Babysam and experiments

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BabySam

Different state-space assessment models

- SAM, NCAM, WHAM, ...
- More similarities than differences
- Common equations
- State-space approach
- Catch-at-age or compositions & total catch
- Random walk or AR(1)
- Censored likelihood or catch-scaling

Exercise

- Add an option to use total & age compositions in babysam
- You will need to define an effective sample size
- The following helper functions may be useful

```
logcay2logtc<-function(logcay){
    log(sum(exp(logcay)))
}

logcay2comp<-function(logcay){
    cay<-exp(logcay)
    cay/sum(cay)
}
```

- Plot to compare

Observational likelihoods

Table 1: Overview of the observational models used in the case studies and some properties: if zero observations are allowed; whether the Baranov catch equation determines the mean, median or location; the number of estimated observational parameters per age (a) and fleet (f); and whether a correlation parameter is estimated. The models are divided in to model classes: Univariate numbers-at-age (UN@A), multivariate numbers-at-age (MN@A), proportions-at-age with log-normal total numbers (P@AwN), and proportions-at-age with log-normal total weight (P@AwW).

Model	Distribution	Class	Allows 0	Baranov	Est. par.s	Est. cor.
M_1	log-Normal	UN@A	No	Median	1 a f[1]	No
M_2	Gamma	UN@A	Some	Mean	1 a f	No
M_3	Generalized Gamma	UN@A	Some	Location	2 a f	No
M_4	Normal	UN@A	Yes	Mean	1 a f	No
M_5	Left Truncated Normal	UN@A	Yes	Location	1 a f	No
M_6	log-Student's t	UN@A	No	Location	2 a f	No
M_7	Multivariate log-Normal	MN@A	No	Median	1 a f+1 f[2]	Yes
M_8	Additive Logistic Normal	P@AwN	No	Location	1 a f+1 f	Yes
M_9	Multiplicative Logistic Normal	P@AwN	No	Location	1 a f + 1 f	Yes
M_{10}	Dirichlet	P@AwN	No	Mean	1 f	No
M_{11}	Additive Logisitc Normal	P@AwW	No	Location	1 a f+1 f	Yes
M_{12}	Multiplicative Logistic Normal	P@AwW	No	Location	1 a f + 1 f	Yes
M_{13}	Dirichlet	P@AwW	No	Mean	1 f	No

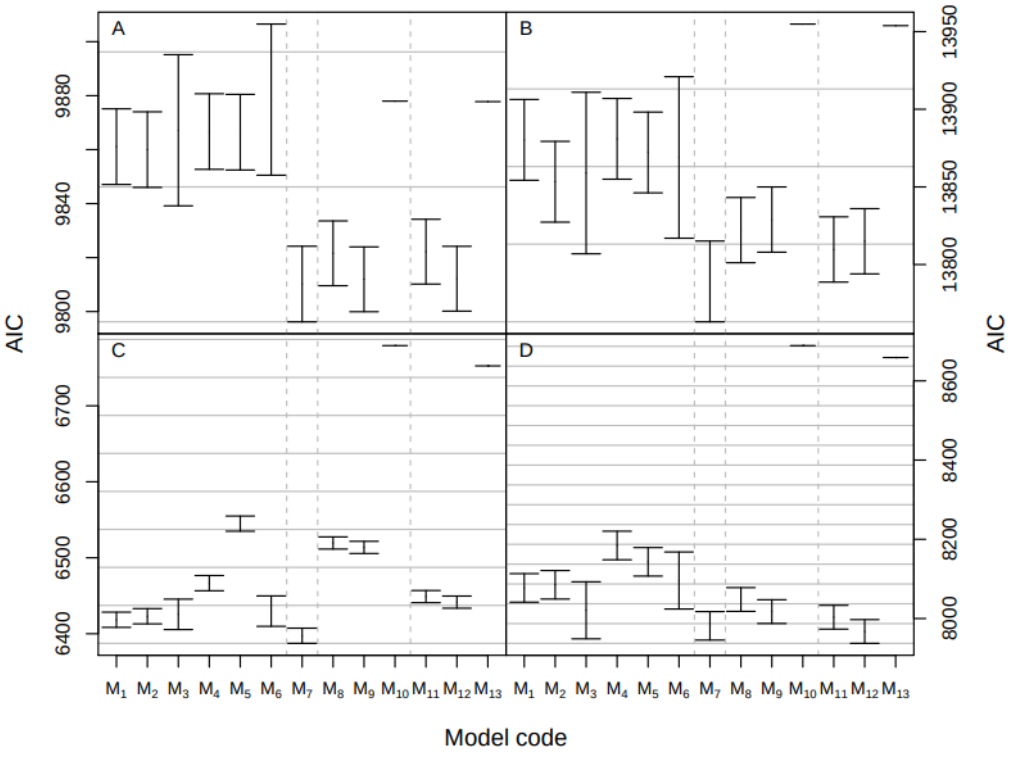

Figure 3: AIC intervals for models M_1 to M_{13} (Table 1) in the case studies: Blue Whiting (A), North-East Arctic Haddock (B), North Sea Cod (C), and Northern Shelf Haddock (D). The horizontal grey lines indicate AIC differences of 50 starting at the lowest lower bound of the models. Vertical dashed grey lines separates the models in model classes (Table 1).

- From paper:

  Choosing the observational likelihood in state-space stock assessment models CM Albertsen, A Nielsen, UH Thygesen - Canadian Journal of Fisheries and Aquatic Sciences, 2016