Assessment for All (a4a)

(https://fishreg.jrc.ec.europa.eu/web/a4a)

Ernesto Jardim*
Colin Millar
Iago Mosqueira
Chato Osio
Finlay Scott

JRC
Unit of Maritime Affairs
Fishreg
*** ernesto.jardim@jrc.ec.europa.eu**

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Long term vision

- To have a group of standard methods that can be applied rapidly without requiring a strong statistical technical background from the analysts, but making use of the technical knowledge on the fisheries, stocks and ecosystem characteristics.
- These methods will generate a reference dataset of biomass and fishing mortality estimates that can be the basis for fisheries management advice or academic work.

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Where does it come from ?

- The European Union Data Collection Framework (DCF) in 2009 introduced the concept of "concurrent sampling" for metier related variables: sampling all or a predefined assemblage of species, simultaneously in a vessel's catches or landings (2008/949/EC, Annex, Chapter I, 1.b)
- Sampling must be performed in order to evaluate the quarterly length distribution of species in the catches, and the quarterly volume of discards (B1.1.1).

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Setting the scene for the EU in numbers

- Biological parameters (growth & reproduction) are being collected for 250+ stocks in waters where European fleets operate.
- The DCF reports make it difficult to evaluate the number of species each Member State is sampling, but it should be hundreds.
- In 2010 the DCF budget was ~57m€

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Setting the scene worldwide

- US law requires all federal fisheries to come up with annual catch limits, including appropriate buffers to account for scientific and management uncertainties.
- Beddington et.al (2007) show that intermediate data stocks that are not being assessed make up for 30% in the USA, 78% in New Zealand, 48% in Australia, 61% in the North-East Atlantic.

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So what ? (Miles *dixit*)

Think about 2020 !

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So what ? (Miles *dixit*)

or 2030 !

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So what ? (Miles *dixit*)

EU fisheries scientists will face the challenge of assessing 250+ stocks !

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So what ? (Miles *dixit*)

How many stocks will Med scientists have to assessment ?

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So what ? (Miles *dixit*)

GFCM has 51 priority species and 30 GSAs ...

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Solution !?

Go automatic !!

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Solution !?

Estimate what you know, MSE(*) what you don't, and keep it simple !!

(*) Management Strategies Evaluation (kell et.al, 2007)

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a4a initiative

The initiative aims to:

(a) develop an assessment method targeting stocks that have a reduced knowledge base on biology and moderate time series on exploitation and abundance;

(b) trigger the discussion about the problem of massive stock assessment.

Side objective:

(c) capacity building

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How ?

- Define moderate data stock (entry level)
- Develop a stock assessment framework
- Develop an Management Strategies Evaluation (MSE) algorithm
- Organize a set of courses and dissemination events

The "moderate data stock"

(a) Exploitation

- Nominal effort
- Volume (L, D)
- Length frequencies

(b) Biology

- Information based knife edge mat ogive
- Indications for growth model
- Length – weight relationship

(c) Index of abundance

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The stock assessment ~~model~~ framework

- Models to be applied rapidly to a wide range of situations with low parametrization requirements
- As simple as a linear regression !?

```
index = trawl(techcreep=0.03)
rec = beverton(a=s(NAO))
```

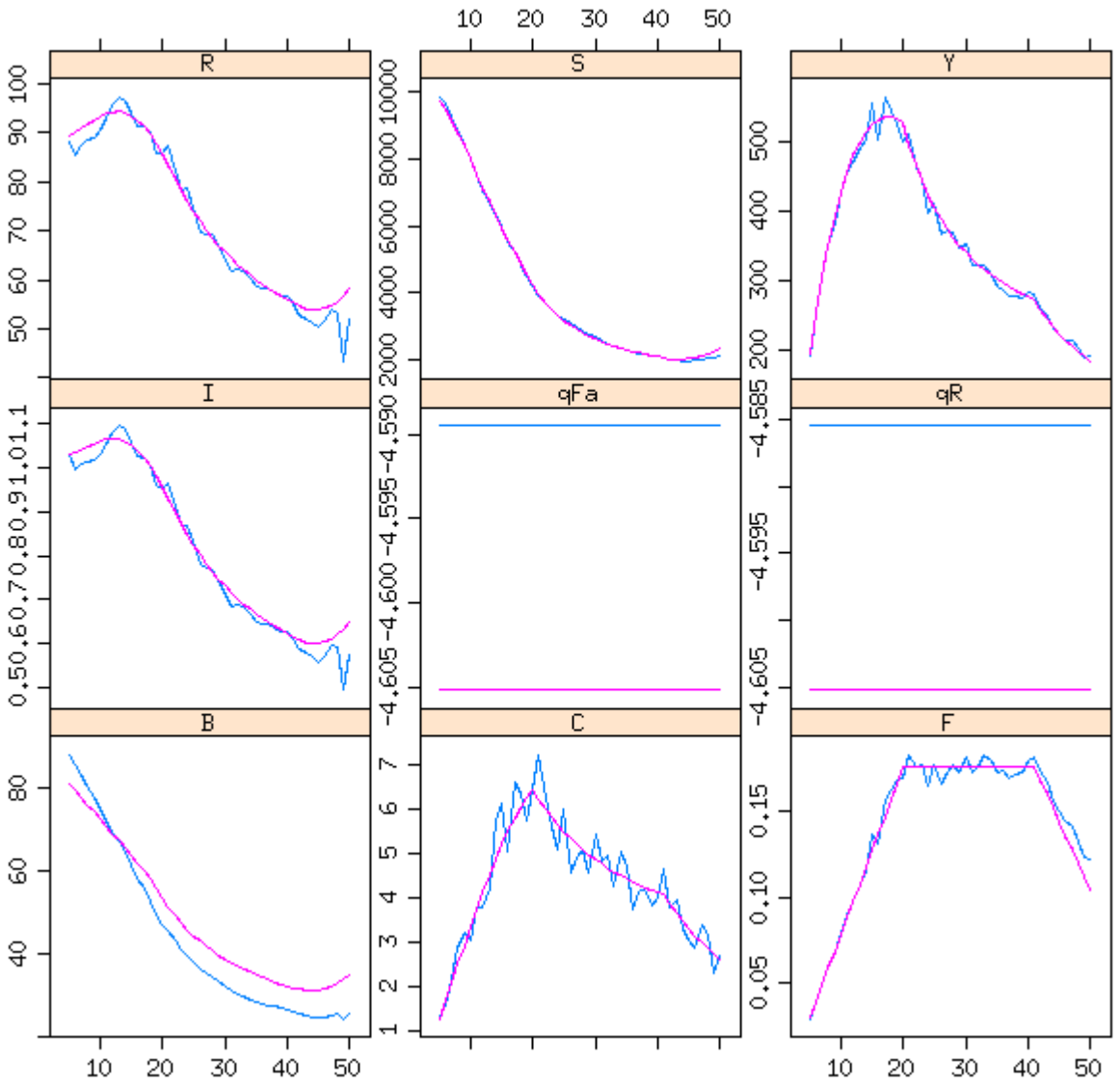
- In FLR(*) (as expected …)
- Tested with simulations

  Website with ~1000000 simulations

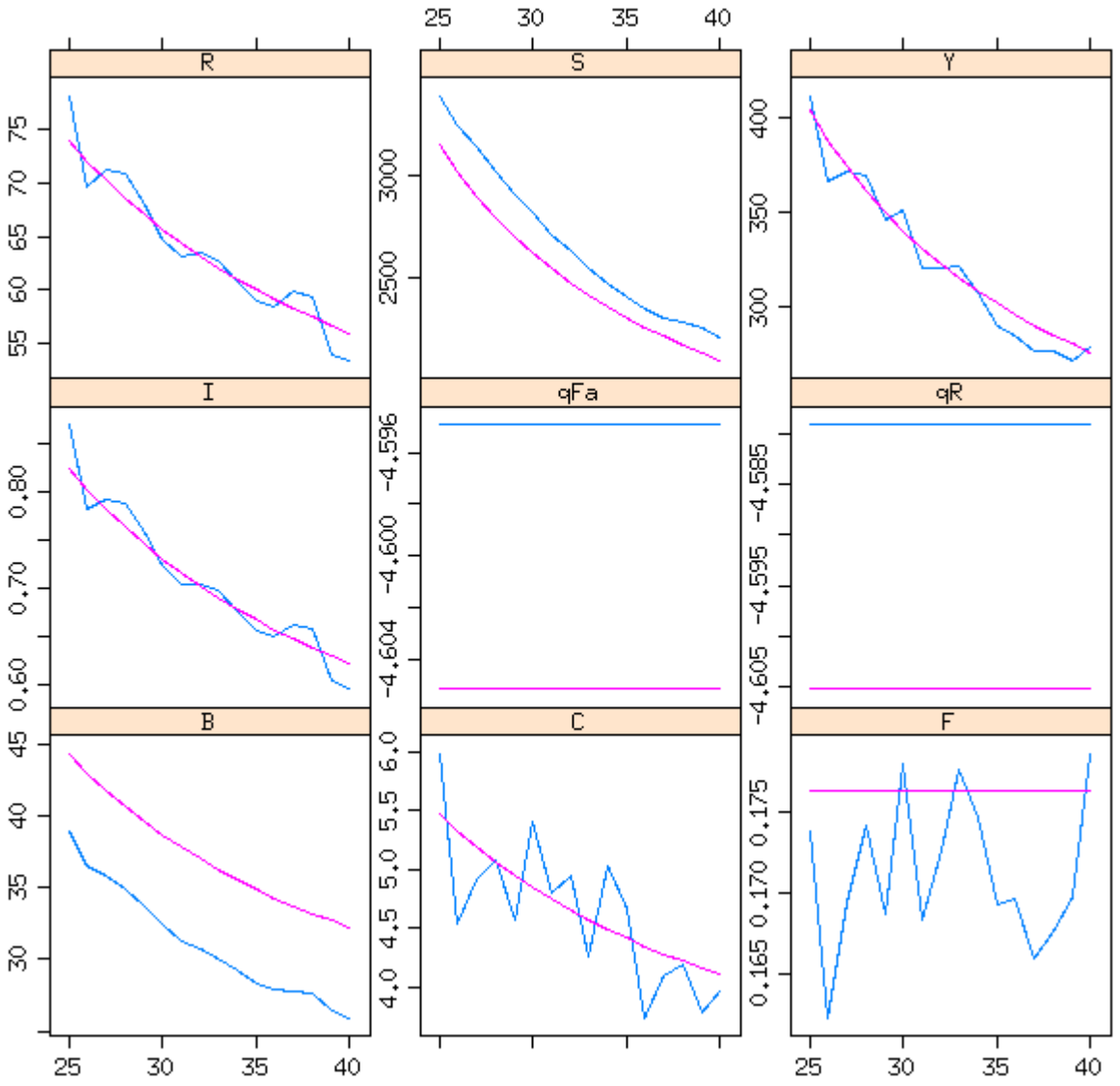
  ICES WKLIFE life history parameters

(*) http://flr-project.org

Testing, 1,2 ...



Testing, 1,2 ...



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MSE in the context of a4a

- Standard MSE algorithm.
- A sophisticated forecasting algorithm that takes into account structural uncertainty on the stock dynamics (growth, recruitment, maturity) and on exploitation by commercial fleets (selectivity), embedding the framework of decision making.

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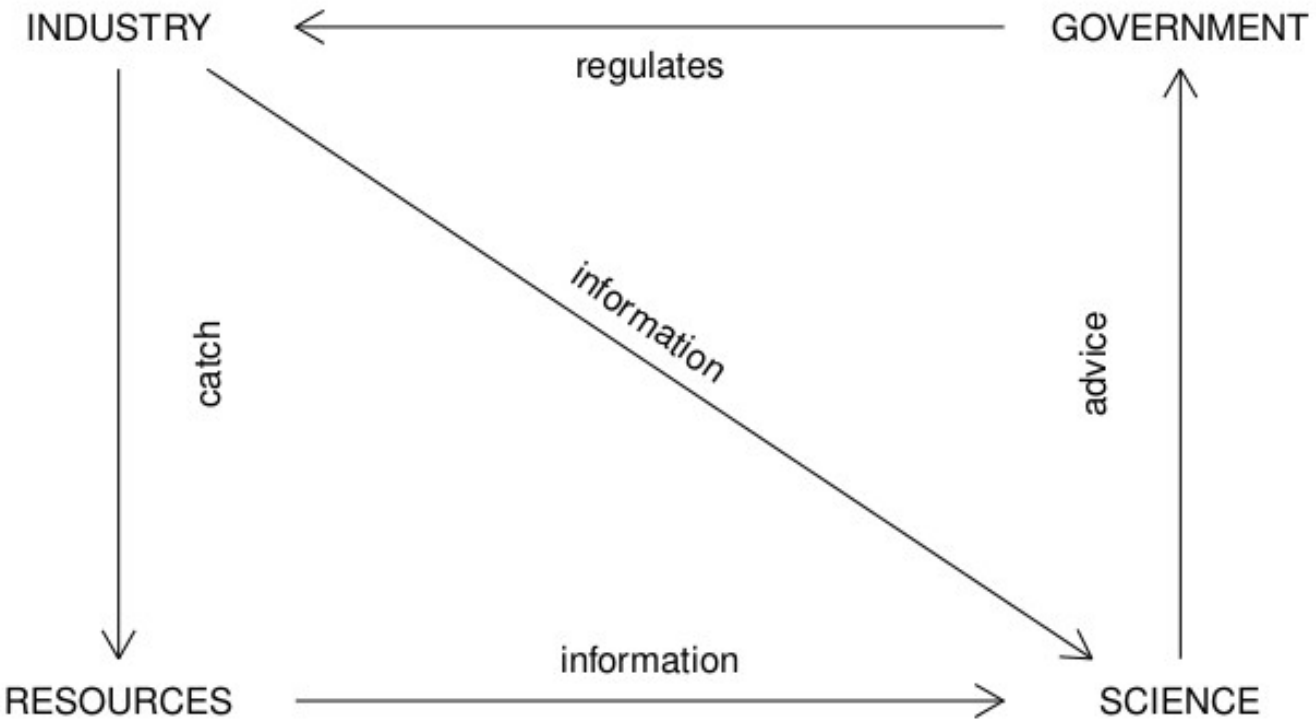
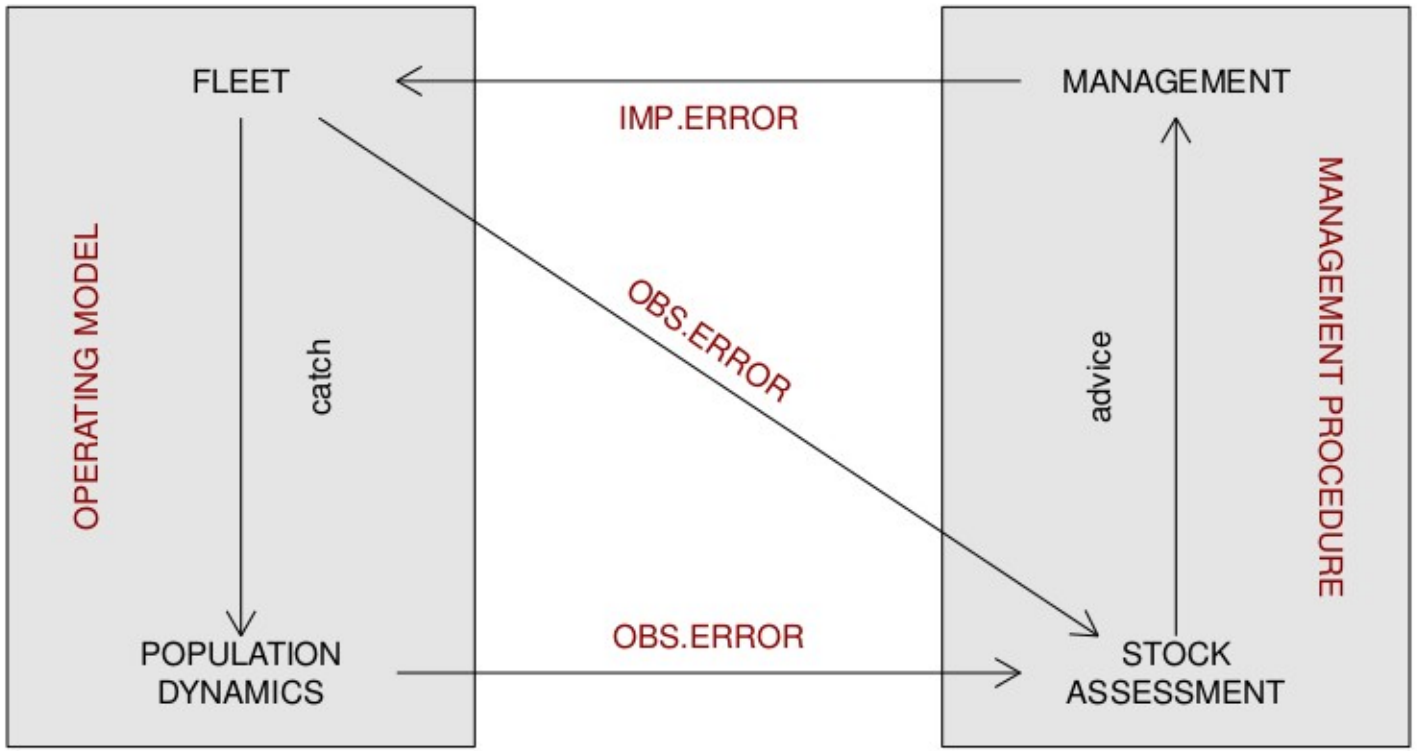
Fisheries Management Cycle



Management Strategies Evaluation (MSE)



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The standard MSE

- Operating models reflecting uncertainty in growth, S/R and selectivity (maturity ??)
- 3 harvest control rules
  - 1 based on catch
  - 1 based on surveys
  - 1 based on stock assessments
- 3 stock assessment models
  - a4a & VPA & biomass dynamic
- Observation error in catch and index
- Implementation error in F or catch

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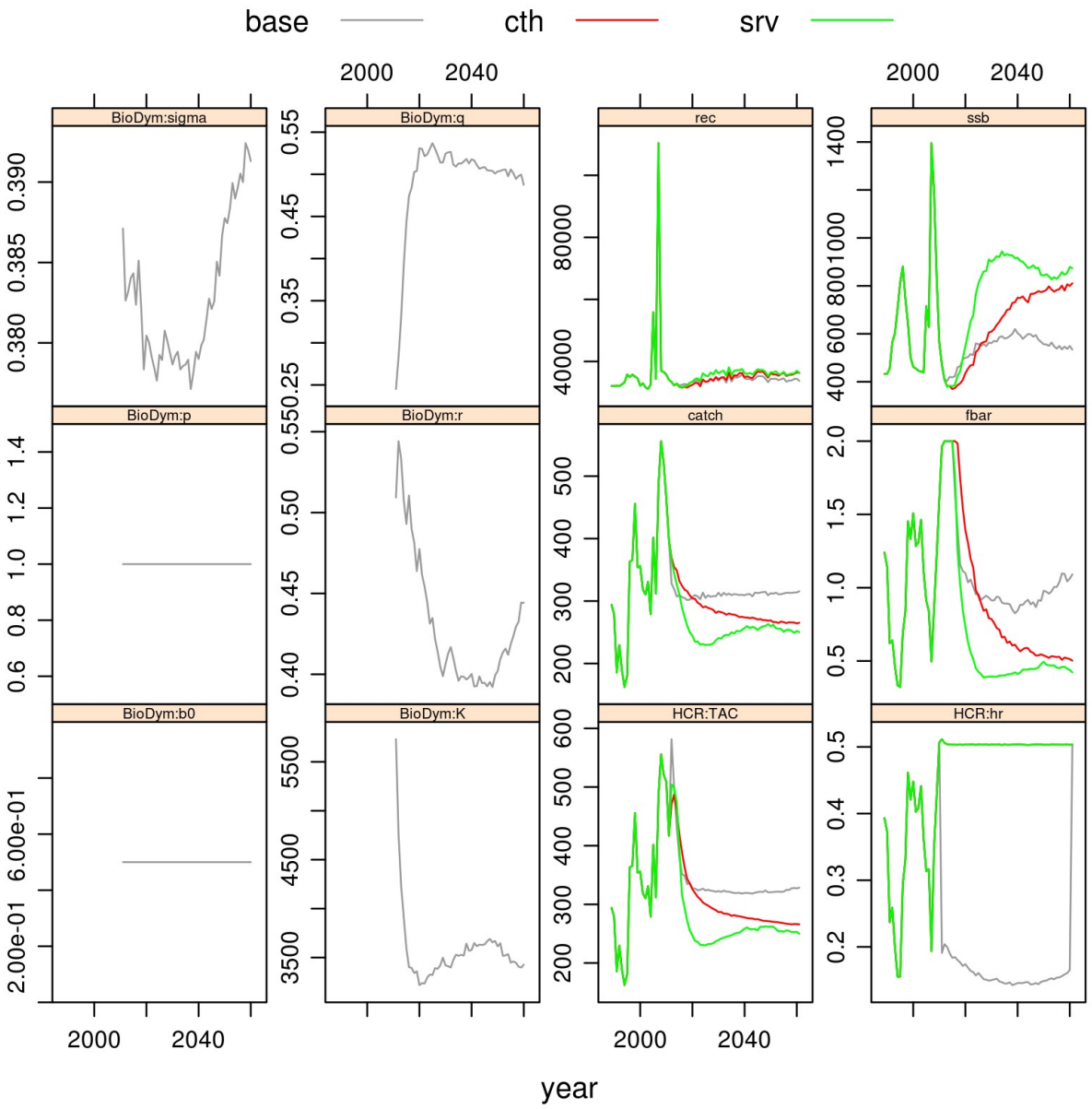
MSE example

(loosely based on *S.aurita* in Northwest Africa)



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Making it easy !?

- Methods should be implemented in a way that it doesn't require a highly specialized statistician to use them.

  Remember the linear stock assessment framework ?

- Courses and dissemination/demonstration actions

  a4a included in JRC FLR course,

  STECF, ICES, GFCM, etc EWG.

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Opportunities

Standardize and constraint stock assessment and forecast so that numerical issues don't become a major issue and scientists can move their focus to more interesting subjects, like ecossystem, population or fleet dynamics.

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Opportunities

- Common stock assessment methodology
- Reshape stock assessment as a data generating engine
- Massive data analysis
- Multi* analysis
- Advise for more species and promote comparative advise analysis
- Direct input to policies like MSFD, MSP, IMP, CFP, ...
- Contribute to Ecossystem Based Management, ...

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Wrapping up – the a4a vision

To have a standard stock assessment and a forecasting methodology that can be applied to a large number (all ?) stocks in a sea basin.

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Thank you for your attention !

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Let me call your attention to:

- JRC course FLR for Quantitative Fisheries Science

  18-22 March 2013, Ispra, Italy

  (*https://fishreg.jrc.ec.europa.eu/web/flr*)

- JRC course Introduction to R

  October 2013, Ispra, Italy

  (*funding for non-EU countries*)

  (<*colin.millar@jrc.ec.europa.eu*>)

- World Conference on Stock Assessment Methods

  15-19 July 2013, Boston, USA

  (*http://ices.dk/iceswork/symposia/wcsam.asp*)