Bayesian Skipjack and Yellowfin Tuna CPUE Standardisation Model for Maldives Pole and Line 1995-2022

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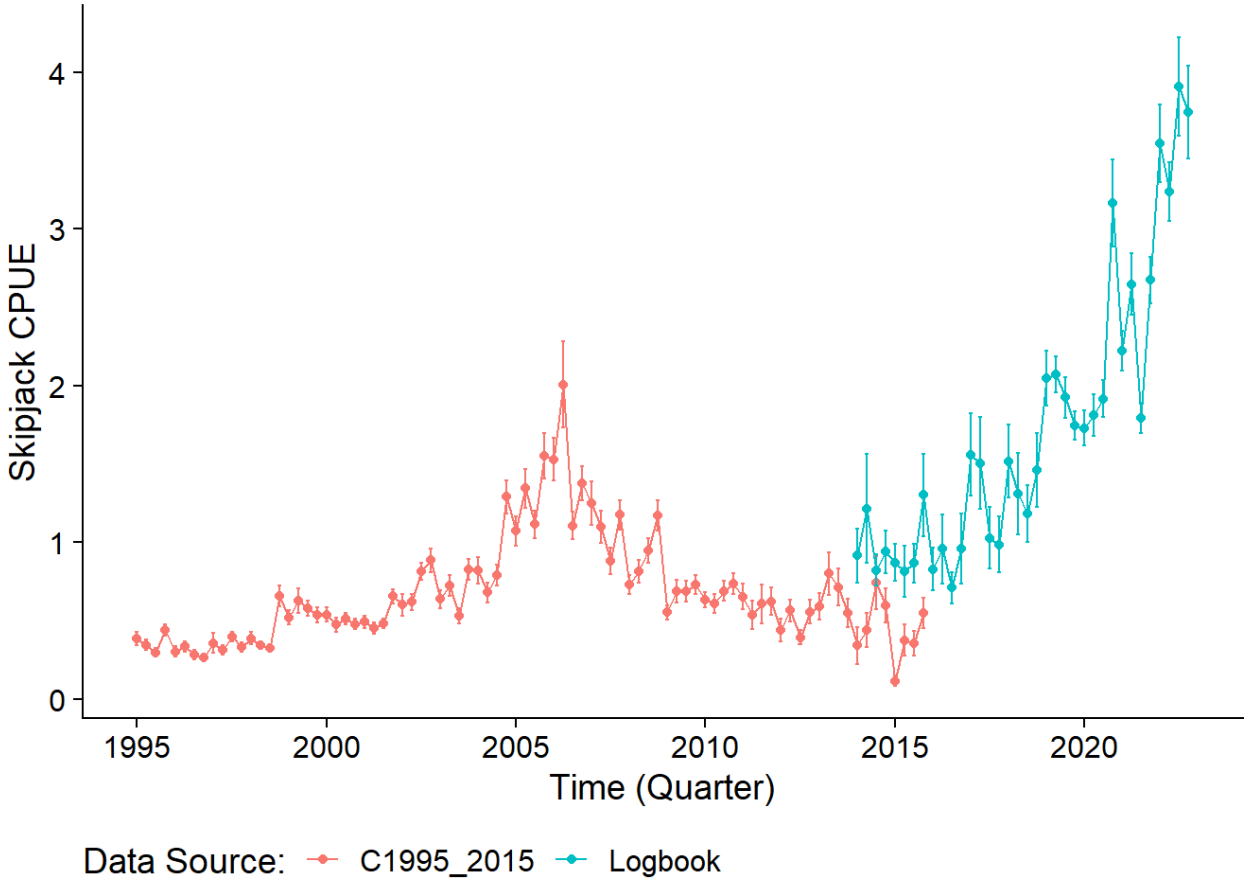
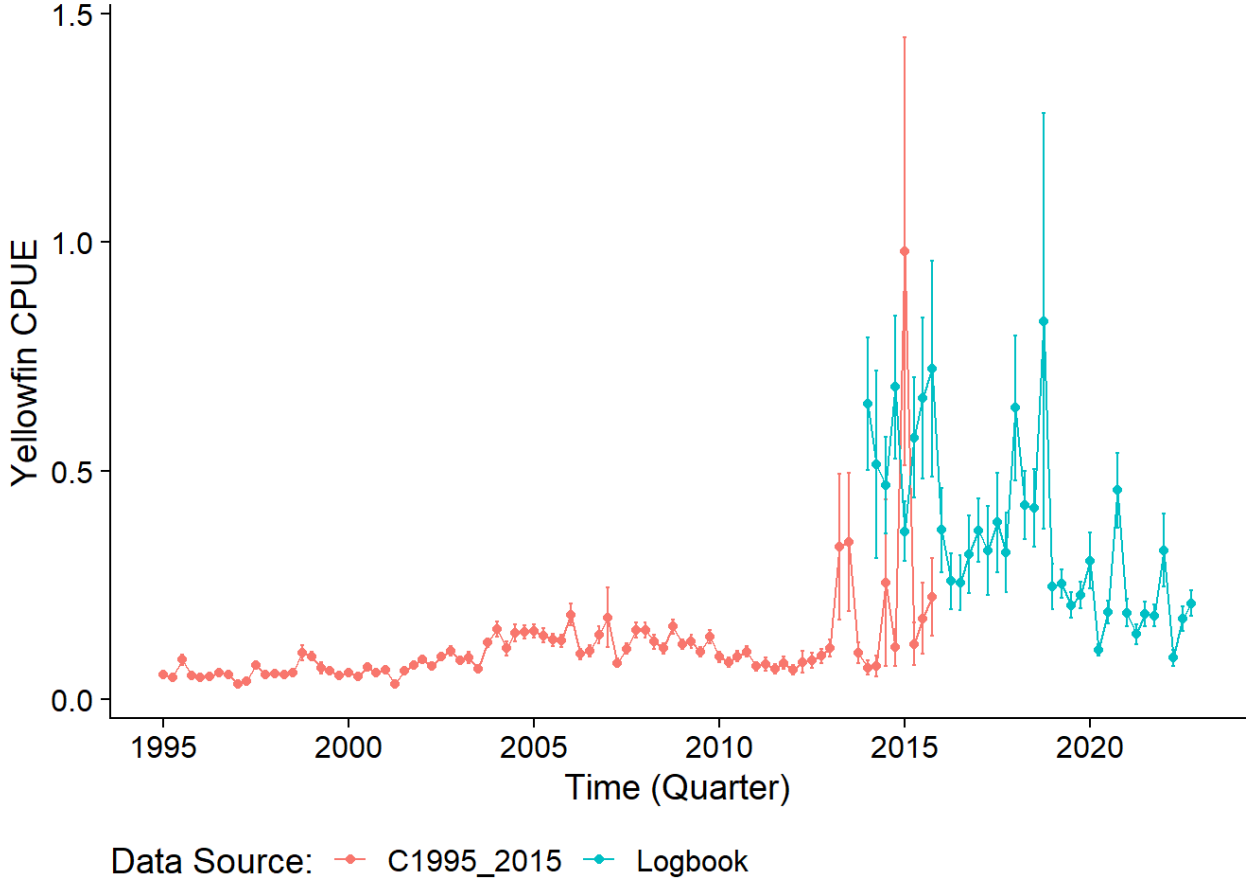
Recap/Summary

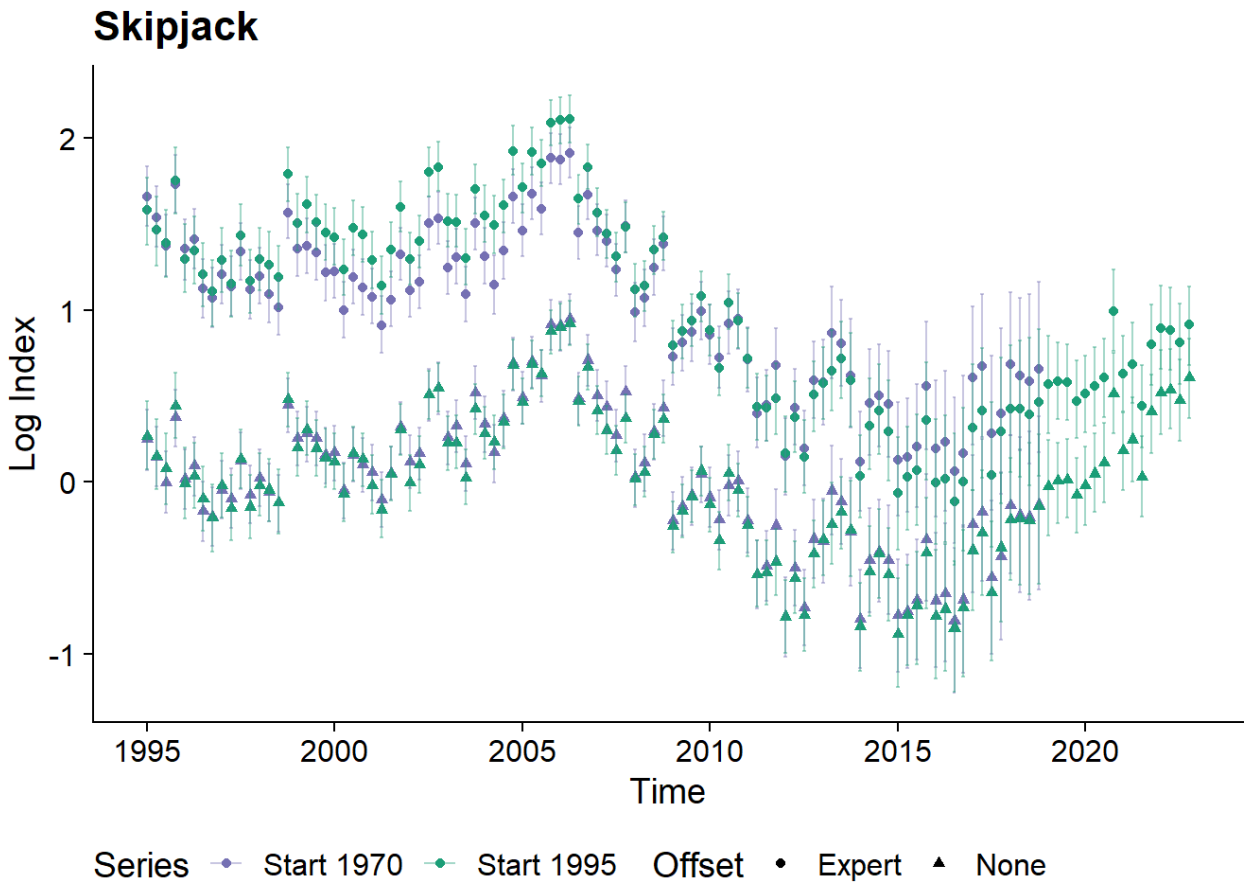
- The model explains changes in fishing power for pole and line catch-effort data 1995-2022 from the Maldives.
- The model accounts for differences in vessel length, regional location within the Maldives chain (west, central, east) and the data source (island reporting vs logbooks) as main effects.
- The model structure is a legacy from the previous model using early data. Optional “expert offset” now excluded.
- The Maldives chain effect is fitted separately for skipjack and yellowfin.
- No development work since 2019.

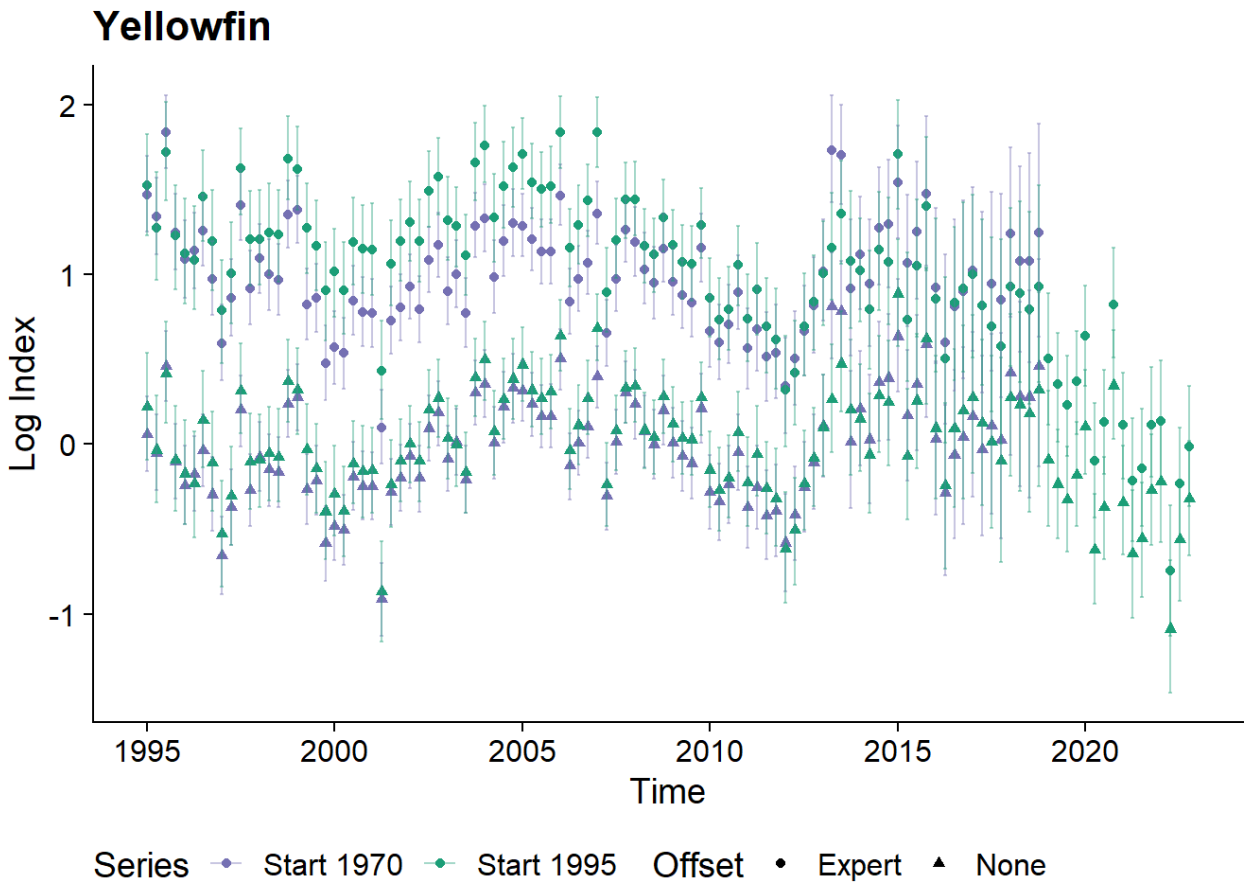
Nominal Skipjack and Yellowfin CPUE





Abundance Indices



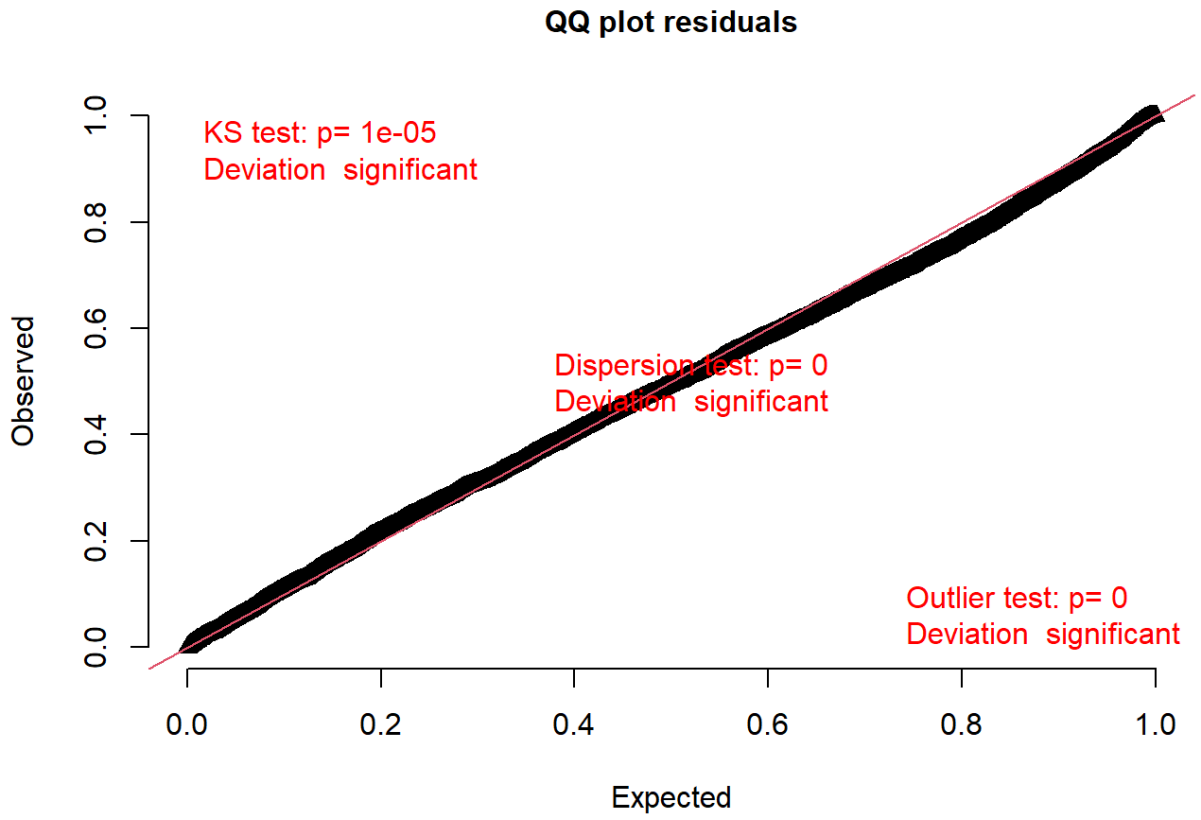


Residual Diagnostics

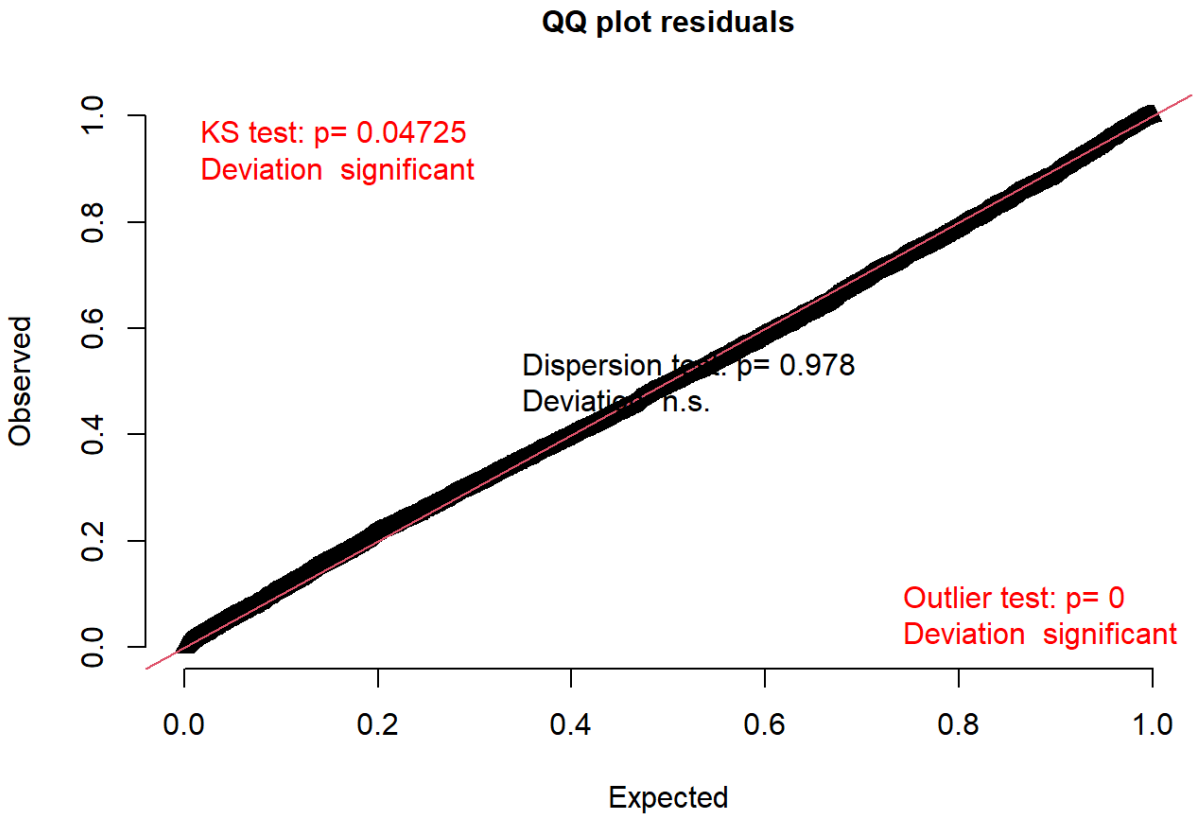
- Residuals were compared to simulated residuals from the compound Poisson gamma distribution using the DHARMa package.
- Plots were made separately for each species and with and without the expert opinion offset.
- Plots are standard examination of dispersion, appropriate likelihood and model structure.

QQ Plot

Skipjack

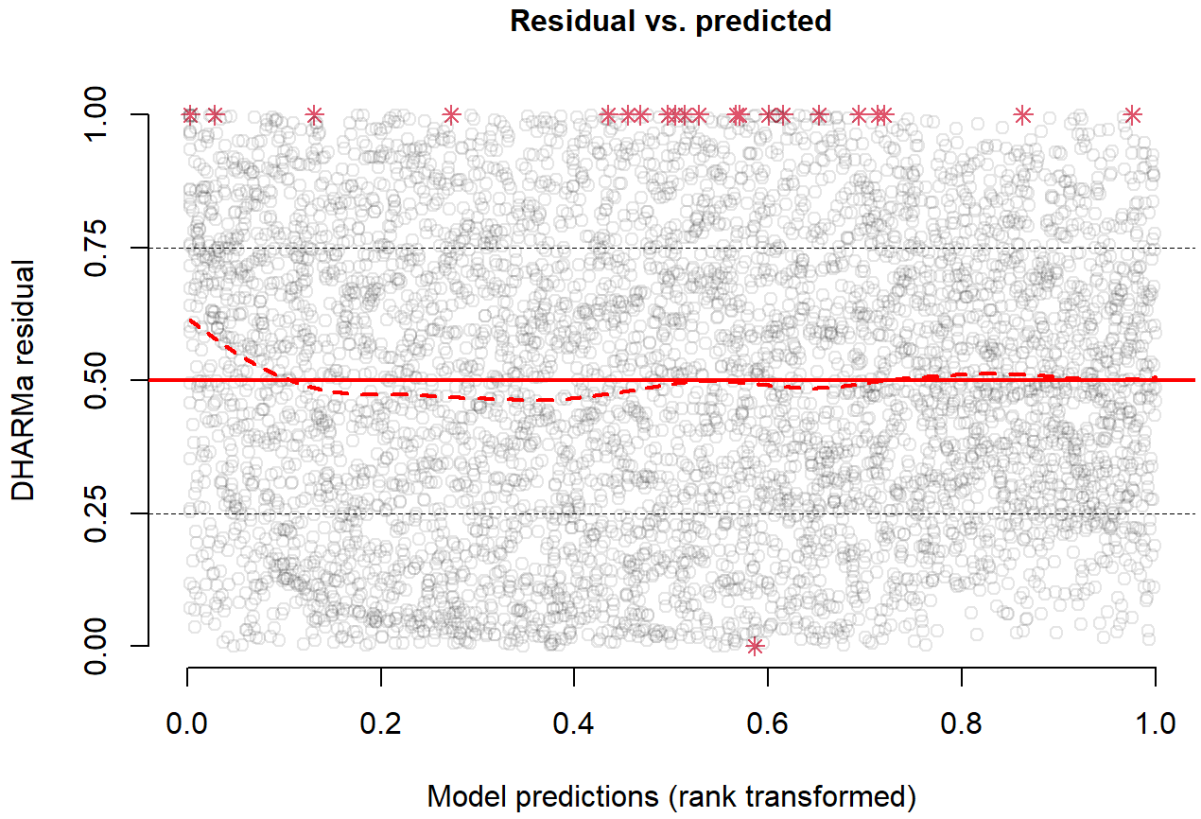


Yellowfin

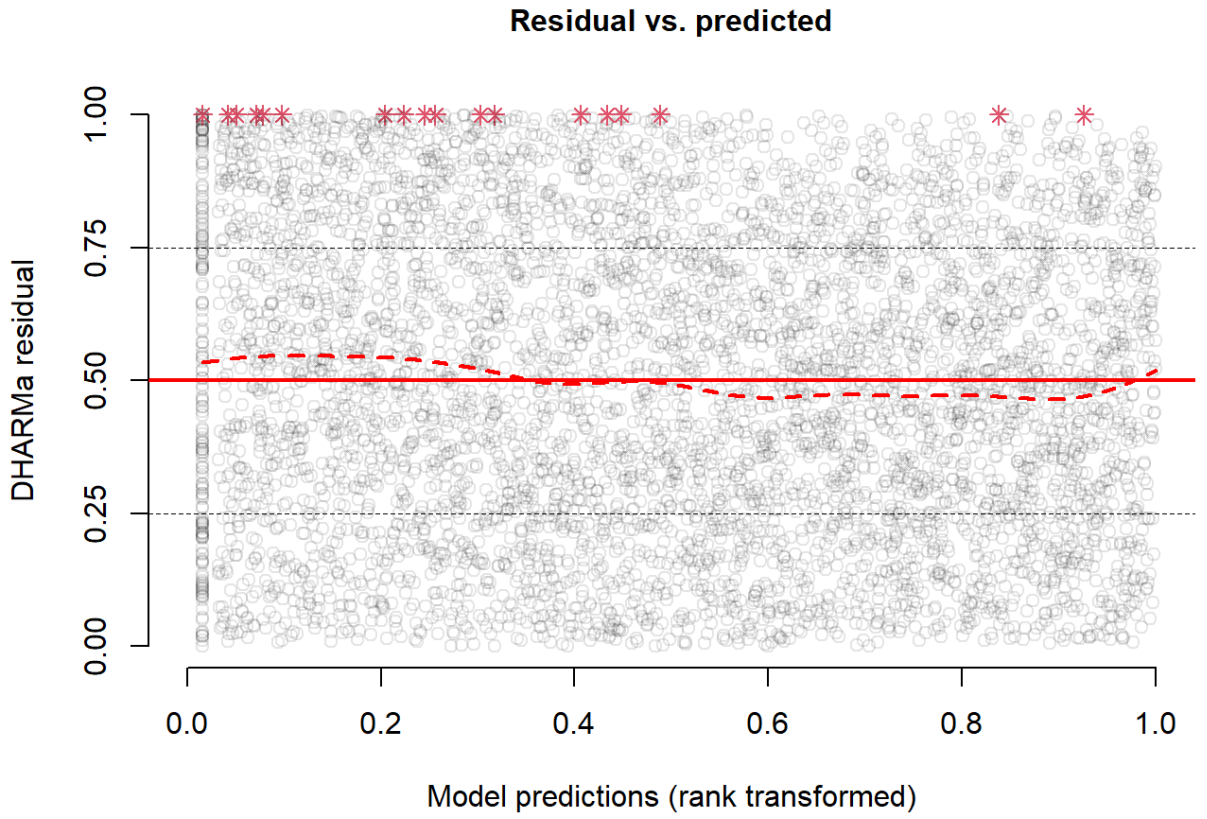


Residuals vs Predicted

Skipjack

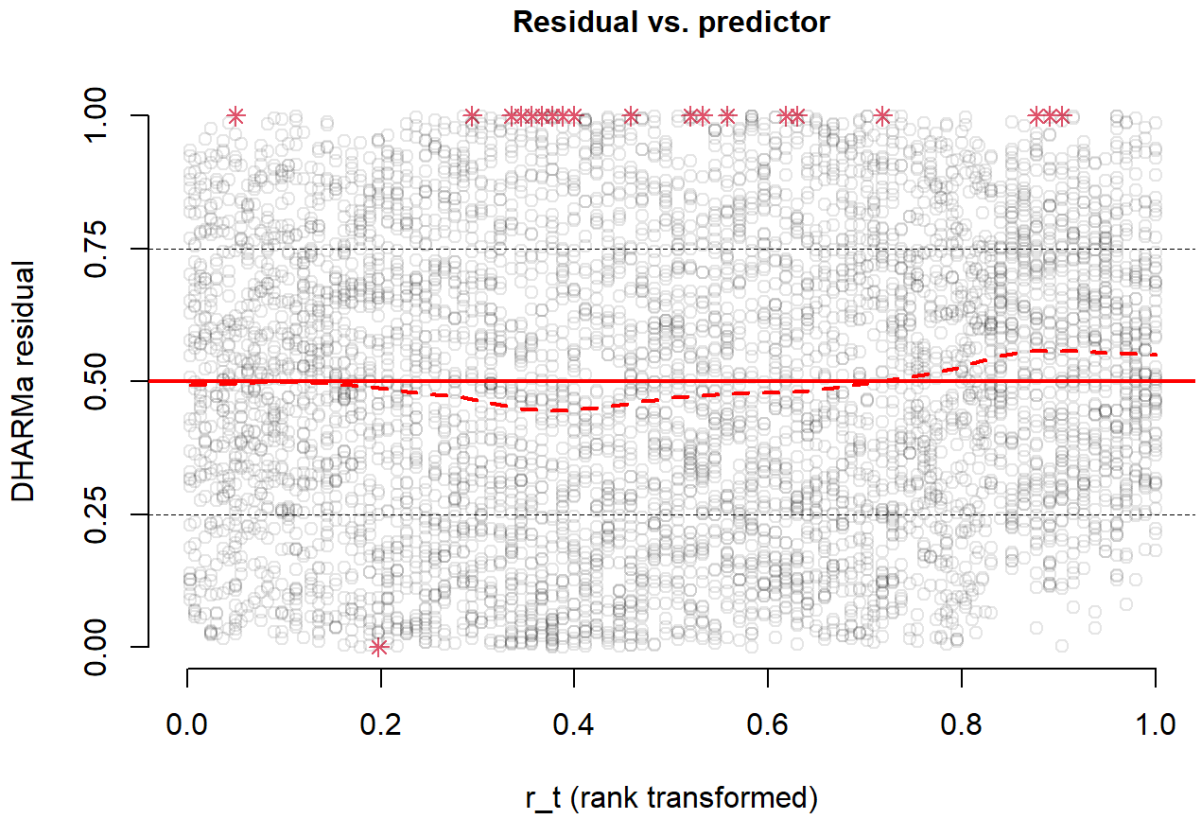


Yellowfin

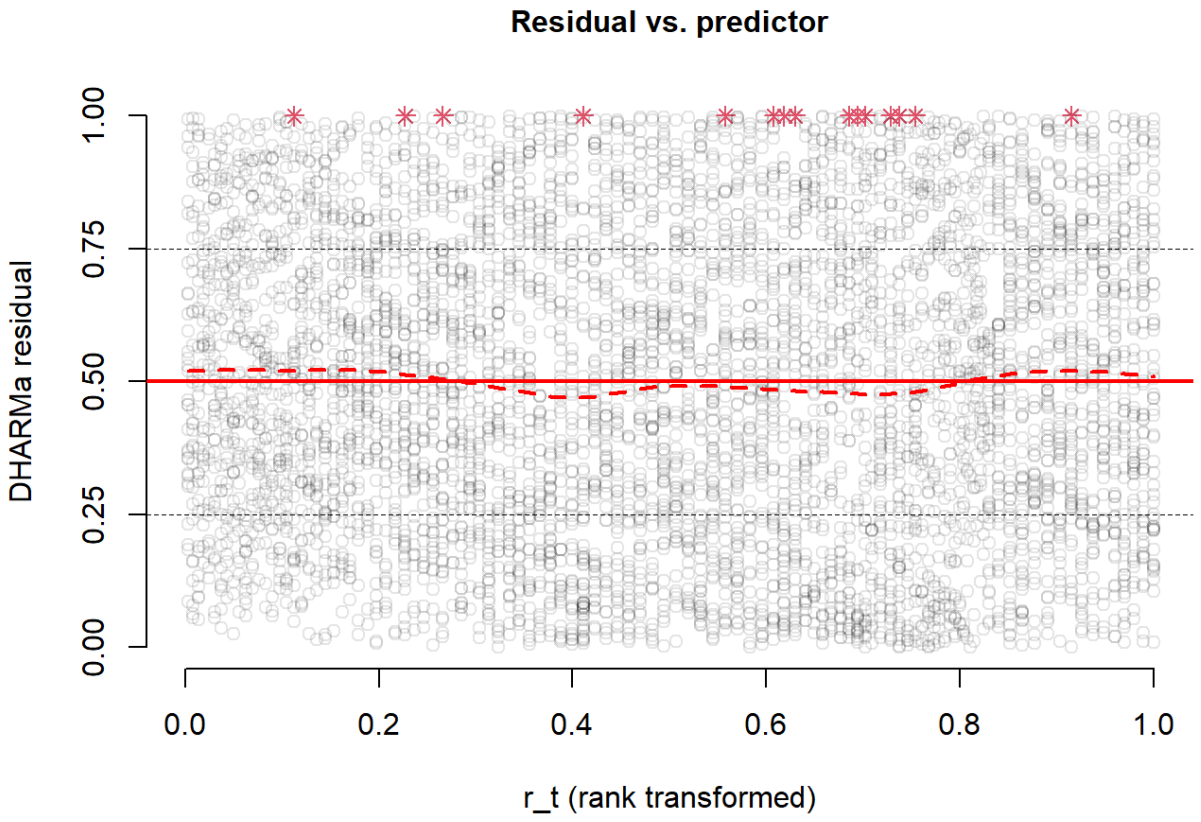


Residuals vs Time

Skipjack

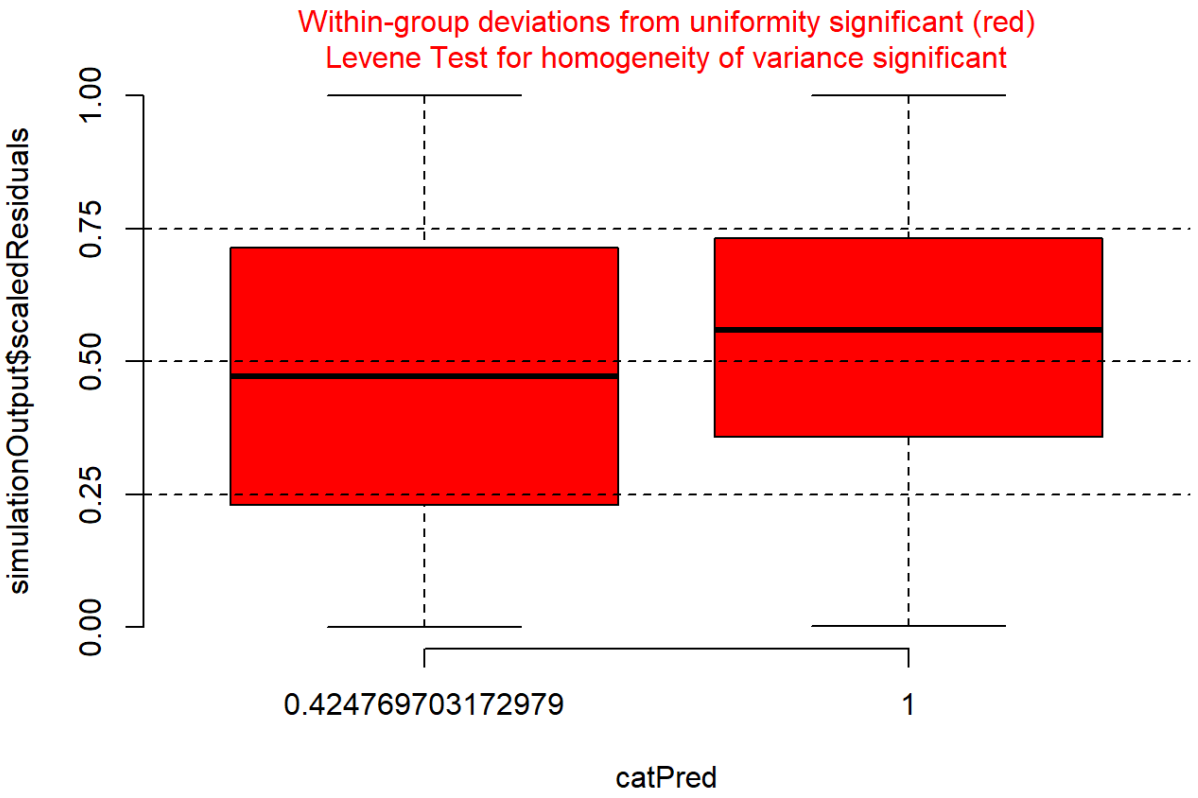


Yellowfin

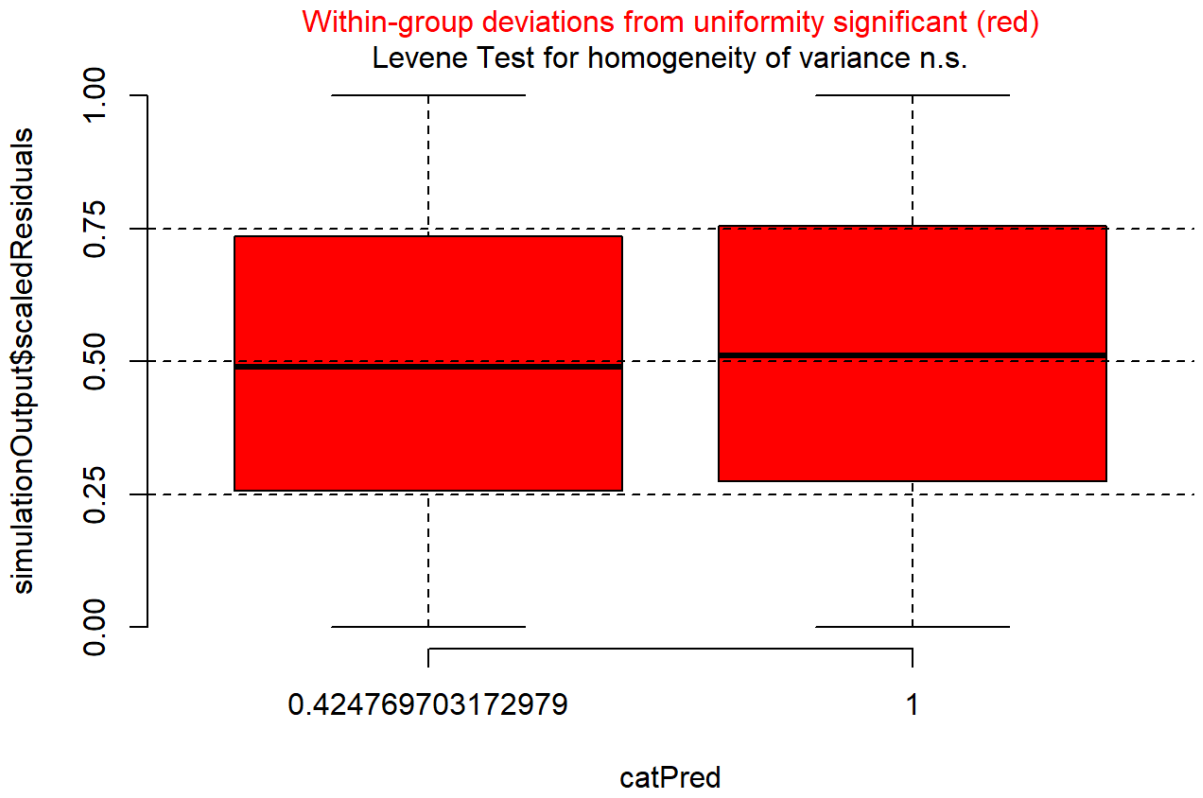


Residuals by Data Source

Skipjack

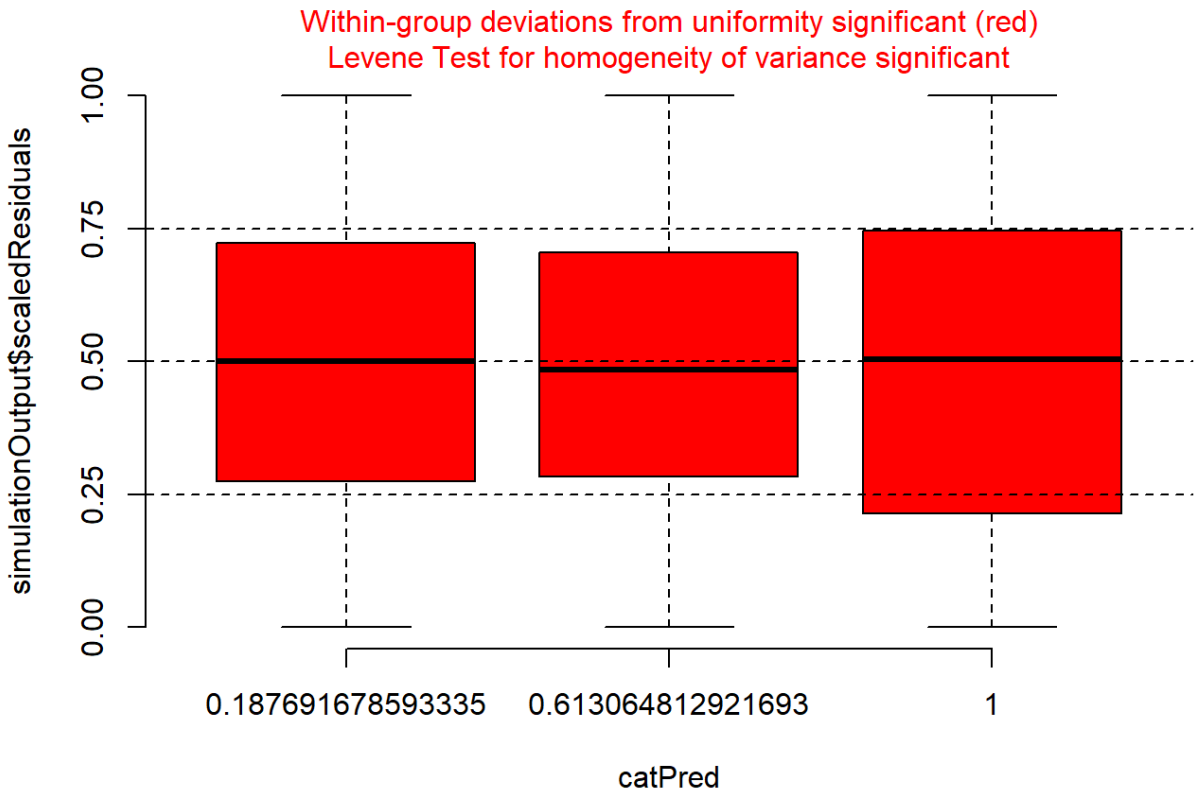


Yellowfin

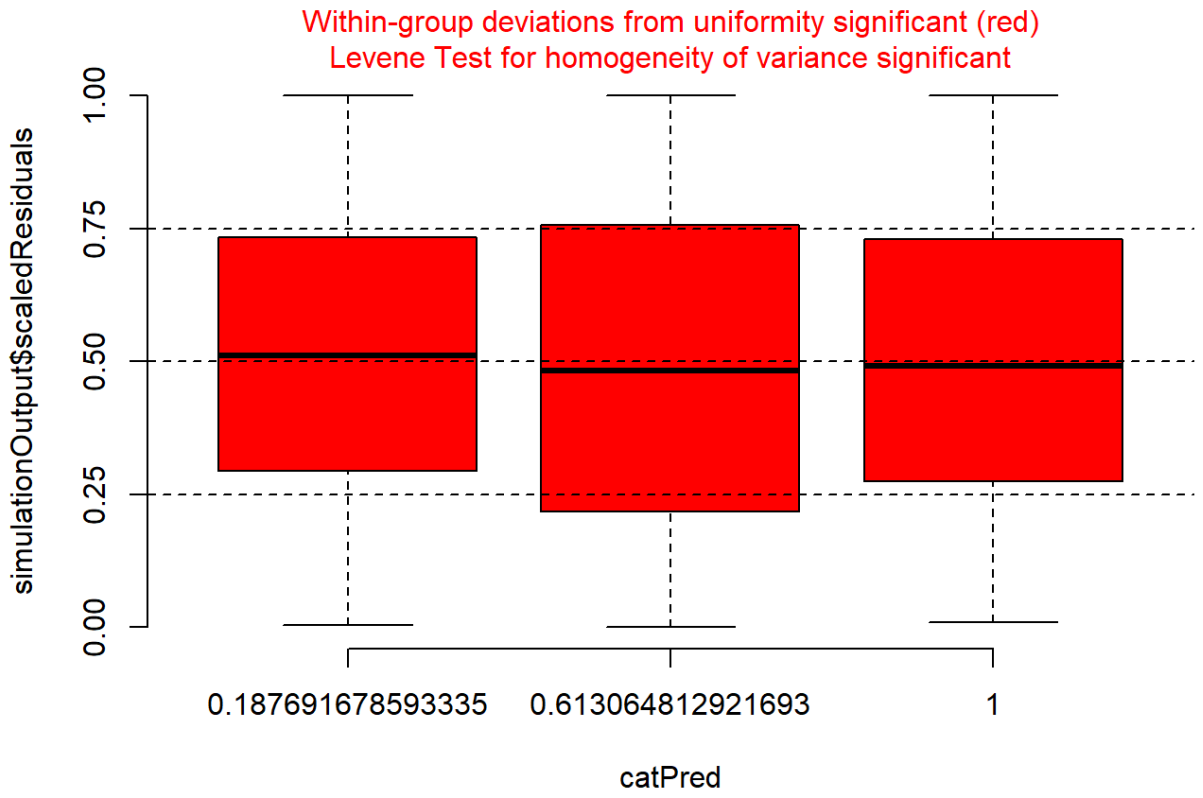


Residuals by Island Chain

Skipjack

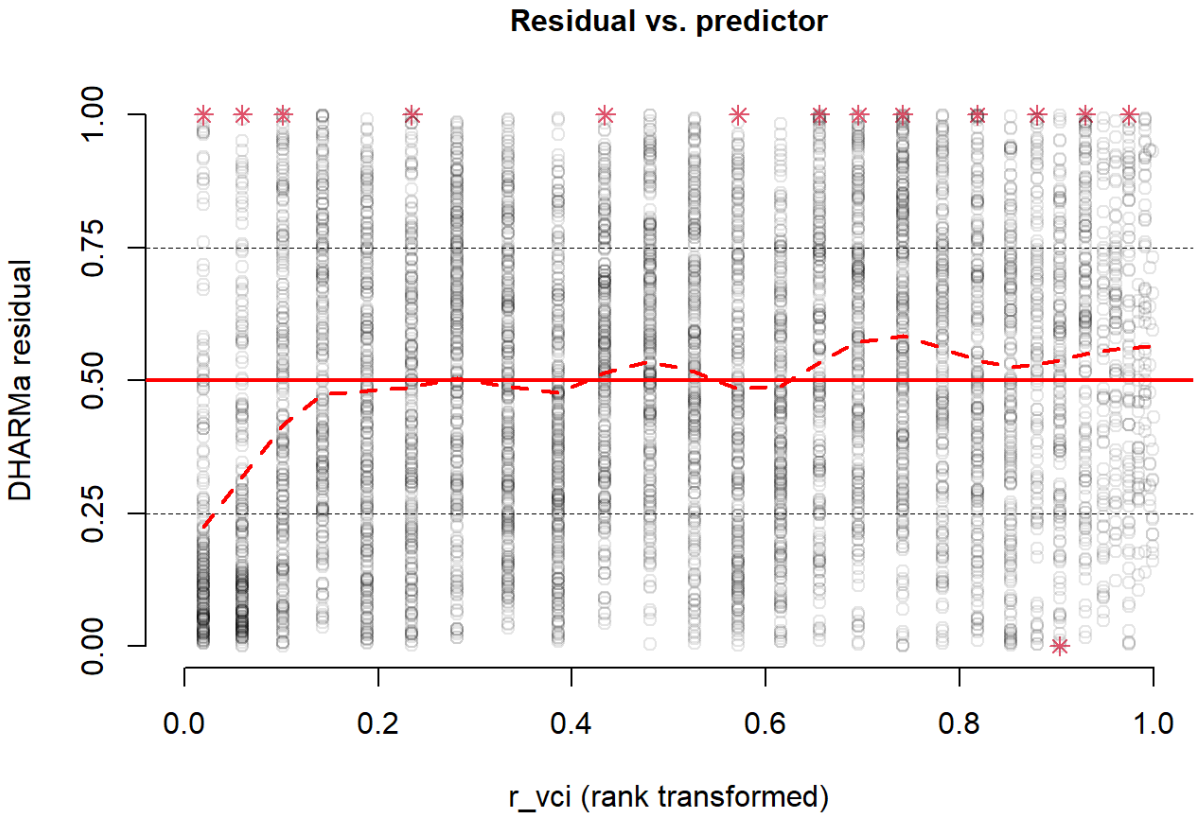


Yellowfin

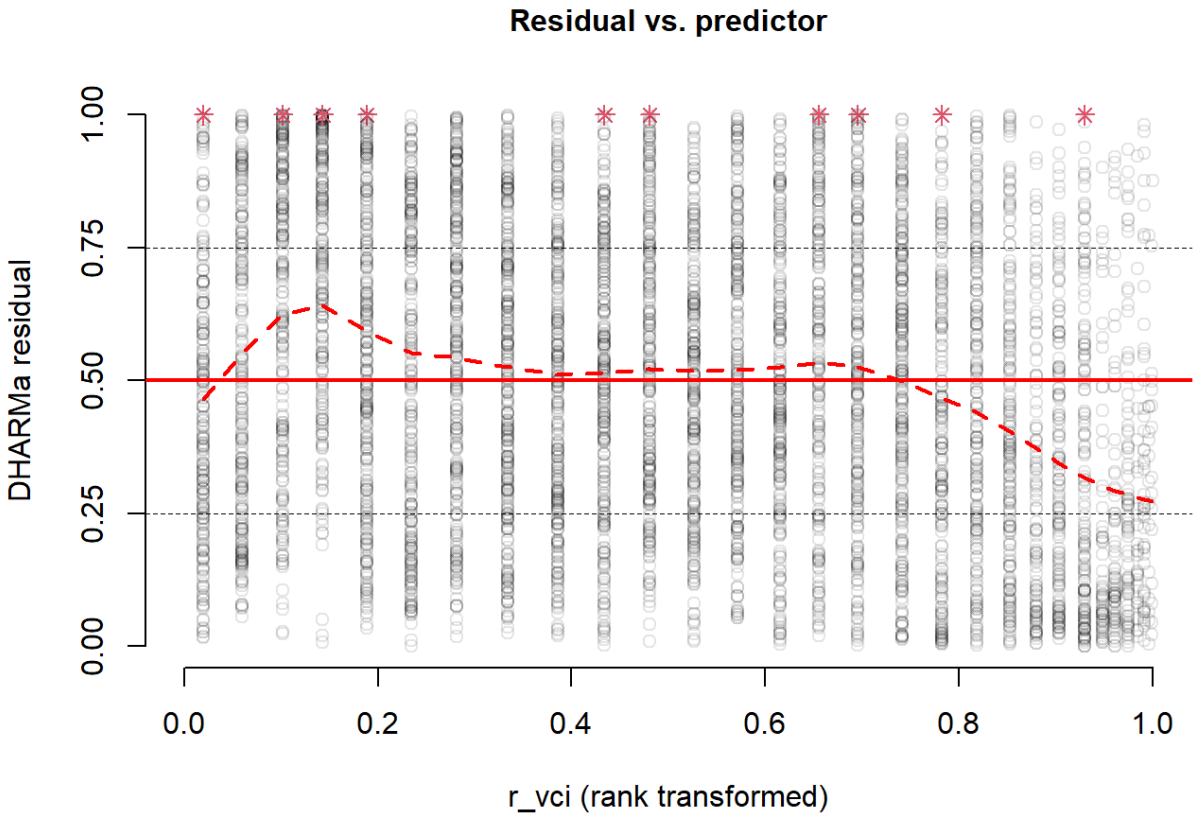


Residuals vs Vessel Length

Skipjack

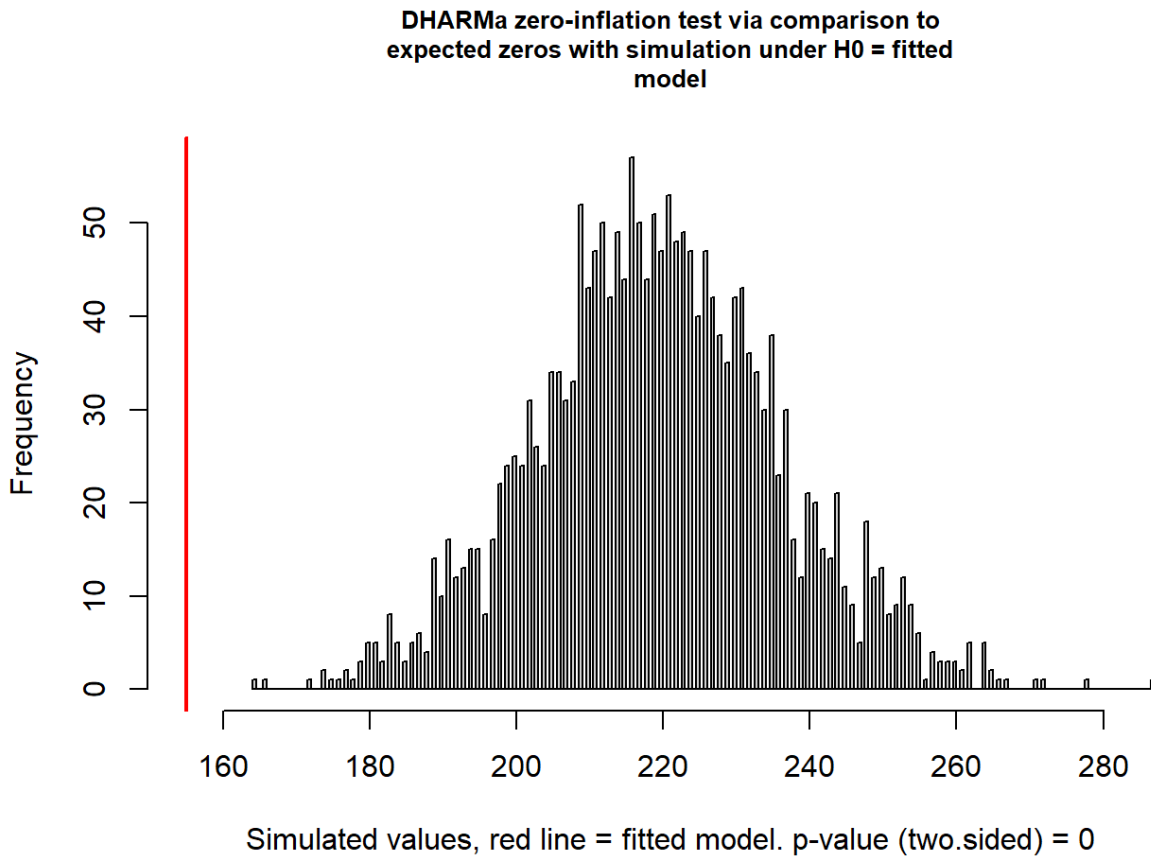


Yellowfin

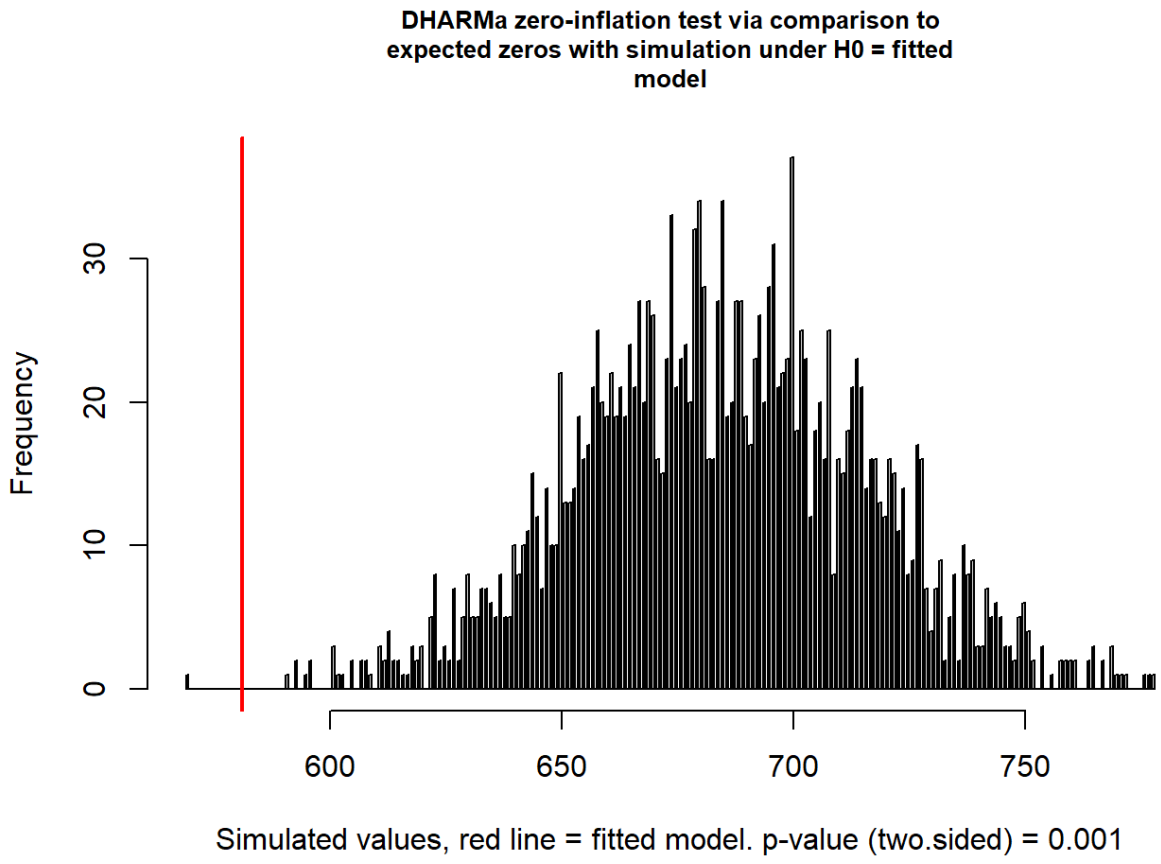


Zero Inflation

Skipjack

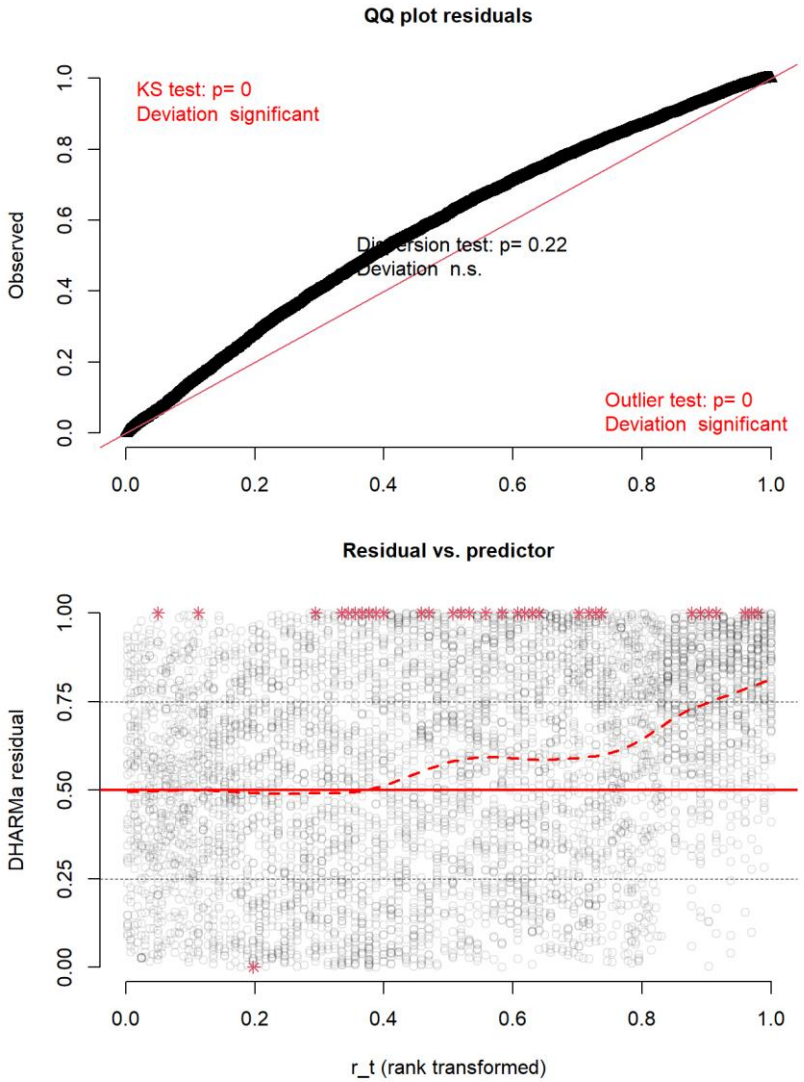


Yellowfin

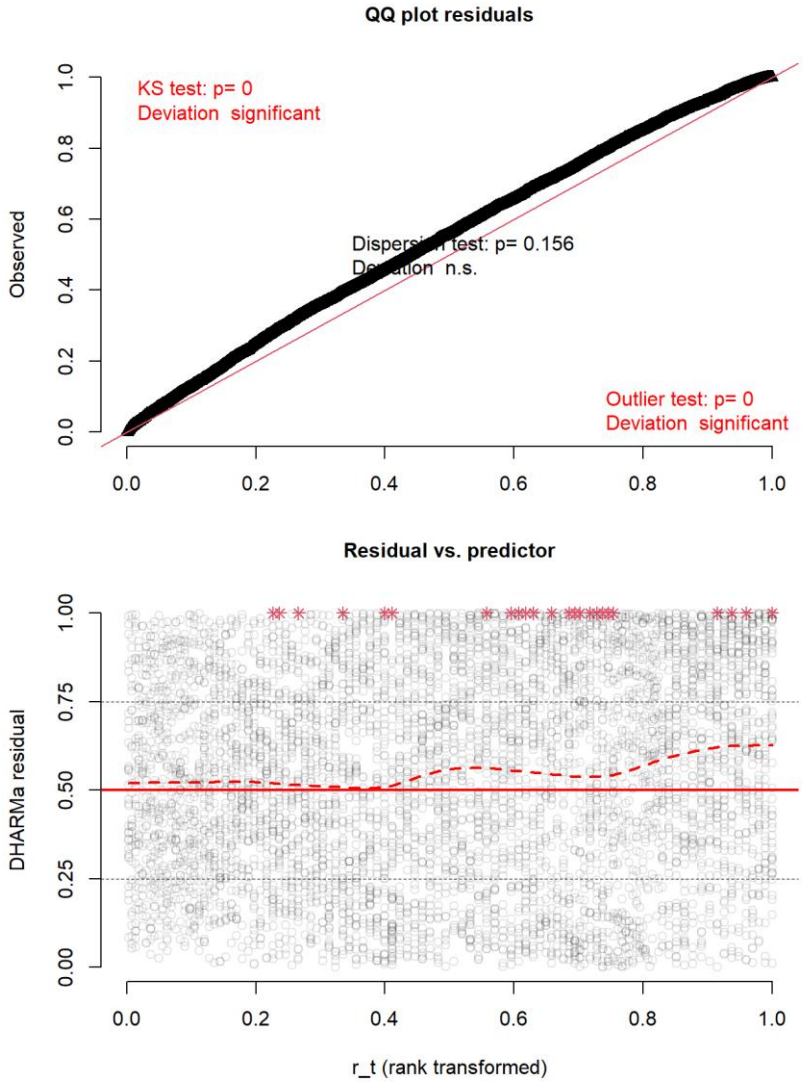


Expert Offset Worsens Fit…

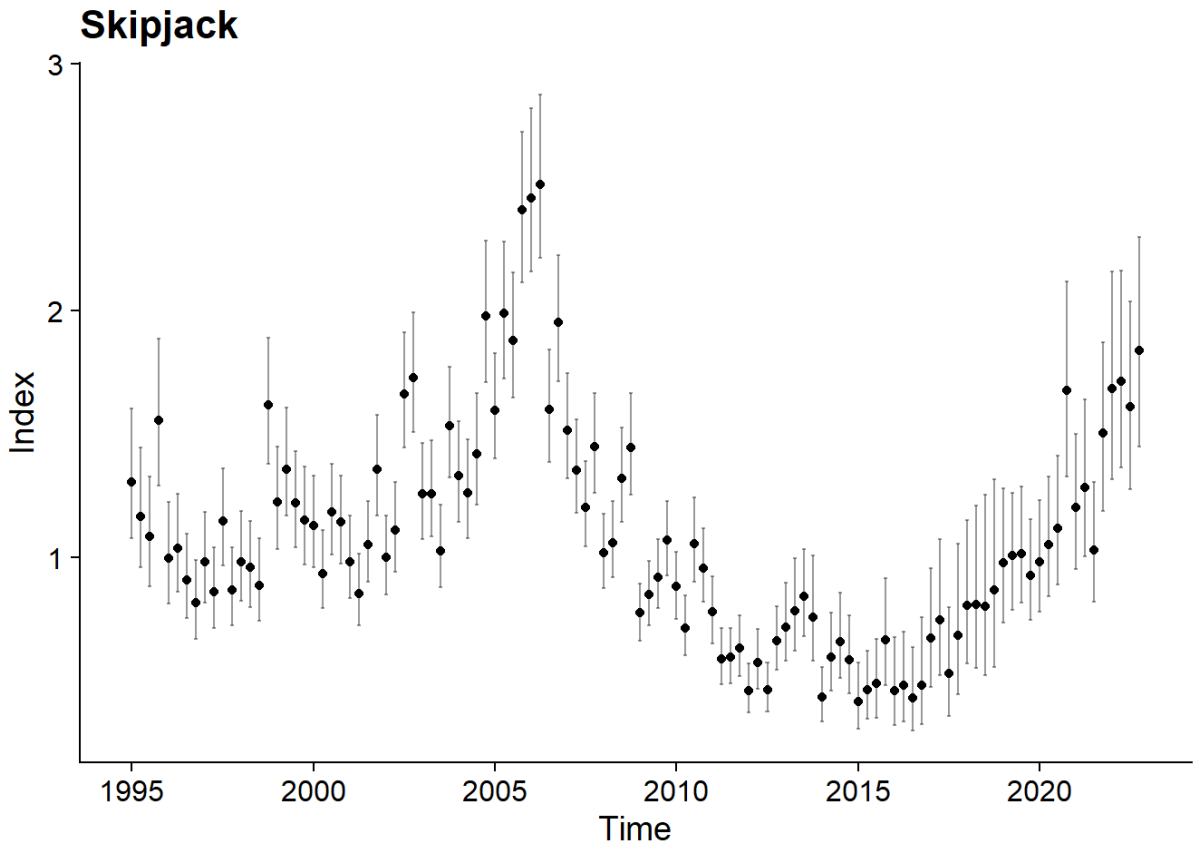
Skipjack

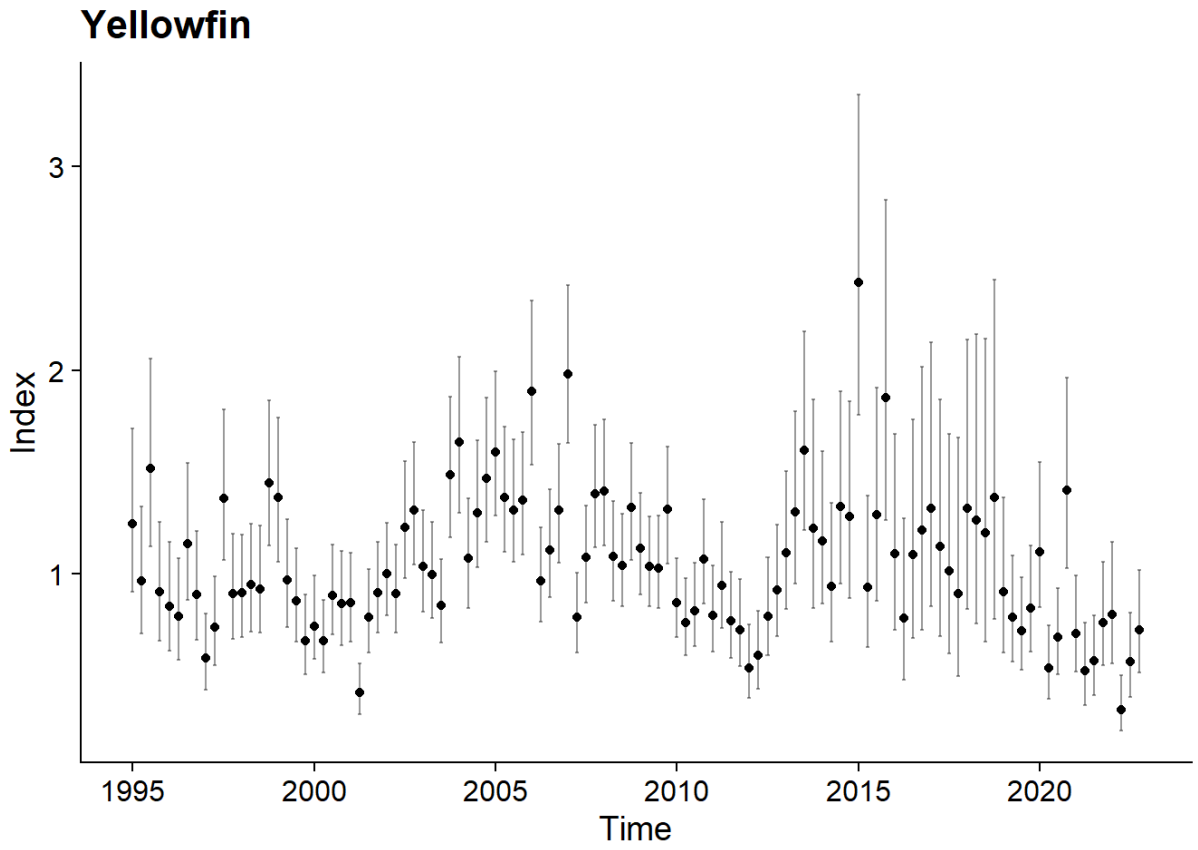


Yellowfin



Final Indices with 95% credible intervals





Further Work

- MMRI to lead future standardisation work
- Re-examine vessel length linear predictor structure
- Include vessel type/design as explanatory variable
- Adjust for unobserved zero catch of SKJ and YFT on a trip
- Examine logbook for more detail on operations to include as explanatory variables.