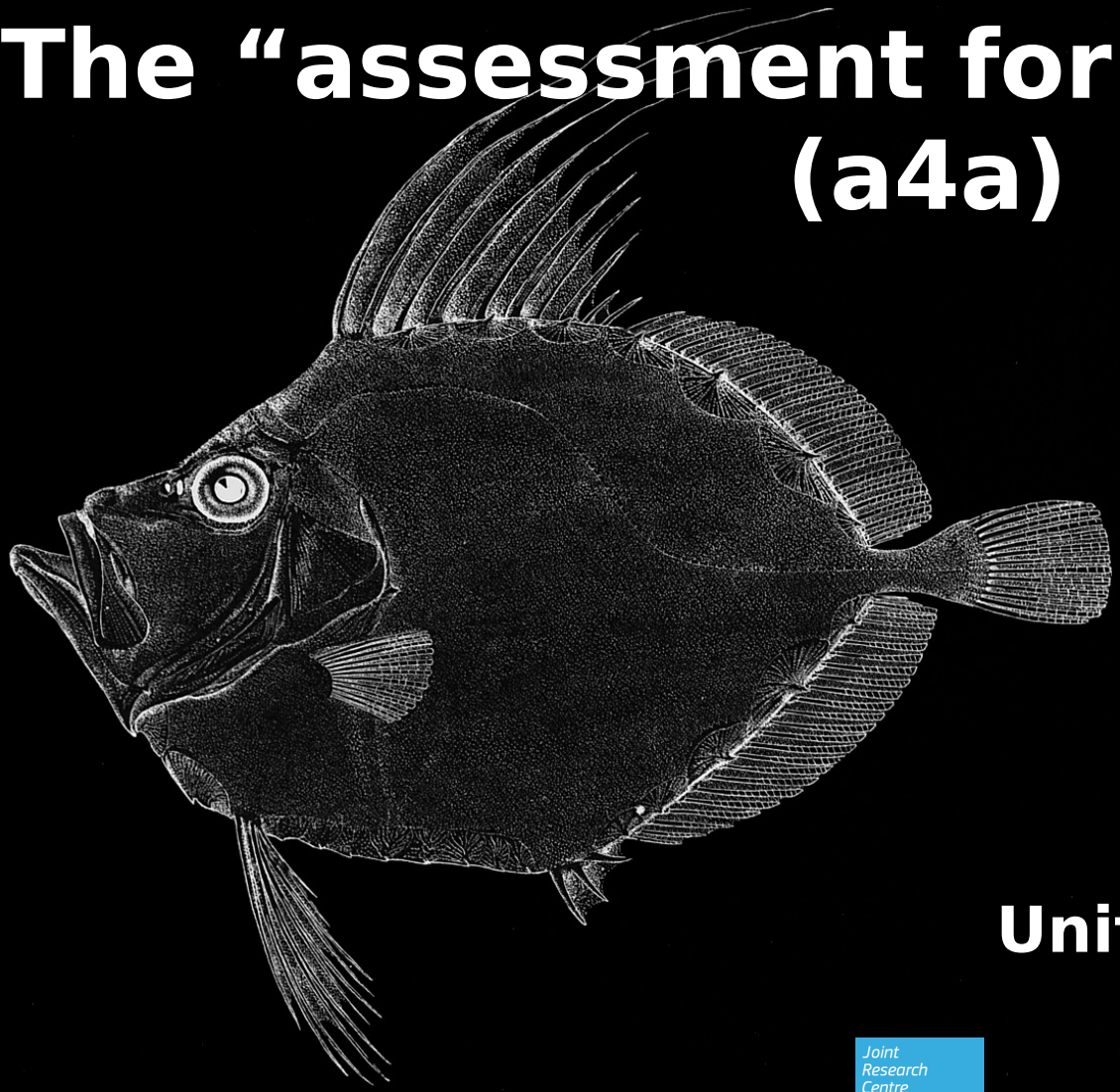
The “assessment for all” Initiative (a4a)



Ernesto Jardim*
Colin Millar
Iago Mosqueira
Chato Osio
Finlay Scott

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

Long term vision

To have a group of standard methods *that can be applied* rapidly *to a large number of stocks,* without requiring *a strong statistical technical background, but* making use *of the technical knowledge on the fisheries, stocks and ecosystem characteristics.*

Why

- Increasing demand for marine fish abundance and exploitation estimates.
- Large investments being made in collecting information.
- Increasing will to rely on scientific advice for fisheries management.

Setting the scene in Europe

- Biological parameters (growth & reproduction) are being collected for 300+ stocks in waters where European fleets operate.
- The DCF reports make it difficult to evaluate the number of species being sampled, but it should be hundreds.
- DCF & Advice budget 2007-2013 is ~360m€(*)

(*) SEC(2011) 1417 final (**) *2008/949/EC, Annex, Chapter I, 1.b*

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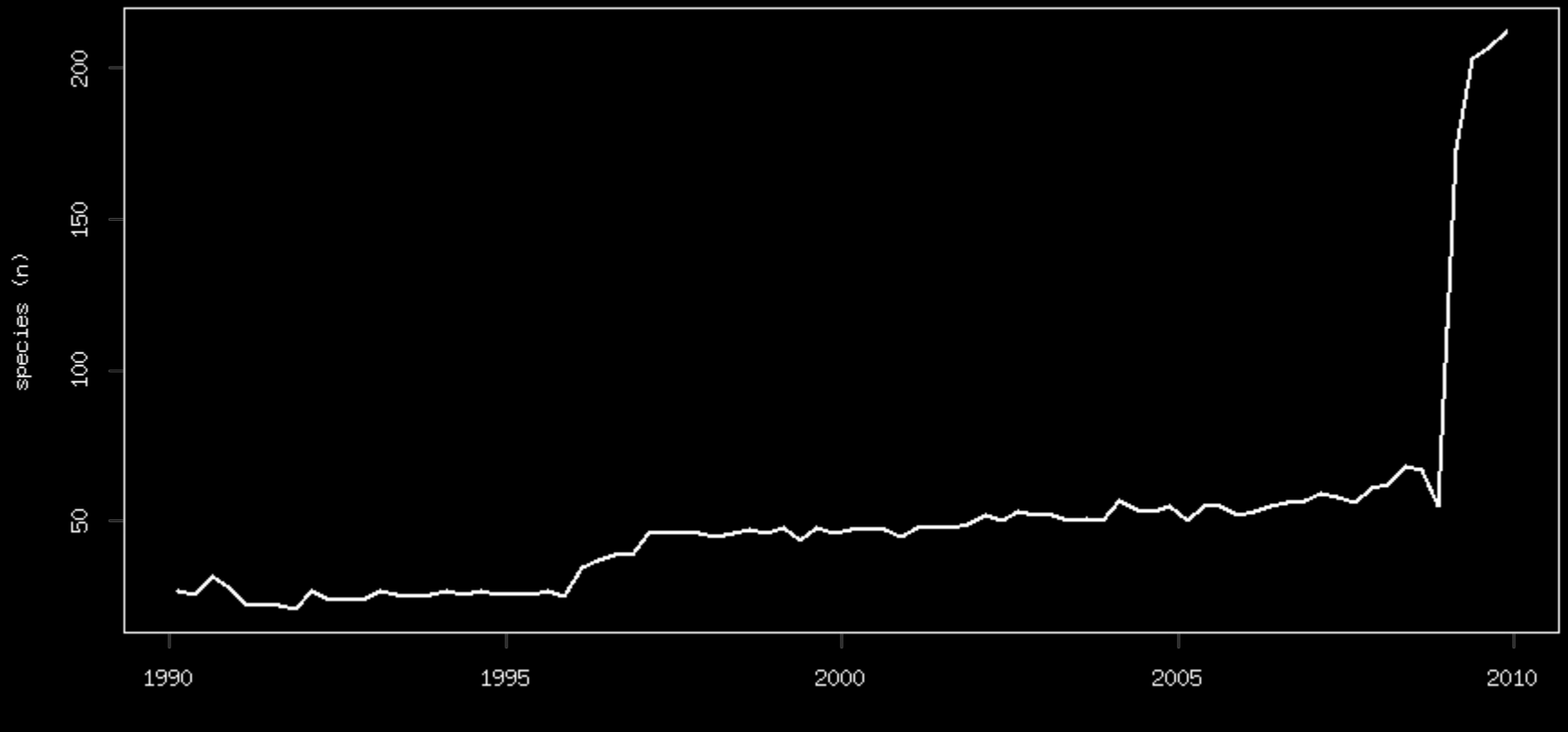
e.g. PT sampled species (lenghts)



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.

However ...

- 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.

So what ? (Miles *dixit*)

What if ~2020 EU fisheries scientists are asked to assess hundreds of stocks, and justify ~1bn€ spent in data collection ?

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Solution !?

Standardize and enter automatic mode !!

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Solution !?

Estimate what you know,

MSE(*) what you don't !!

(*) Management Strategies Evaluation

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a4a initiative

(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.

(c) capacity building

How ?

(1) Define a moderate data stock (entry level)

(2) Develop a stock assessment framework

(3) Develop a forecasting algorithm based on MSE

(4) Carry out training courses for marine scientists

(1) 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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(2) The stock assessment framework

- Non-Linear catch-at-age model implemented in R/FLR(*)/ADMB that can be applied rapidly to a wide range of situations with low parametrization requirements

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

- As simple as a linear regression !?

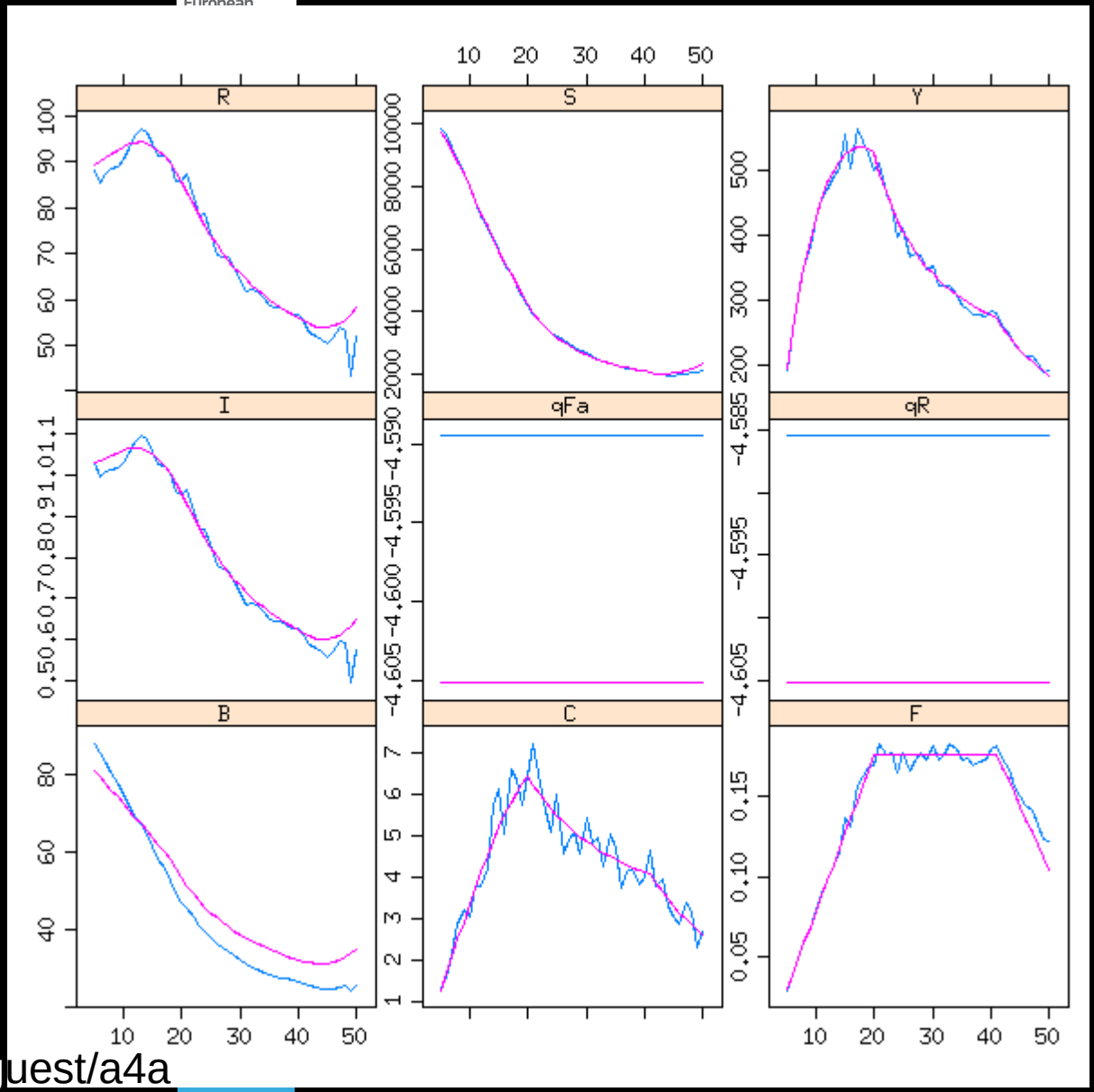
```
fmodel = separable()
qmodel = trawl(techcreep=0.03)
rmodel = beverton(a=s(NAO))
```

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

Testing, 1,2 …

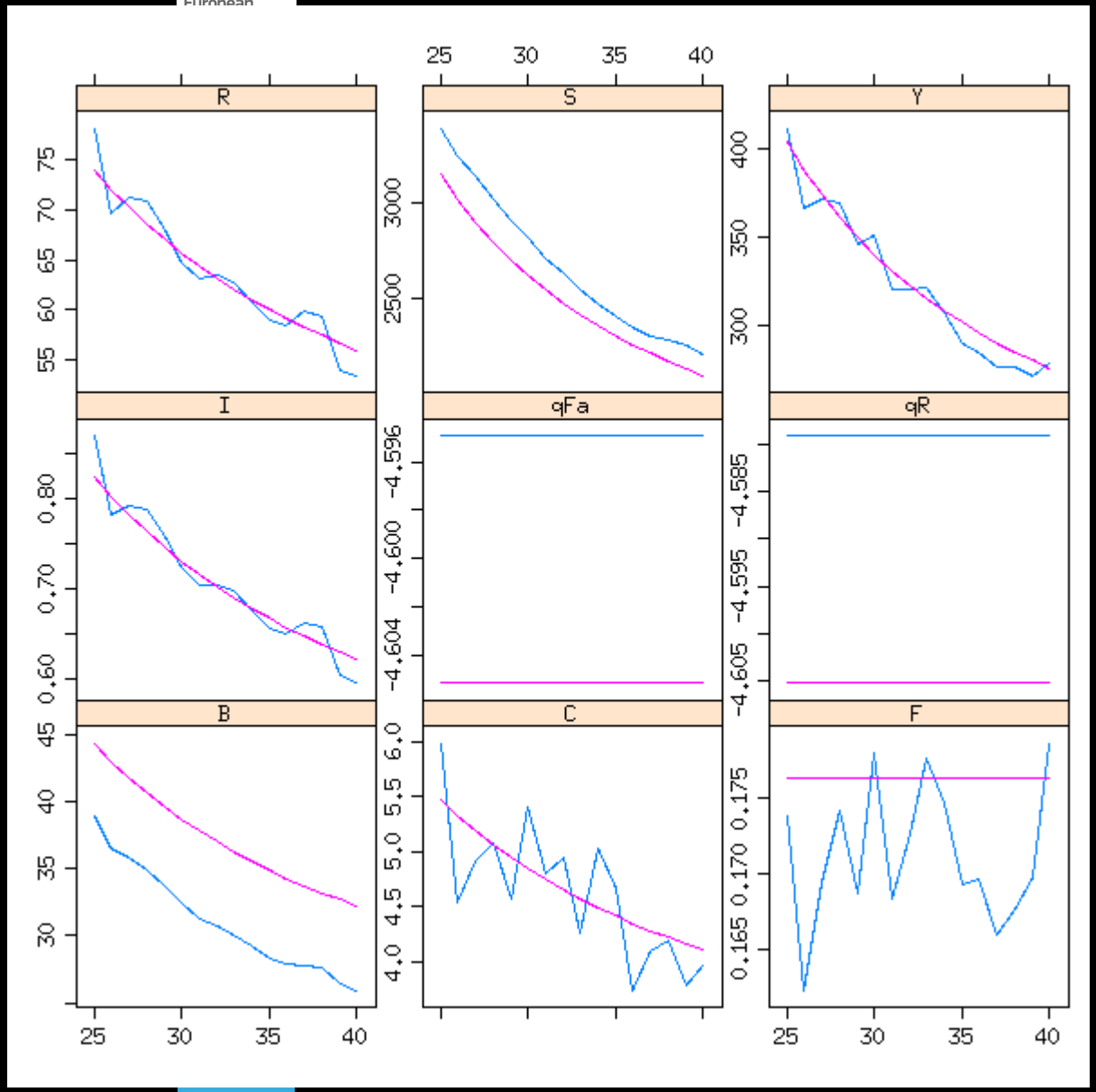
WKLIFE stocks

Fishbase stocks(*)



(*) http://fishnet-dev.jrc.it/web/guest/a4a

Testing, 1,2 ...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(3) Forecasting (MSE & Co.)

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

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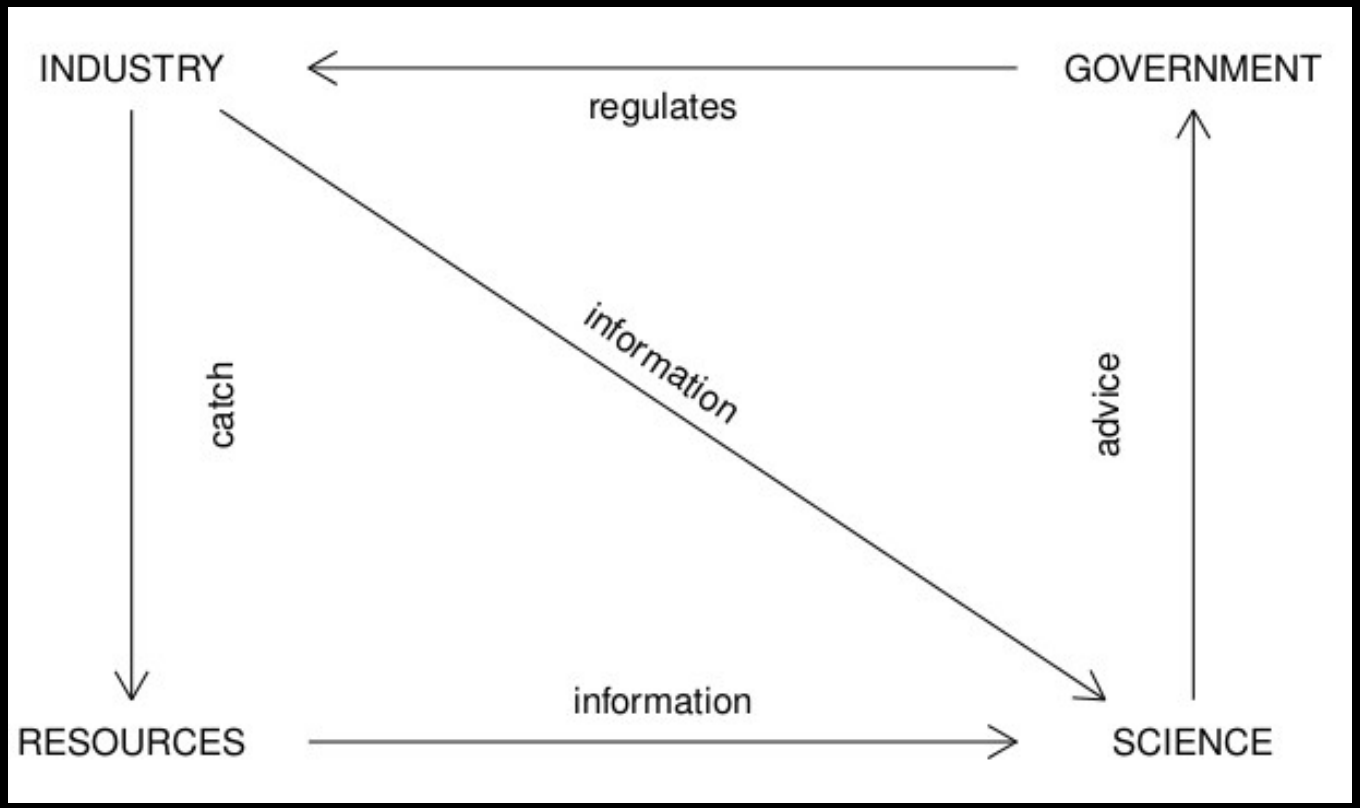
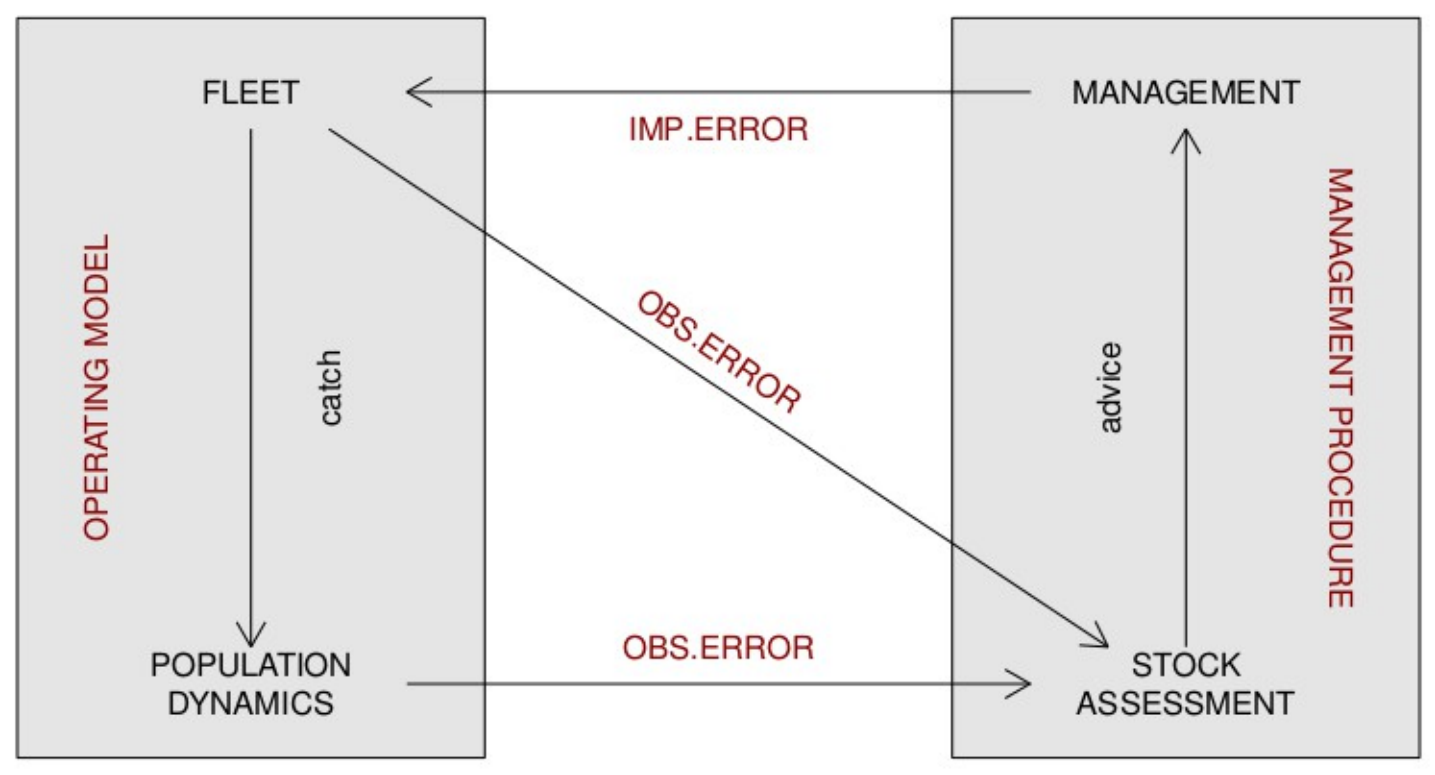
Fisheries Management Cycle



Management Strategies Evaluation (MSE)

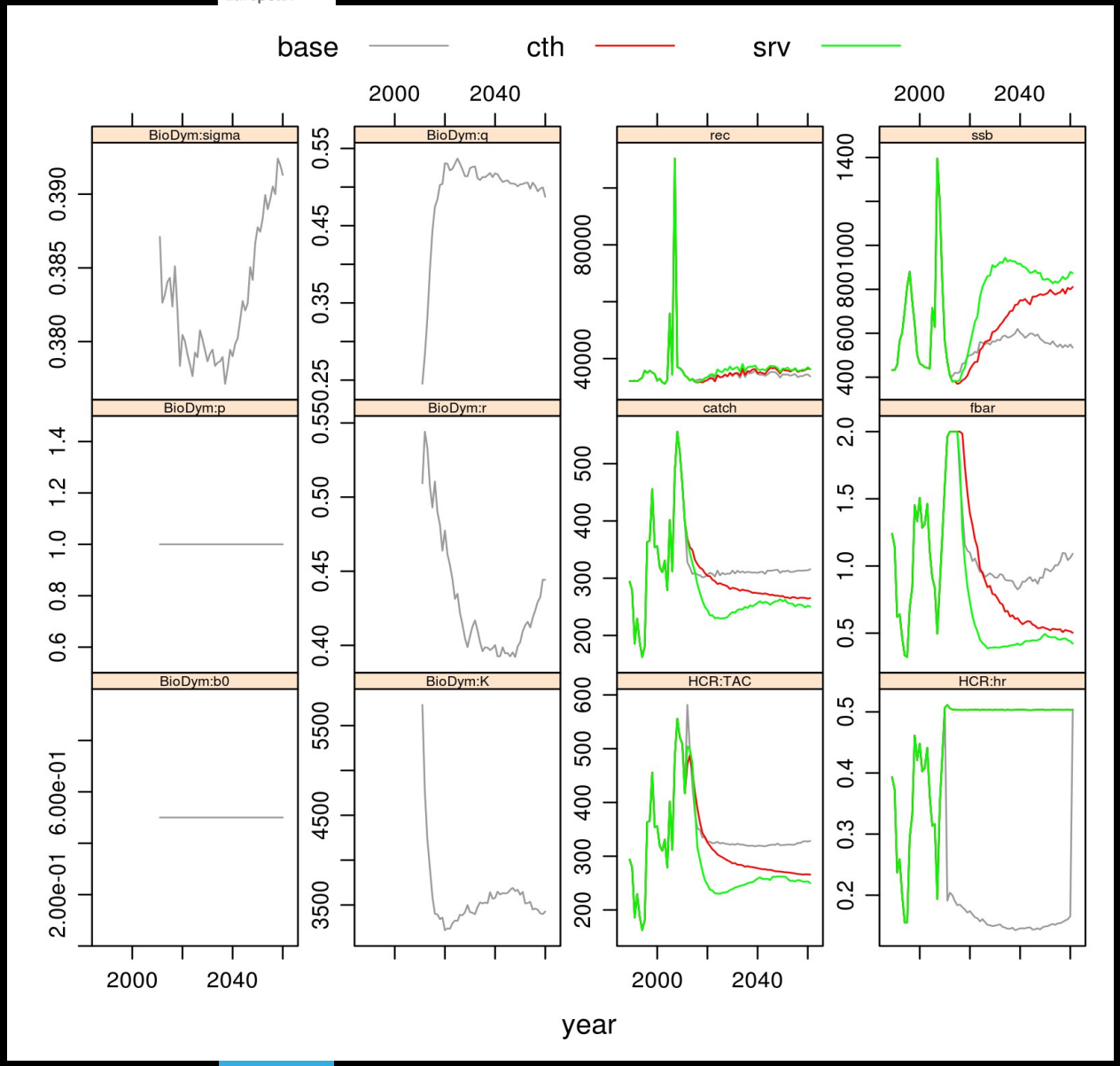


Components of a standard MSE

- **Operating model**
  natural mortality, growth, S/R, exploitation pattern
- **Management procedure**
  indicator to inform HCR, HCR shape
- **Observation error model**
  error in catch, error in the abundance index
- **Implementation error model**
  error in effective F, overcatch

MSE example

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



a4a methods' workflow

UNCERTAINTY

GROWTH

NATURAL MORTALITY

MODEL

PARAMETERS

IMPLEMENTATION

DECISION MAKING

SCENARIOS

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Wrapping up

a4a aims to provide standard methods for stock assessment and forecasting that can be applied rapidly to a large number (all ?) stocks in a sea basin.

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Thank you for your attention !

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

Joint Research Centre