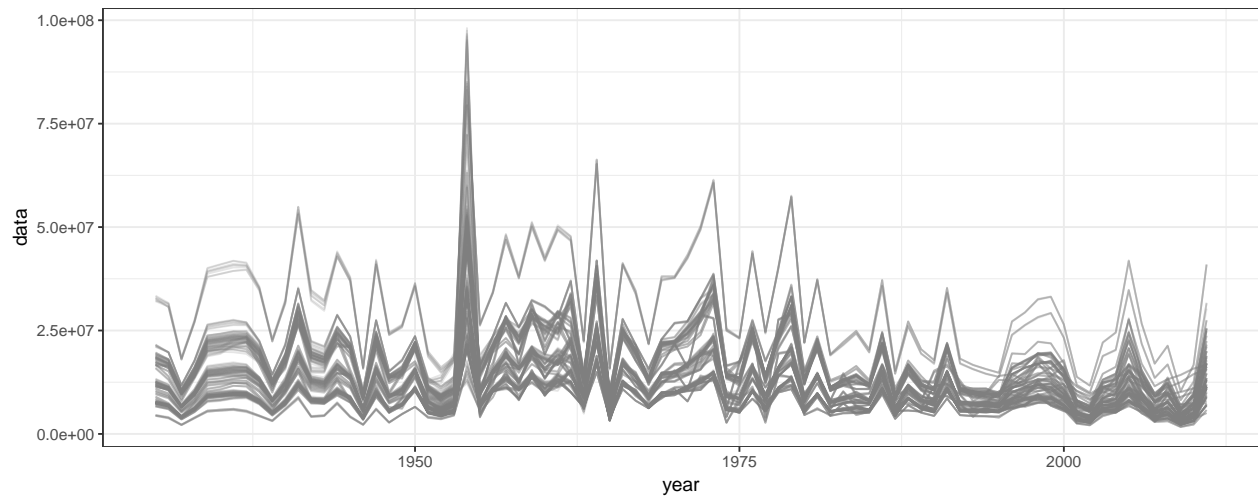


Figure 31 Albacore North Atlantic Ocean recruits

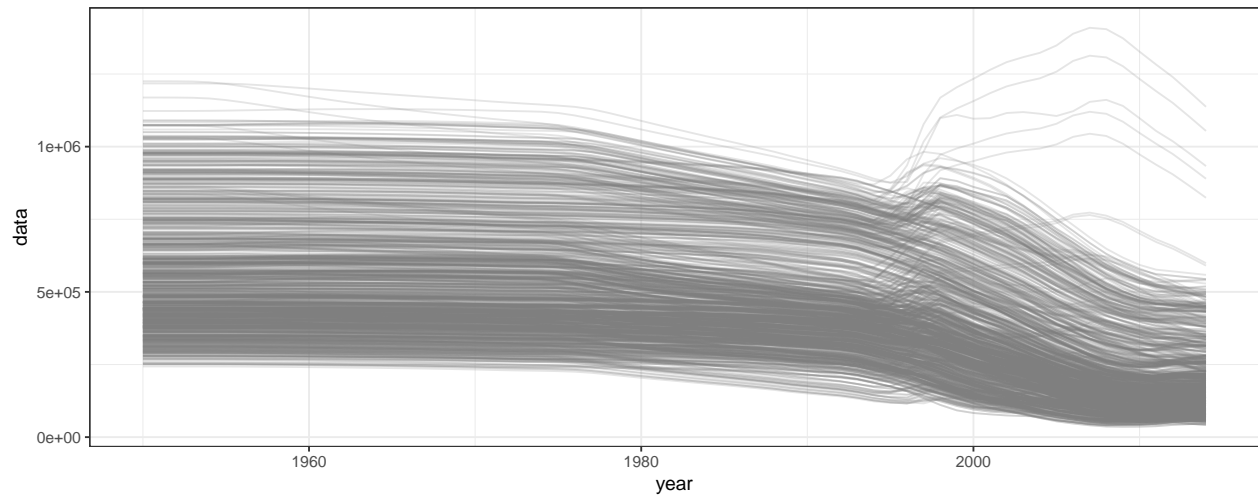


Figure 32 Swordfish Indian Ocean SSB

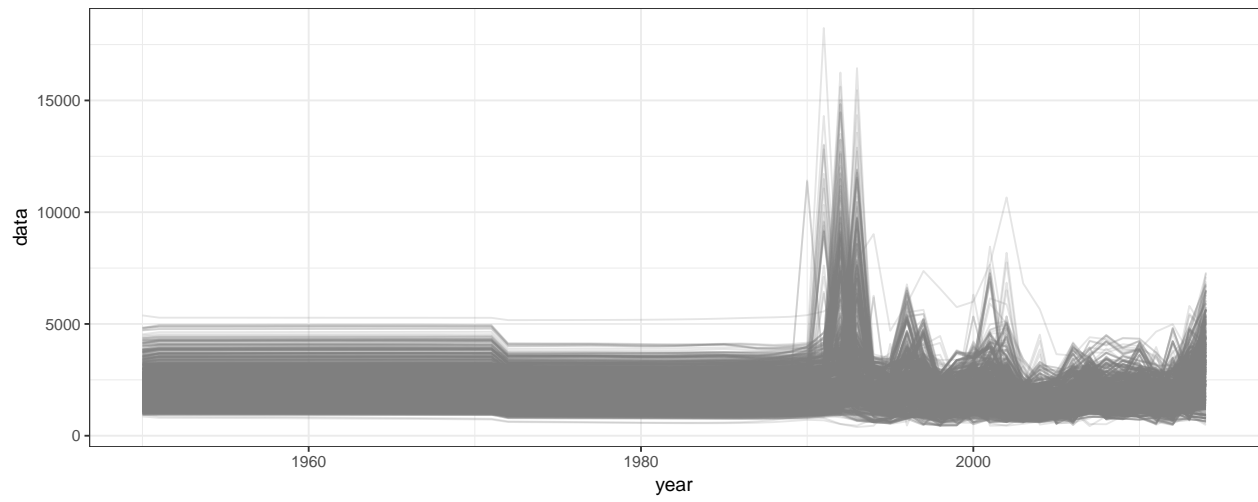


Figure 33 Swordfish Indian Ocean recruits

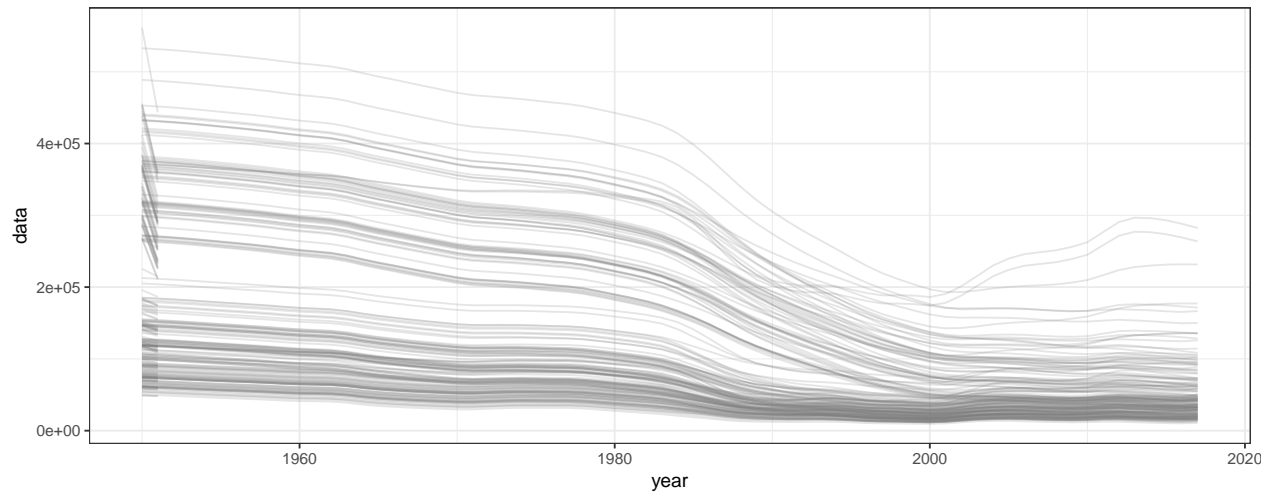


Figure 34 Swordfish North Atlantic Ocean SSB

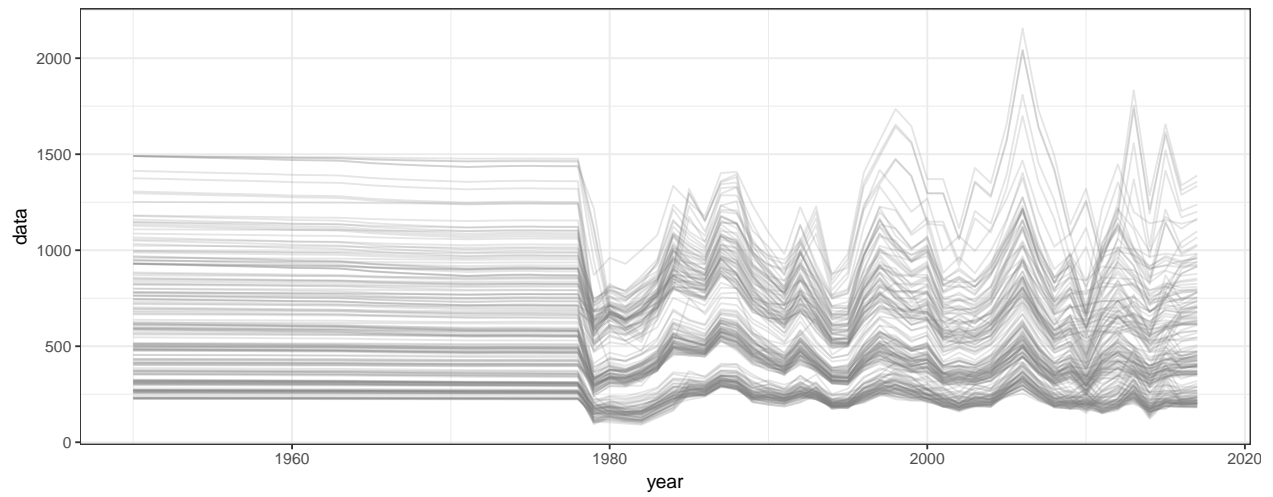


Figure 35 Swordfish North Atlantic Ocean Recruits