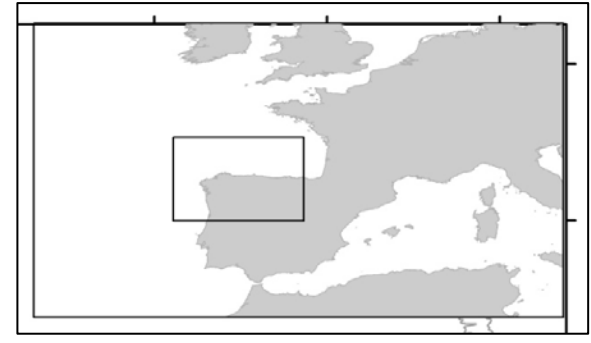
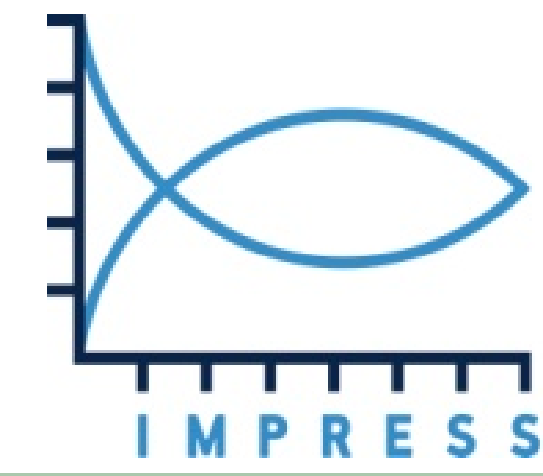


When uncertainty is for the better: a4a, the option for the southern megrims stocks



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INTRODUCTION

Both southern megrims stocks (*L. whiffiagonis* and *L. boscii*) divisions 8c and 9a are assessed in ICES Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (WGBIE). The model used in the assessment is Extended Survivors Analysis (XSA) (Shepherd, 1992). The XSA is a deterministic model and do not consider the uncertainty in its operation. To this day, it is known that uncertainty is fundamental when establishing any reference point and management derived from a biological process. Megrims are caught in mixed fisheries of bottom trawlers generally targeting a heterogeneous group of valuable demersal white fish. As megrims have significant commercial value in the Spanish market and they are regulated species in the area by a total allowable catch (TAC) quota system, they must have the more appropriate tools to assess them.

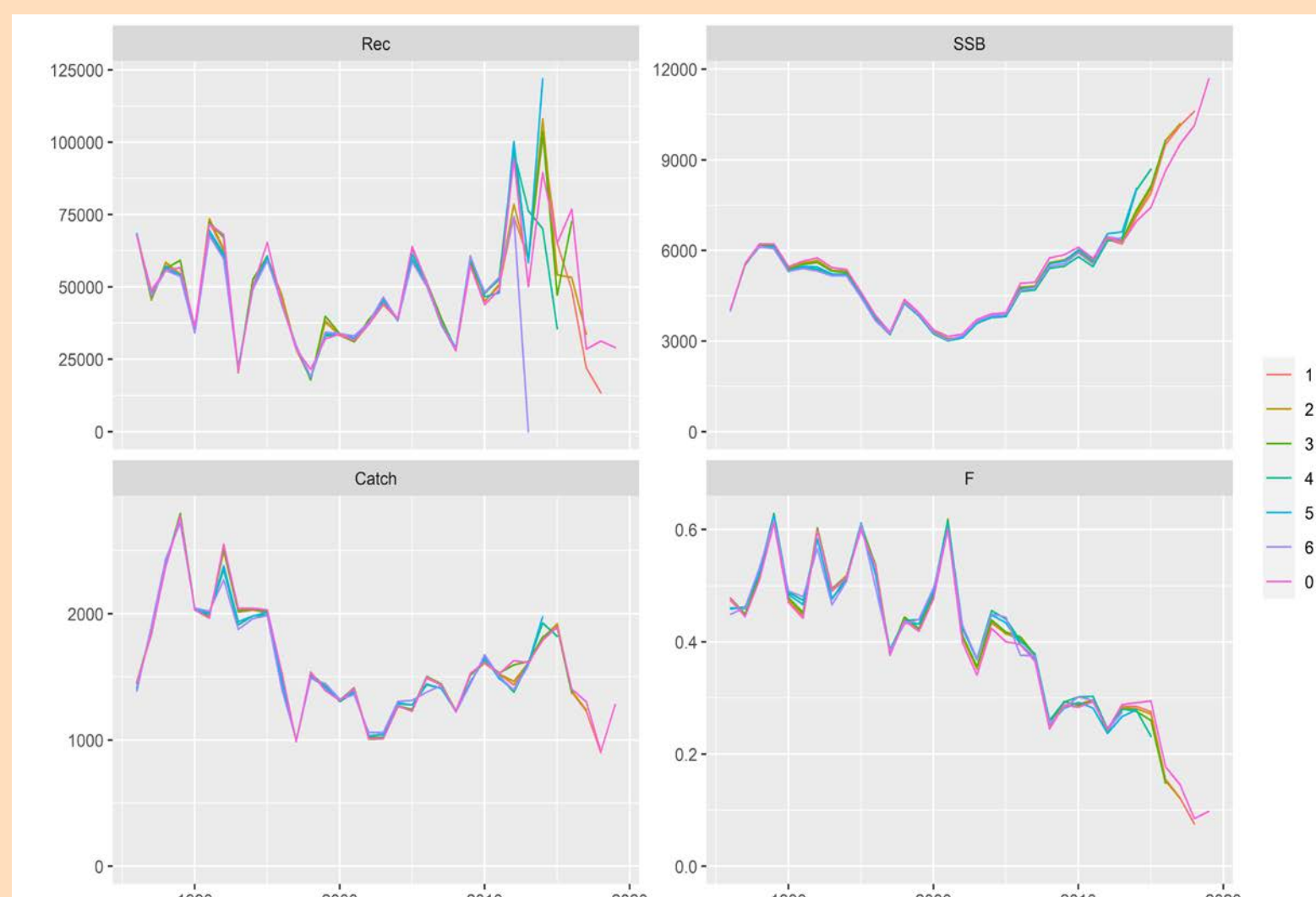
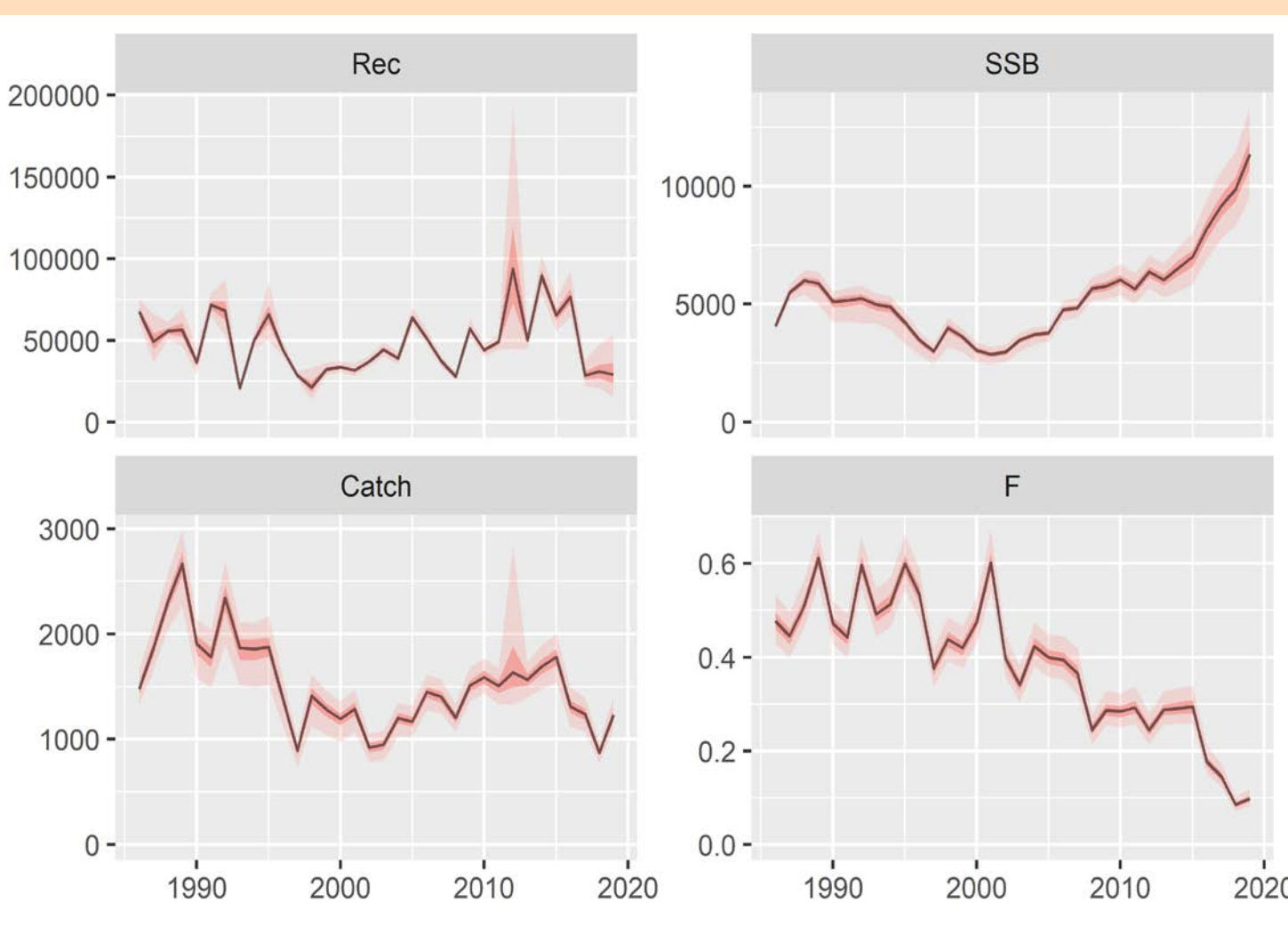
MATERIAL AND METHODS

- a4a - Assessment For All, a non-linear catch-at-age model implemented in the R software and FLR (Fisheries Library in R), using AD Model Builder (ADMB), has been tested in these stocks. The model structure is defined by submodels, which are the different parts that require structural assumptions. There are 5 submodels in operation: a model for F-at-age, a model for the initial age structure, a model for recruitment, a (list) of model(s) for abundance indices catchability-at-age, and a list of models for the observation variance of catch-at-age and abundance indices (http://www.flr-project.org/doc/Statistical_catch_at_age_models_in_FLa4a.html)
- A FLStock object is needed and it was adapted from XSA input data. This object includes catches, landings, discards, weights at age, natural mortality, maturity, harvest before spawning and mortality before spawning.
- Also, for tuning indices, a FLIndices object was created for the tuning fleets for *L. whiffiagonis* and *L. boscii*.
- Several fits have been tested in order to find an appropriate configuration for this stocks. In this poster the most relevant ones are presented.

RESULTS

L. boscii model configuration

- Smooth in age 0 (fmod) and in survey and LPUEs (qmod) increase k:
- fmod <- ~factor(replace(age, age > 6, 6)) + factor(year) + s(year, k = 25, by = as.numeric(age == 0))
 - qmod <- list(~l(1/(1 + exp(-age))) + s(replace(age, age > 5, 5), k = 5),
 ~l(1/(1 + exp(-age))) + s(year, k = 3),
 ~l(1/(1 + exp(-age))) + s(year, k = 3))



L. whiffiagonis model configuration

- Smooth in age 1 (fmod) and in LPUEs (qmod):
- fmod <- ~factor(replace(age, age > 6, 6)) + factor(year) + s(year, k = 3, by = as.numeric(age == 1))
 - qmod <- list(~l(1/(1 + exp(-age))),
 ~l(1/(1 + exp(-age))) + s(year, k = 3),
 ~l(1/(1 + exp(-age))) + s(year, k = 3))

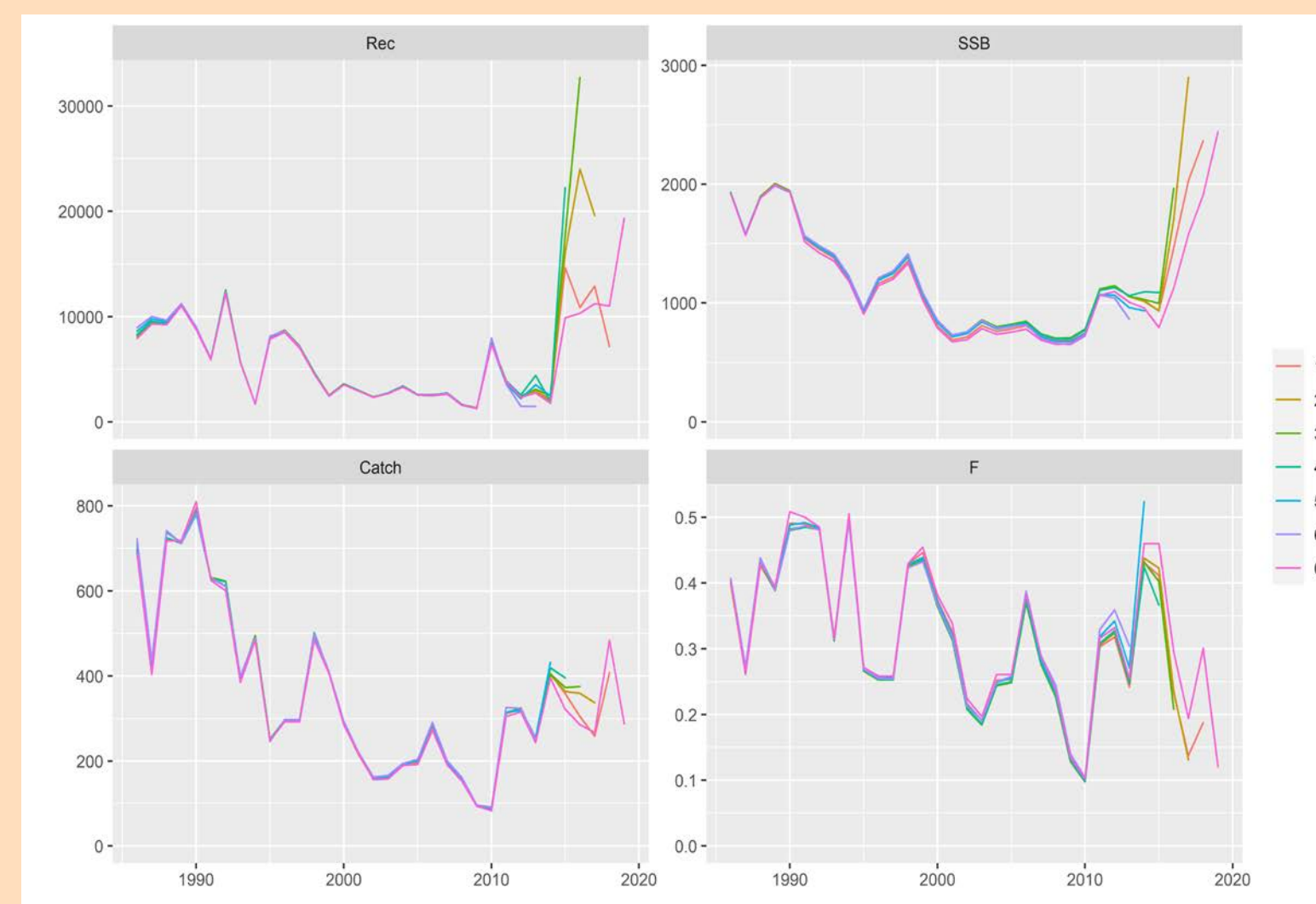
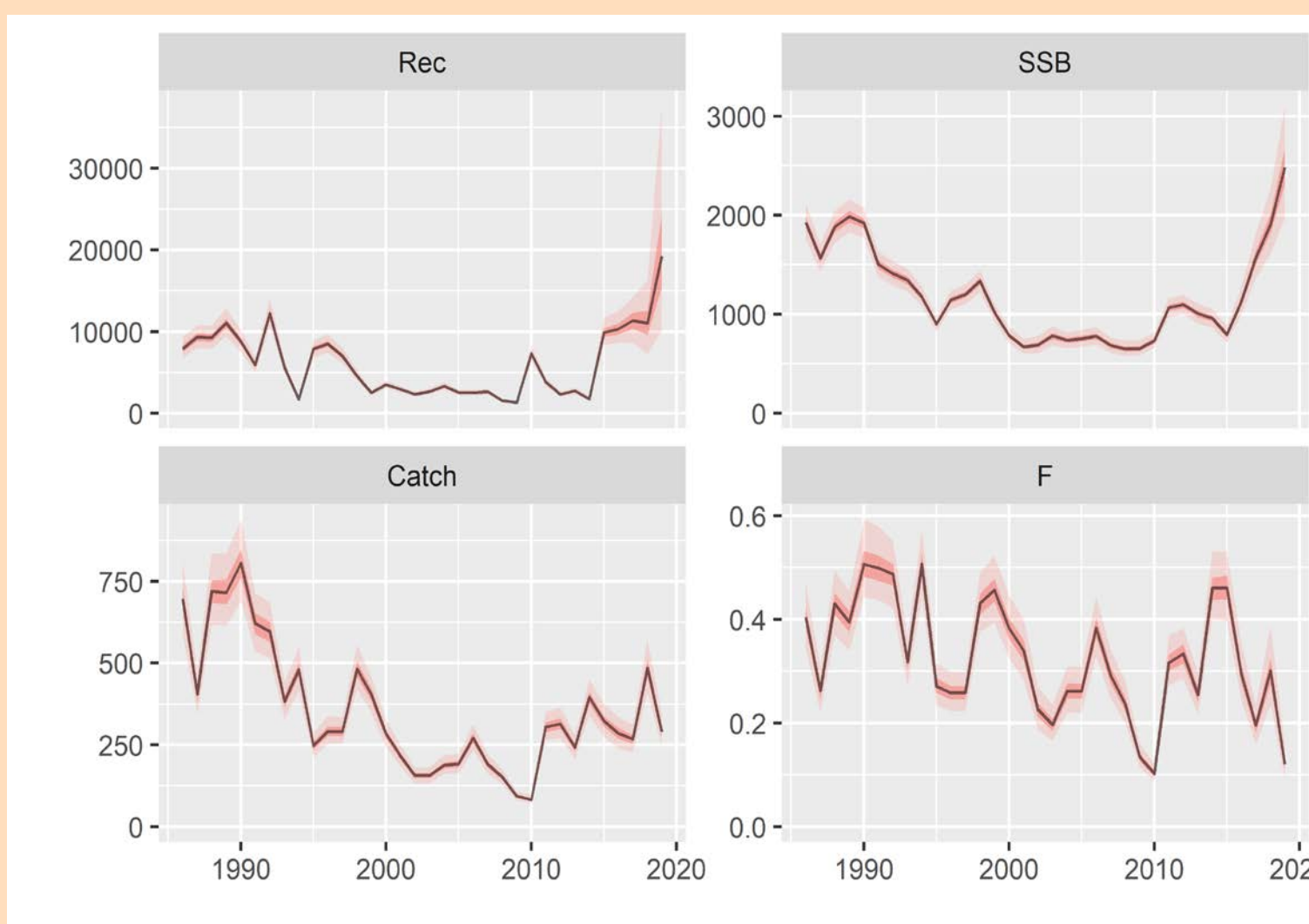


Figure 1. Outputs of the assessment; Recruitment, SSB and F

Figure 2. Retrospective pattern plots over the last 6 years

Figure 5. Outputs of the assessment; Recruitment, SSB and F

Figure 6. Retrospective pattern plots over the last 6 years

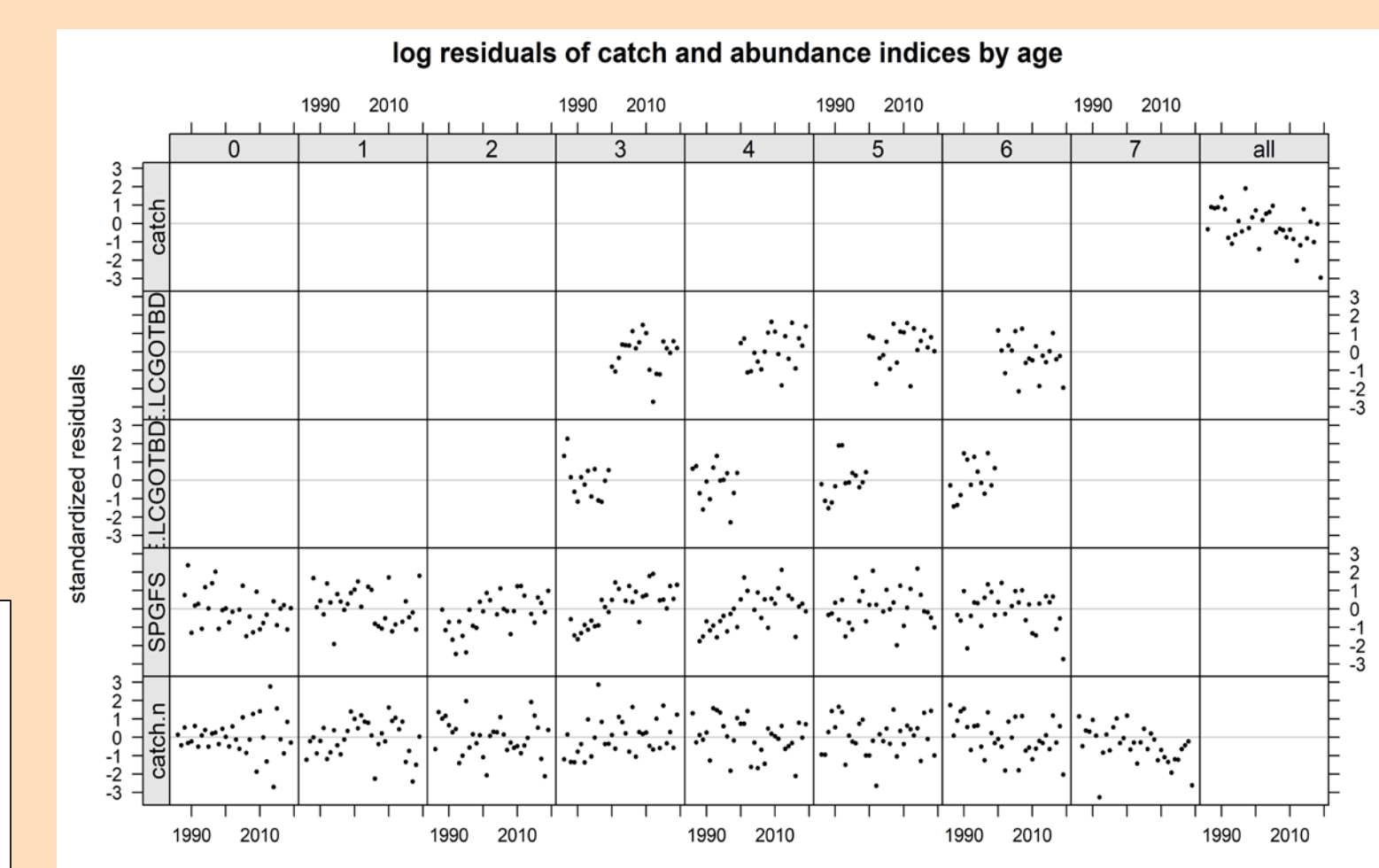


Figure 3. Log residuals of catch and abundance indices by age

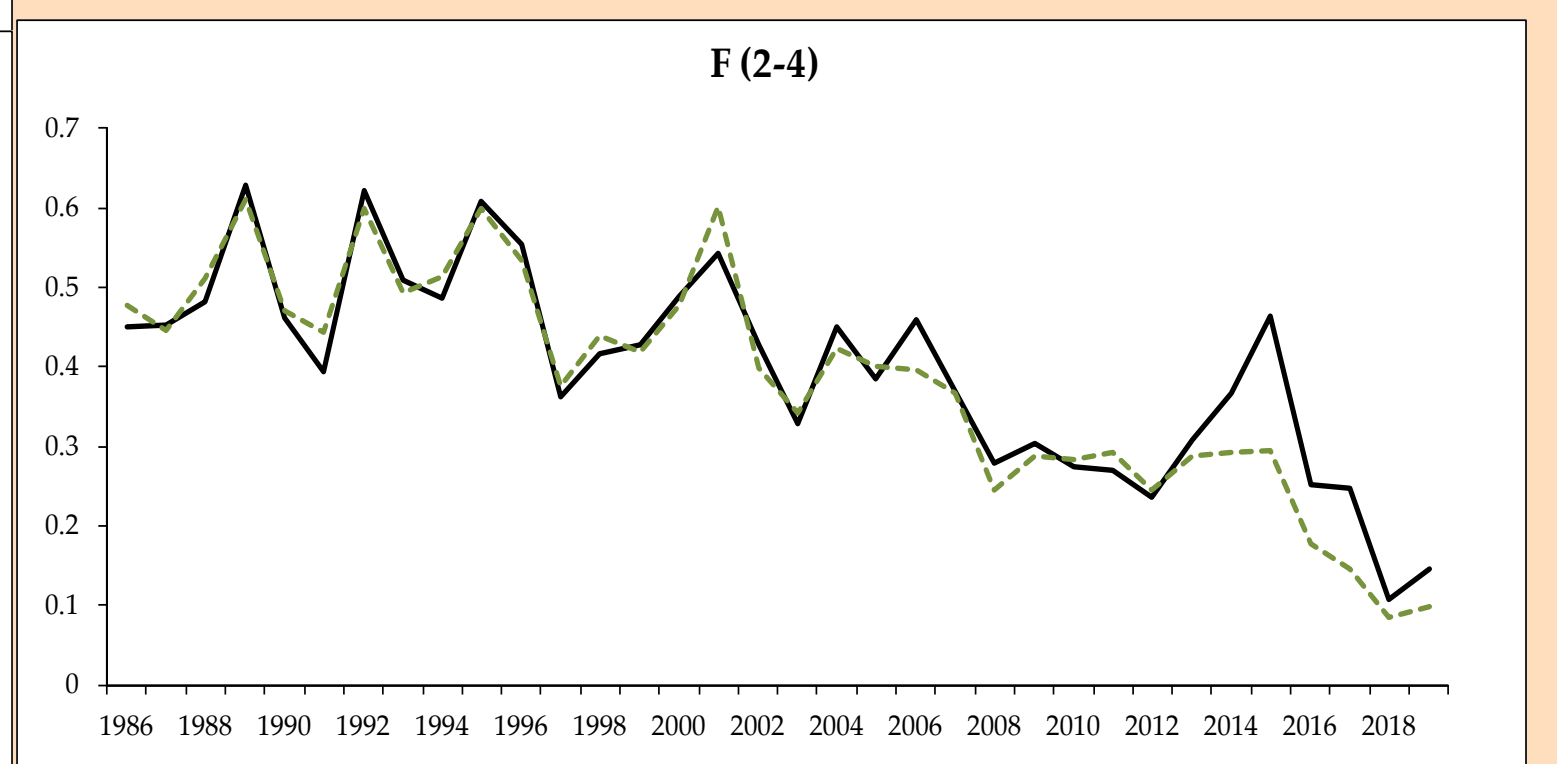
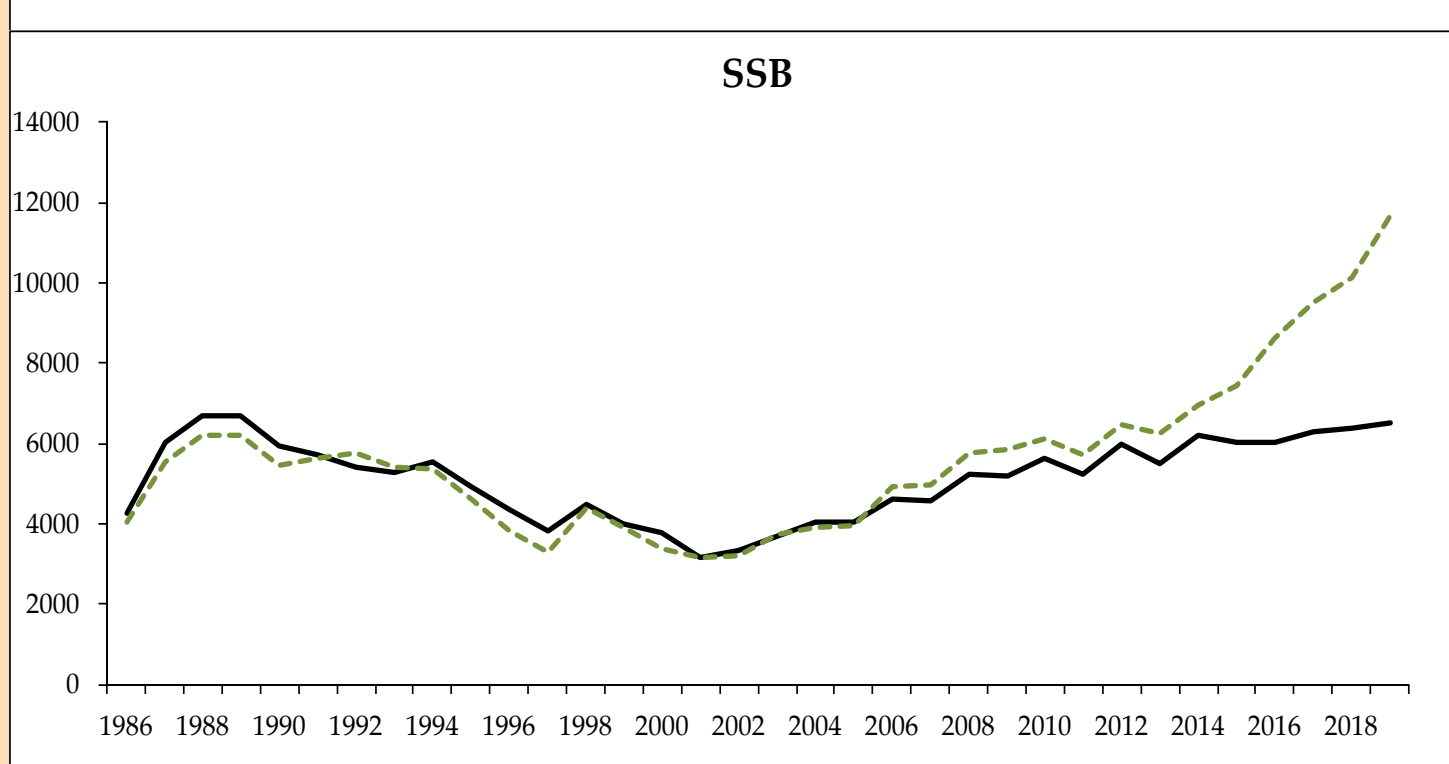
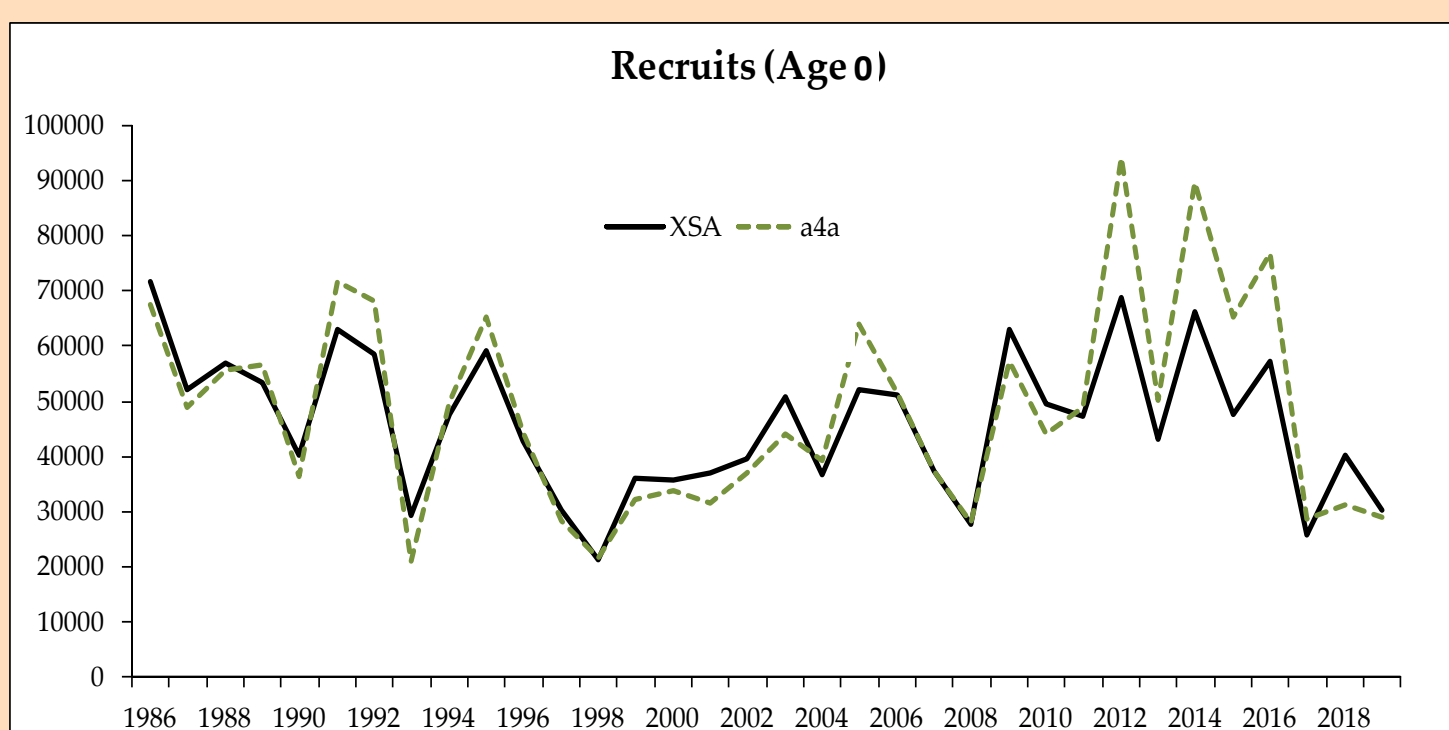


Figure 4 . A comparative approach between XSA and a4a.; Recruitment, SSB and F

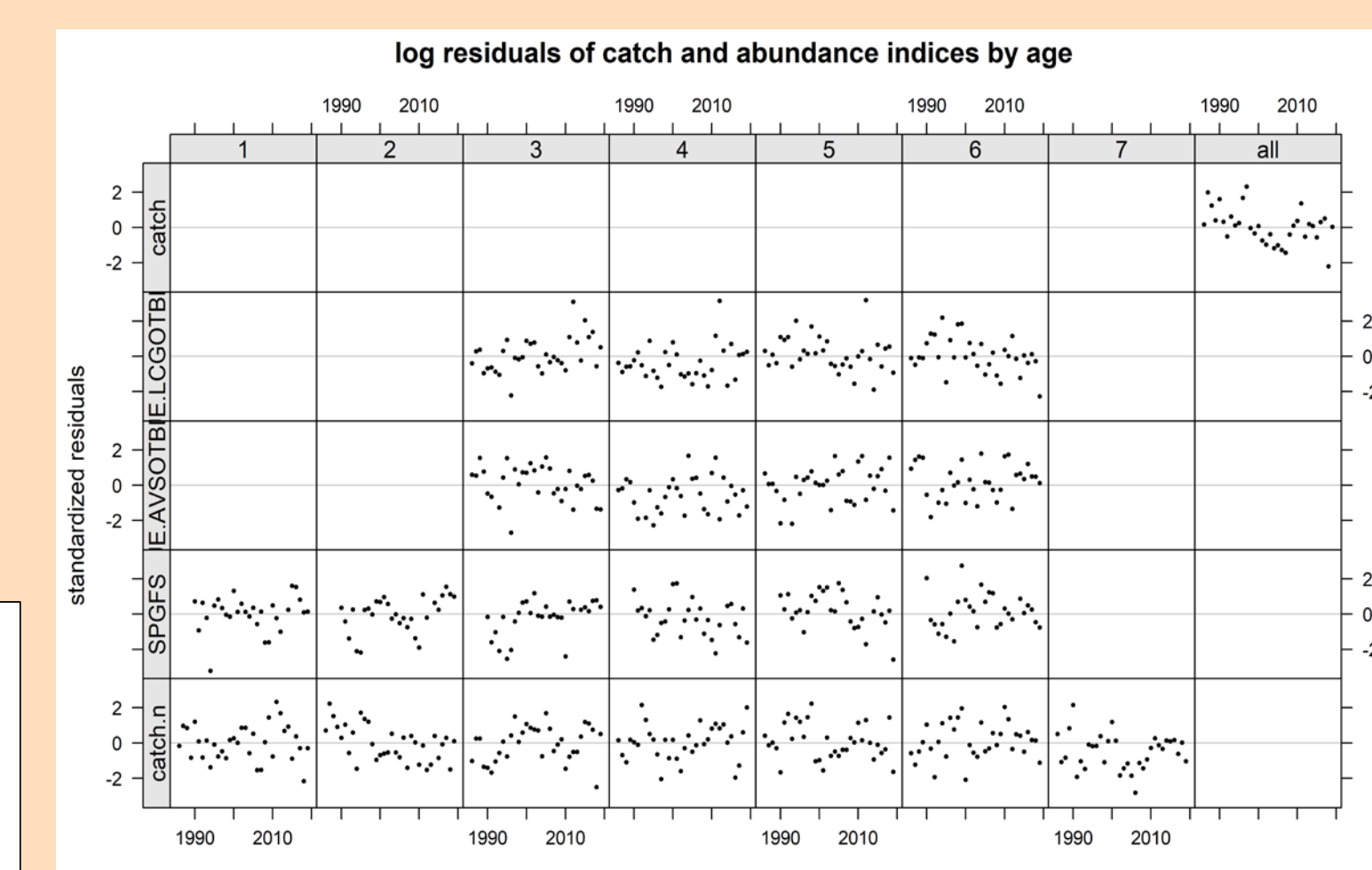


Figure 7. Log residuals of catch and abundance indices by age

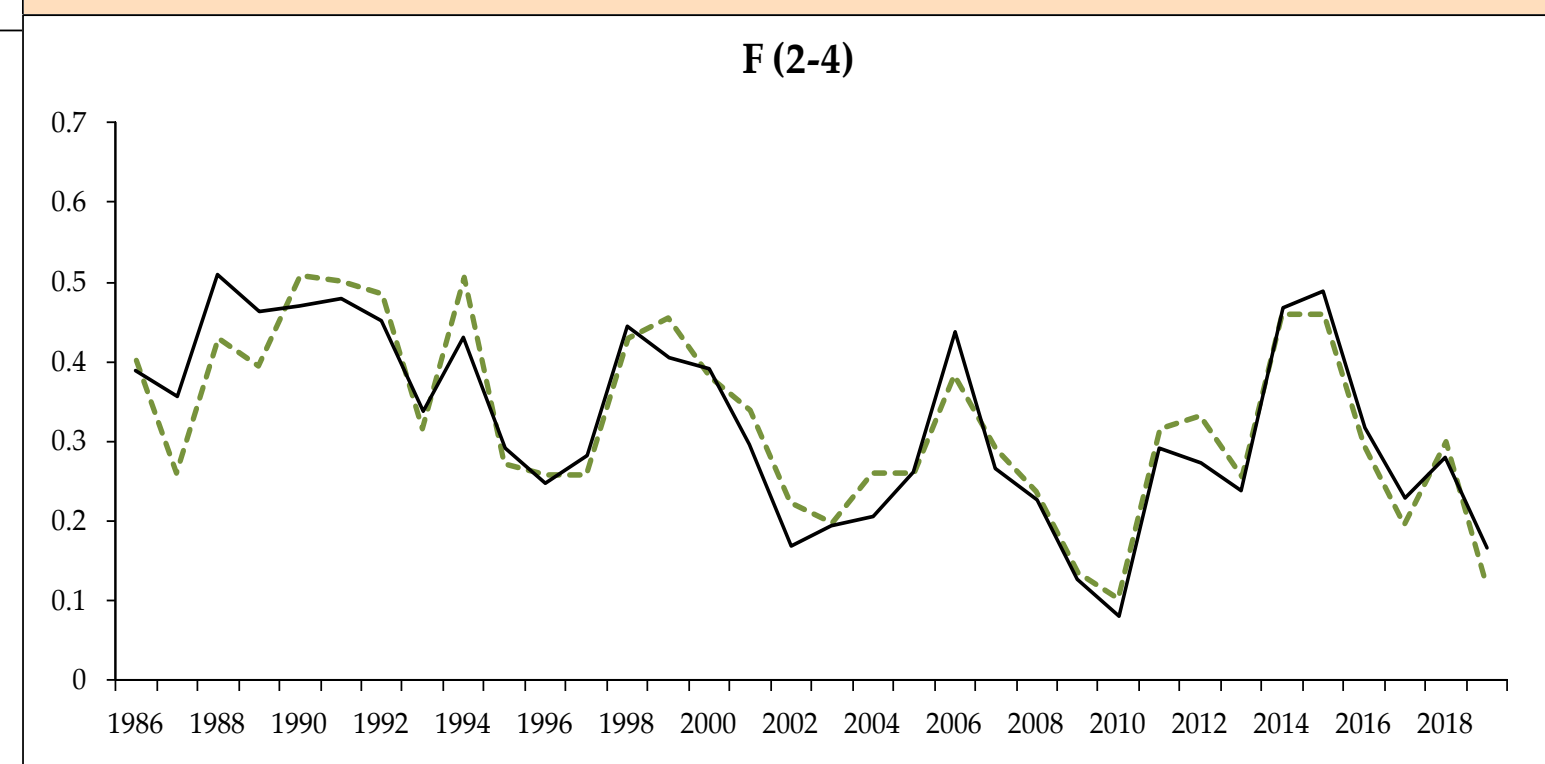
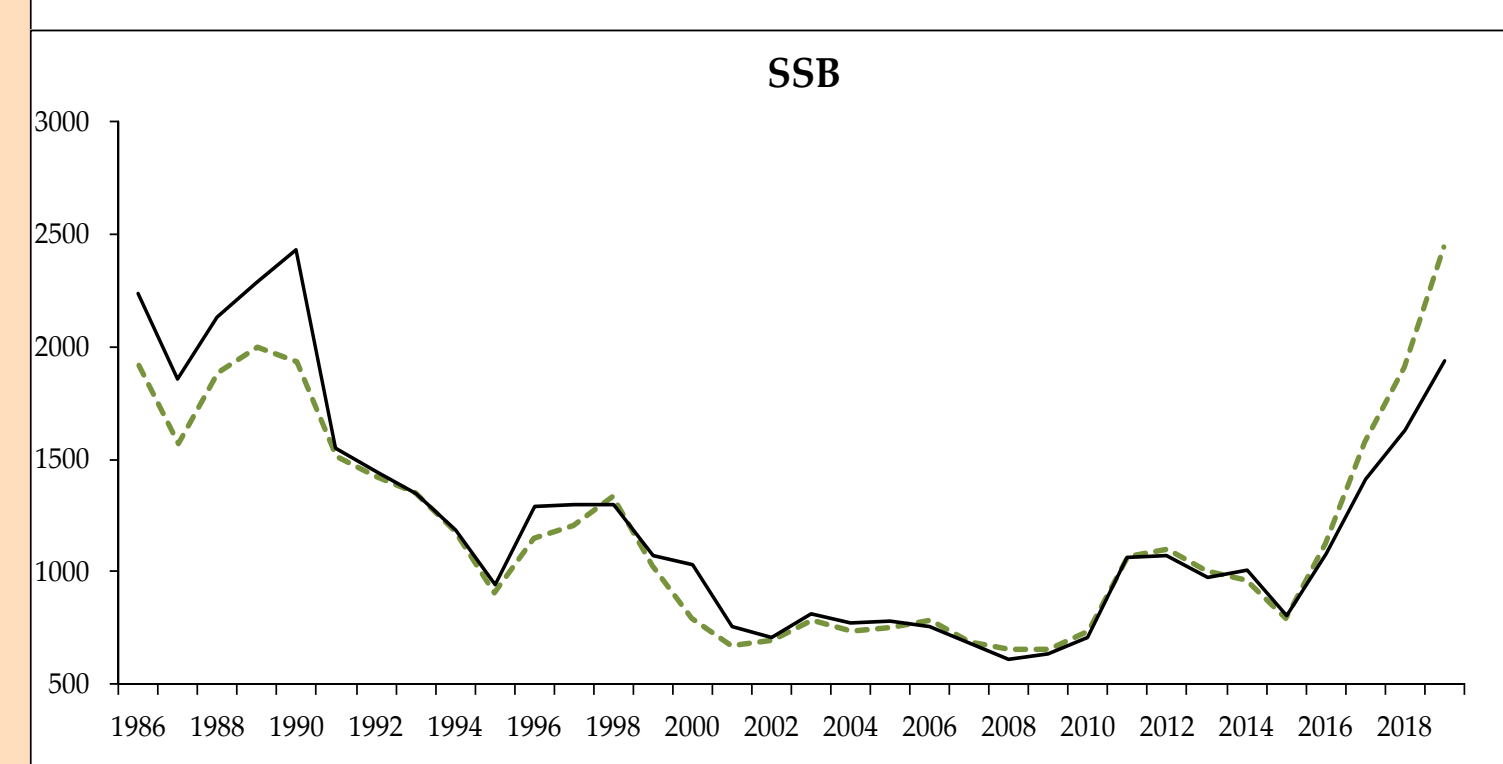
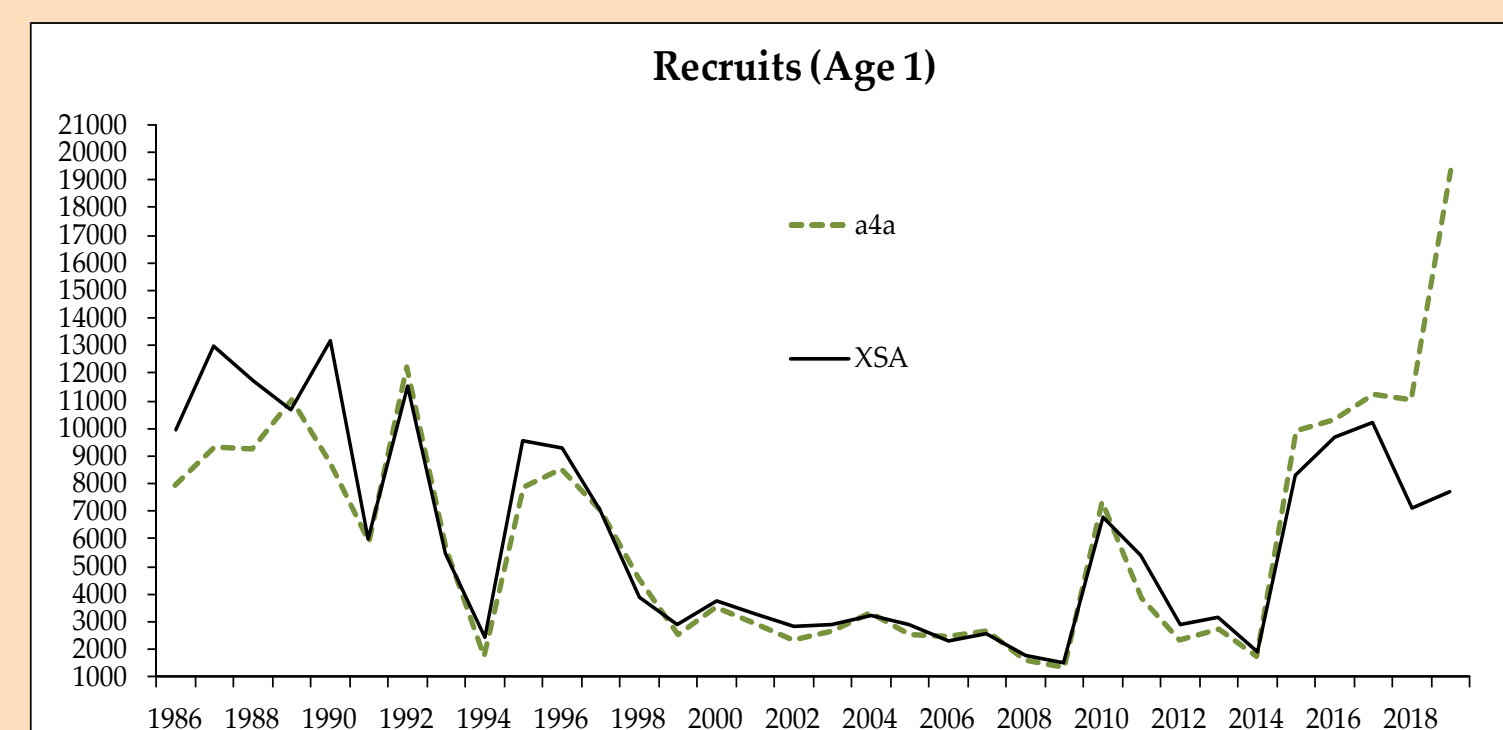


Figure 8 . A comparative approach between XSA and a4a.; Recruitment, SSB and F

CONCLUSION

The results show that the a4a model is a strong candidate to be chosen for the assessments of these stocks including uncertainty for a better approach to the state of the stock