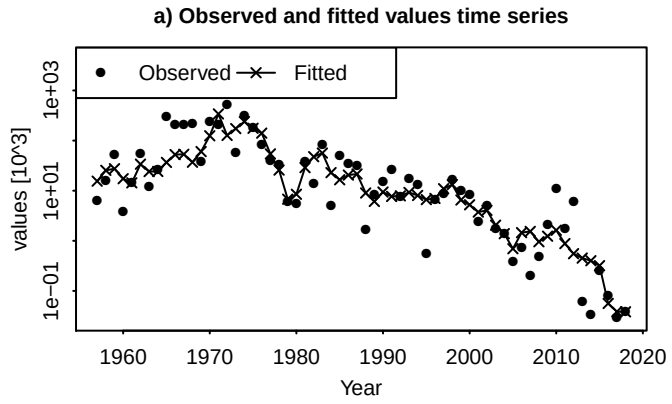
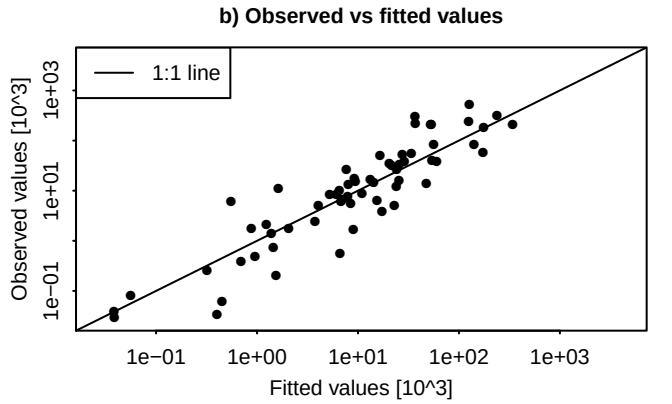
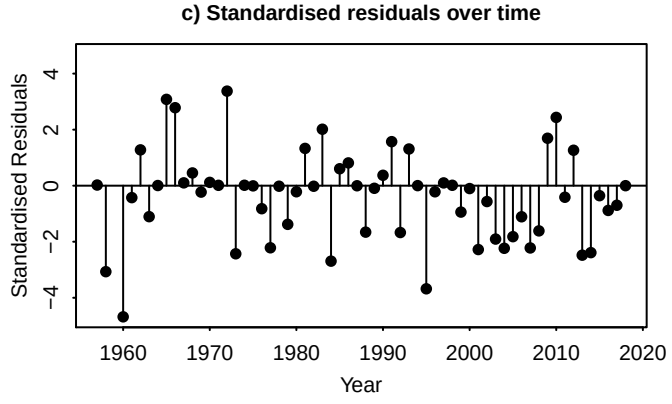
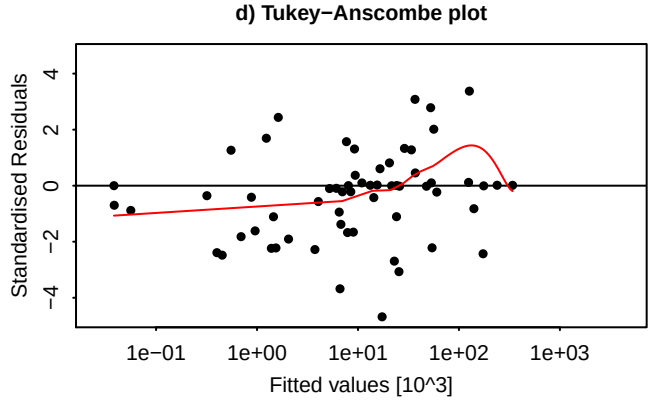
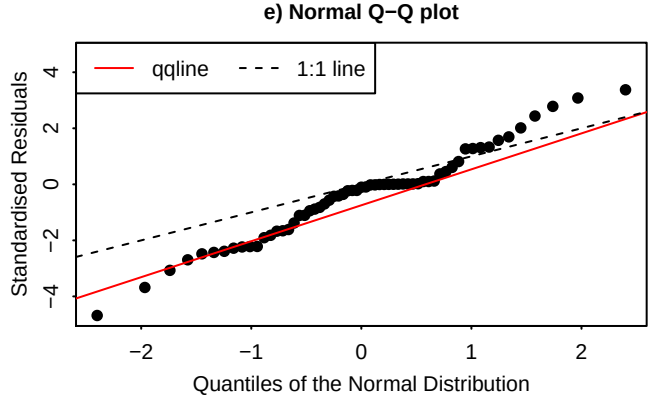
Herring in VIa (combined) and VIIbc Diagnostics − catch unique, age 1

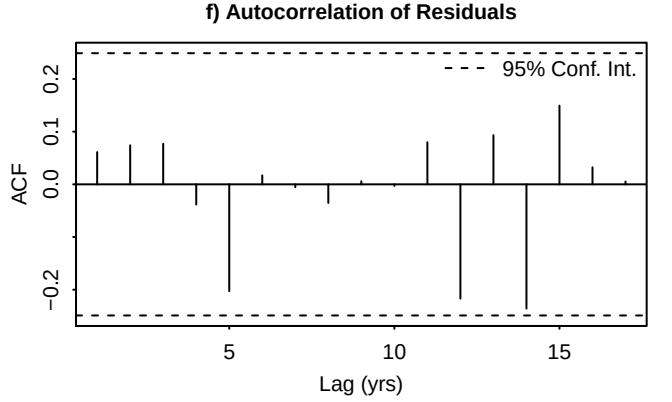


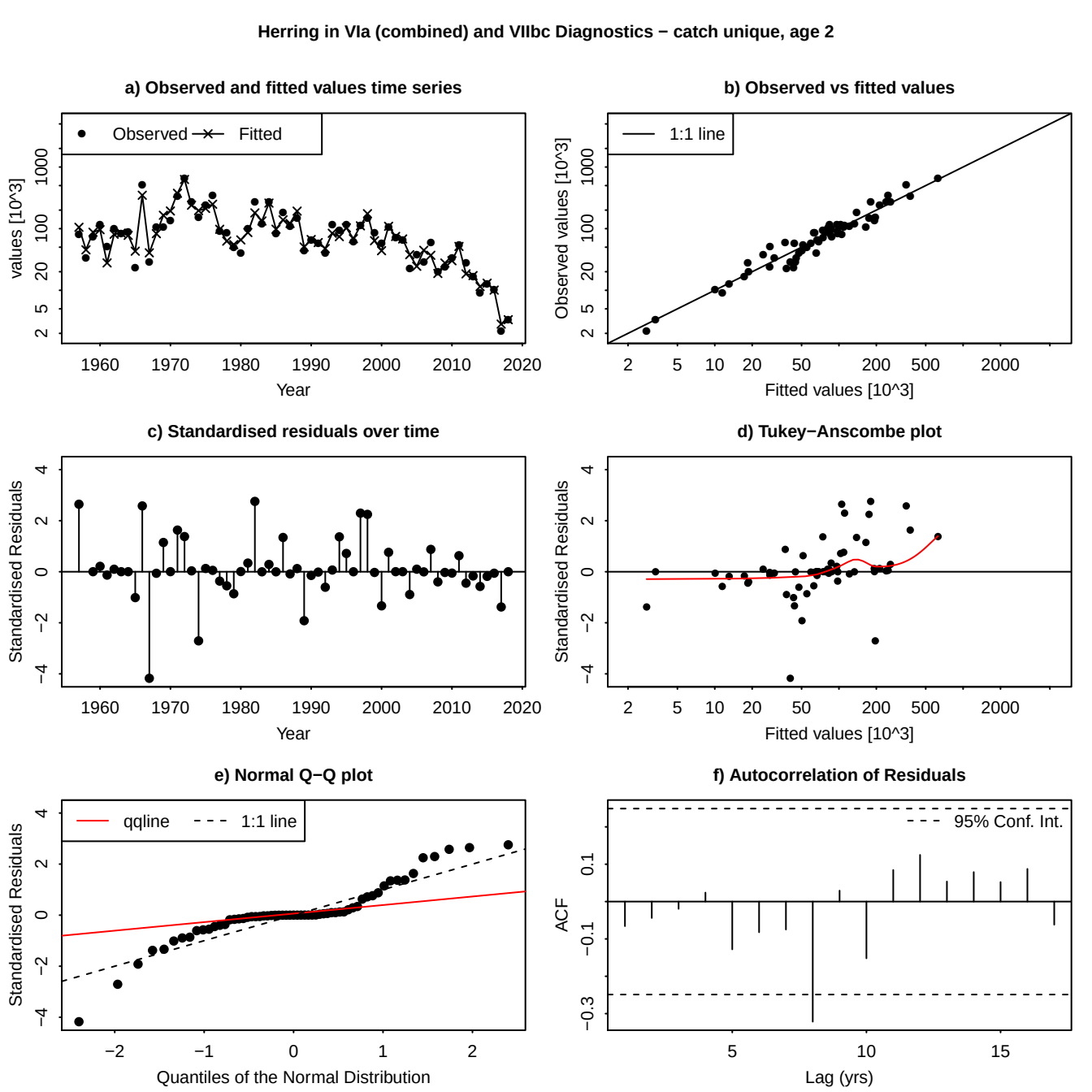




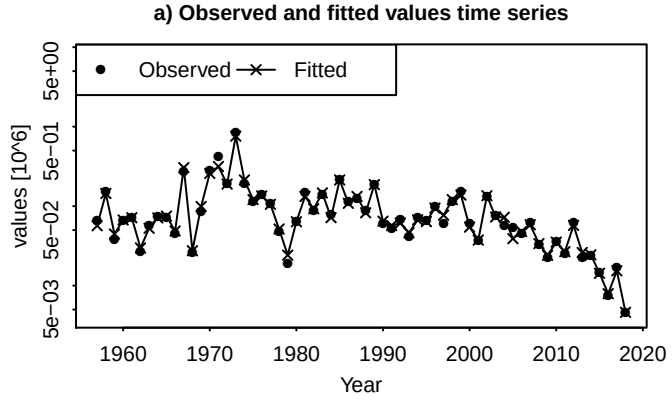


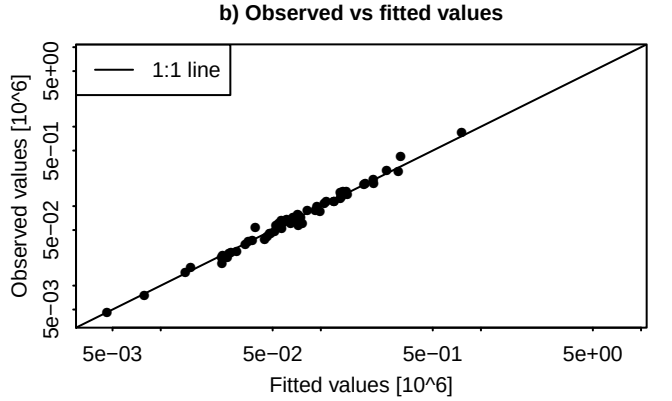


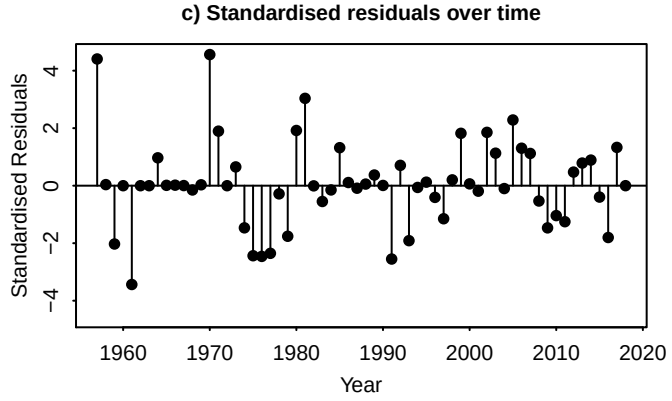


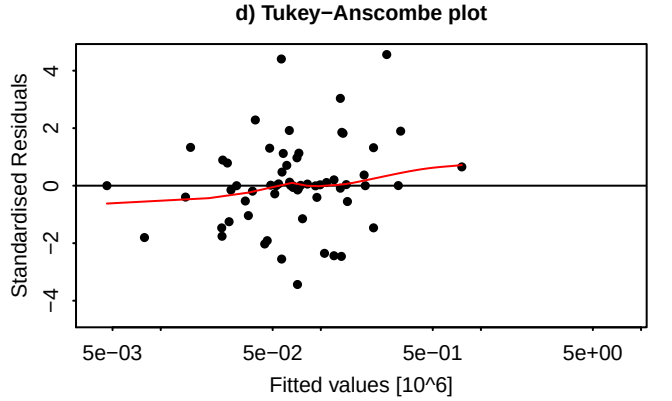

Herring in VIa (combined) and VIIbc Diagnostics − catch unique, age 2
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)

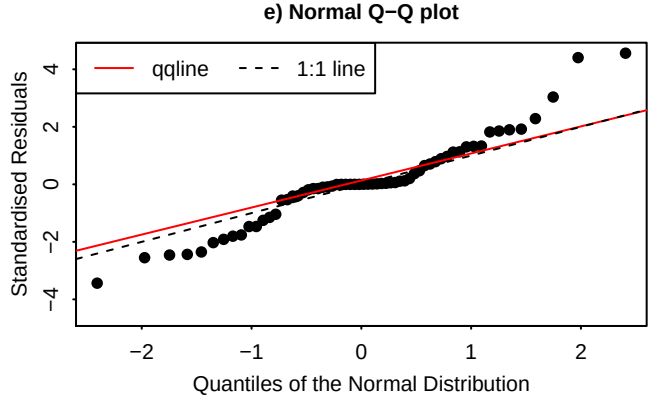
Herring in VIa (combined) and VIIbc Diagnostics − catch unique, age 3

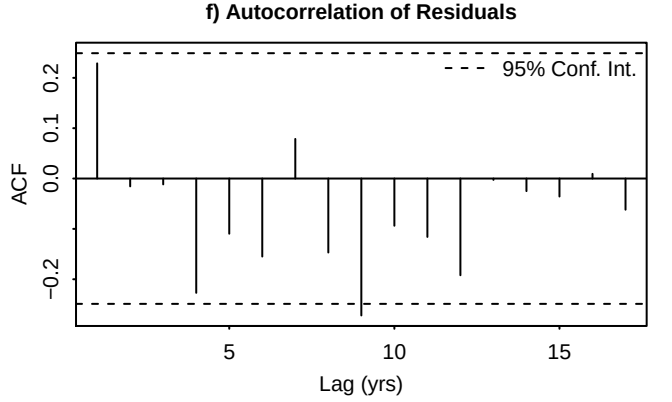


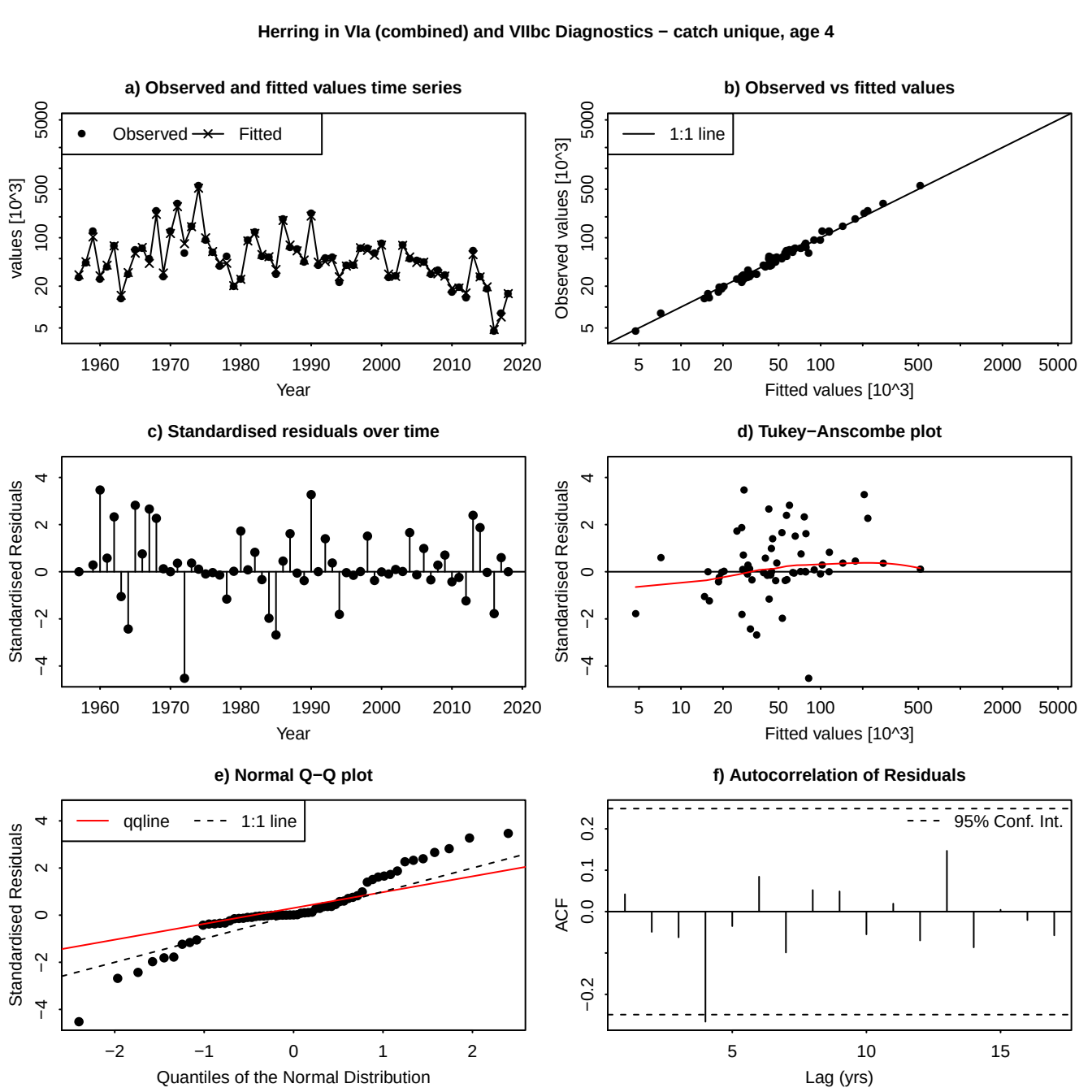




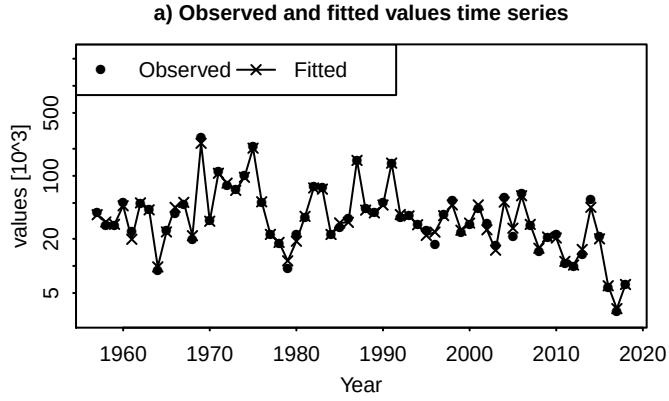


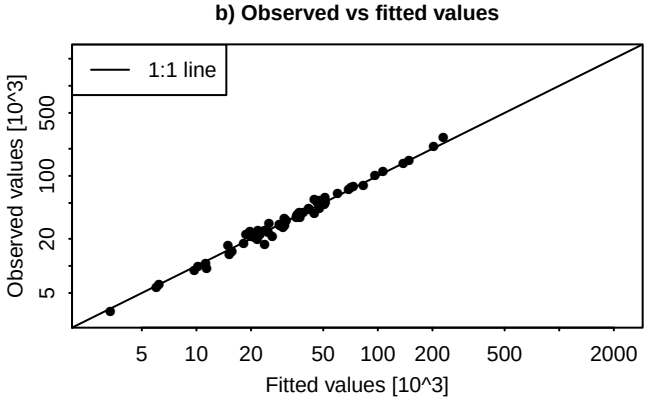


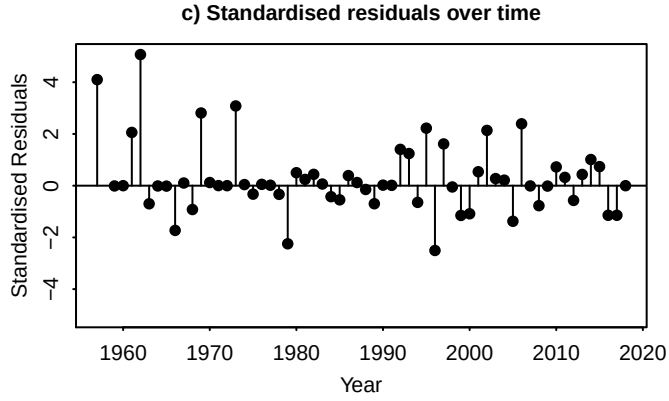


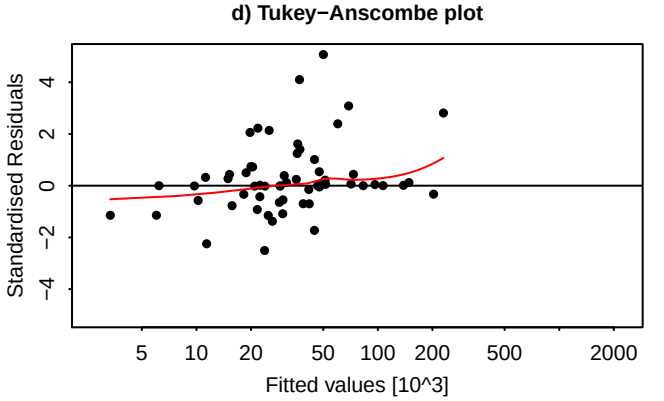

Herring in VIa (combined) and VIIbc Diagnostics − catch unique, age 4
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)

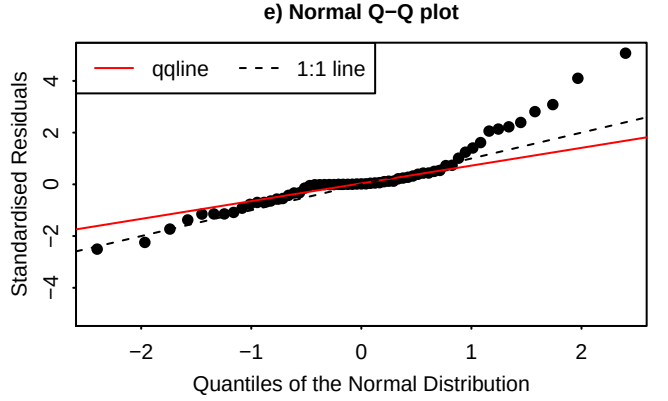
Herring in VIa (combined) and VIIbc Diagnostics − catch unique, age 5

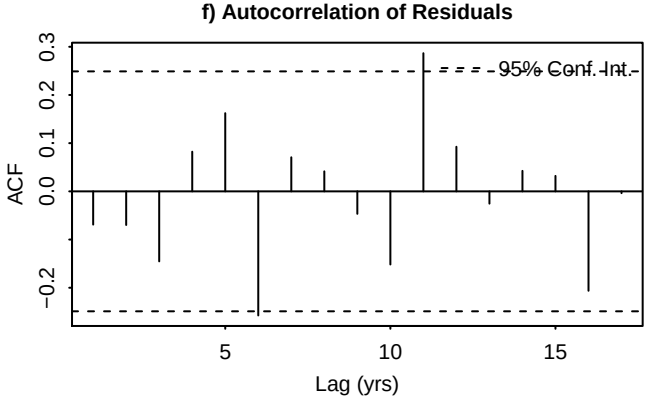




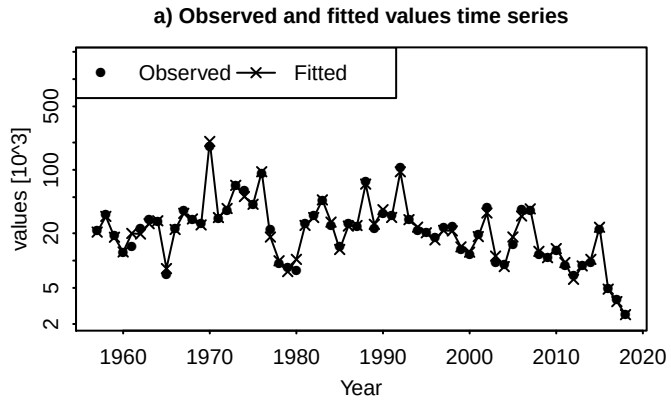


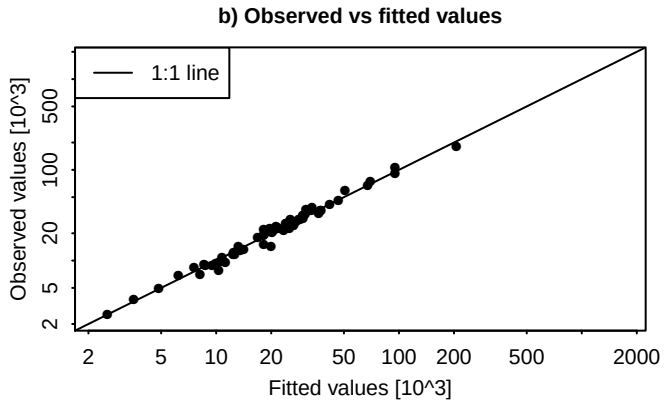


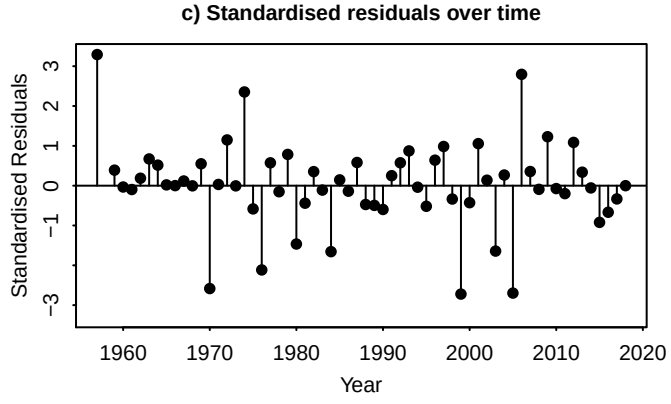


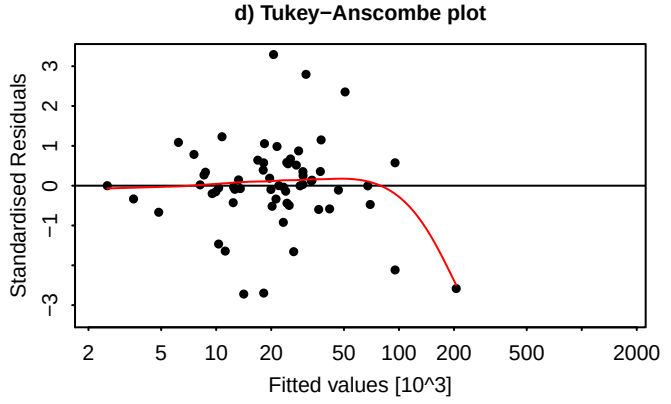


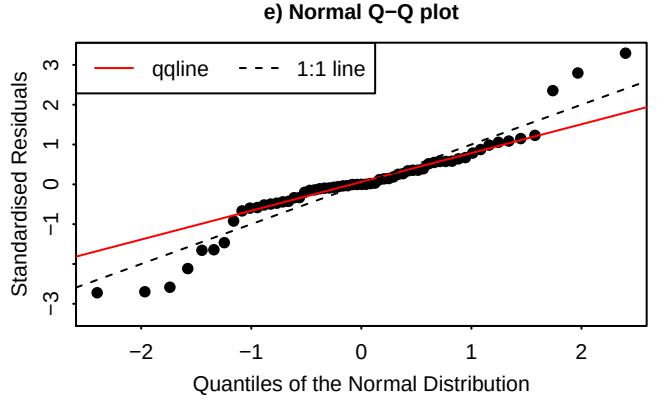
Herring in VIa (combined) and VIIbc Diagnostics − catch unique, age 6

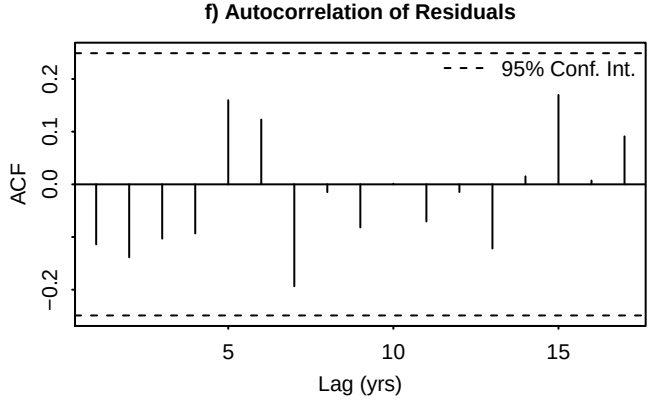


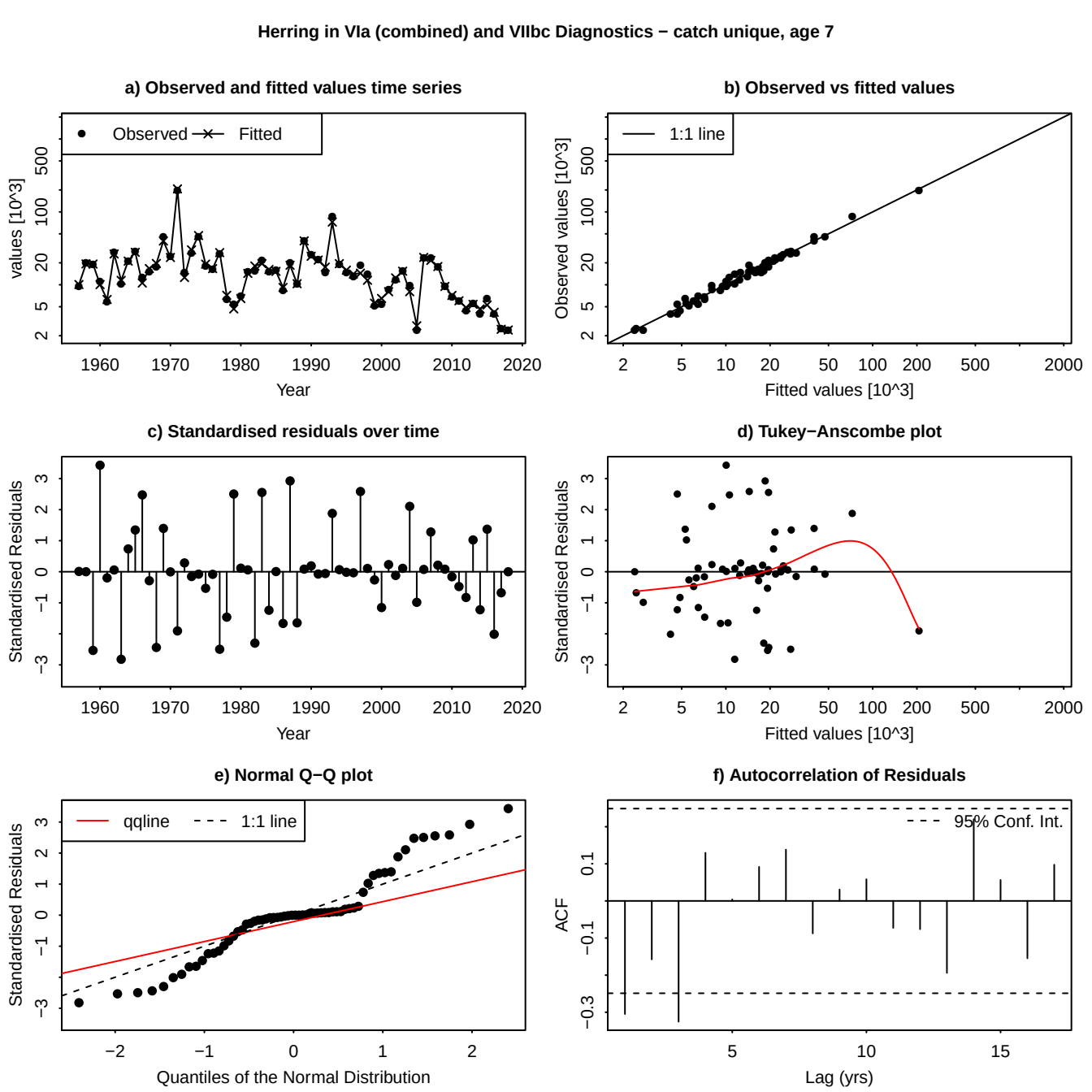






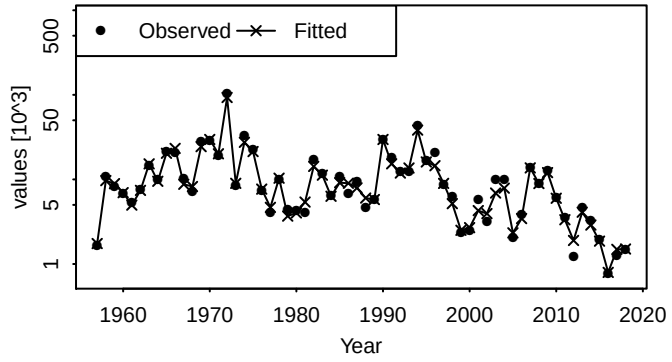




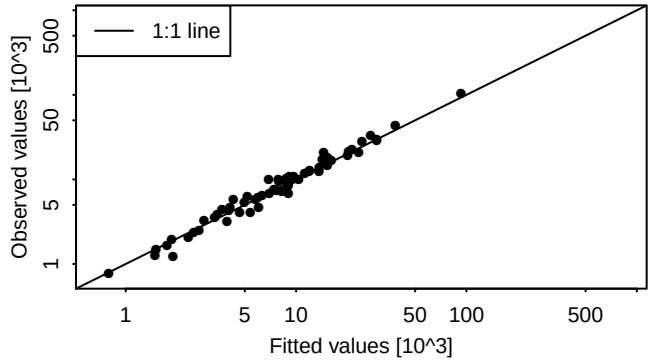

Herring in VIa (combined) and VIIbc Diagnostics − catch unique, age 7
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)

Herring in VIa (combined) and VIIbc Diagnostics − catch unique, age 8

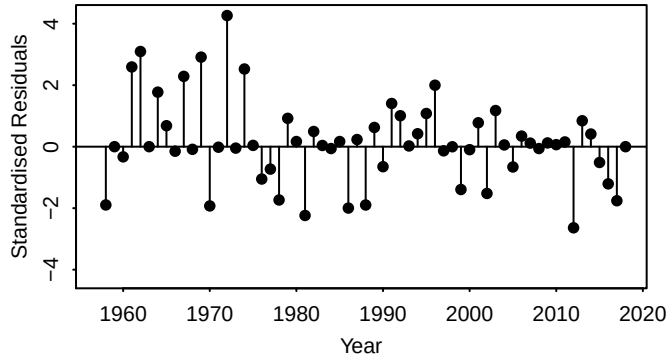
a) Observed and fitted values time series



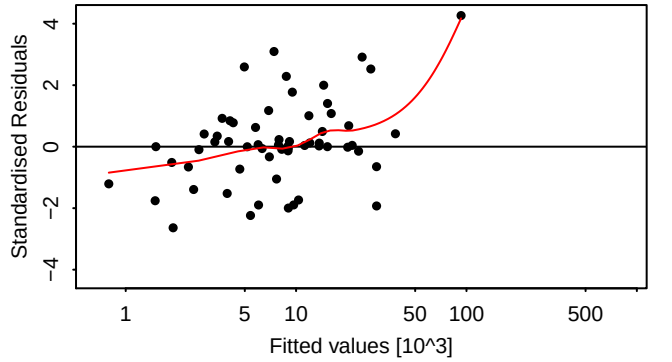
b) Observed vs fitted values



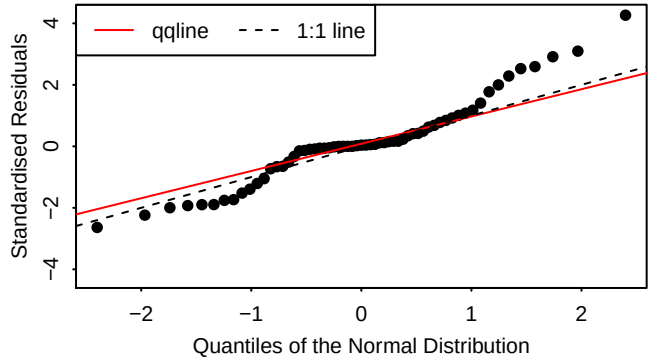
c) Standardised residuals over time



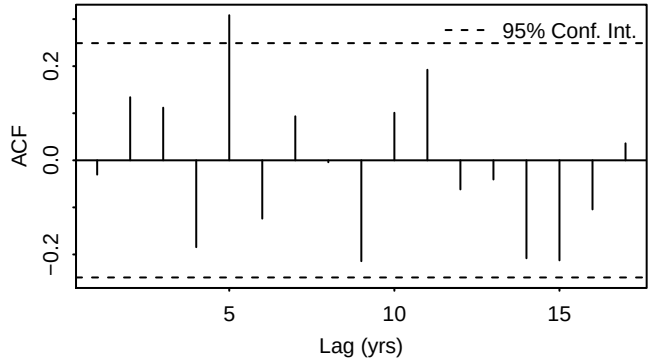
d) Tukey−Anscombe plot

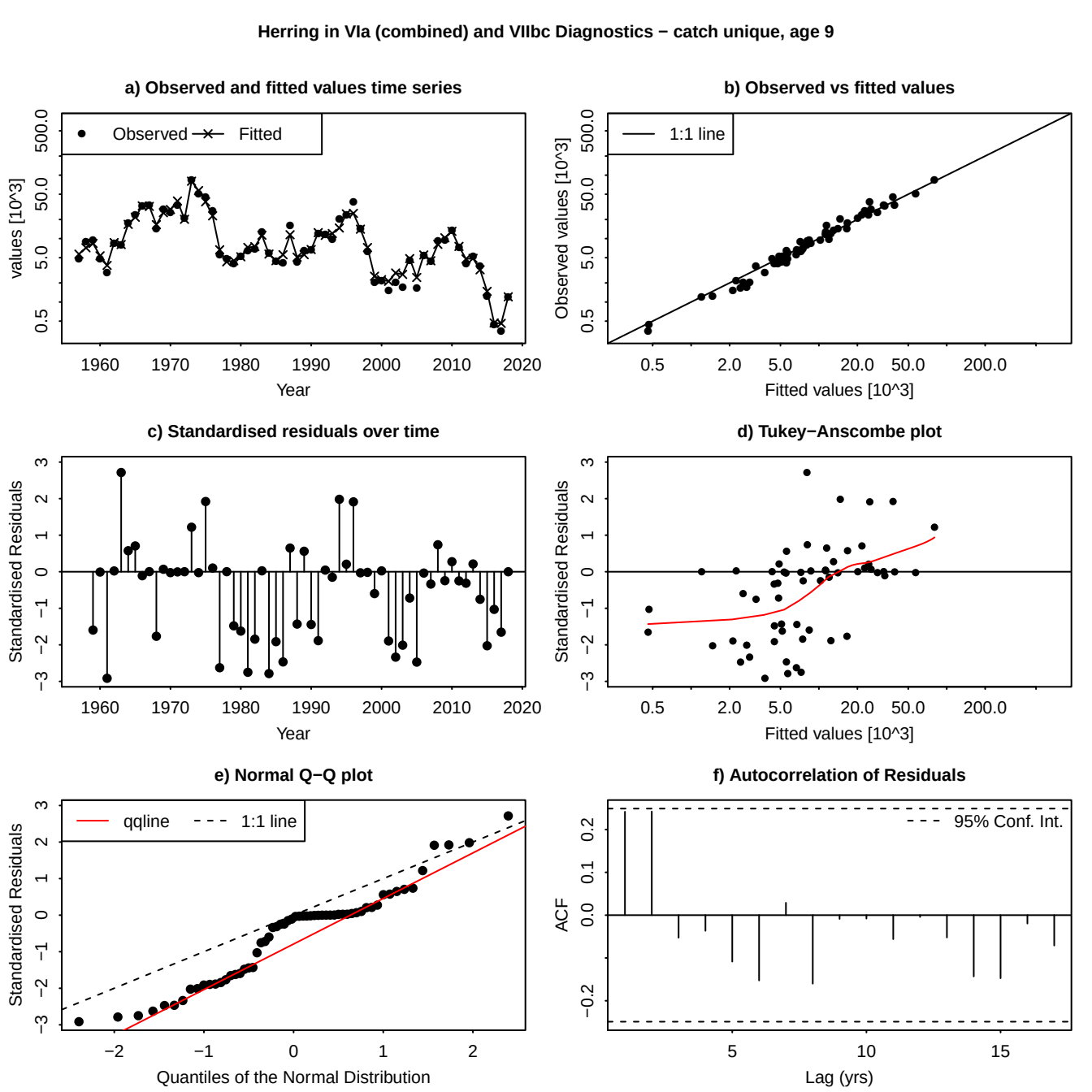


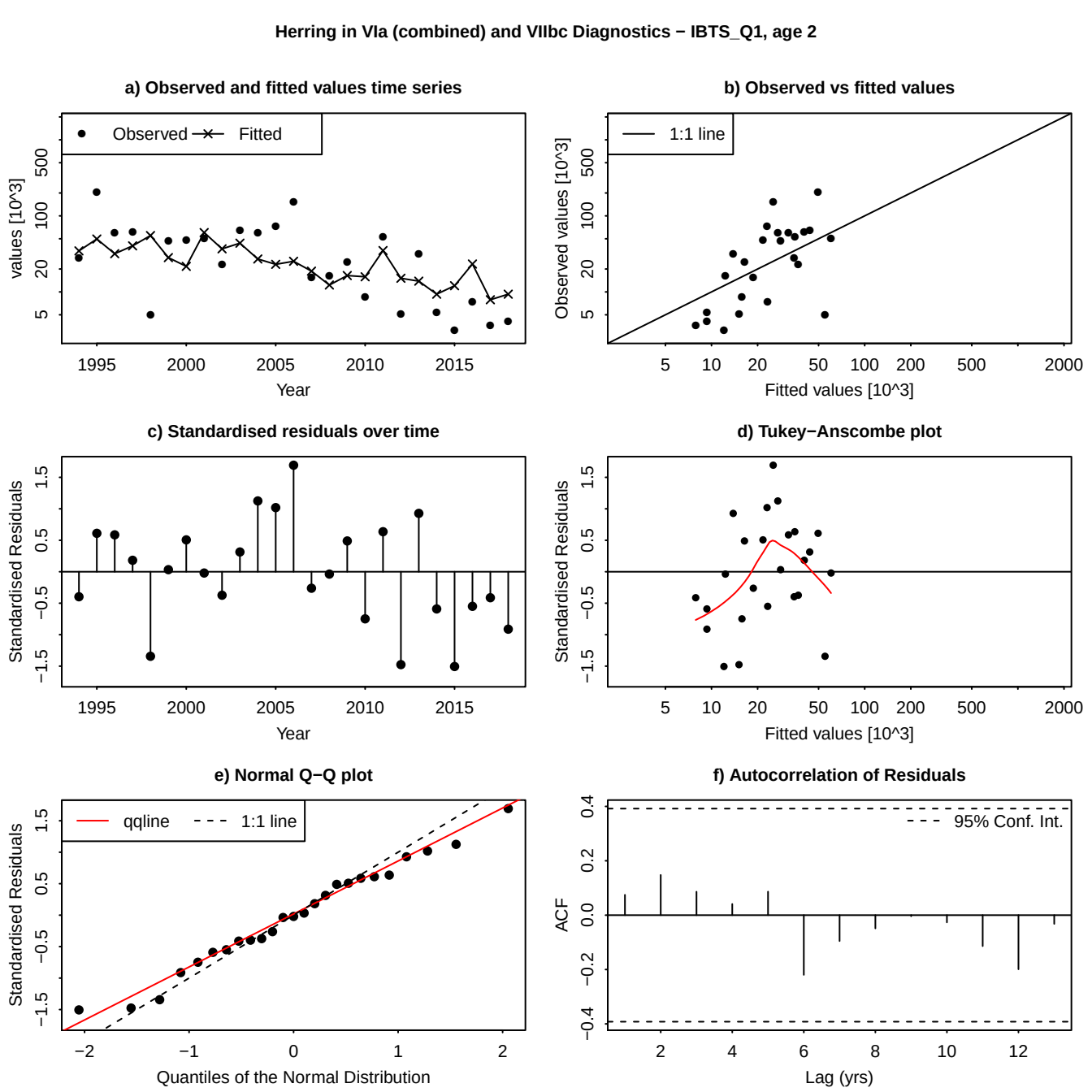
e) Normal Q−Q plot

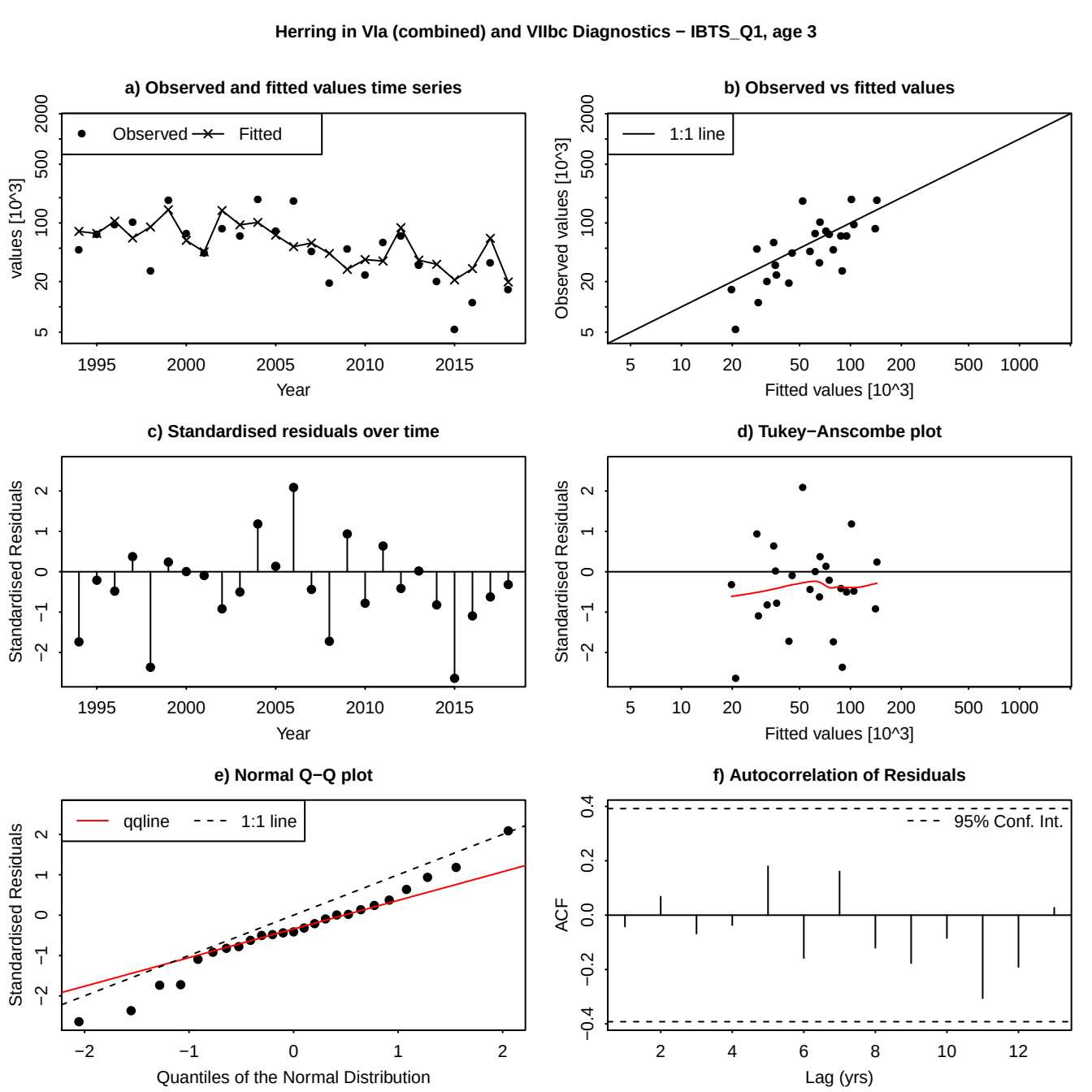


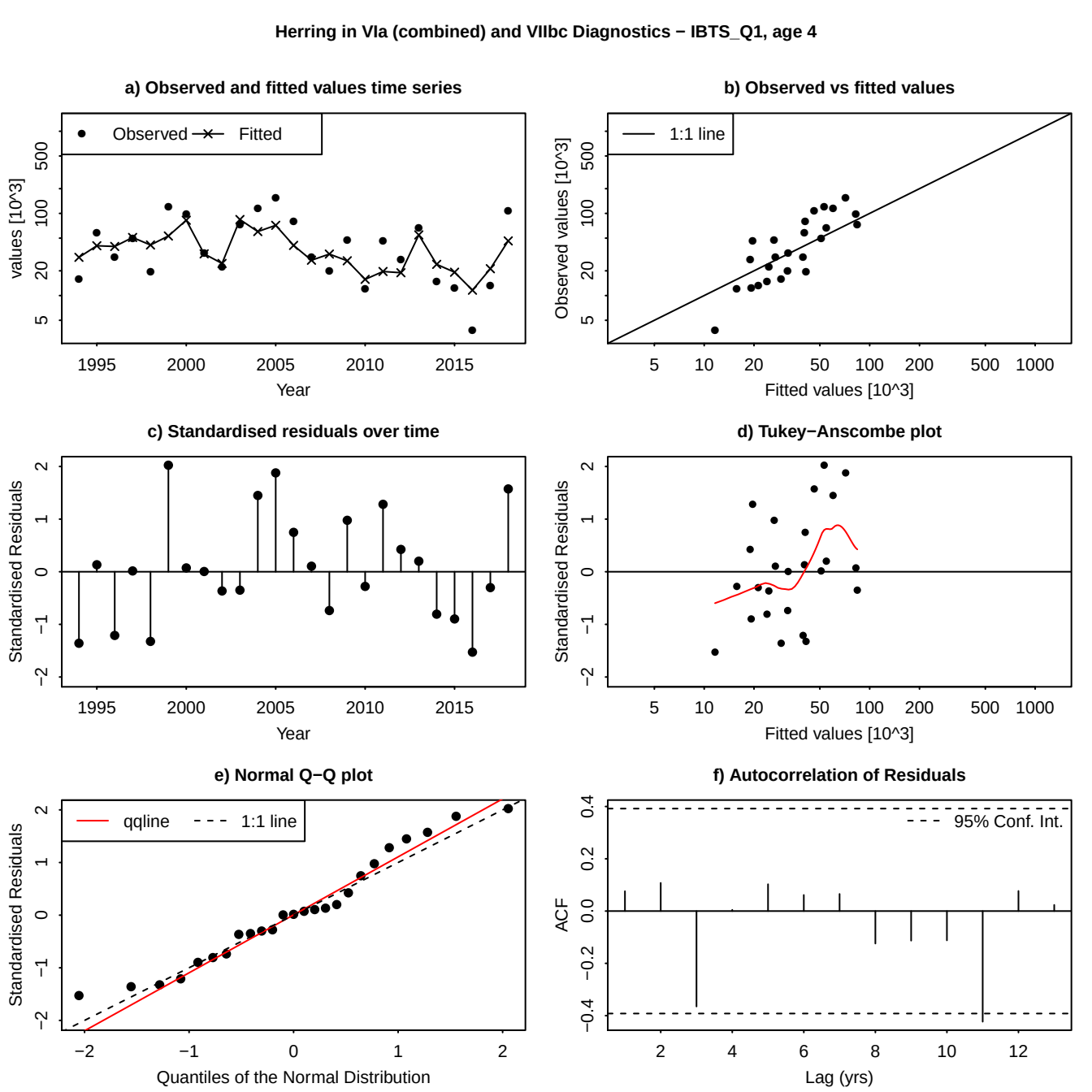
f) Autocorrelation of Residuals

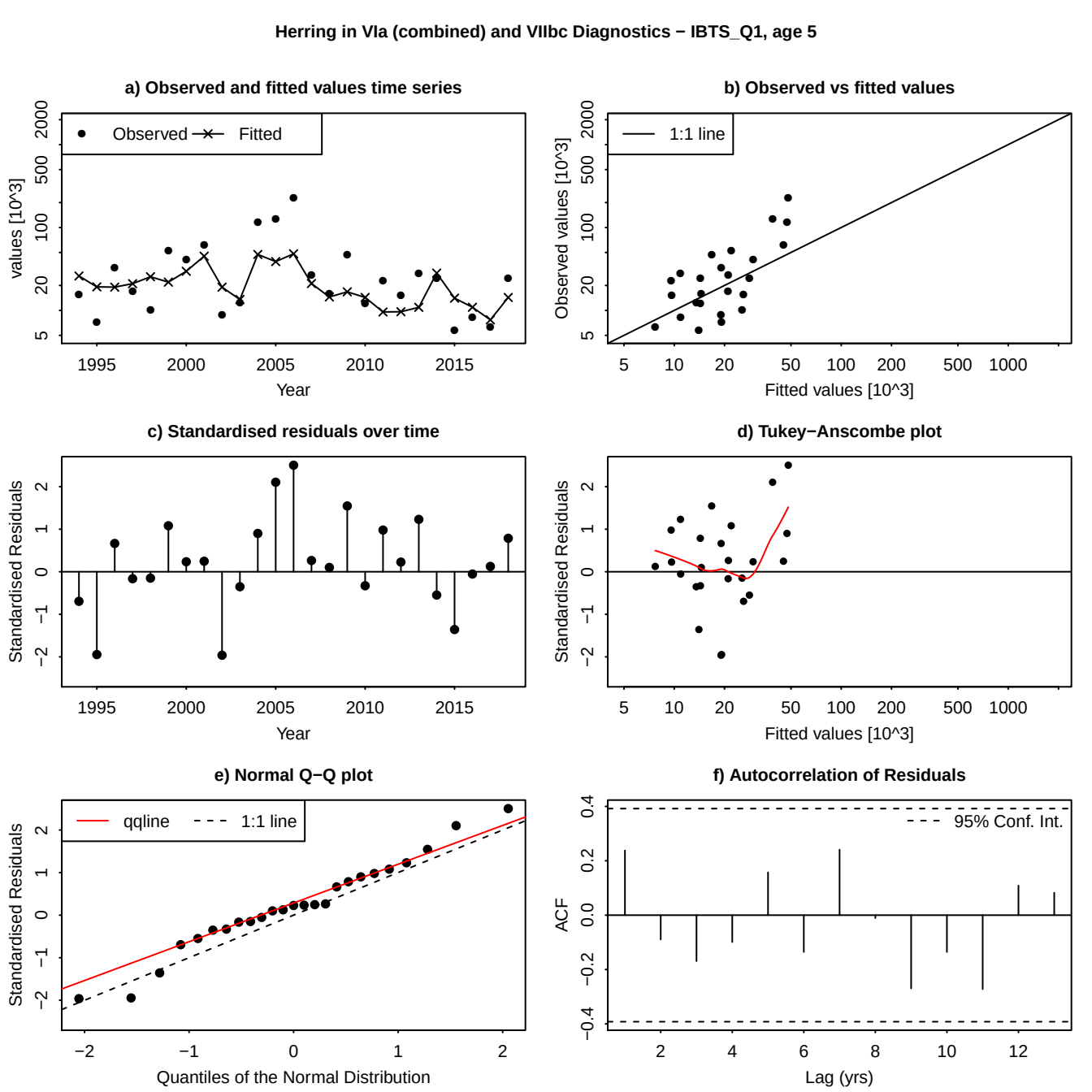


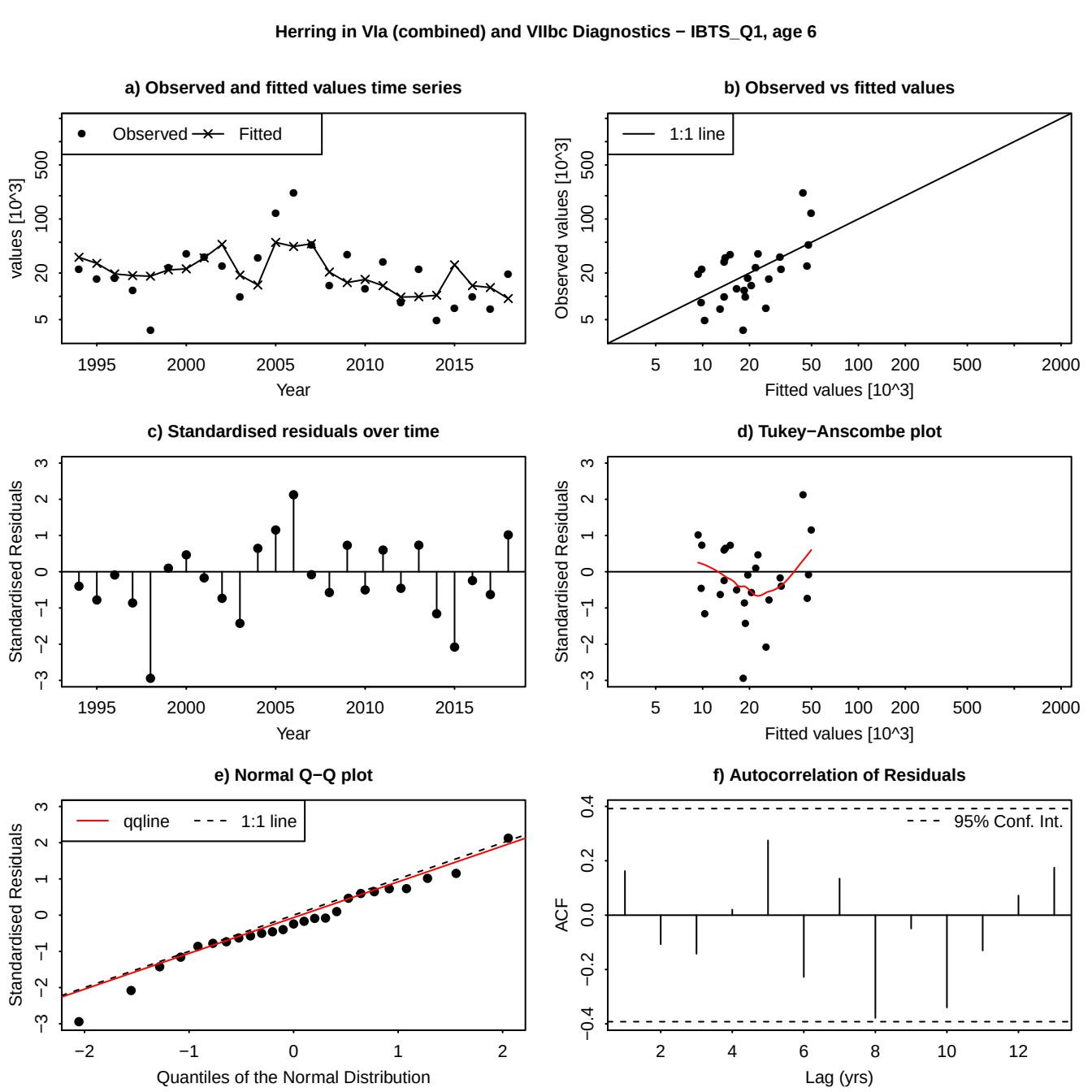

Herring in VIa (combined) and VIIbc Diagnostics − catch unique, age 9
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
500.0
50.0
5.0
0.5
1960
1970
1980
1990
2000
2010
2020
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.5
2.0
5.0
20.0
50.0
200.0
c) Standardised residuals over time
Standardised Residuals
3
2
1
0
−1
−2
−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
0.2
0.1
0.0
−0.2
5
10
15
Lag (yrs)

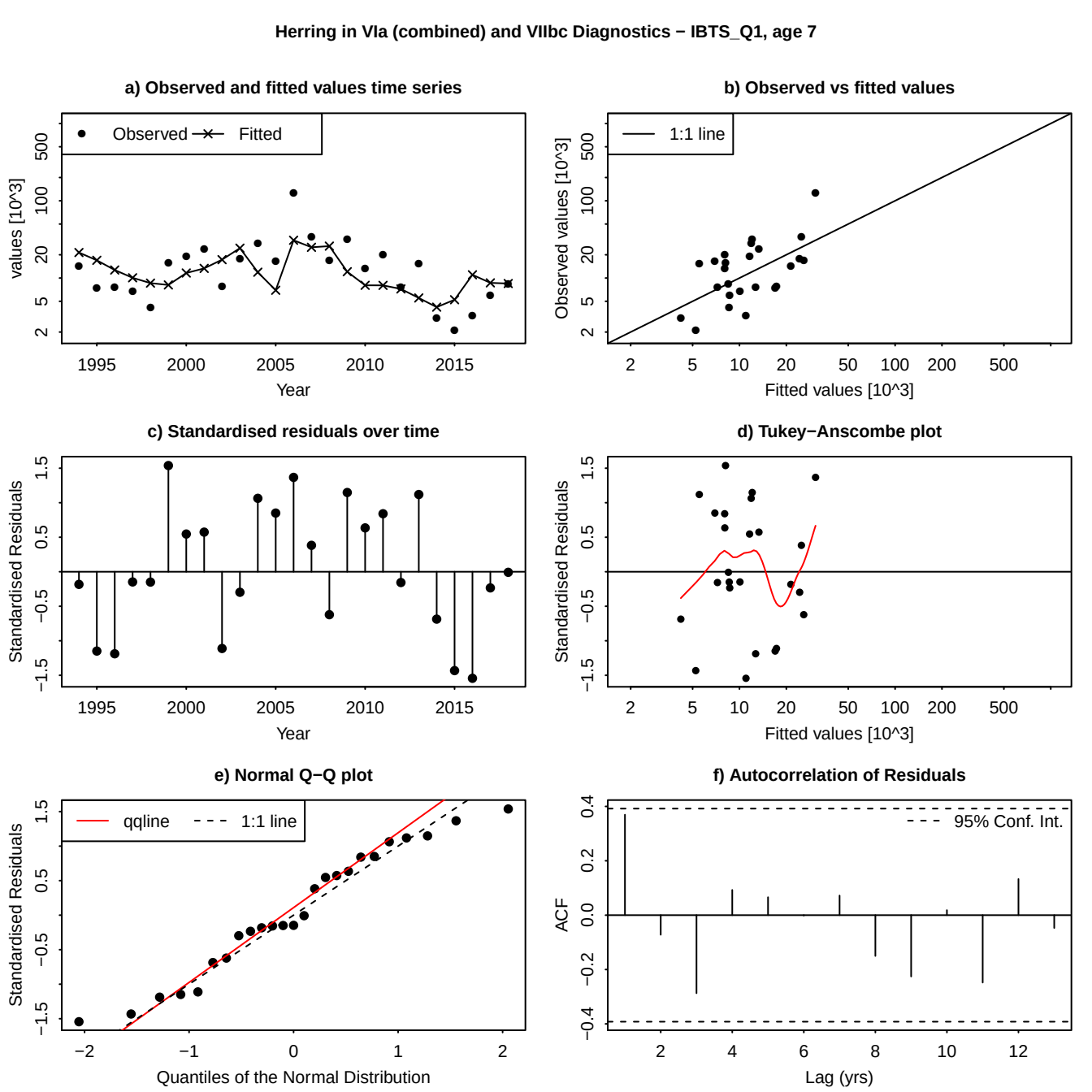

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q1, age 2
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
5
20
100
500
1995
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
5
20
100
500
5
10
20
50
100
200
500
2000
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
−1.5
−0.5
0.5
1.5
1995
2000
2005
2010
2015
Year
d) Tukey−Anscombe plot
Standardised Residuals
−1.5
−0.5
0.5
1.5
5
10
20
50
100
200
500
2000
Fitted values [10^3]
e) Normal Q−Q plot
qqline
1:1 line
Standardised Residuals
−1.5
−0.5
0.5
1.5
−2
−1
0
1
2
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.4
−0.2
0.0
0.2
0.4
2
4
6
8
10
12
Lag (yrs)

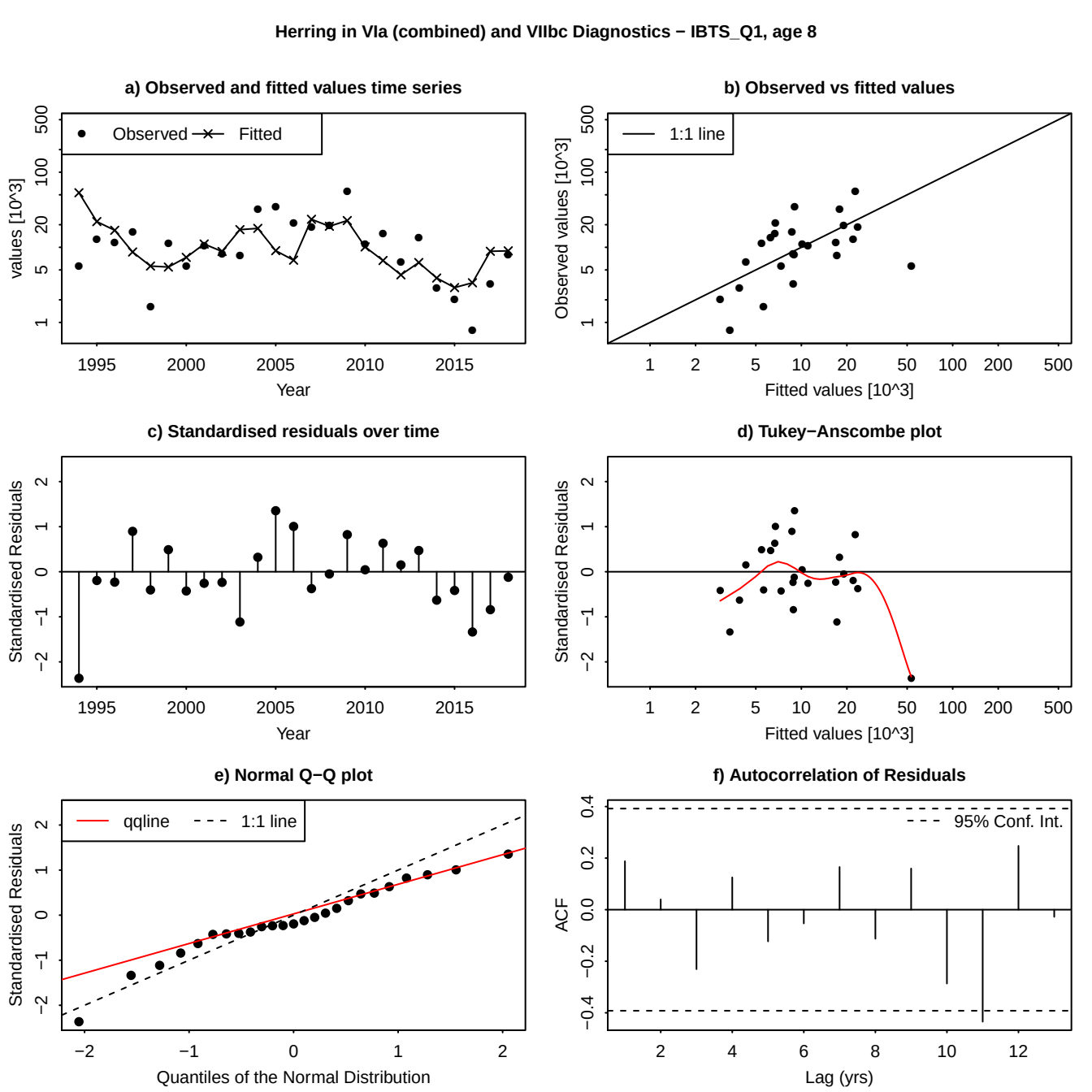

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q1, age 3
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)

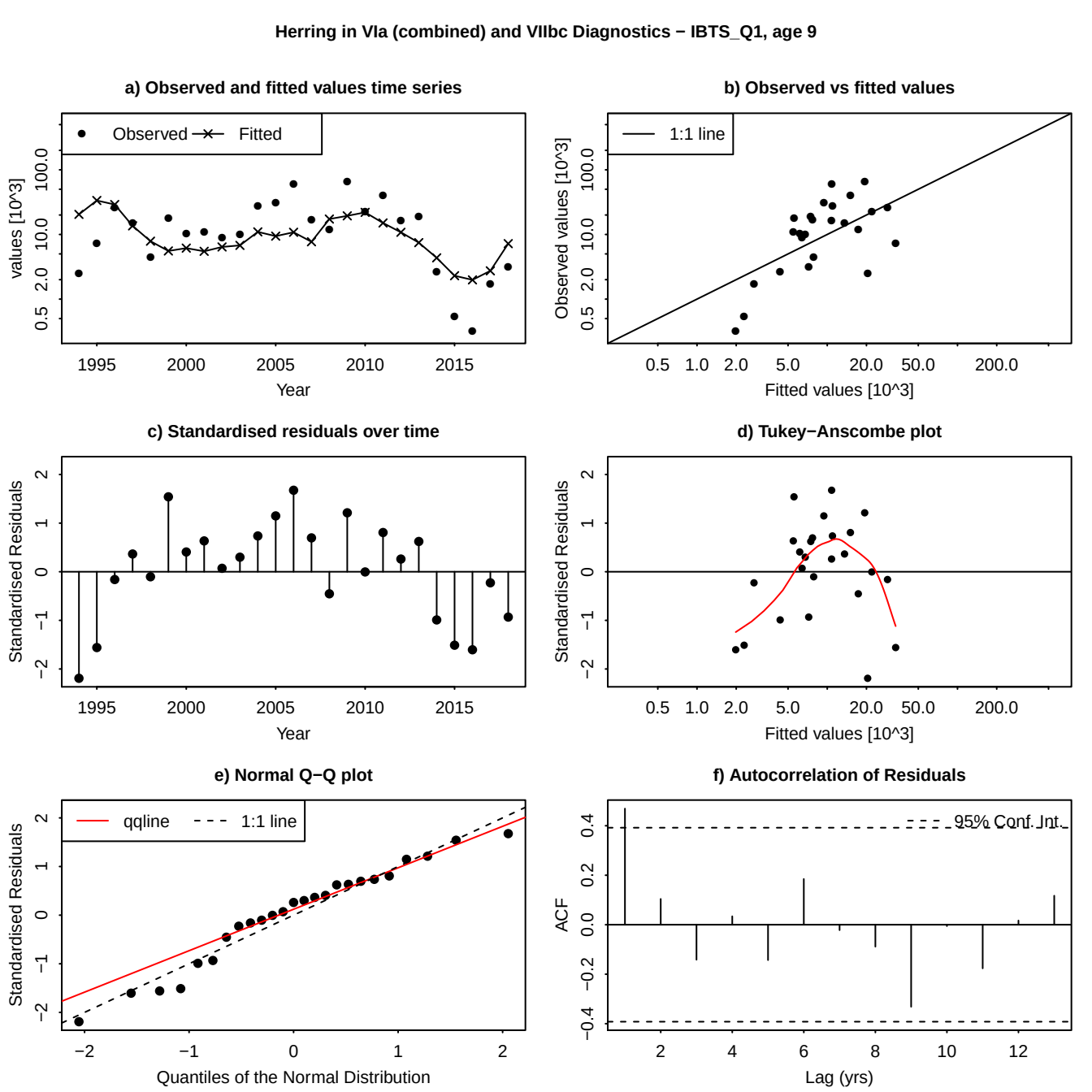

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q1, age 4
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
5
20
100
500
1995
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
5
10
20
50
100
200
500
1000
c) Standardised residuals over time
Standardised Residuals
−2
−1
0
1
2
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
−0.4
−0.2
0.0
0.2
0.4
Lag (yrs)
2
4
6
8
10
12

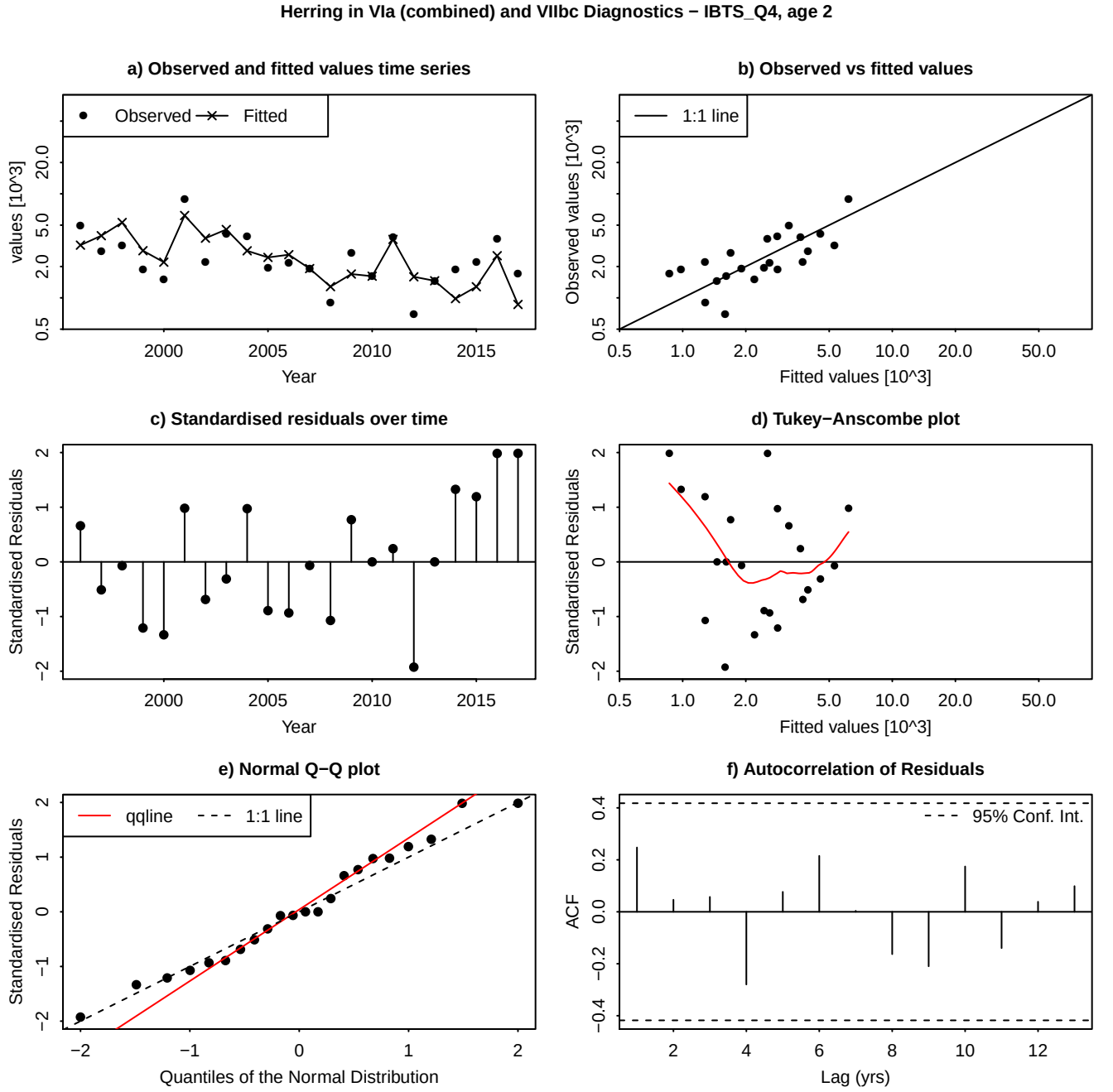

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q1, age 5
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)

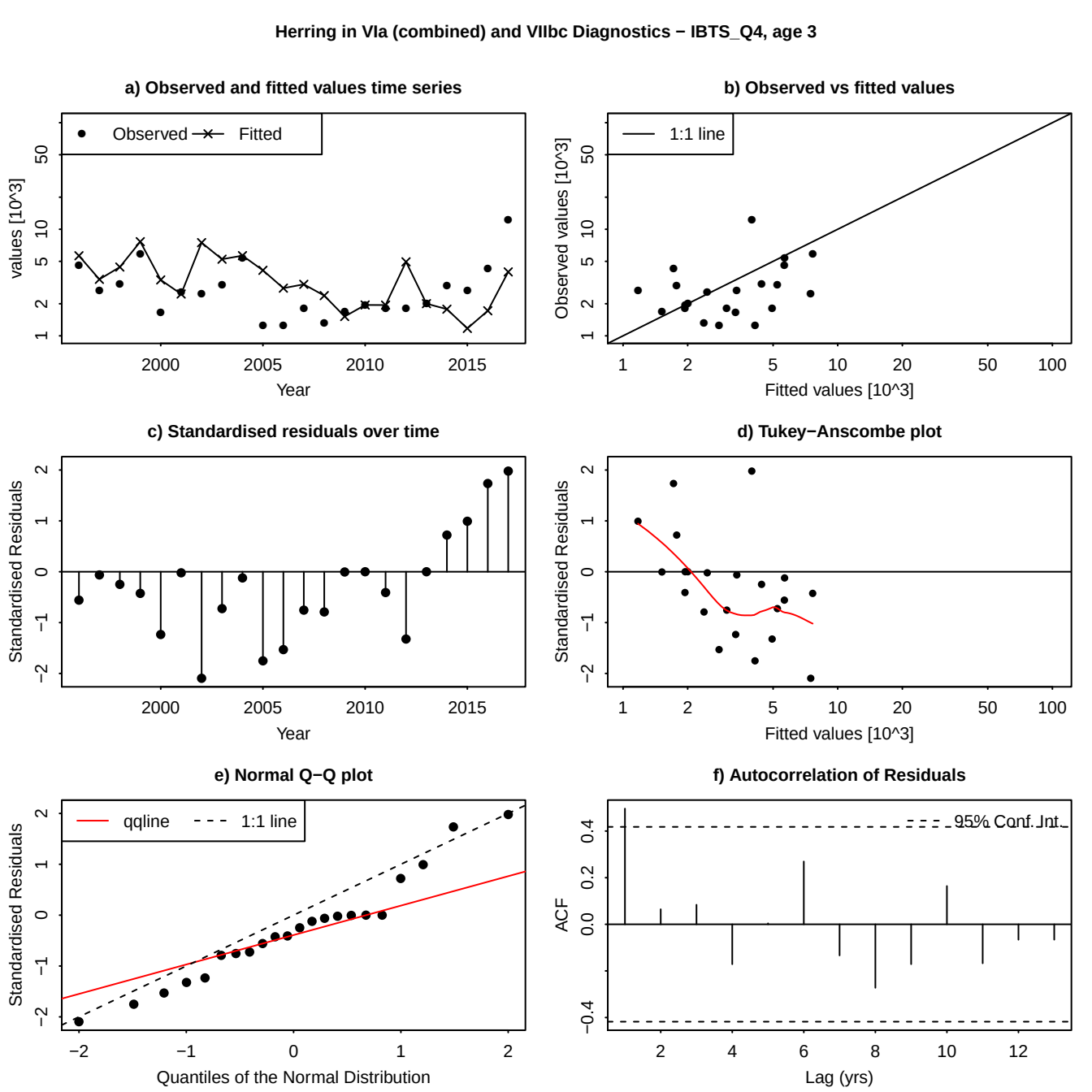

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q1, age 6
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)

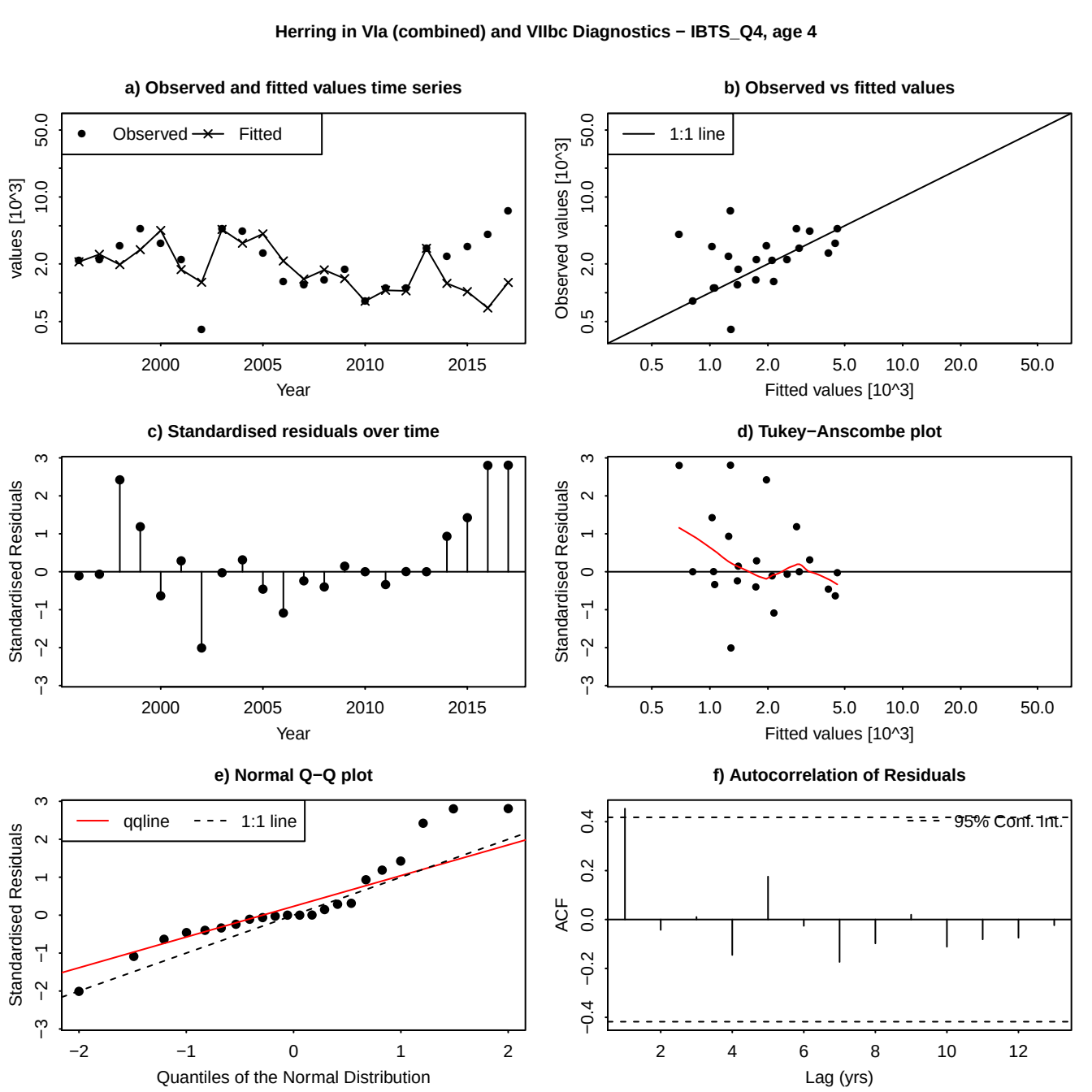

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q1, age 7
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
2
5
20
100
500
1995
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
2
5
10
20
50
100
200
500
c) Standardised residuals over time
Standardised Residuals
−1.5
−0.5
0.5
1.5
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
−0.4
−0.2
0.0
0.2
0.4
Lag (yrs)
4
6
8
10
12

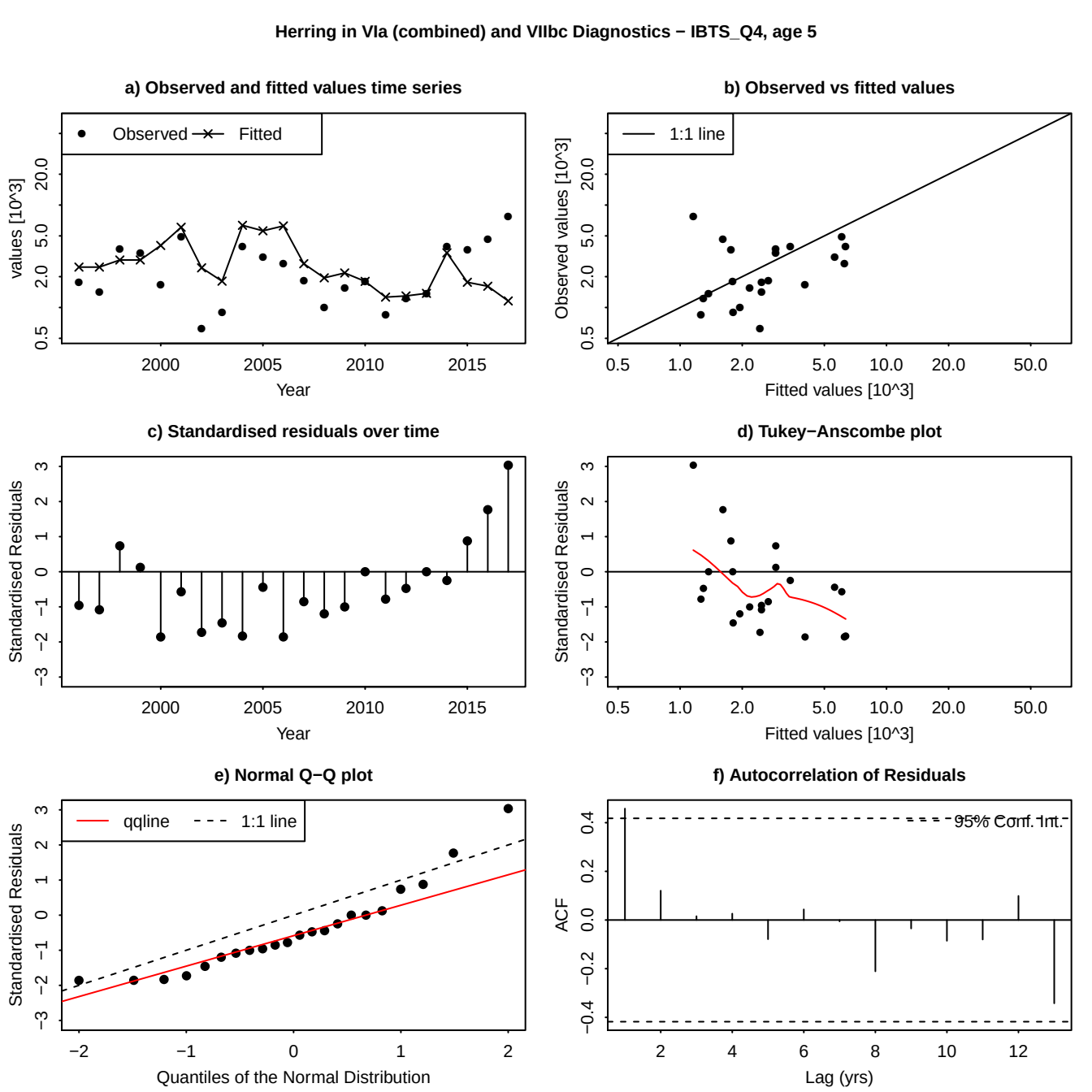

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q1, age 8
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)

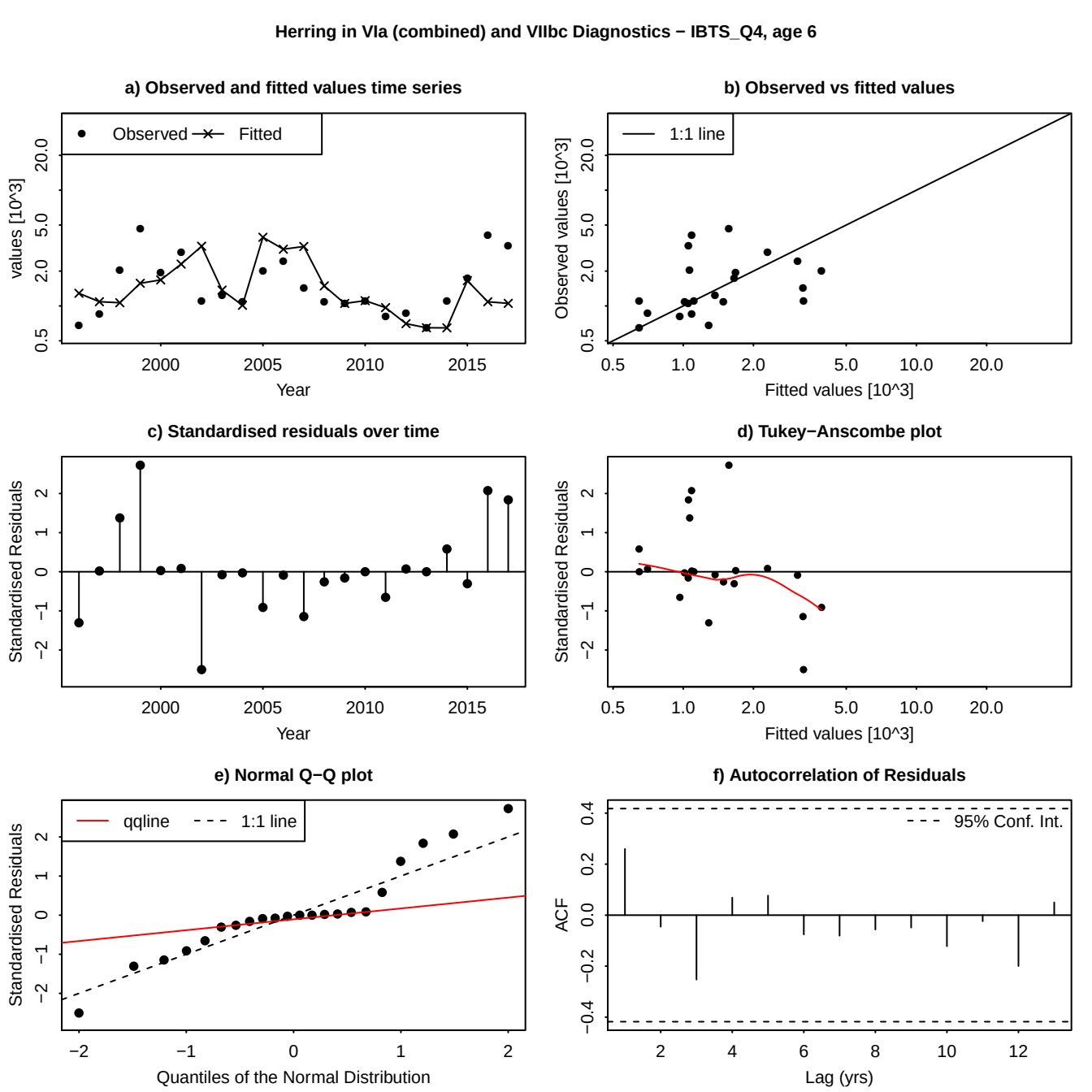

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q1, age 9
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
0.5
2.0
10.0
100.0
1995
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.5
1.0
2.0
5.0
20.0
50.0
200.0
c) 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
−0.4
−0.2
0.0
0.2
0.4
Lag (yrs)
2
4
6
8
10
12

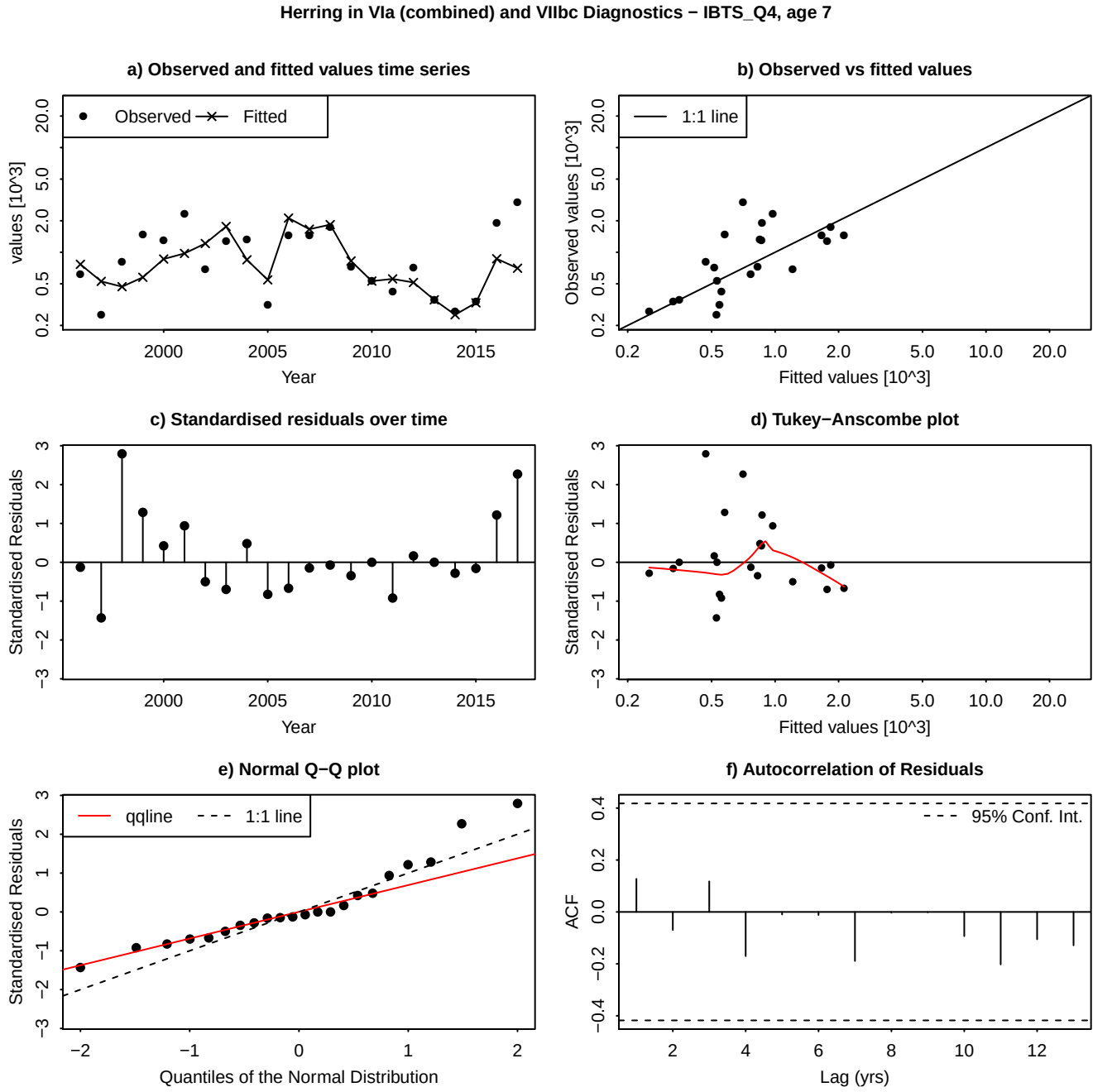

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q4, age 2
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
0.5
2.0
5.0
20.0
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.5
1.0
2.0
5.0
10.0
20.0
50.0
c) Standardised 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
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.4
−0.2
0.0
0.2
0.4
Lag (yrs)
2
4
6
8
10
12

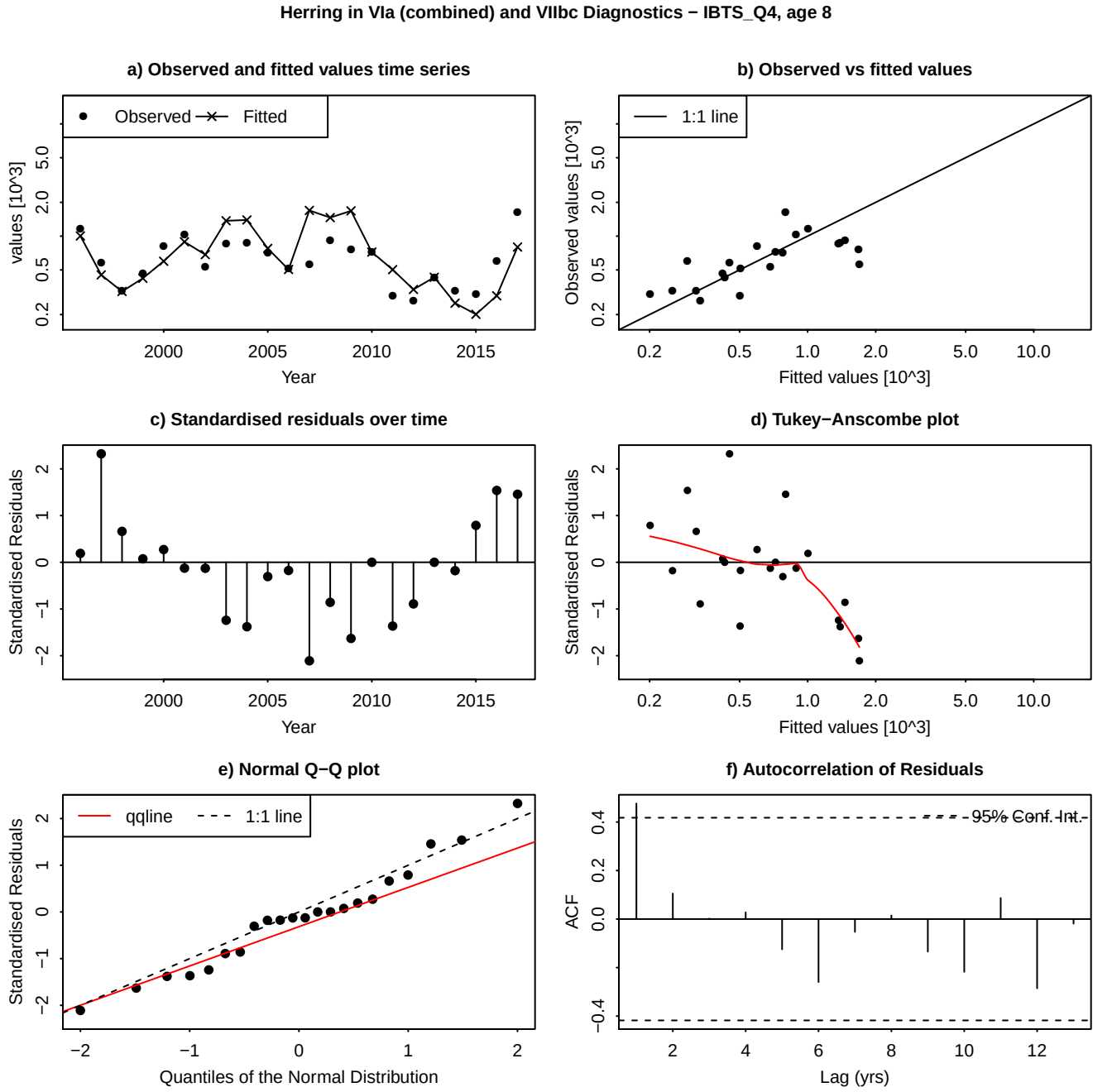

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q4, age 3
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
1
2
5
10
50
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
1
2
5
10
20
50
100
c) Standardised residuals 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
−0.4
0.0
0.2
0.4
Lag (yrs)
4
6
8
10
12

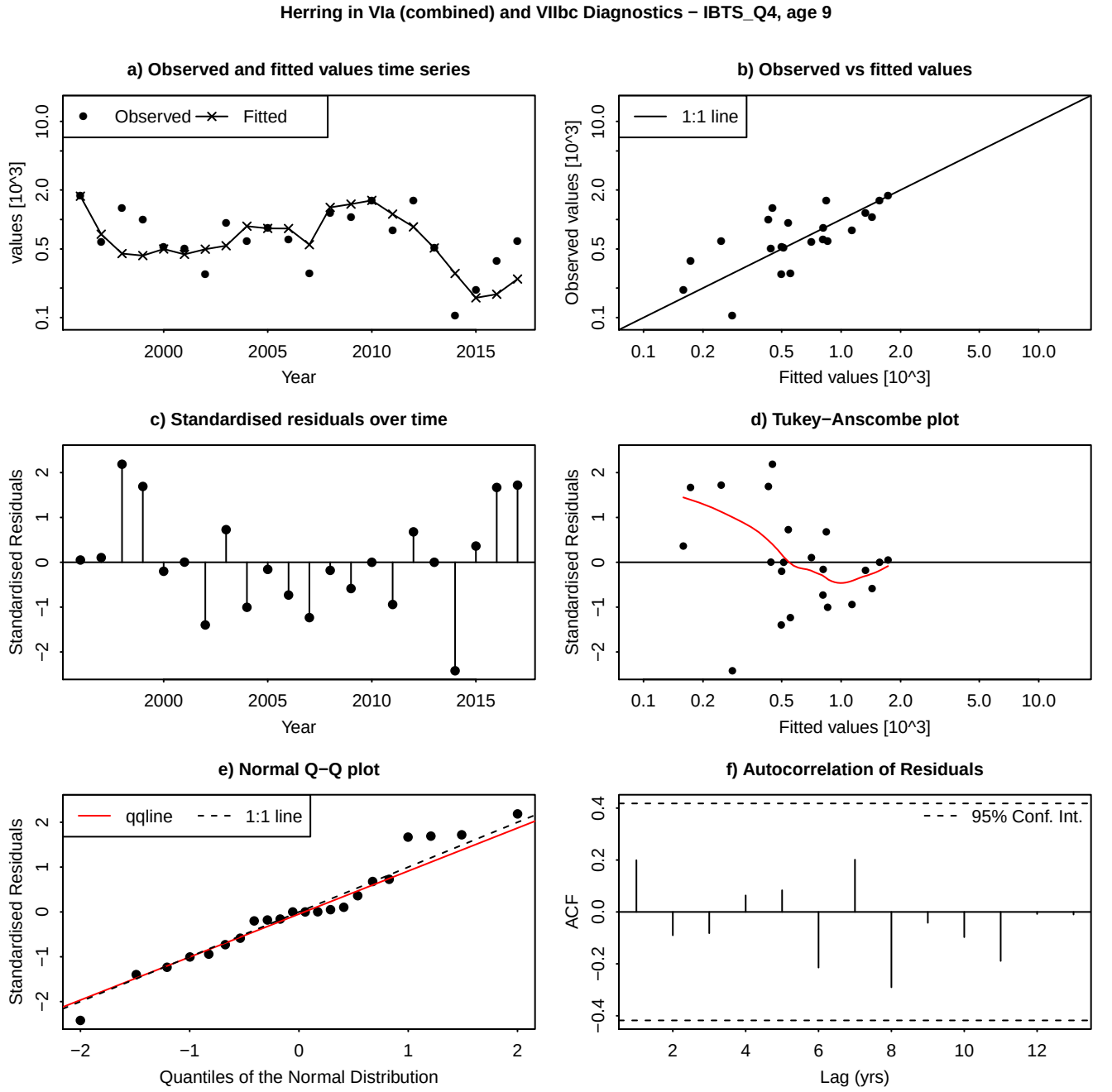

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q4, age 4
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
50.0
10.0
2.0
0.5
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.5
1.0
2.0
5.0
10.0
20.0
50.0
c) Standardised residuals over time
Standardised Residuals
3
2
1
0
−1
−2
−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
0.4
0.2
0.0
−0.2
−0.4
Lag (yrs)
2
4
6
8
10
12

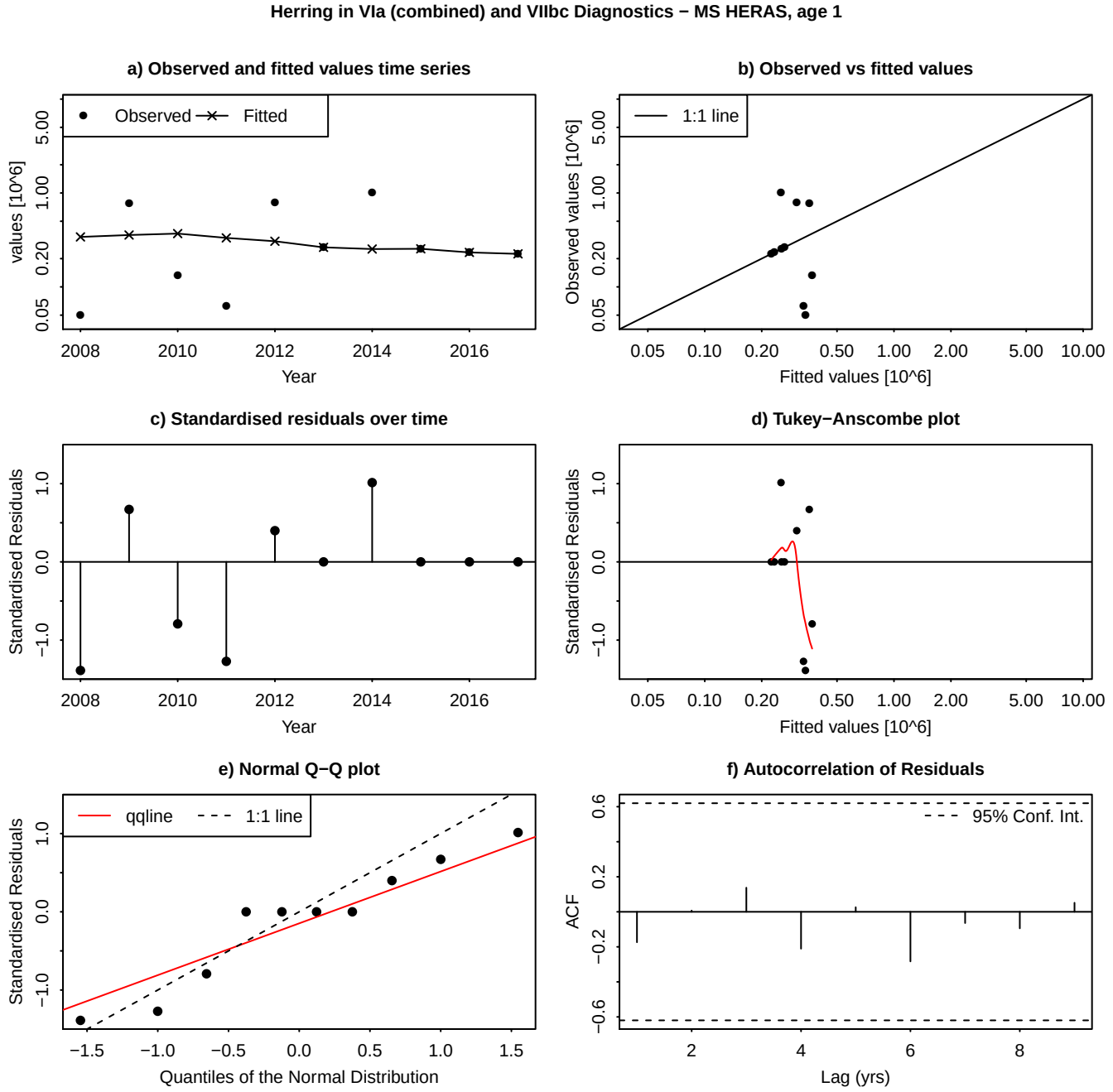

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q4, age 5
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
0.5
2.0
5.0
20.0
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.5
1.0
2.0
5.0
10.0
20.0
50.0
c) Standardised residuals over time
Standardised Residuals
−3
−2
−1
0
1
2
3
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
−0.4
−0.2
0.0
0.2
0.4
Lag (yrs)

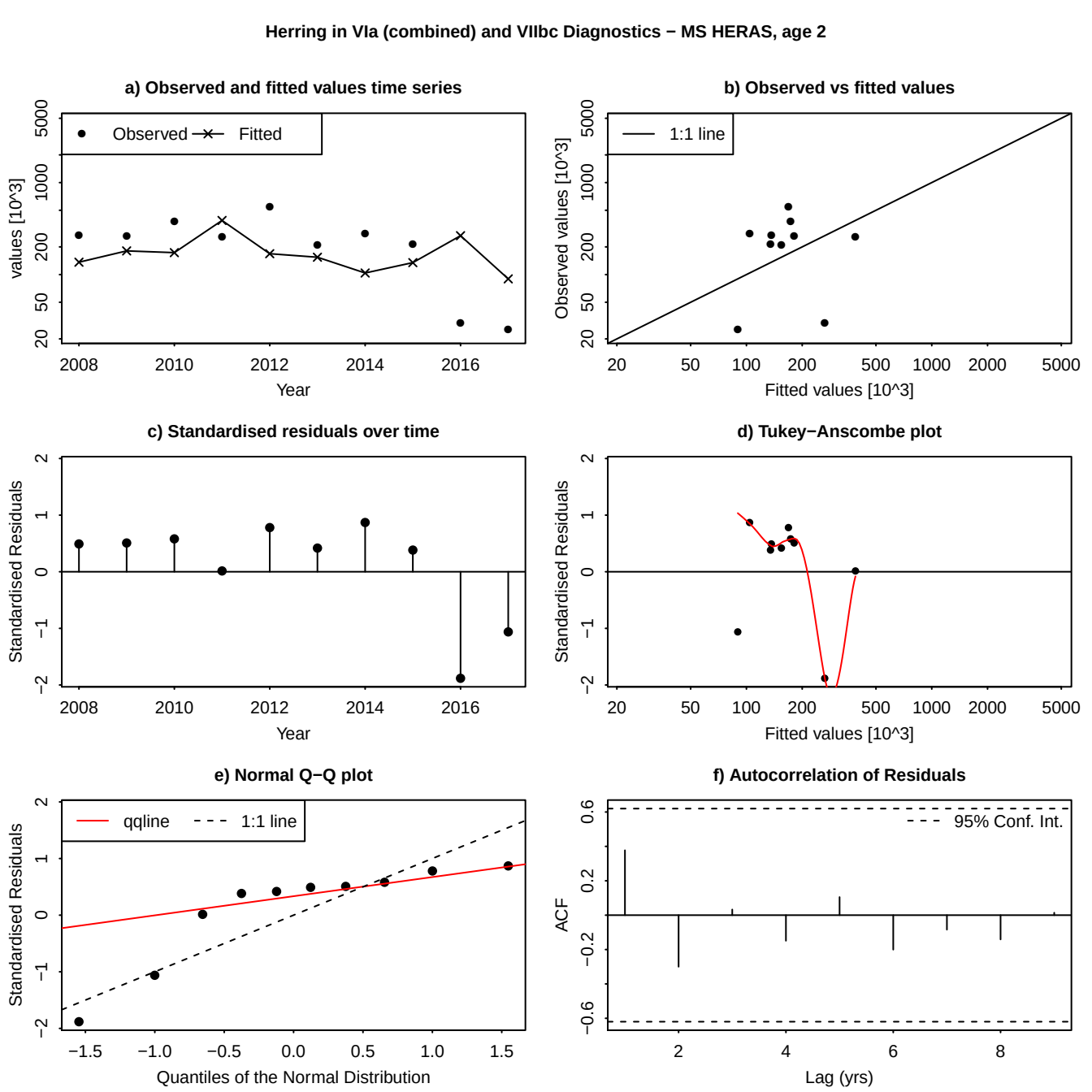

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q4, age 6
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
0.5
2.0
5.0
20.0
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.5
1.0
2.0
5.0
10.0
20.0
c) Standardised residuals over time
Standardised Residuals
−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
−0.4
−0.2
0.0
0.2
0.4
Lag (yrs)
2
4
6
8
10
12

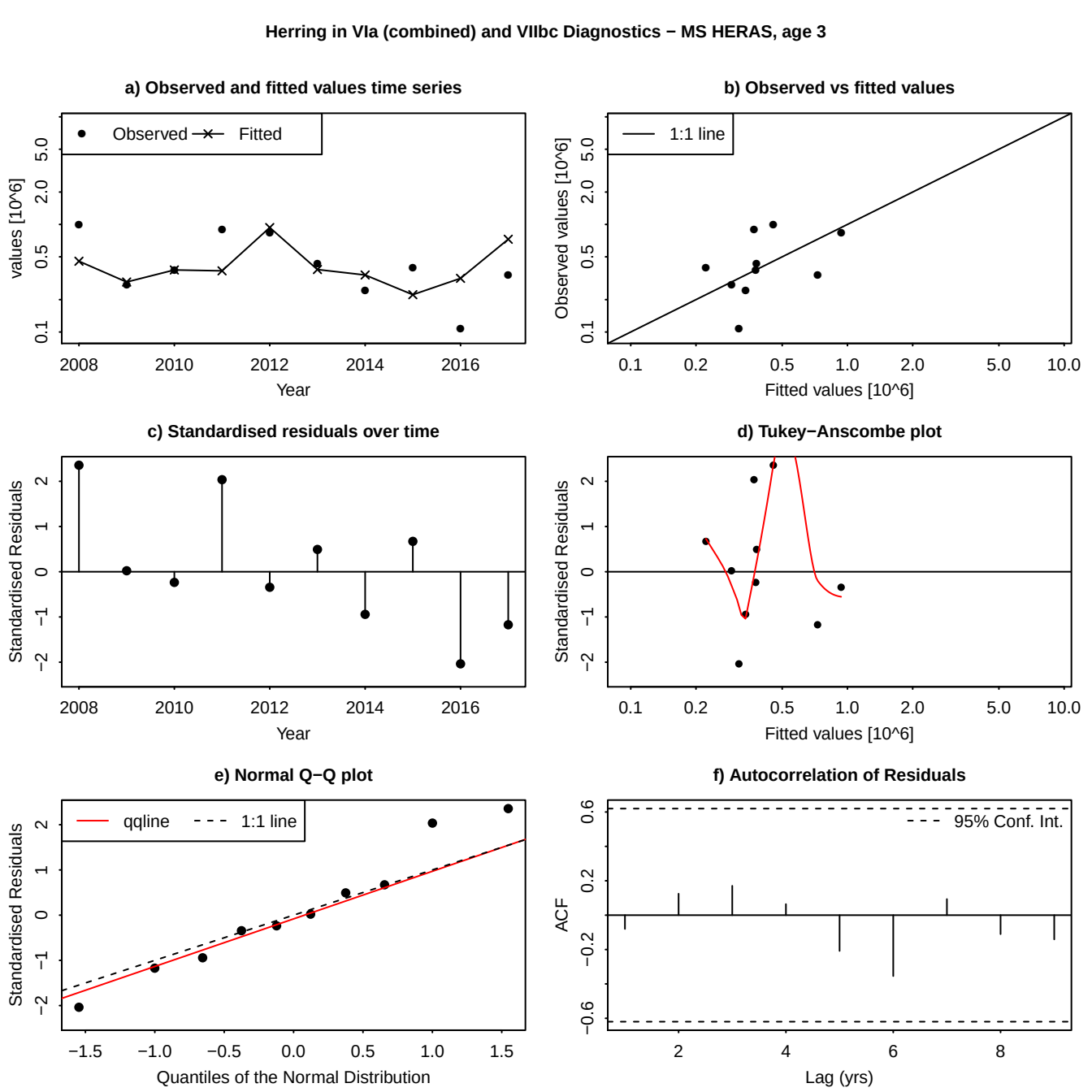

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q4, age 7
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
20.0
5.0
2.0
0.5
0.2
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.2
0.5
1.0
2.0
5.0
10.0
20.0
c) Standardised residuals over time
Standardised Residuals
3
2
1
0
−1
−2
−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
0.4
0.2
0.0
−0.2
−0.4
Lag (yrs)
2
4
6
8
10
12

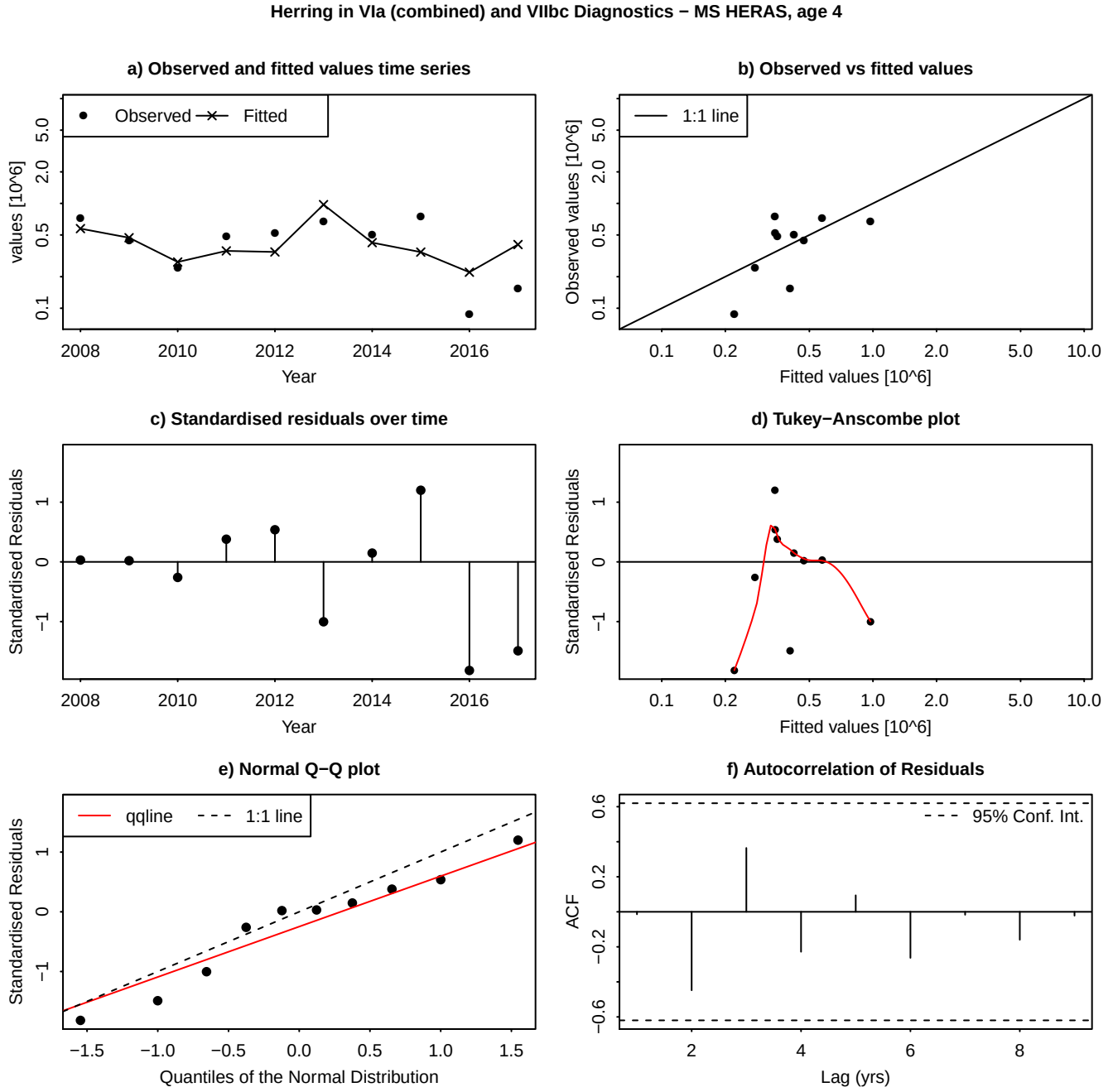

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q4, age 8
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
0.2
0.5
2.0
5.0
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.2
0.5
1.0
2.0
5.0
10.0
c) Standardised 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
−0.4
0.0
0.2
0.4
Lag (yrs)
2
4
6
8
10
12

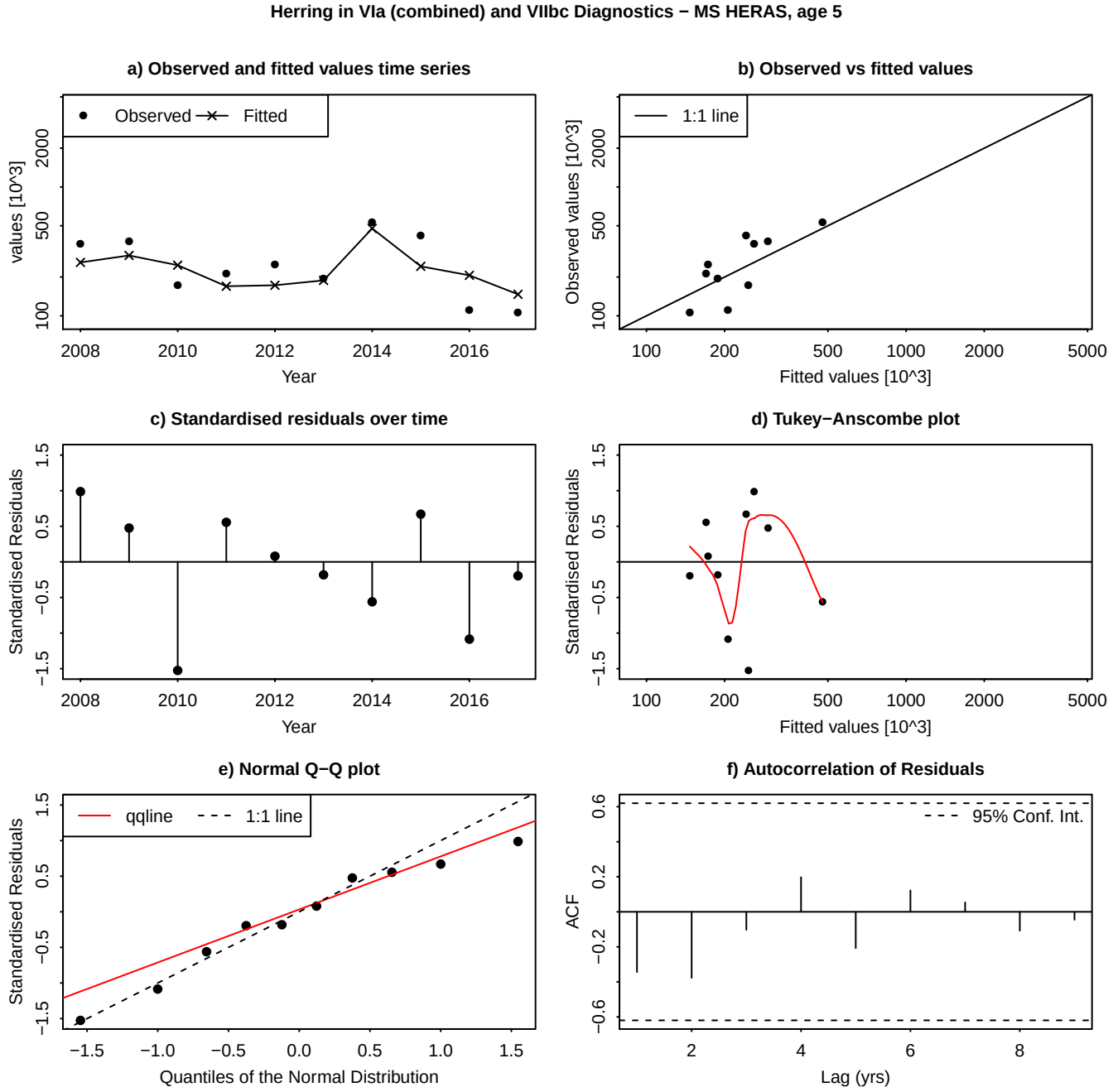

Herring in VIa (combined) and VIIbc Diagnostics − IBTS_Q4, age 9
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
10.0
2.0
0.5
0.1
2000
2005
2010
2015
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
0.1
0.2
0.5
1.0
2.0
5.0
10.0
c) Standardised residuals over time
Standardised Residuals
2
1
0
−1
−2
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
0.4
0.2
0.0
−0.2
−0.4
Lag (yrs)
4
6
8
10
12

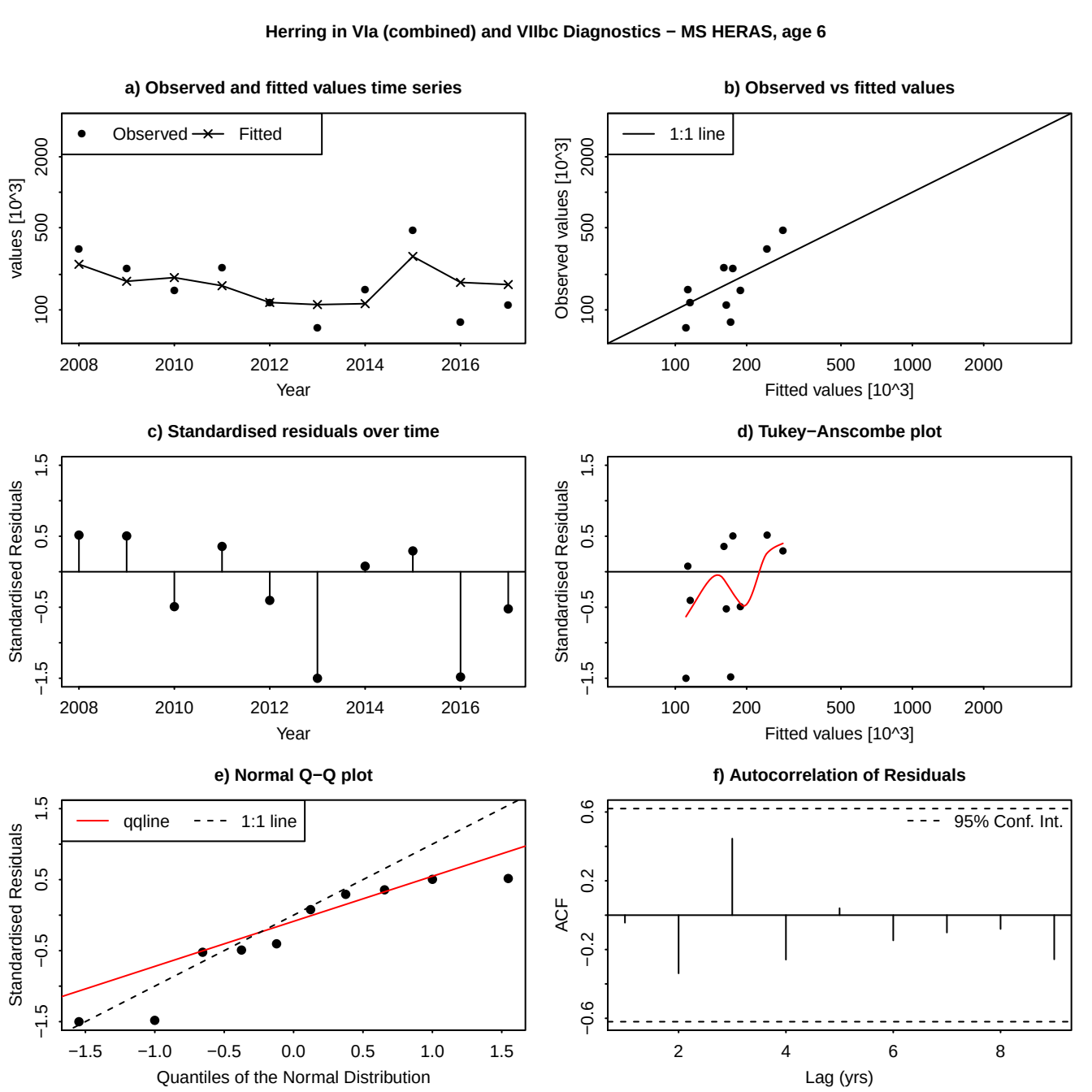

Herring in VIa (combined) and VIIbc Diagnostics − MS HERAS, age 1
a) Observed and fitted values time series
Observed
Fitted
values [10^6]
0.05
0.20
1.00
5.00
2008
2010
2012
2014
2016
Year
b) Observed vs fitted values
1:1 line
Observed values [10^6]
Fitted values [10^6]
0.05
0.10
0.20
0.50
1.00
2.00
5.00
10.00
c) Standardised residuals over time
Standardised Residuals
−1.0
0.0
1.0
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
−0.6
−0.2
0.2
0.6
2
4
6
8
Lag (yrs)

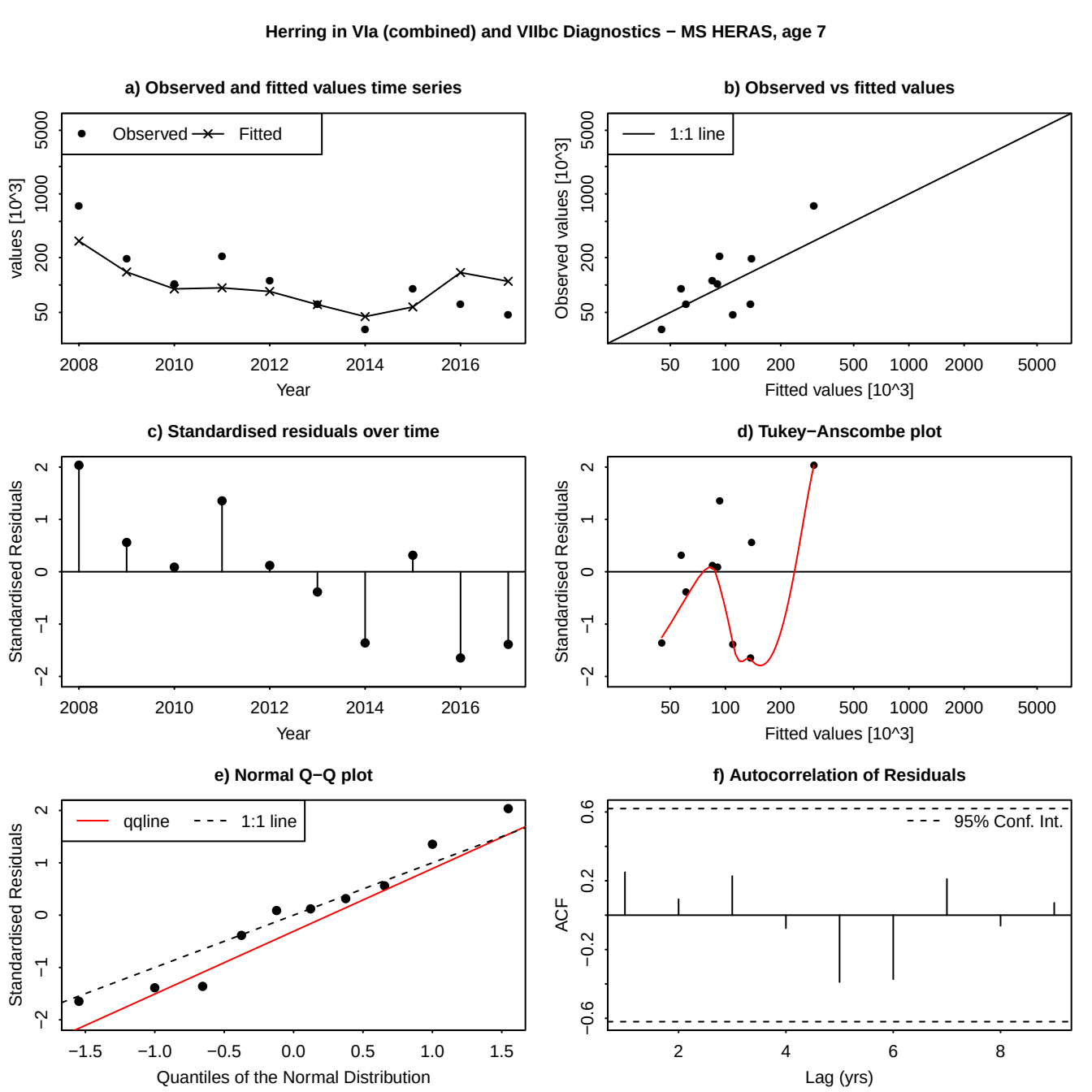

Herring in VIa (combined) and VIIbc Diagnostics − MS HERAS, age 2
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)

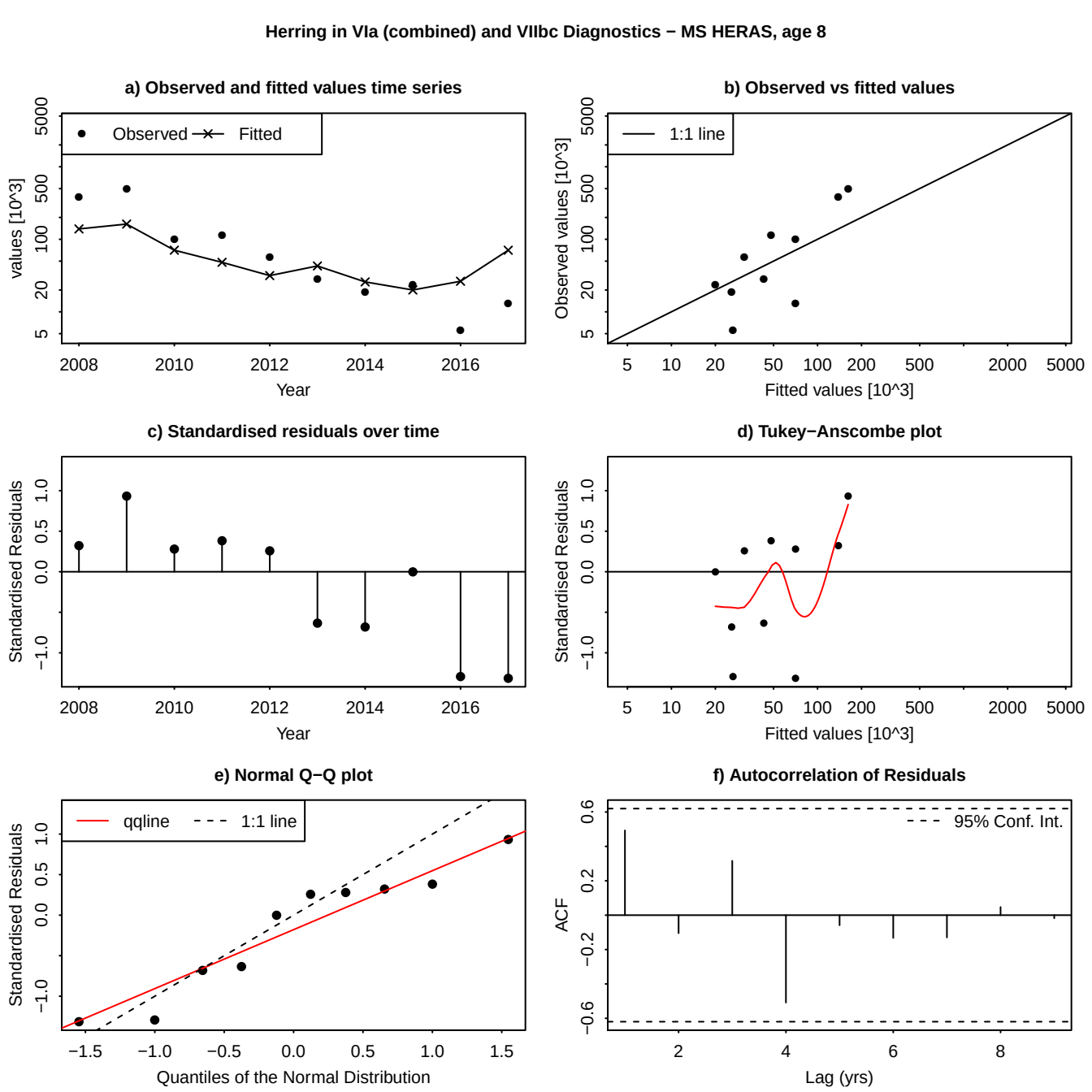

Herring in VIa (combined) and VIIbc Diagnostics − MS HERAS, age 3
a) Observed and fitted values time series
Observed
Fitted
values [10^6]
0.1
0.5
2.0
5.0
2008
2010
2012
2014
2016
Year
b) Observed vs fitted values
1:1 line
Observed values [10^6]
Fitted values [10^6]
0.1
0.2
0.5
1.0
2.0
5.0
10.0
c) Standardised 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
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.6
−0.2
0.2
0.6
2
4
6
8
Lag (yrs)


Herring in VIa (combined) and VIIbc Diagnostics − MS HERAS, age 4
a) Observed and fitted values time series
Observed
Fitted
values [10^6]
0.1
0.5
2.0
5.0
2008
2010
2012
2014
2016
Year
b) Observed vs fitted values
1:1 line
Observed values [10^6]
Fitted values [10^6]
0.1
0.2
0.5
1.0
2.0
5.0
10.0
c) Standardised residuals over time
Standardised Residuals
−1
0
1
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
−0.6
−0.2
0.2
0.6
2
4
6
8
Lag (yrs)

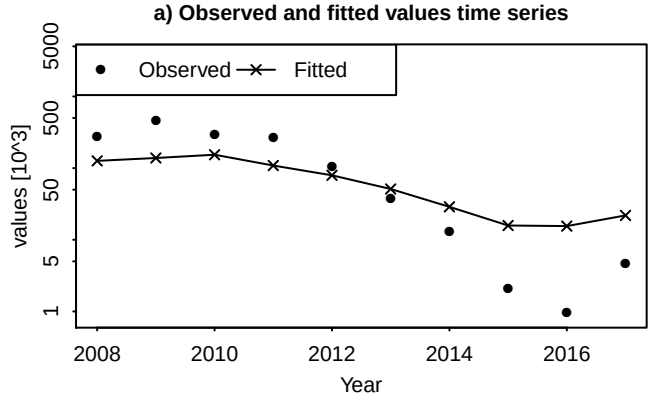

Herring in VIa (combined) and VIIbc Diagnostics − MS HERAS, age 5
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)

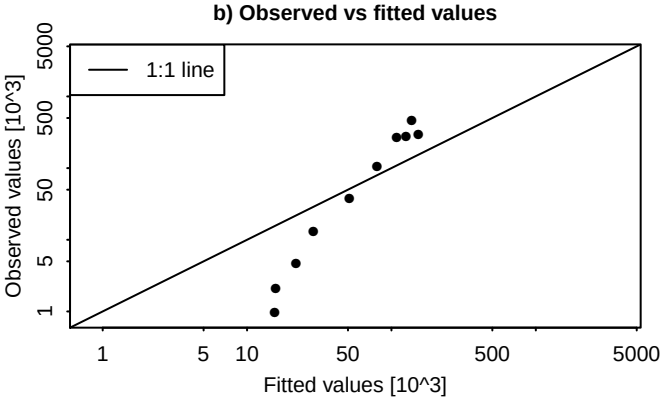

Herring in VIa (combined) and VIIbc Diagnostics − MS HERAS, age 6
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
100
500
2000
2008
2010
2012
2014
2016
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
1.5
0.5
−0.5
−1.5
d) Tukey−Anscombe plot
e) Normal Q−Q plot
qqline
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
0.6
0.2
−0.2
−0.6
2
4
6
8
Lag (yrs)

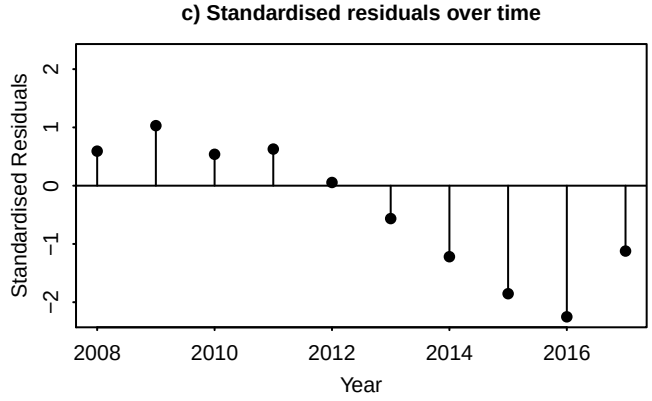

Herring in VIa (combined) and VIIbc Diagnostics − MS HERAS, age 7
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
5000
1000
200
50
2008
2010
2012
2014
2016
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
50
100
200
500
1000
2000
5000
c) Standardised 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
0.6
0.2
−0.2
−0.6
Lag (yrs)
2
4
6
8

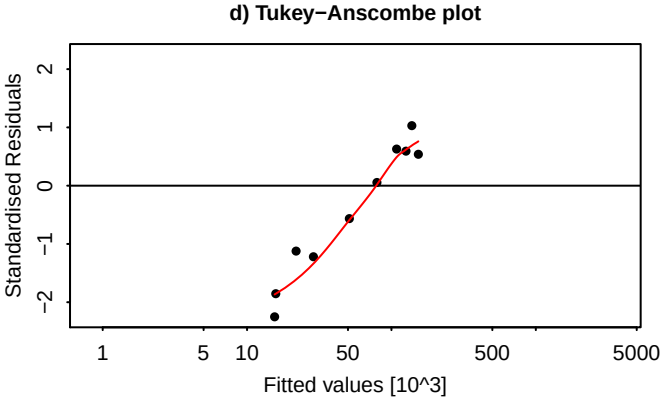

Herring in VIa (combined) and VIIbc Diagnostics − MS HERAS, age 8
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
5000
500
100
20
5
2008
2010
2012
2014
2016
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
5
10
20
50
100
200
500
2000
5000
c) Standardised residuals over time
Standardised Residuals
1.0
0.5
0.0
−1.0
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
0.6
0.2
−0.2
−0.6
2
4
6
8
Lag (yrs)

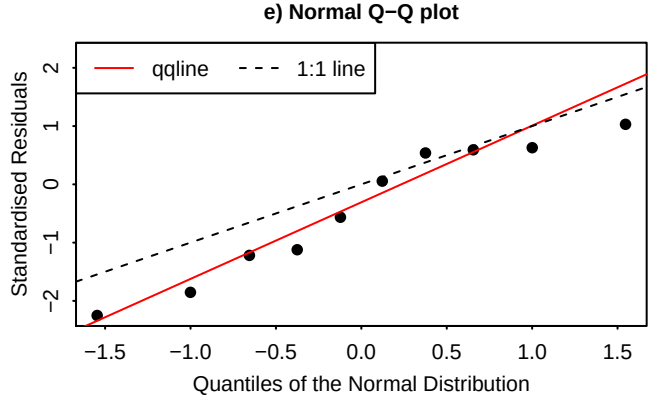
Herring in VIa (combined) and VIIbc Diagnostics − MS HERAS, age 9

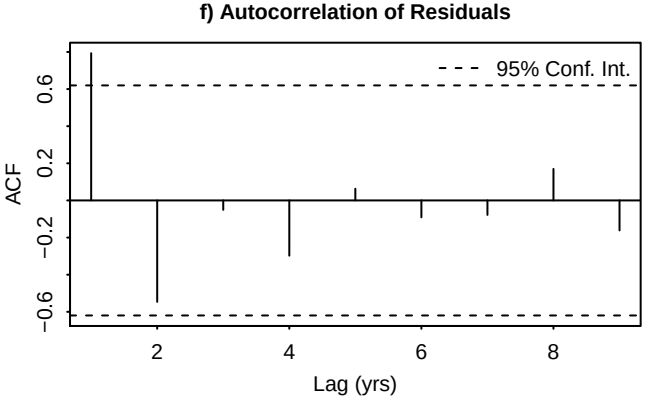


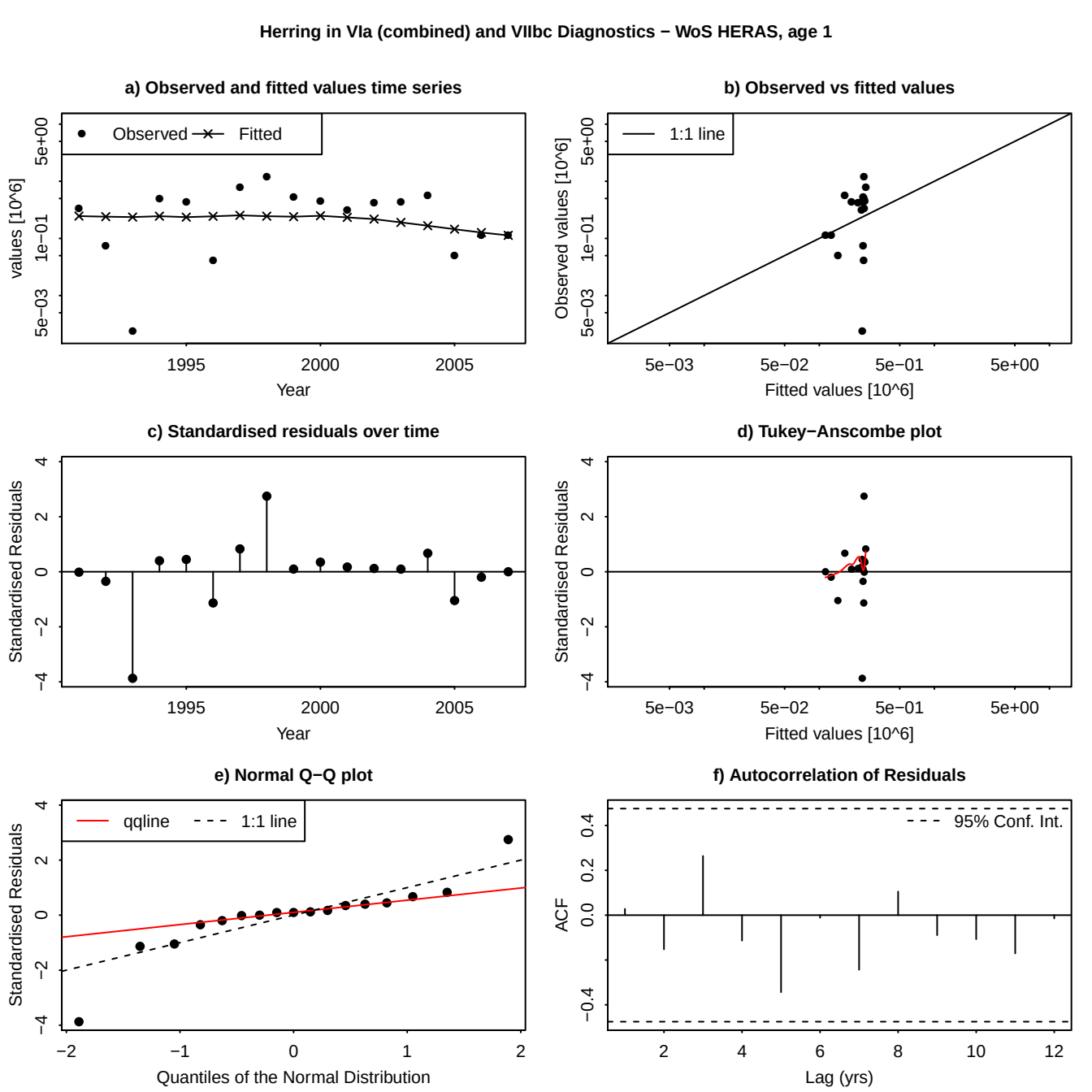


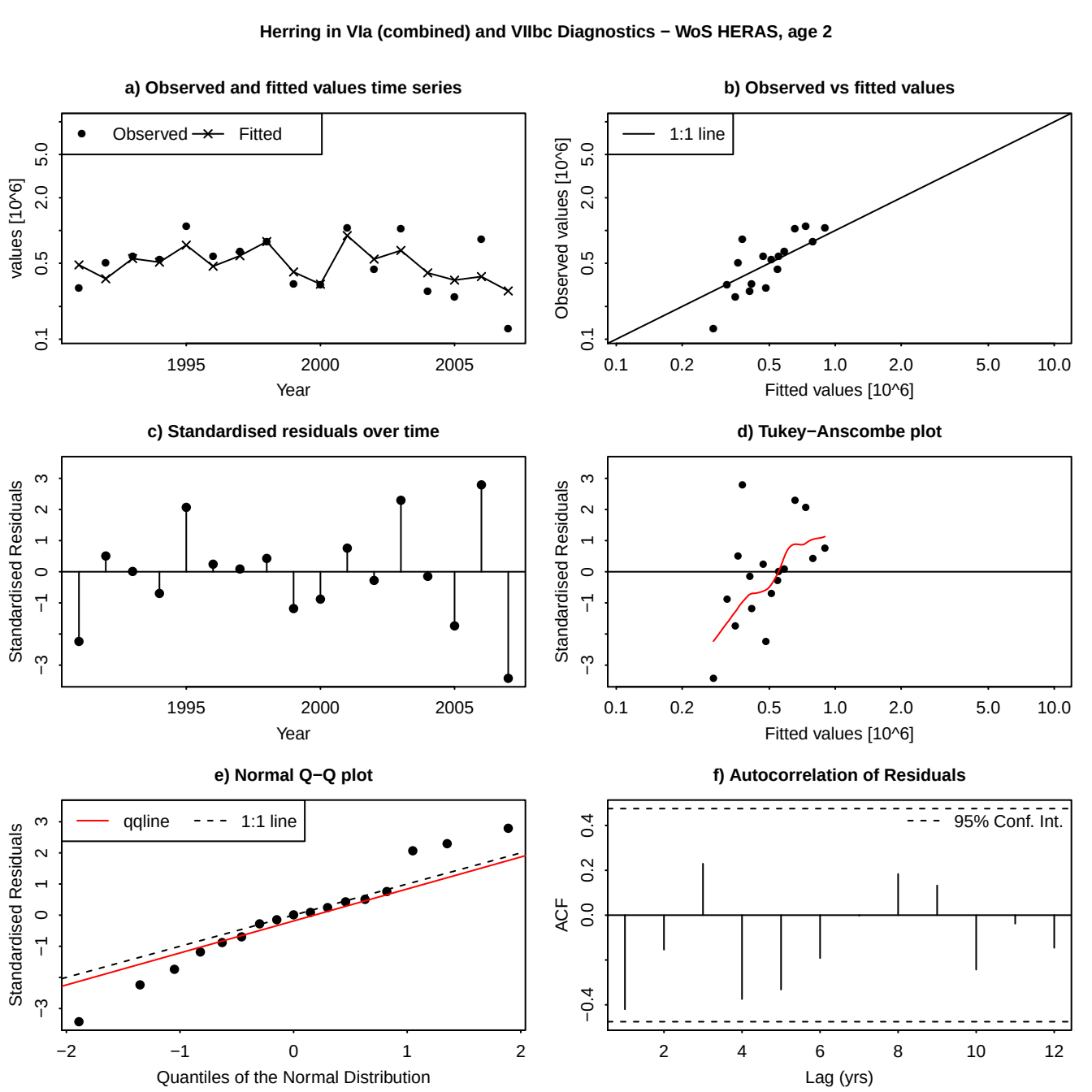


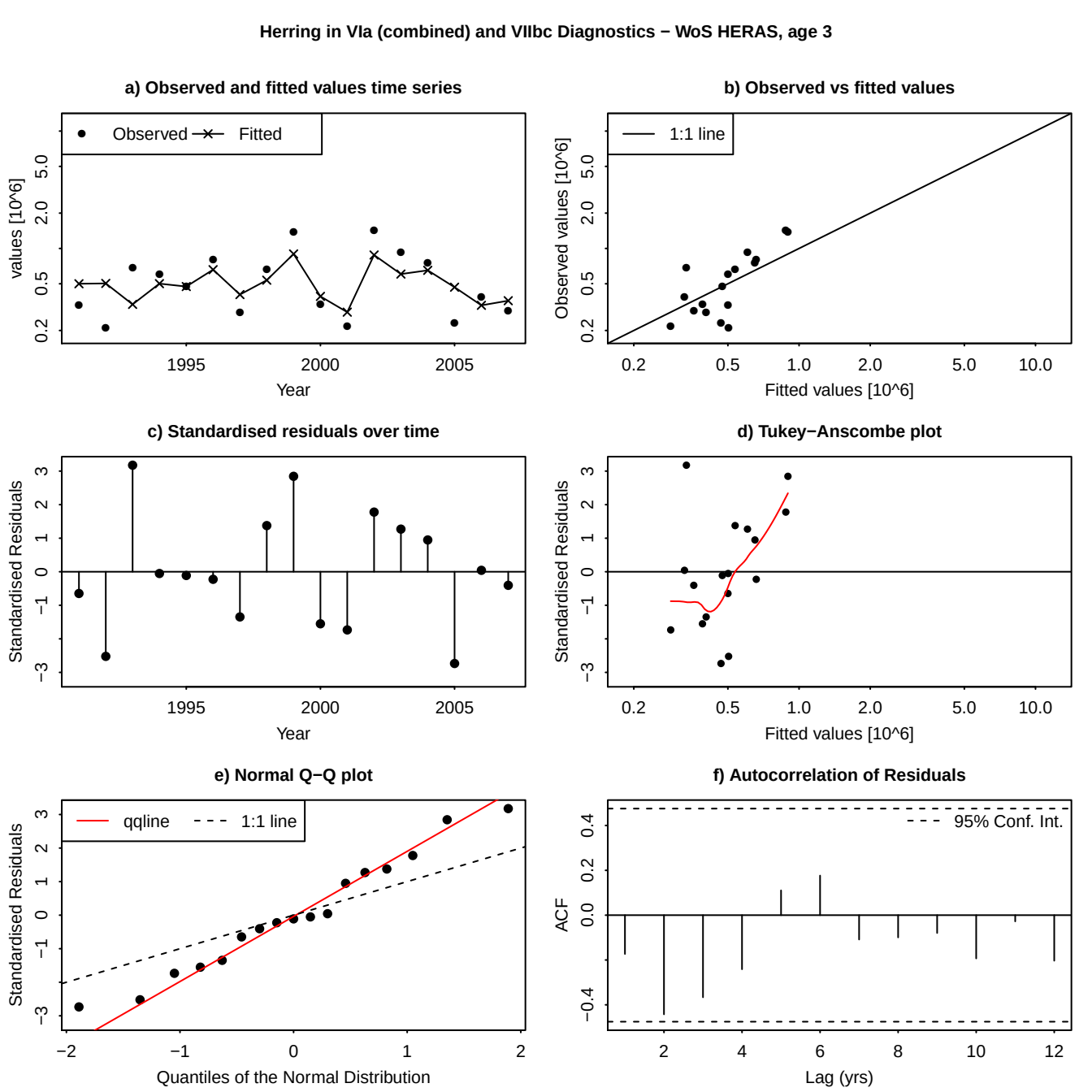


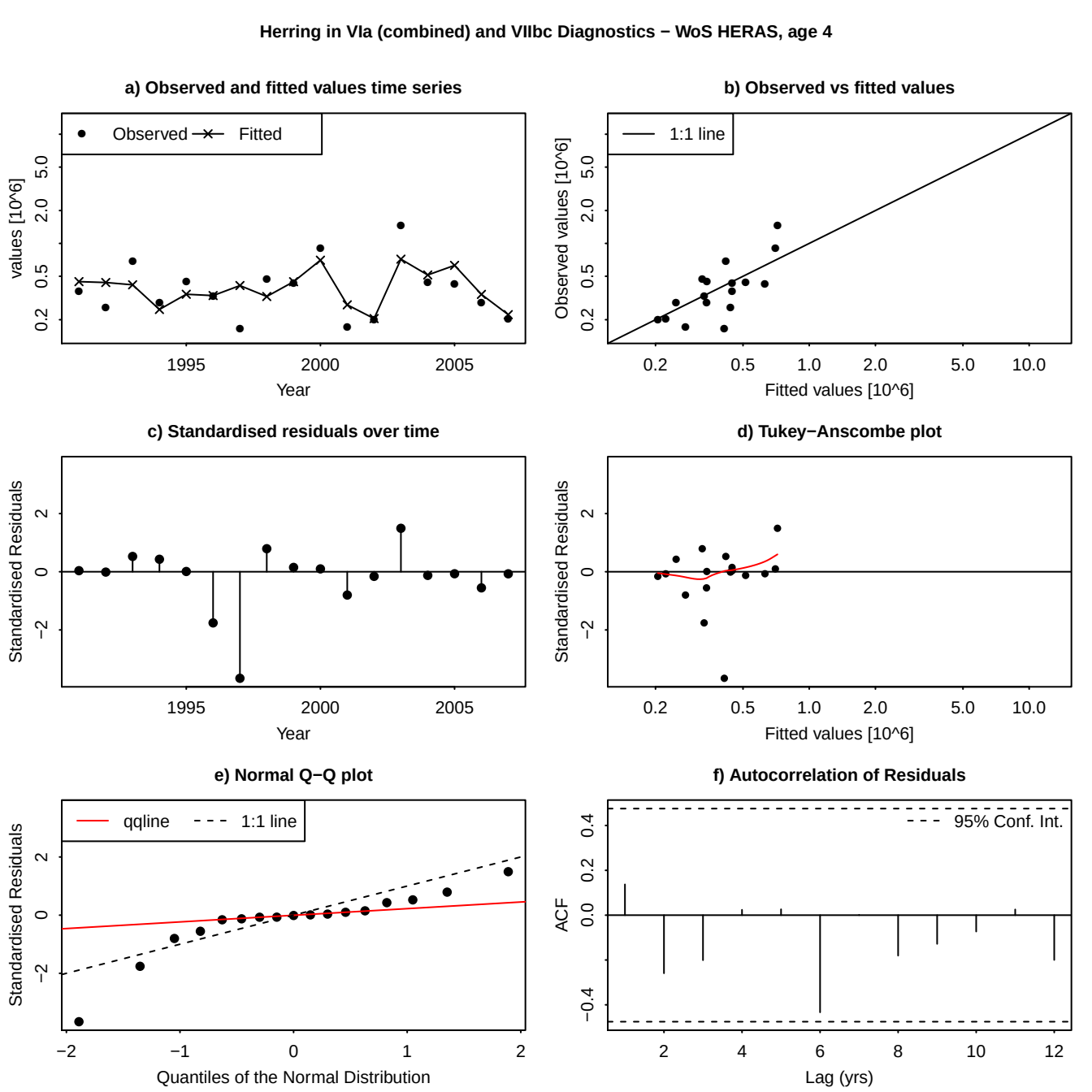


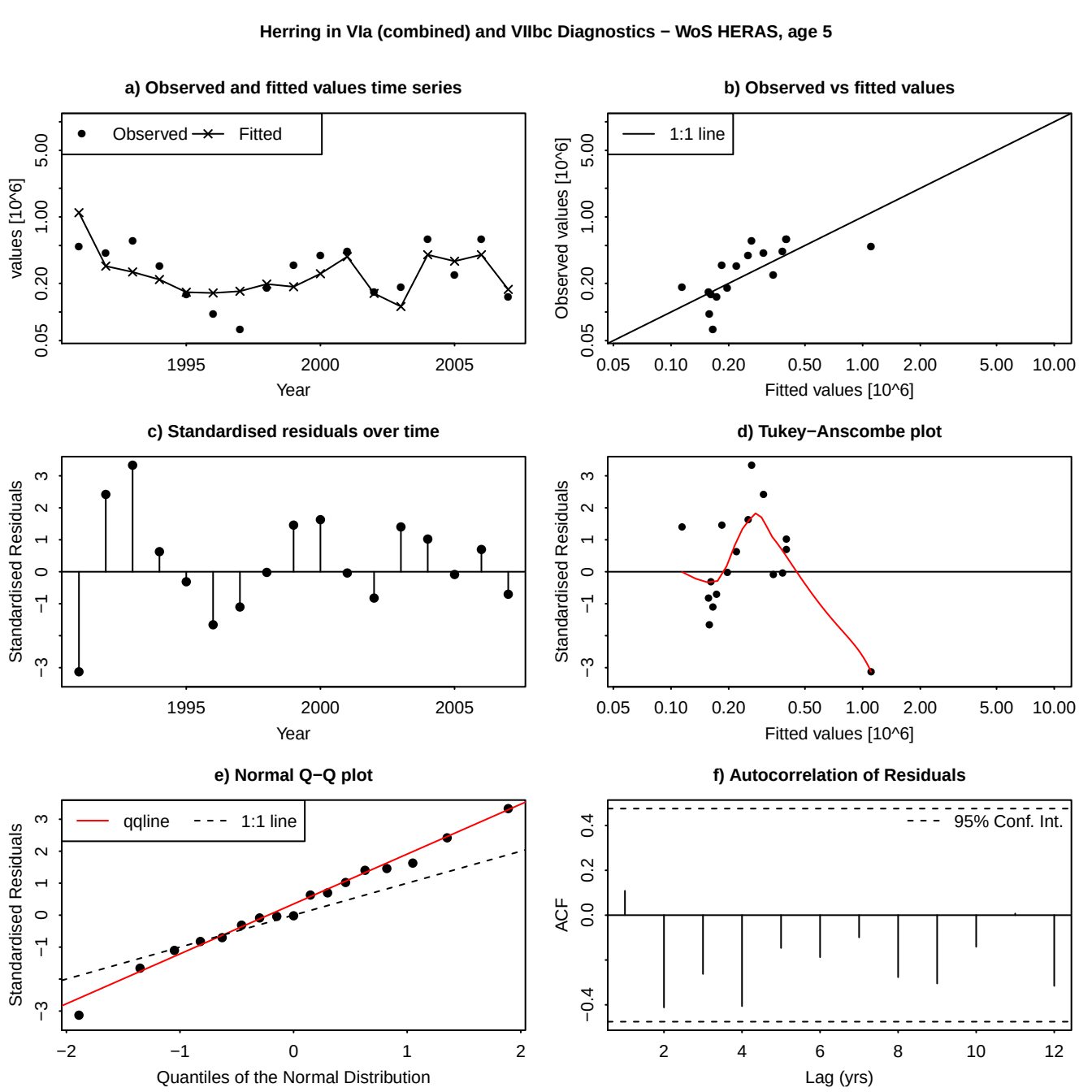


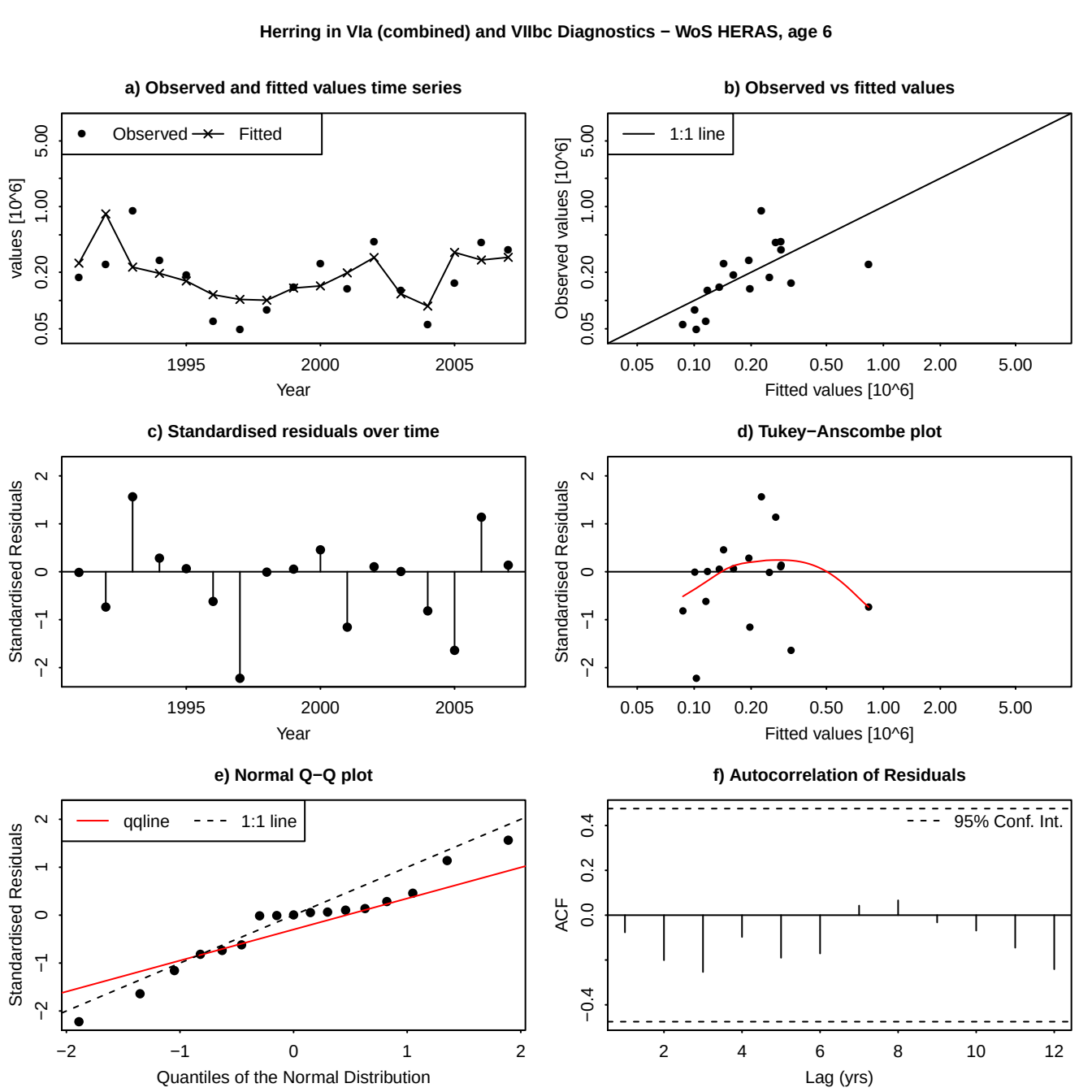

Herring in VIa (combined) and VIIbc Diagnostics − WoS HERAS, age 1
a) Observed and fitted values time series
Observed
Fitted
values [10^6]
5e+00
1e−01
5e−03
1995
2000
2005
Year
b) Observed vs fitted values
1:1 line
Observed values [10^6]
Fitted values [10^6]
c) Standardised residuals over time
Standardised 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)

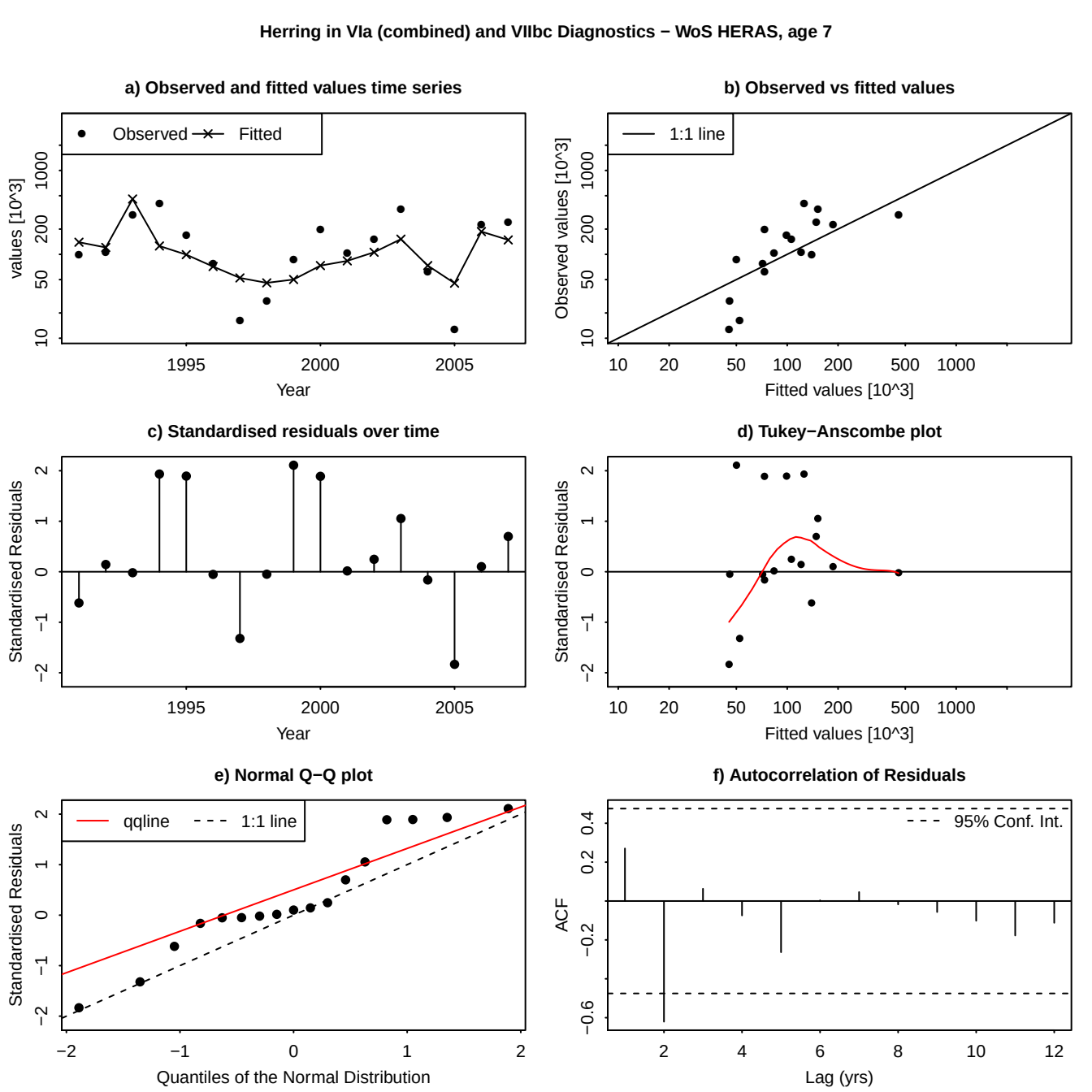

Herring in VIa (combined) and VIIbc Diagnostics − WoS HERAS, age 2
a) Observed and fitted values time series
Observed
Fitted
values [10^6]
0.1
0.5
2.0
5.0
1995
2000
2005
Year
b) Observed vs fitted values
1:1 line
Observed values [10^6]
Fitted values [10^6]
0.1
0.2
0.5
1.0
2.0
5.0
10.0
c) Standardised residuals over time
Standardised Residuals
−3
−1
0
1
2
3
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
−0.4
0.0
0.2
0.4
Lag (yrs)

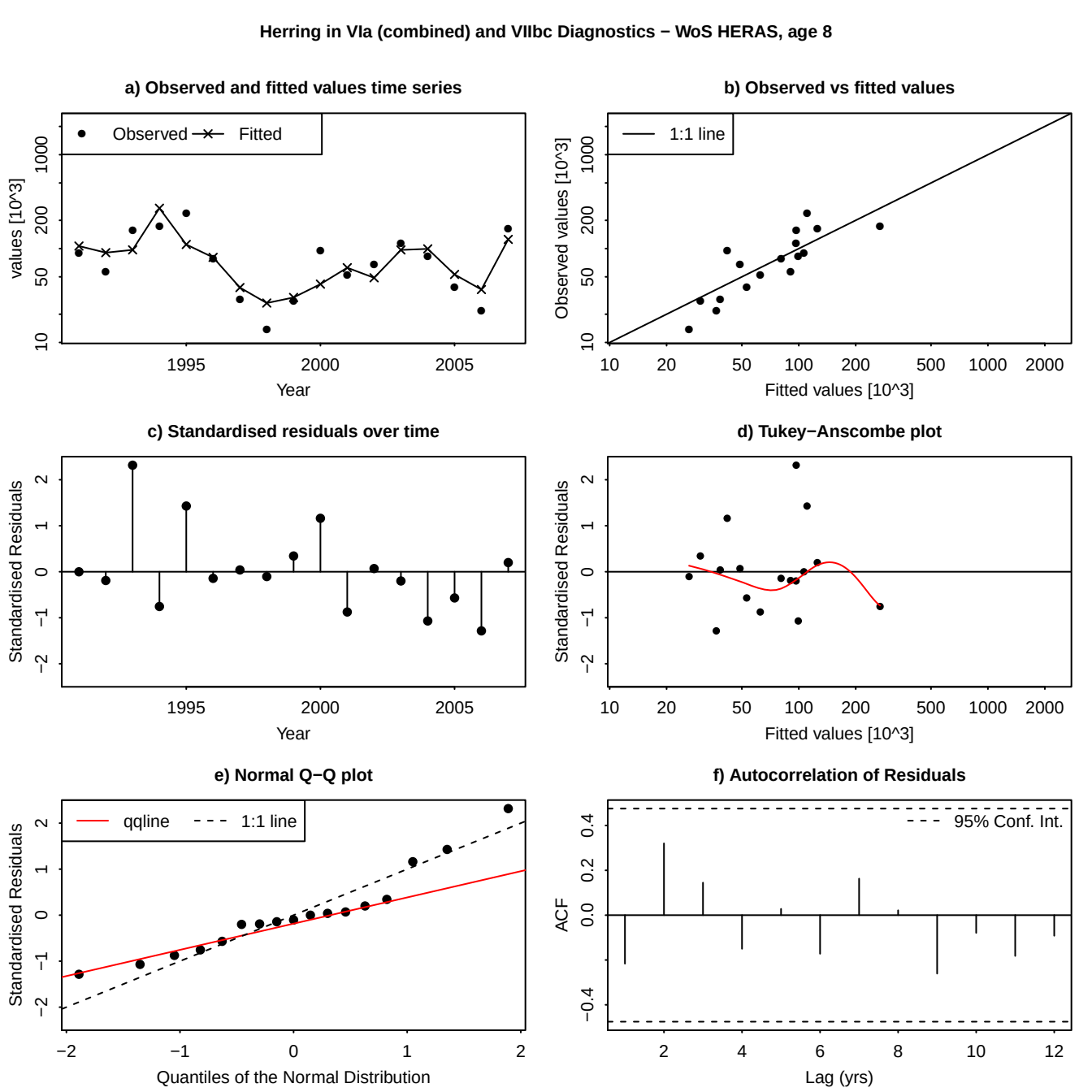

Herring in VIa (combined) and VIIbc Diagnostics − WoS HERAS, age 3
a) Observed and fitted values time series
Observed
Fitted
values [10^6]
0.2
0.5
2.0
5.0
1995
2000
2005
Year
b) Observed vs fitted values
1:1 line
Observed values [10^6]
Fitted values [10^6]
0.2
0.5
1.0
2.0
5.0
10.0
c) Standardised residuals over time
Standardised Residuals
−3
−1
0
1
2
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
−0.4
0.0
0.2
0.4
Lag (yrs)
2
4
6
8
10
12

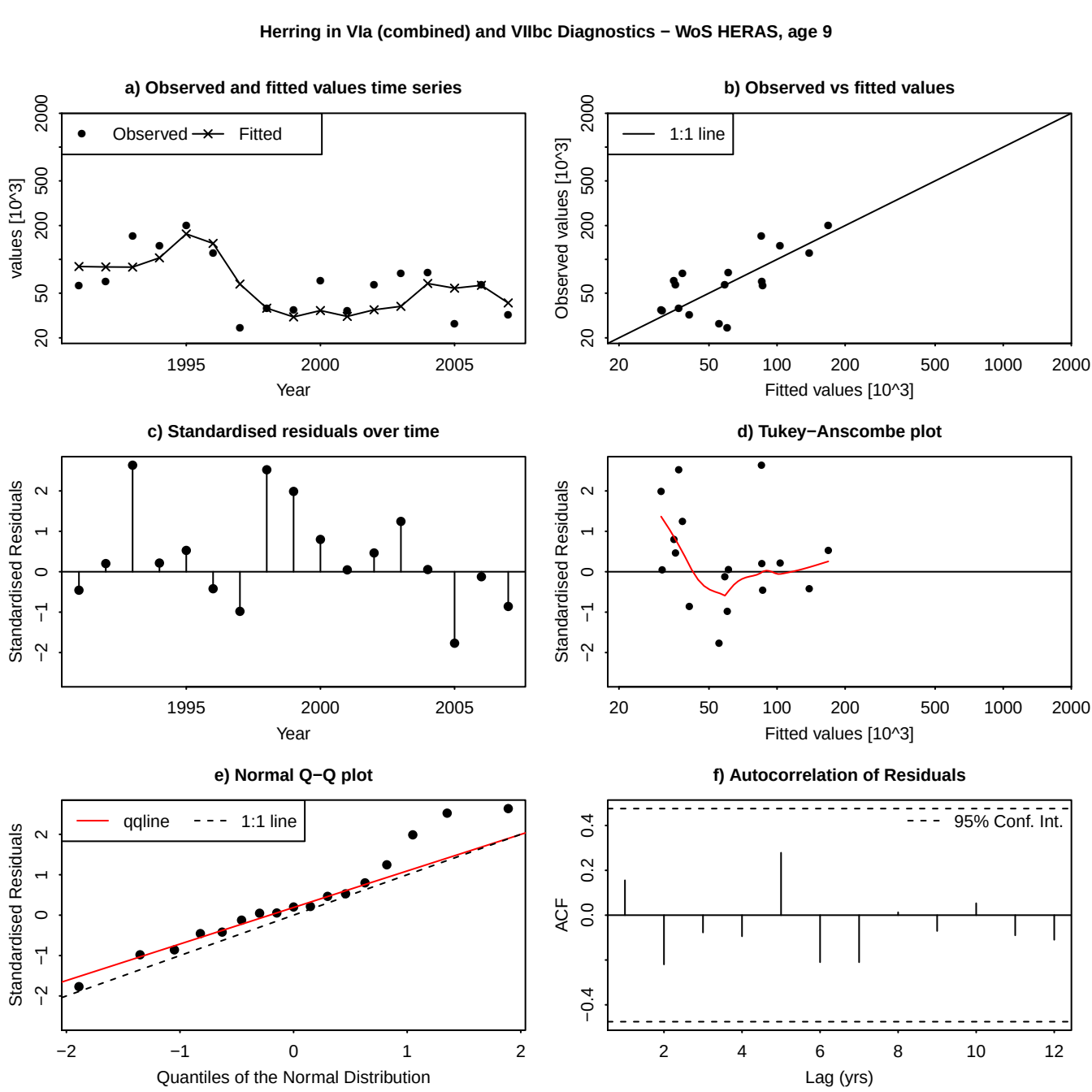

Herring in VIa (combined) and VIIbc Diagnostics − WoS HERAS, age 4
a) Observed and fitted values time series
Observed
Fitted
values [10^6]
0.2
0.5
2.0
5.0
1995
2000
2005
Year
b) Observed vs fitted values
1:1 line
Observed values [10^6]
Fitted values [10^6]
0.2
0.5
1.0
2.0
5.0
10.0
c) Standardised residuals over time
Standardised Residuals
−2
0
2
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
−0.4
0.0
0.2
0.4
Lag (yrs)
2
4
6
8
10
12

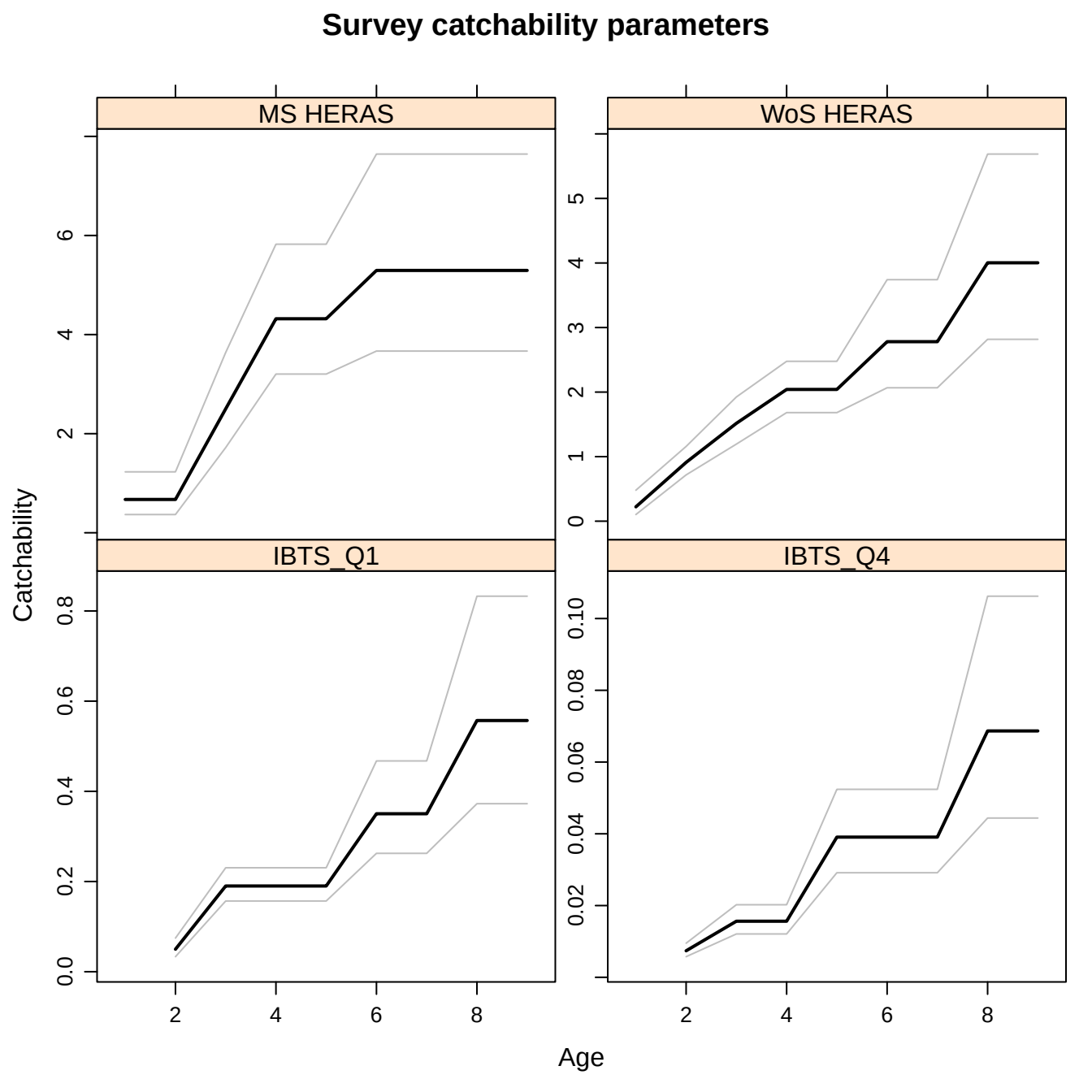

Herring in VIa (combined) and VIIbc Diagnostics − WoS HERAS, age 5
a) Observed and fitted values time series
Observed
Fitted
values [10^6]
0.05
0.20
1.00
5.00
1995
2000
2005
Year
b) Observed vs fitted values
1:1 line
Observed values [10^6]
Fitted values [10^6]
0.05
0.10
0.20
0.50
1.00
2.00
5.00
10.00
c) Standardised residuals over time
Standardised Residuals
−3
−1
0
1
2
3
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
−0.4
0.0
0.2
0.4
Lag (yrs)

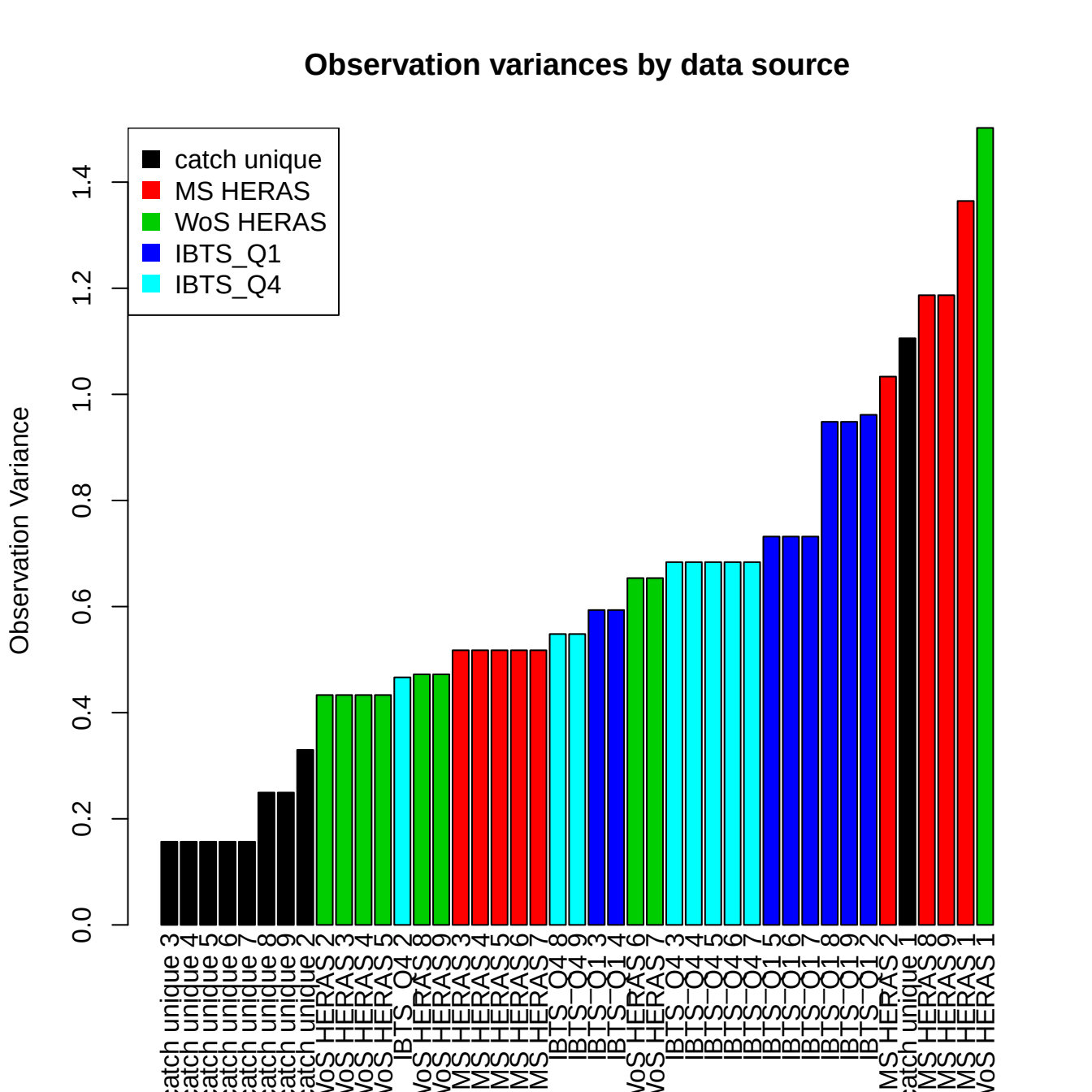

Herring in VIa (combined) and VIIbc Diagnostics − WoS HERAS, age 6
a) Observed and fitted values time series
Observed
Fitted
values [10^6]
0.05
0.20
1.00
5.00
1995
2000
2005
Year
b) Observed vs fitted values
1:1 line
Observed values [10^6]
Fitted values [10^6]
0.05
0.10
0.20
0.50
1.00
2.00
5.00
c) Standardised 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
−0.4
0.0
0.2
0.4
Lag (yrs)
2
4
6
8
10
12

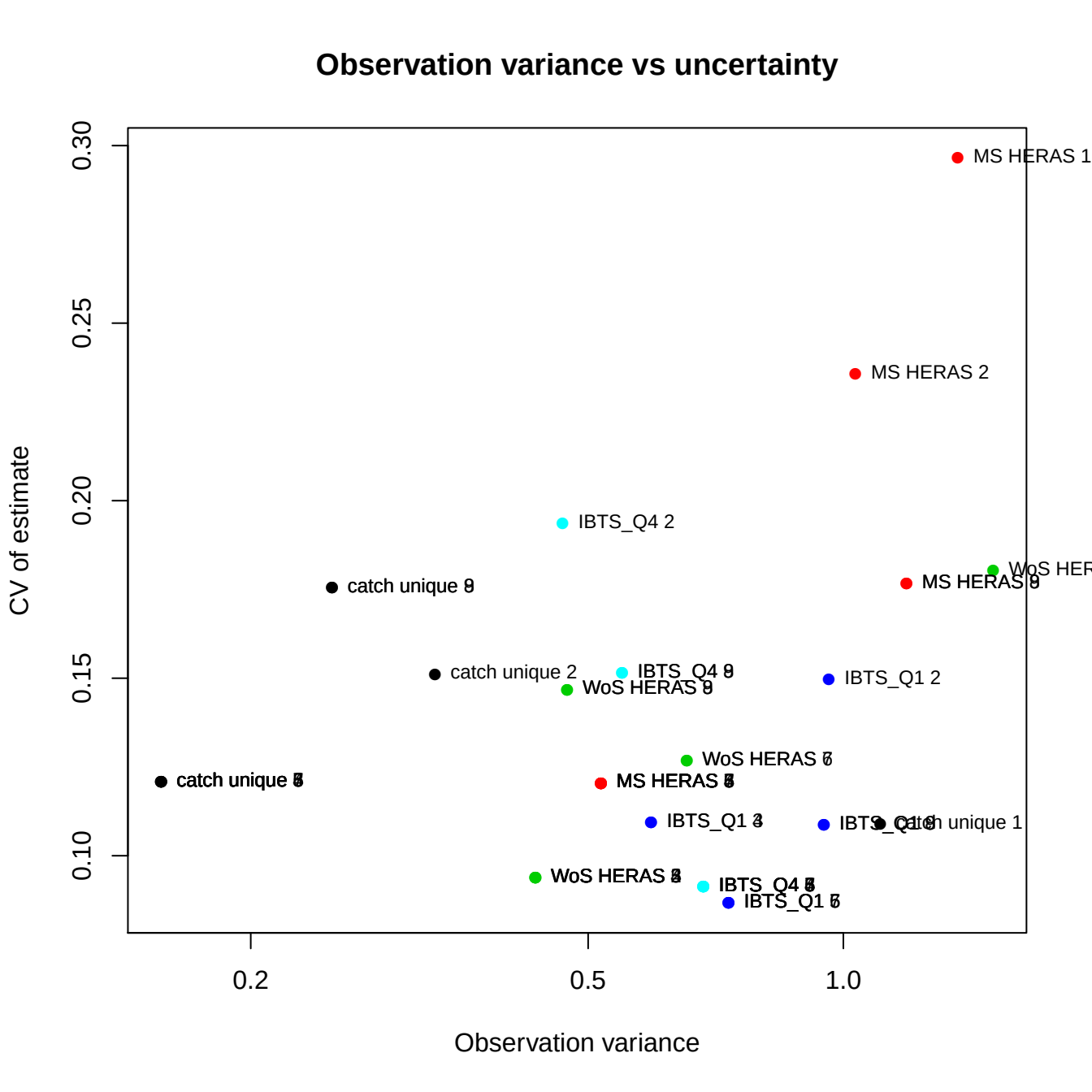

Herring in VIa (combined) and VIIbc Diagnostics − WoS HERAS, age 7
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)


Herring in VIa (combined) and VIIbc Diagnostics − WoS HERAS, age 8
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
10
50
200
1000
1995
2000
2005
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
10
20
50
100
200
500
1000
2000
c) Standardised residuals over time
Standardised Residuals
−2
−1
0
1
2
d) Tukey−Anscombe plot
e) Normal Q−Q plot
qqline
Quantiles of the Normal Distribution
f) Autocorrelation of Residuals
95% Conf. Int.
ACF
−0.4
0.0
0.2
0.4
Lag (yrs)
2
4
6
8
10
12

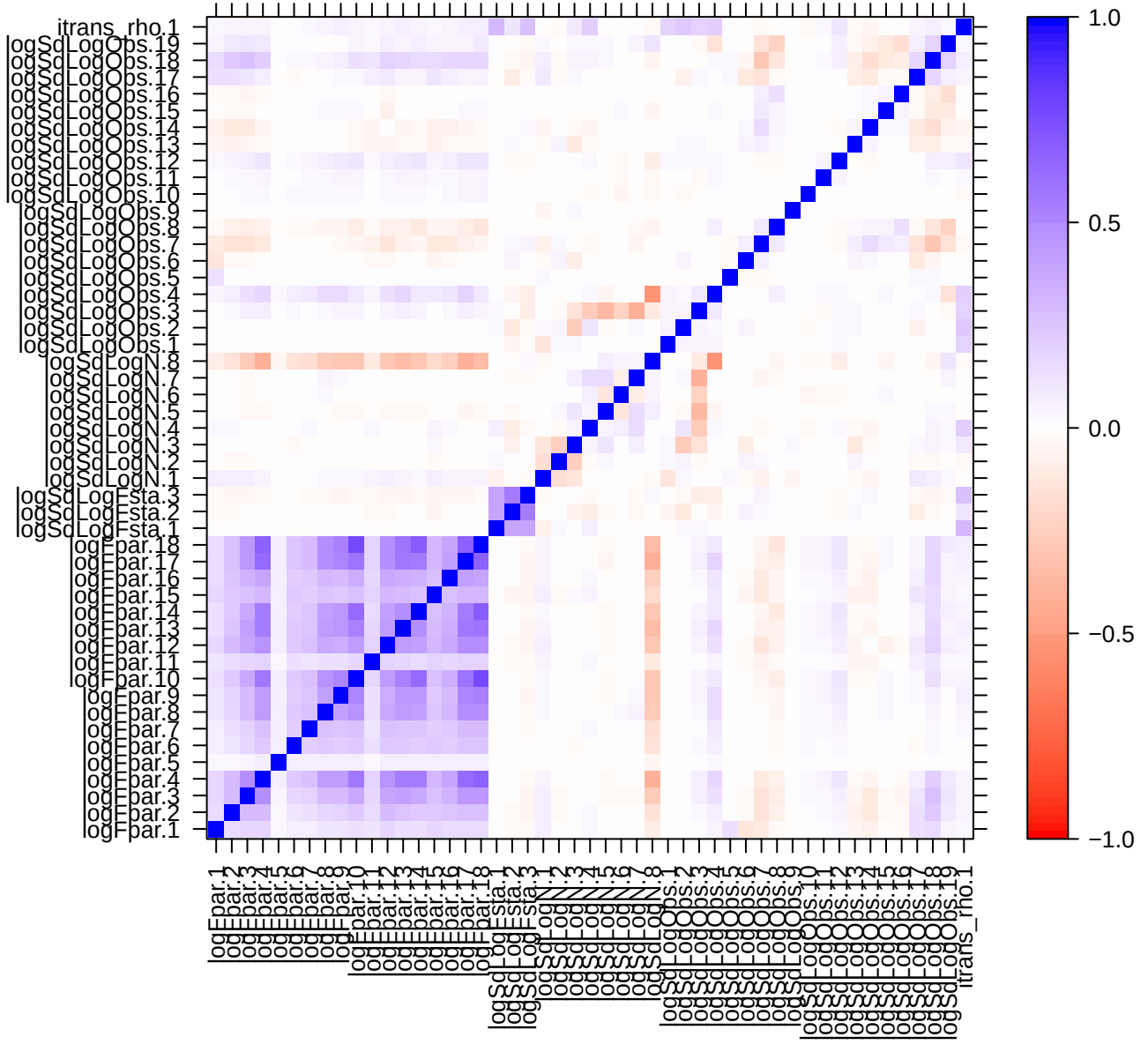

Herring in VIa (combined) and VIIbc Diagnostics − WoS HERAS, age 9
a) Observed and fitted values time series
Observed
Fitted
values [10^3]
Year
b) Observed vs fitted values
1:1 line
Observed values [10^3]
Fitted values [10^3]
c) Standardised residuals over time
Standardised Residuals
Year
d) Tukey−Anscombe plot
Standardised Residuals
Fitted values [10^3]
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)

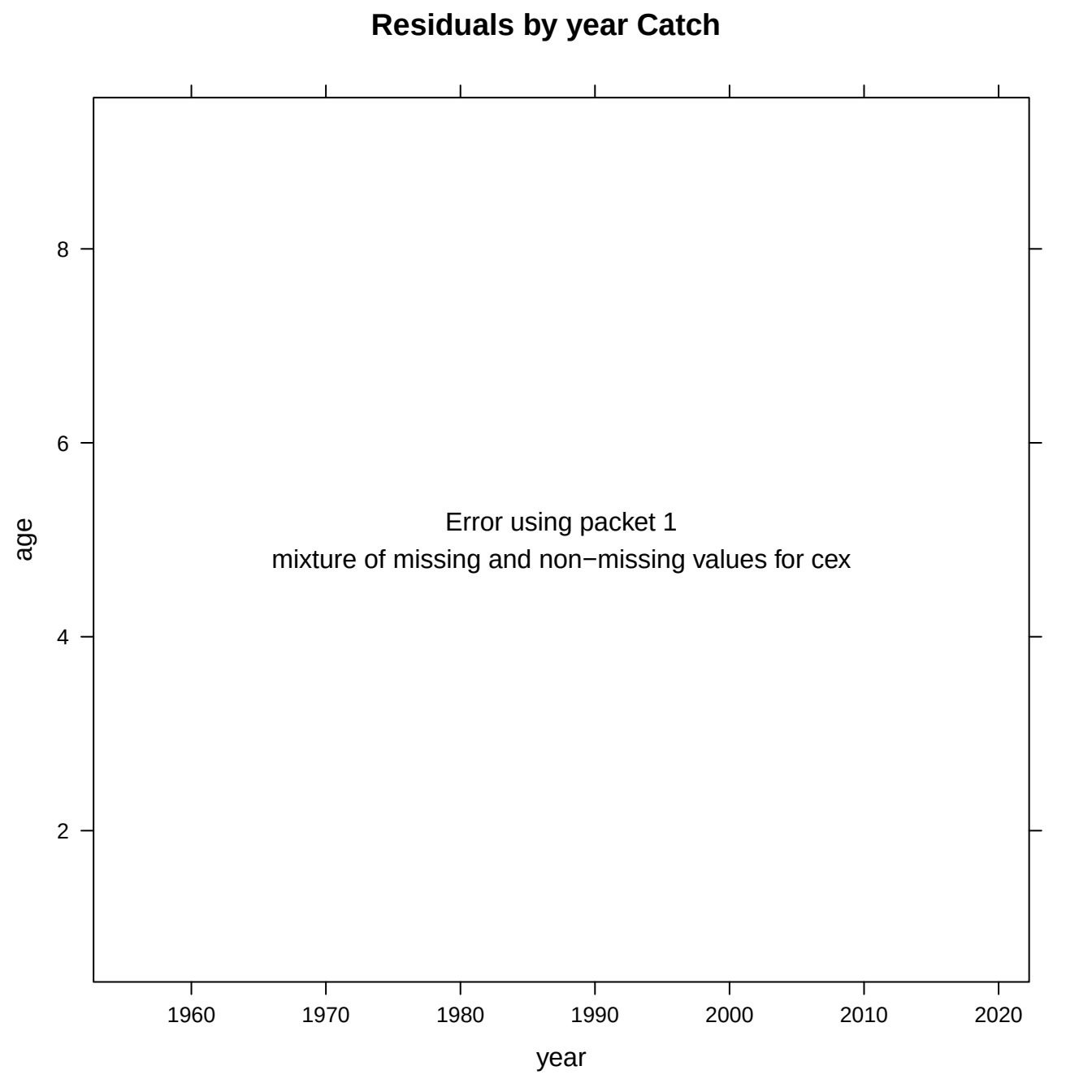

Survey catchability parameters
MS HERAS
WoS HERAS
IBTS_Q1
IBTS_Q4
Catchability
Age
0.0
0.2
0.4
0.6
0.8
0.02
0.04
0.06
0.08
0.10
0
1
2
3
4
5
2
4
6
8

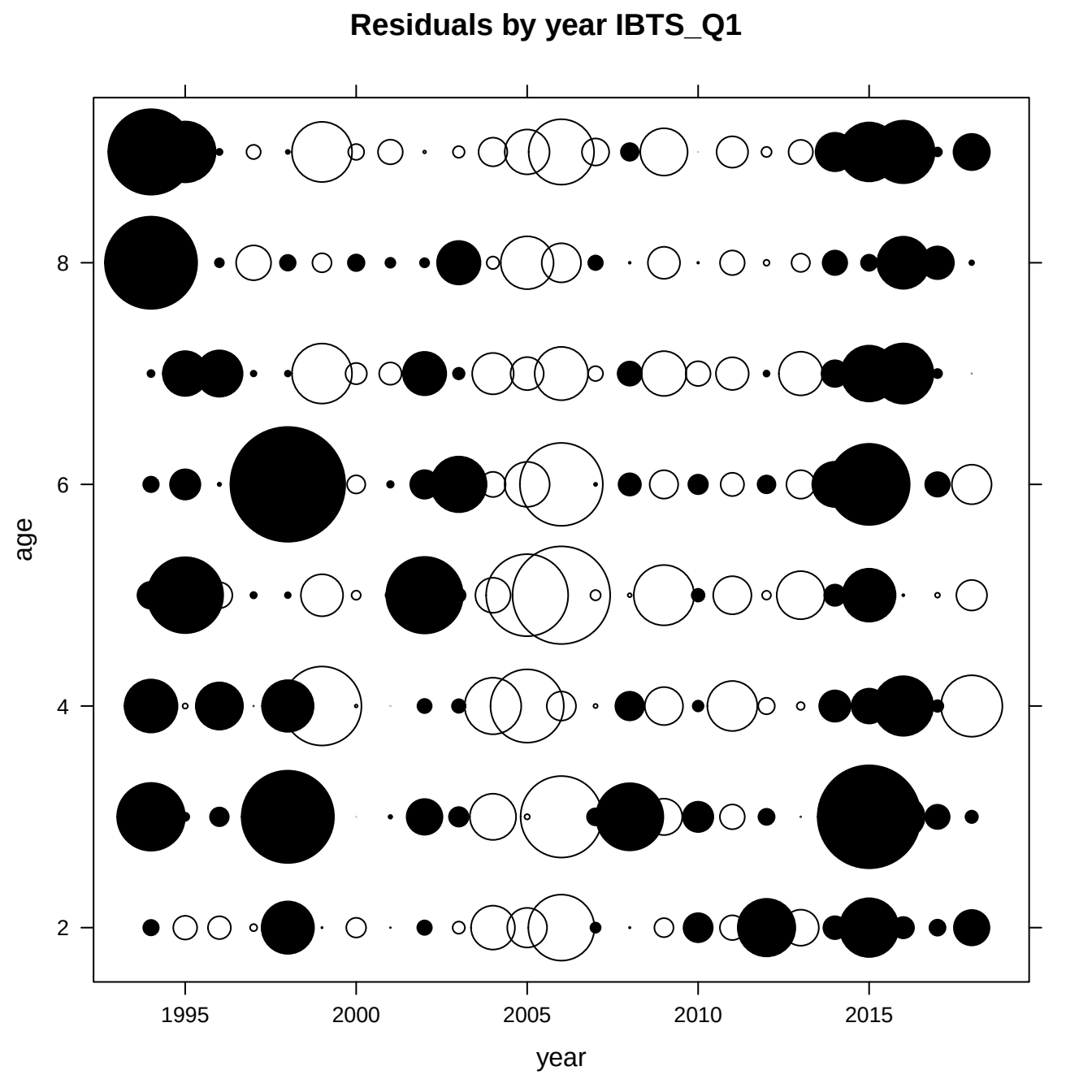

Observation variances by data source
Observation Variance
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
catch unique
MS HERAS
WoS HERAS
IBTS_Q1
IBTS_Q4
catch unique 3
catch unique 4
catch unique 5
catch unique 6
catch unique 7
catch unique 8
catch unique 9
catch unique 2
WoS HERAS 2
WoS HERAS 3
WoS HERAS 4
WoS HERAS 5
IBTS_Q4 2
WoS HERAS 8
WoS HERAS 9
MS HERAS 3
MS HERAS 4
MS HERAS 5
MS HERAS 6
MS HERAS 7
IBTS_Q4 8
IBTS_Q4 9
IBTS_Q1 3
IBTS_Q1 4
WoS HERAS 6
WoS HERAS 7
IBTS_Q4 3
IBTS_Q4 4
IBTS_Q4 5
IBTS_Q4 6
IBTS_Q4 7
IBTS_Q1 5
IBTS_Q1 6
IBTS_Q1 7
IBTS_Q1 8
IBTS_Q1 9
IBTS_Q1 2
MS HERAS 2
catch unique 1
MS HERAS 8
MS HERAS 9
MS HERAS 1
WoS HERAS 1

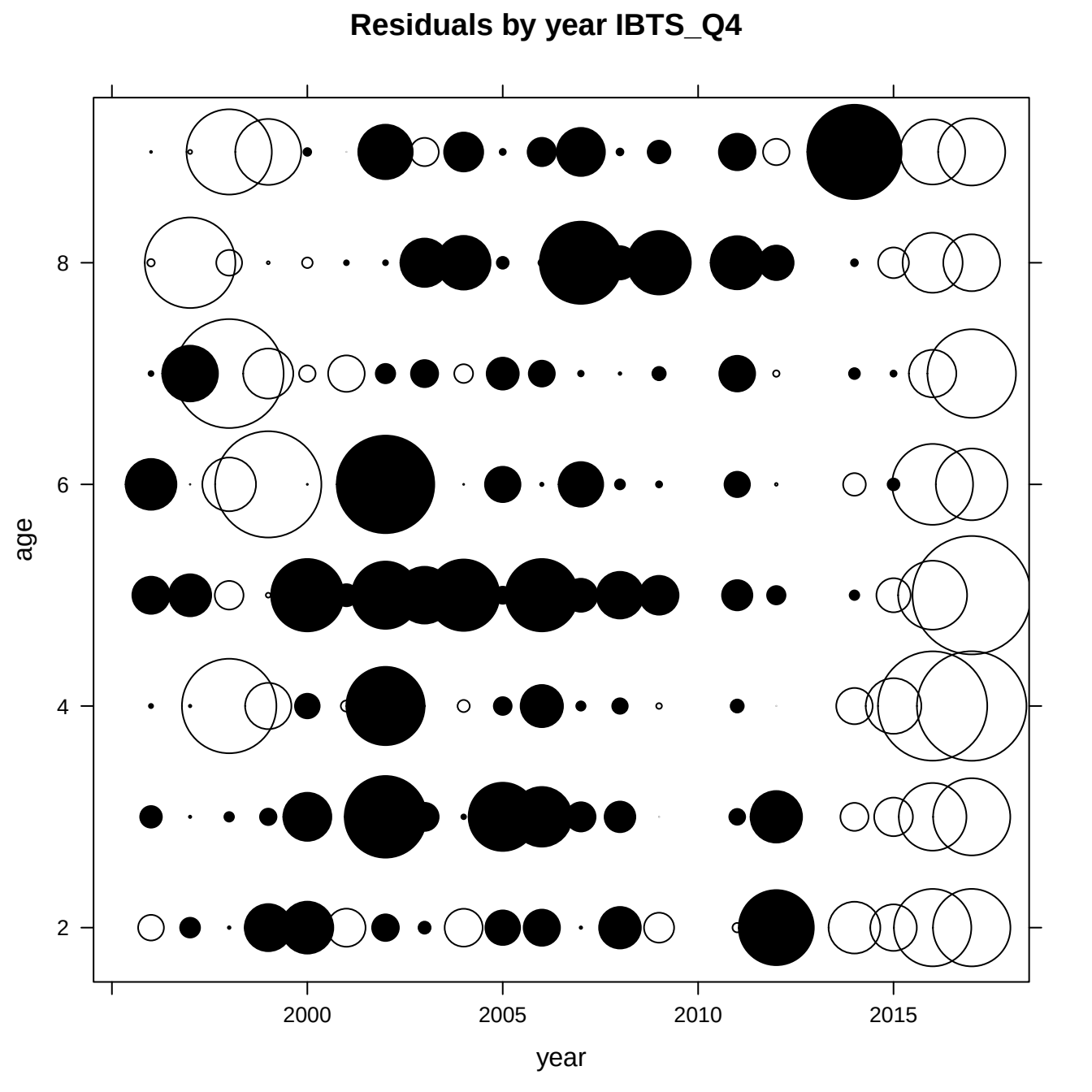

Observation variance vs uncertainty
CV of estimate
0.30
0.25
0.20
0.15
0.10
0.2
0.5
1.0
Observation variance
MS HERAS 1
MS HERAS 2
IBTS_Q4 2
WoS HER
MS HERAS 9
catch unique 9
catch unique 2
IBTS_Q4 9
WoS HERAS 9
IBTS_Q1 2
WoS HERAS 7
catch unique 5
MS HERAS 5
IBTS_Q1 4
IBTS_Q1 5
catch unique 1
WoS HERAS 4
IBTS_Q4 5
IBTS_Q1 7

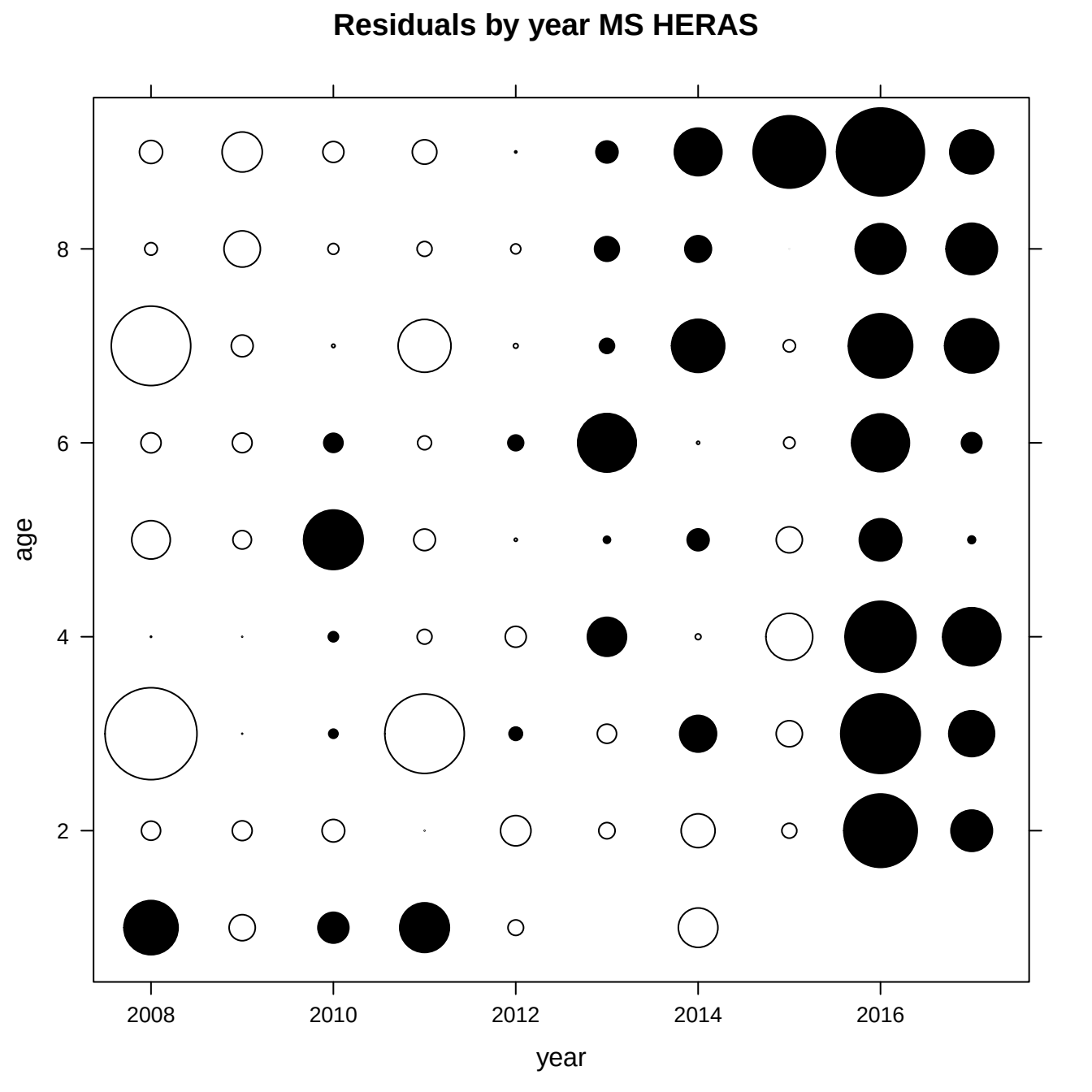
Herring in VIa (combined) and VIIbc

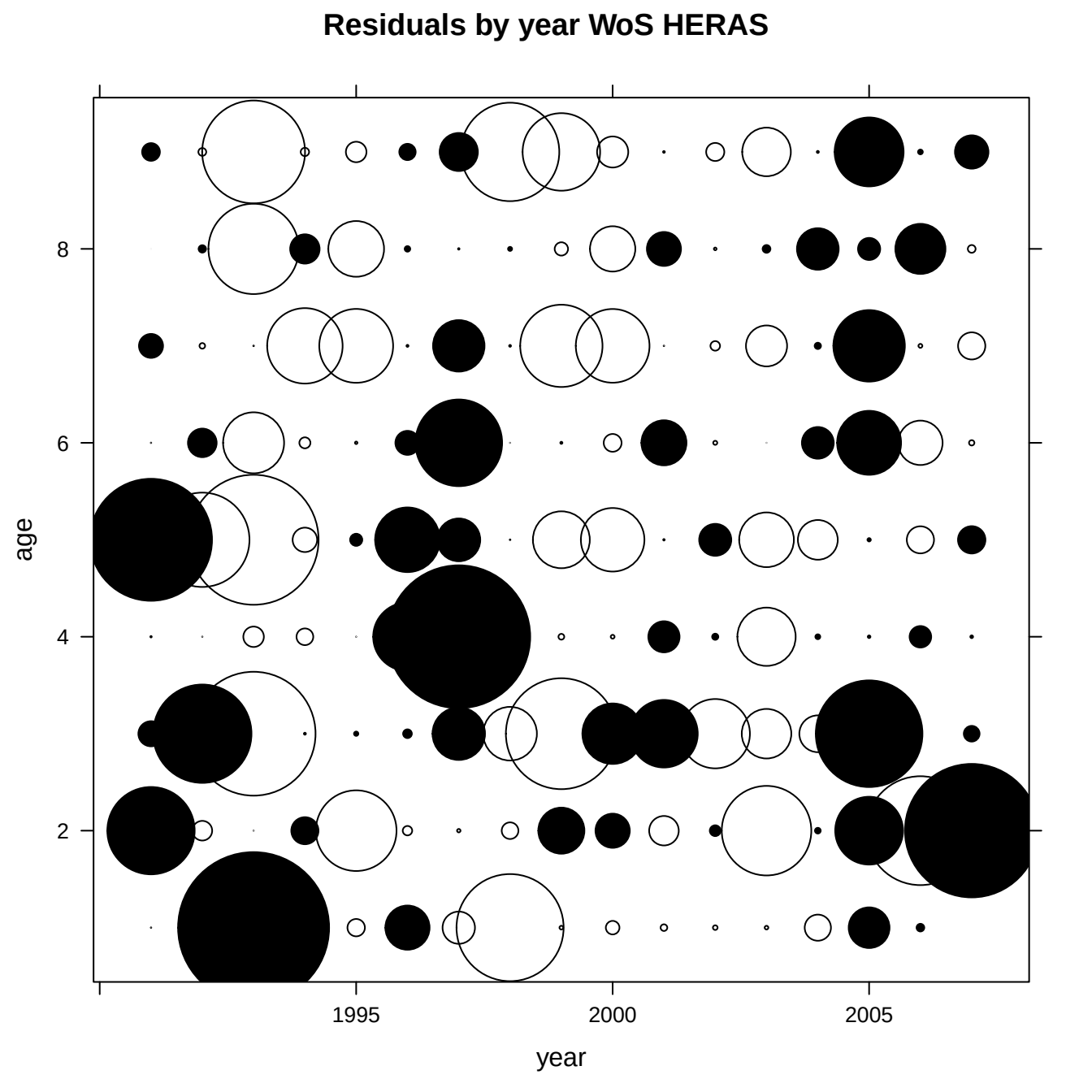


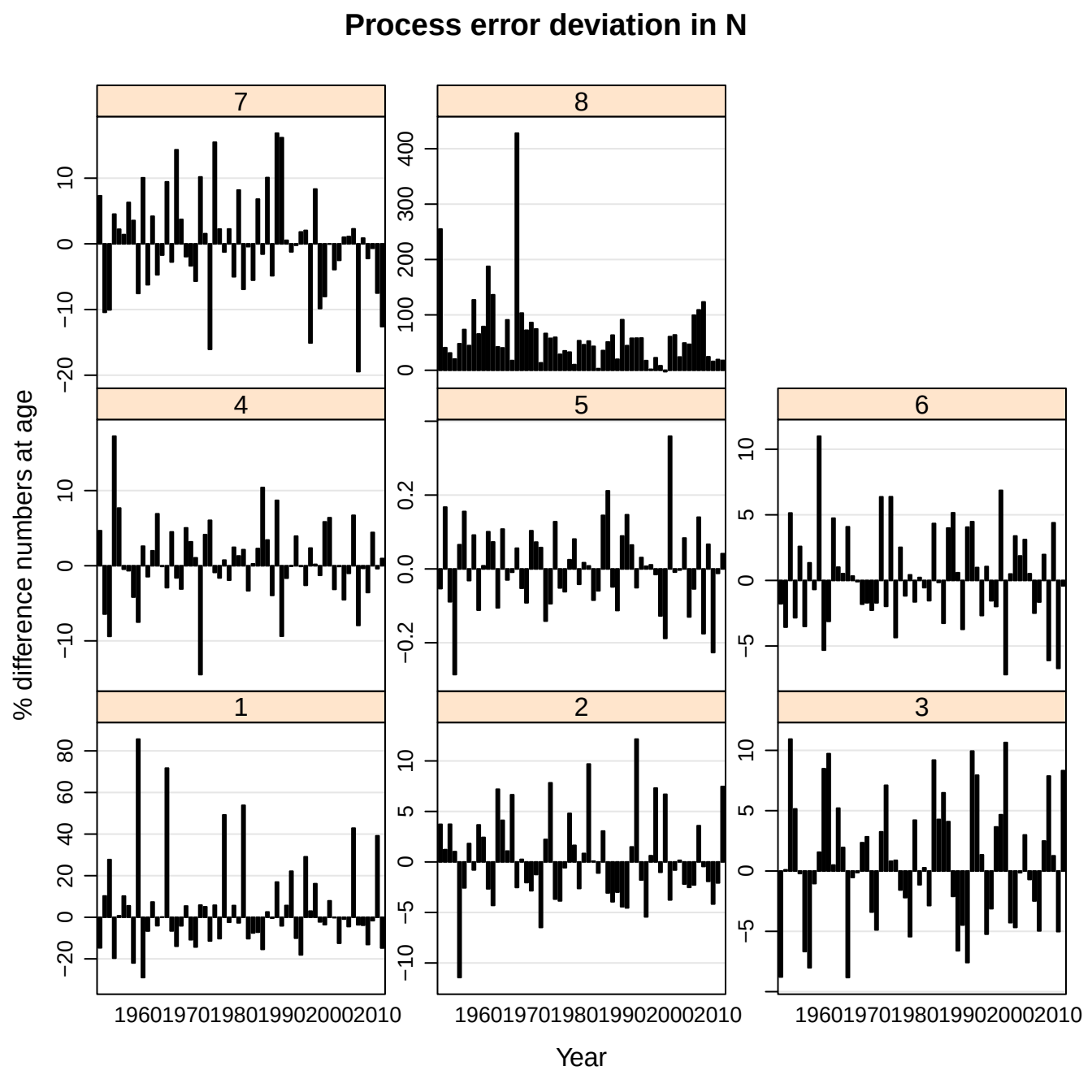

Residuals by year Catch
Error using packet 1
mixture of missing and non−missing values for cex
age
year
2
4
6
8
1960
1970
1980
1990
2000
2010
2020

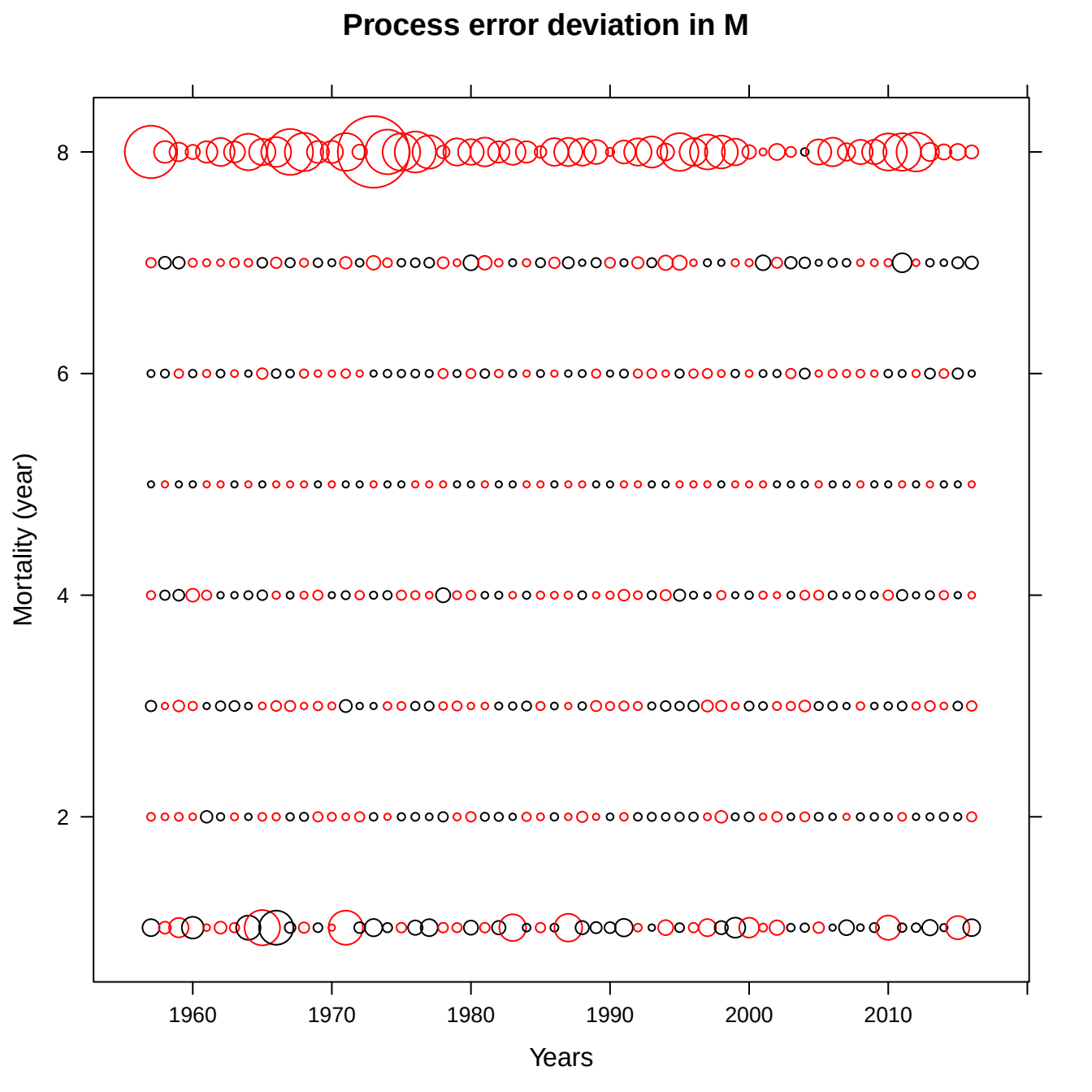

Residuals by year IBTS_Q1
age
8
6
4
2
1995
2000
2005
2010
2015
year


Residuals by year IBTS_Q4
age
8
6
4
2
2000
2005
2010
2015
year

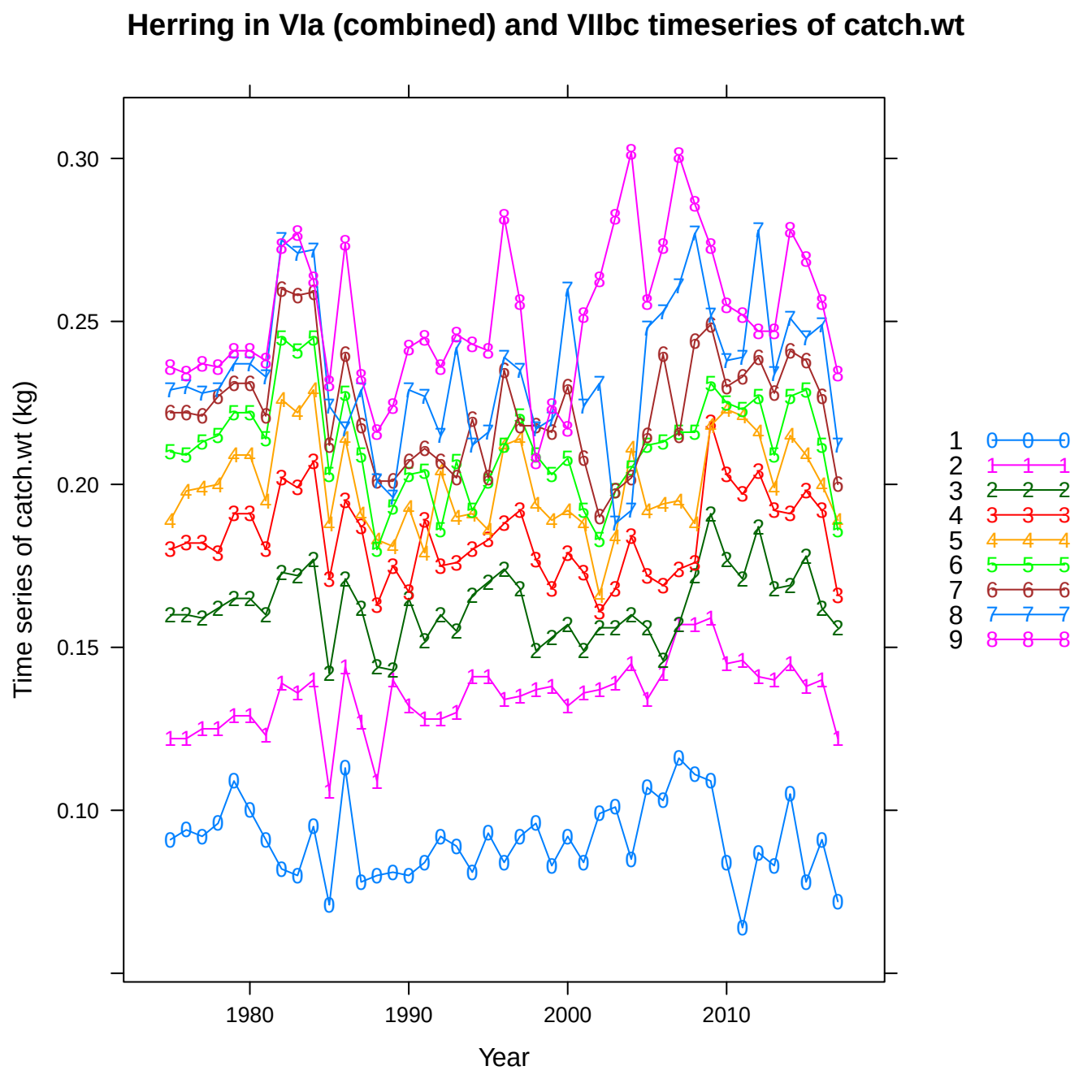

Residuals by year MS HERAS
age
8
6
4
2
2008
2010
2012
2014
2016
year

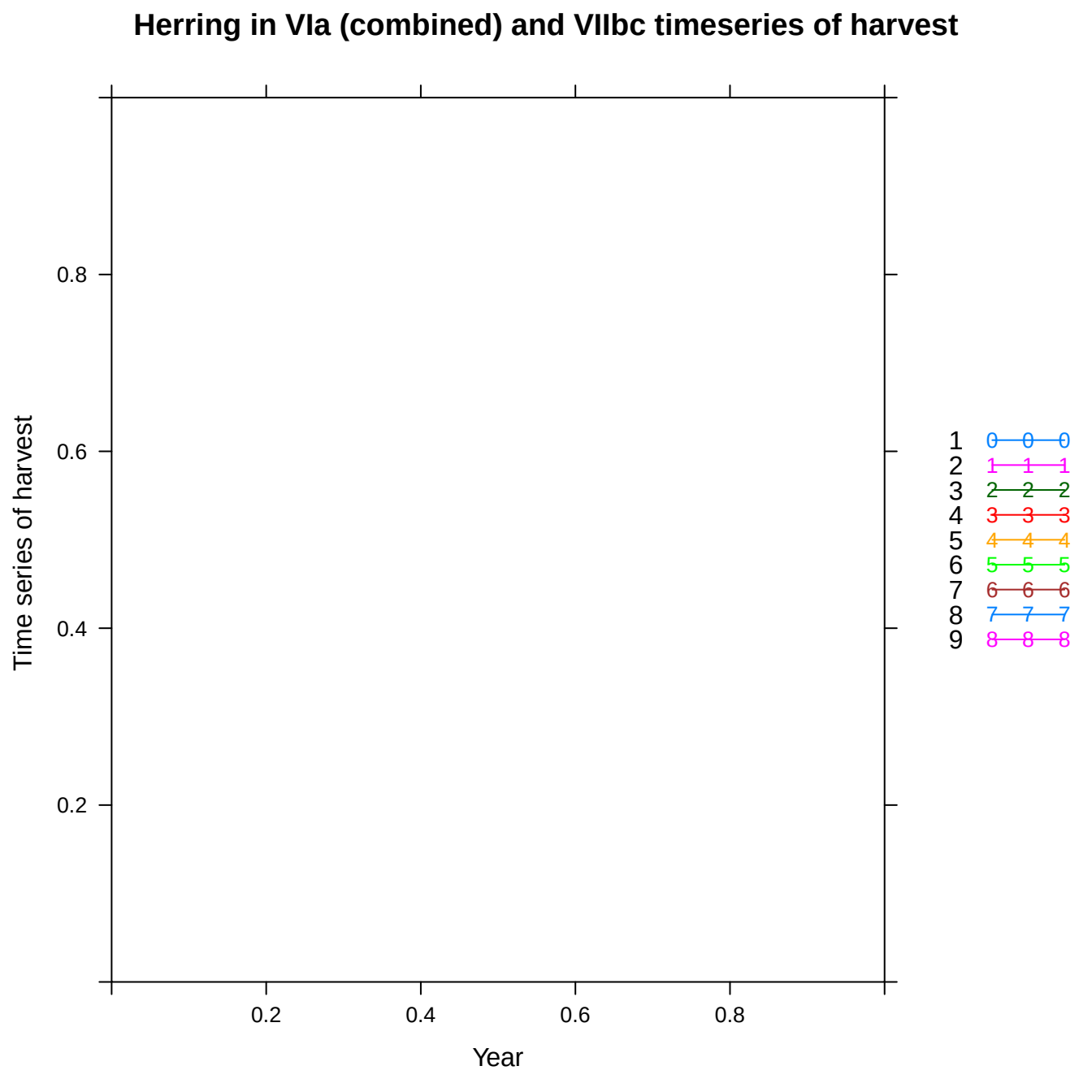

Residuals by year WoS HERAS
age
8
6
4
2
1995
2000
2005
year

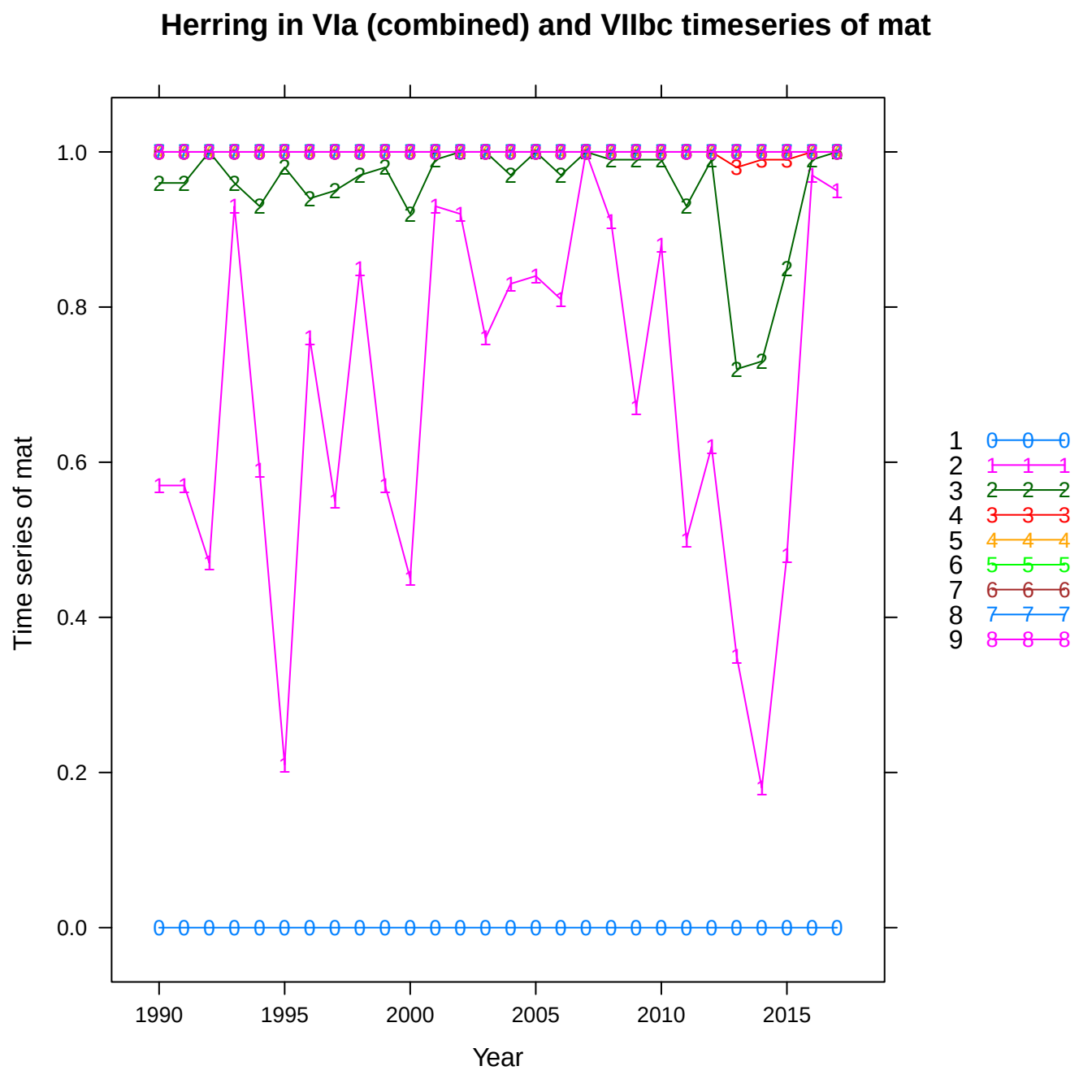

Process error deviation in N
7
8
4
5
6
1
2
3
% difference numbers at age
1960 1970 1980 1990 2000 2010
Year

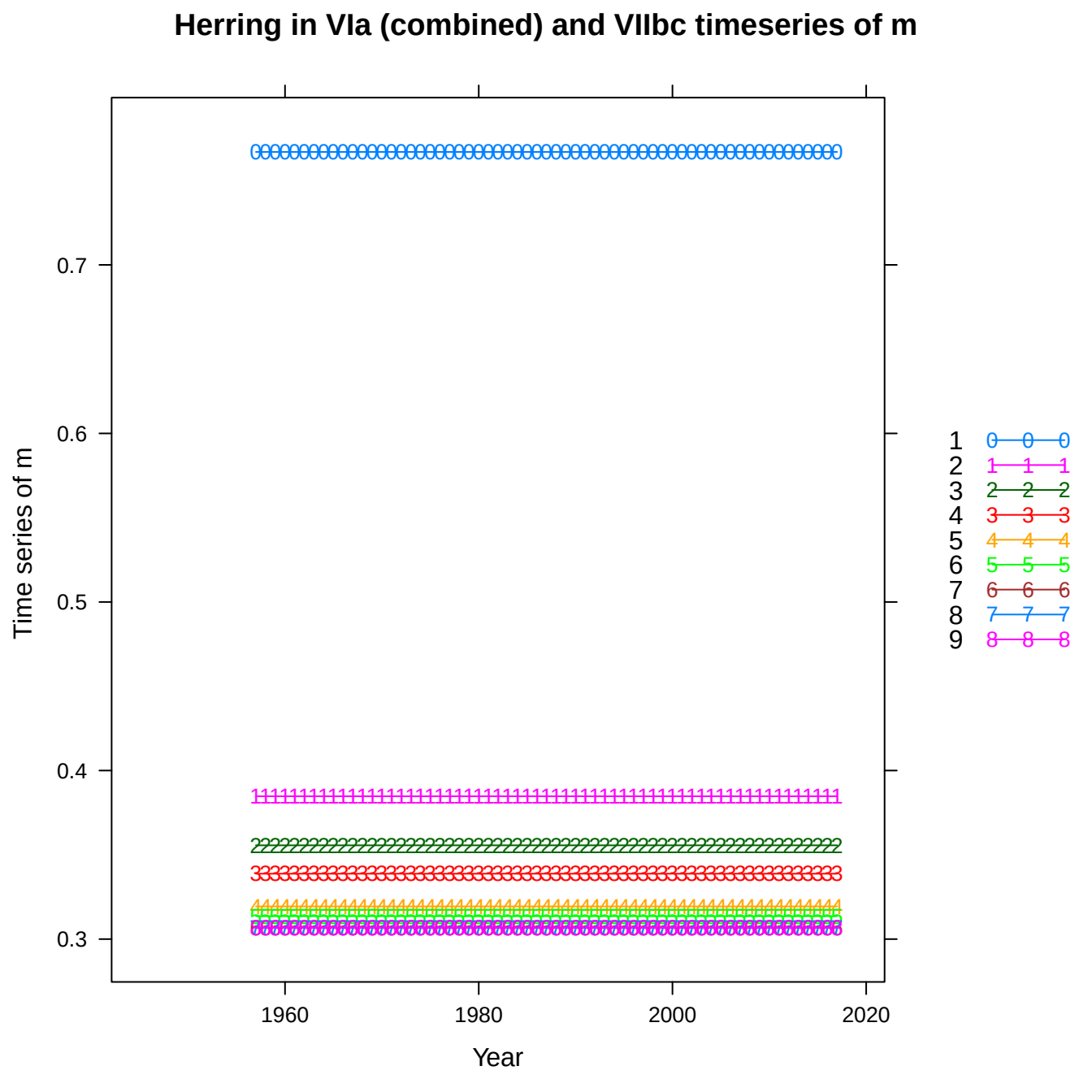

Process error deviation in M
Mortality (year)
8
6
4
2
1960
1970
1980
1990
2000
2010
Years

Herring in VIa (combined) and VIIbc timeseries of stock.wt
Time series of stock.wt (kg)
0.30
0.25
0.20
0.15
0.10
0.05
1980
1990
2000
2010
Year
1
2
3
4
5
6
7
8
9

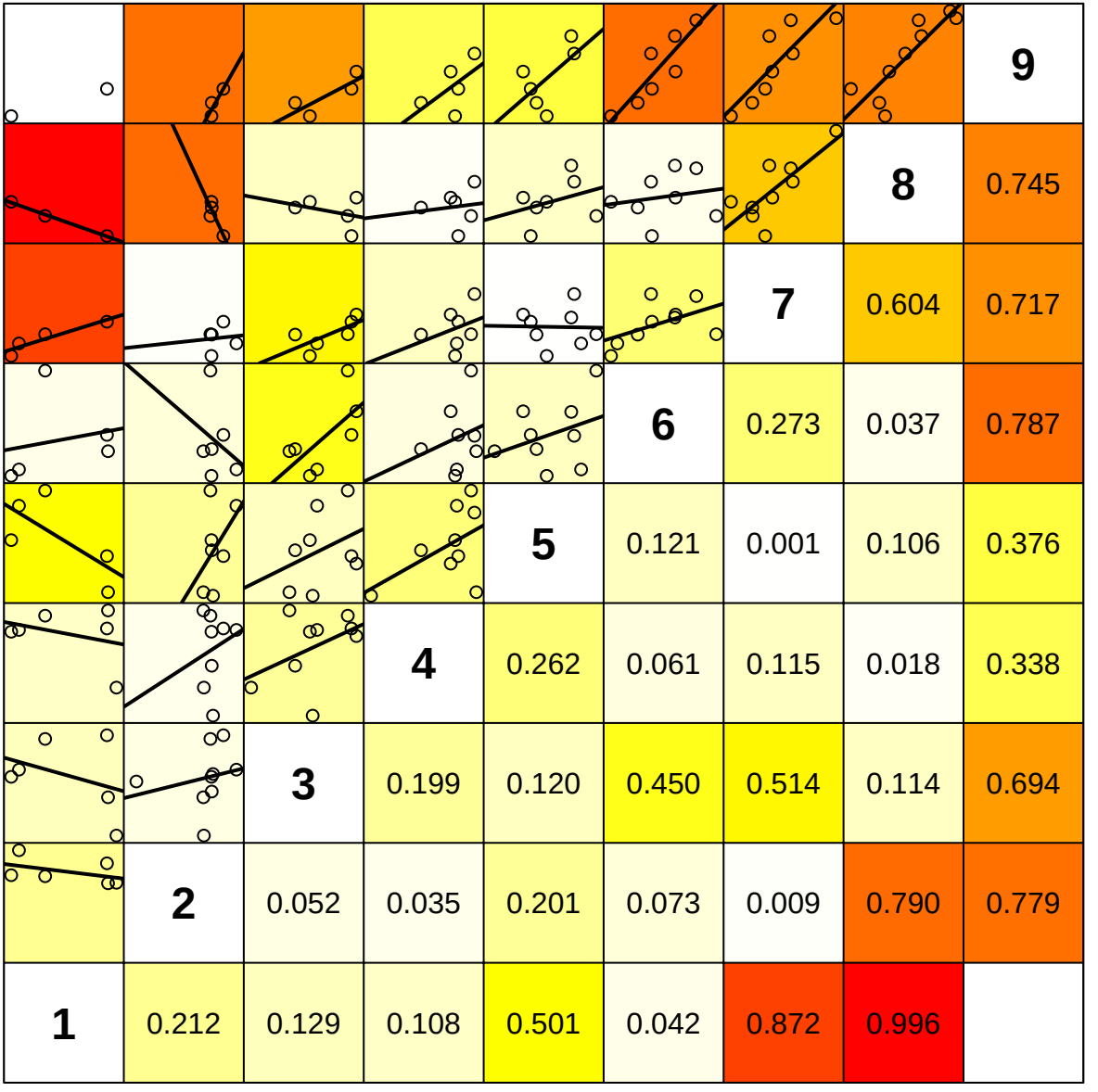

Herring in VIa (combined) and VIIbc timeseries of catch.wt
Time series of catch.wt (kg)
0.30
0.25
0.20
0.15
0.10
1980
1990
2000
2010
Year
1
2
3
4
5
6
7
8
9


Herring in VIa (combined) and VIIbc timeseries of harvest
Time series of harvest
0.8
0.6
0.4
0.2
0.2
0.4
0.6
0.8
Year
1 0 0 0
2 1 1 1
3 2 2 2
4 3 3 3
5 4 4 4
6 5 5 5
7 6 6 6
8 7 7 7
9 8 8 8


Herring in VIa (combined) and VIIbc timeseries of mat
Time series of mat
Year
1990
1995
2000
2005
2010
2015
0.0
0.2
0.4
0.6
0.8
1.0
1 0 0 0
2 1 1 1
3 2 2 2
4 3 3 3
5 4 4 4
6 5 5 5
7 6 6 6
8 7 7 7
9 8 8 8


Herring in VIa (combined) and VIIbc timeseries of m
Time series of m
0.3
0.4
0.5
0.6
0.7
1960
1980
2000
2020
Year
1 0 0 0
2 1 1 1
3 2 2 2
4 3 3 3
5 4 4 4
6 5 5 5
7 6 6 6
8 7 7 7
9 8 8 8

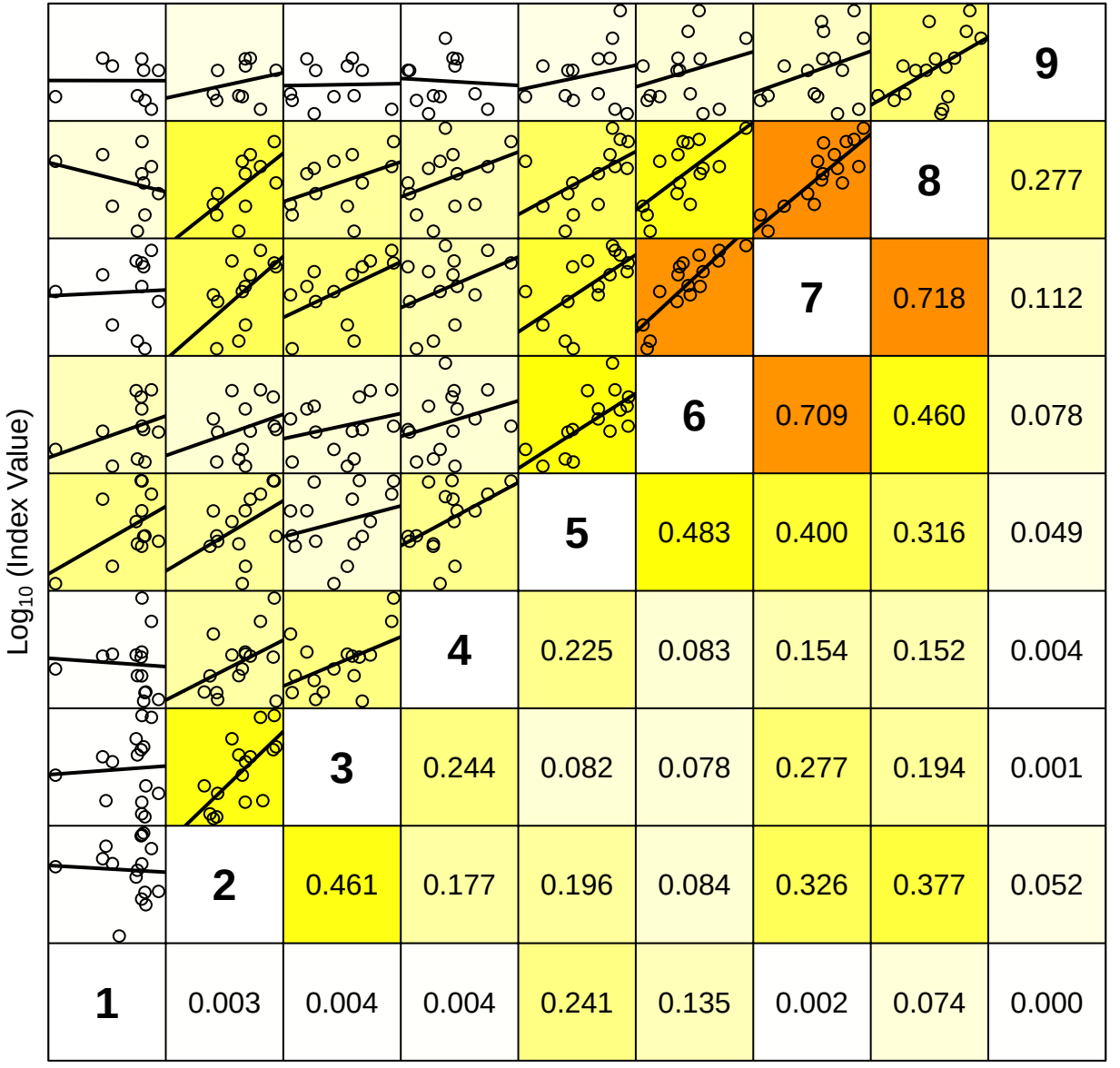
MS HERAS

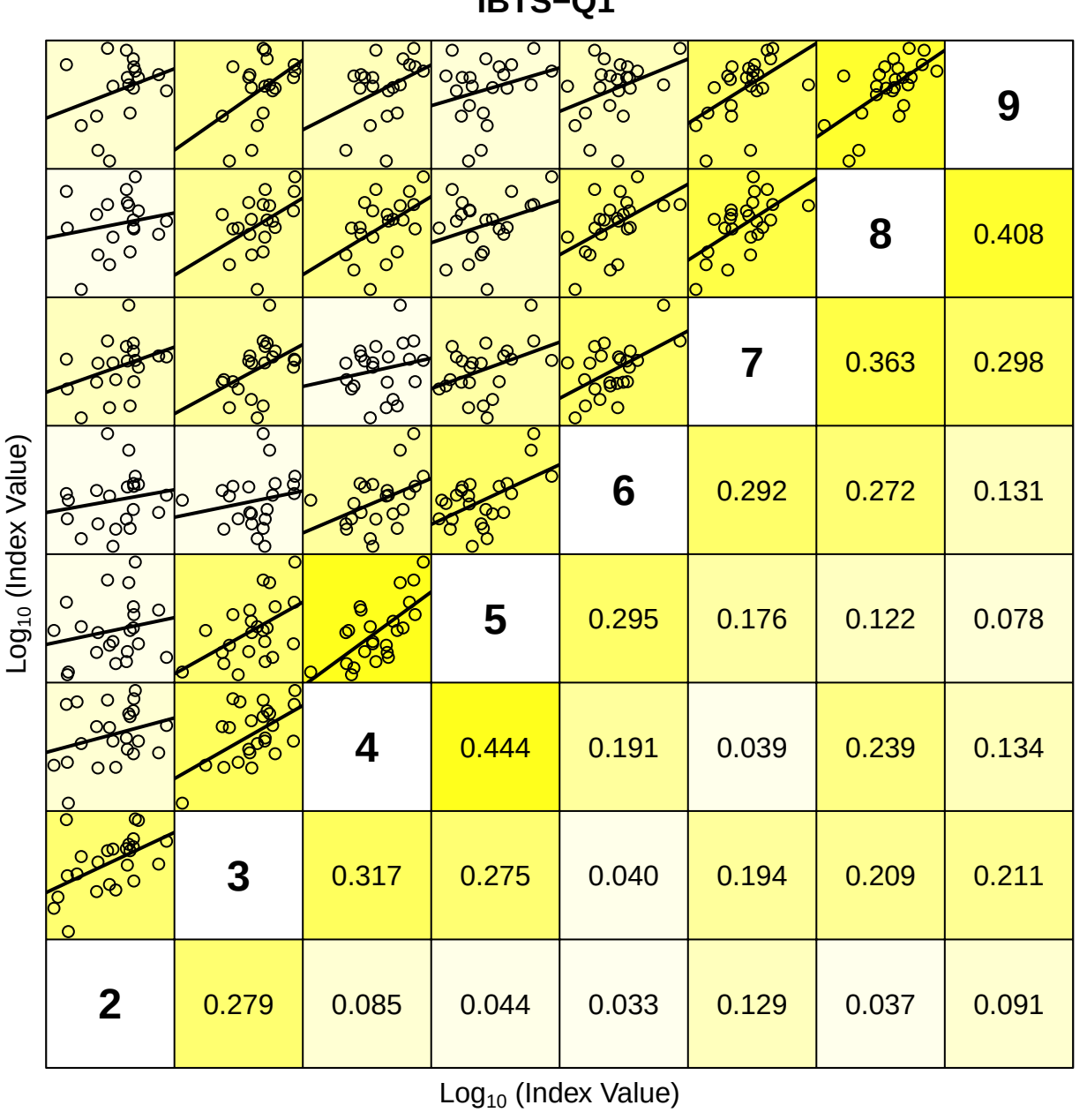


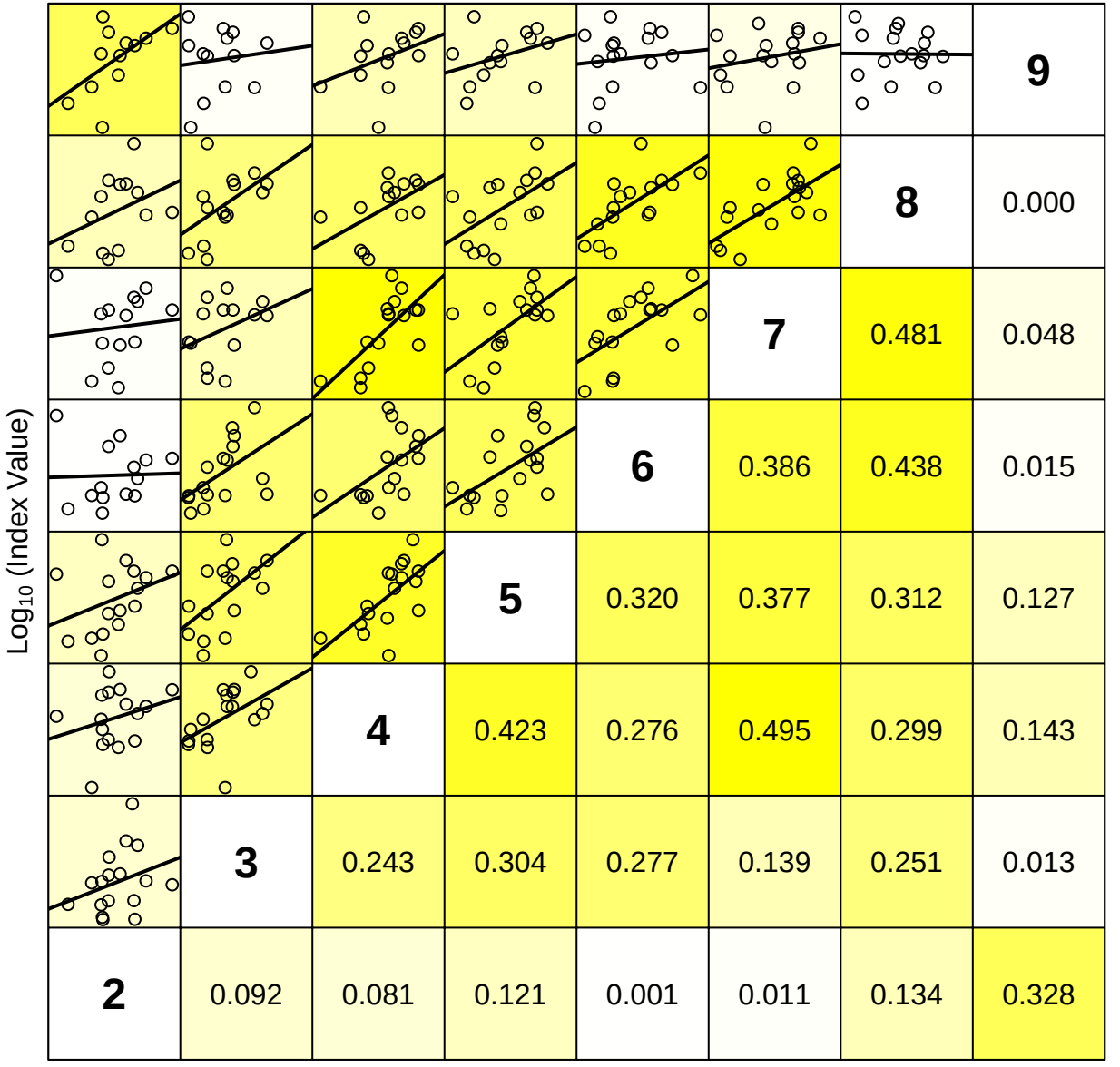
Log_{10} (Index Value)

Log_{10} (Index Value)

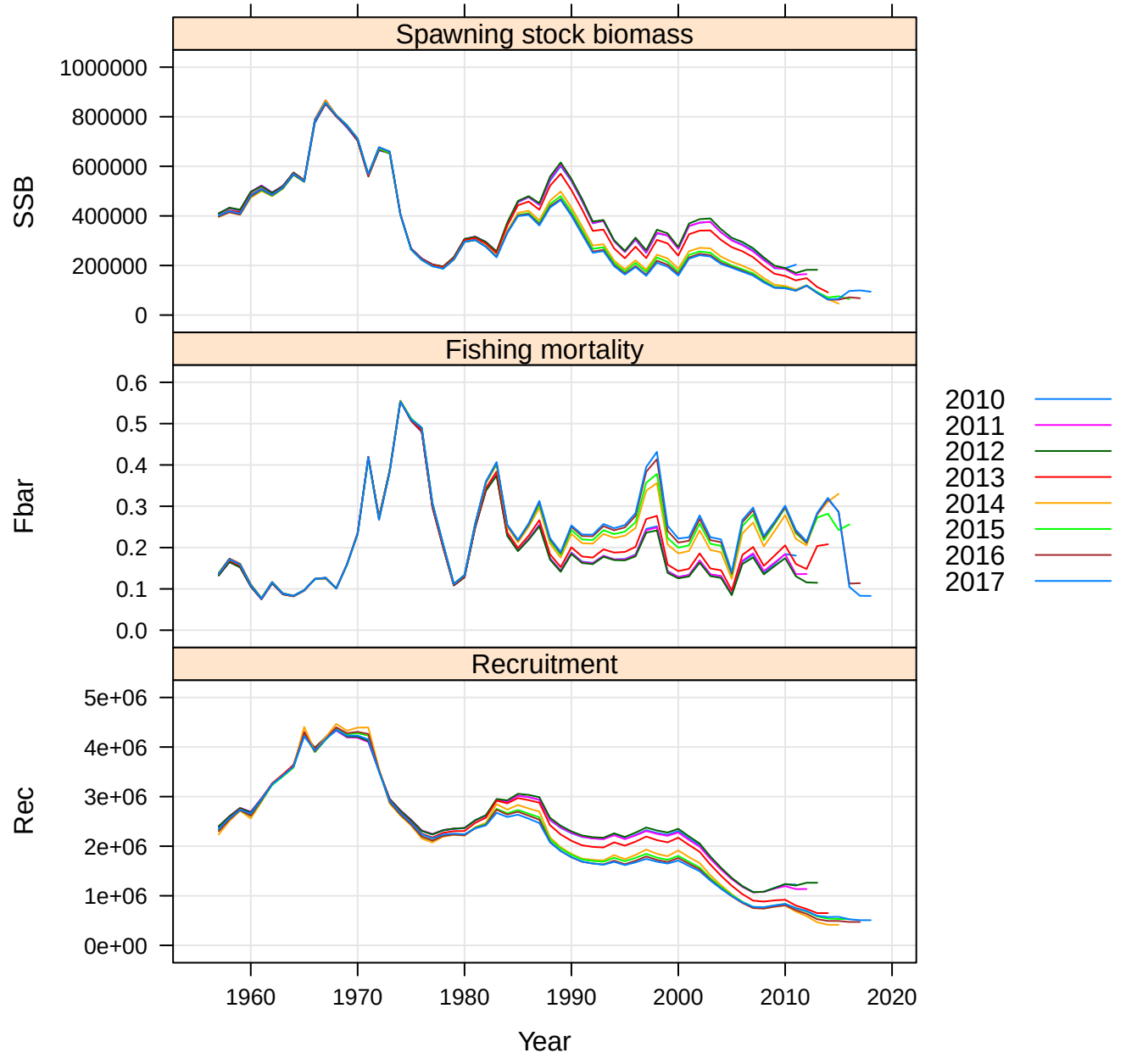
Lower right panels show the Coefficient of Determination (r^2)

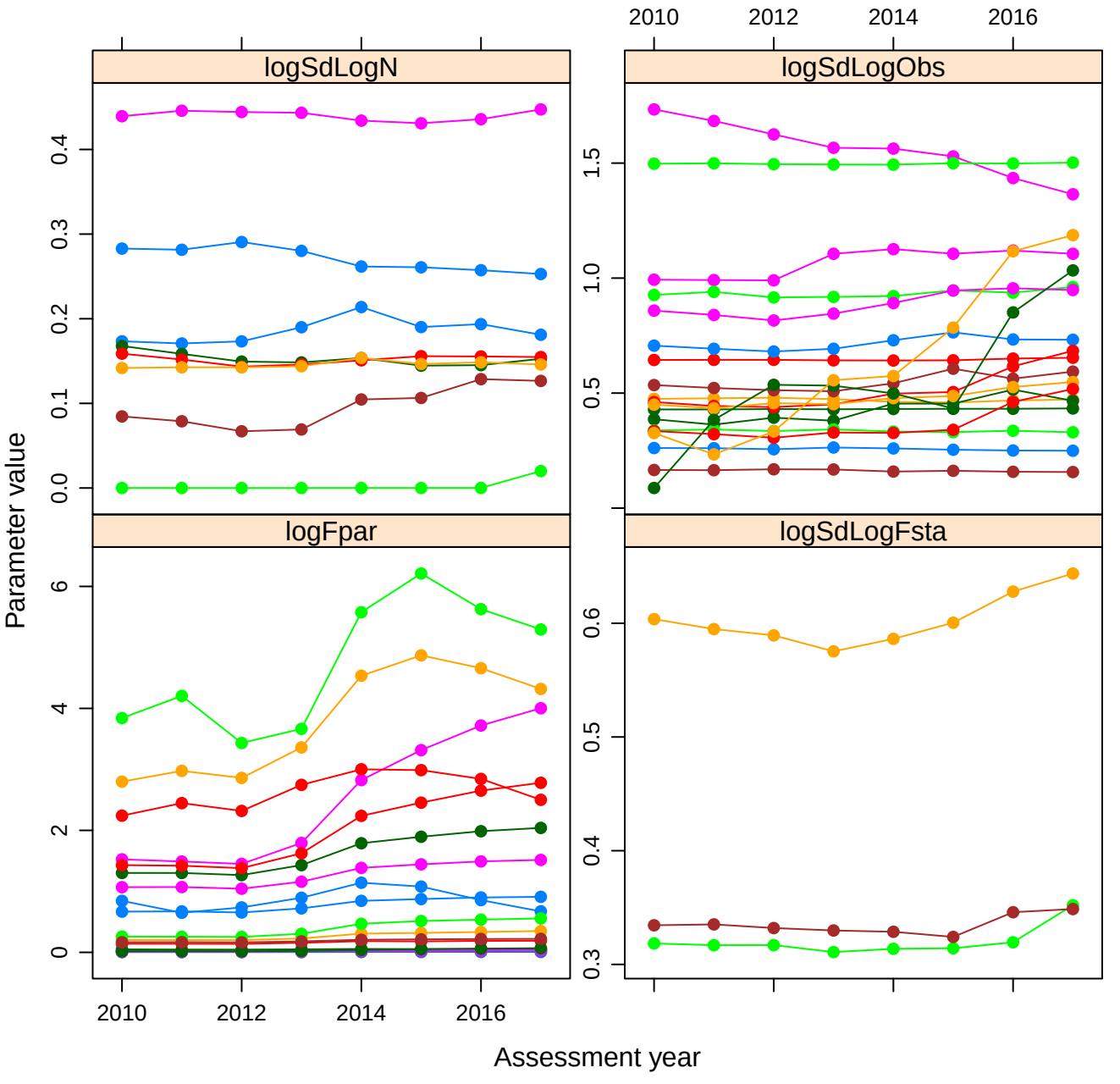

WoS HERAS
Log10 (Index Value)
Log10 (Index Value)
Lower right panels show the Coefficient of Determination (r2)
9
8 0.277
7 0.718 0.112
6 0.709 0.460 0.078
5 0.483 0.400 0.316 0.049
4 0.225 0.083 0.154 0.152 0.004
3 0.244 0.082 0.078 0.277 0.194 0.001
2 0.461 0.177 0.196 0.084 0.326 0.377 0.052
1 0.003 0.004 0.004 0.241 0.135 0.002 0.074 0.000

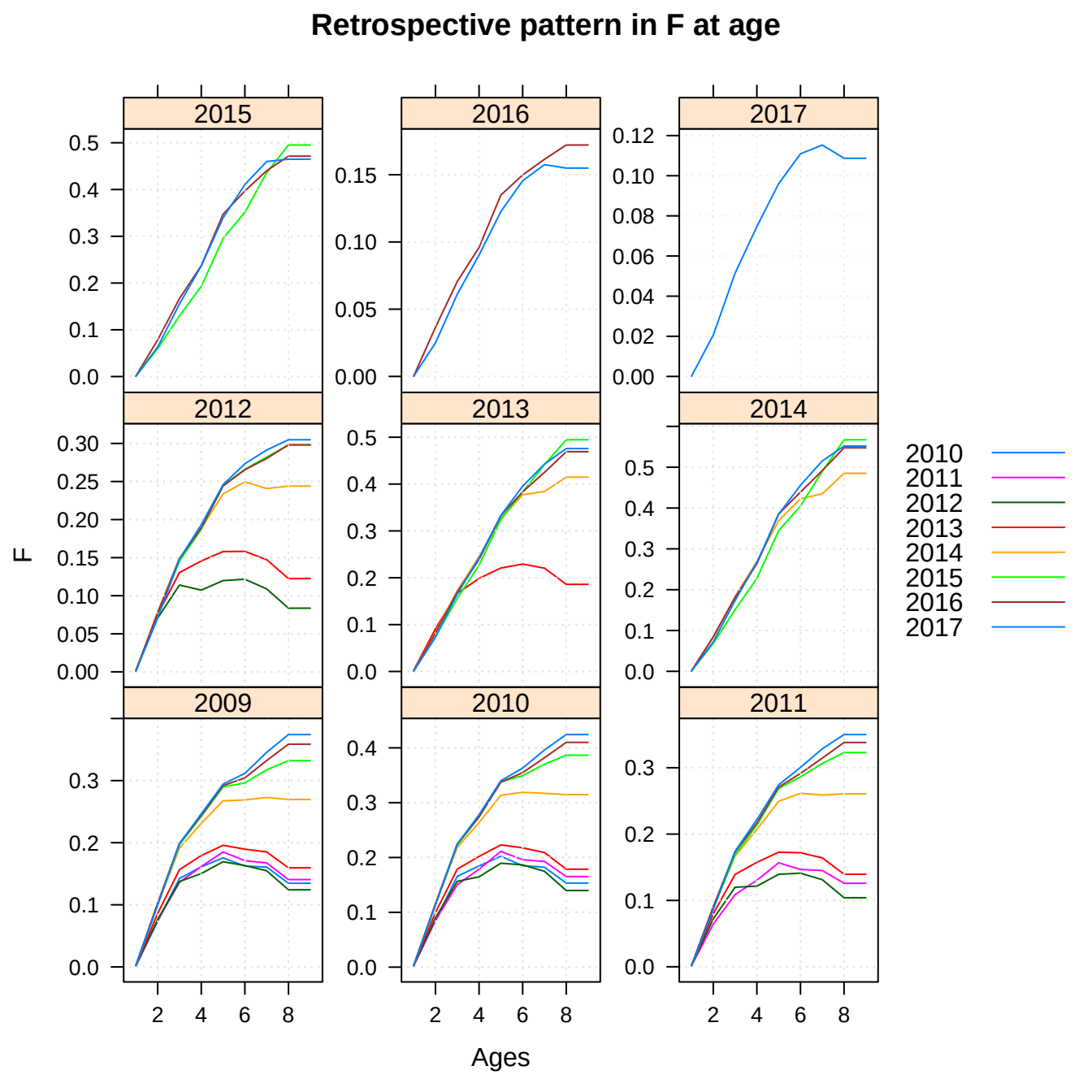

IBTS−Q1
9
8
0.408
7
0.363
0.298
6
0.292
0.272
0.131
5
0.295
0.176
0.122
0.078
4
0.444
0.191
0.039
0.239
0.134
3
0.317
0.275
0.040
0.194
0.209
0.211
2
0.279
0.085
0.044
0.033
0.129
0.037
0.091
Log10 (Index Value)
Log10 (Index Value)
Lower right panels show the Coefficient of Determination (r2)



Lower right panels show the Coefficient of Determination (r^2)


Spawning stock biomass
SSB
1000000
800000
600000
400000
200000
0
Fishing mortality
Fbar
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Recruitment
Rec
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
1960
1970
1980
1990
2000
2010
2020
Year
2010
2011
2012
2013
2014
2015
2016
2017


logSdLogN
logSdLogObs
logFpar
logSdLogFsta
Parameter value
Assessment year
2010
2012
2014
2016
0.0
0.1
0.2
0.3
0.4
0.5
1.0
1.5
0
2
4
6
0.3
0.4
0.5
0.6


Retrospective pattern in F at age
2015
2016
2017
2012
2013
2014
2009
2010
2011
F
Ages
2010
2011
2012
2013
2014
2015
2016
2017