The a4a Initiative
What if stock assessment is as simple as a linear model ?

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European Commission

What if ...

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We could assess all stocks in a sea basin !?

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How do fisherman interact with the stocks ? Is it related with economics ...

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Think about stock assessment as the starting point !

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Ok, but …

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How do we do it ?

A bit of reality …

Europe spends 50-70 million euros per year collecting data for stock assessment.

In Europe 300+ stocks are sampled for biological information.

ICES and GFCM assess ~ 100 stocks.

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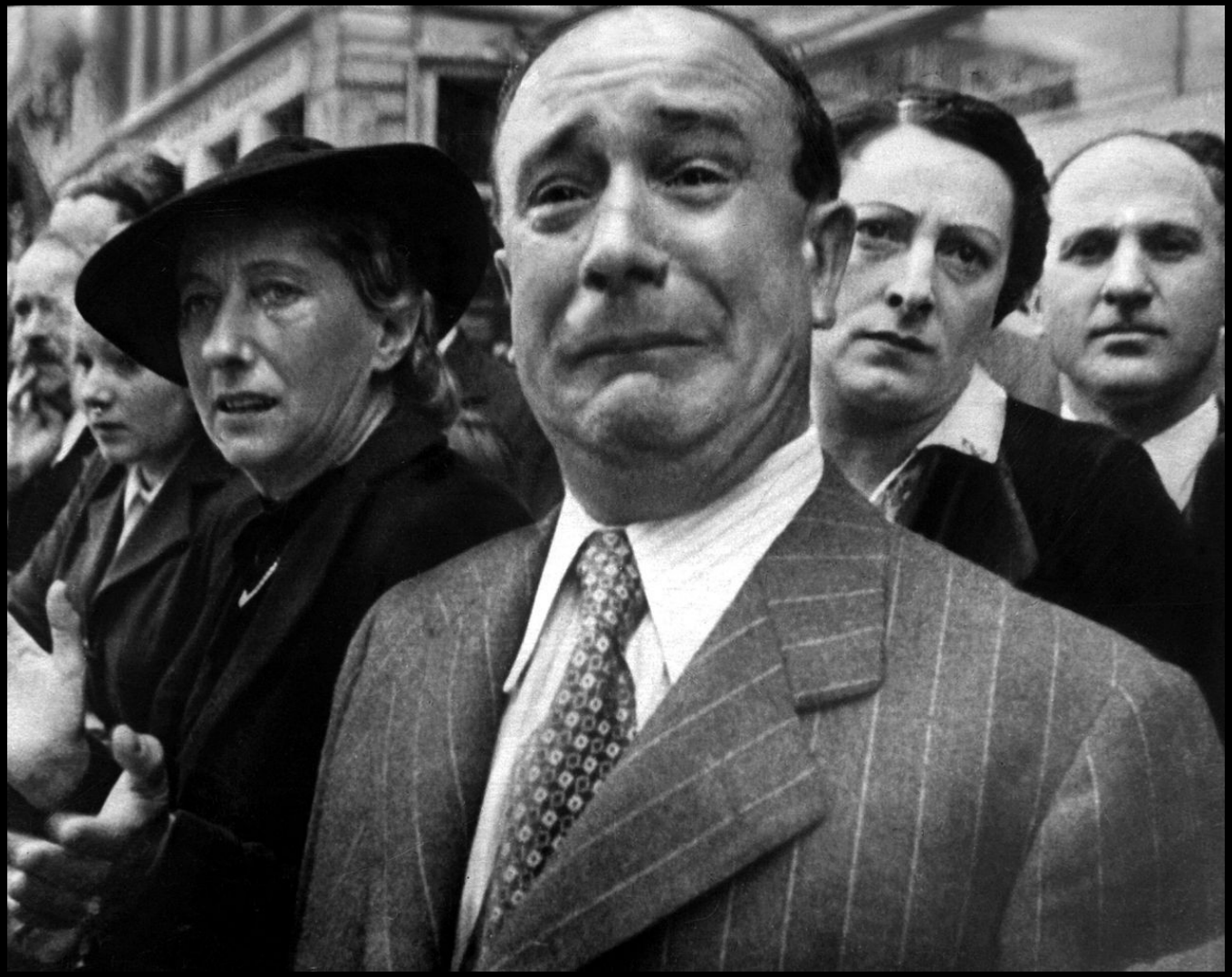

a4a initiative

(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

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a4a stock assessment framework

A SCA 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

Joint Research Centre

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a4a stock assessment framework

[C] ⟶ f model

[I] ⟶ q model

[S/R] ⟶ r model

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What about the linear model you promised ?

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Use R's capabilities to set models based on equations.

```
a4a(fmodel= ~ year,
    qmodel= list( ~ age),
    srmodel = ~ factor(year),
    stock, indices)
```

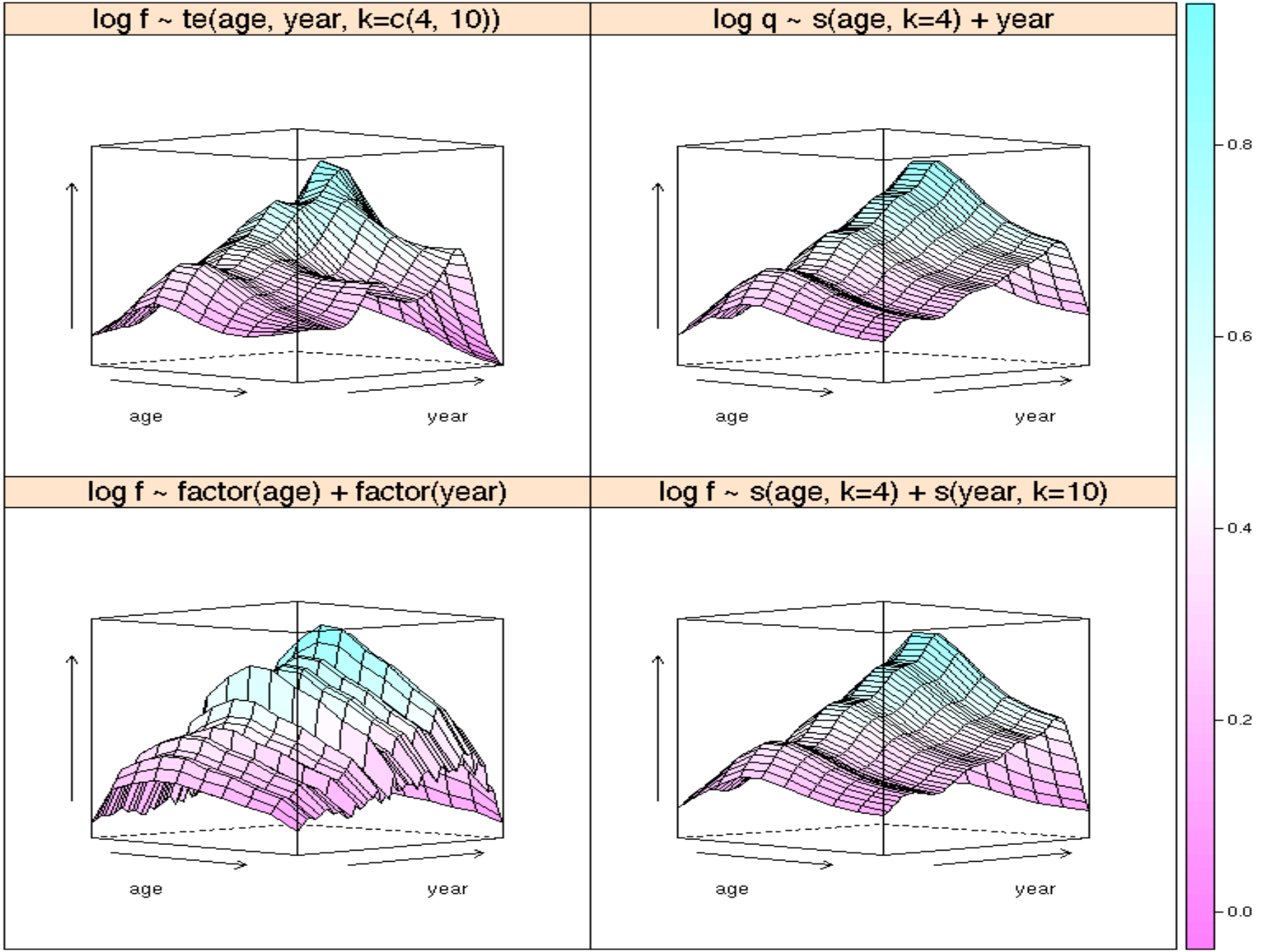
Examples

```
Log f ~ factor(age) + factor(year)

Log f ~ s(age, k=4) + s(year, k=10)

Log q ~ s(age, k=4) + year

Log f ~ te(age, year, k=c(4, 10))
```


log f ~ te(age, year, k=c(4, 10))
log q ~ s(age, k=4) + year
log f ~ factor(age) + factor(year)
log f ~ s(age, k=4) + s(year, k=10)
age
year
0.8
0.6
0.4
0.2
0.0

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But we want more …

We want to make it intuitive !!!

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

Parametrization must have a biological meaning (when possible).

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```
~ factor(age) + factor(year)

~ separable()
```

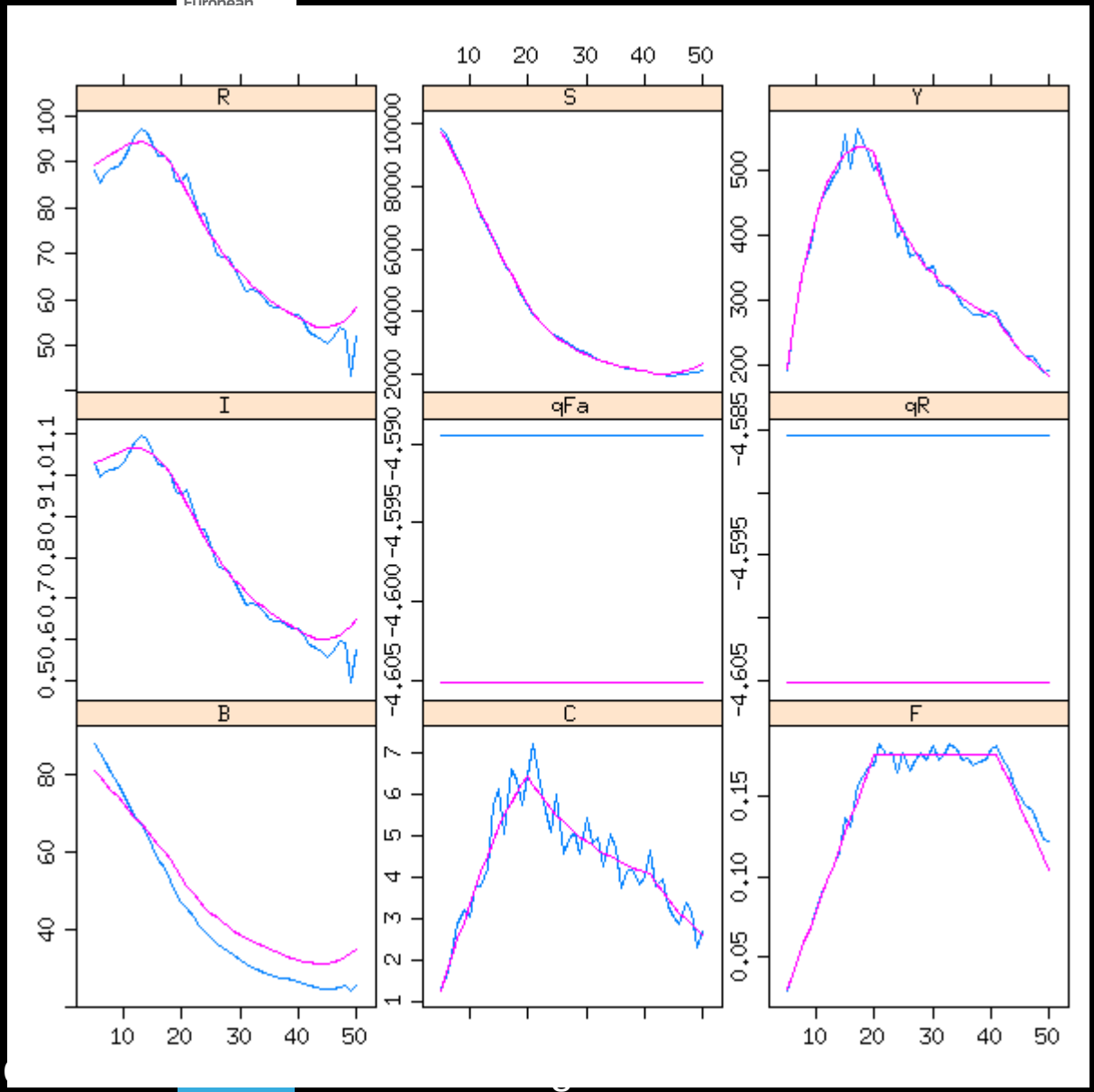
```
~ s(age, k=4) + year
```

```
~ trawl(catchability="linear")
```

Testing, 1,2 …

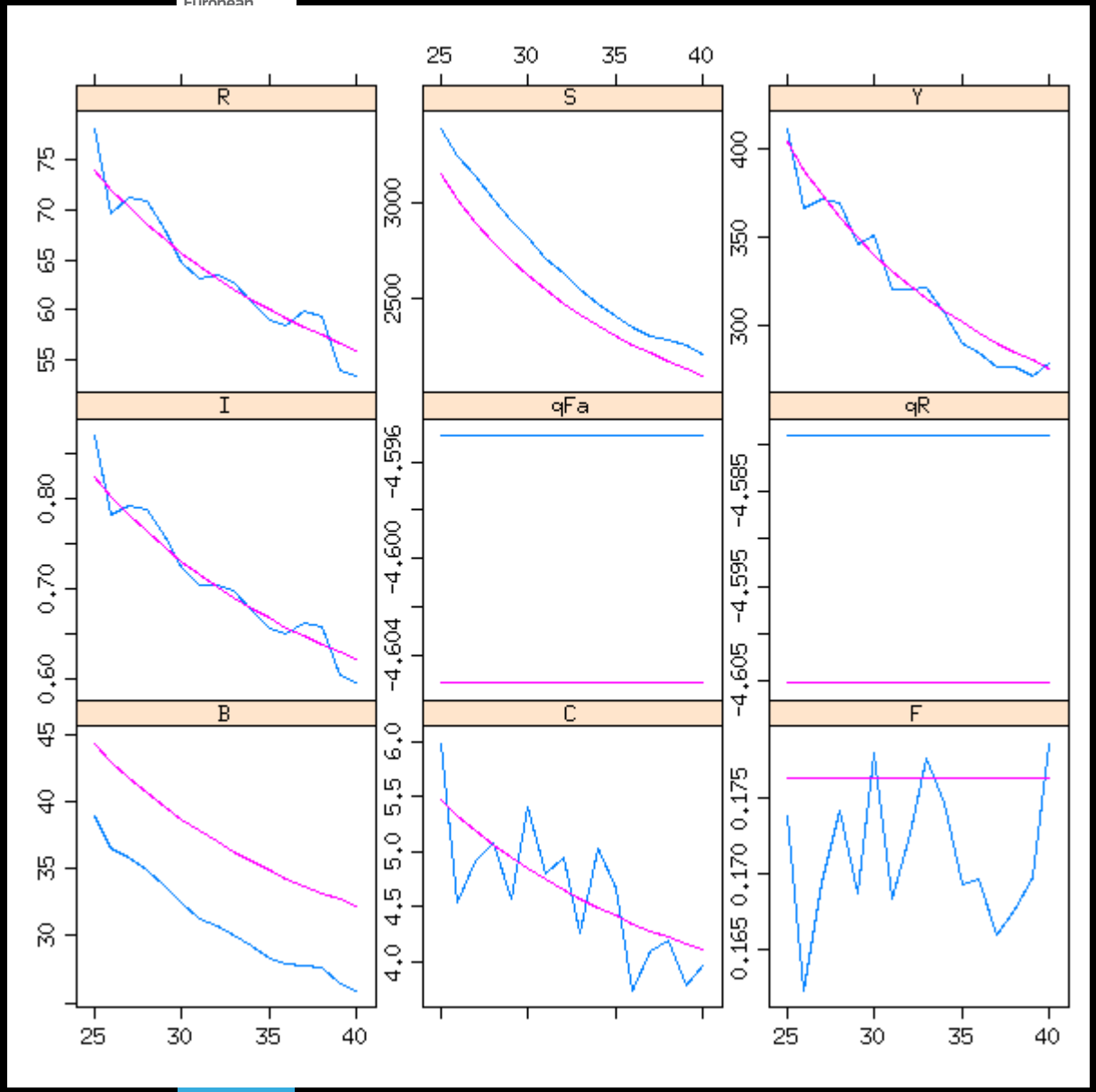
WKLIFE stocks

Fishbase stocks(*)



(*) https://fishreg.jrc.ec.europa.

Testing, 1,2 ...


R
S
Y
I
qFa
qR
B
C
F
25
30
35
40
55
60
65
70
75
2500
3000
300
350
400
0.60
0.70
0.80
-4.604
-4.600
-4.596
-4.605
-4.595
-4.585
30
35
40
45
4.0
4.5
5.0
5.5
6.0
0.165
0.170
0.175

Wrapping up

The framework is opensource and free to promote transparency, transferability.

It uses R to take advantage of R's capabilities.

It uses ADMB to take advantage of the statistical sophistication of AD.

Wrapping up

The a4a stock assessment model provides a flexible framework for stock assessment that can be applied rapidly to a large number (all ?) stocks in a sea basin.

(*) web