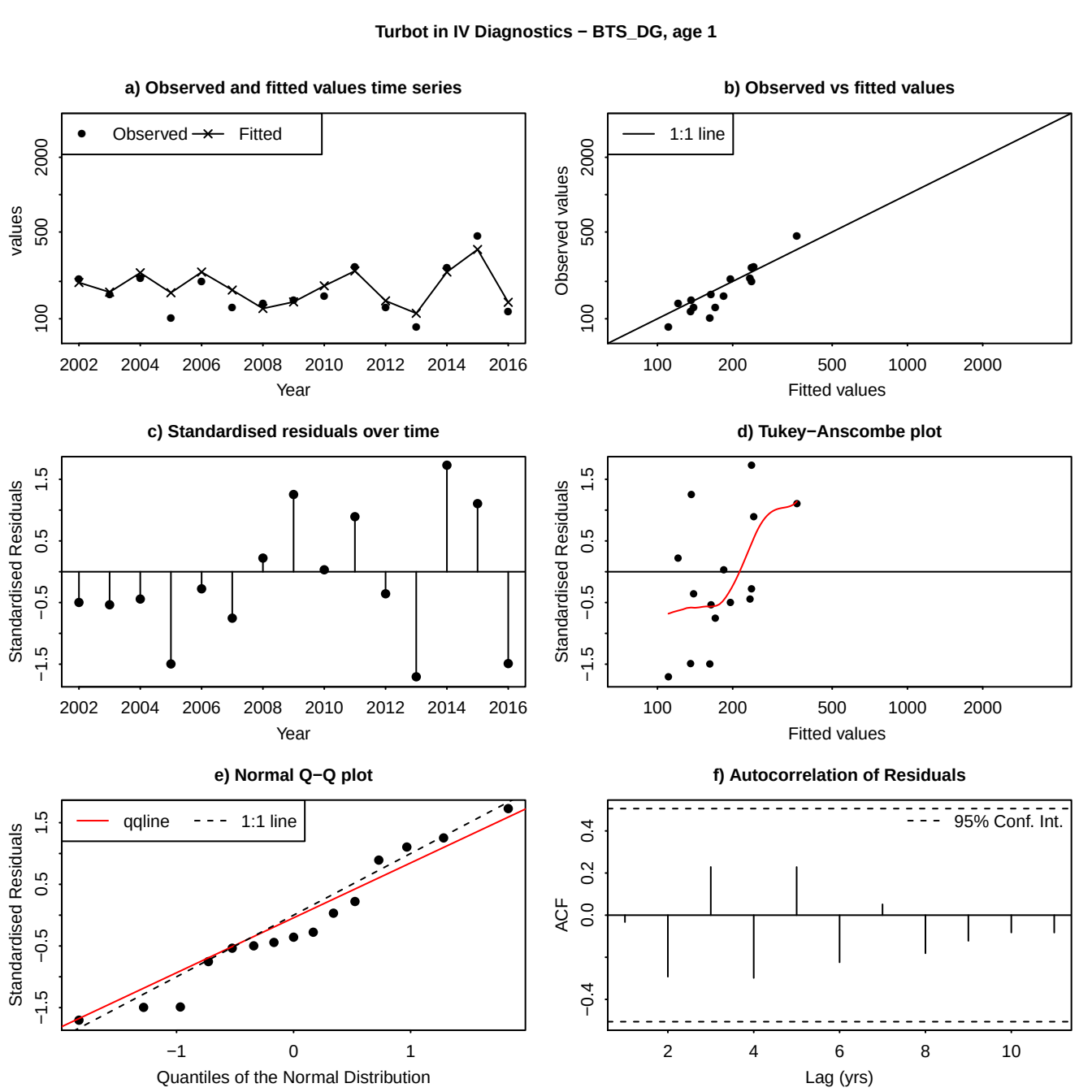
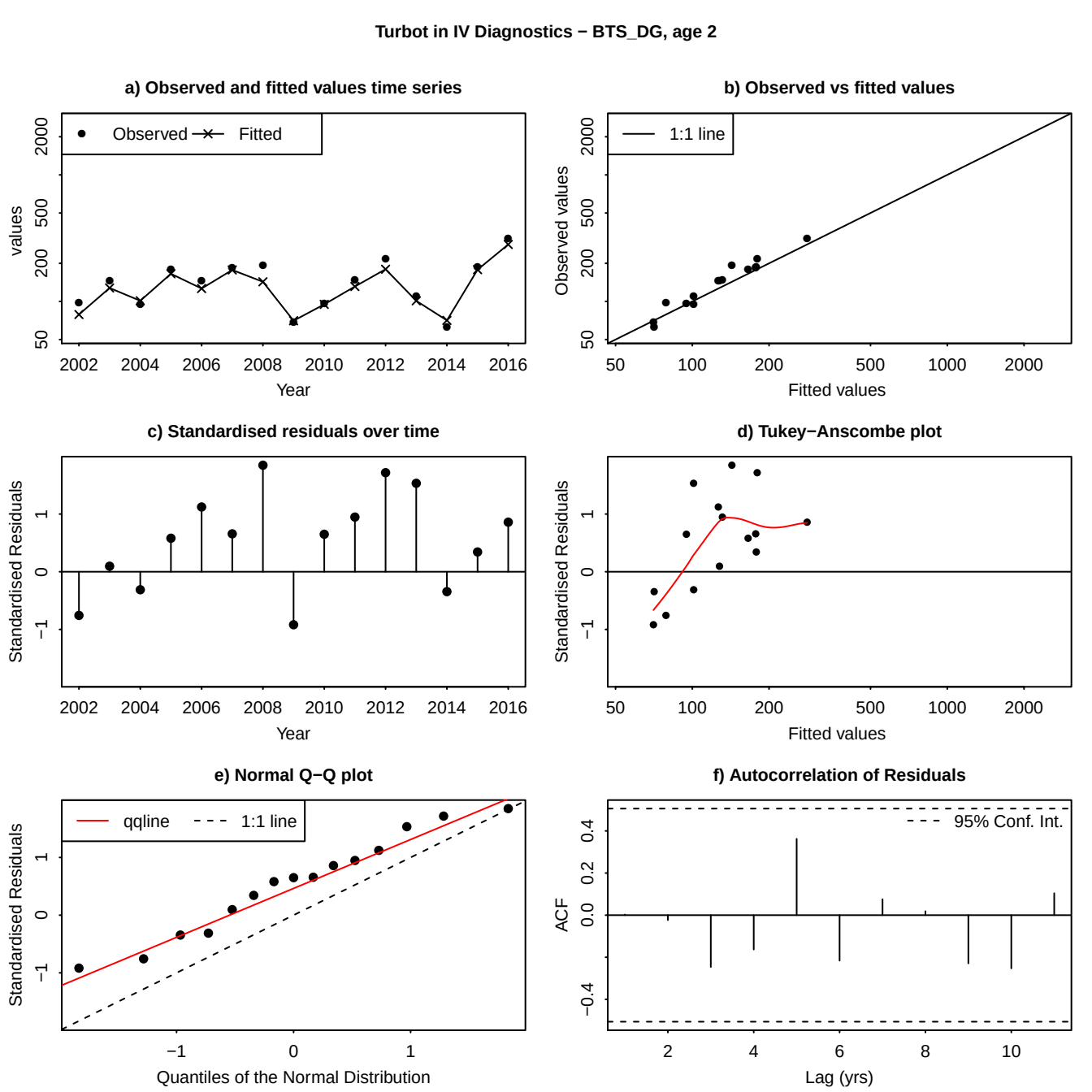
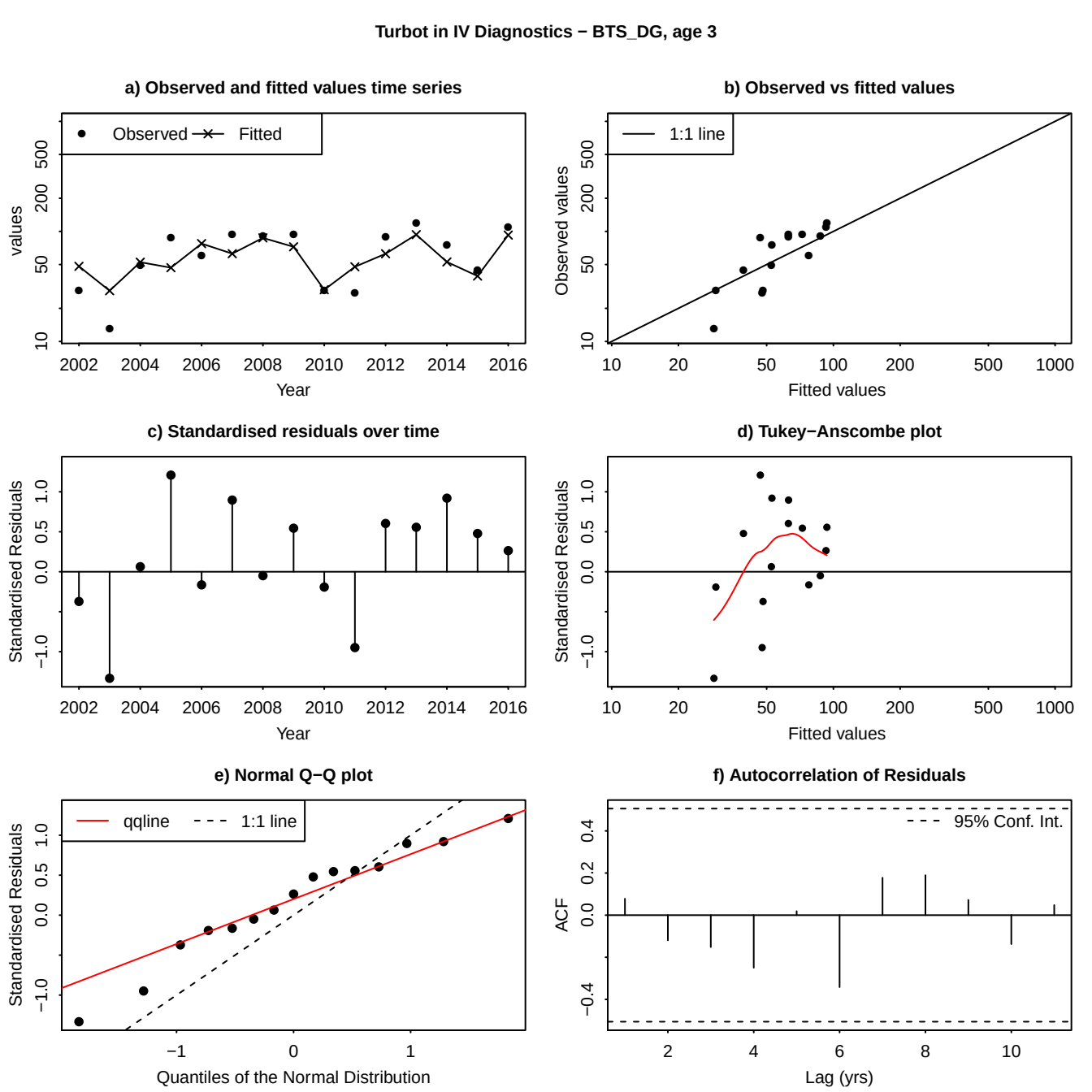
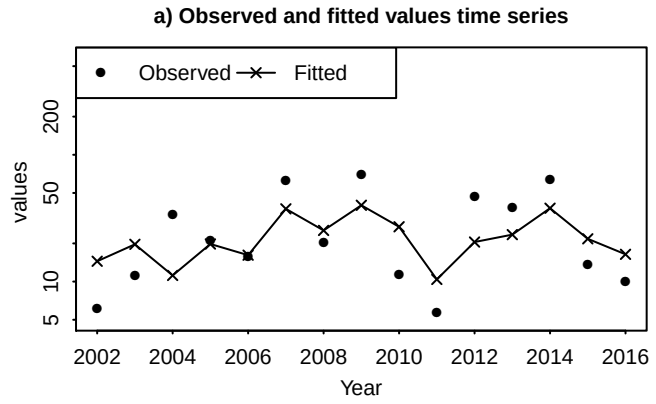
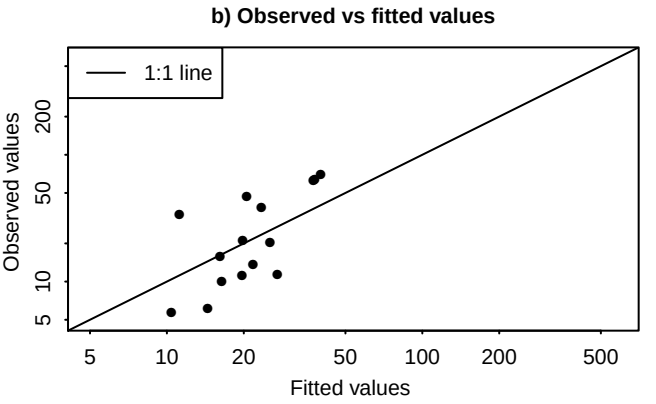

Turbot in IV Diagnostics − BTS_DG, age 1
a) Observed and fitted values time series
Observed
Fitted
values
100
500
2000
2002
2004
2006
2008
2010
2012
2014
2016
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
c) Standardised residuals over time
Standardised Residuals
−1.5
−0.5
0.5
1.5
d) Tukey−Anscombe plot
e) Normal Q−Q plot
qqline
Quantiles of the Normal Distribution
−1
0
1
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.4
0.0
0.2
0.4
Lag (yrs)

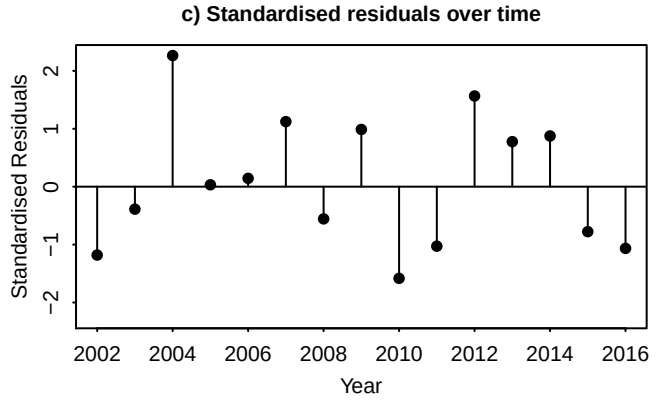

Turbot in IV Diagnostics − BTS_DG, age 2
a) Observed and fitted values time series
Observed
Fitted
values
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
Lag (yrs)

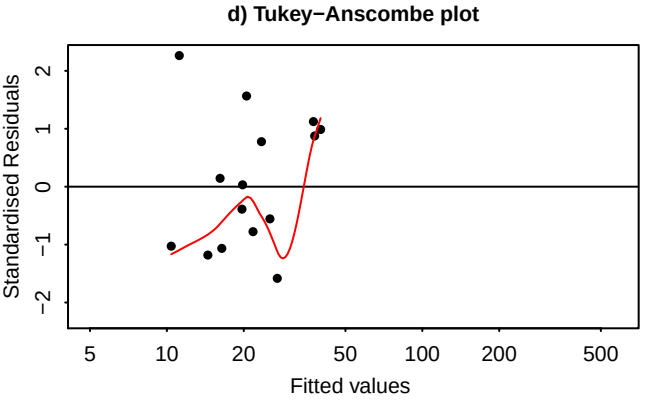

Turbot in IV Diagnostics − BTS_DG, age 3
a) Observed and fitted values time series
Observed
Fitted
values
10
50
200
500
2002
2004
2006
2008
2010
2012
2014
2016
Year
b) Observed vs fitted values
1:1 line
Observed values
10
50
200
500
10
20
50
100
200
500
1000
Fitted values
c) Standardised residuals over time
Standardised Residuals
−1.0
0.0
0.5
1.0
2002
2004
2006
2008
2010
2012
2014
2016
Year
d) Tukey−Anscombe plot
Standardised Residuals
−1.0
0.0
0.5
1.0
10
20
50
100
200
500
1000
Fitted values
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
−1.0
0.0
0.5
1.0
−1
0
1
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.4
0.0
0.2
0.4
2
4
6
8
10
Lag (yrs)

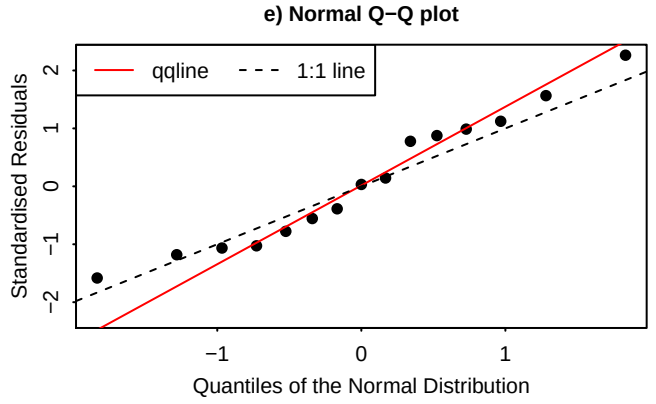
Turbot in IV Diagnostics − BTS_DG, age 4

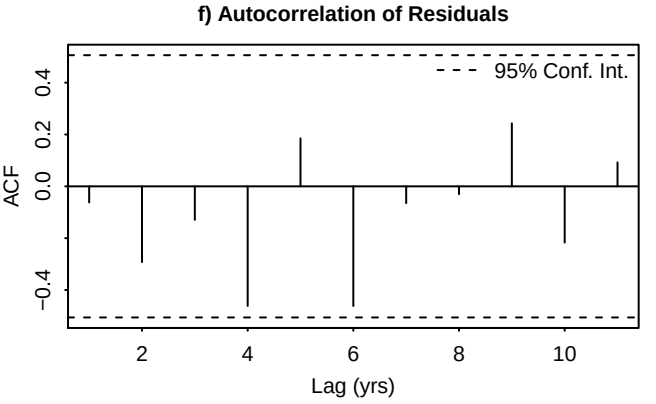




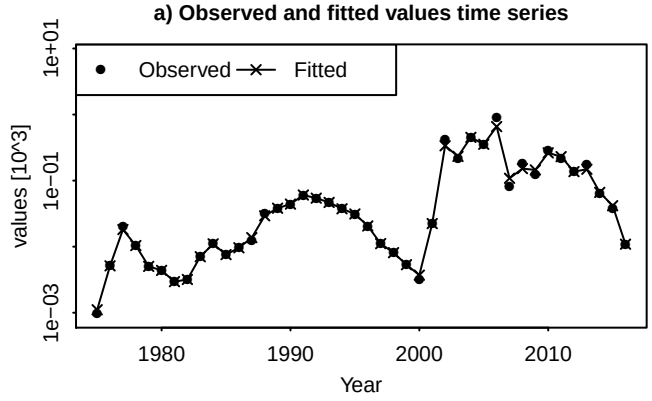


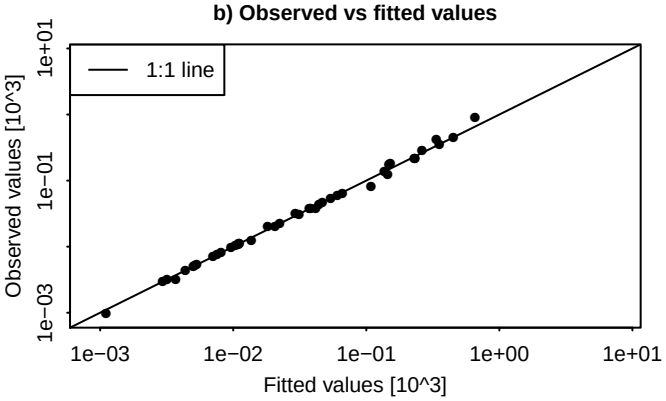


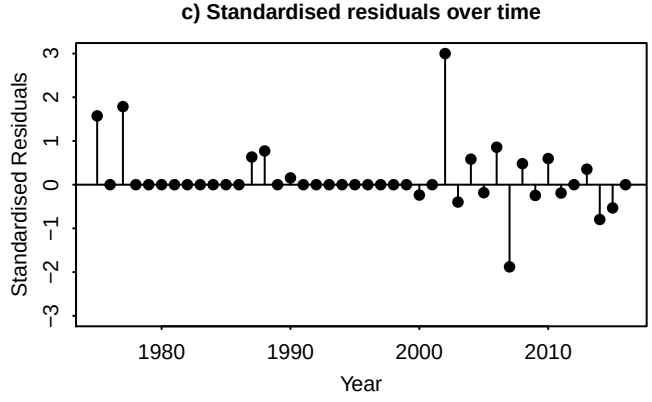


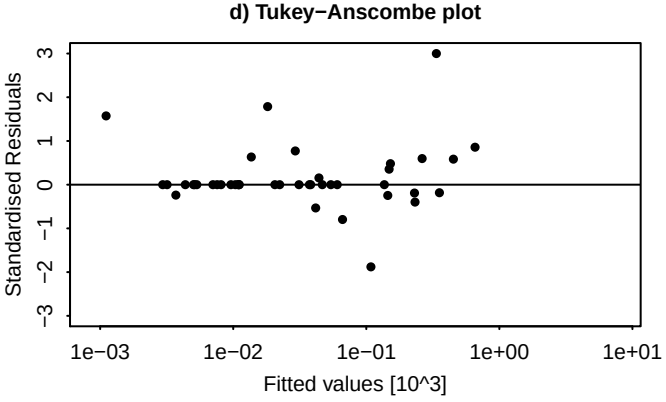


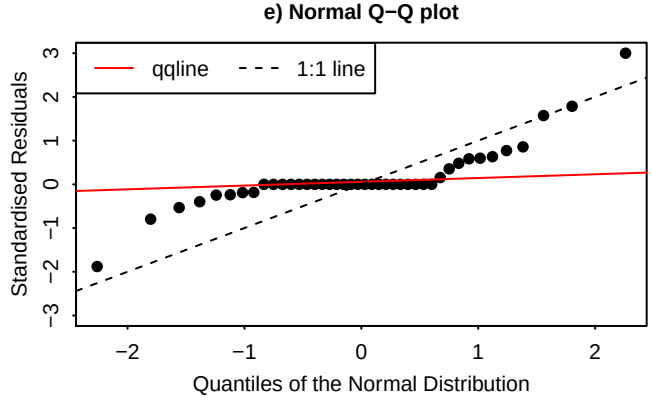
Turbot in IV Diagnostics − catch, age 1

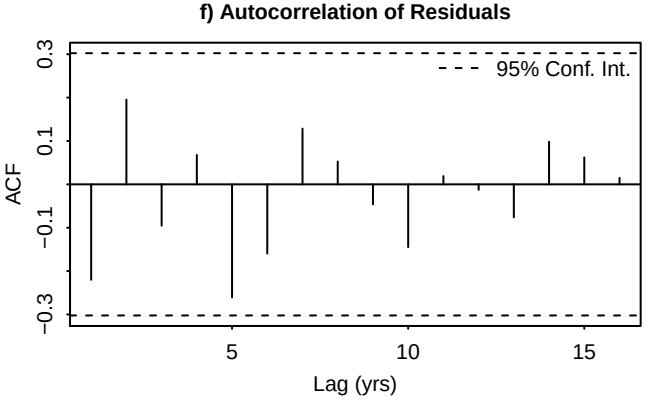




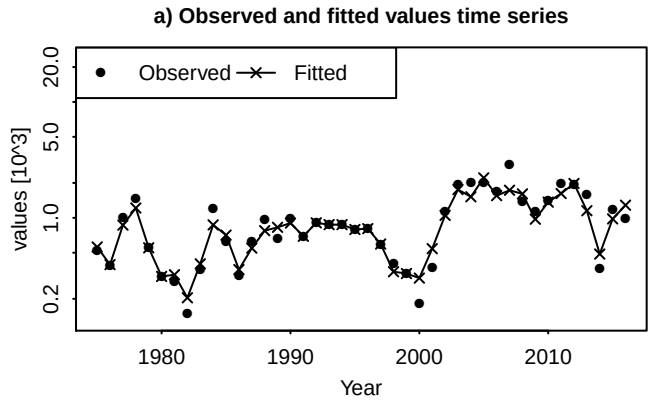


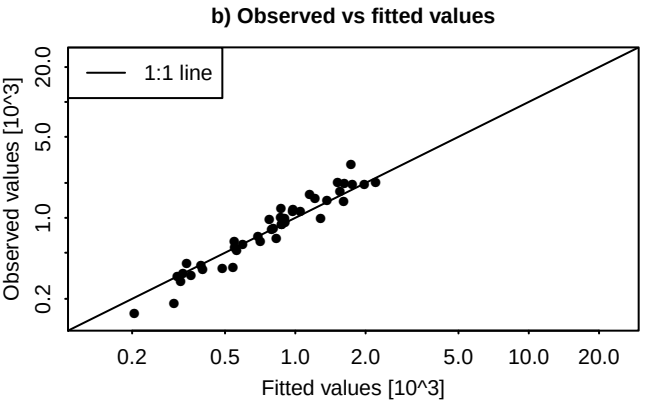


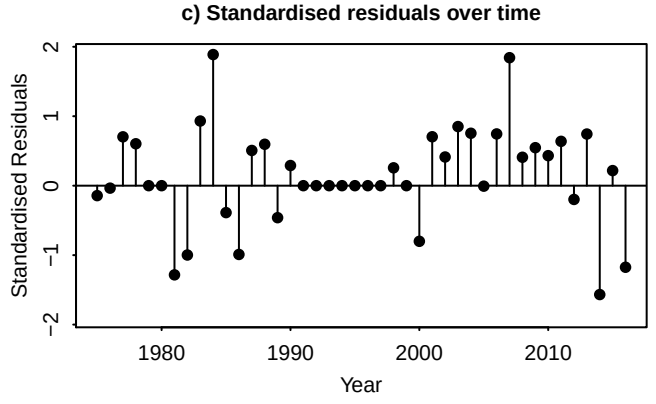


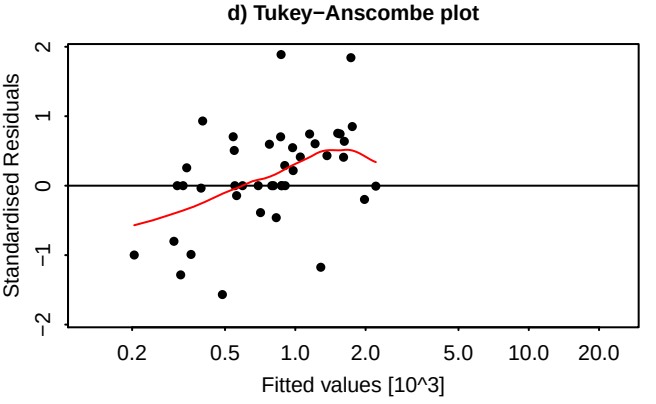


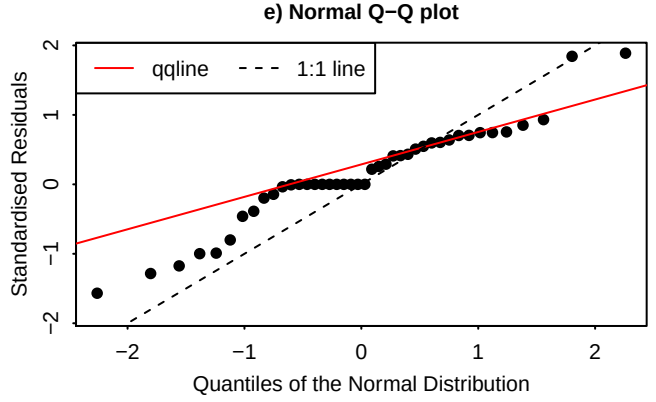
Turbot in IV Diagnostics − catch, age 2

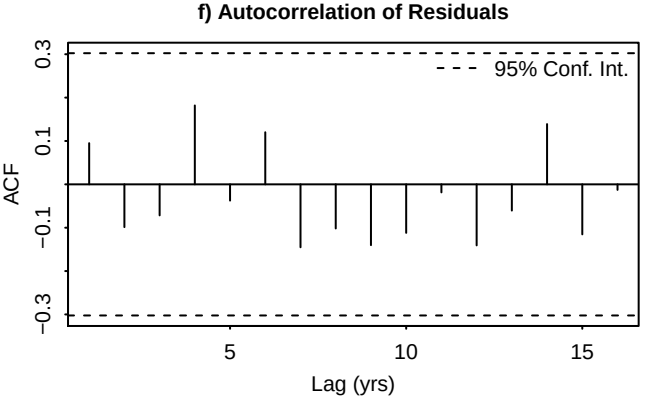


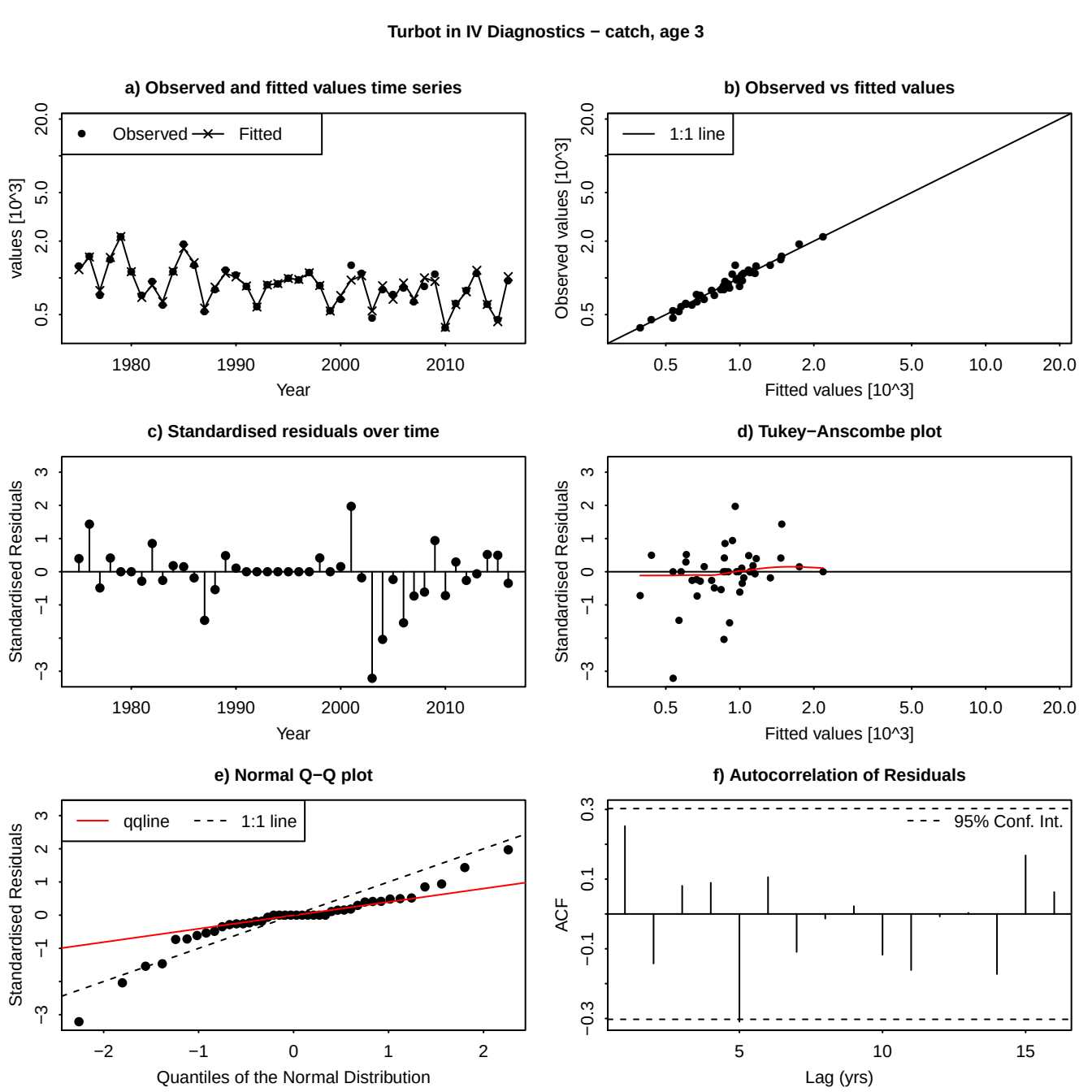


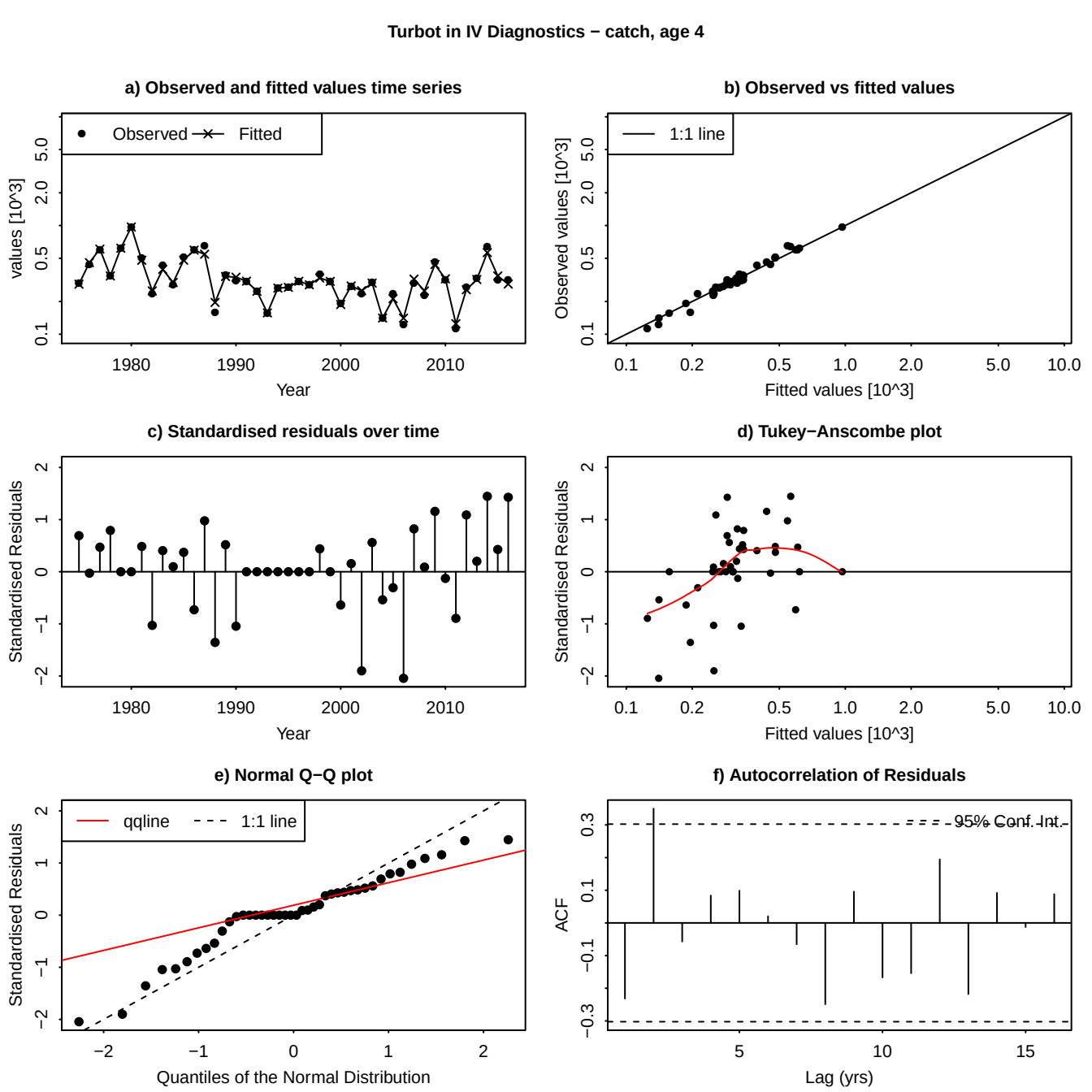


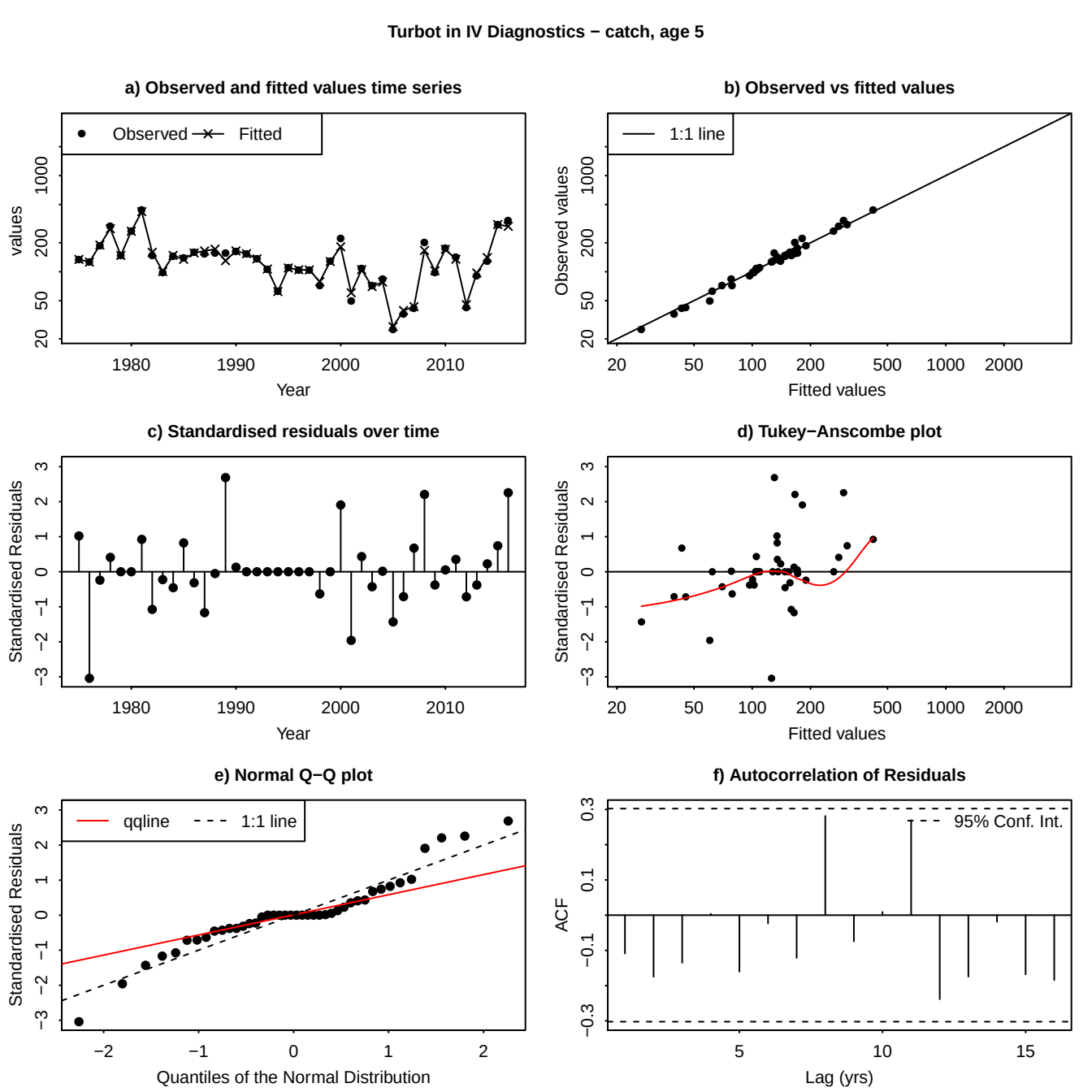


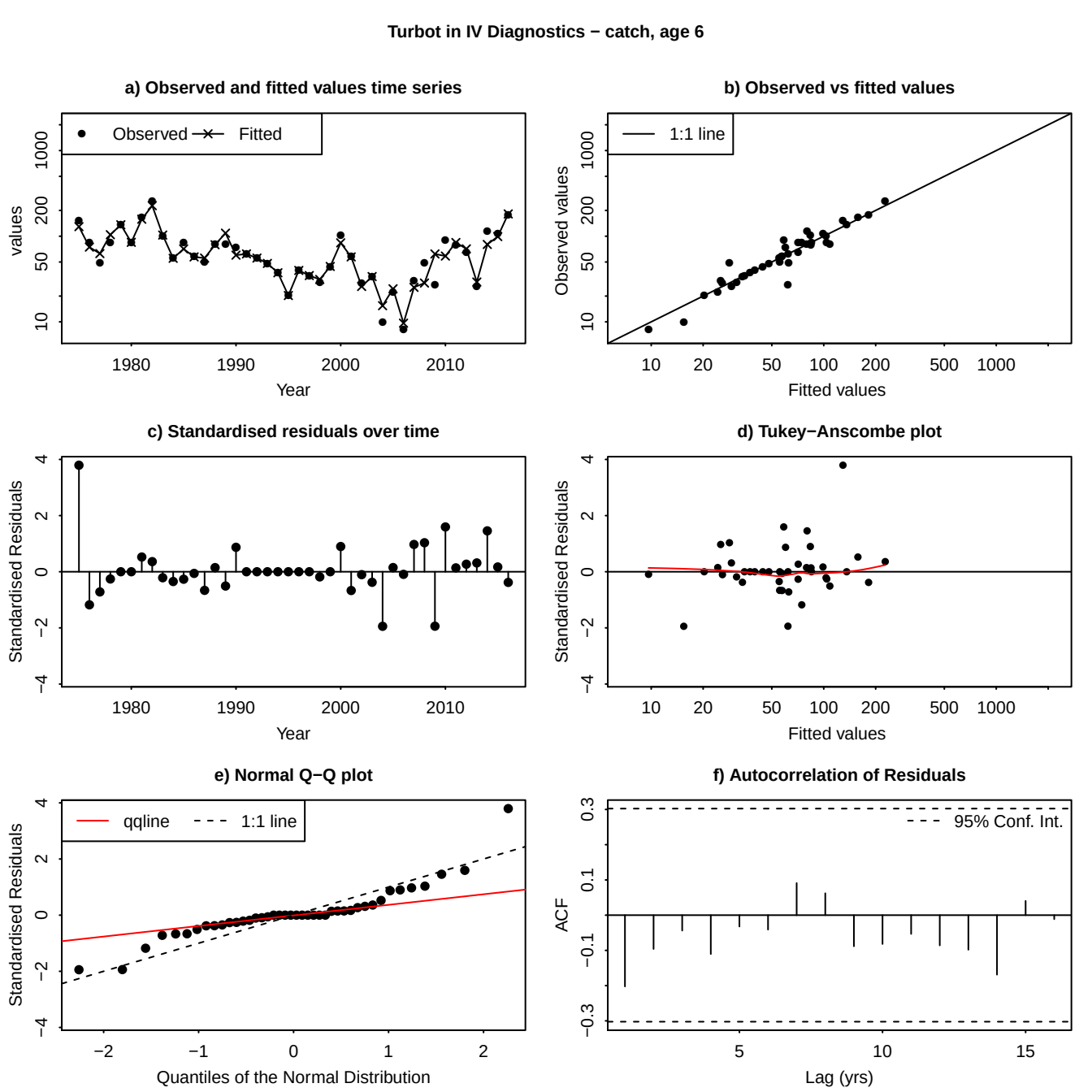


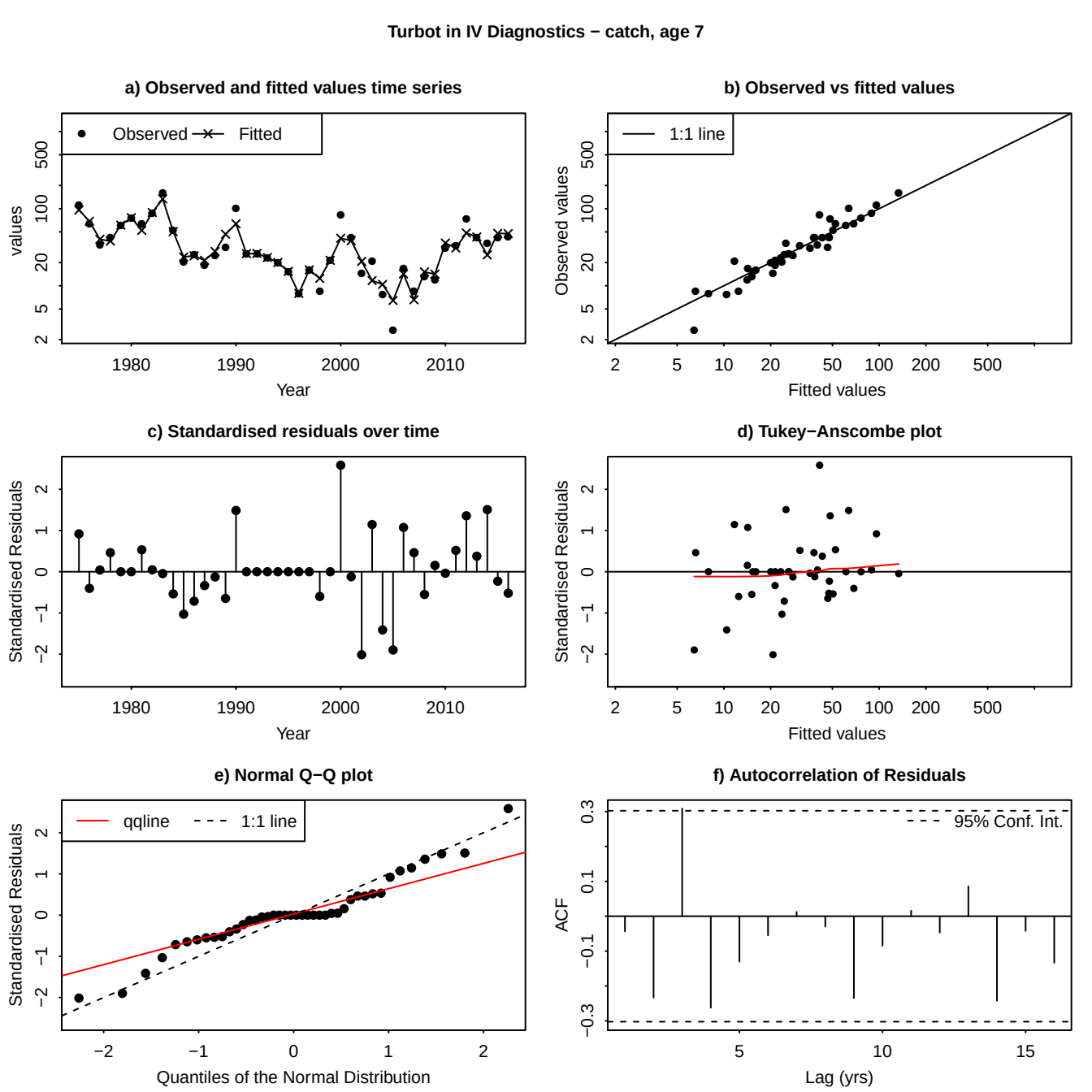


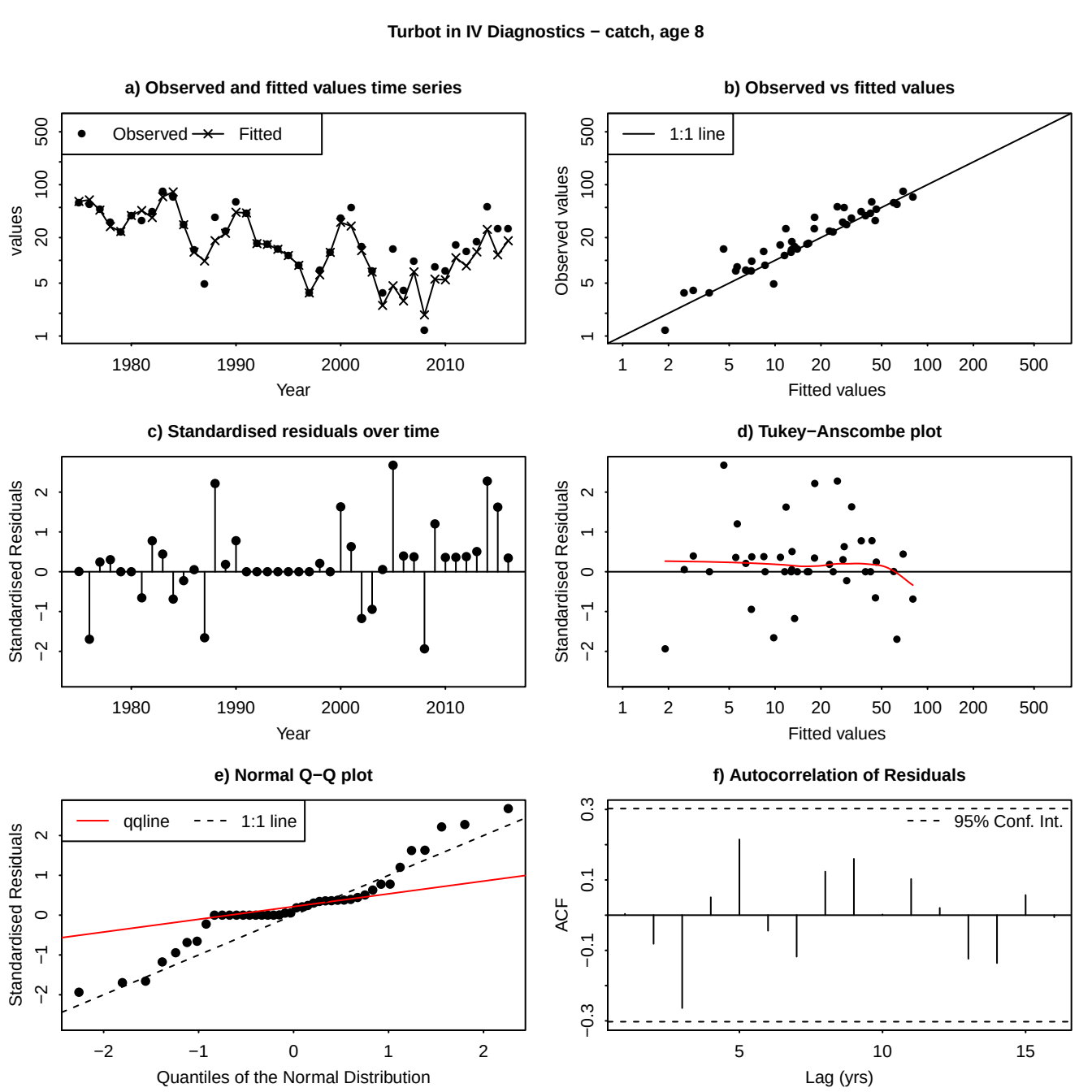

Turbot in IV Diagnostics − catch, age 3
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
20.0
5.0
2.0
0.5
1980
1990
2000
2010
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.5
1.0
2.0
5.0
10.0
20.0
c) Standardised residuals over time
Standardised Residuals
3
2
1
0
−1
−3
Year
d) Tukey−Anscombe plot
e) Normal Q−Q plot
qqline
1:1 line
Quantiles of the Normal Distribution
−2
−1
0
1
2
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
0.3
0.1
−0.1
−0.3
5
10
15
Lag (yrs)

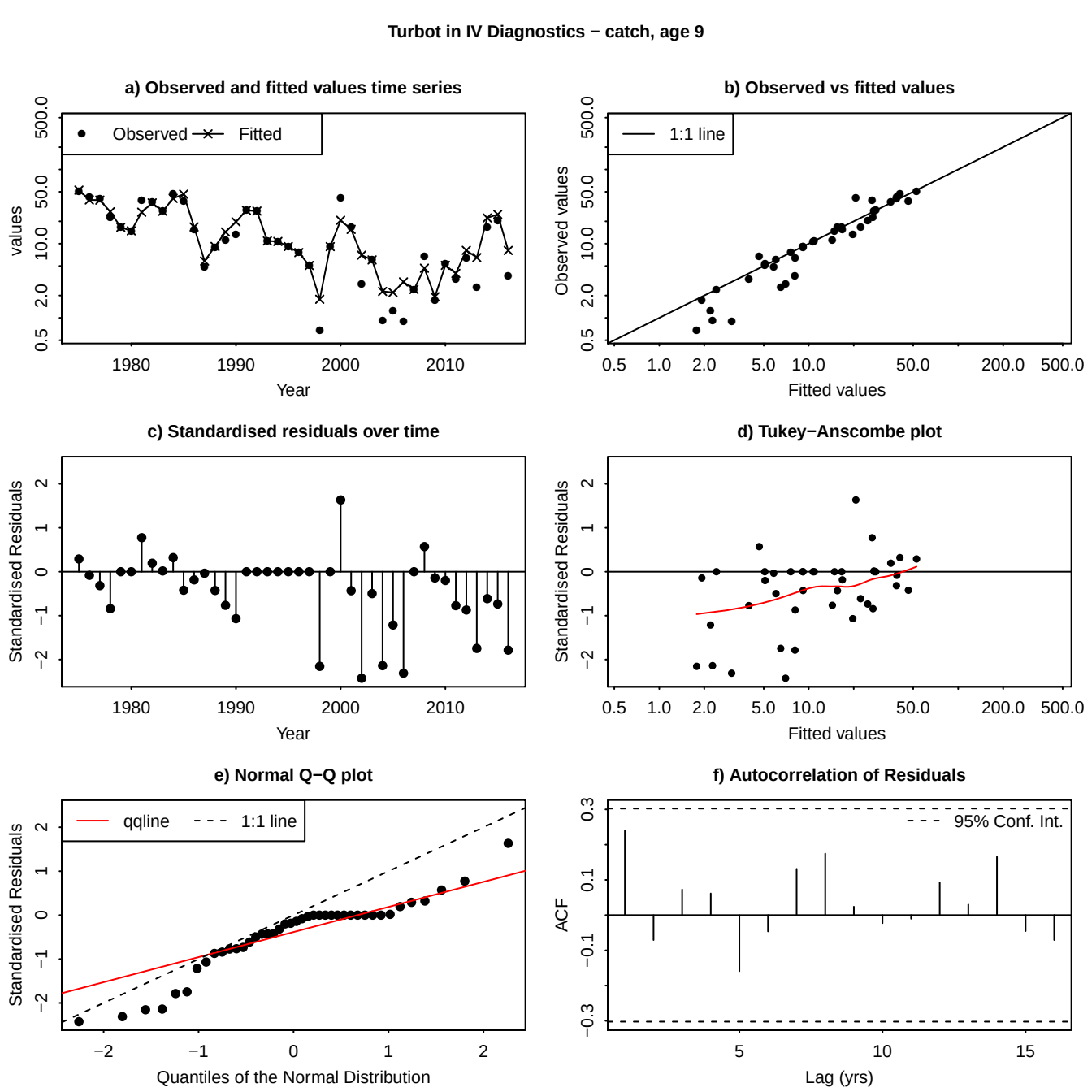

Turbot in IV Diagnostics − catch, age 4
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
0.1
0.5
2.0
5.0
1980
1990
2000
2010
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.1
0.2
0.5
1.0
2.0
5.0
10.0
c) Standardised residuals over time
Standardised Residuals
−2
−1
0
1
2
Year
d) Tukey−Anscombe plot
e) Normal Q−Q plot
qqline
1:1 line
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.3
−0.1
0.1
0.3
5
10
15
Lag (yrs)

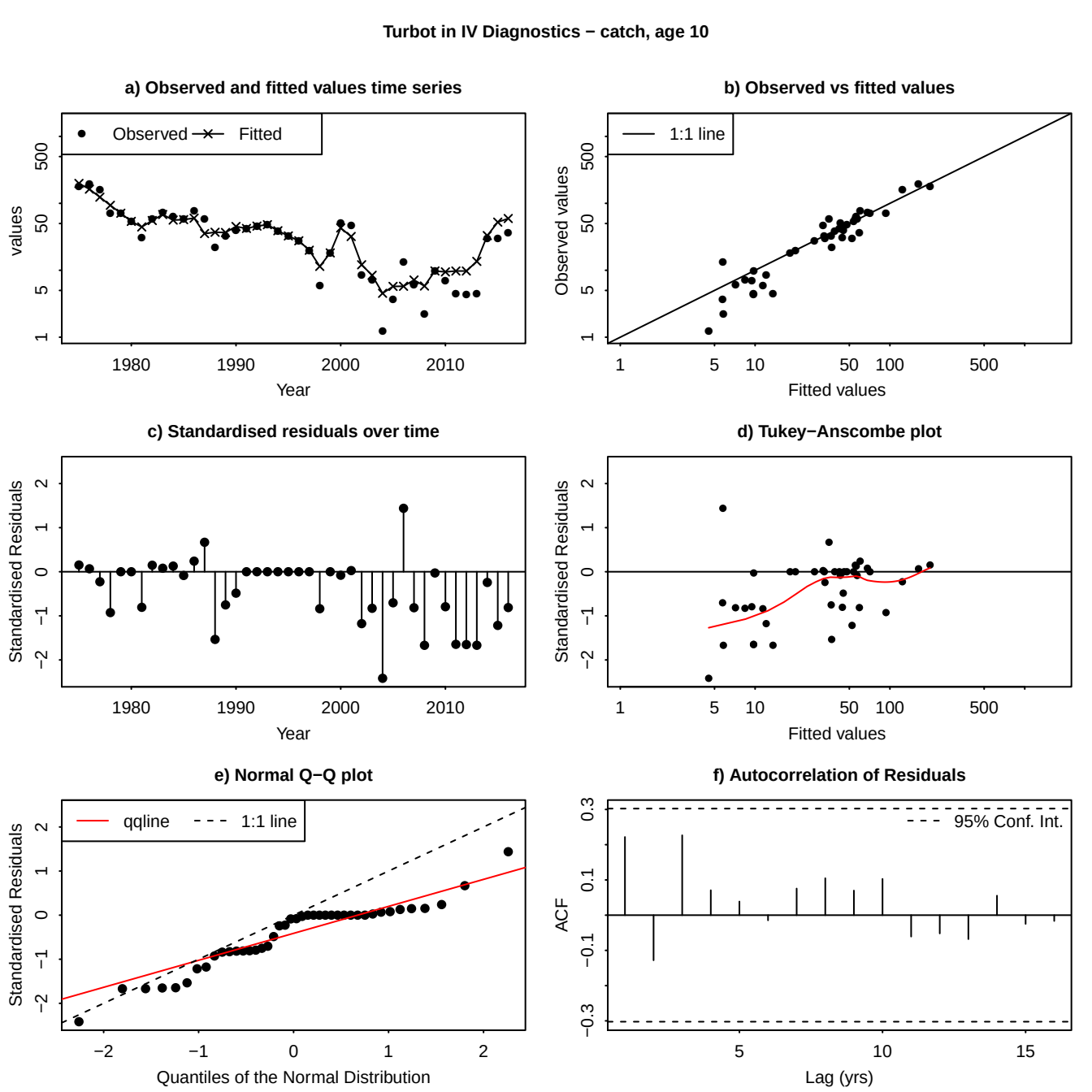

Turbot in IV Diagnostics − catch, age 5
a) Observed and fitted values time series
Observed
Fitted
values
20
50
200
1000
1980
1990
2000
2010
Year
b) Observed vs fitted values
1:1 line
Observed values
20
50
100
200
500
1000
2000
Fitted values
c) Standardised residuals over time
Standardised Residuals
−3
−2
−1
0
1
2
3
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.3
−0.1
0.1
0.3
5
10
15
Lag (yrs)

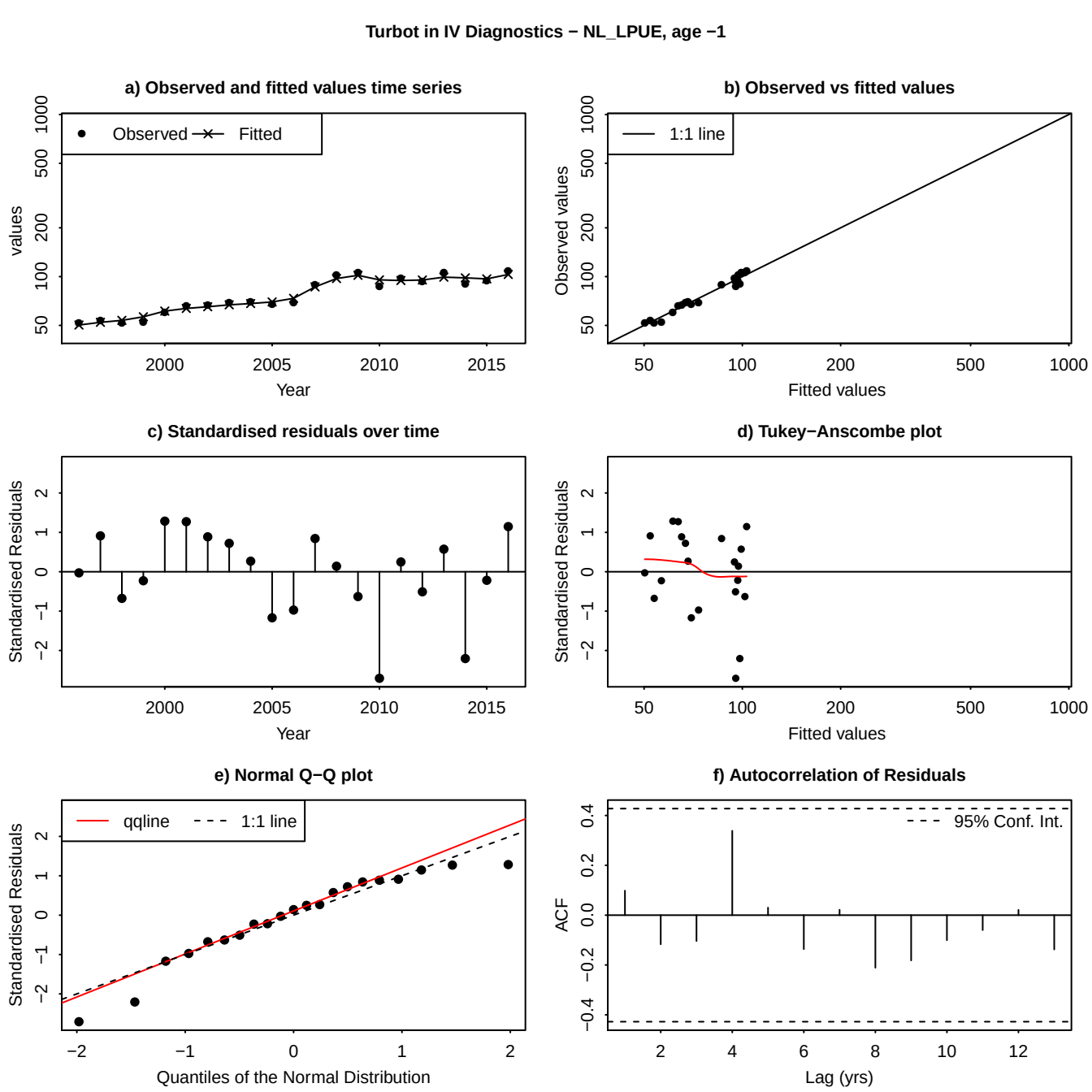

Turbot in IV Diagnostics − catch, age 6
a) Observed and fitted values time series
Observed
Fitted
values
10
50
200
1000
1980
1990
2000
2010
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
c) Standardised residuals over time
Standardised Residuals
d) Tukey−Anscombe plot
e) Normal Q−Q plot
qqline
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
Lag (yrs)

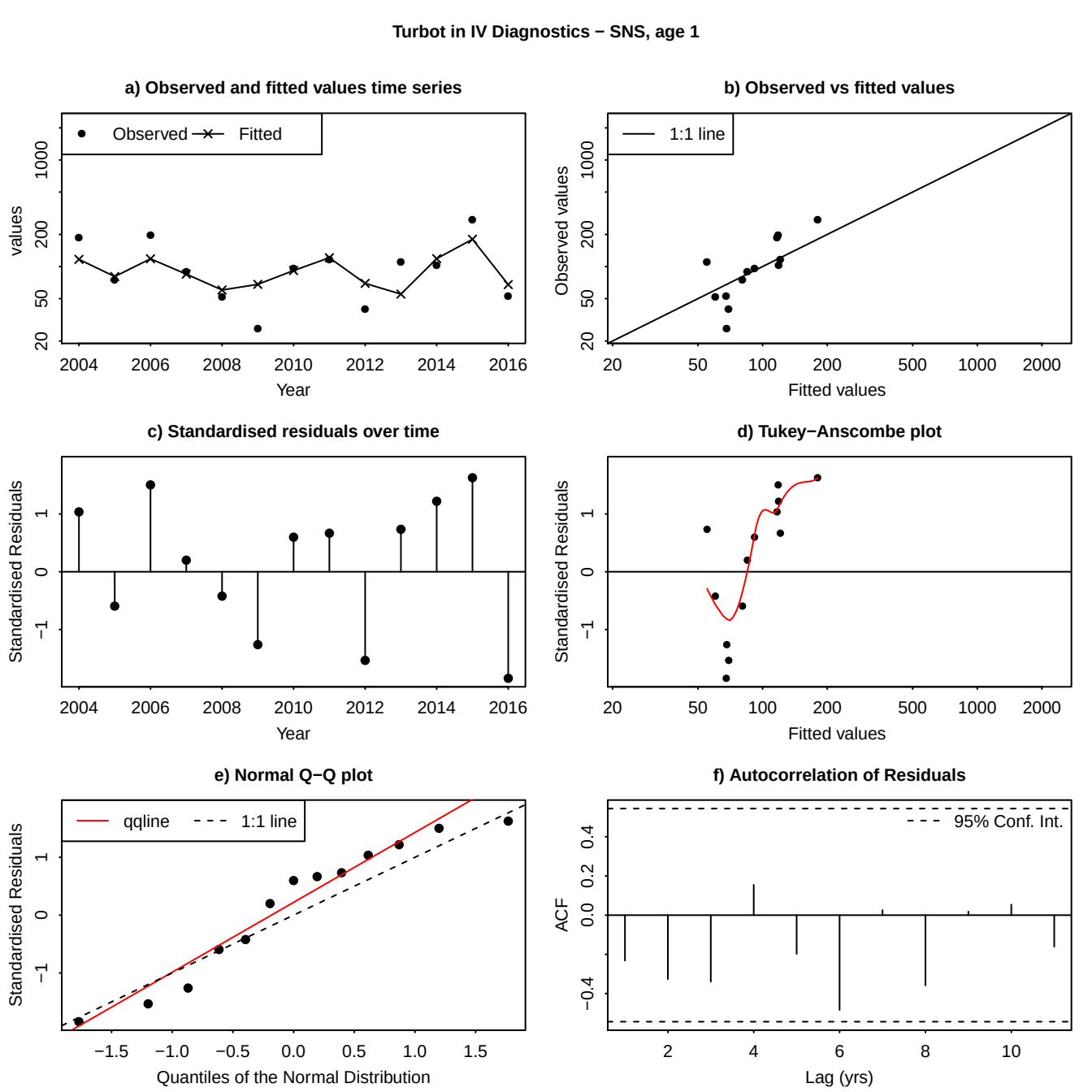

Turbot in IV Diagnostics − catch, age 7
a) Observed and fitted values time series
Observed
Fitted
values
2
5
20
100
500
1980
1990
2000
2010
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
c) Standardised residuals over time
Standardised Residuals
d) Tukey−Anscombe plot
e) Normal Q−Q plot
qqline
1:1 line
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
Lag (yrs)

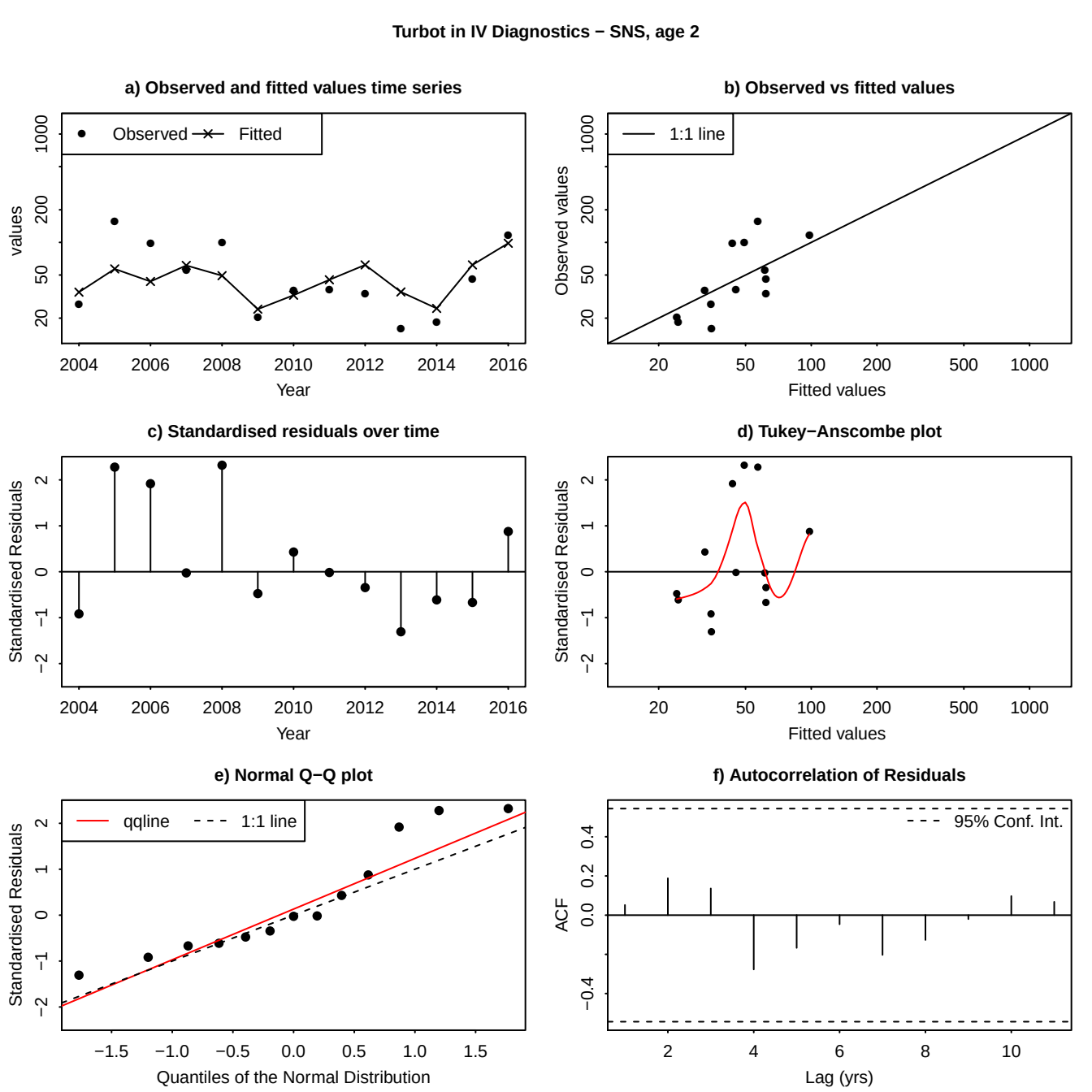

Turbot in IV Diagnostics − catch, age 8
a) Observed and fitted values time series
Observed
Fitted
values
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
Lag (yrs)


Turbot in IV Diagnostics − catch, age 9
a) Observed and fitted values time series
Observed
Fitted
values
500.0
50.0
10.0
2.0
0.5
1980
1990
2000
2010
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
0.5
1.0
2.0
5.0
10.0
50.0
200.0
500.0
c) Standardised residuals over time
Standardised Residuals
2
1
0
−1
−2
Year
d) Tukey−Anscombe plot
e) Normal Q−Q plot
qqline
1:1 line
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
0.3
0.1
−0.1
−0.3
5
10
15
Lag (yrs)

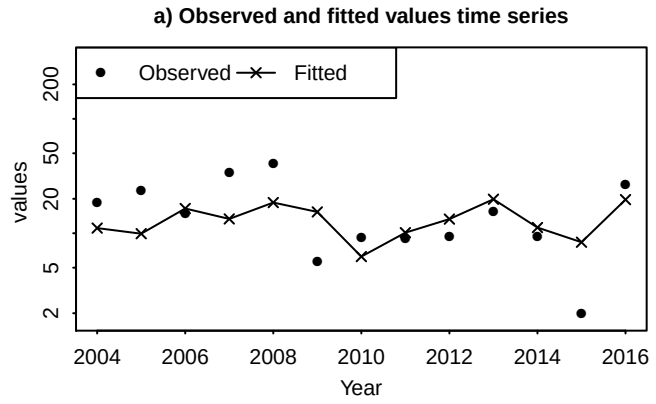

Turbot in IV Diagnostics − catch, age 10
a) Observed and fitted values time series
Observed
Fitted
values
1
5
50
500
1980
1990
2000
2010
Year
b) Observed vs fitted values
1:1 line
Observed values
1
5
50
500
1
5
10
50
100
500
Fitted values
c) Standardised residuals over time
Standardised Residuals
−2
−1
0
1
2
1980
1990
2000
2010
Year
d) Tukey−Anscombe plot
Standardised Residuals
−2
−1
0
1
2
1
5
10
50
100
500
Fitted values
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
−2
−1
0
1
2
−2
−1
0
1
2
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.3
−0.1
0.1
0.3
5
10
15
Lag (yrs)

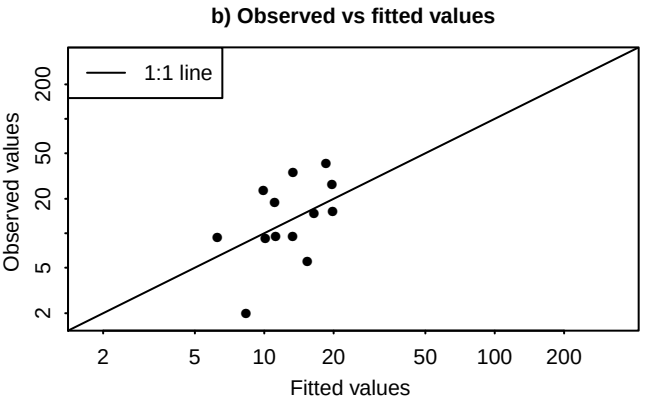

Turbot in IV Diagnostics − NL_LPUE, age −1
a) Observed and fitted values time series
Observed
Fitted
values
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
Lag (yrs)

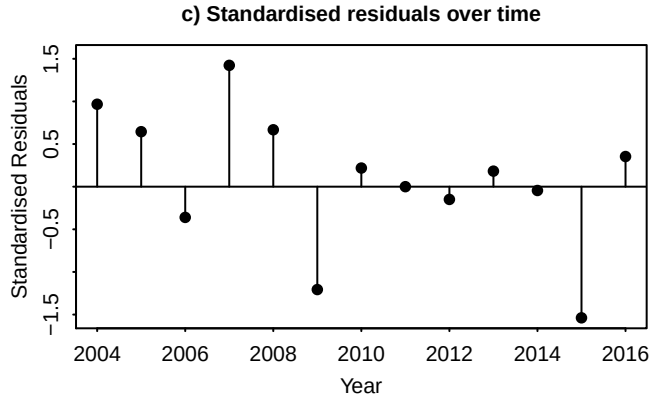

Turbot in IV Diagnostics − SNS, age 1
a) Observed and fitted values time series
Observed
Fitted
values
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
Lag (yrs)

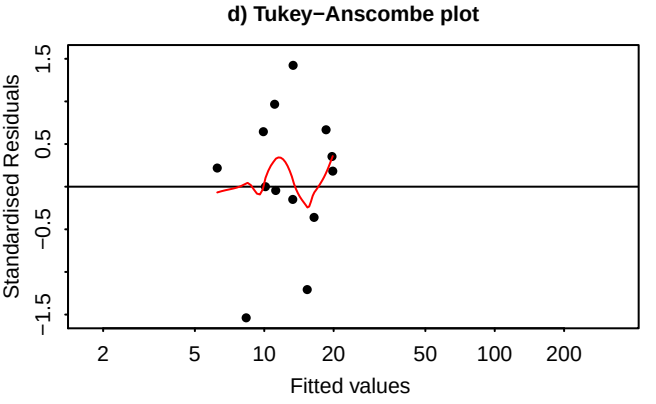

Turbot in IV Diagnostics − SNS, age 2
a) Observed and fitted values time series
Observed
Fitted
values
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
Lag (yrs)

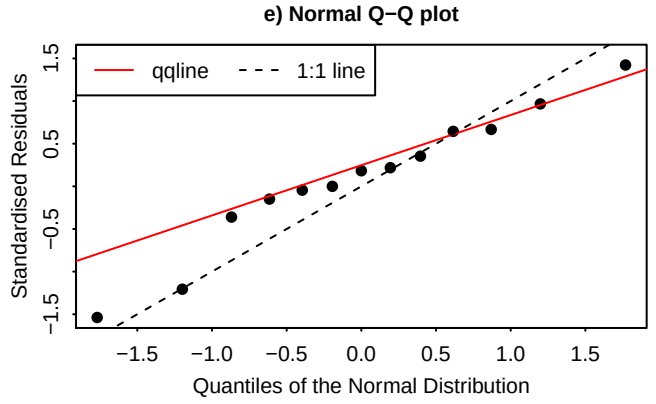
Turbot in IV Diagnostics − SNS, age 3

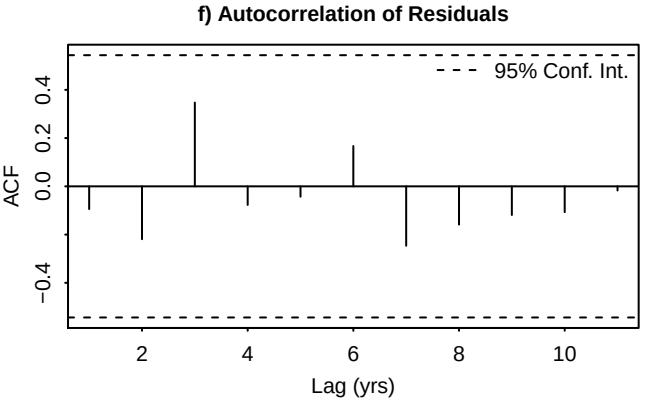


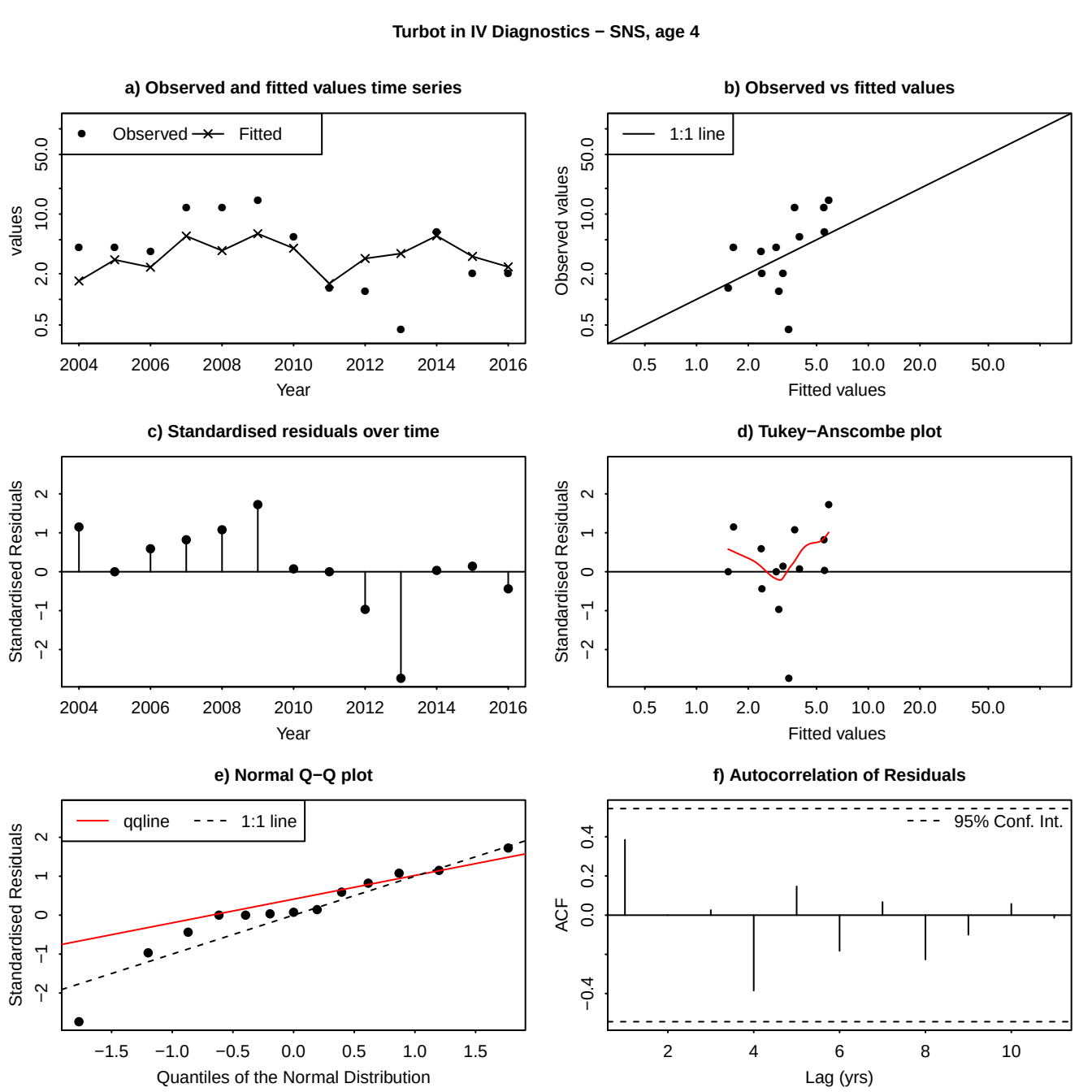


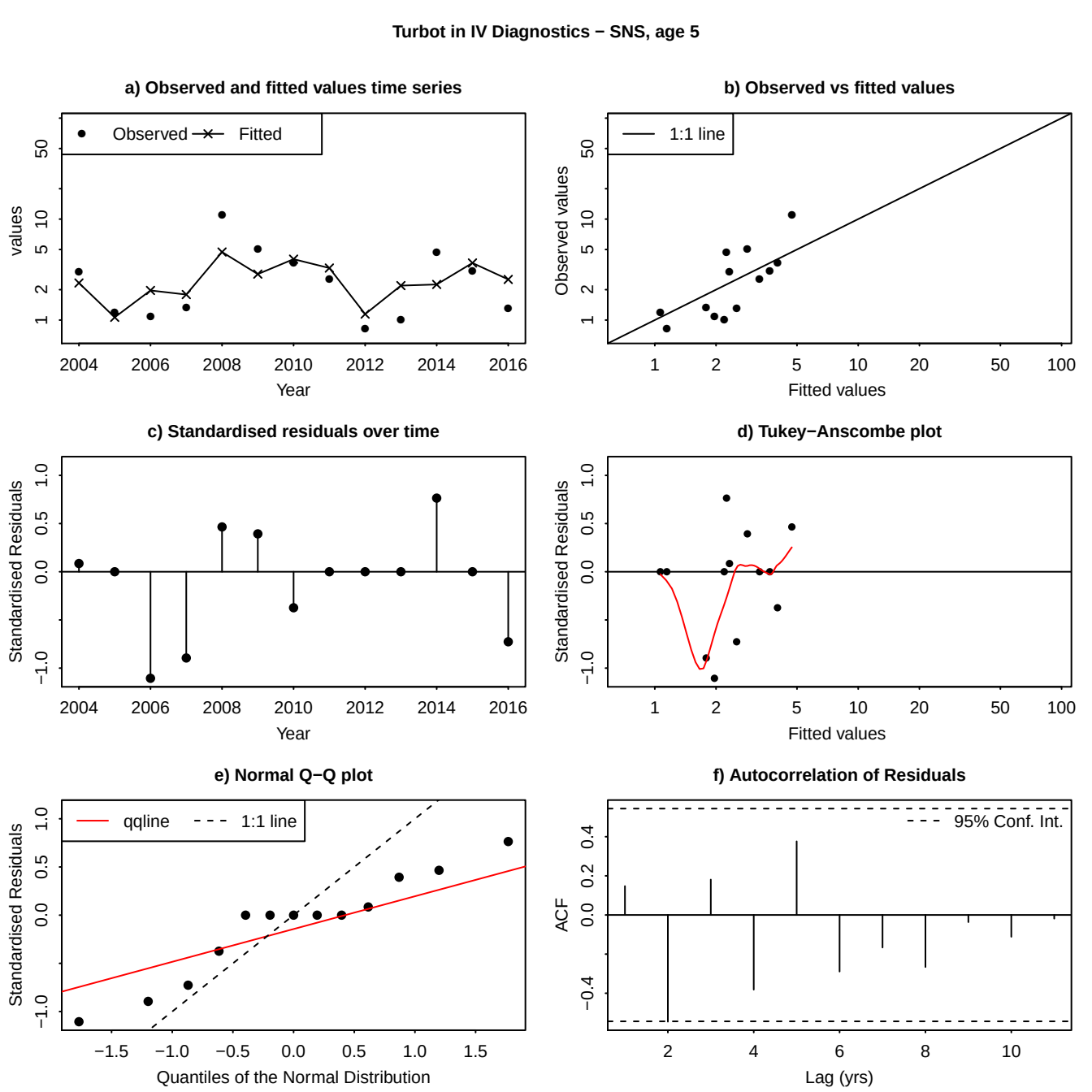


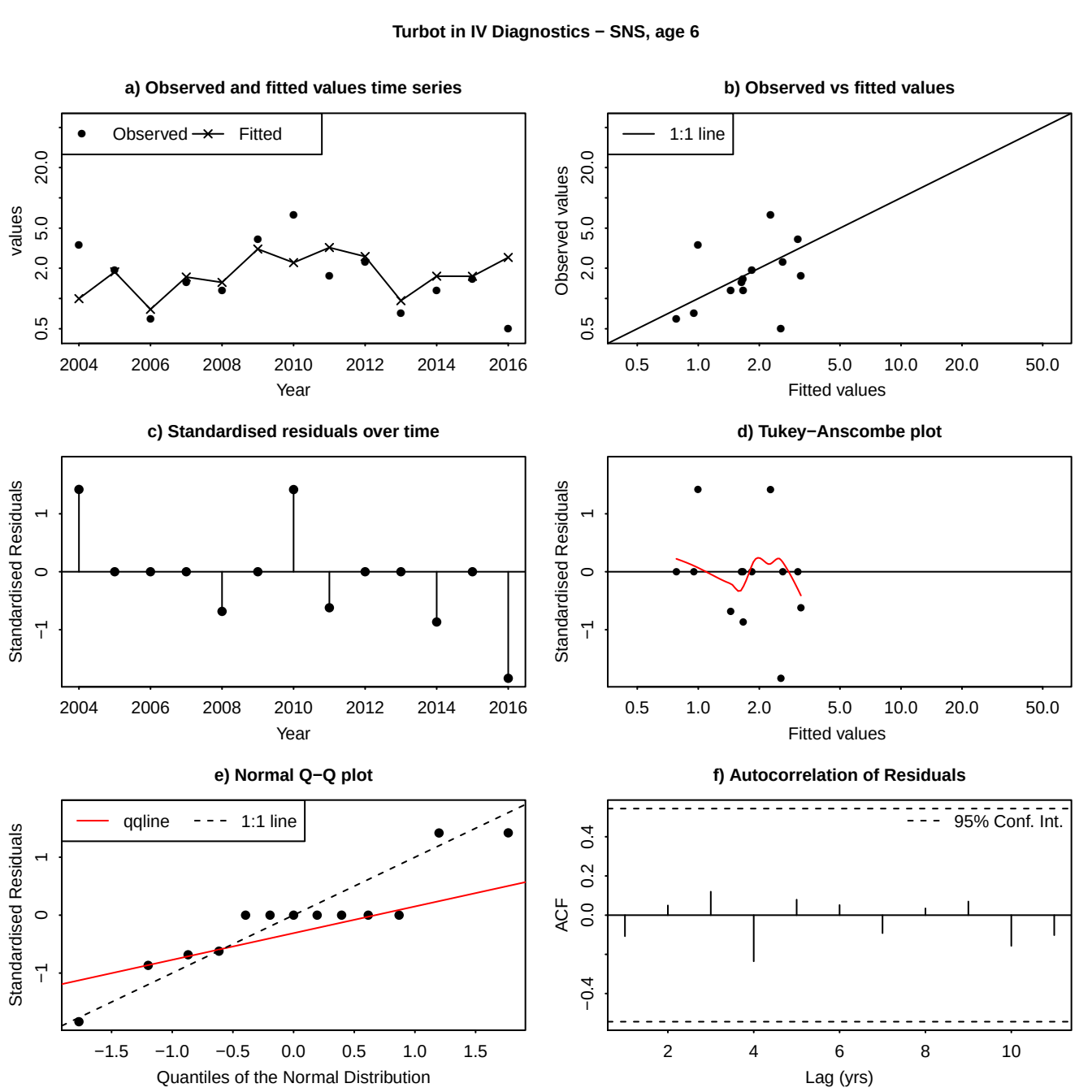


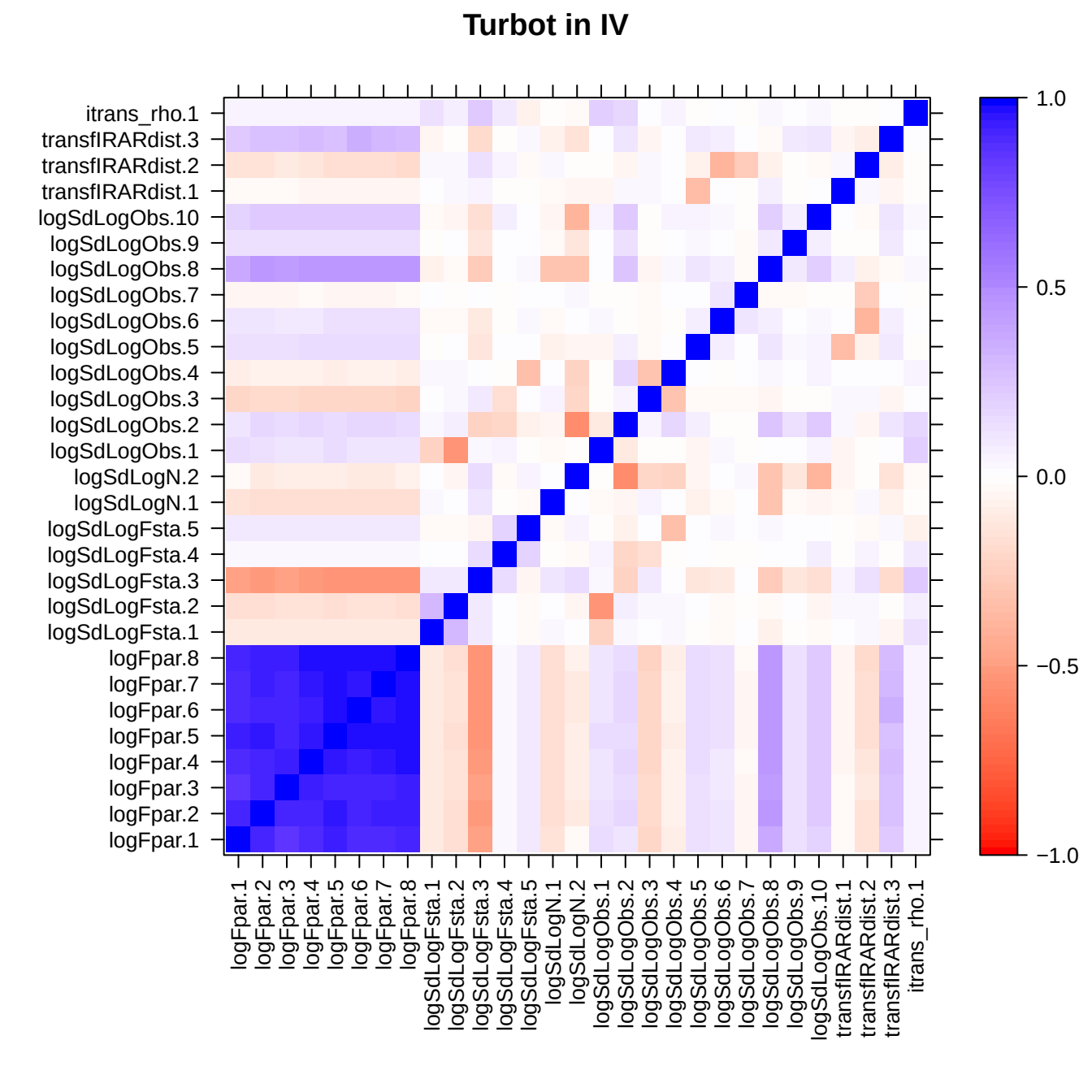


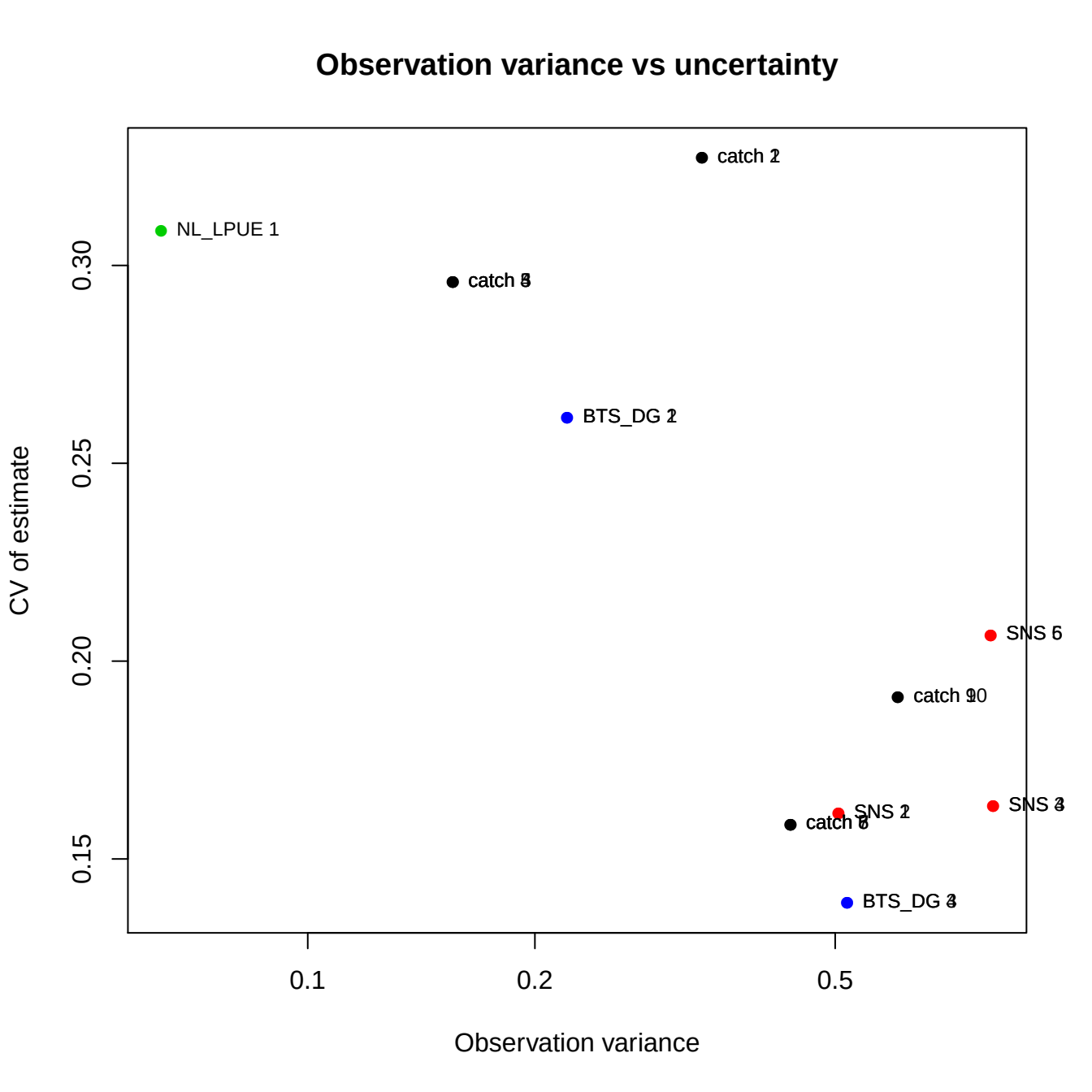


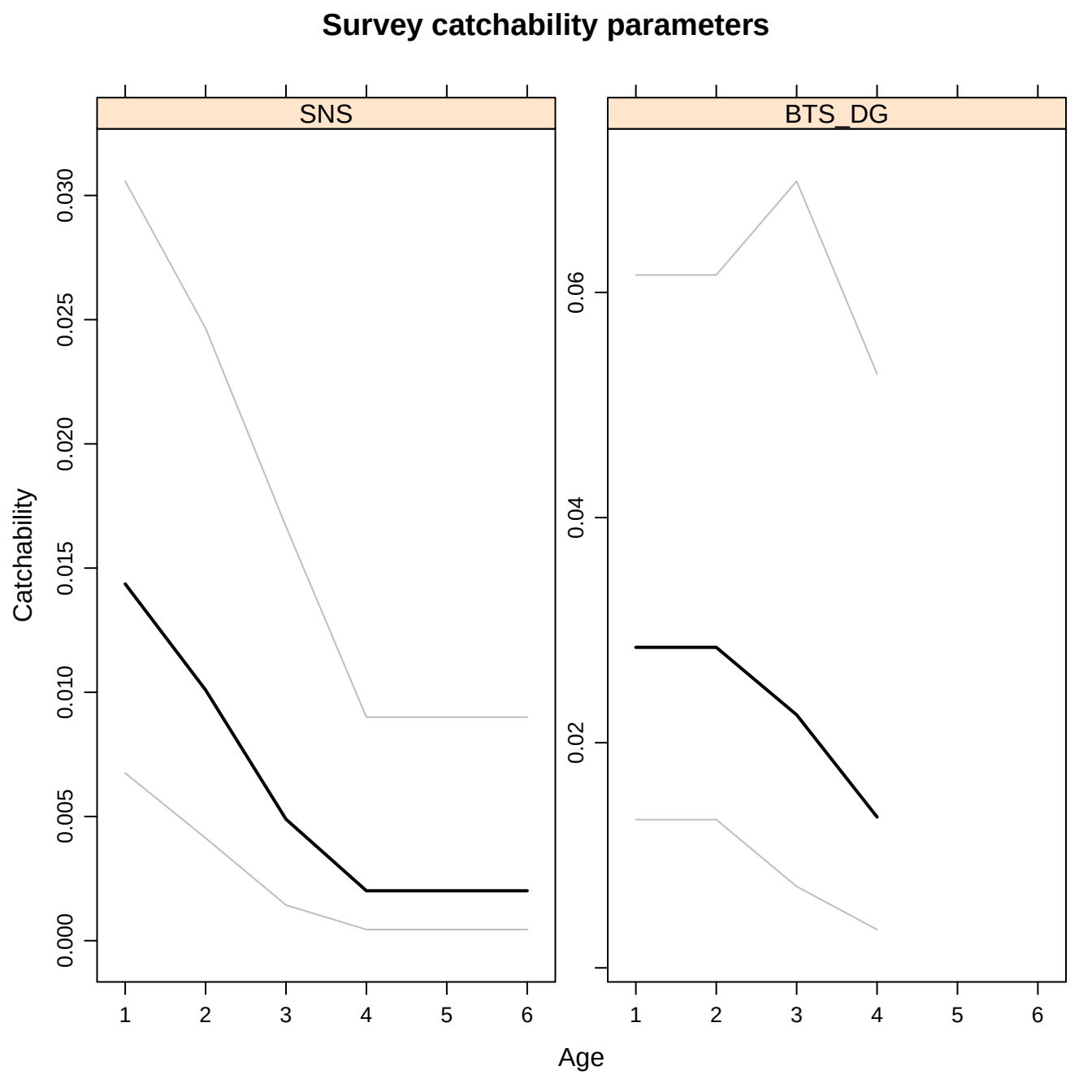

Turbot in IV Diagnostics − SNS, age 4
a) Observed and fitted values time series
Observed
Fitted
values
0.5
2.0
10.0
50.0
2004
2006
2008
2010
2012
2014
2016
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
0.5
1.0
2.0
5.0
10.0
20.0
50.0
c) Standardised residuals over time
Standardised Residuals
−2
−1
0
1
2
Year
d) Tukey−Anscombe plot
e) Normal Q−Q plot
qqline
1:1 line
Quantiles of the Normal Distribution
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.4
0.0
0.2
0.4
2
4
6
8
10
Lag (yrs)

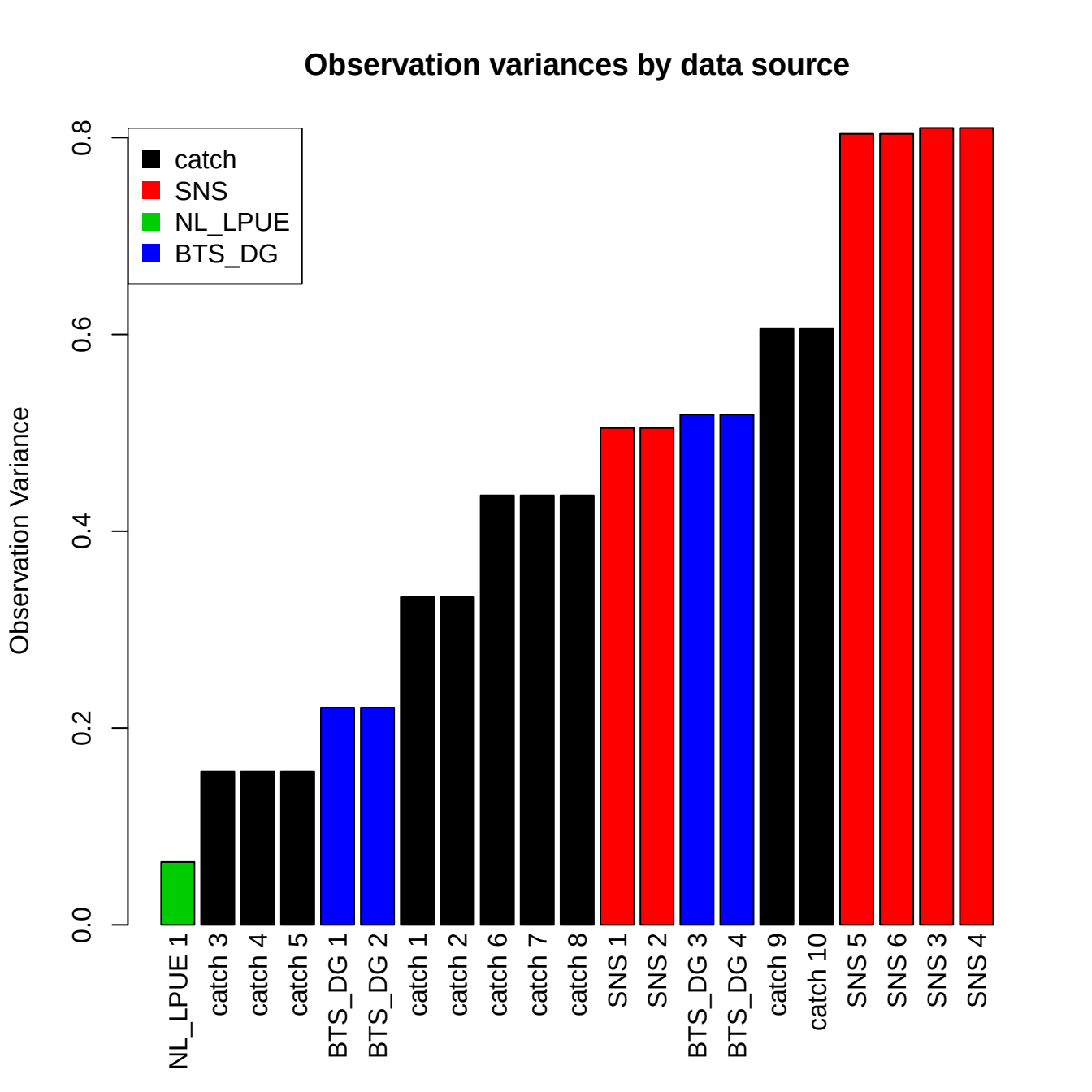

Turbot in IV Diagnostics − SNS, age 5
a) Observed and fitted values time series
Observed
Fitted
values
Year
b) Observed vs fitted values
1:1 line
Observed values
Fitted values
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
Lag (yrs)

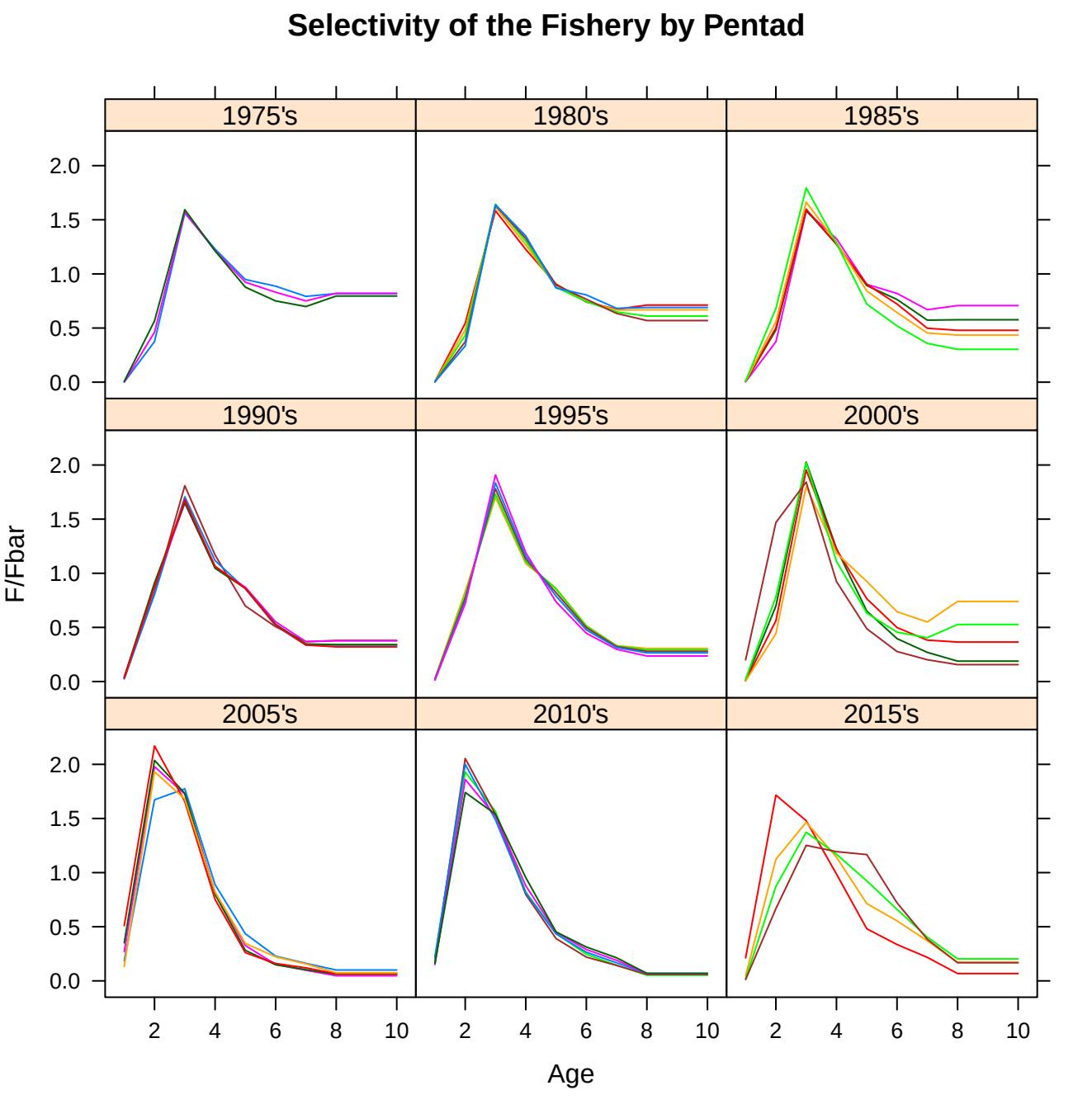

Turbot in IV Diagnostics − SNS, age 6
a) Observed and fitted values time series
Observed
Fitted
values
0.5
2.0
5.0
20.0
2004
2006
2008
2010
2012
2014
2016
Year
b) Observed vs fitted values
1:1 line
Observed values
0.5
1.0
2.0
5.0
10.0
20.0
50.0
Fitted values
c) Standardised residuals over time
Standardised Residuals
−1
0
1
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.4
0.0
0.2
0.4
2
4
6
8
10
Lag (yrs)

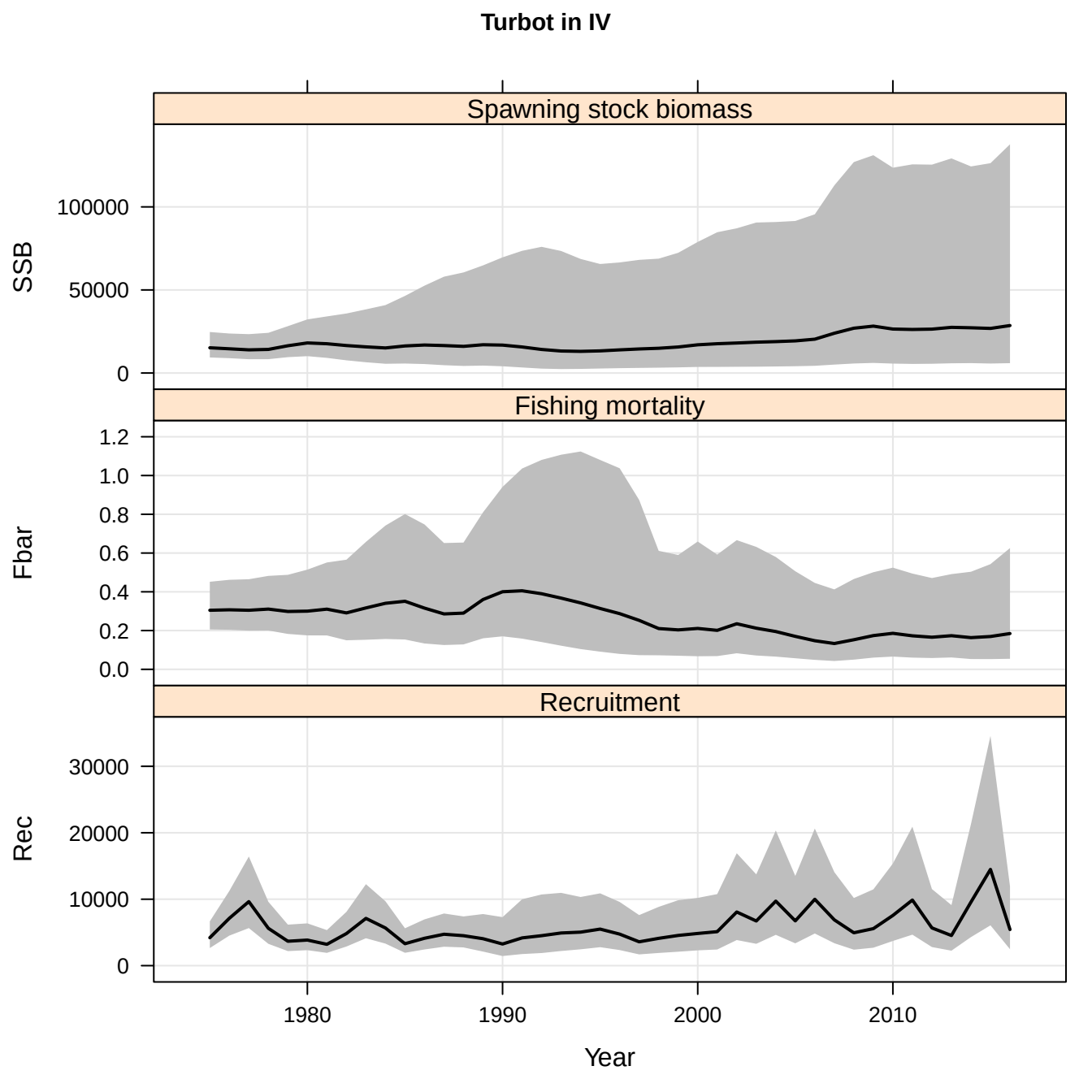

Turbot in IV
itrans_rho.1
transfIRARdist.3
transfIRARdist.2
transfIRARdist.1
logSdLogObs.10
logSdLogObs.9
logSdLogObs.8
logSdLogObs.7
logSdLogObs.6
logSdLogObs.5
logSdLogObs.4
logSdLogObs.3
logSdLogObs.2
logSdLogObs.1
logSdLogN.2
logSdLogN.1
logSdLogFsta.5
logSdLogFsta.4
logSdLogFsta.3
logSdLogFsta.2
logSdLogFsta.1
logFpar.8
logFpar.7
logFpar.6
logFpar.5
logFpar.4
logFpar.3
logFpar.2
logFpar.1
logFpar.1
logFpar.2
logFpar.3
logFpar.4
logFpar.5
logFpar.6
logFpar.7
logFpar.8
logSdLogFsta.1
logSdLogFsta.2
logSdLogFsta.3
logSdLogFsta.4
logSdLogFsta.5
logSdLogN.1
logSdLogN.2
logSdLogObs.1
logSdLogObs.2
logSdLogObs.3
logSdLogObs.4
logSdLogObs.5
logSdLogObs.6
logSdLogObs.7
logSdLogObs.8
logSdLogObs.9
logSdLogObs.10
transfIRARdist.1
transfIRARdist.2
transfIRARdist.3
itrans_rho.1
1.0
0.5
0.0
−0.5
−1.0

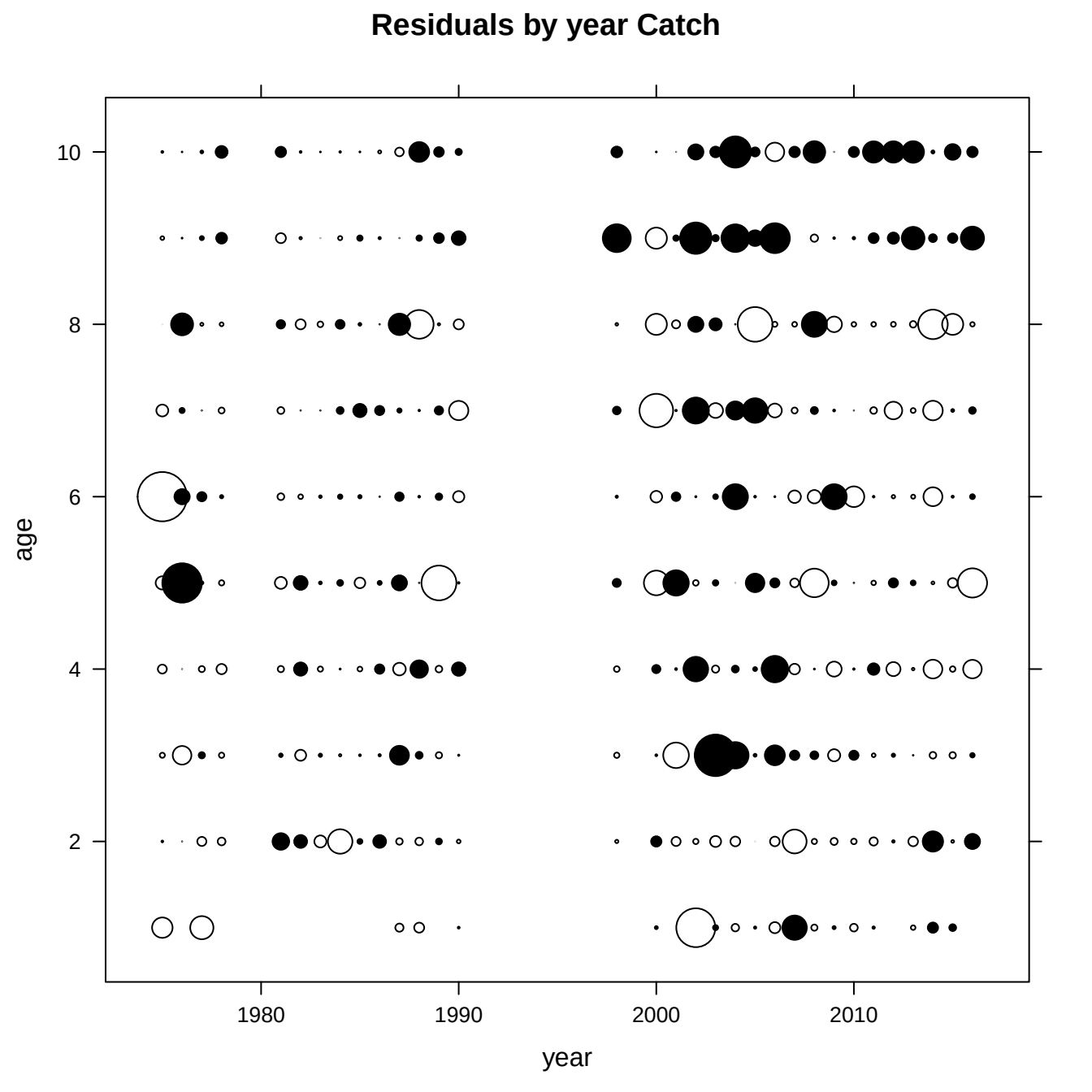

Observation variance vs uncertainty
catch 2
NL_LPUE 1
catch 5
BTS_DG 2
SNS 6
catch 10
SNS 2
SNS 3
catch 6
BTS_DG 4
0.30
0.25
0.20
0.15
CV of estimate
0.1
0.2
0.5
Observation variance

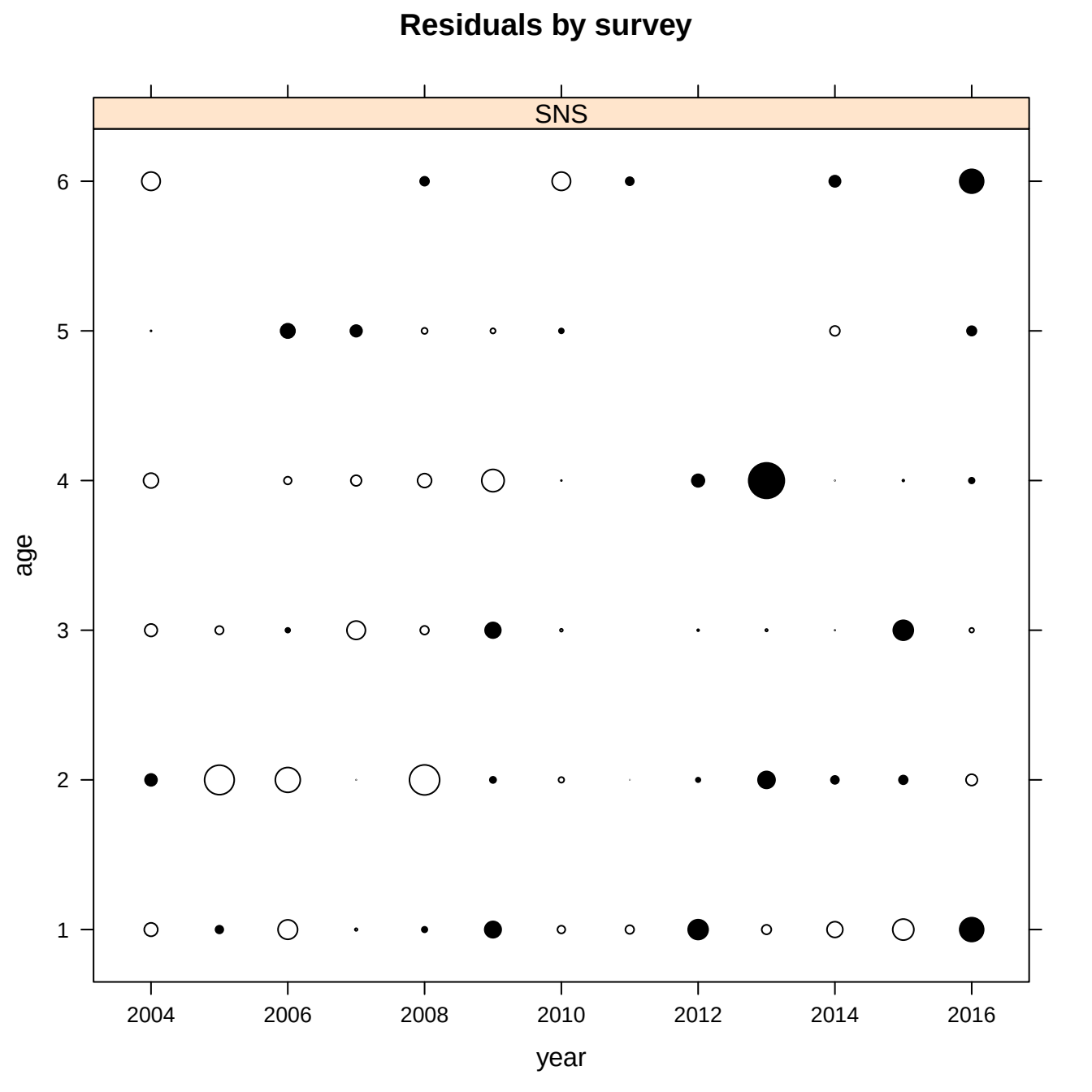

Survey catchability parameters
SNS
BTS_DG
Catchability
0.000
0.005
0.010
0.015
0.020
0.025
0.030
0.02
0.04
0.06
1
2
3
4
5
6
Age


Observation variances by data source
Observation Variance
0.0
0.2
0.4
0.6
0.8
catch
SNS
NL_LPUE
BTS_DG
NL_LPUE 1
catch 3
catch 4
catch 5
BTS_DG 1
BTS_DG 2
catch 1
catch 2
catch 6
catch 7
catch 8
SNS 1
SNS 2
BTS_DG 3
BTS_DG 4
catch 9
catch 10
SNS 5
SNS 6
SNS 3
SNS 4

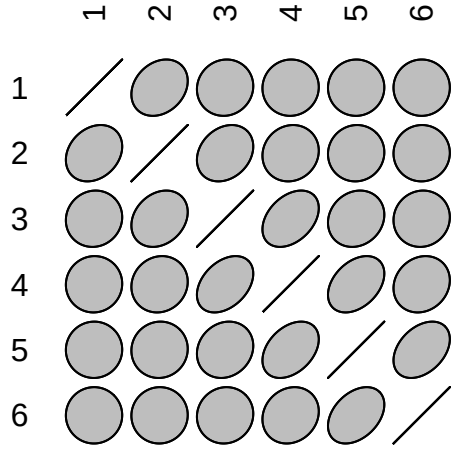

Selectivity of the Fishery by Pentad
1975's
1980's
1985's
1990's
1995's
2000's
2005's
2010's
2015's
F/Fbar
Age
0.0
0.5
1.0
1.5
2.0
2
4
6
8
10


Turbot in IV
Spawning stock biomass
SSB
100000
50000
0
Fishing mortality
Fbar
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Recruitment
Rec
30000
20000
10000
0
1980
1990
2000
2010
Year

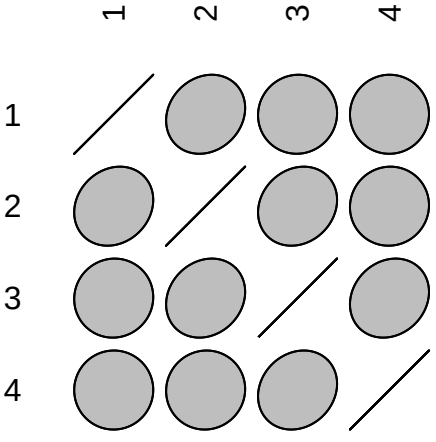

Residuals by year Catch
10
8
6
4
2
age
1980
1990
2000
2010
year

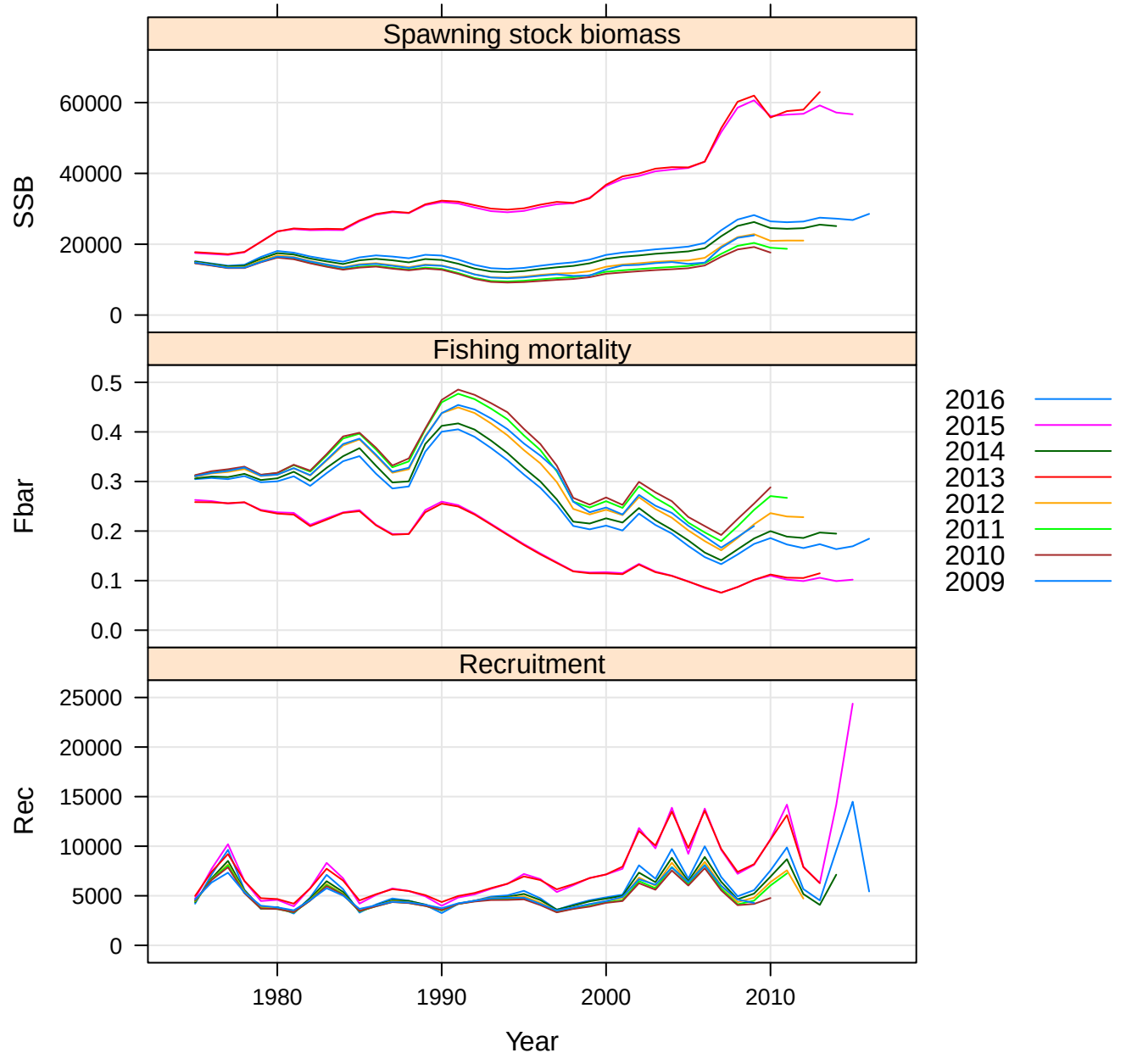

Residuals by survey
SNS
age
year
1
2
3
4
5
6
2004
2006
2008
2010
2012
2014
2016

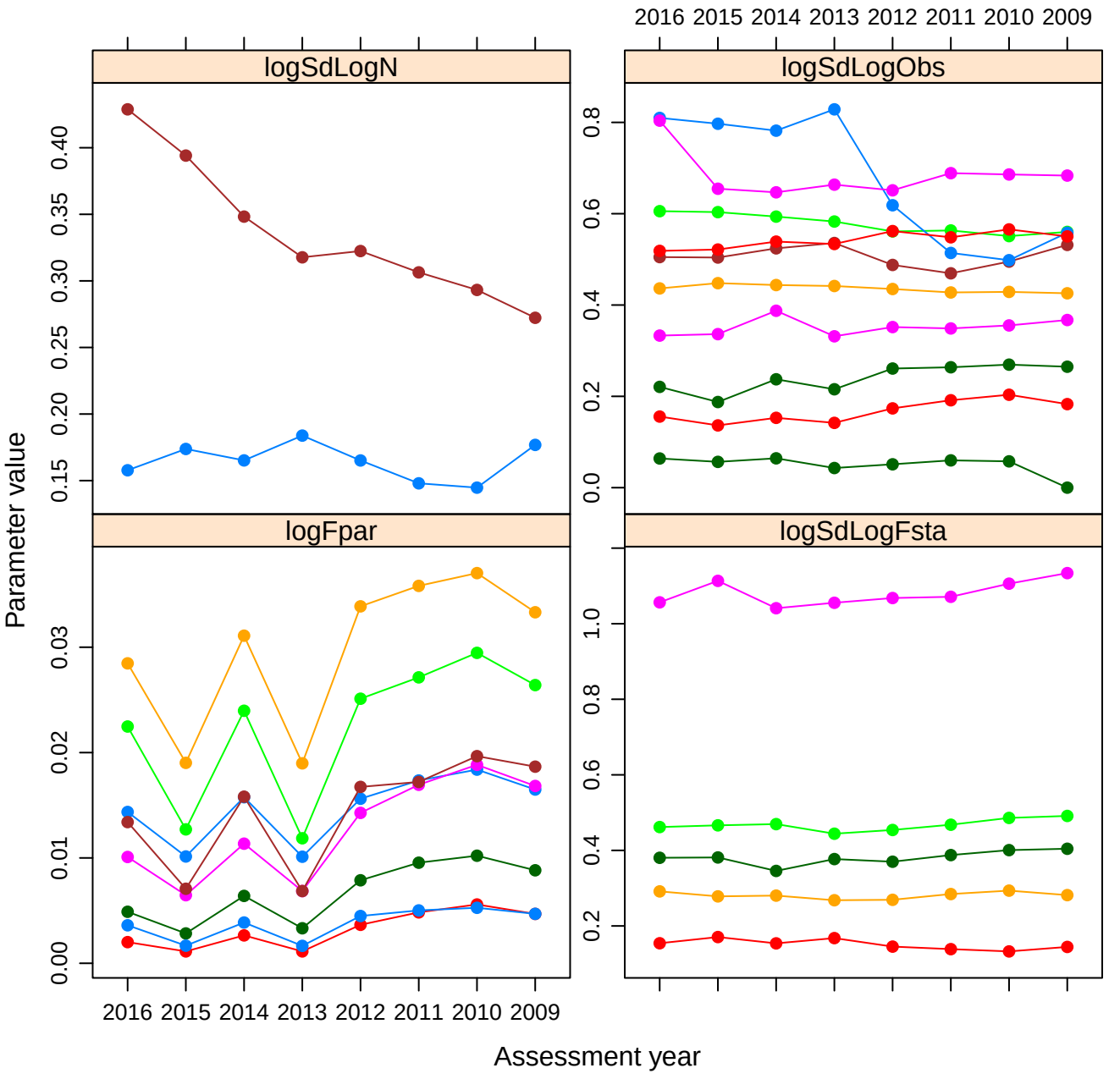
SNS

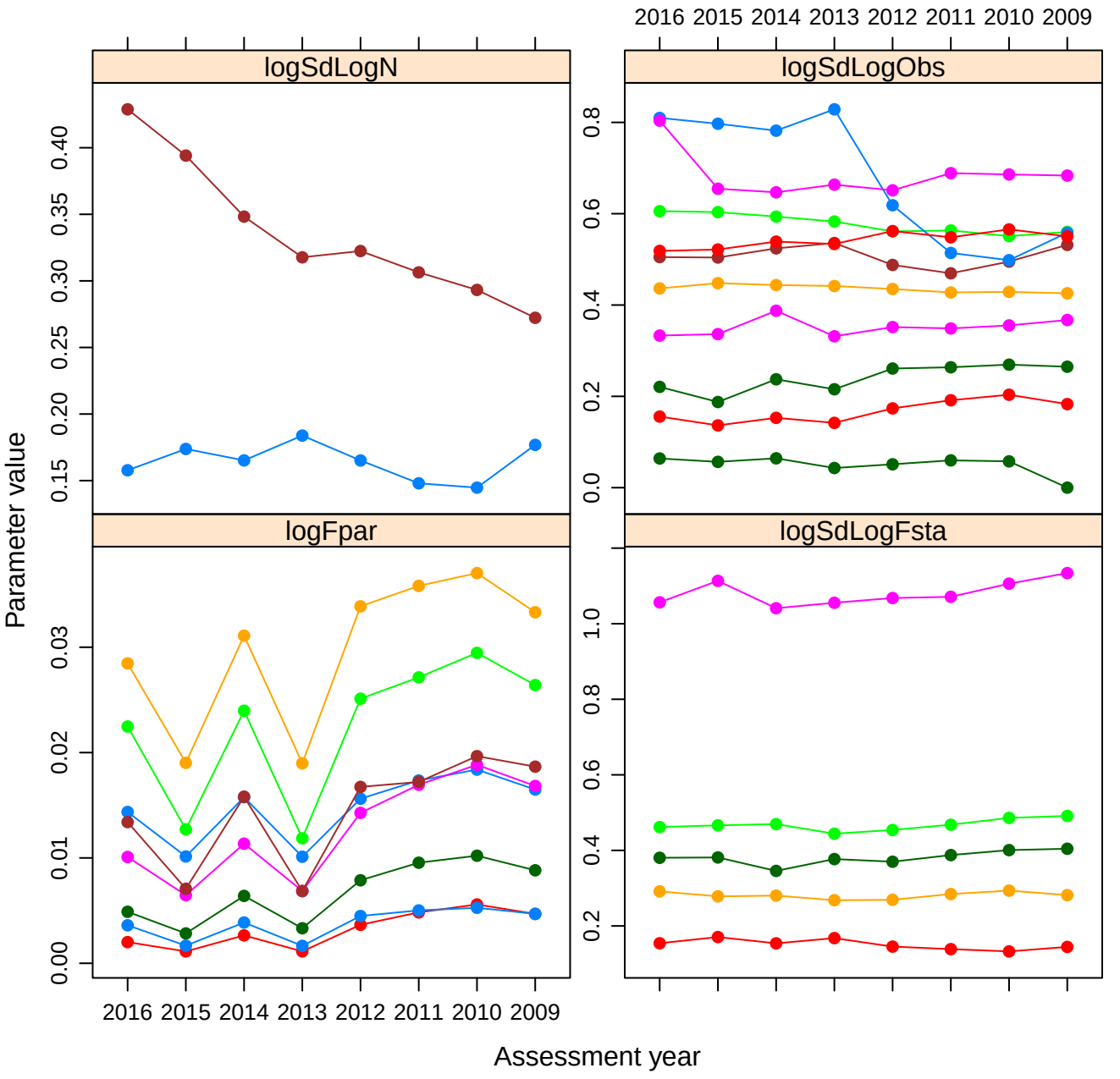


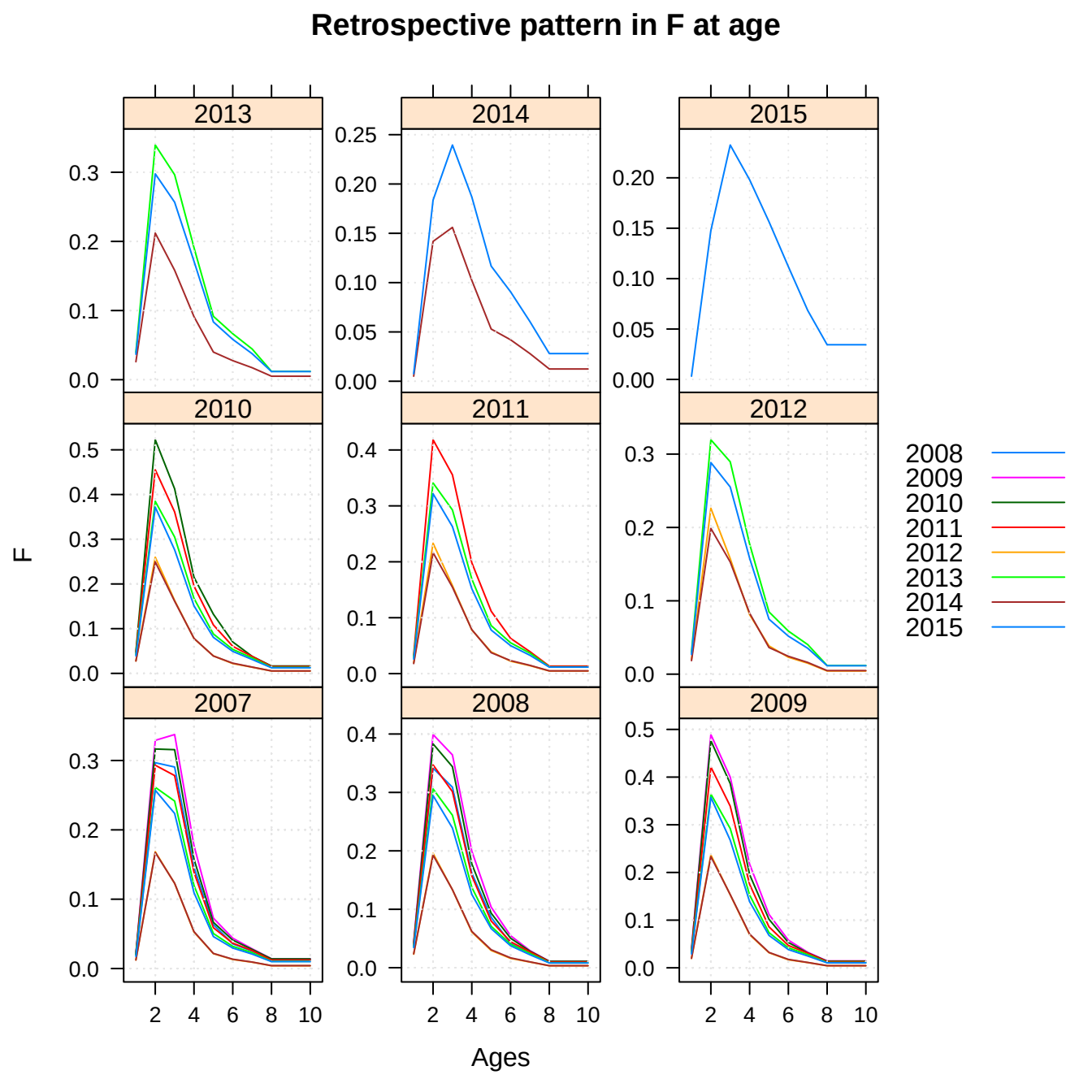
BTS_DG

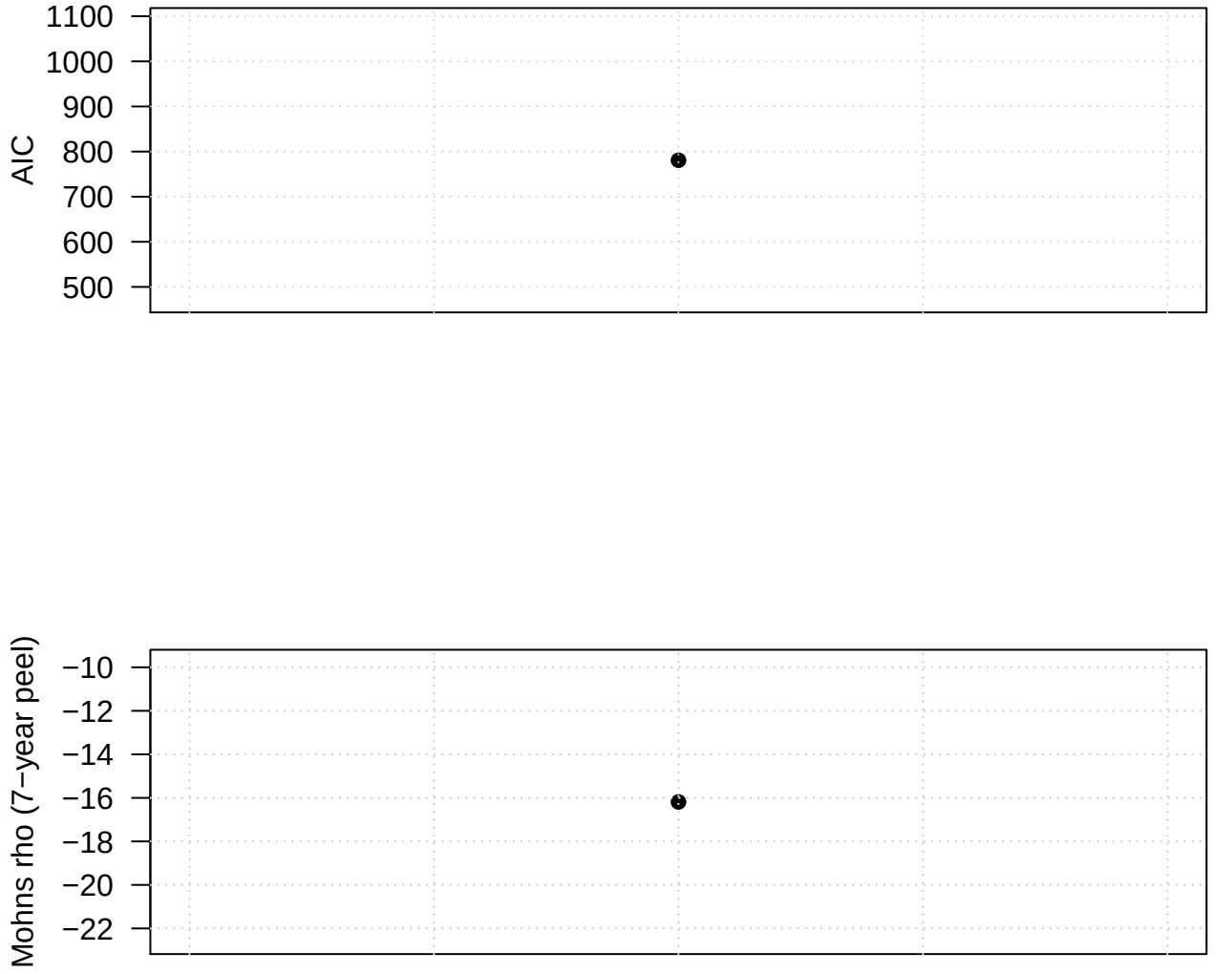



Spawning stock biomass
SSB
60000
40000
20000
0
Fishing mortality
Fbar
0.5
0.4
0.3
0.2
0.1
0.0
Recruitment
Rec
25000
20000
15000
10000
5000
0
1980
1990
2000
2010
Year
2016
2015
2014
2013
2012
2011
2010
2009


logSdLogN
logSdLogObs
logFpar
logSdLogFsta
Parameter value
Assessment year
2016 2015 2014 2013 2012 2011 2010 2009
0.15 0.20 0.25 0.30 0.35 0.40
0.0 0.2 0.4 0.6 0.8
0.00 0.01 0.02 0.03
0.2 0.4 0.6 0.8 1.0


logSdLogN
logSdLogObs
logFpar
logSdLogFsta
Parameter value
Assessment year
2016 2015 2014 2013 2012 2011 2010 2009
0.15 0.20 0.25 0.30 0.35 0.40
0.0 0.2 0.4 0.6 0.8
0.00 0.01 0.02 0.03
0.2 0.4 0.6 0.8 1.0


Retrospective pattern in F at age
2013
2014
2015
2010
2011
2012
2007
2008
2009
F
Ages
2008
2009
2010
2011
2012
2013
2014
2015


AIC
1100
1000
900
800
700
600
500
Mohns rho (7−year peel)
−10
−12
−14
−16
−18
−20
−22