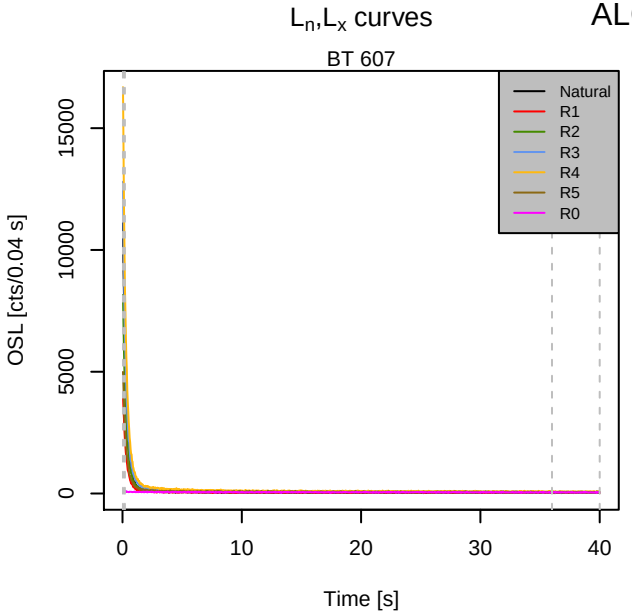
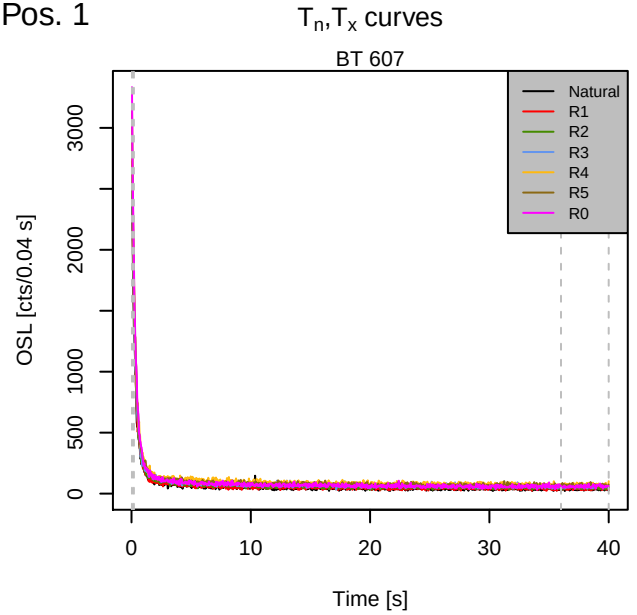
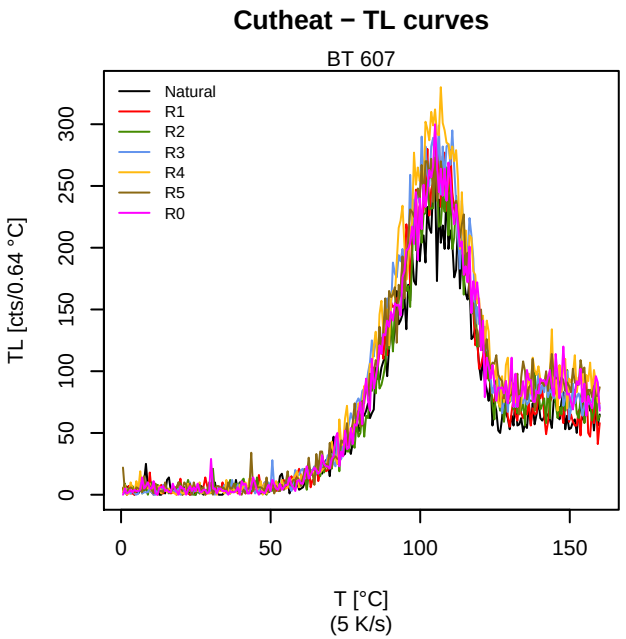
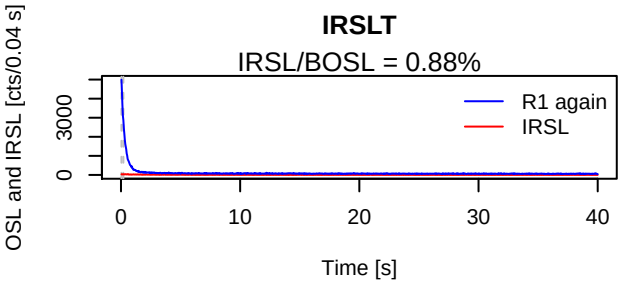
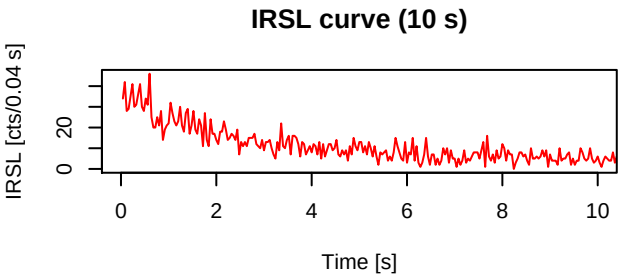
ALQ Pos. 1





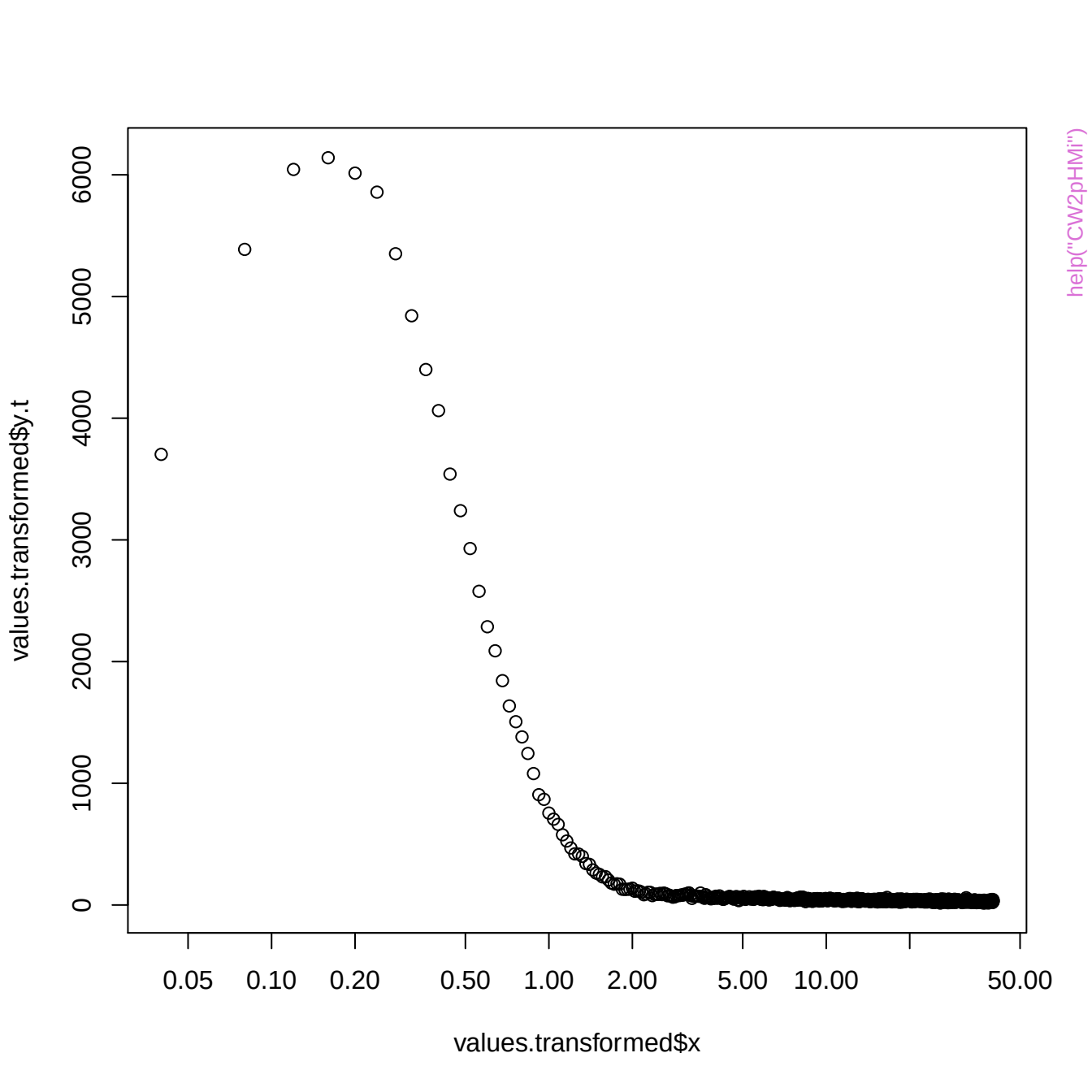






help("Analyse_SAR.OSLdata")

unkown measurement


values.transformed$y.t
0
1000
2000
3000
4000
5000
6000
0.05
0.10
0.20
0.50
1.00
2.00
5.00
10.00
50.00
values.transformed$x
help("CW2pHMi")

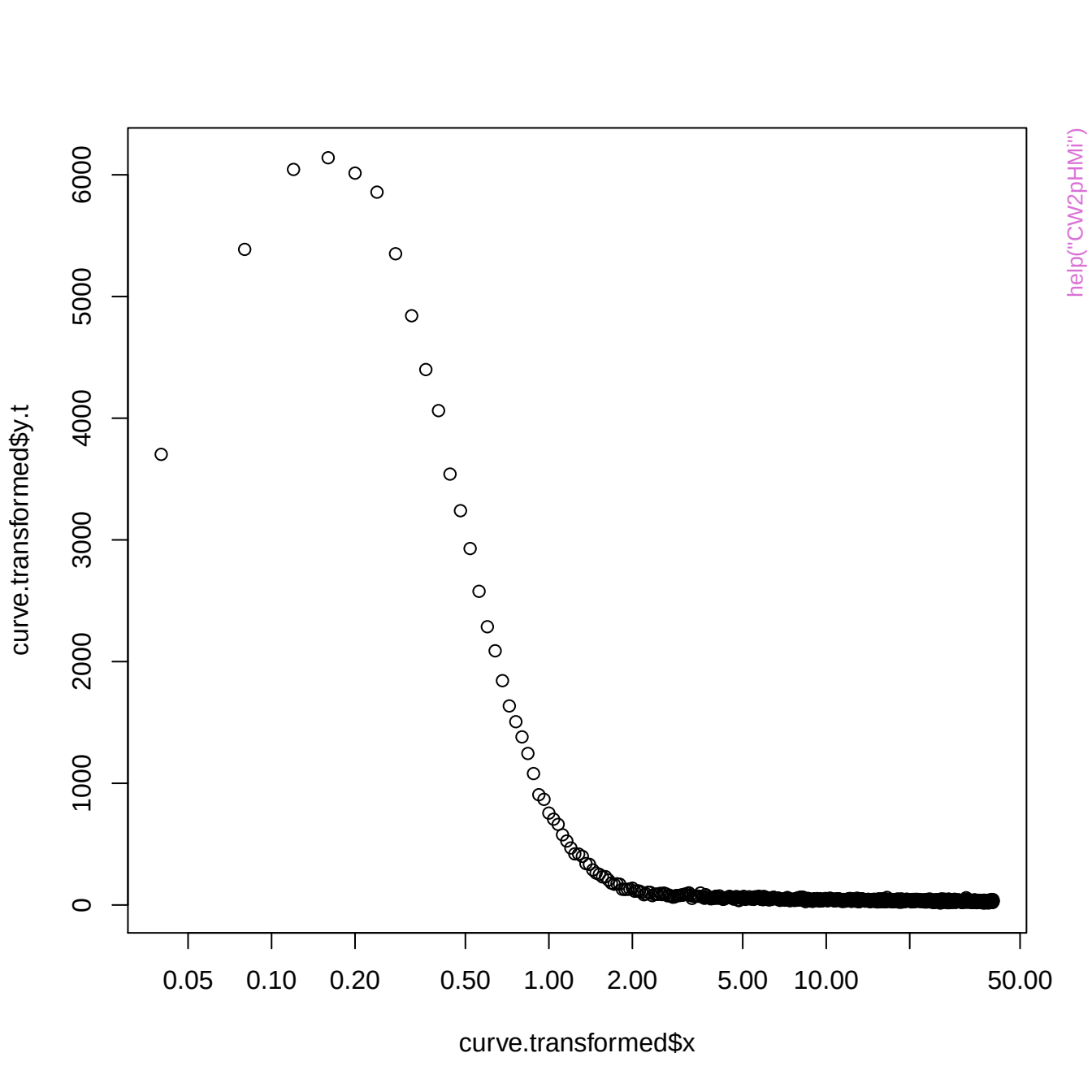
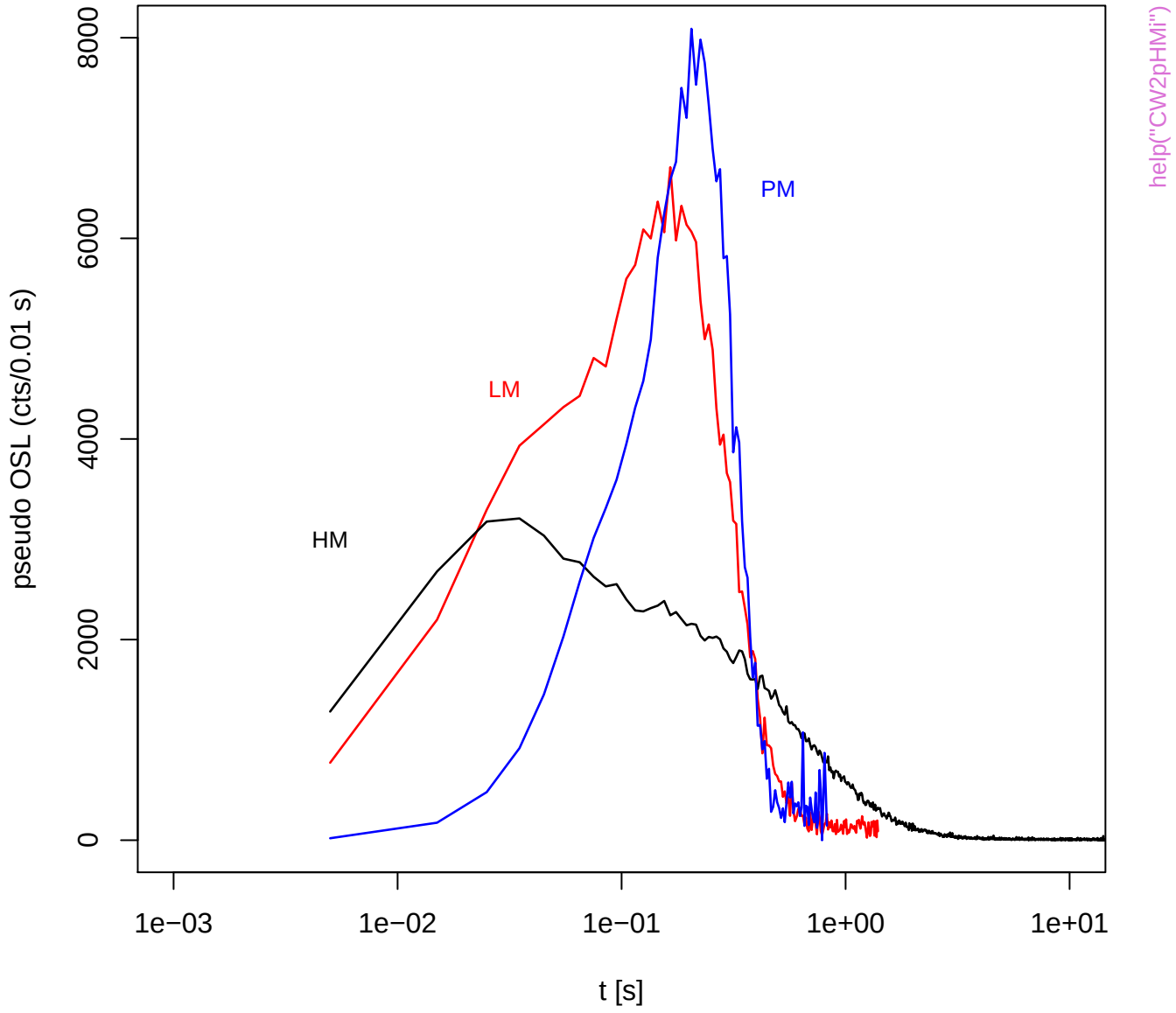
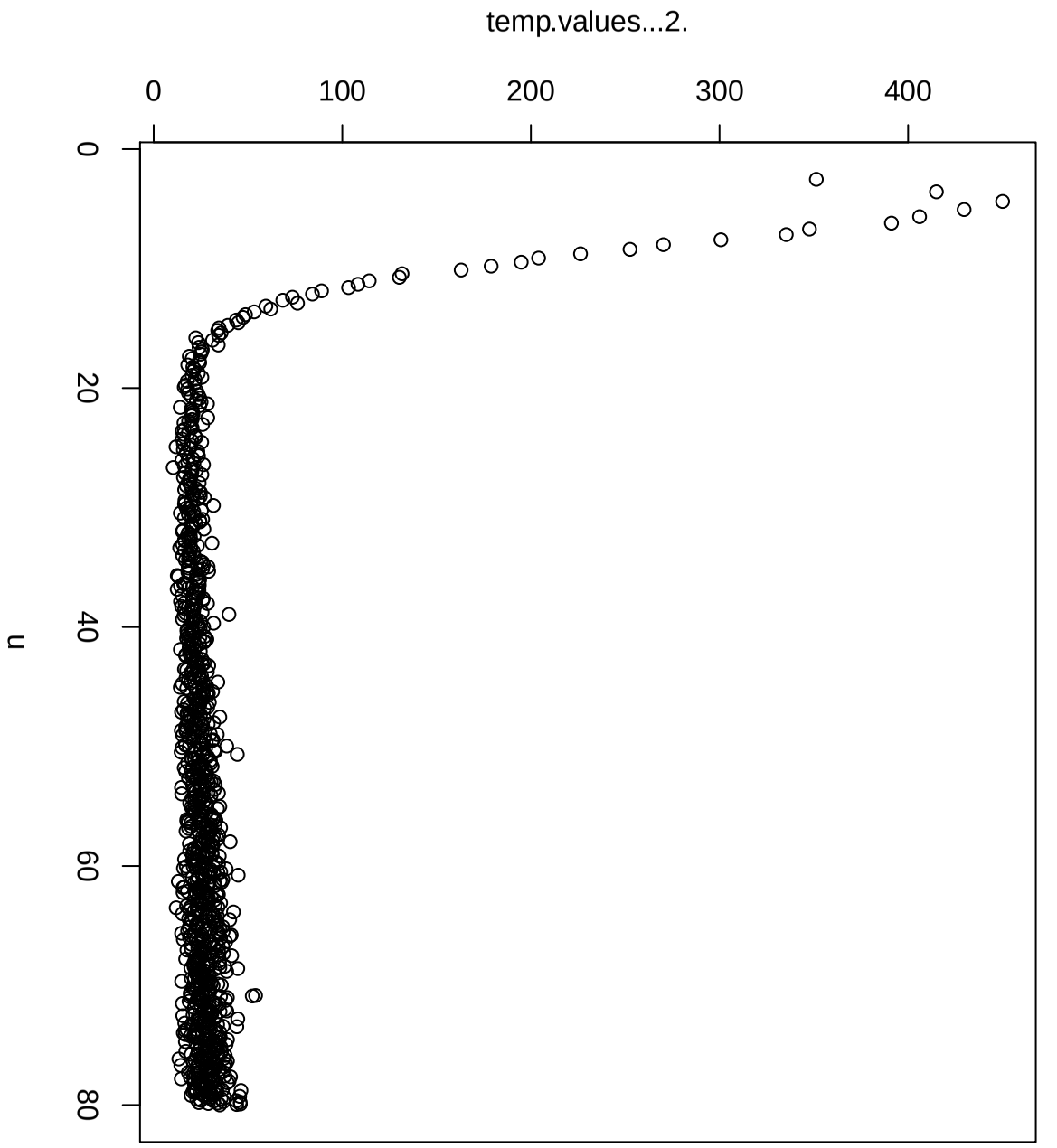

curve.transformed$y.t
0
1000
2000
3000
4000
5000
6000
0.05
0.10
0.20
0.50
1.00
2.00
5.00
10.00
50.00
curve.transformed$x
help("CW2pHMi")

Fig. 4 − Bos & Wallinga (2012)





help("CW2pLM")

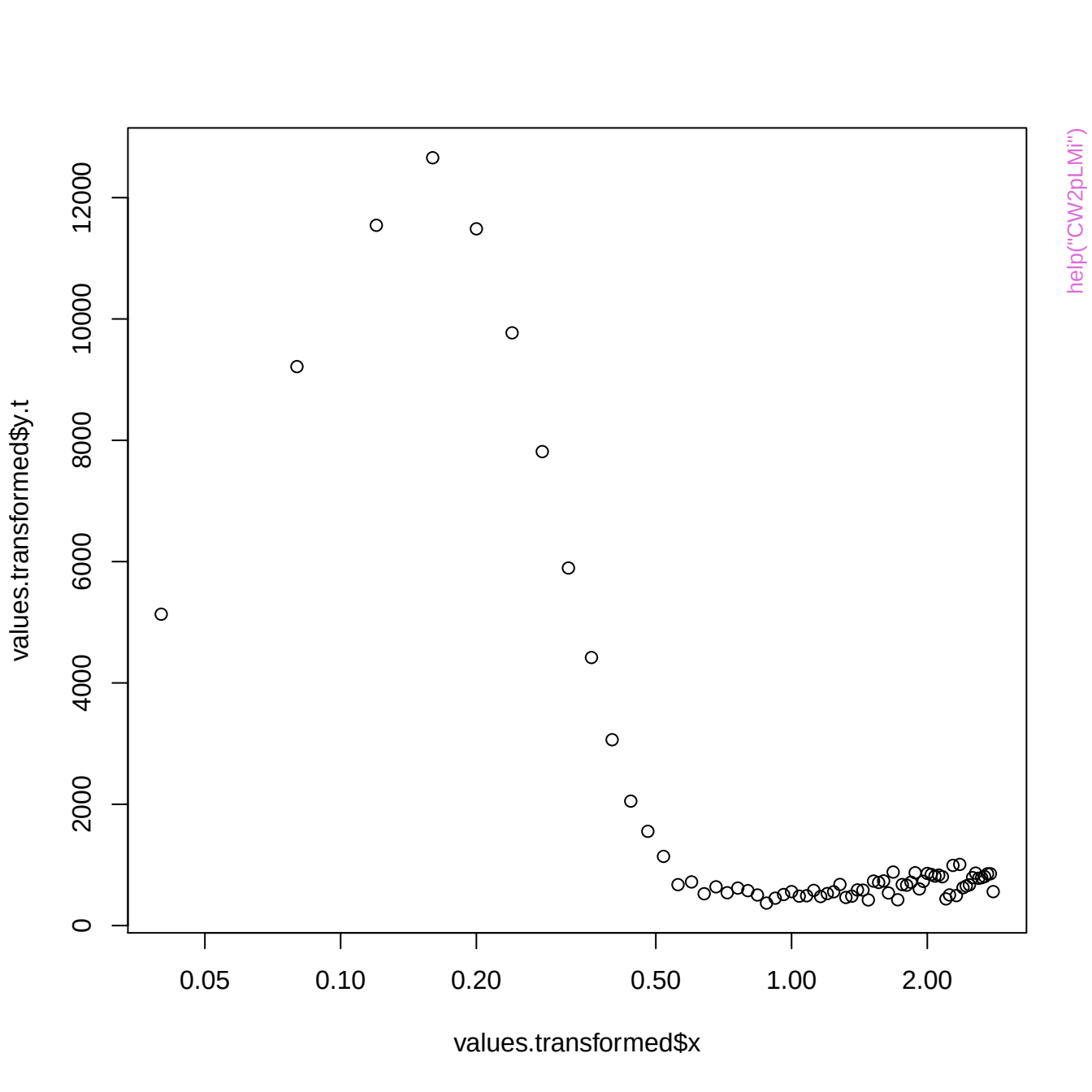
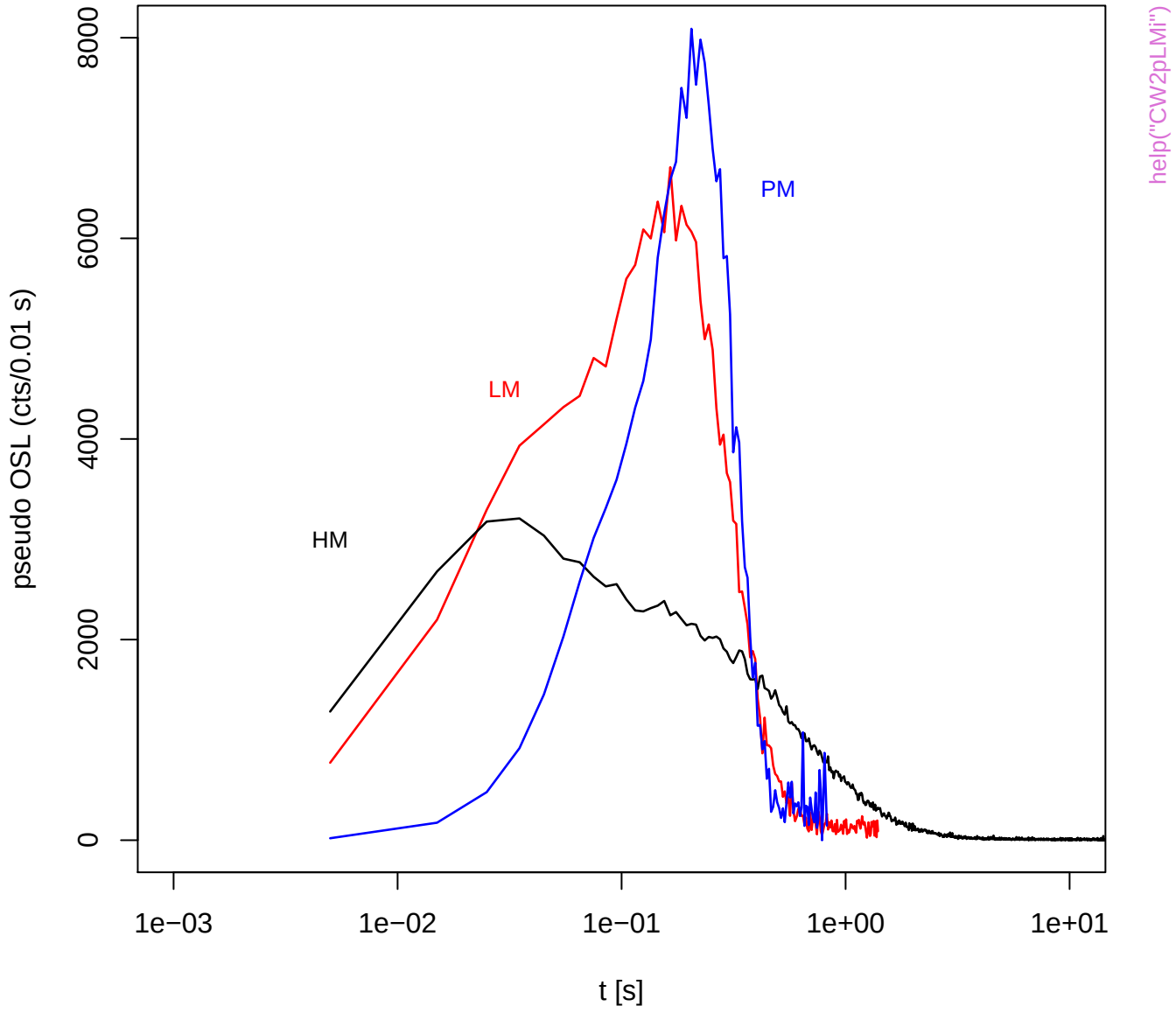

values.transformed$y.t
0
2000
4000
6000
8000
10000
12000
0.05
0.10
0.20
0.50
1.00
2.00
values.transformed$x
help("CW2pLMI")

Fig. 4 − Bos & Wallinga (2012)



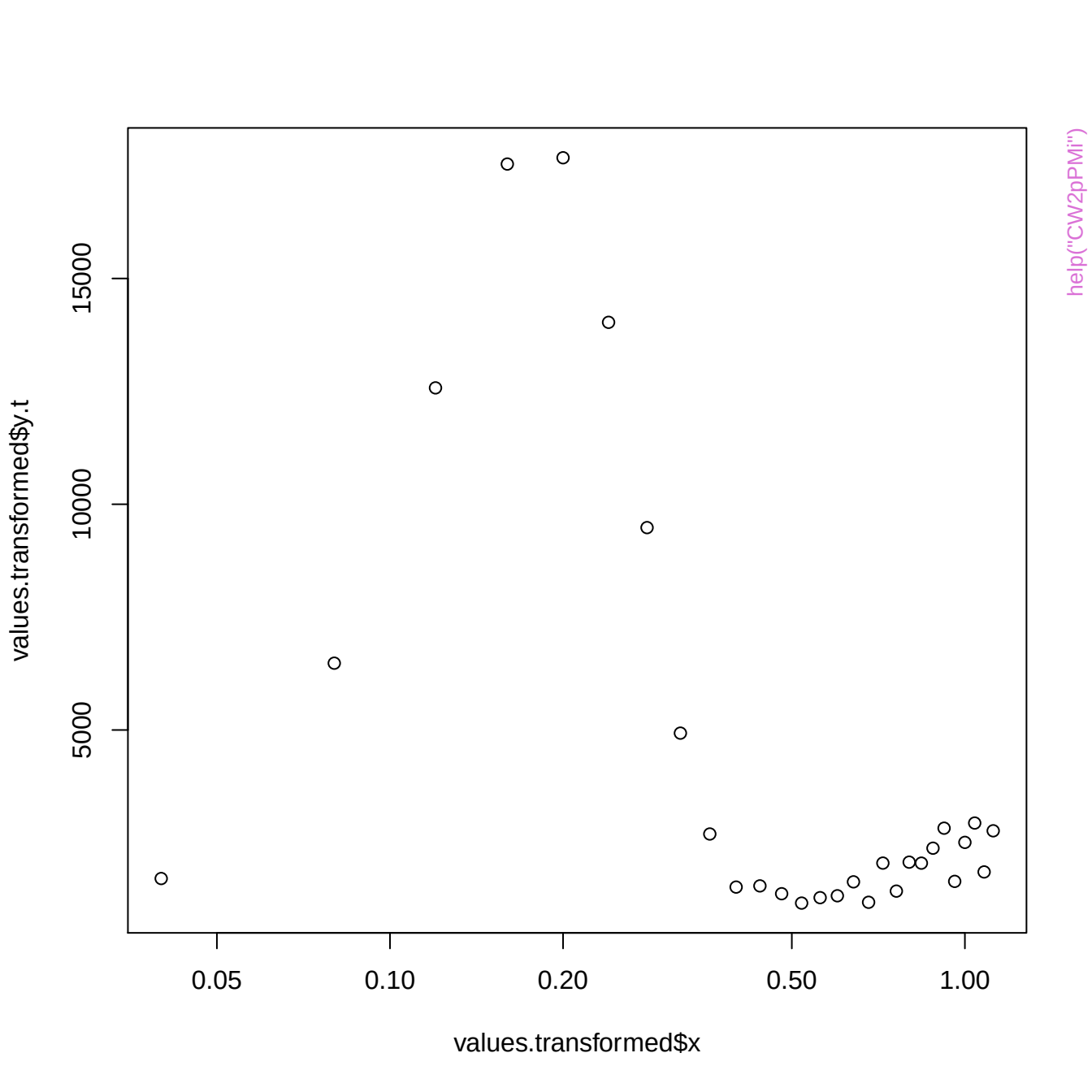
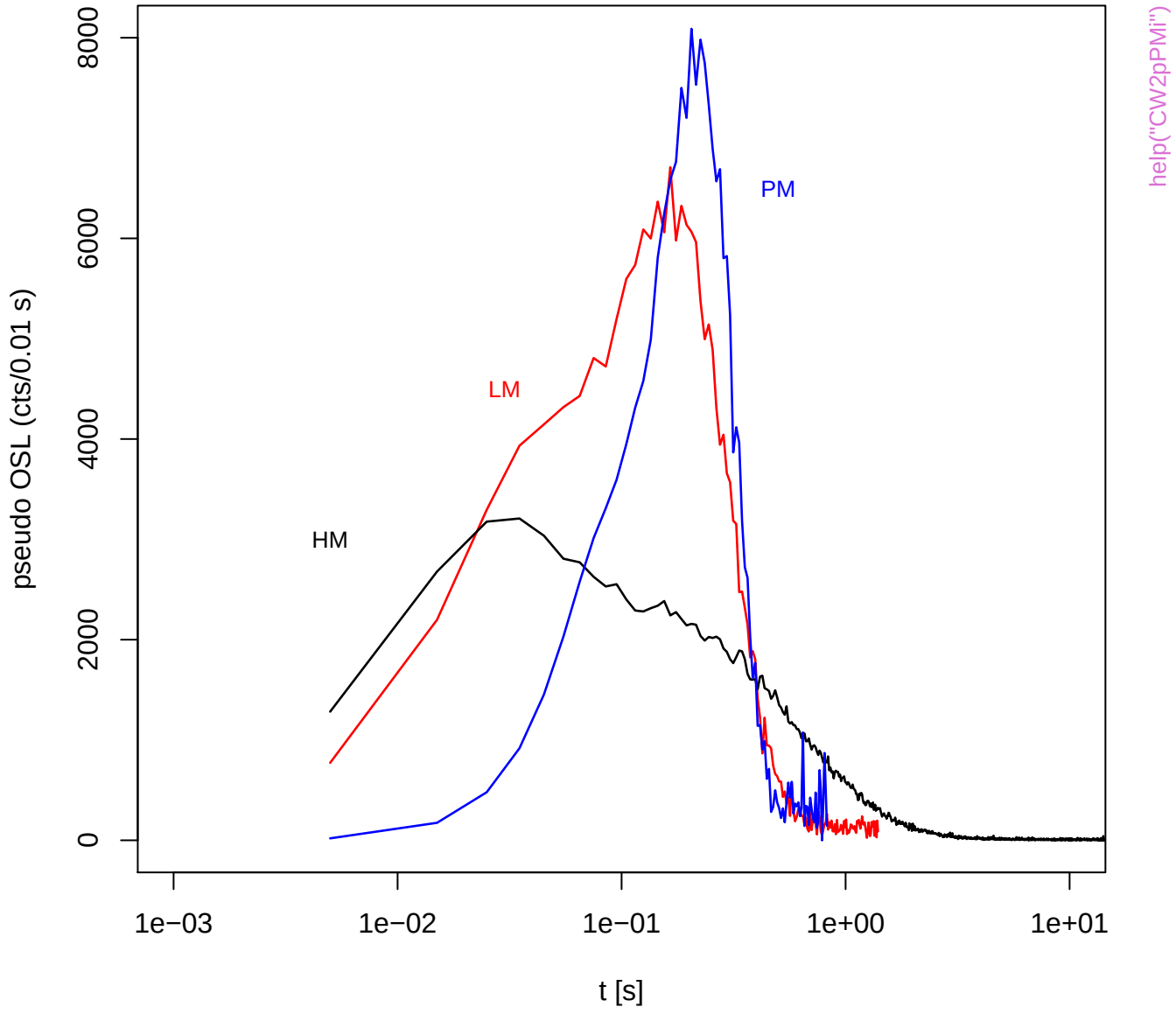
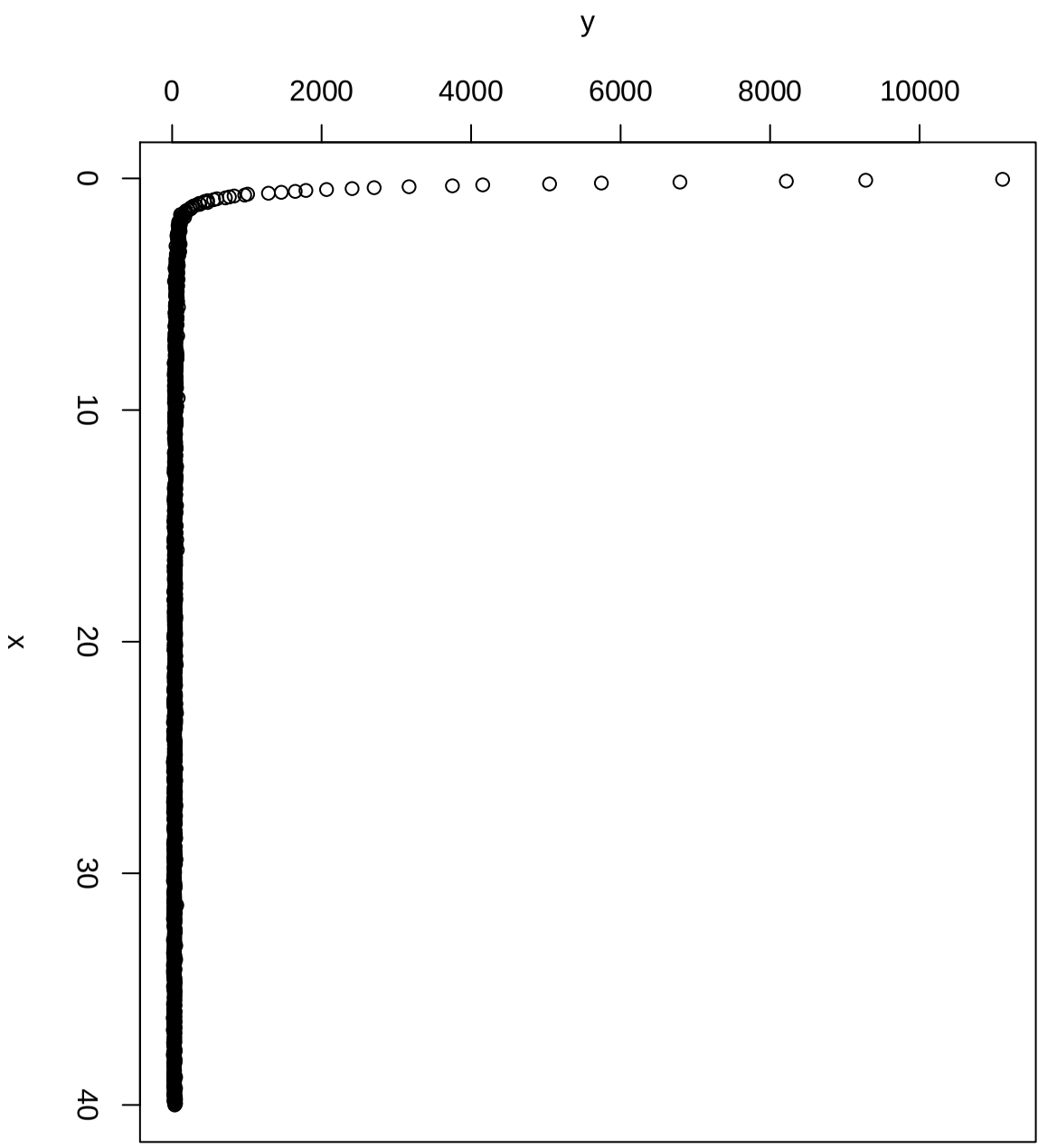
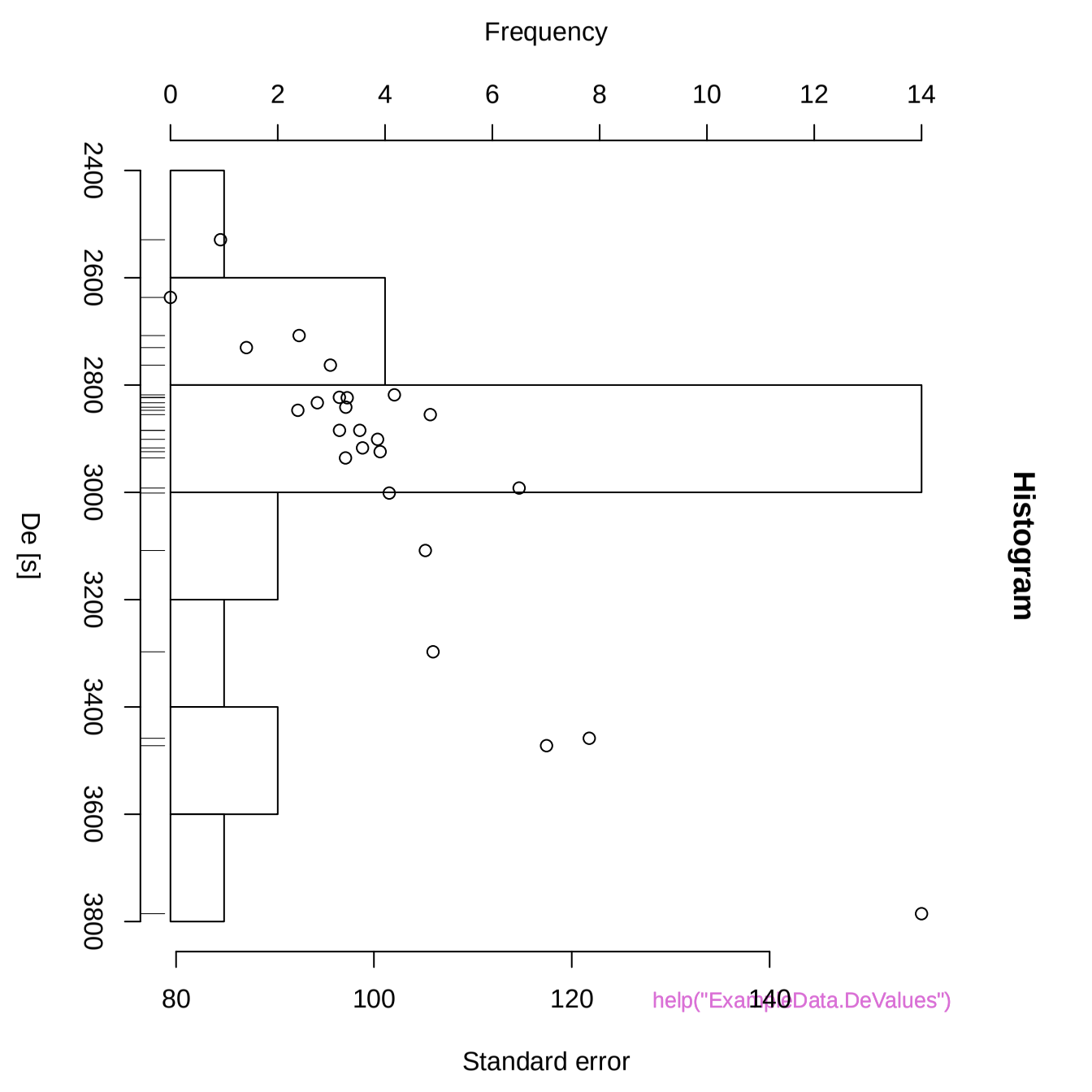

values.transformed$y.t
5000
10000
15000
0.05
0.10
0.20
0.50
1.00
values.transformed$x
help("CW2pPMi")

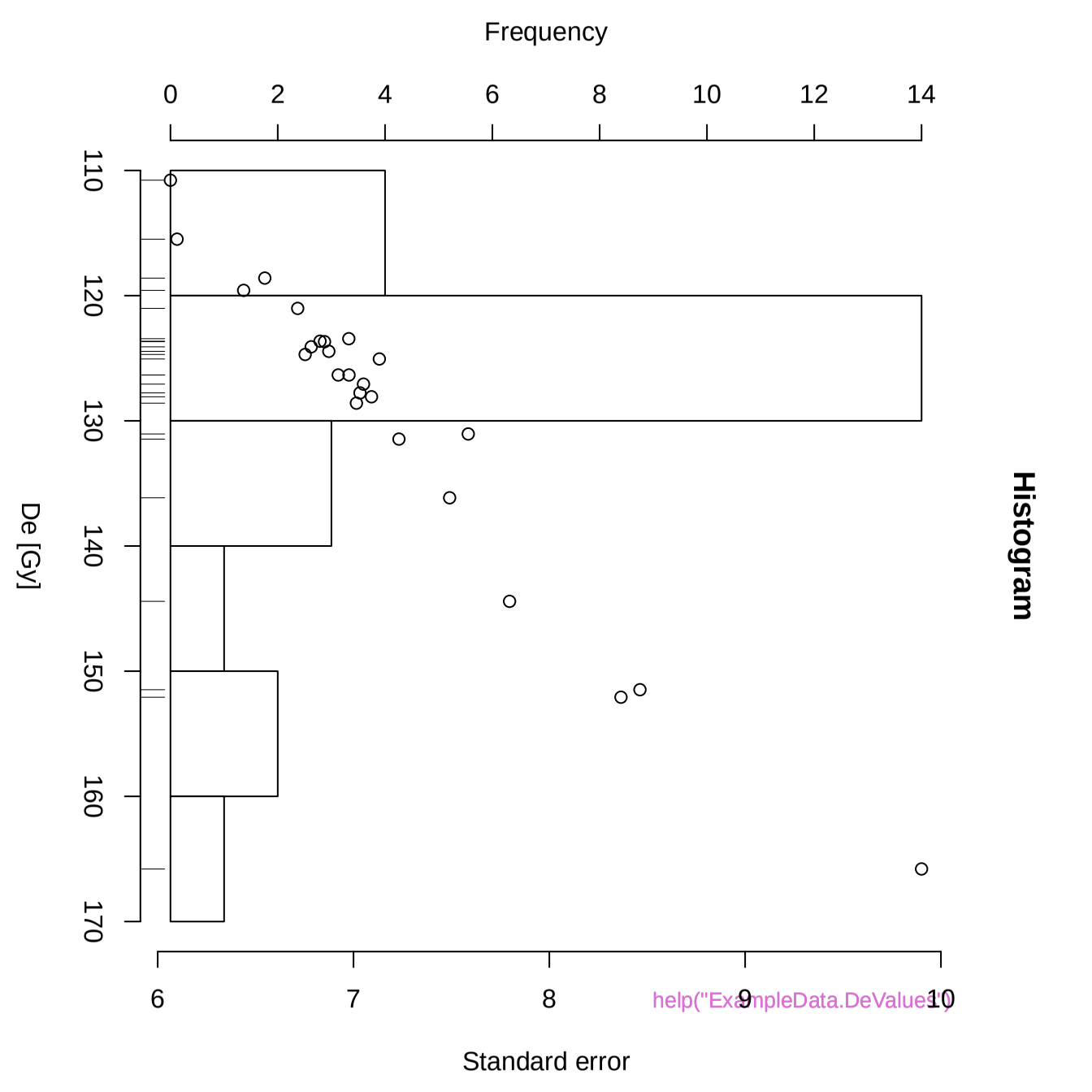
Fig. 4 − Bos & Wallinga (2012)

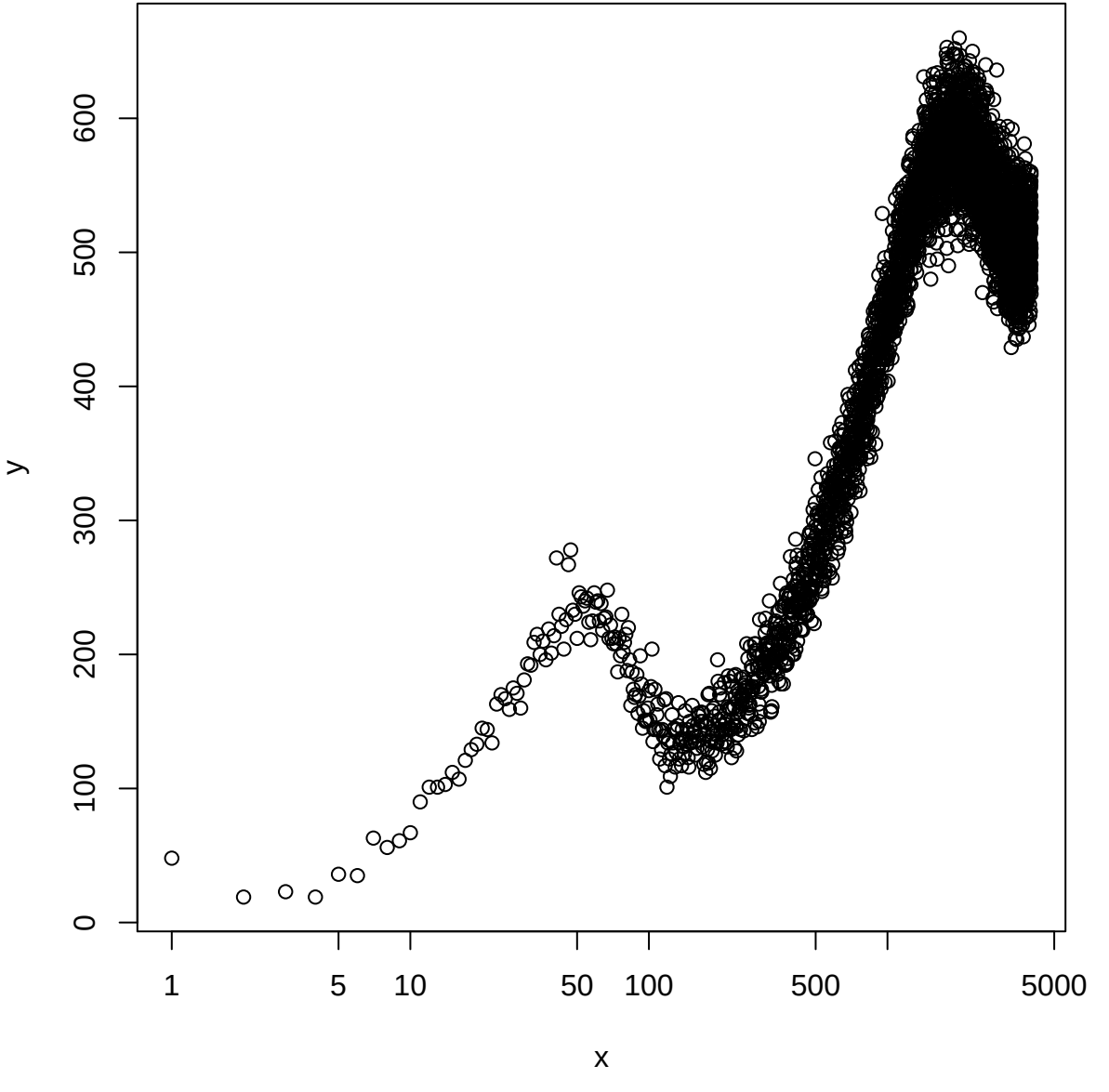


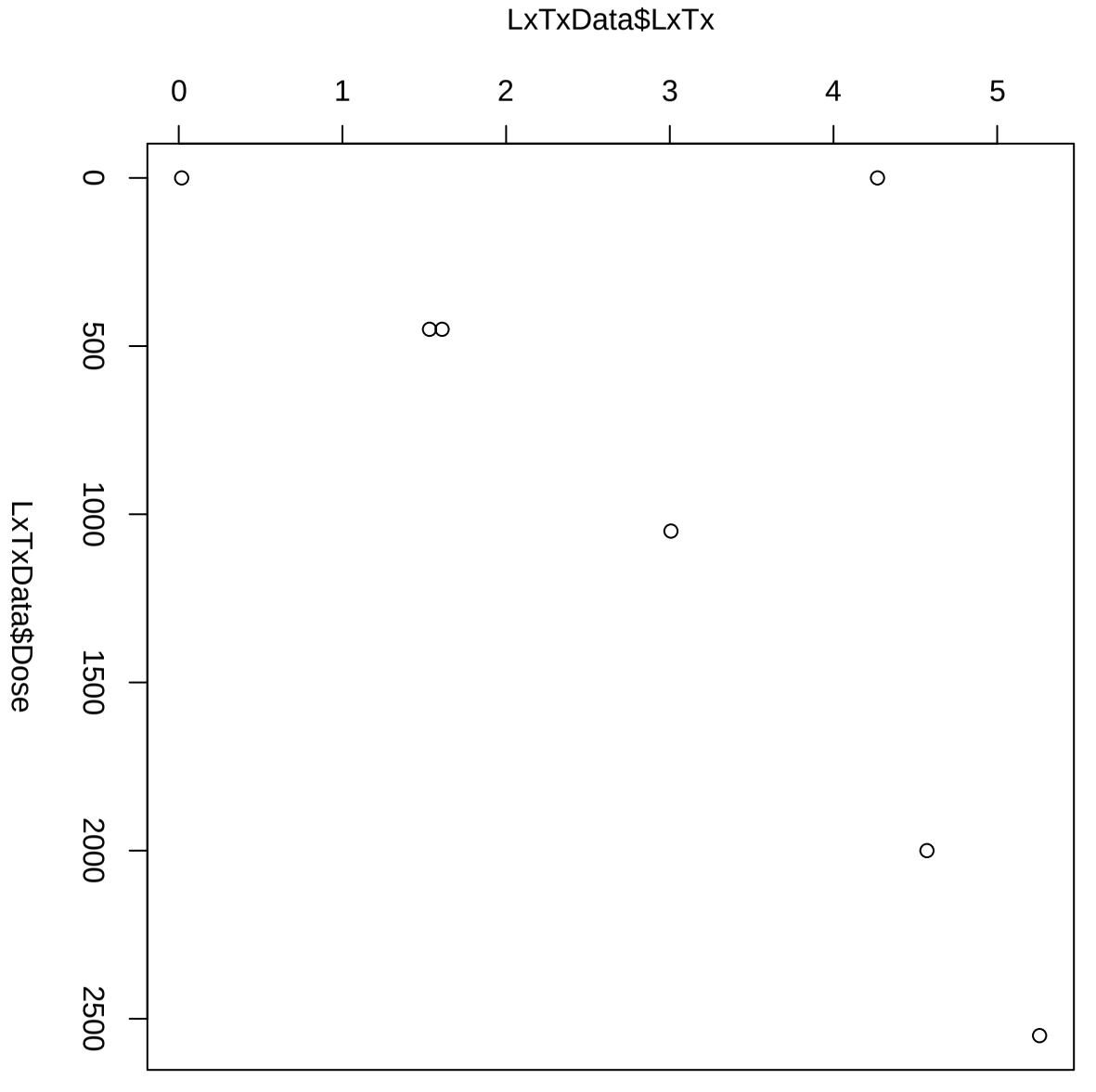


help("ExampleData.CW_OSL_Curve")

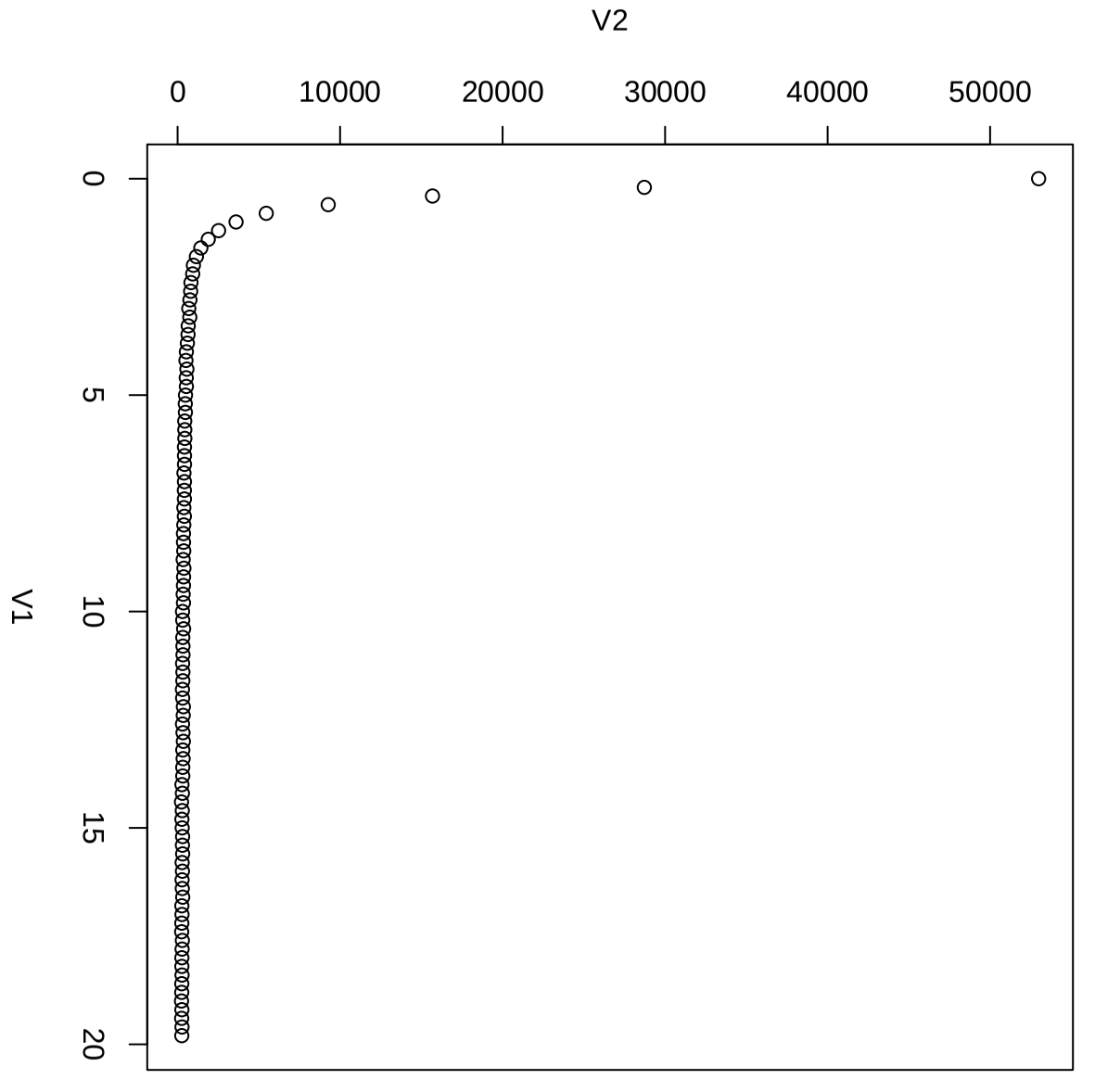

Frequency
0
2
4
6
8
10
12
14
2400
2600
2800
3000
3200
3400
3600
3800
De [s]
Histogram
80
100
120
140
help("ExampleData.DeValues")
Standard error


Frequency
0
2
4
6
8
10
12
14
110
120
130
140
150
160
170
De [Gy]
Histogram
6
7
8
9
10
Standard error
help("ExampleData.DeValues")

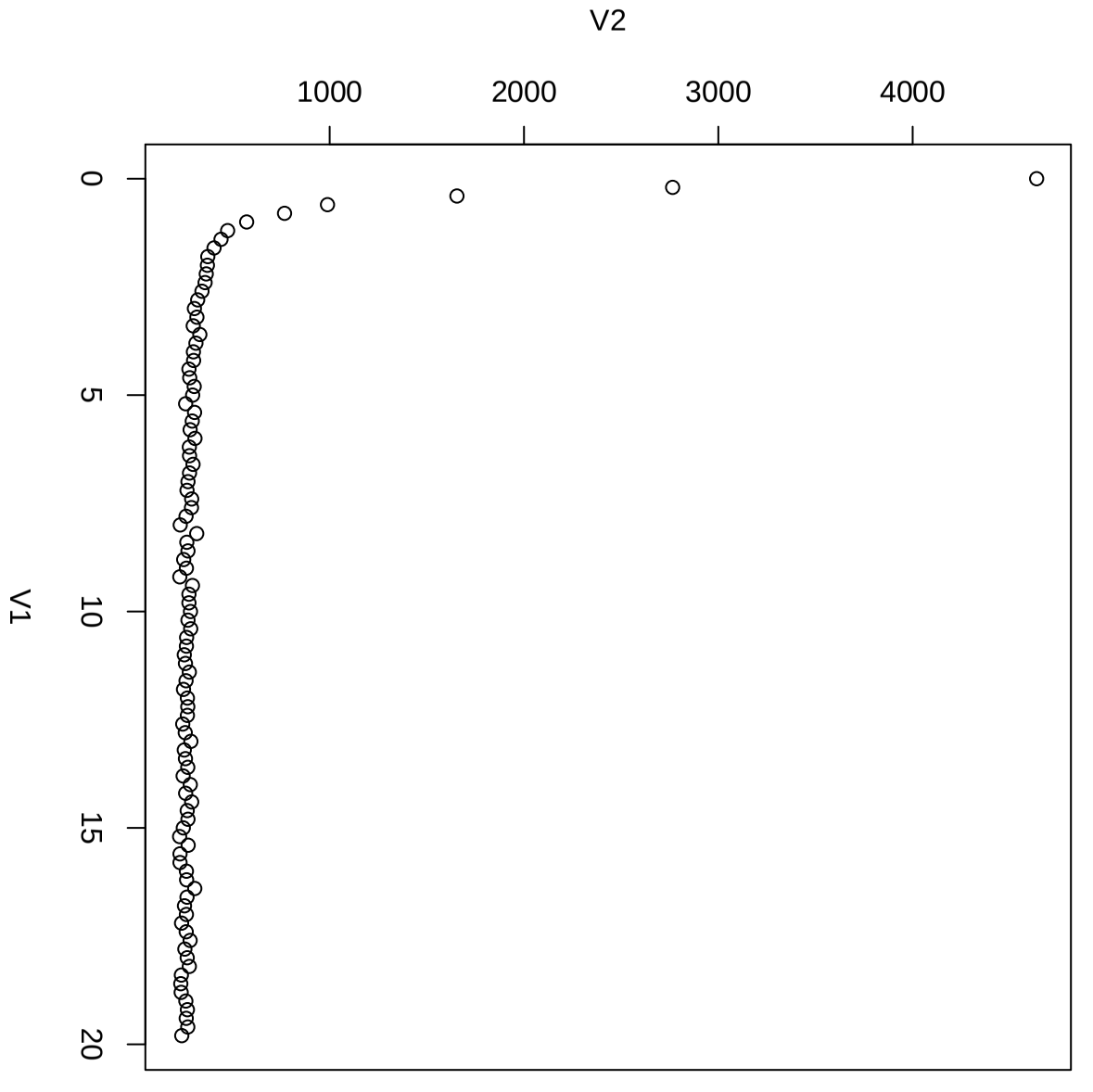

y
0
100
200
300
400
500
600
x
1
5
10
50
100
500
5000
help("ExampleData.FittingLM")



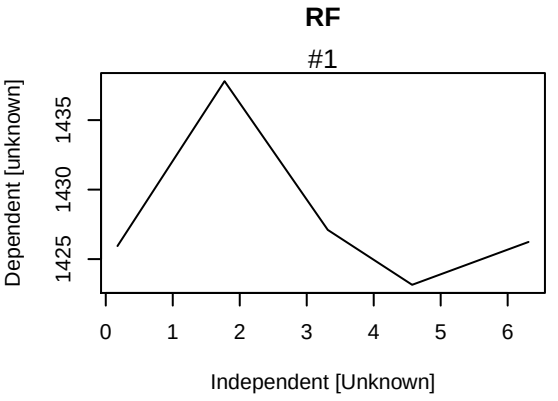
help("ExampleData.LxTxData")

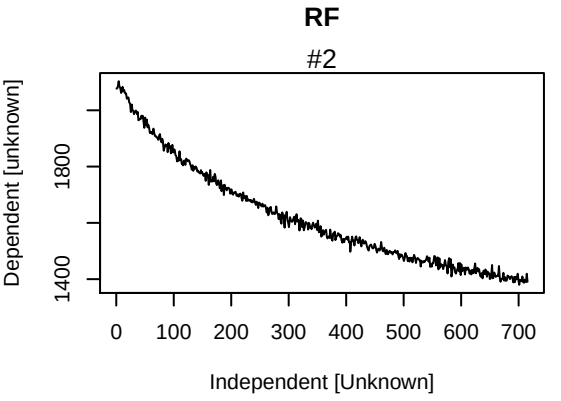


help("ExampleData.LxTxOSLData")

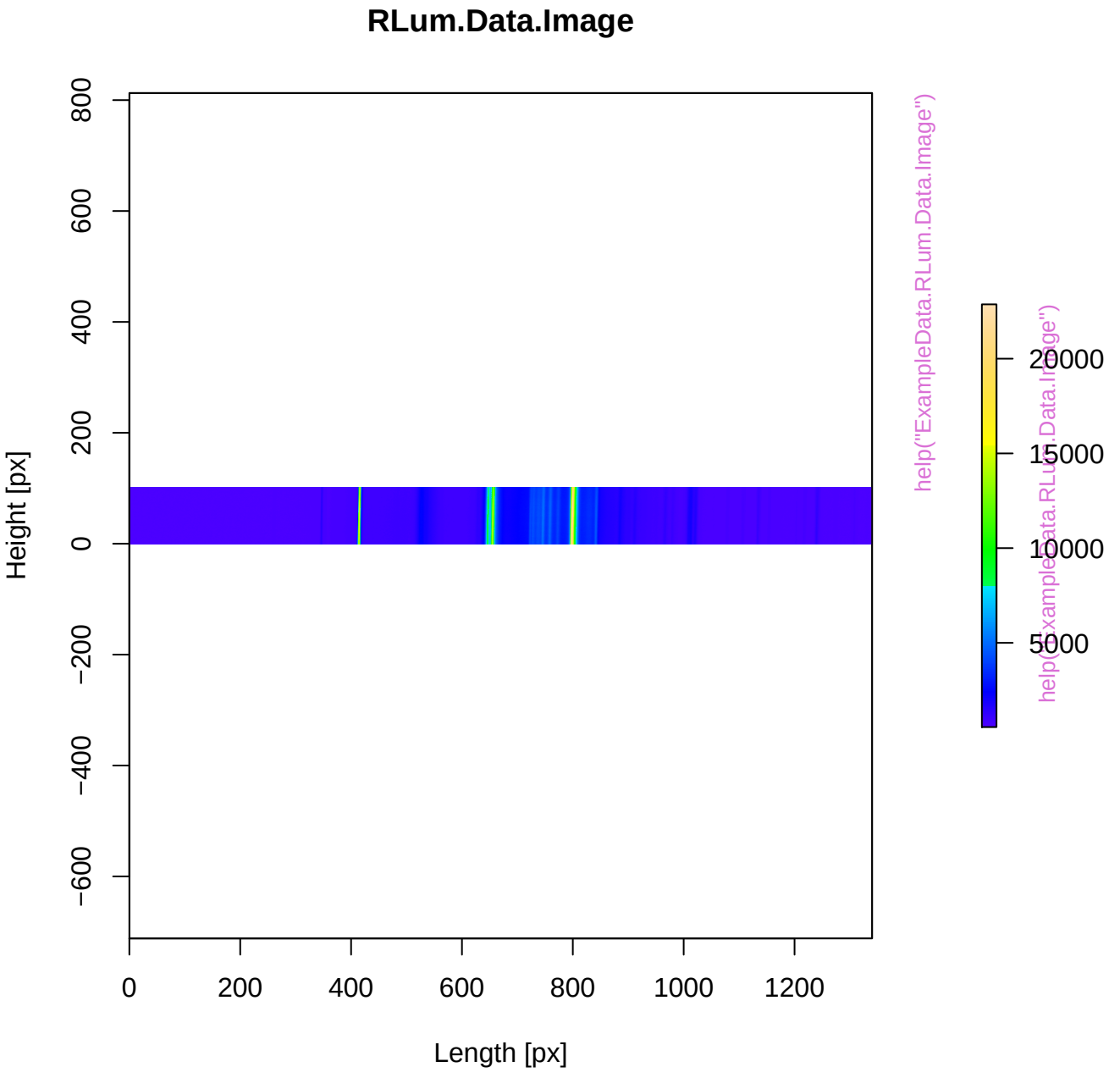


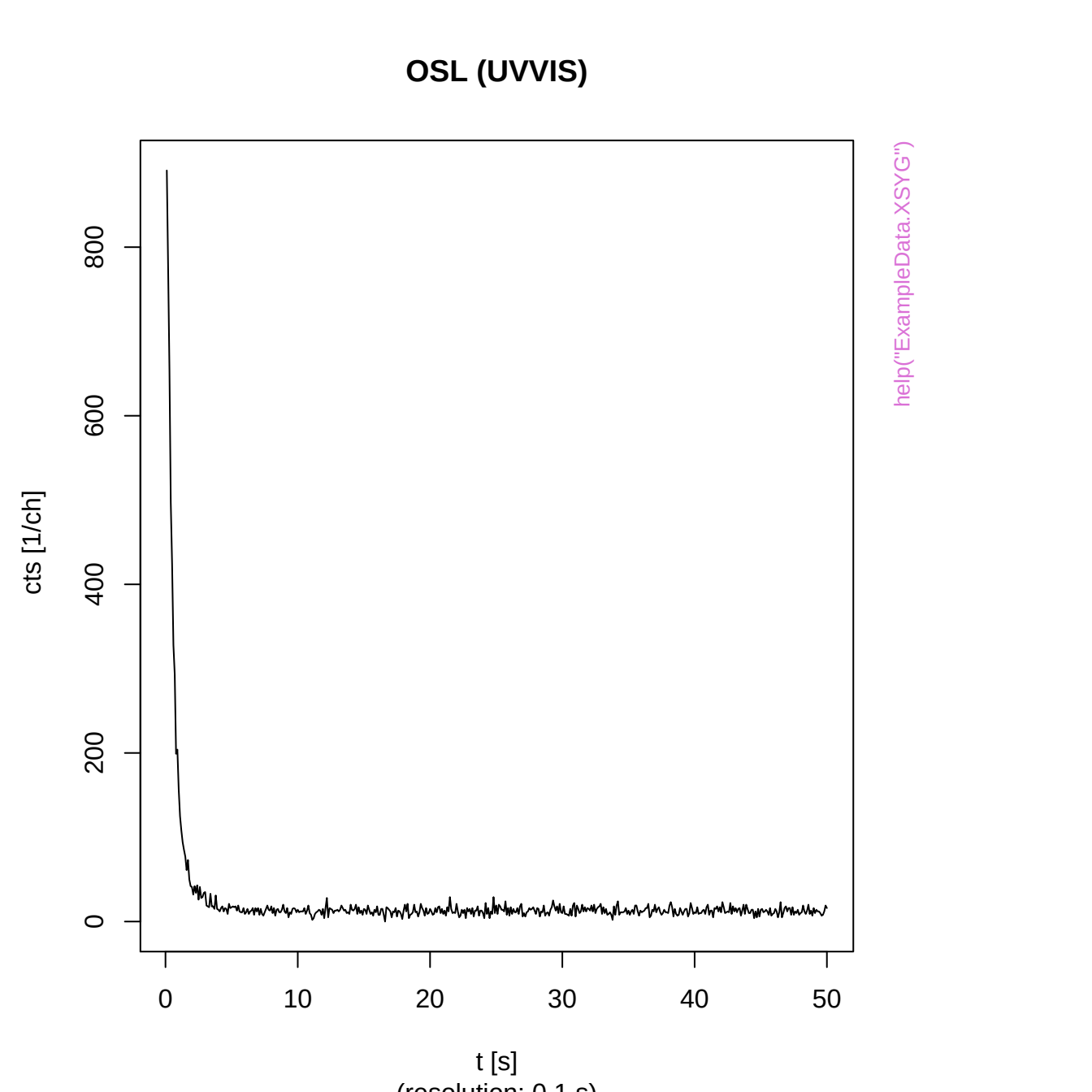
help("ExampleData.LxTxOSLData")

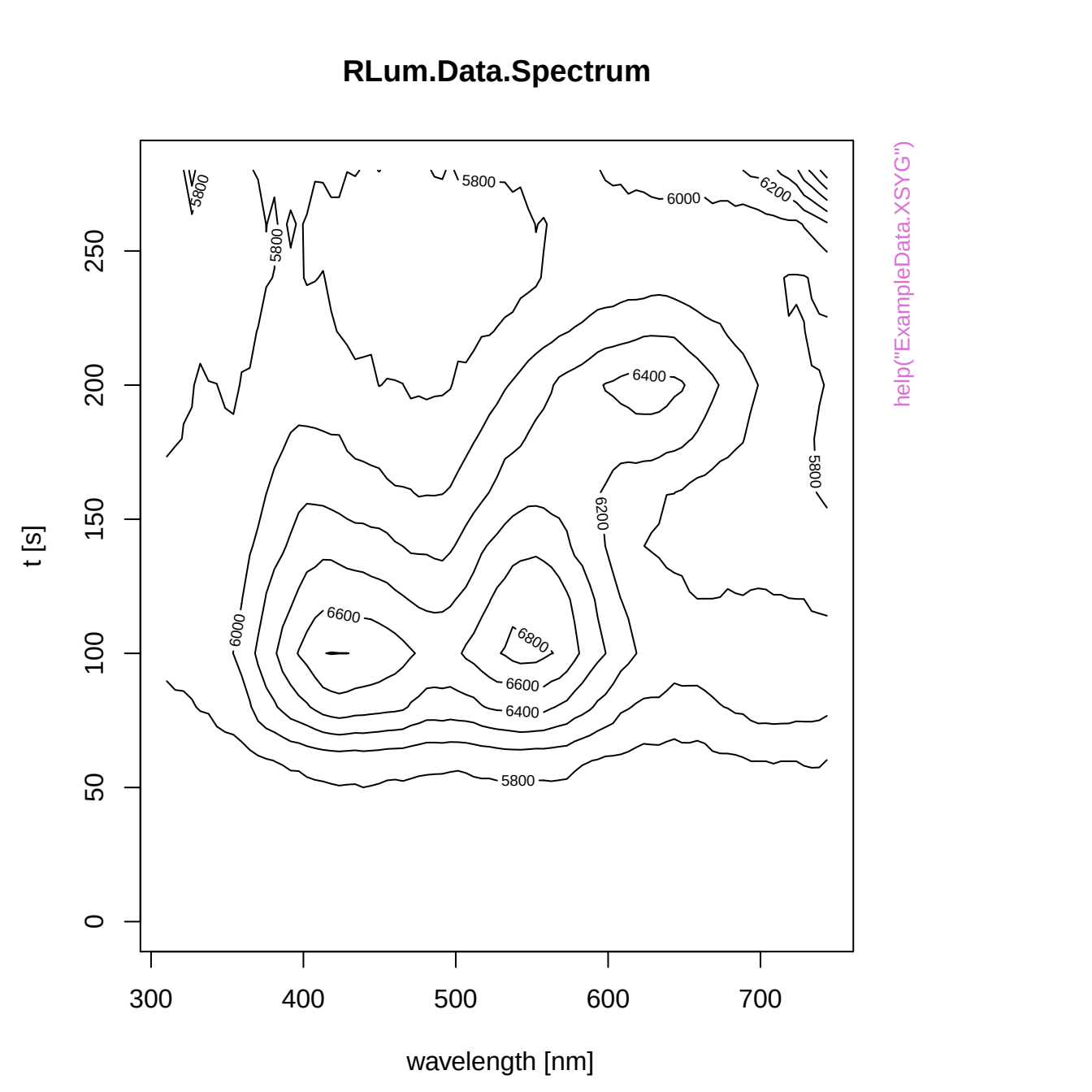


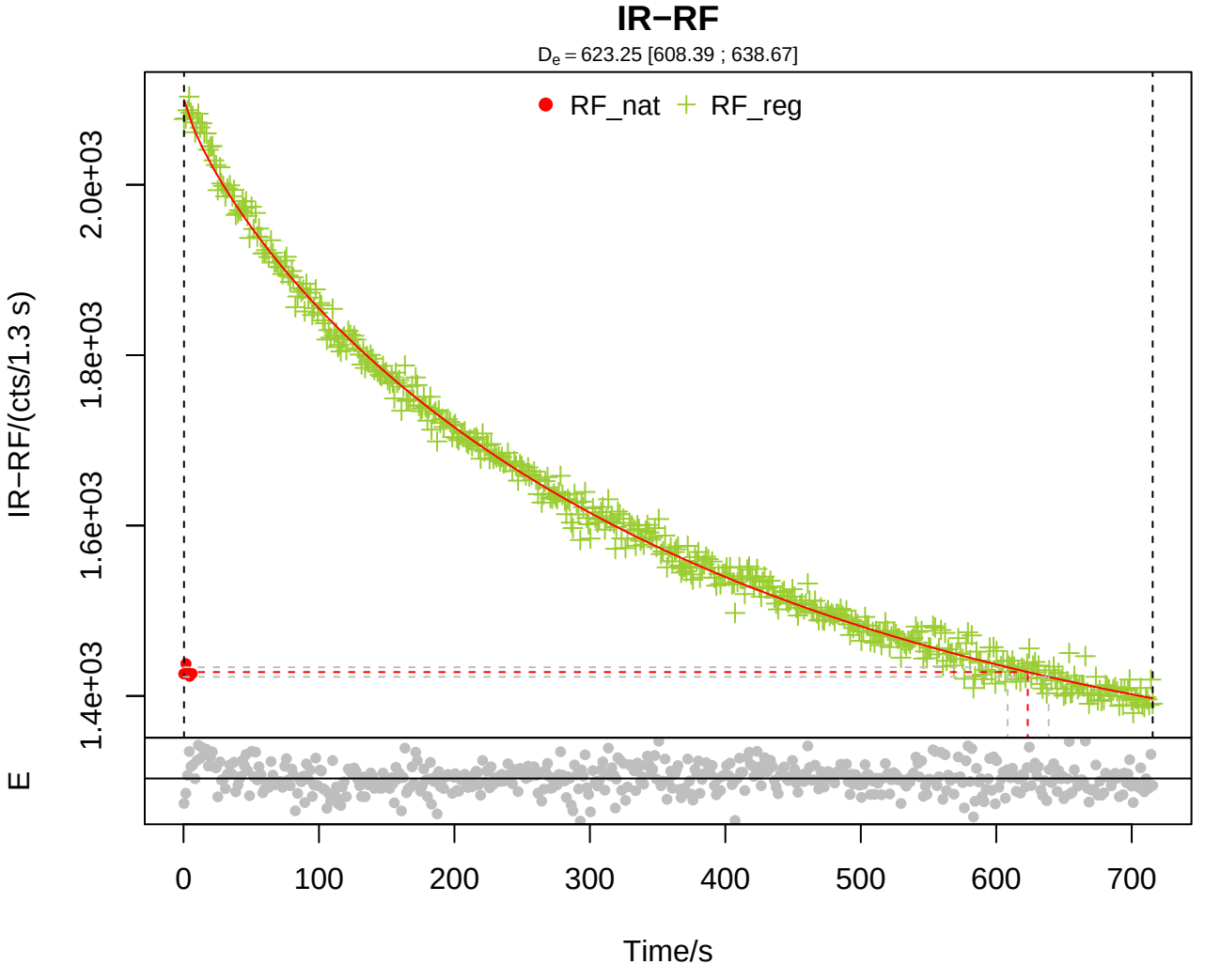


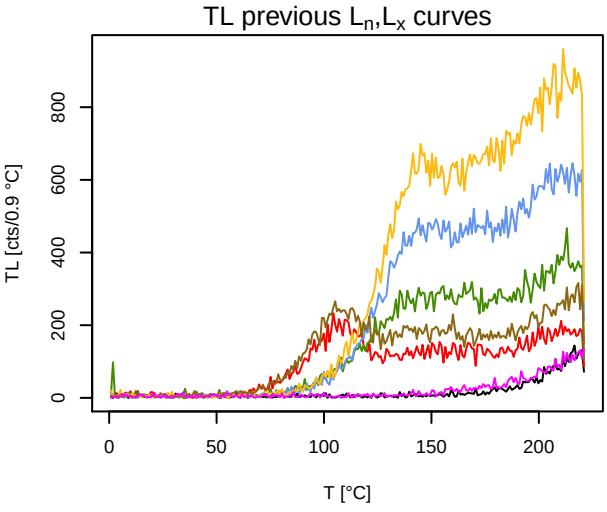
help("ExampleData.RLum.Analysis")

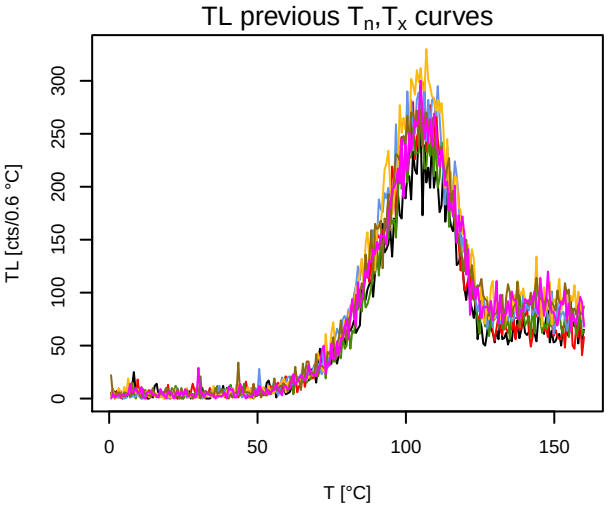

RLum.Data.Image
Height [px]
800
600
400
200
0
−200
−400
−600
0
200
400
600
800
1000
1200
Length [px]
help("ExampleData.RLum.Data.Image")
20000
15000
10000
5000
help("ExampleData.RLum.Data.Image")

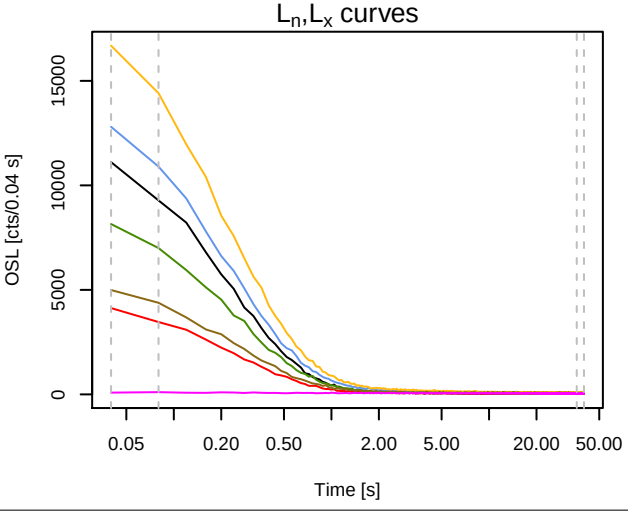

OSL (UVVIS)
cts [1/ch]
0
200
400
600
800
0
10
20
30
40
50
t [s]
(resolution: 0.1 s)
help("ExampleData.XSYG")

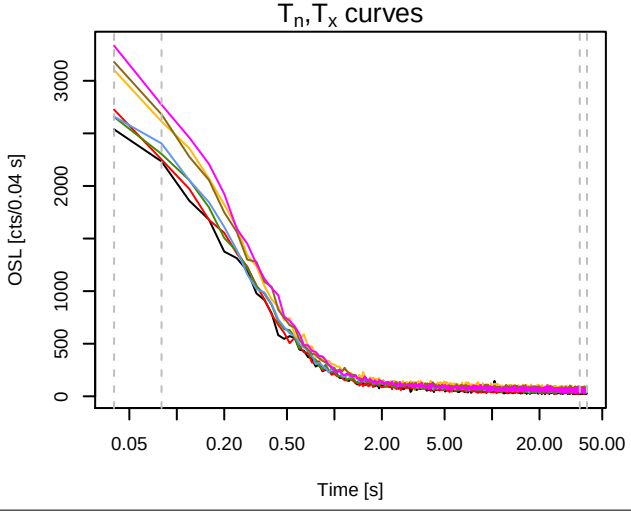

RLum.Data.Spectrum
t [s]
wavelength [nm]
0
50
100
150
200
250
300
400
500
600
700
5800
6000
6200
6400
6600
6800
help("ExampleData.XSYG")


IR−RF
D_e = 623.25 [608.39 ; 638.67]
RF_nat
RF_reg
IR−RF/(cts/1.3 s)
1.4e+03
1.6e+03
1.8e+03
2.0e+03
E
0
100
200
300
400
500
600
700
Time/s





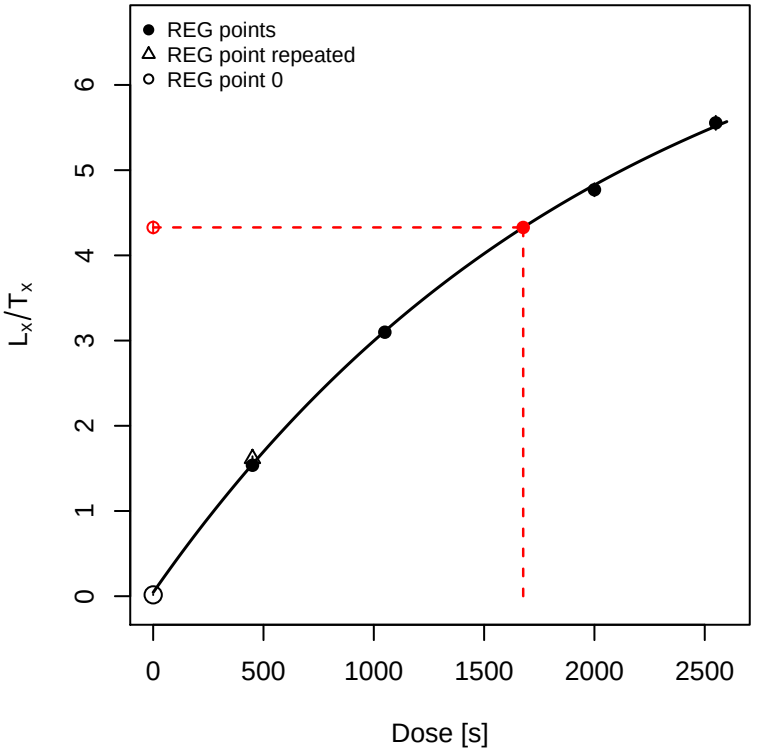




Natural (0)
R1 (450)
R2 (1050)
R3 (2000)
R4 (2550)
R5 (450)
R0 (0)

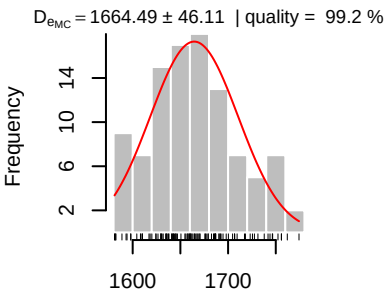
Growth curve

$D_e = 1677.16 \pm 46.11$ | fit: EXP



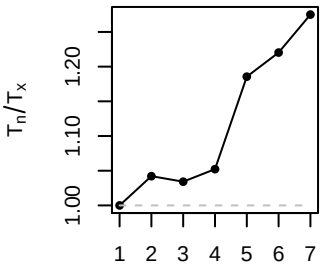
D_e from MC simulation

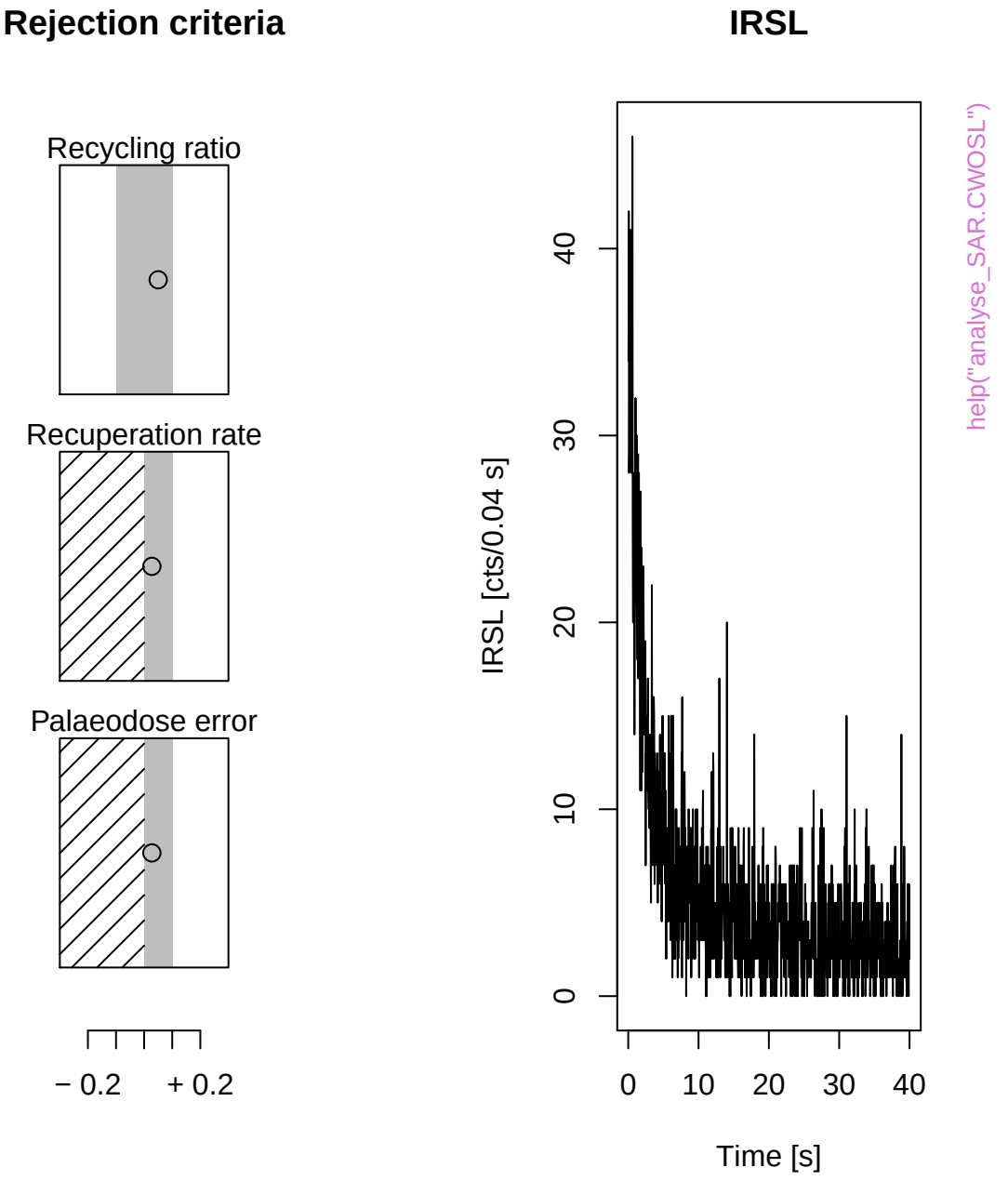
$D_{e_{MC}} = 1664.49 \pm 46.11$ | quality = 99.2 %

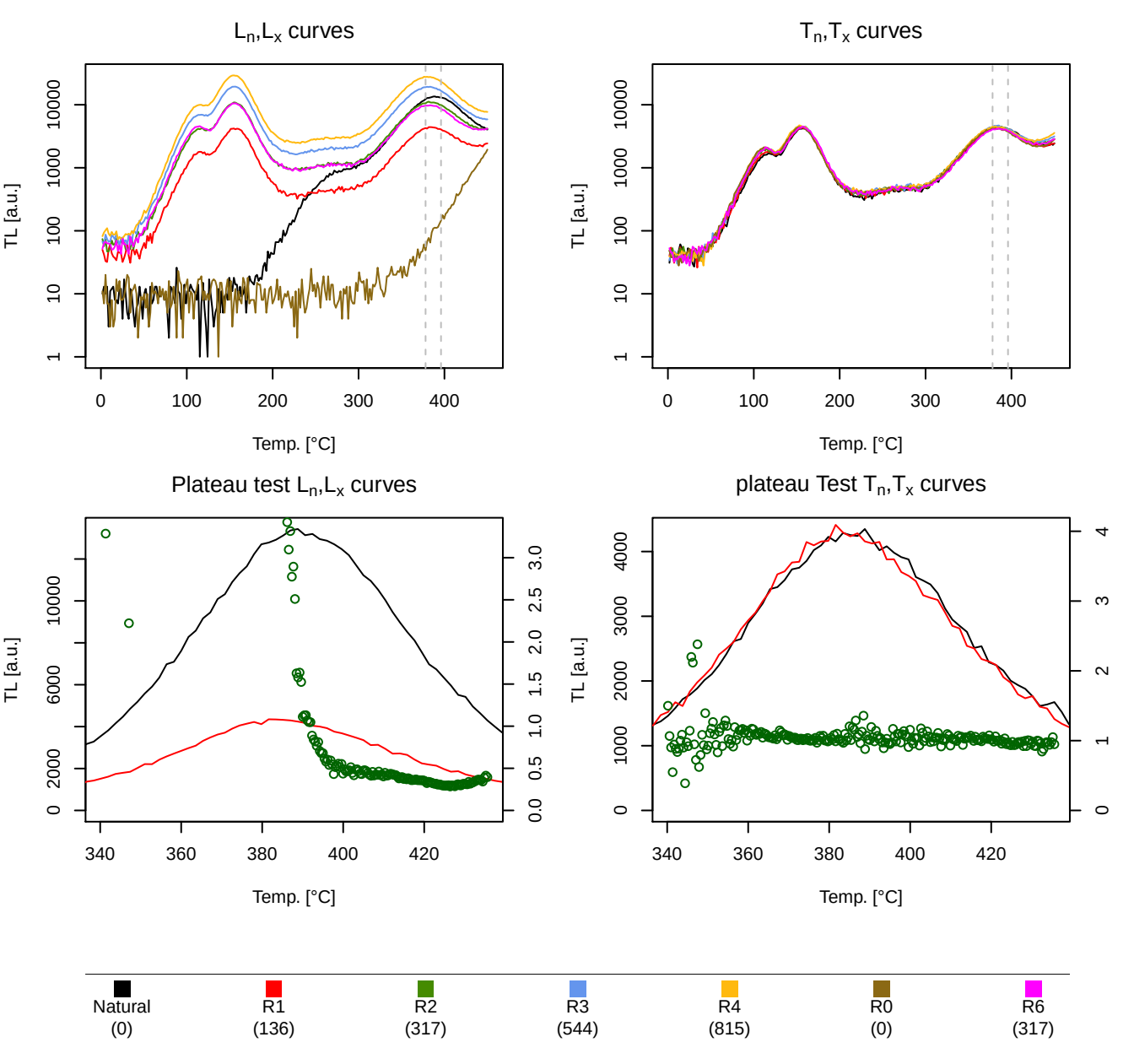


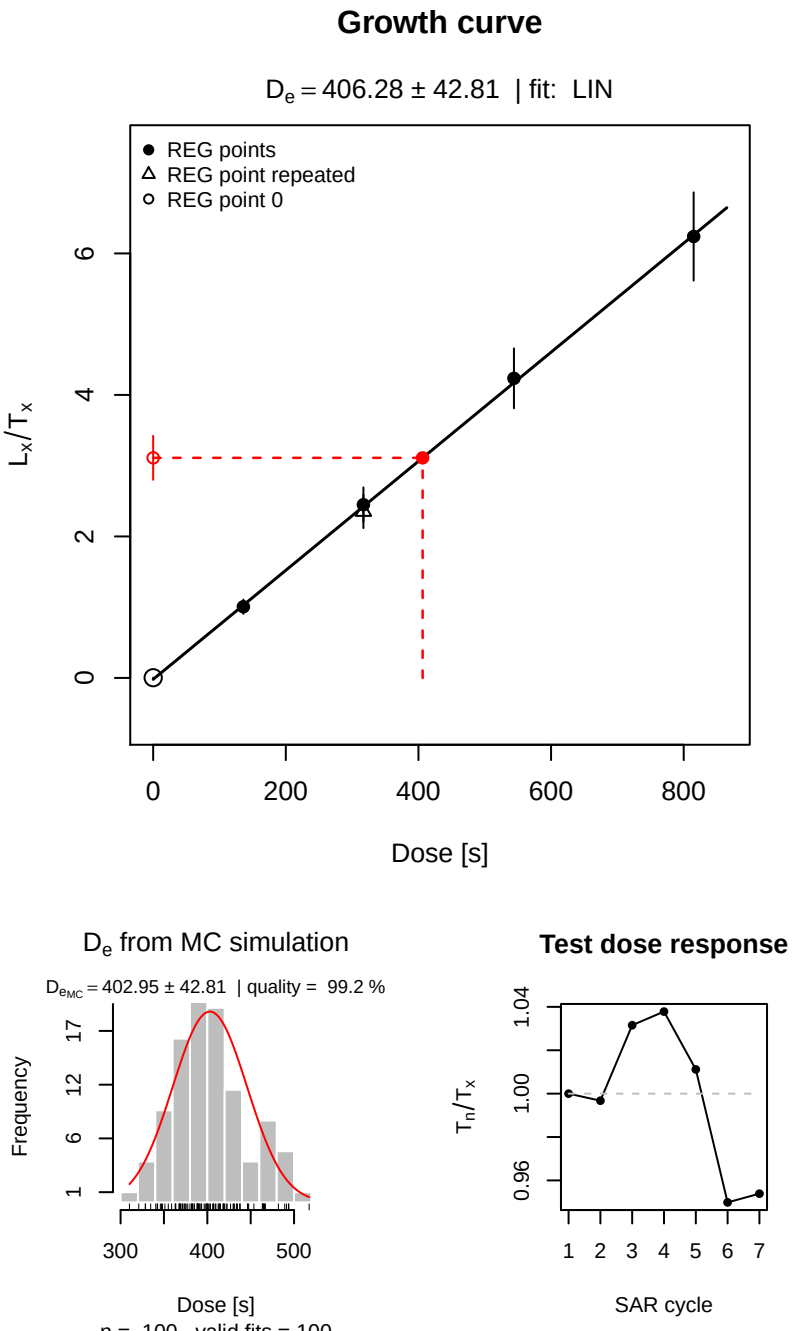
n = 100, valid fits = 100

Test dose response




Rejection criteria
Recycling ratio
Recuperation rate
Palaeodose error
− 0.2
+ 0.2
IRSL
IRSL [cts/0.04 s]
0
10
20
30
40
Time [s]
help("analyse_SAR.CWOSL")

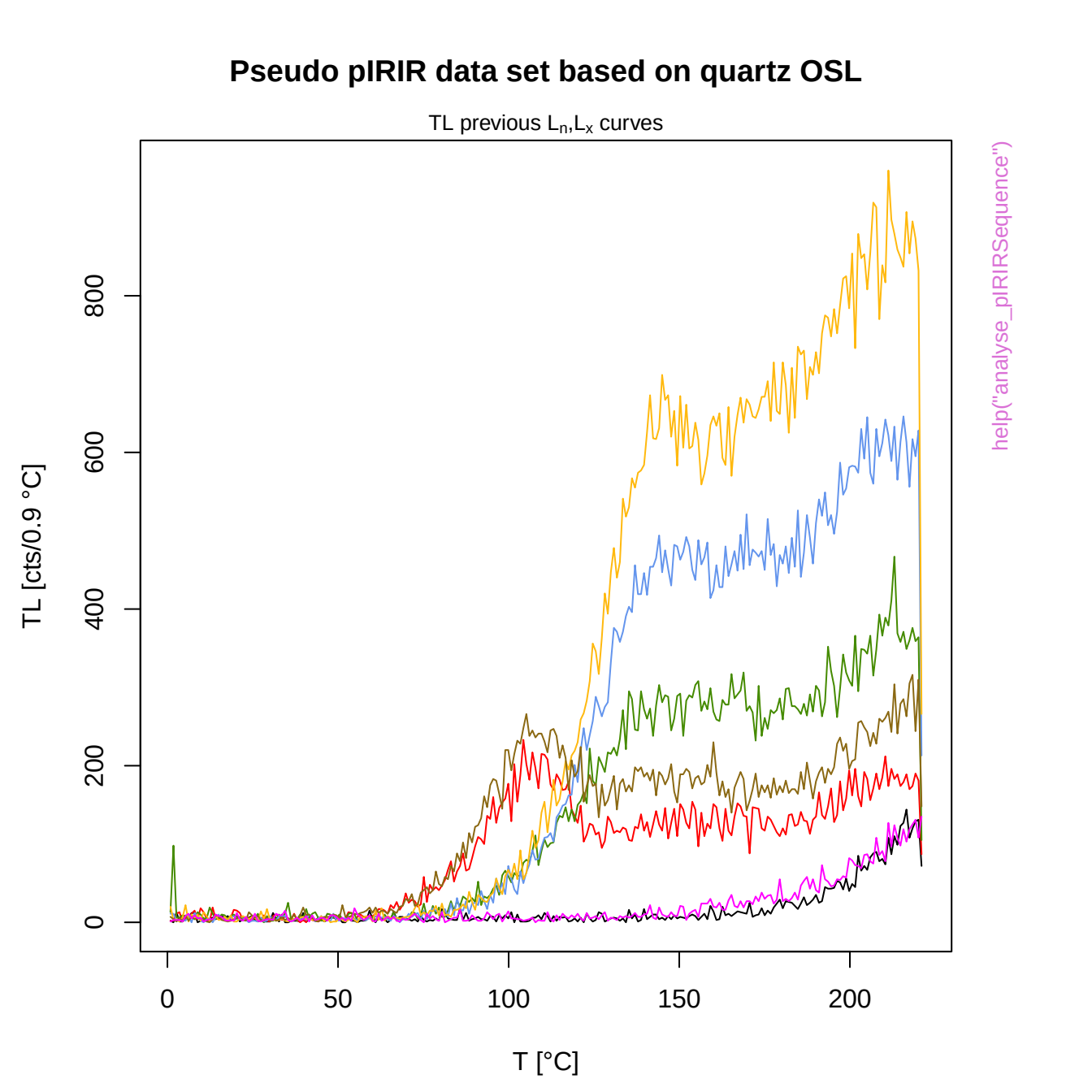

L_n,L_x curves
TL [a.u.]
1
10
100
1000
10000
0
100
200
300
400
Temp. [°C]
T_n,T_x curves
TL [a.u.]
1
10
100
1000
10000
0
100
200
300
400
Temp. [°C]
Plateau test L_n,L_x curves
TL [a.u.]
0
2000
6000
10000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
340
360
380
400
420
Temp. [°C]
plateau Test T_n,T_x curves
TL [a.u.]
0
1000
2000
3000
4000
0
1
2
3
4
340
360
380
400
420
Temp. [°C]
Natural
(0)
R1
(136)
R2
(317)
R3
(544)
R4
(815)
R0
(0)
R6
(317)

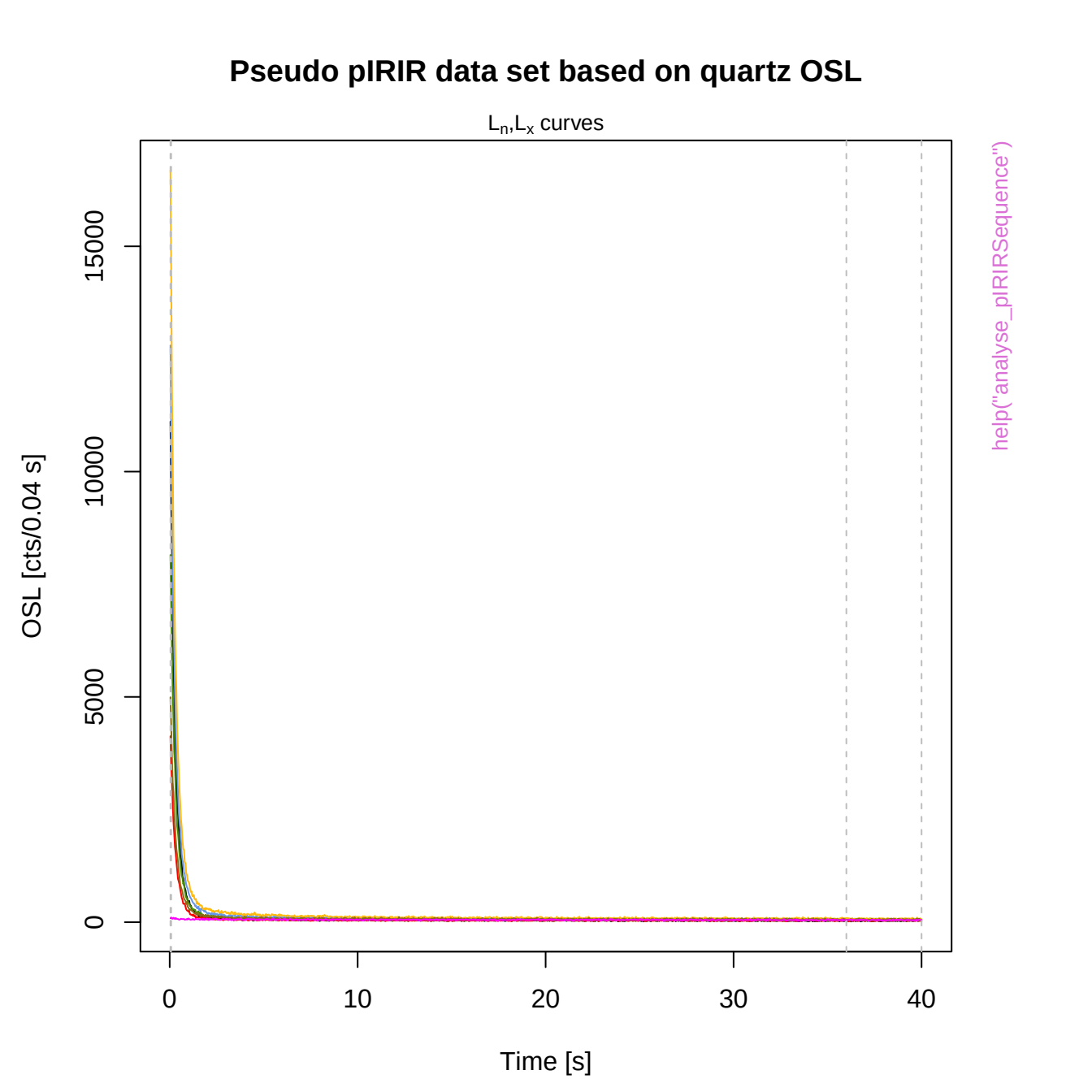

Growth curve
De = 406.28 ± 42.81 | fit: LIN
REG points
REG point repeated
REG point 0
Lx/Tx
0
2
4
6
0
200
400
600
800
Dose [s]
De from MC simulation
DeMC = 402.95 ± 42.81 | quality = 99.2 %
Frequency
1
6
12
17
300
400
500
Dose [s]
Test dose response
Tn/Tx
0.96
1.00
1.04
1
2
3
4
5
6
7
SAR cycle

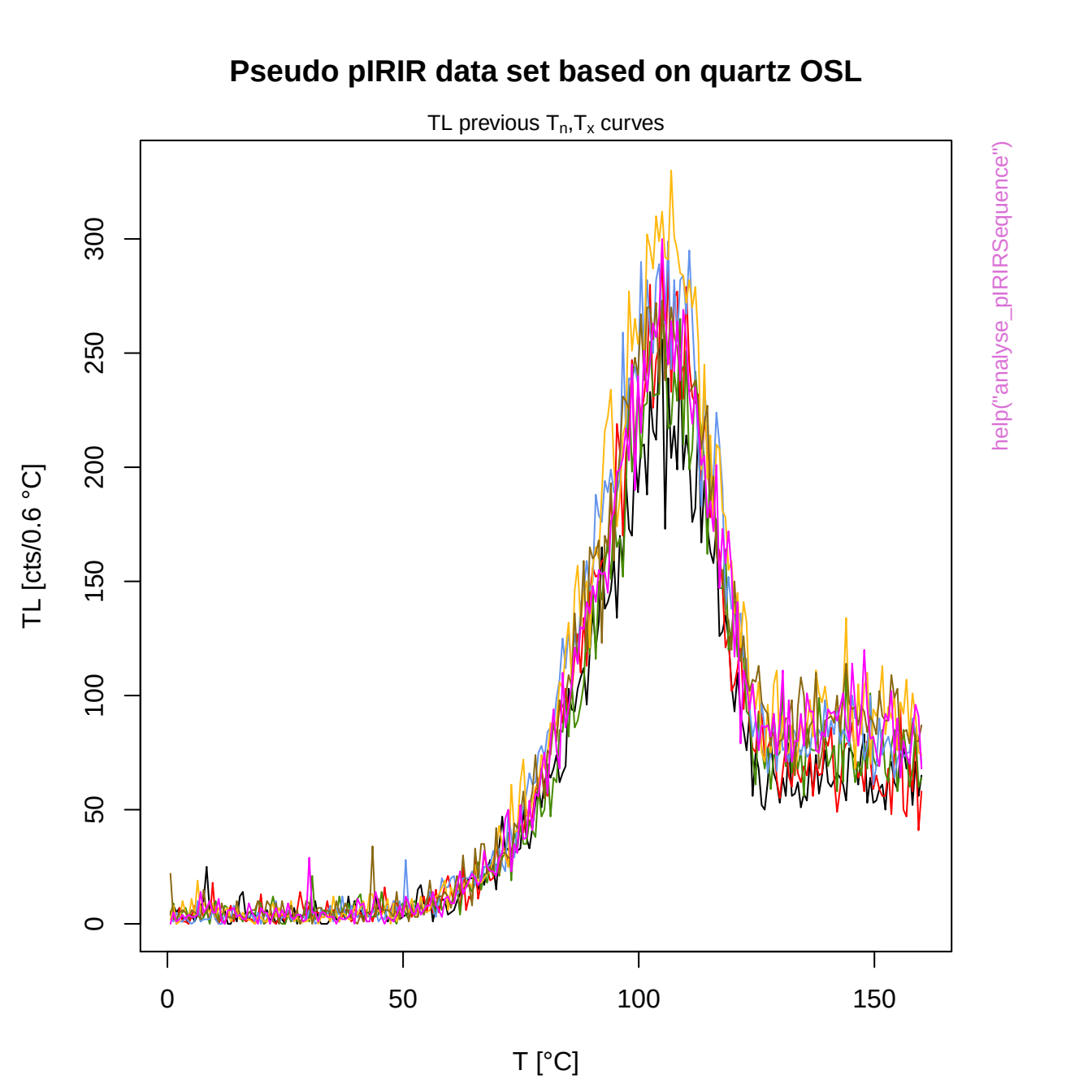
Pseudo pIRIR data set based on quartz OSL

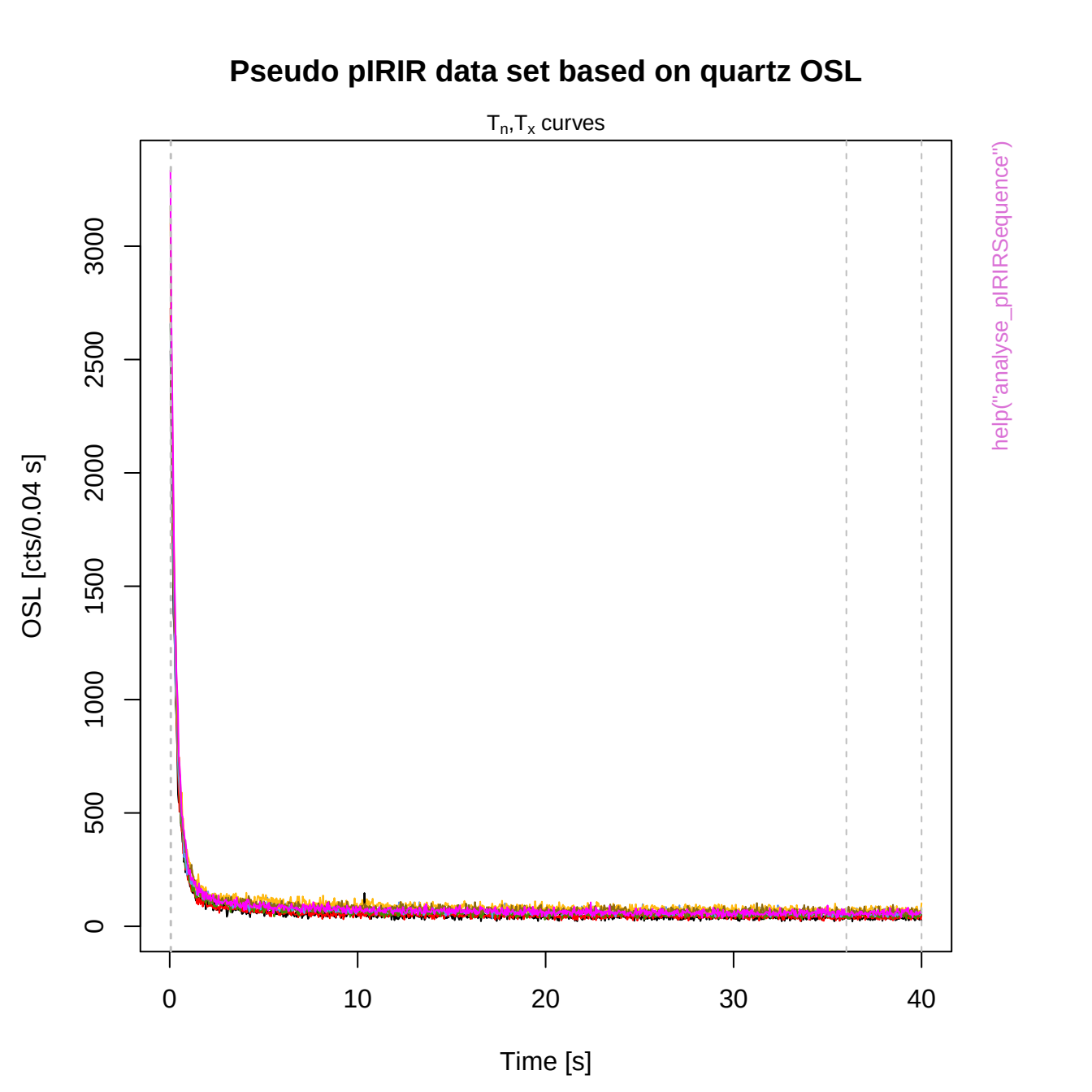
help("analyse_pIRIRSequence")

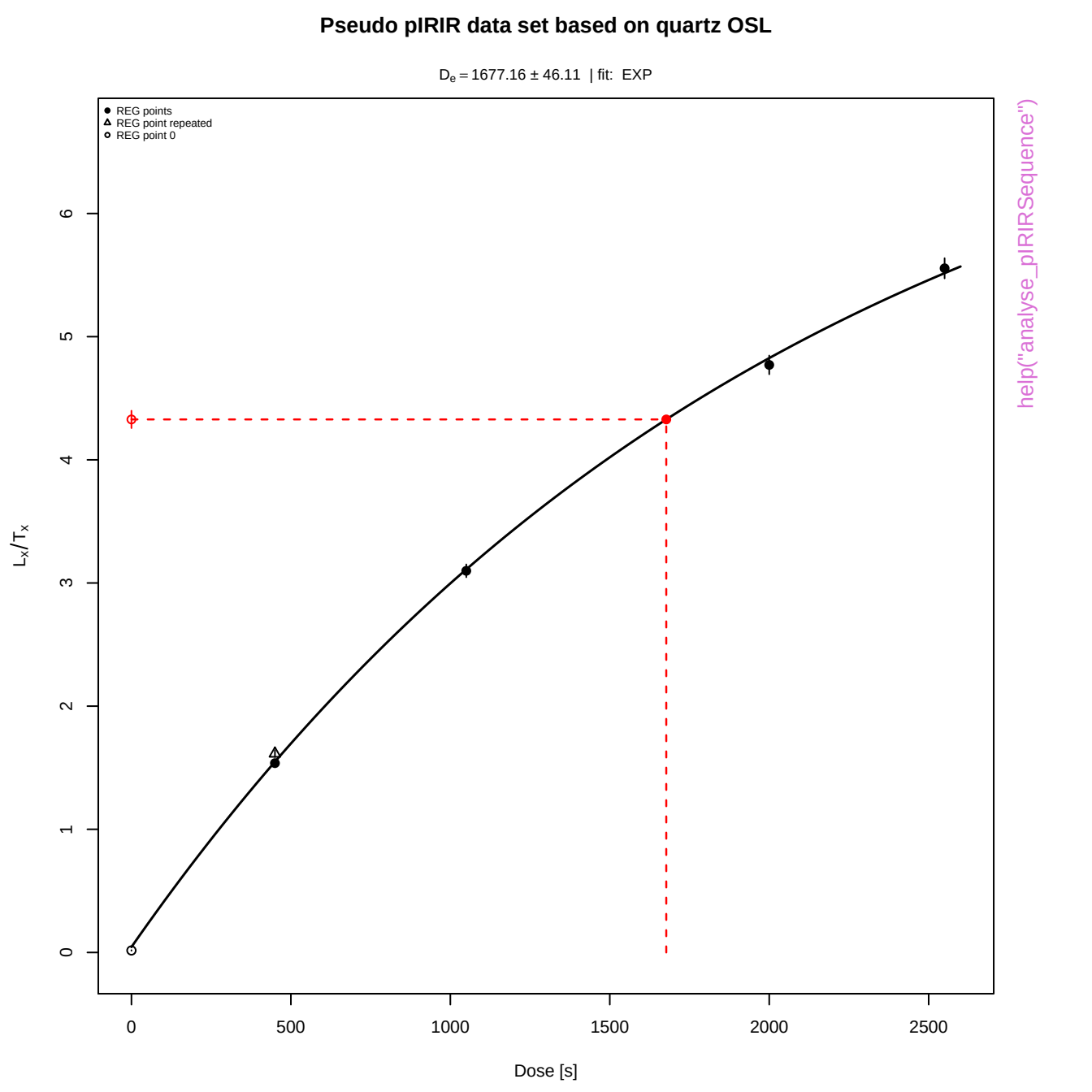
TL
pseudoIRSL1
pseudoIRSL2

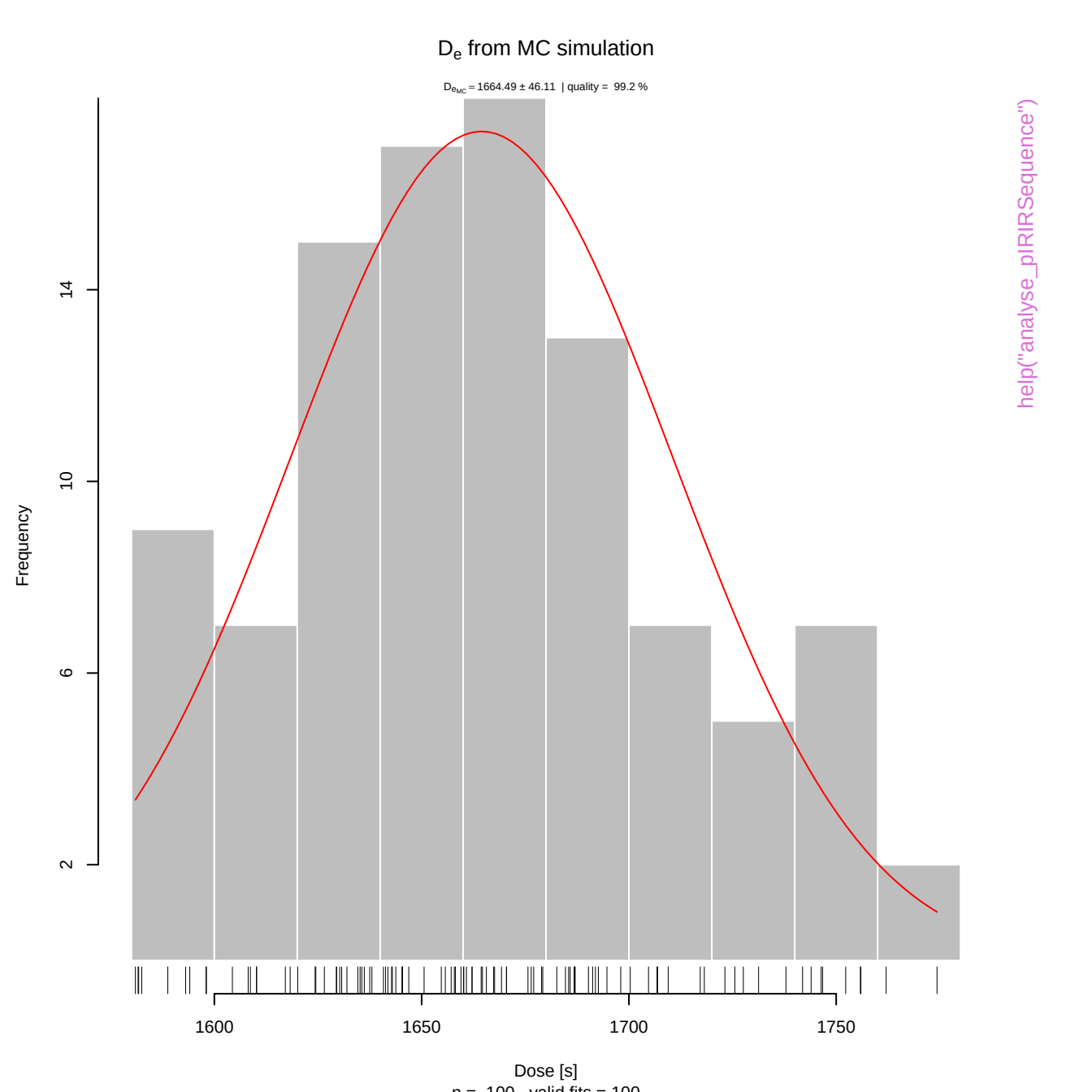

Pseudo pIRIR data set based on quartz OSL
TL previous L_n,L_x curves
TL [cts/0.9 °C]
0
200
400
600
800
0
50
100
150
200
T [°C]
help("analyse_pIRIRSequence")

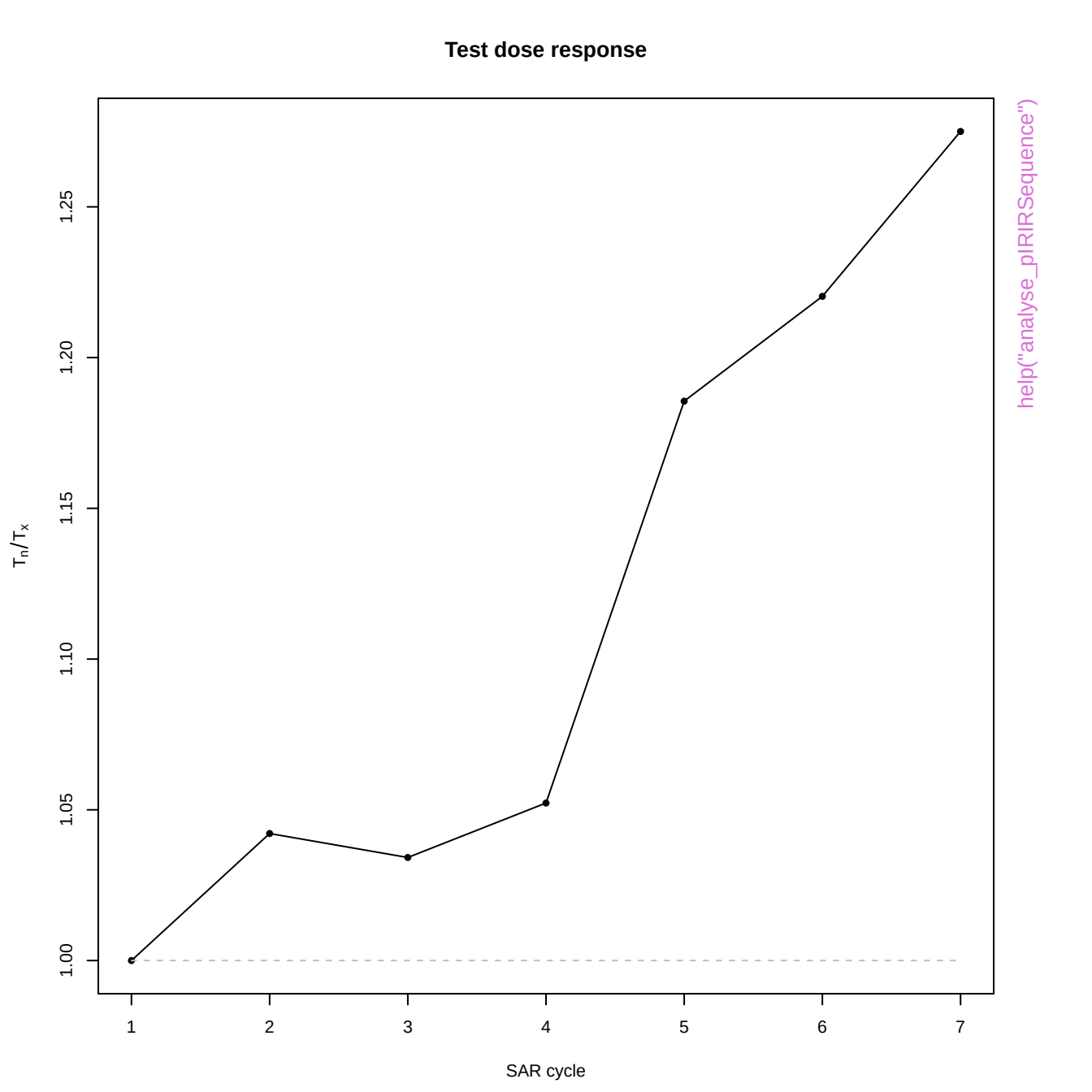

Pseudo pIRIR data set based on quartz OSL
L_n,L_x curves
OSL [cts/0.04 s]
0
5000
10000
15000
0
10
20
30
40
Time [s]
help("analyse_pIRIRSequence")

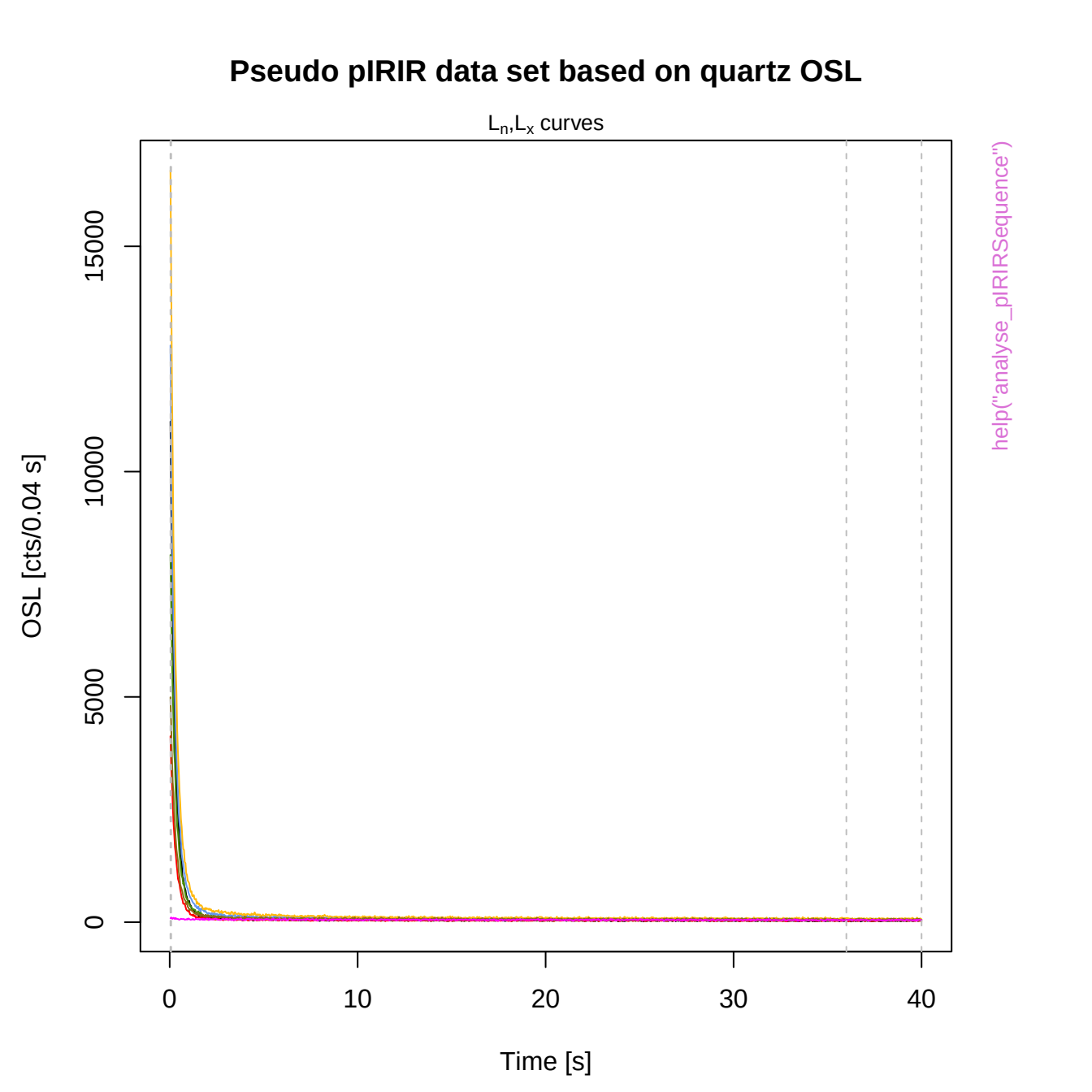

Pseudo pIRIR data set based on quartz OSL
TL previous T_n,T_x curves
TL [cts/0.6 °C]
0
50
100
150
200
250
300
T [°C]
0
50
100
150
help("analyse_pIRIRSequence")

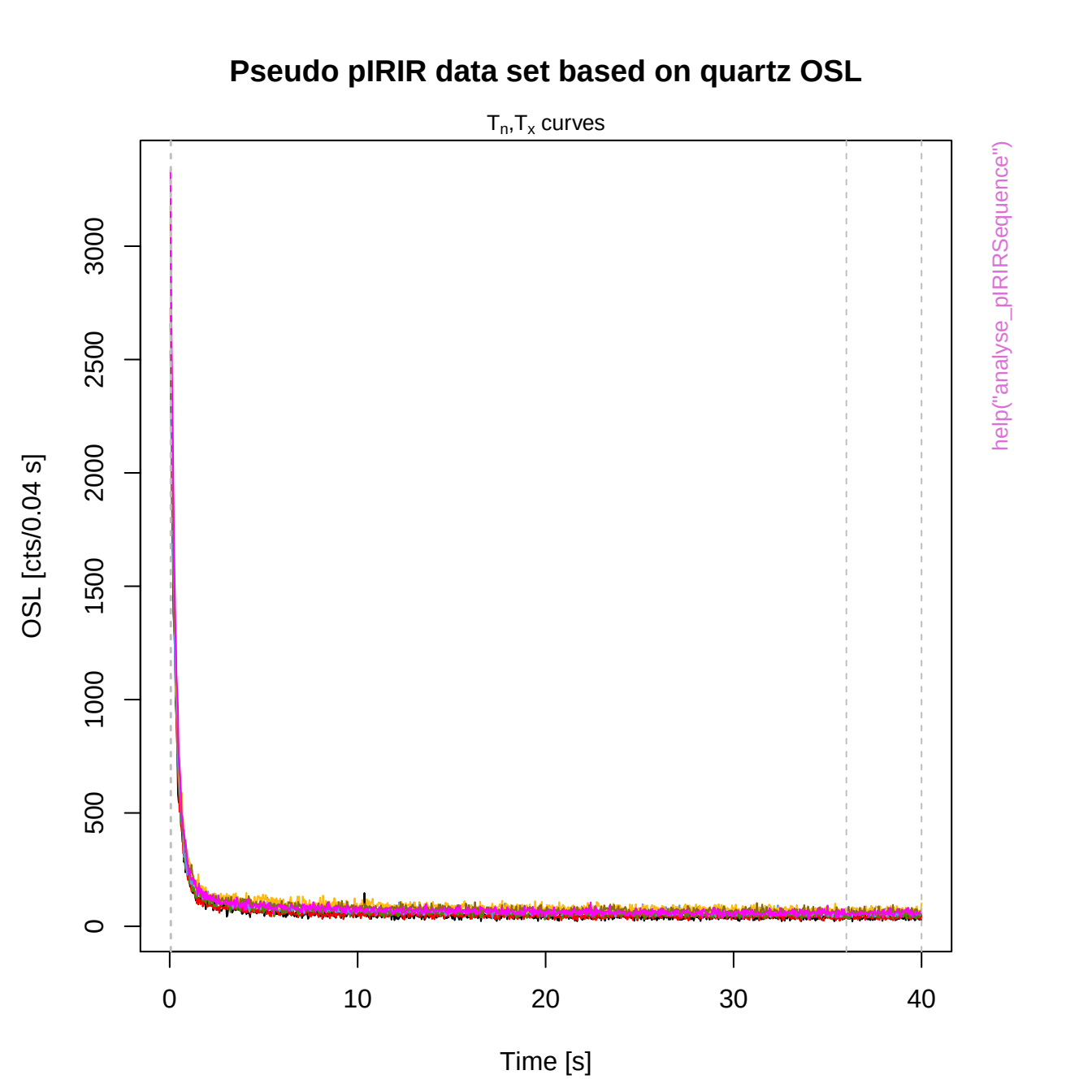

Pseudo pIRIR data set based on quartz OSL
T_n,T_x curves
OSL [cts/0.04 s]
0
500
1000
1500
2000
2500
3000
0
10
20
30
40
Time [s]
help("analyse_pIRIRSequence")


Pseudo pIRIR data set based on quartz OSL
De = 1677.16 ± 46.11 | fit: EXP
REG points
REG point repeated
REG point 0
Lx/Tx
Dose [s]
0
500
1000
1500
2000
2500
0
1
2
3
4
5
6
help("analyse_pIRIRSequence")

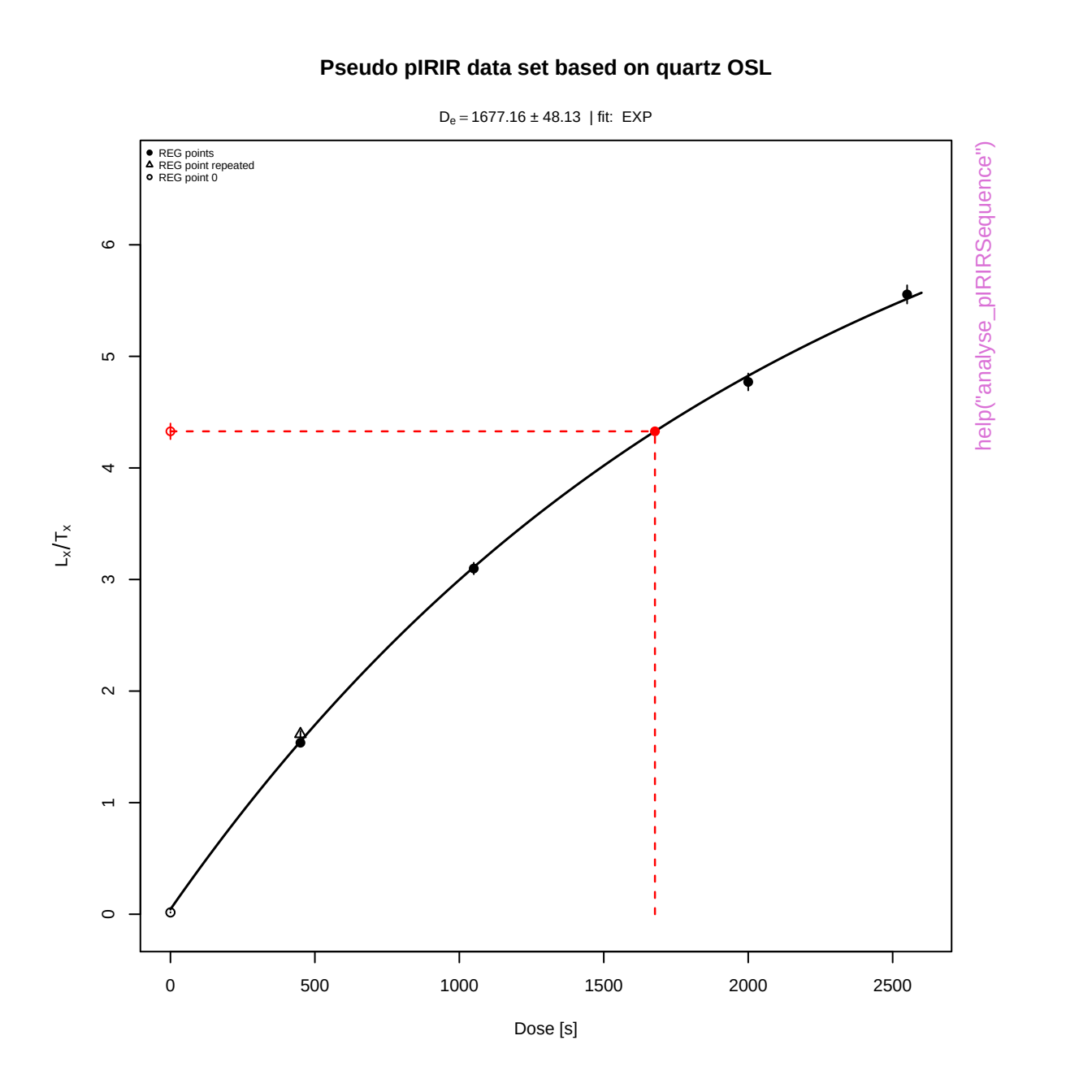

D$_e$ from MC simulation
$D_{e_{MC}}$ = 1664.49 ± 46.11 | quality = 99.2 %
help("analyse_pIRIRSequence")
Frequency
2
6
10
14
1600
1650
1700
1750
Dose [s]
n = 100, valid fits = 100

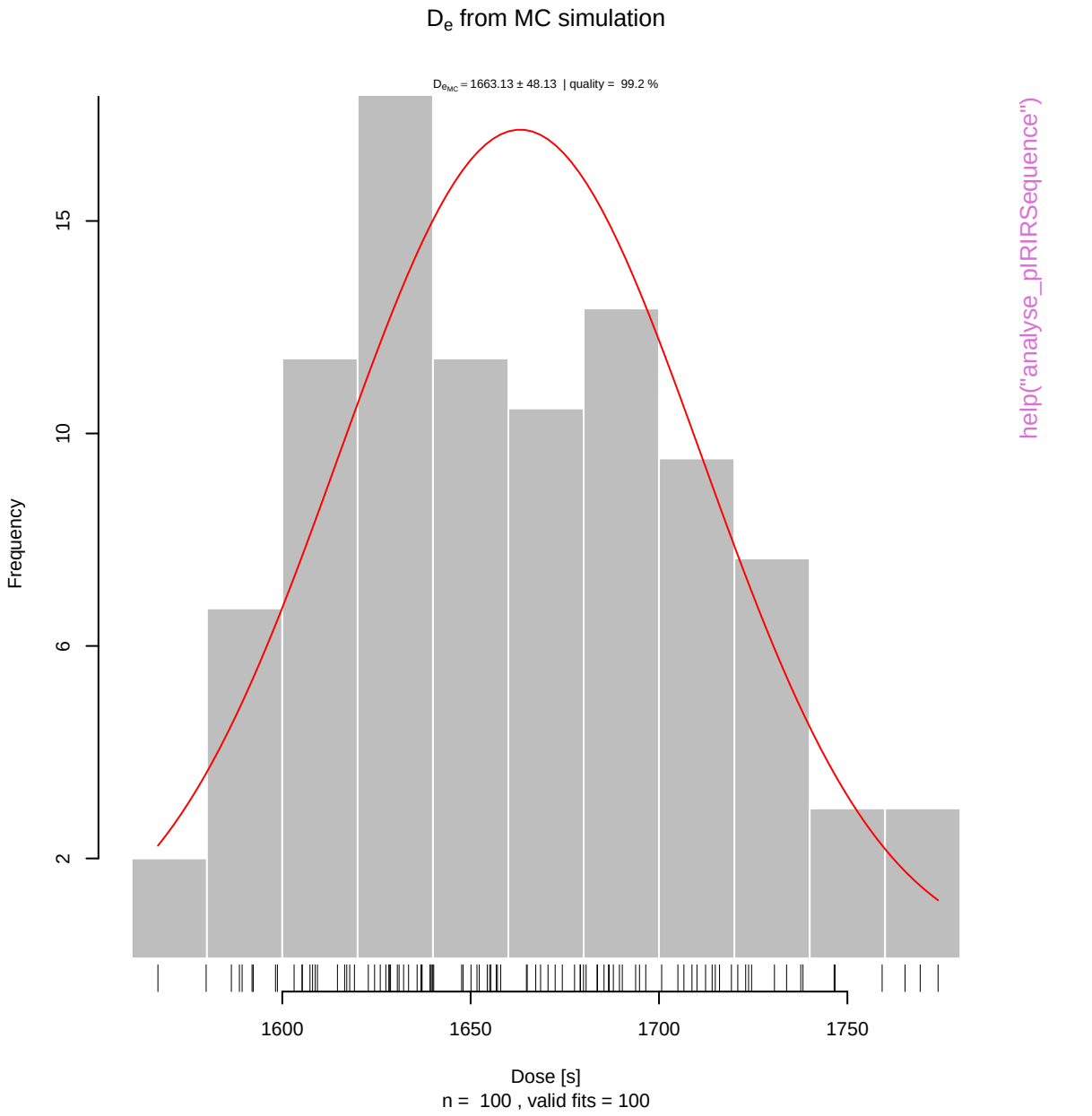

Test dose response
help("analyse_plRIRSequence")
T_n/T_x
1.00
1.05
1.10
1.15
1.20
1.25
1
2
3
4
5
6
7
SAR cycle

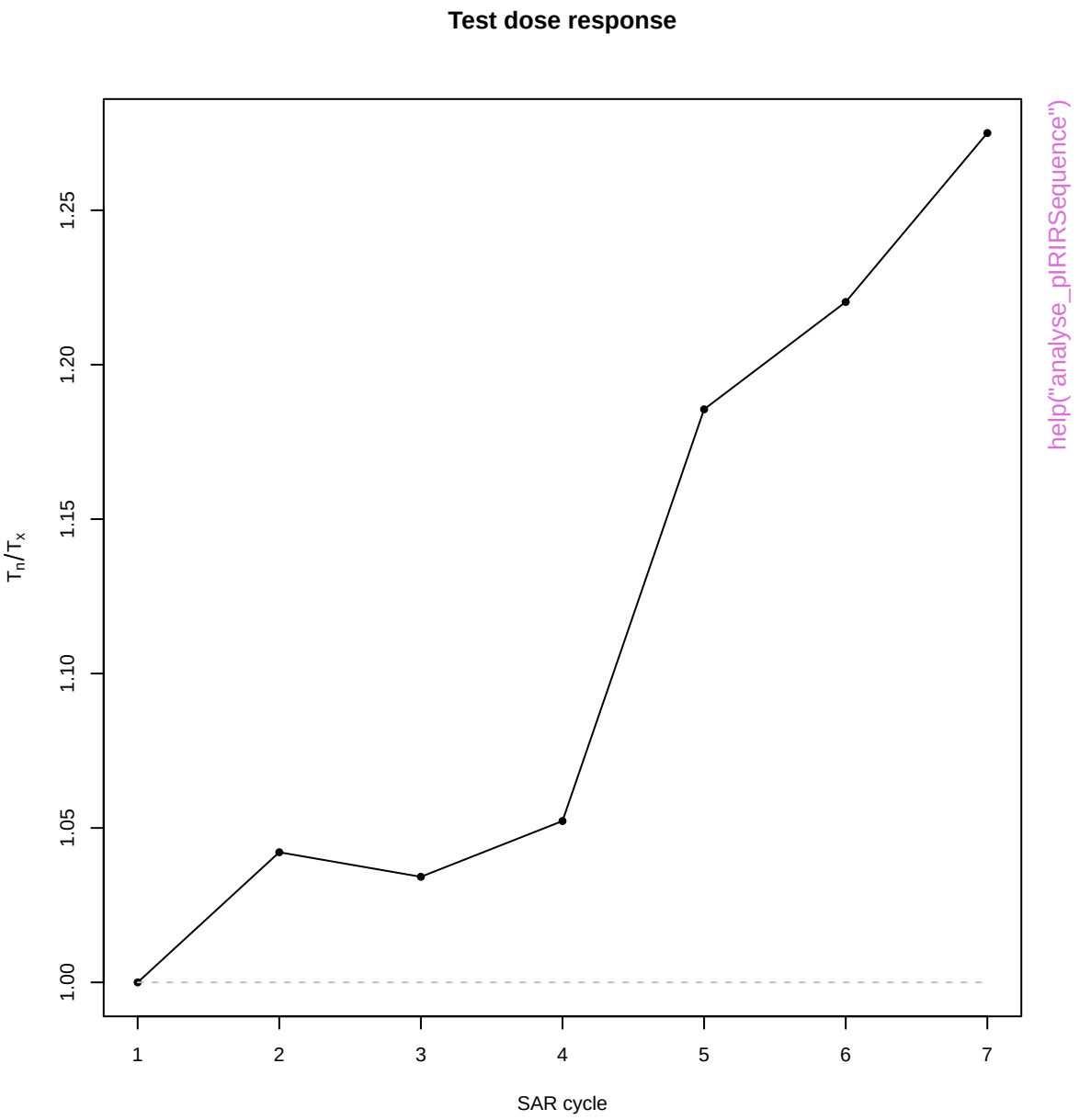

Pseudo pIRIR data set based on quartz OSL
L_n,L_x curves
OSL [cts/0.04 s]
0
5000
10000
15000
0
10
20
30
40
Time [s]
help("analyse_pIRIRSequence")

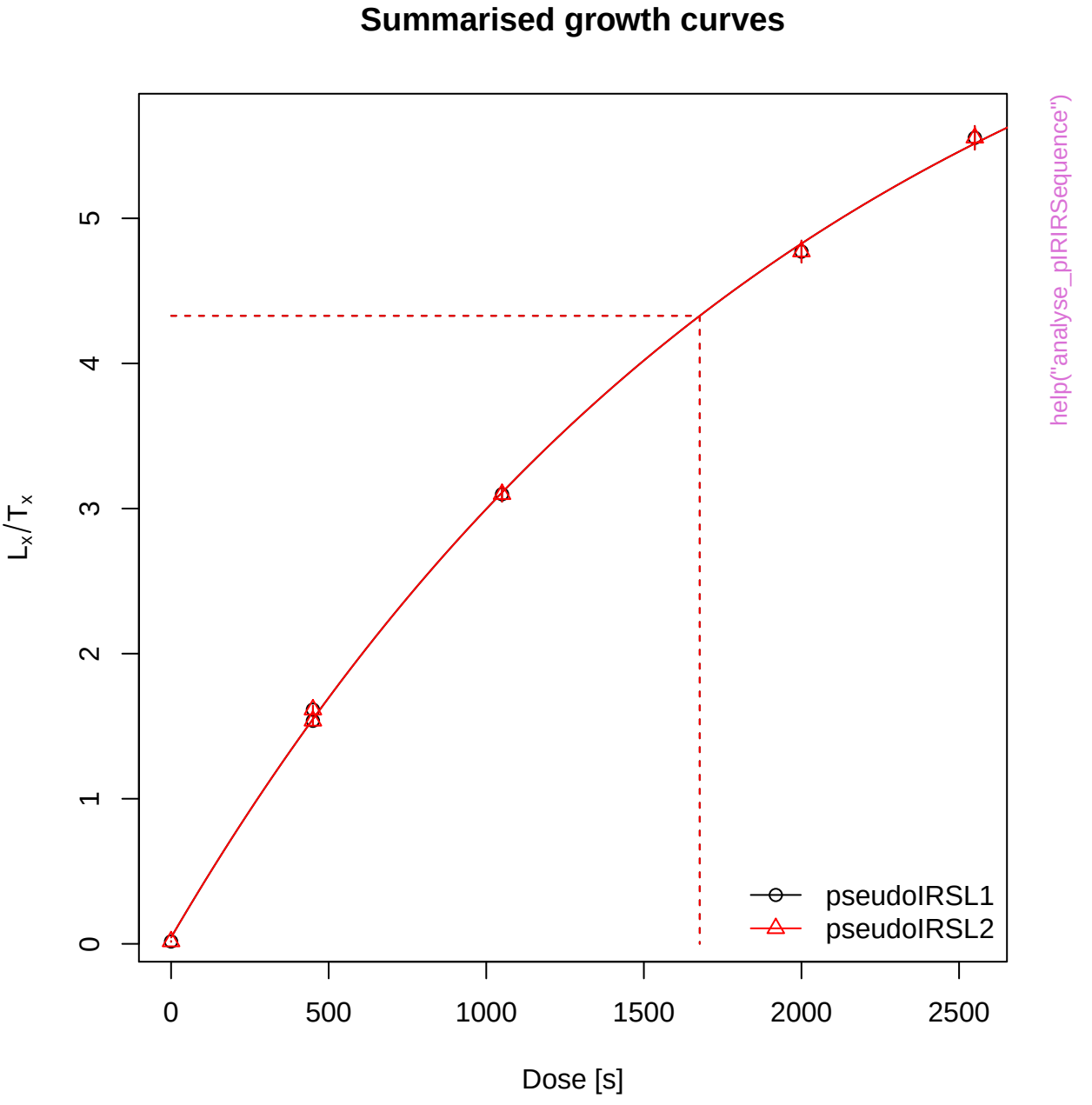

Pseudo pIRIR data set based on quartz OSL
T_n,T_x curves
OSL [cts/0.04 s]
0
500
1000
1500
2000
2500
3000
0
10
20
30
40
Time [s]
help("analyse_pIRIRSequence")

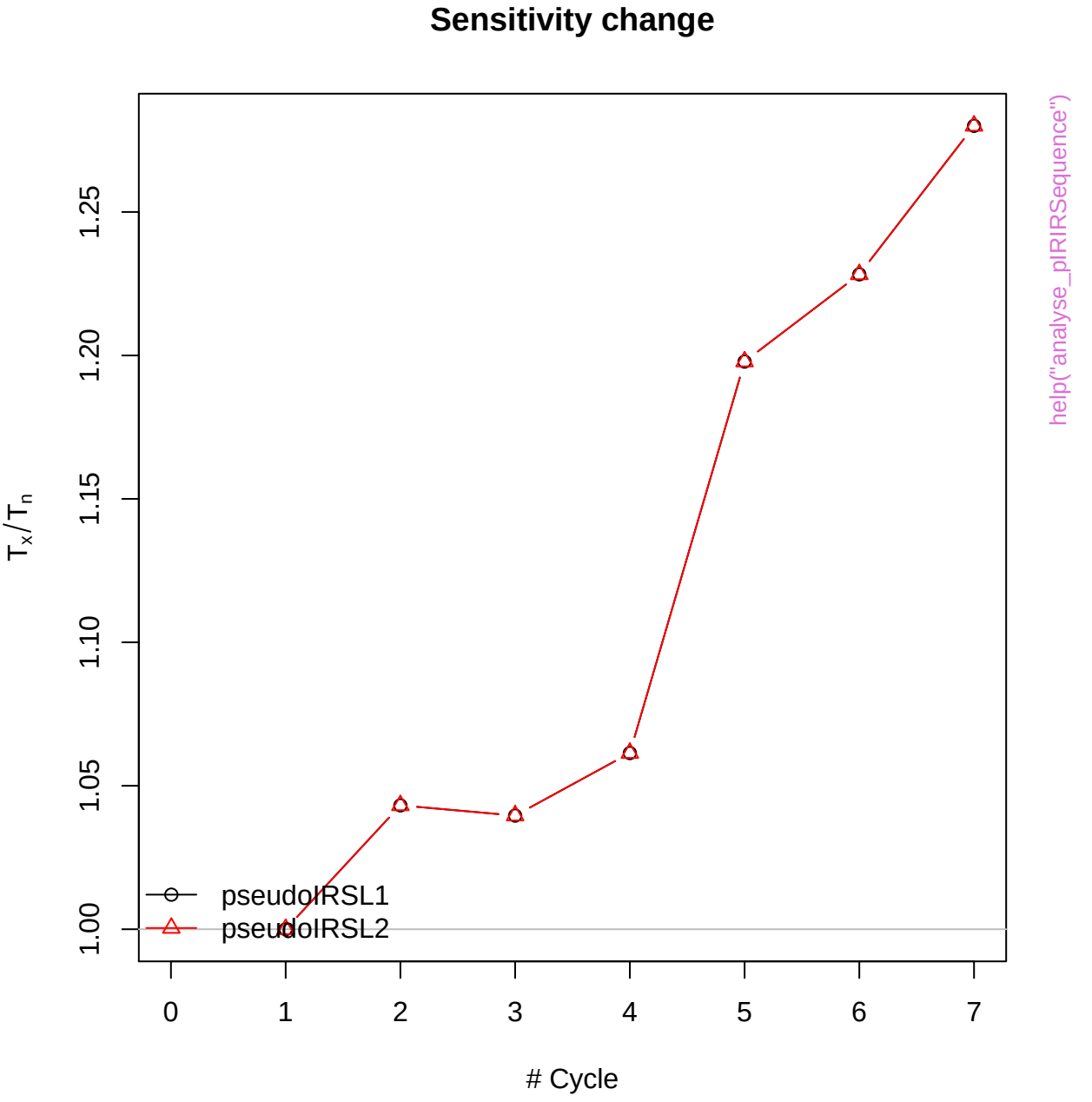
help("analyse_plRIRSequence")

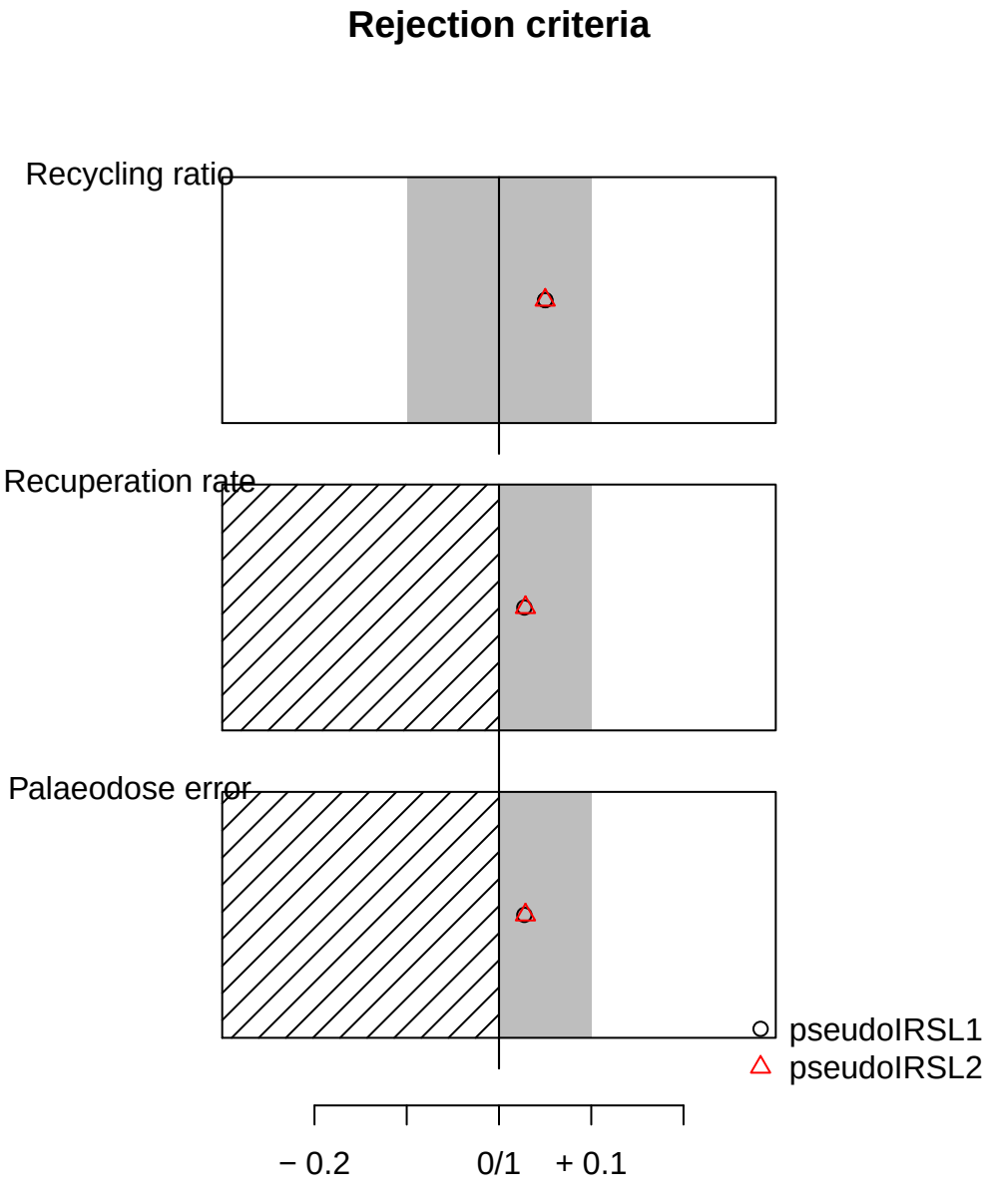

Pseudo pIRIR data set based on quartz OSL
De = 1677.16 ± 48.13 | fit: EXP
REG points
REG point repeated
REG point 0
Lx/Tx
Dose [s]
0
500
1000
1500
2000
2500
1
2
3
4
5
6
help("analyse_pIRIRSequence")

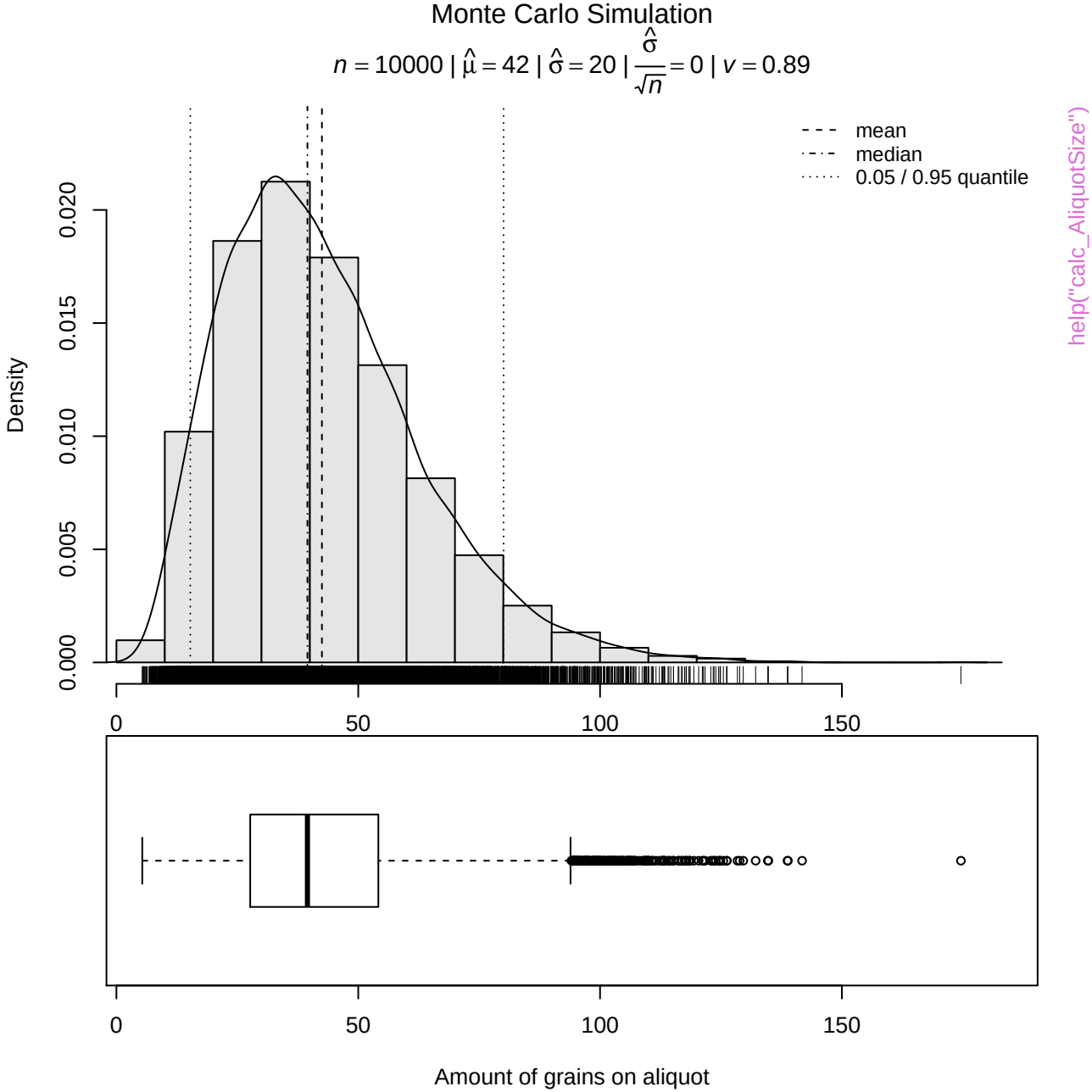

De from MC simulation
De_MC = 1663.13 ± 48.13 | quality = 99.2 %
Frequency
2
6
10
15
1600
1650
1700
1750
Dose [s]
n = 100 , valid fits = 100
help("analyse_pIRIRSequence")

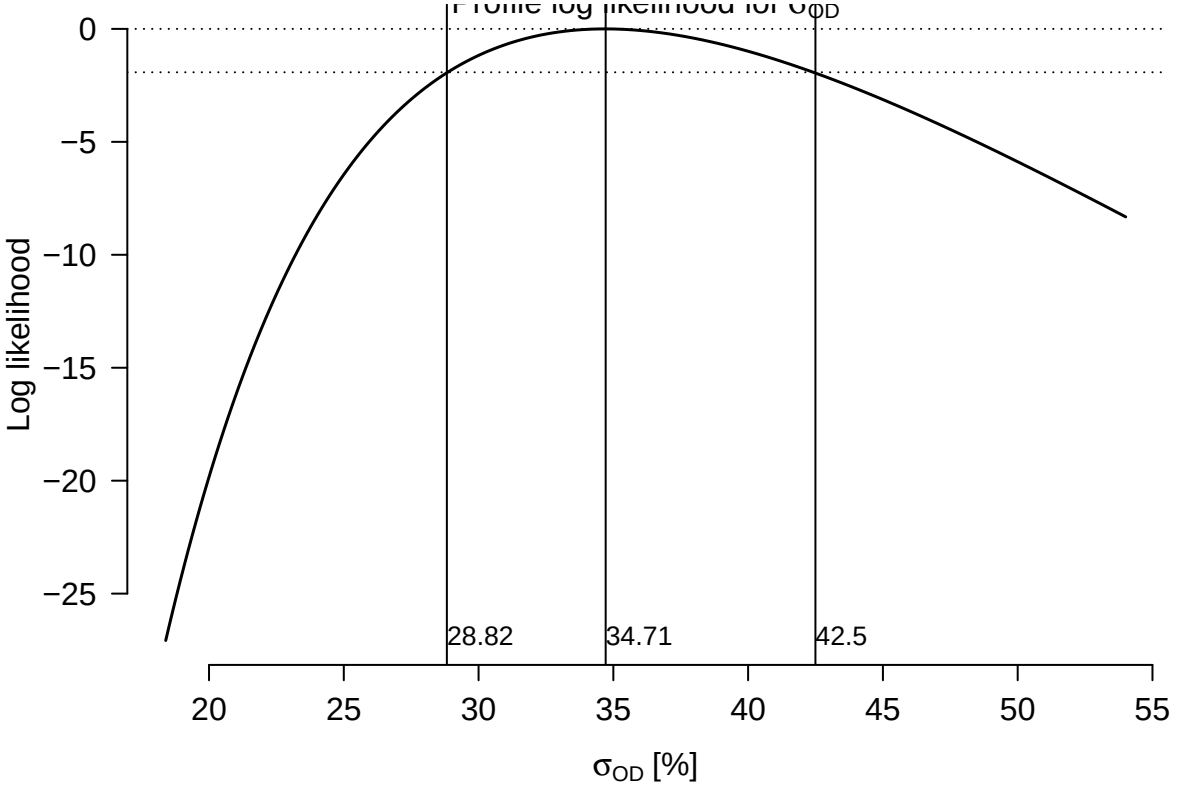

Test dose response
T_n/T_x
1.00
1.05
1.10
1.15
1.20
1.25
1
2
3
4
5
6
7
SAR cycle
help("analyse_pIRIRSequence")

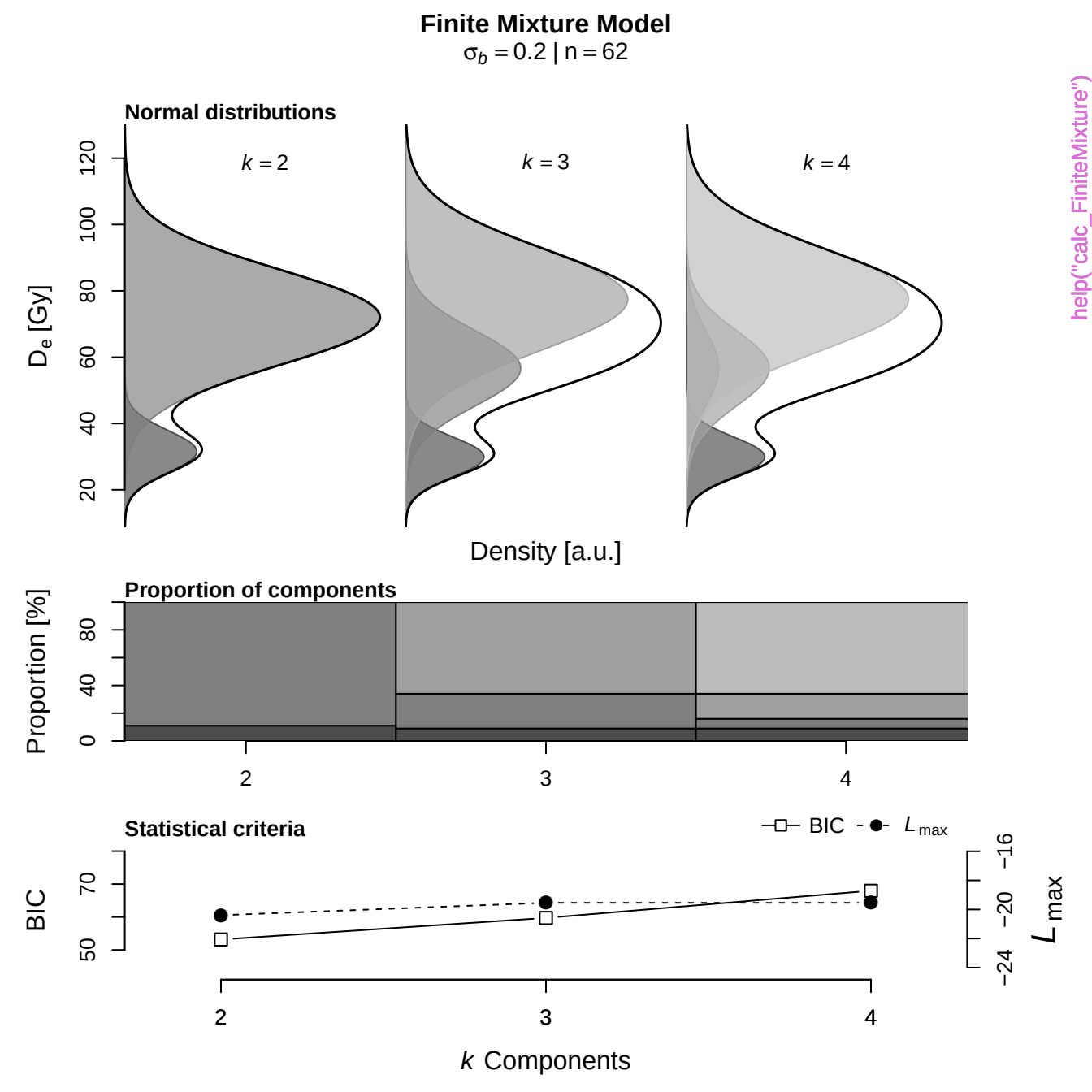

Summarised growth curves
help("analyse_pIRIRSequence")
L_x/T_x
0
1
2
3
4
5
0
500
1000
1500
2000
2500
Dose [s]
pseudoIRSL1
pseudoIRSL2

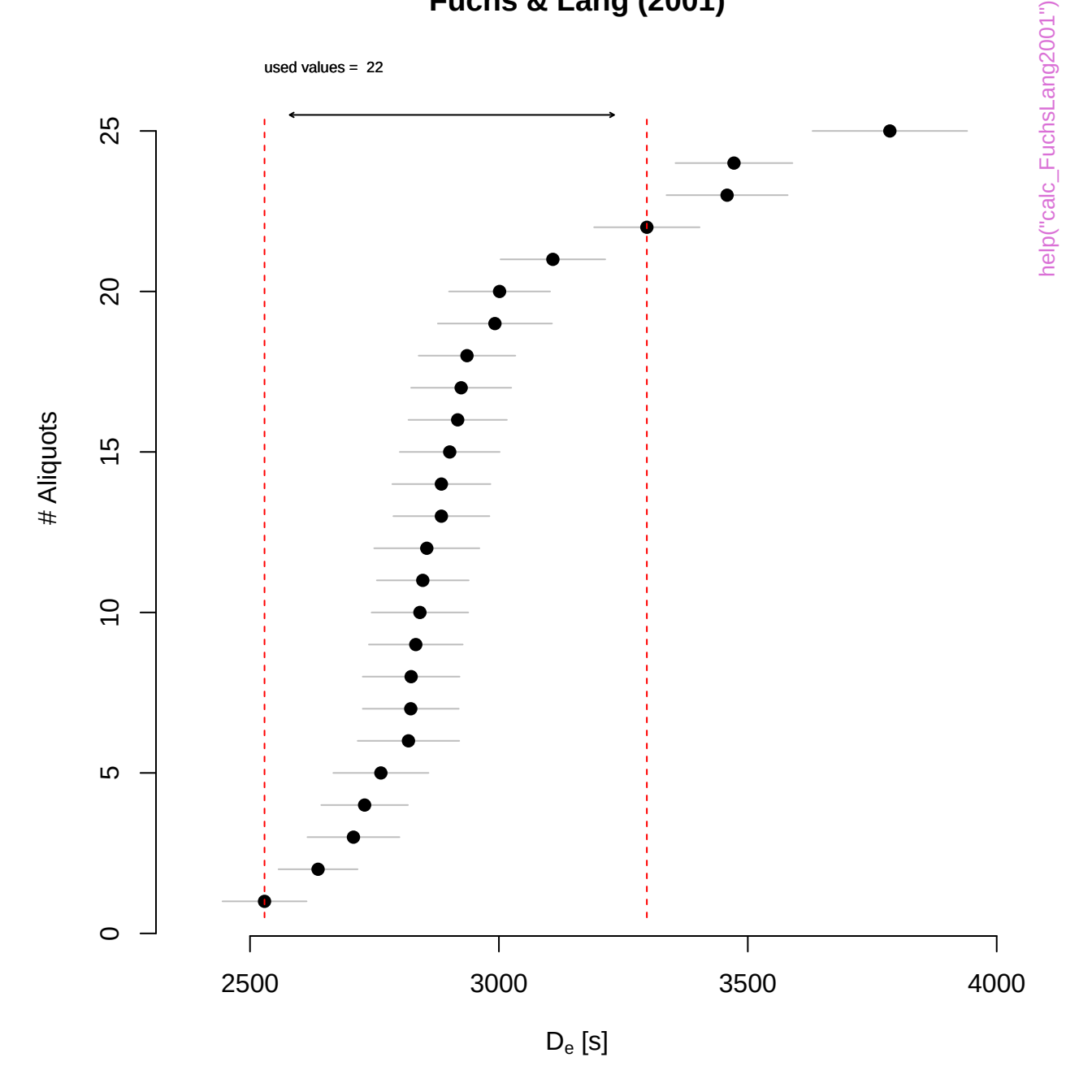

Sensitivity change
help("analyse_pIRIRSequence")
T_x/T_n
1.00
1.05
1.10
1.15
1.20
1.25
0
1
2
3
4
5
6
7
Cycle
pseudoIRSL1
pseudoIRSL2

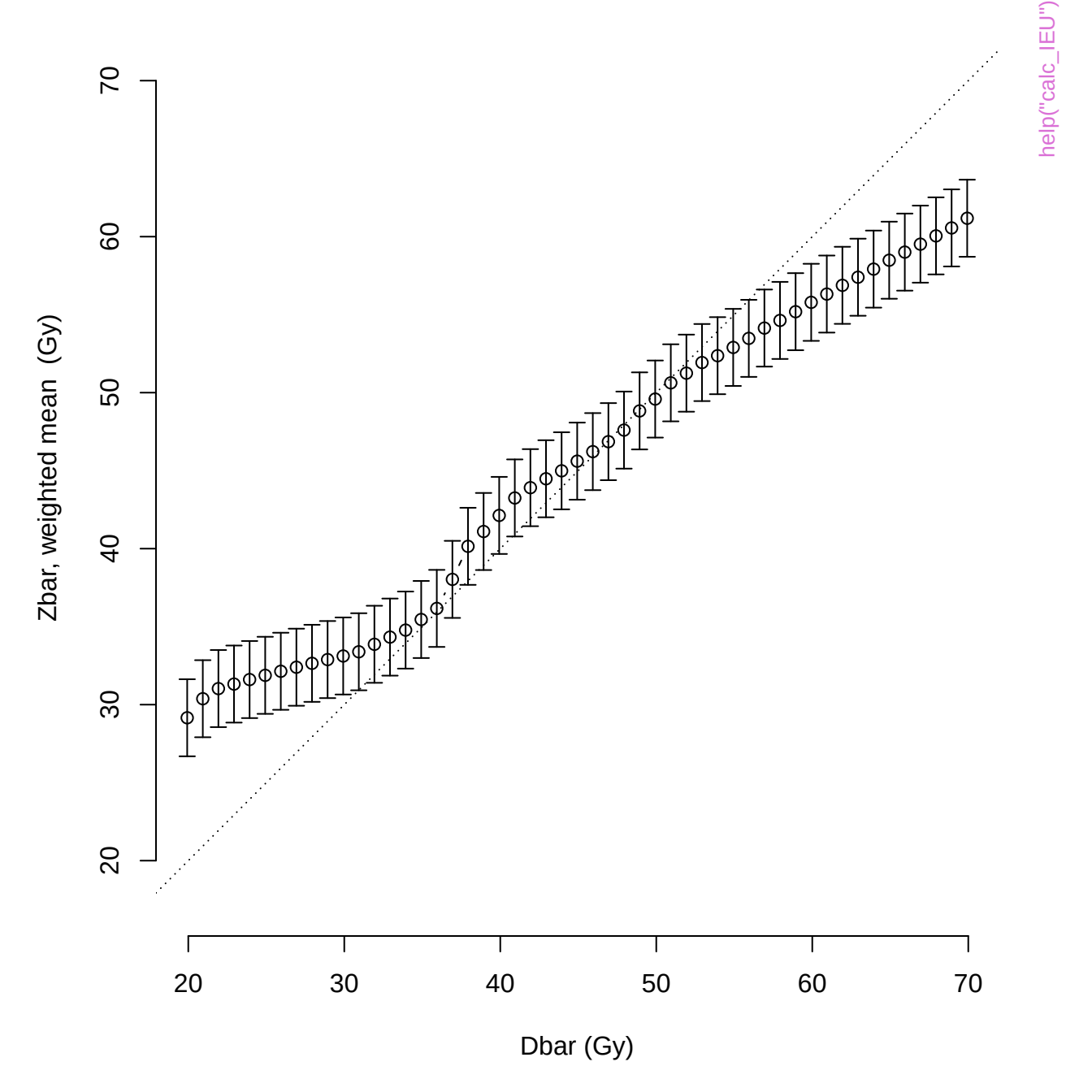

Rejection criteria
Recycling ratio
Recuperation rate
Palaeodose error
pseudoIRSL1
pseudoIRSL2
− 0.2
0/1
+ 0.1
help("analyse_pIRIRSequence")

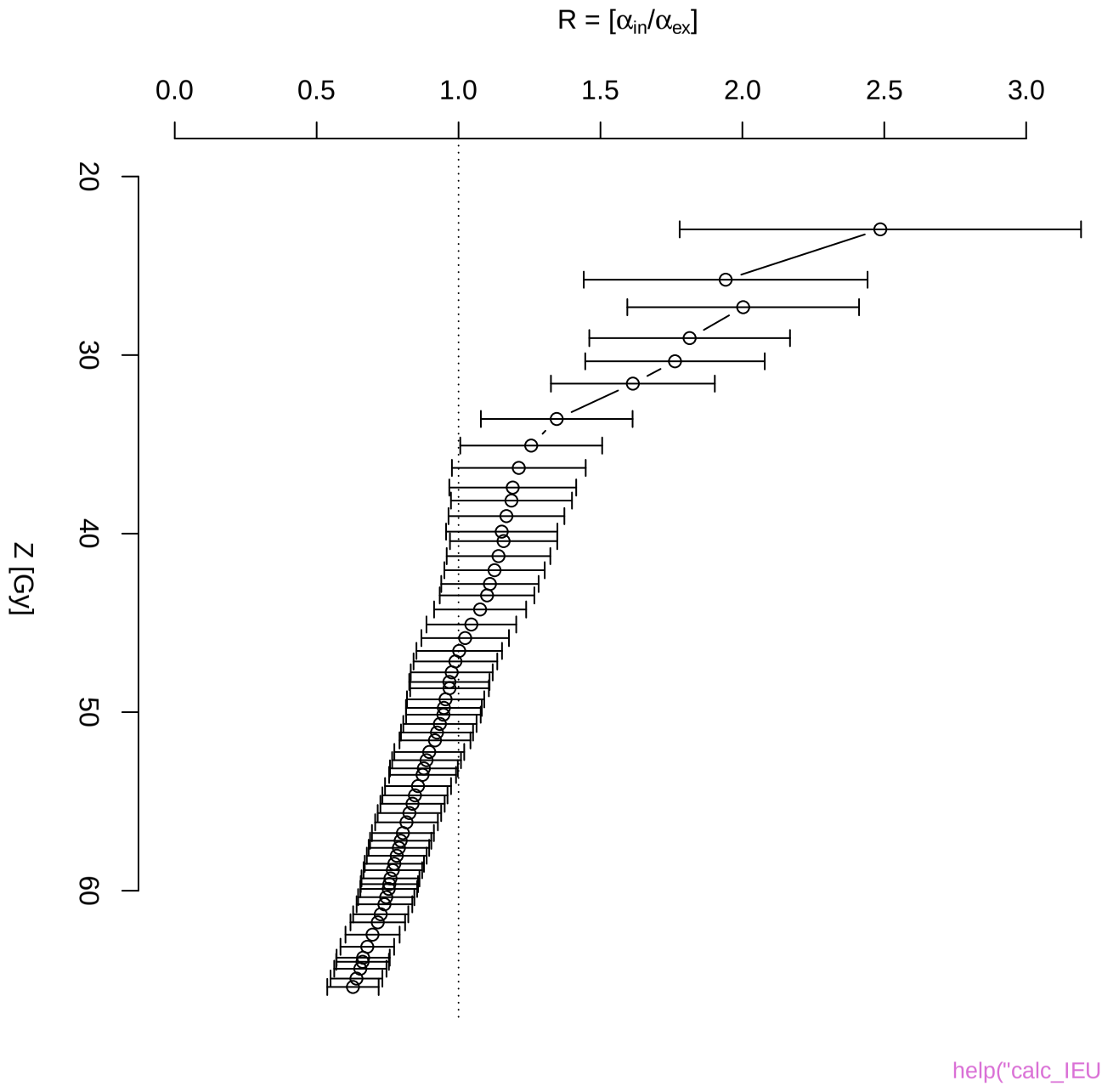

Monte Carlo Simulation
$n = 10000 \mid \hat{\mu} = 42 \mid \hat{\sigma} = 20 \mid \frac{\hat{\sigma}}{\sqrt{n}} = 0 \mid v = 0.89$
mean
median
0.05 / 0.95 quantile
help("calc_AliquotSize")
Density
0.000
0.005
0.010
0.015
0.020
0
50
100
150
Amount of grains on aliquot


Profile log likelihood for σOD
0
−5
−10
−15
−20
−25
Log likelihood
28.82
34.71
42.5
20
25
30
35
40
45
50
55
σOD [%]

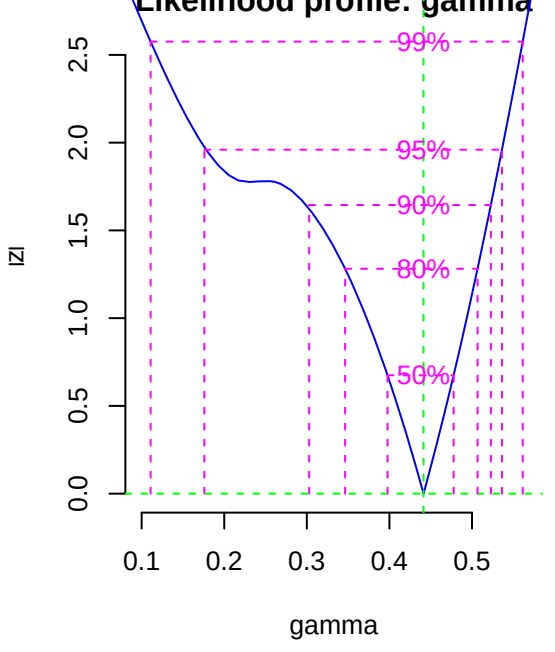

Finite Mixture Model
σb = 0.2 | n = 62
Normal distributions
k = 2
k = 3
k = 4
De [Gy]
20
40
60
80
100
120
Density [a.u.]
Proportion of components
Proportion [%]
0
40
80
2
3
4
Statistical criteria
BIC
Lmax
BIC
70
50
−16
−20
−24
2
3
4
k Components
help("calc_FiniteMixture")

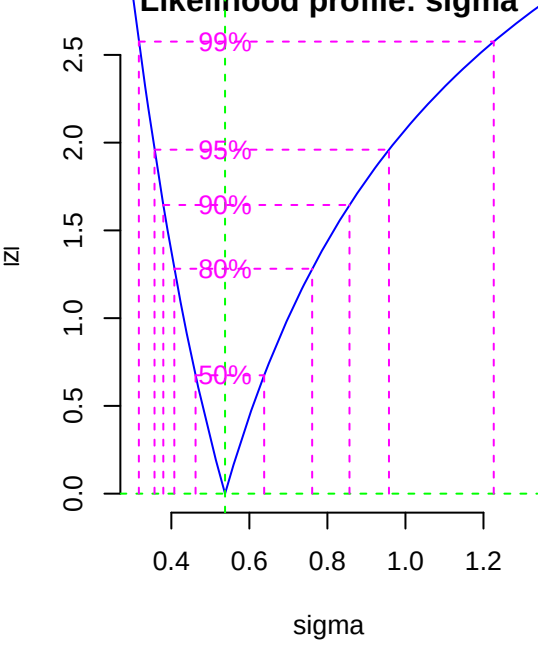

Fuchs & Lang (2001)
used values = 22
Aliquots
0
5
10
15
20
25
2500
3000
3500
4000
De [s]
help("calc_FuchsLang2001")

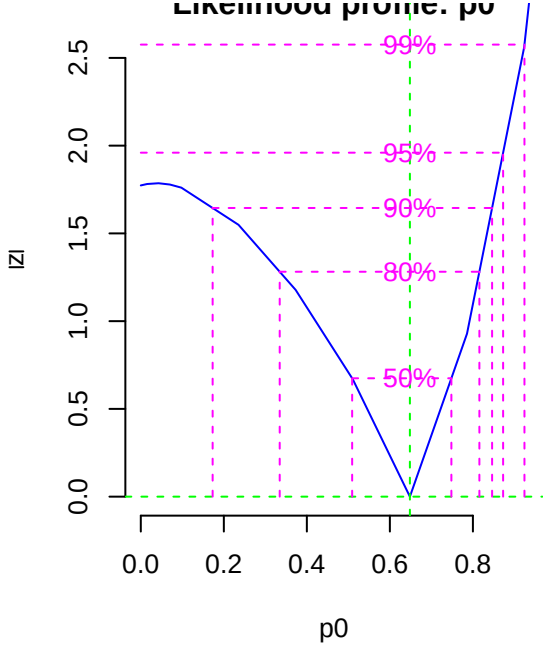

Zbar, weighted mean (Gy)
20
30
40
50
60
70
Dbar (Gy)
20
30
40
50
60
70
help("calc_IEU")



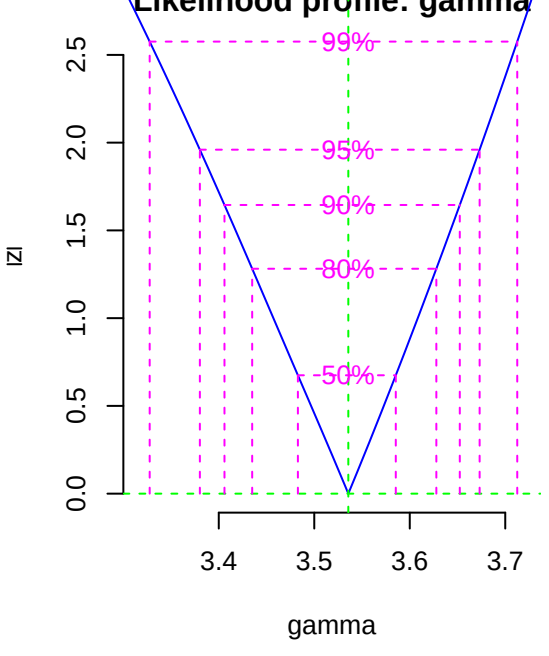
help("calc_IEU")

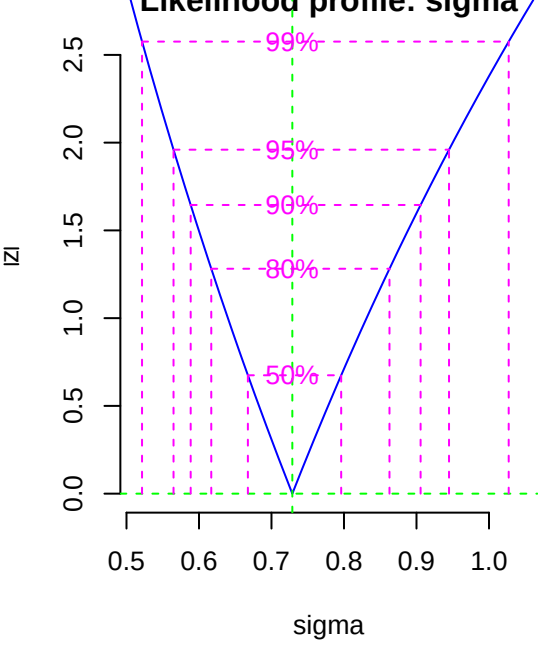


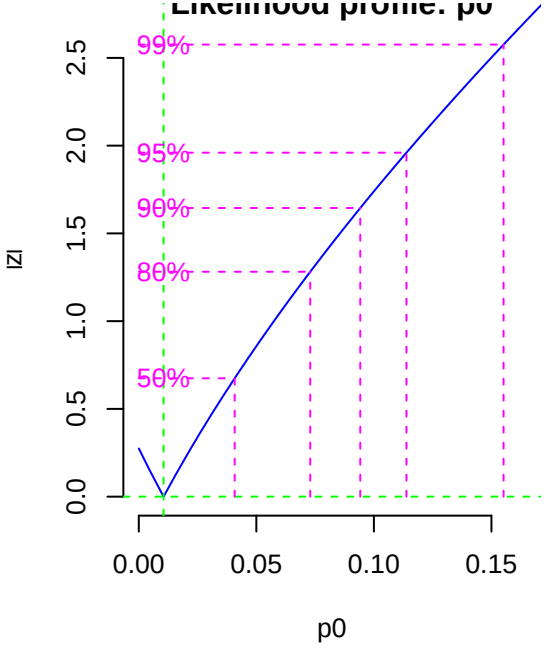




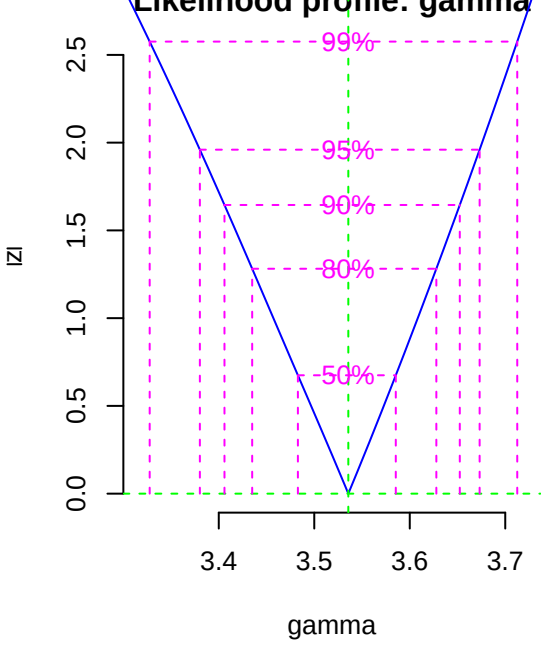
help("calc_MaxDose")

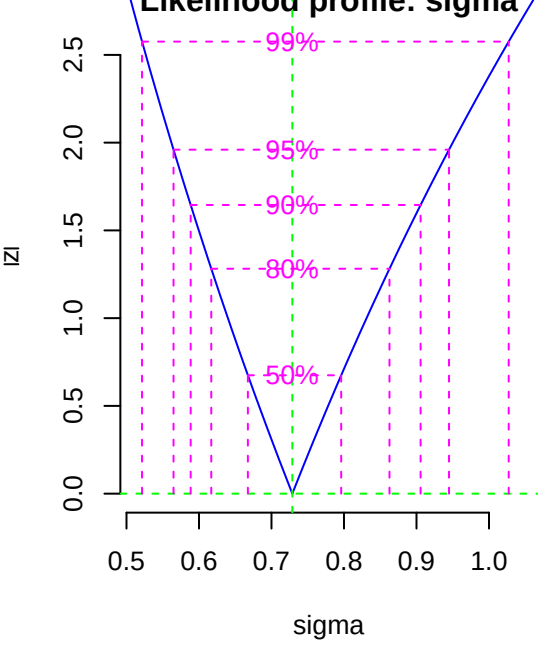


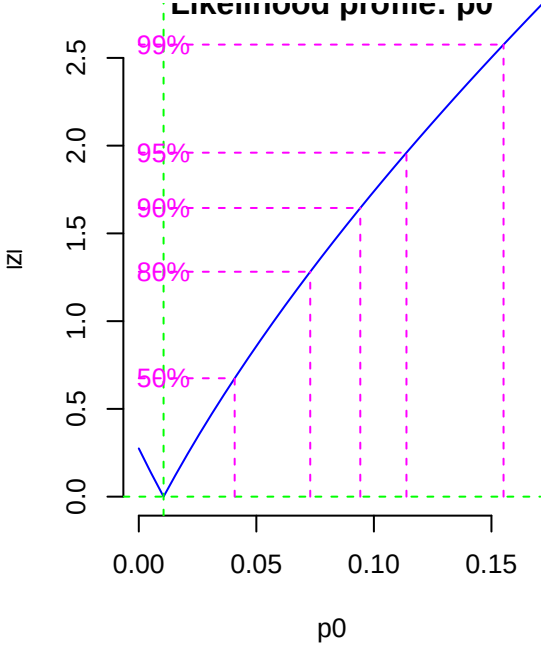




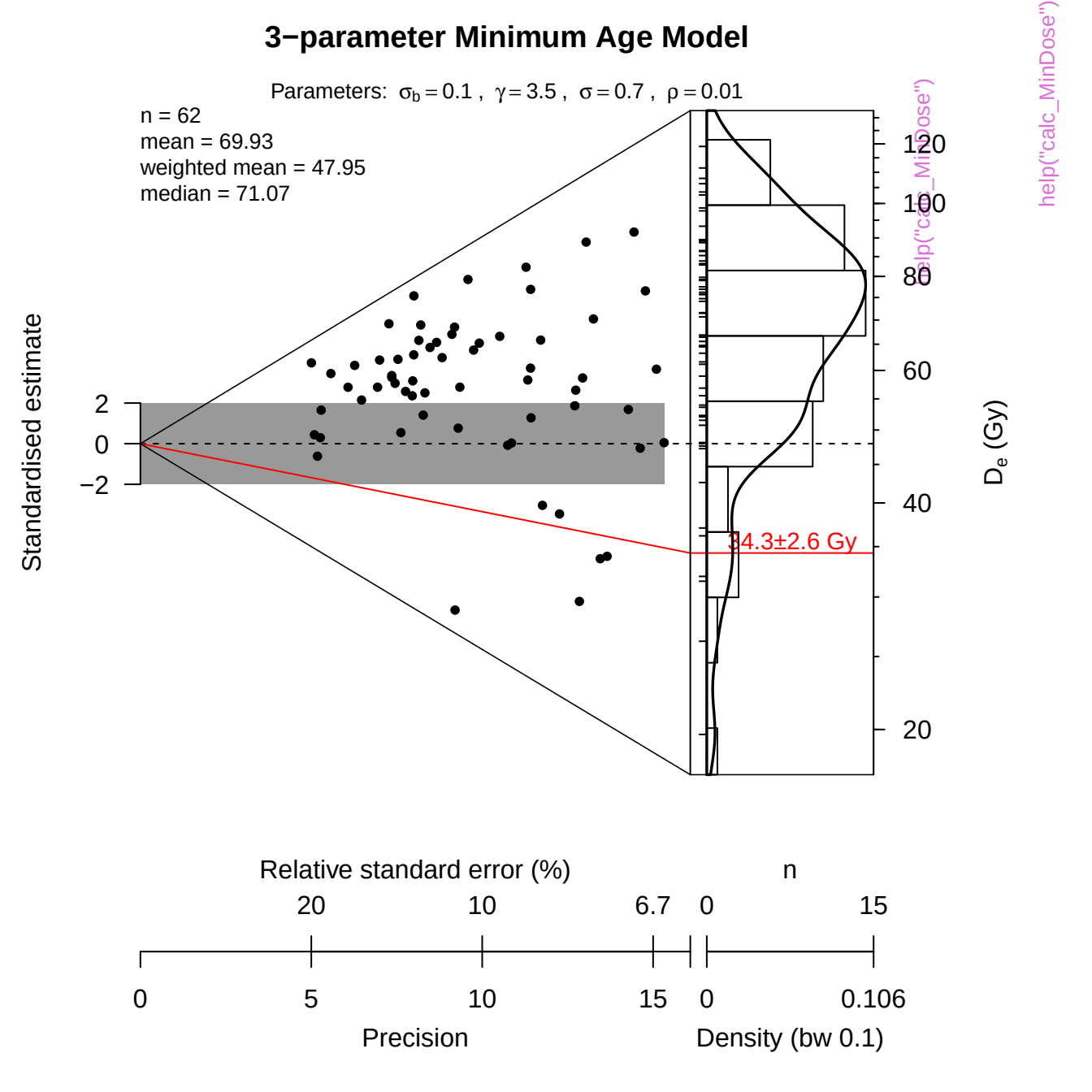
help("calc_MinDose")

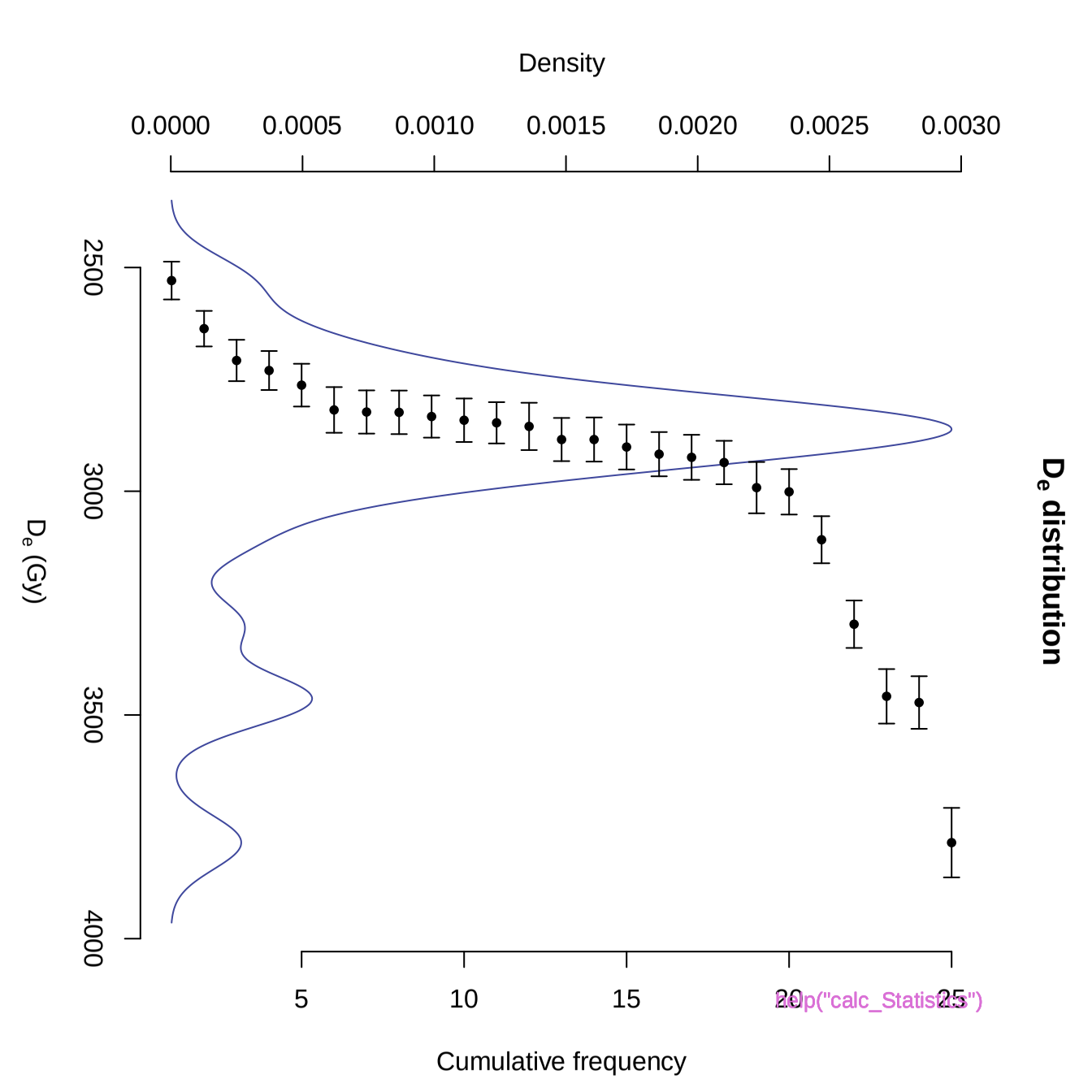


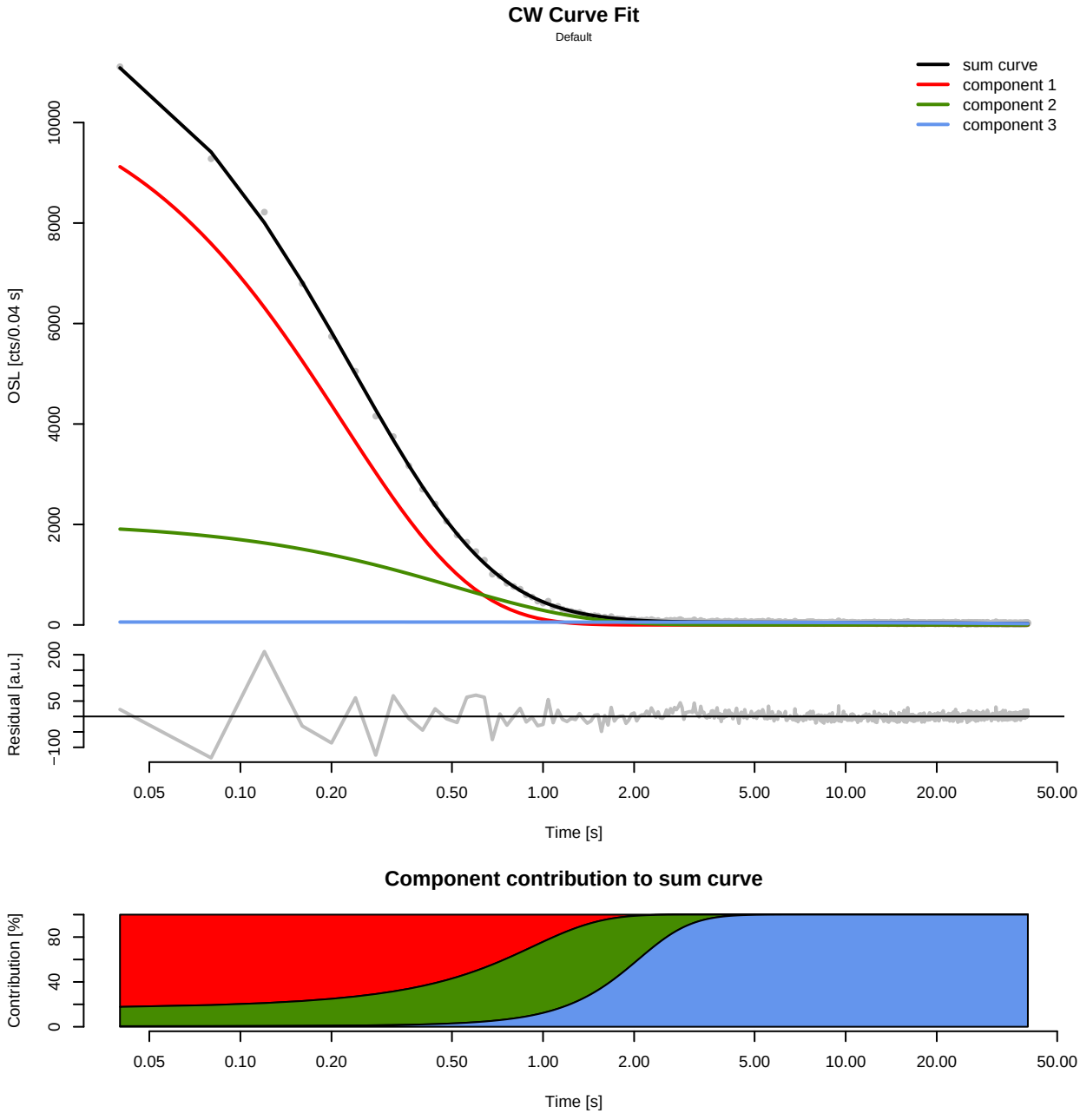


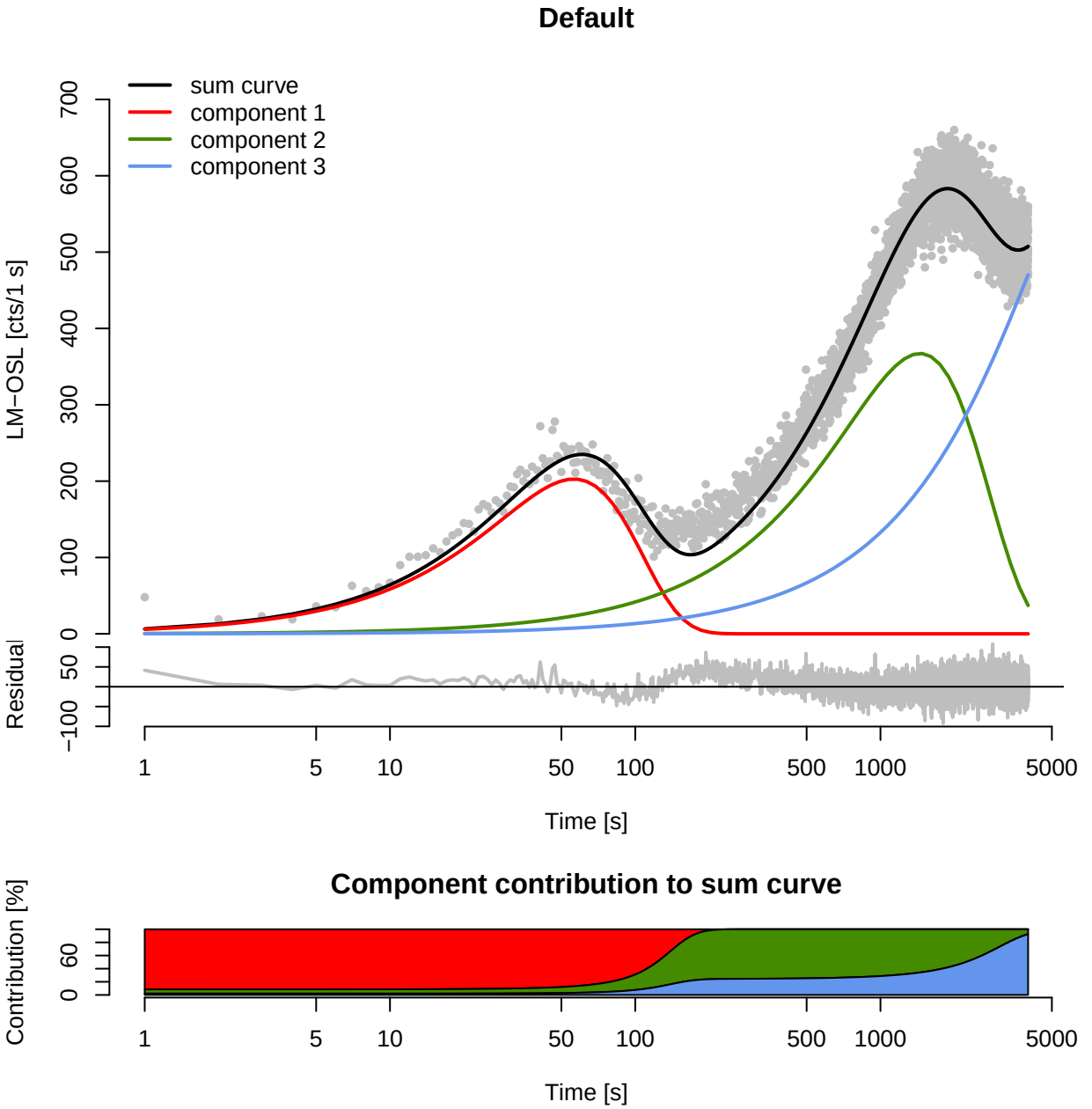


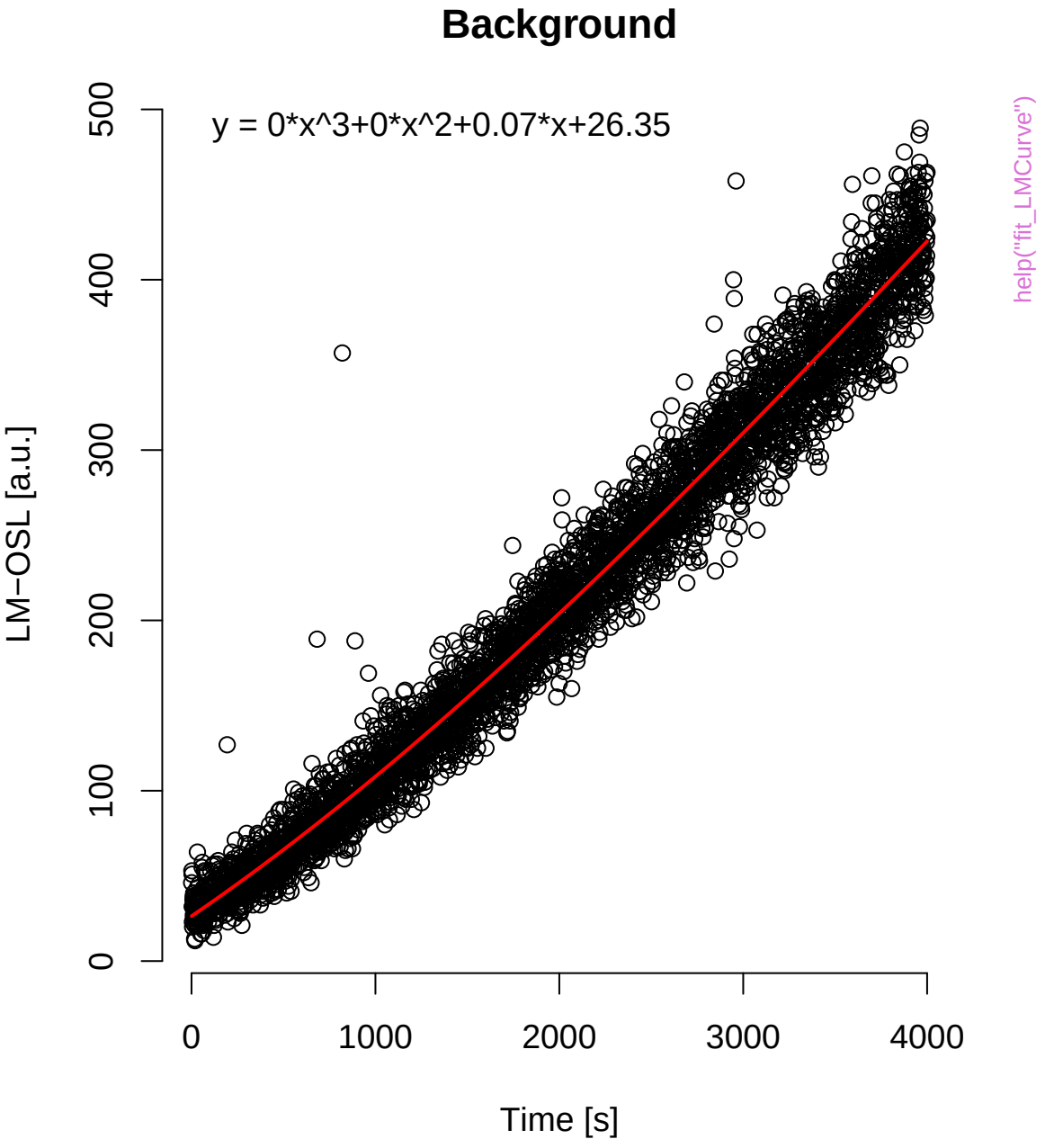
help("calc_MinDose")

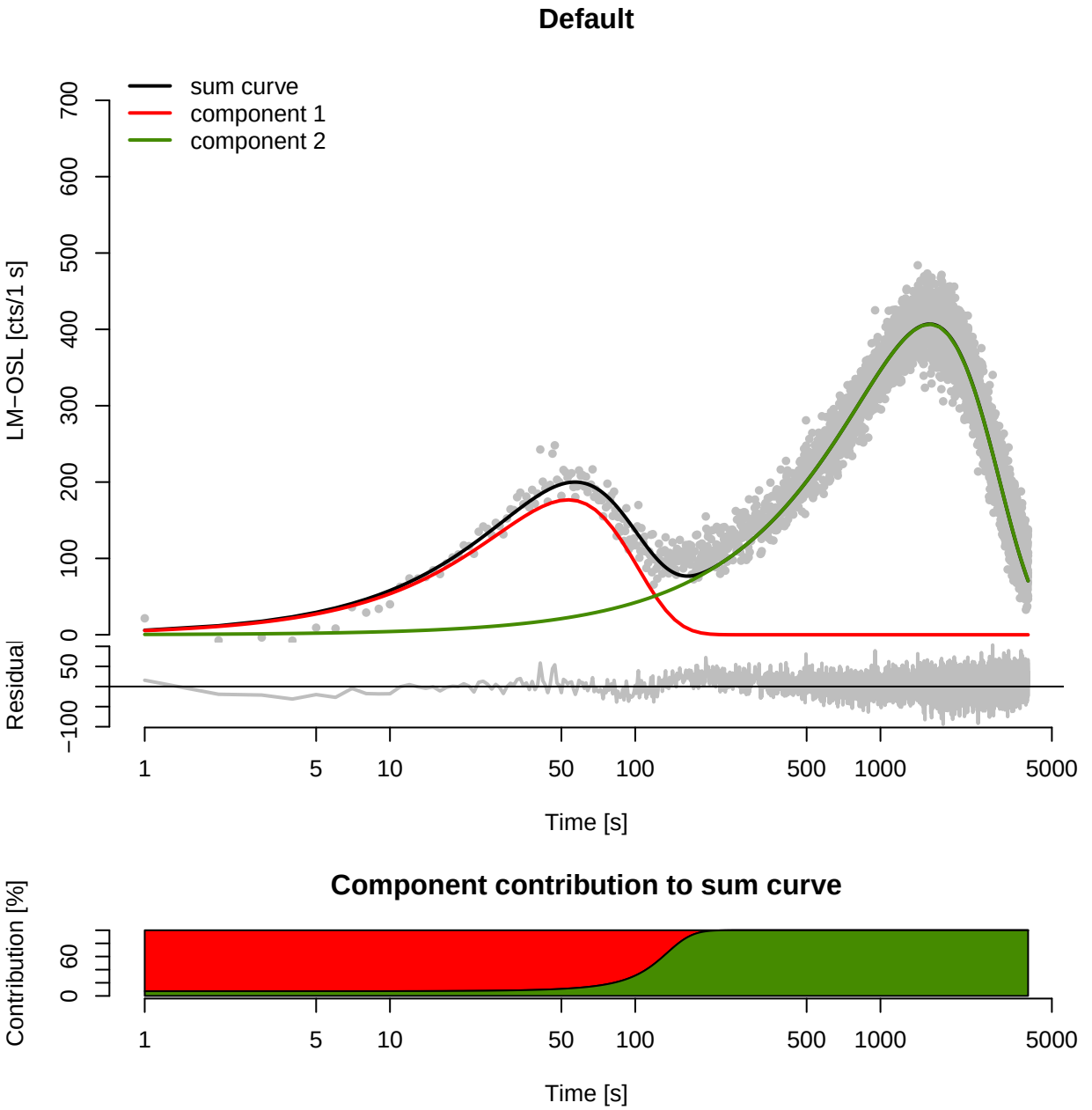

3−parameter Minimum Age Model
Parameters: σb = 0.1 , γ = 3.5 , σ = 0.7 , ρ = 0.01
n = 62
mean = 69.93
weighted mean = 47.95
median = 71.07
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
34.3±2.6 Gy
help("calc_MinDose")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
n
0
15
0
0.106
Density (bw 0.1)

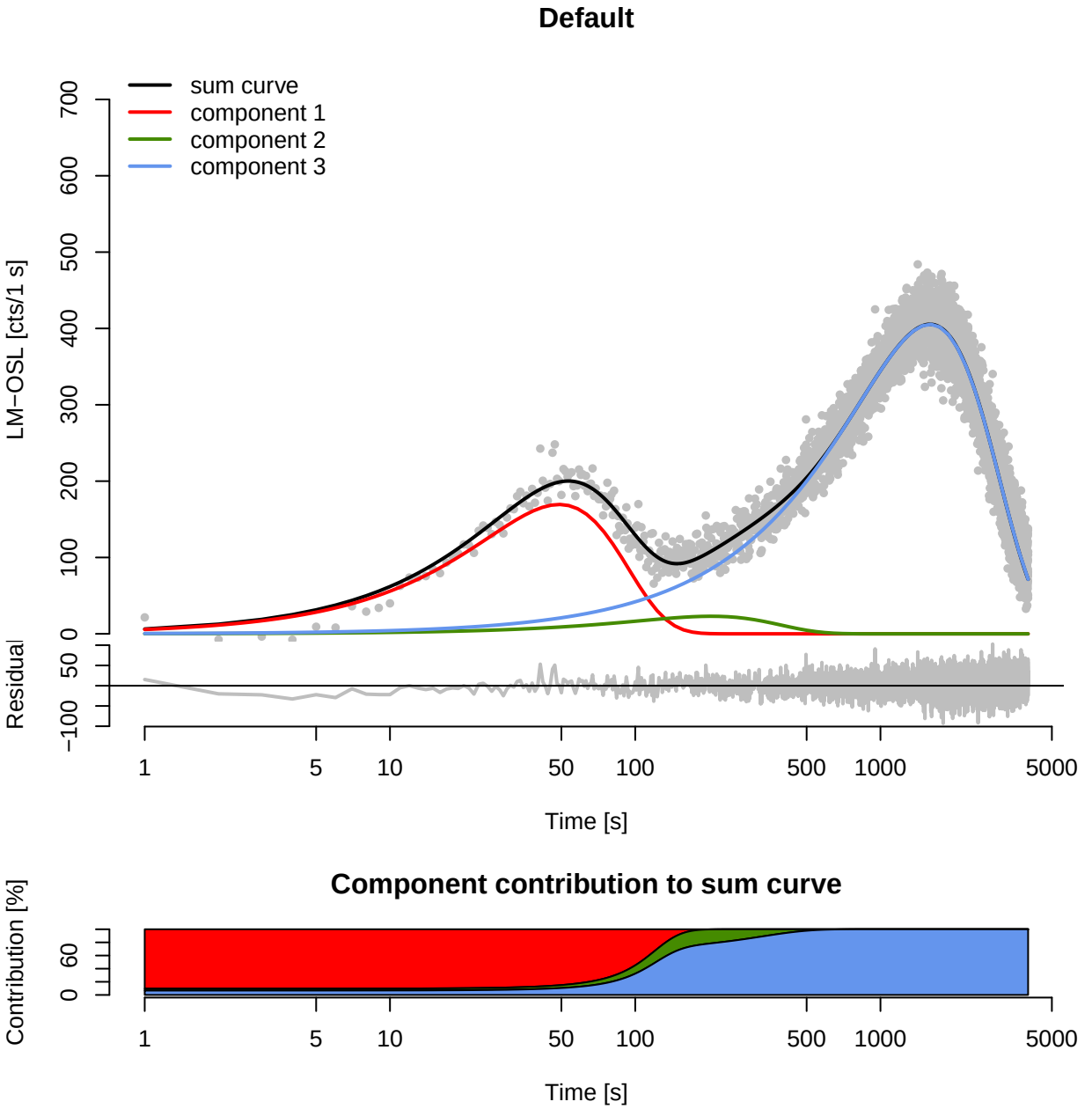

Density
0.0000
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
2500
3000
3500
4000
De (Gy)
De distribution
5
10
15
20
25
Cumulative frequency
help("calc_Statistics")

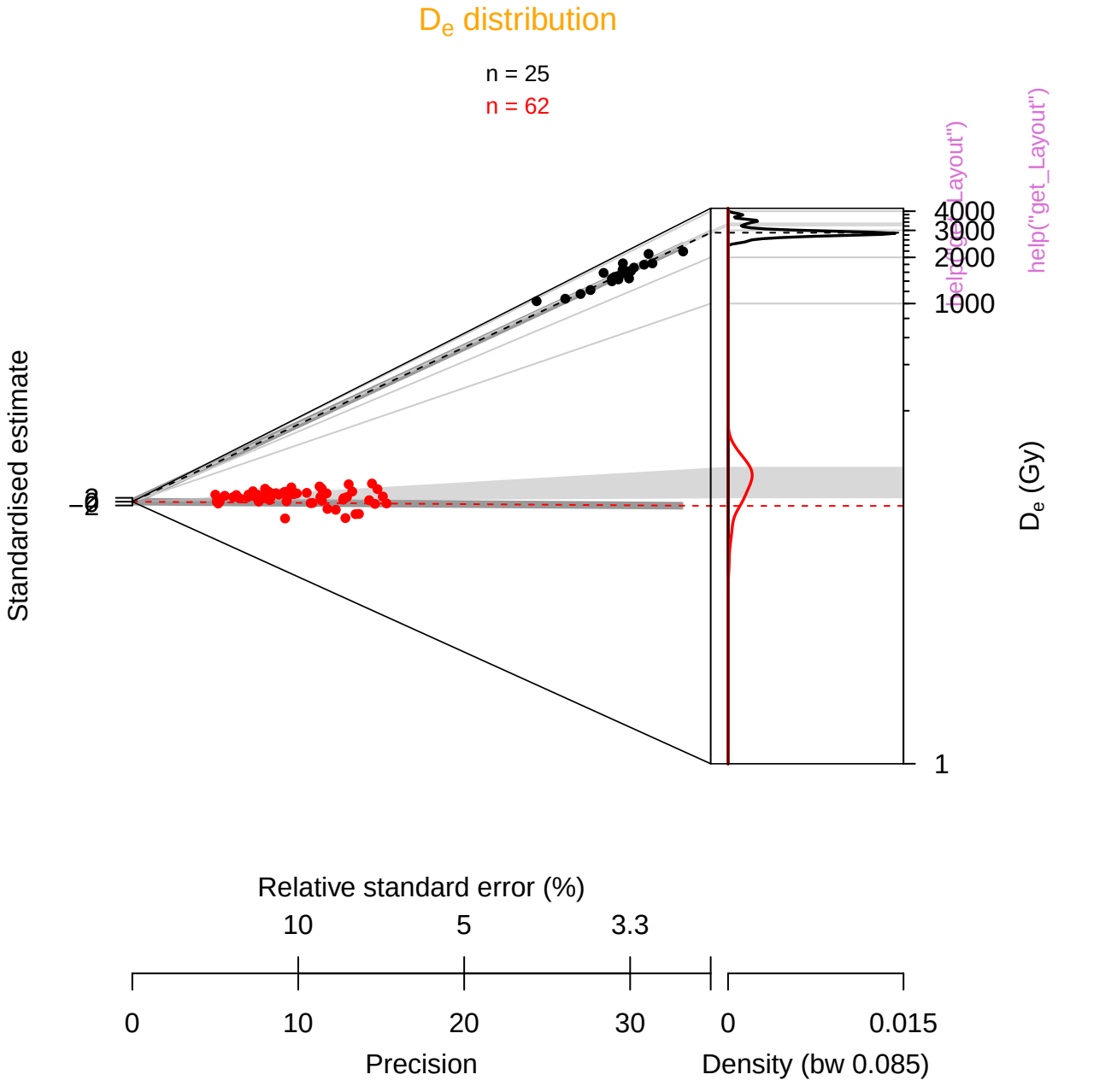

CW Curve Fit
Default
sum curve
component 1
component 2
component 3
OSL [cts/0.04 s]
0
2000
4000
6000
8000
10000
Residual [a.u.]
−100
50
200
0.05
0.10
0.20
0.50
1.00
2.00
5.00
10.00
20.00
50.00
Time [s]
Component contribution to sum curve
Contribution [%]
0
40
80
0.05
0.10
0.20
0.50
1.00
2.00
5.00
10.00
20.00
50.00
Time [s]

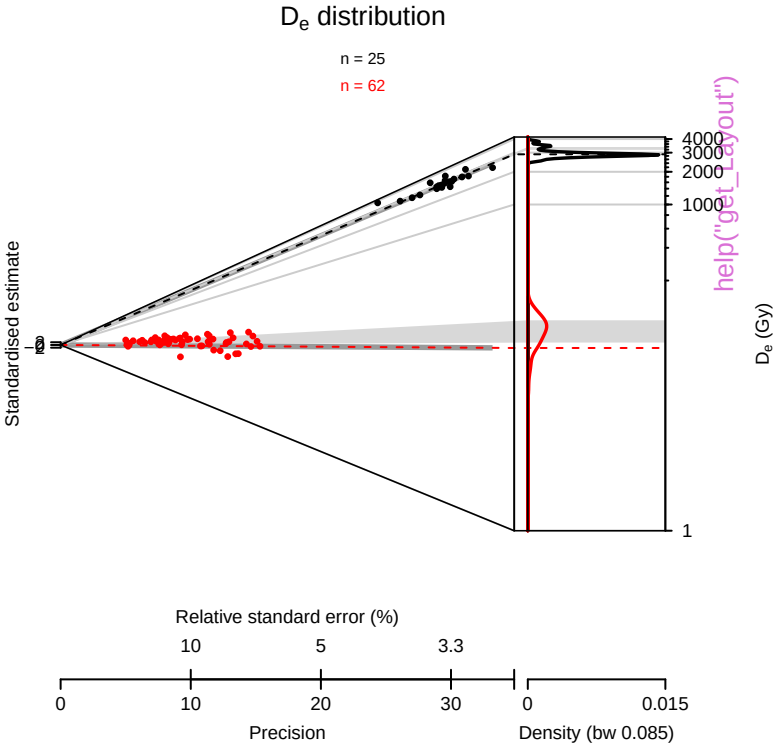

Default
sum curve
component 1
component 2
component 3
LM−OSL [cts/1 s]
0
100
200
300
400
500
600
700
Residual
−100
50
0
1
5
10
50
100
500
1000
5000
Time [s]
Component contribution to sum curve
Contribution [%]
0
60
1
5
10
50
100
500
1000
5000
Time [s]


Background
y = 0*x^3+0*x^2+0.07*x+26.35
LM−OSL [a.u.]
0
100
200
300
400
500
0
1000
2000
3000
4000
Time [s]
help("fit_LMCurve")

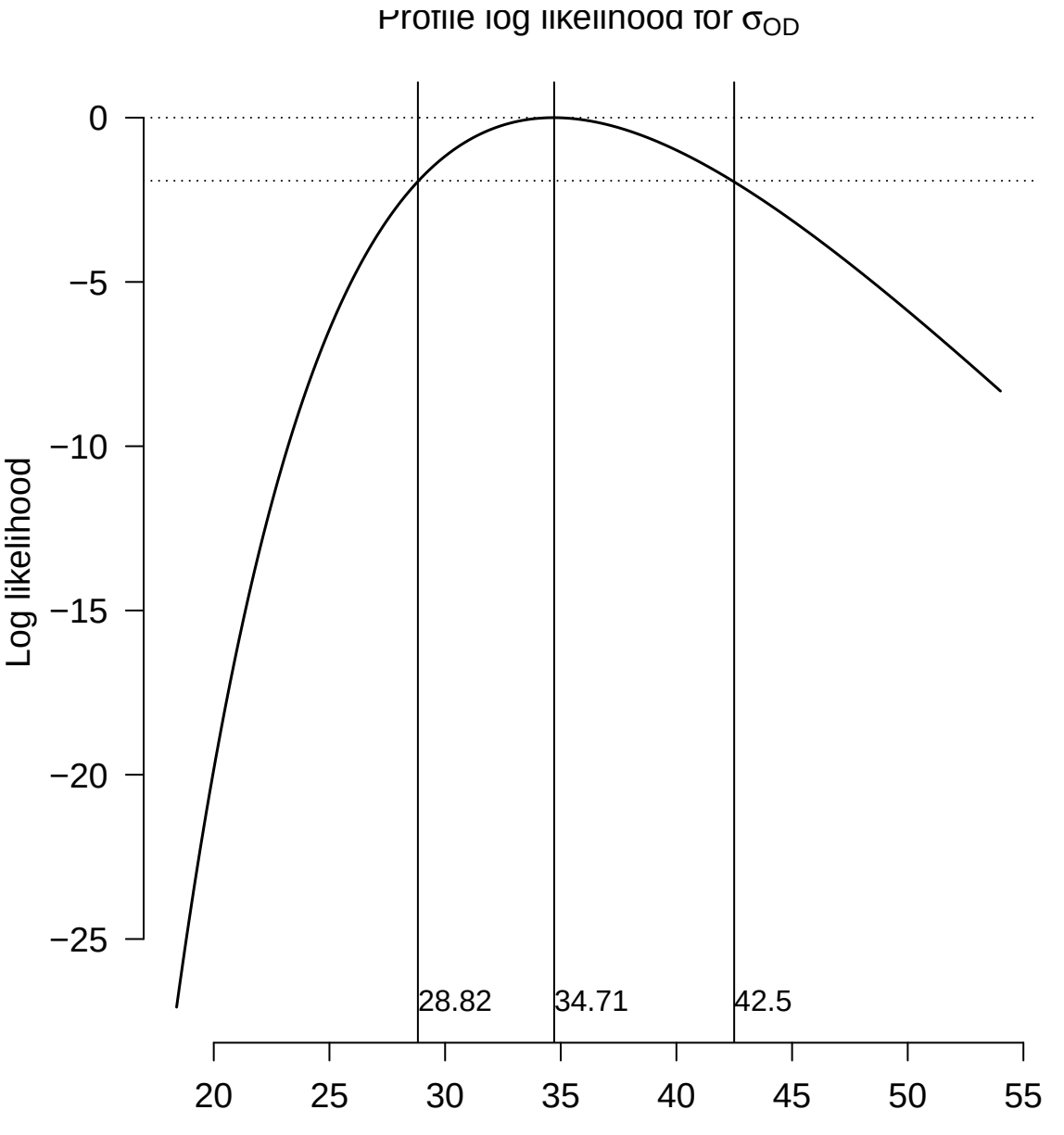

Default
sum curve
component 1
component 2
LM−OSL [cts/1 s]
0
100
200
300
400
500
600
700
Residual
−100
50
0
1
5
10
50
100
500
1000
5000
Time [s]
Component contribution to sum curve
Contribution [%]
0
60
1
5
10
50
100
500
1000
5000
Time [s]

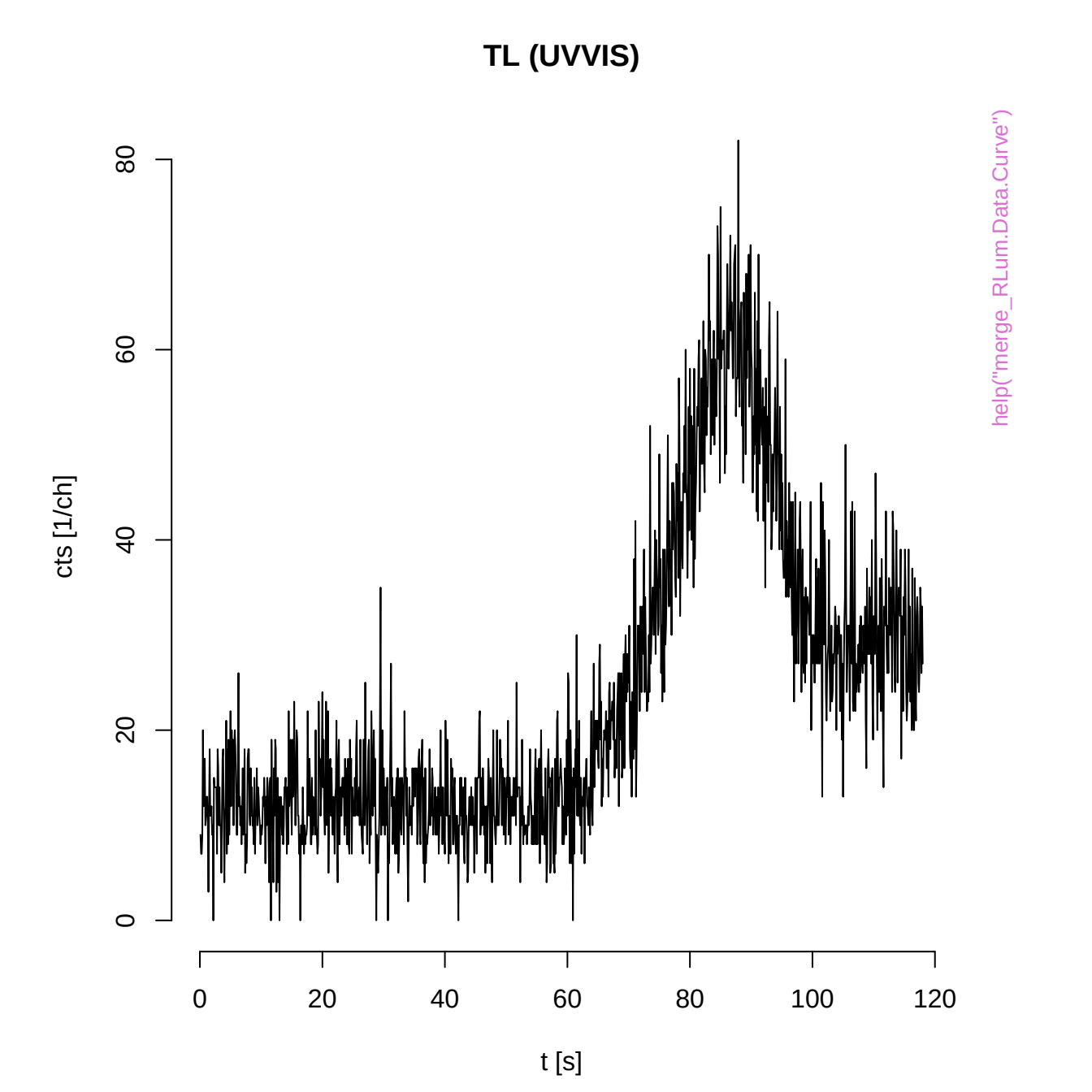

Default
sum curve
component 1
component 2
component 3
LM−OSL [cts/1 s]
0
100
200
300
400
500
600
700
Residual
−100
50
0
1
5
10
50
100
500
1000
5000
Time [s]
Component contribution to sum curve
Contribution [%]
0
60
1
5
10
50
100
500
1000
5000
Time [s]

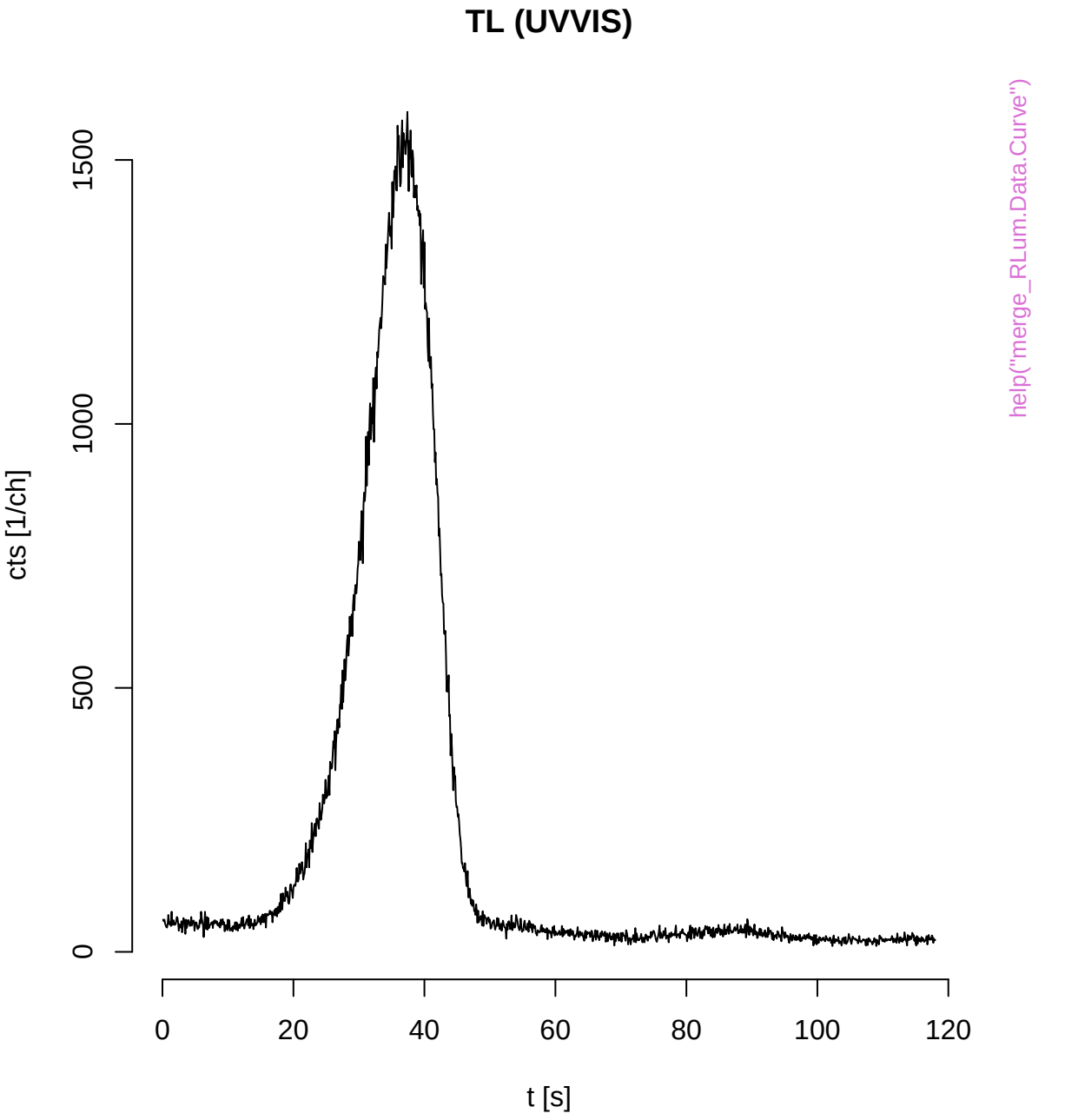

De distribution
n = 25
n = 62
Standardised estimate
De (Gy)
4000
3000
2000
1000
1
help("get_Layout")
help("get_Layout")
Relative standard error (%)
10
5
3.3
0
10
20
30
0
0.015
Precision
Density (bw 0.085)

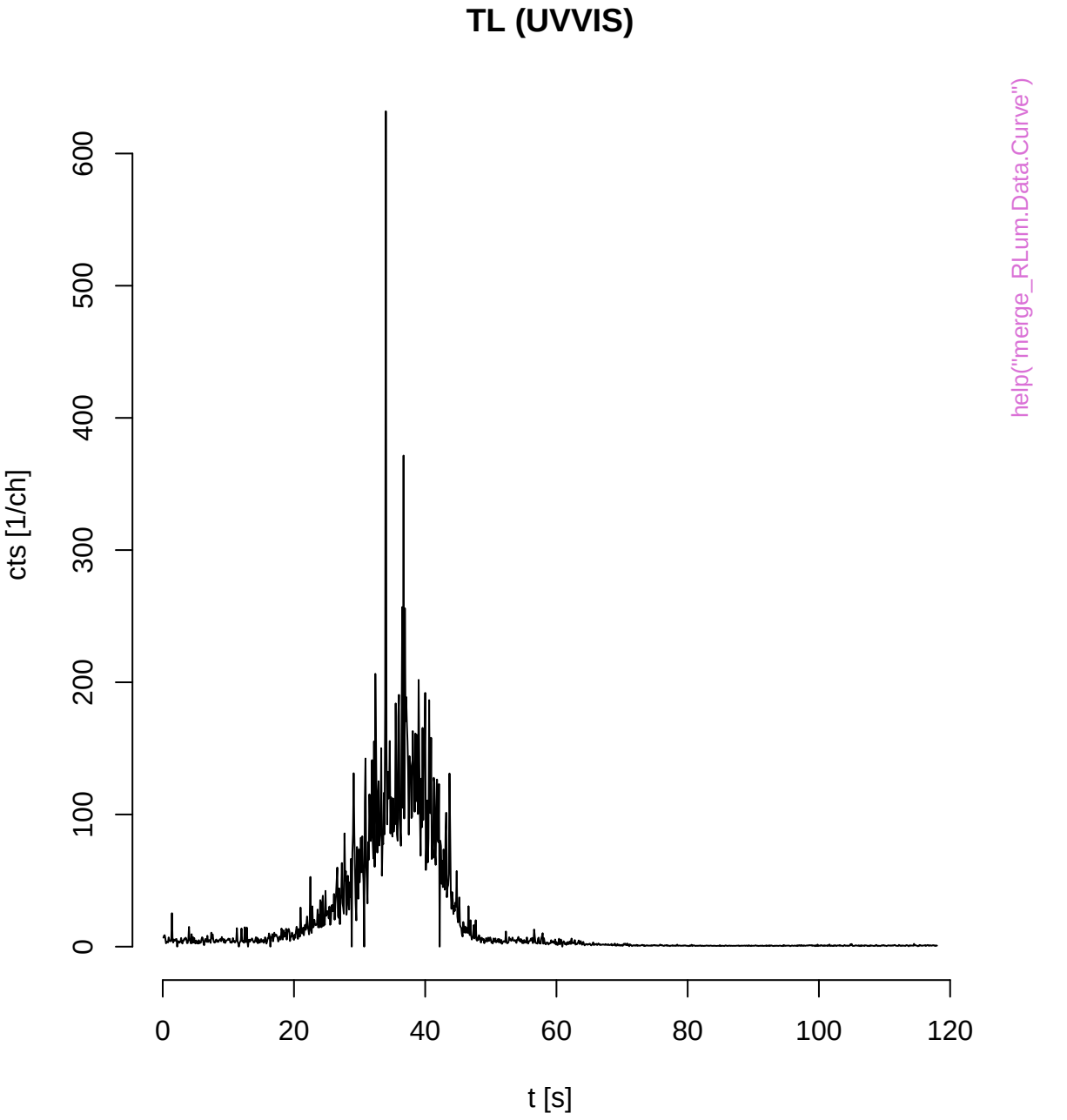


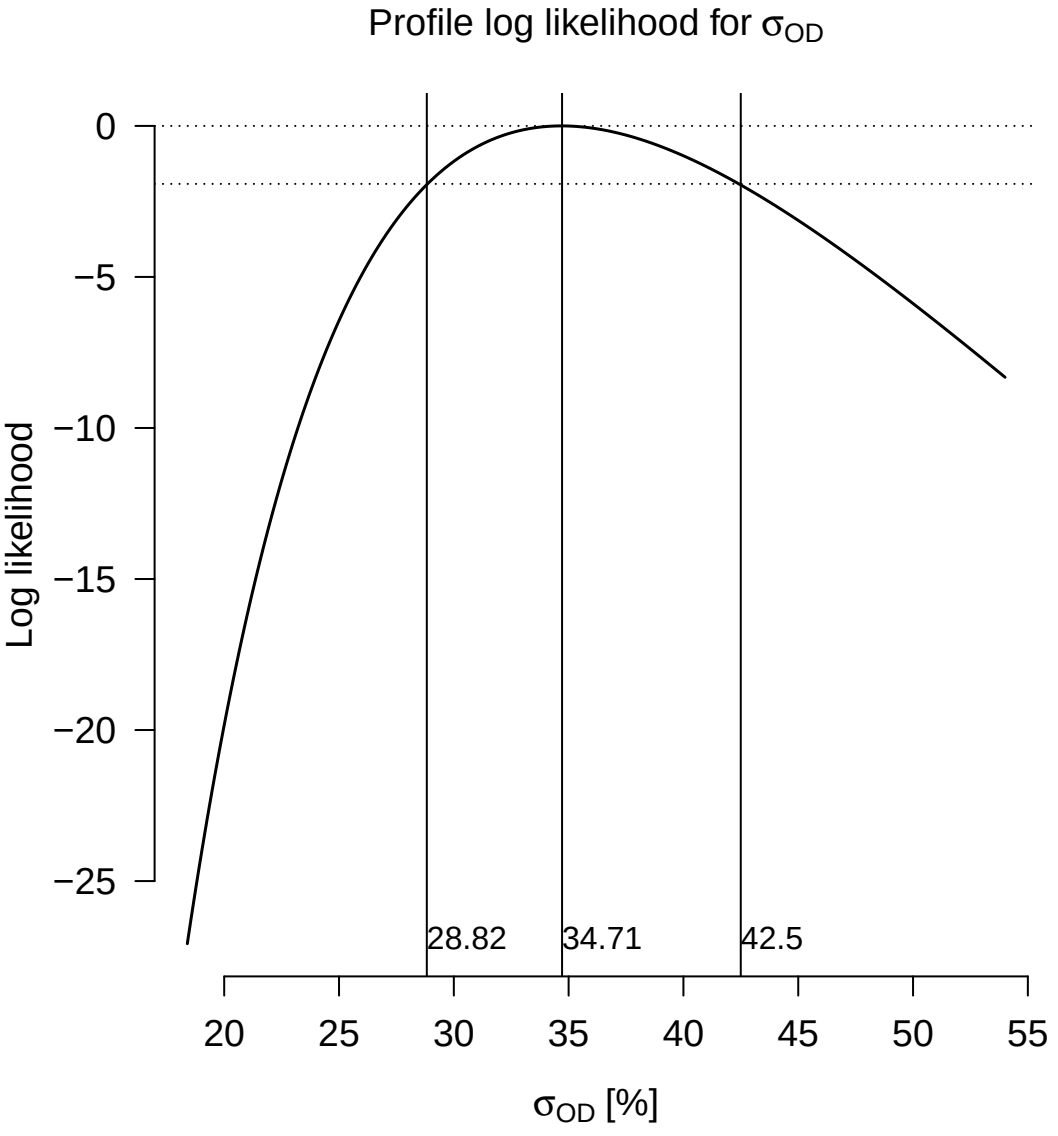
help("get_Layout")

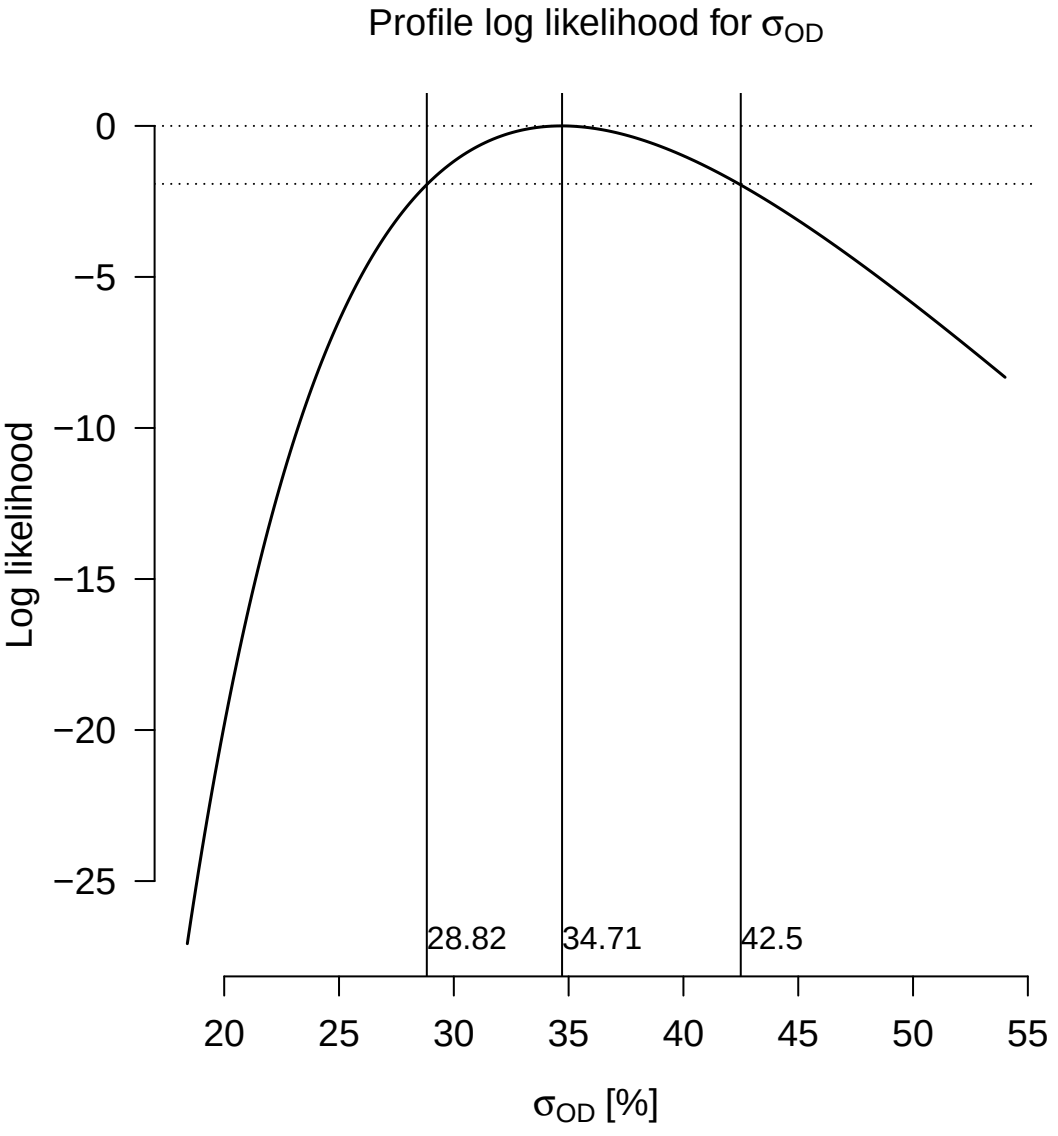

Profile log likelihood for σ_{OD}
Log likelihood
0
−5
−10
−15
−20
−25
28.82
34.71
42.5
20
25
30
35
40
45
50
55

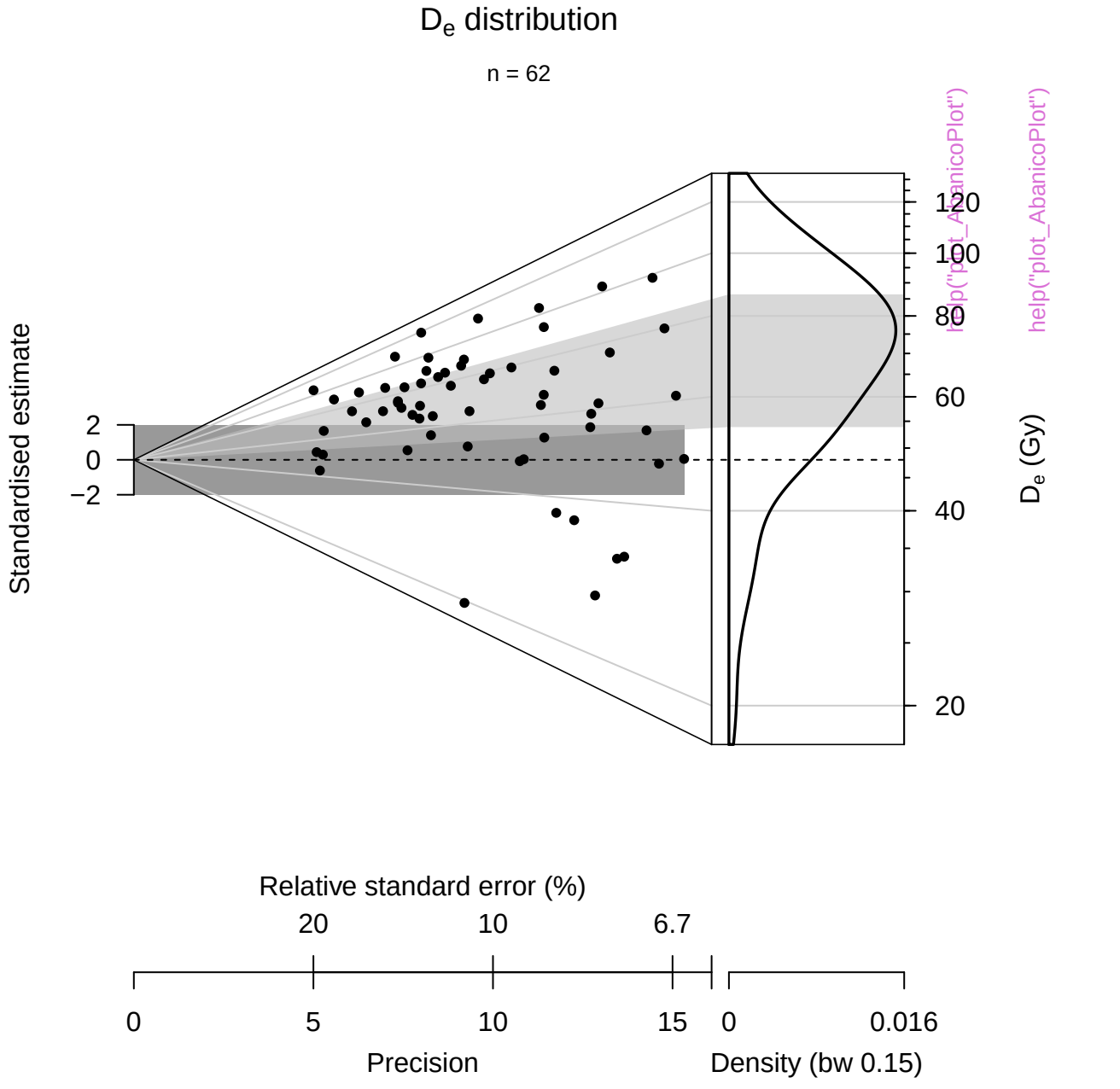

TL (UVVIS)
cts [1/ch]
0
20
40
60
80
0
20
40
60
80
100
120
t [s]
help("merge_RLum.Data.Curve")

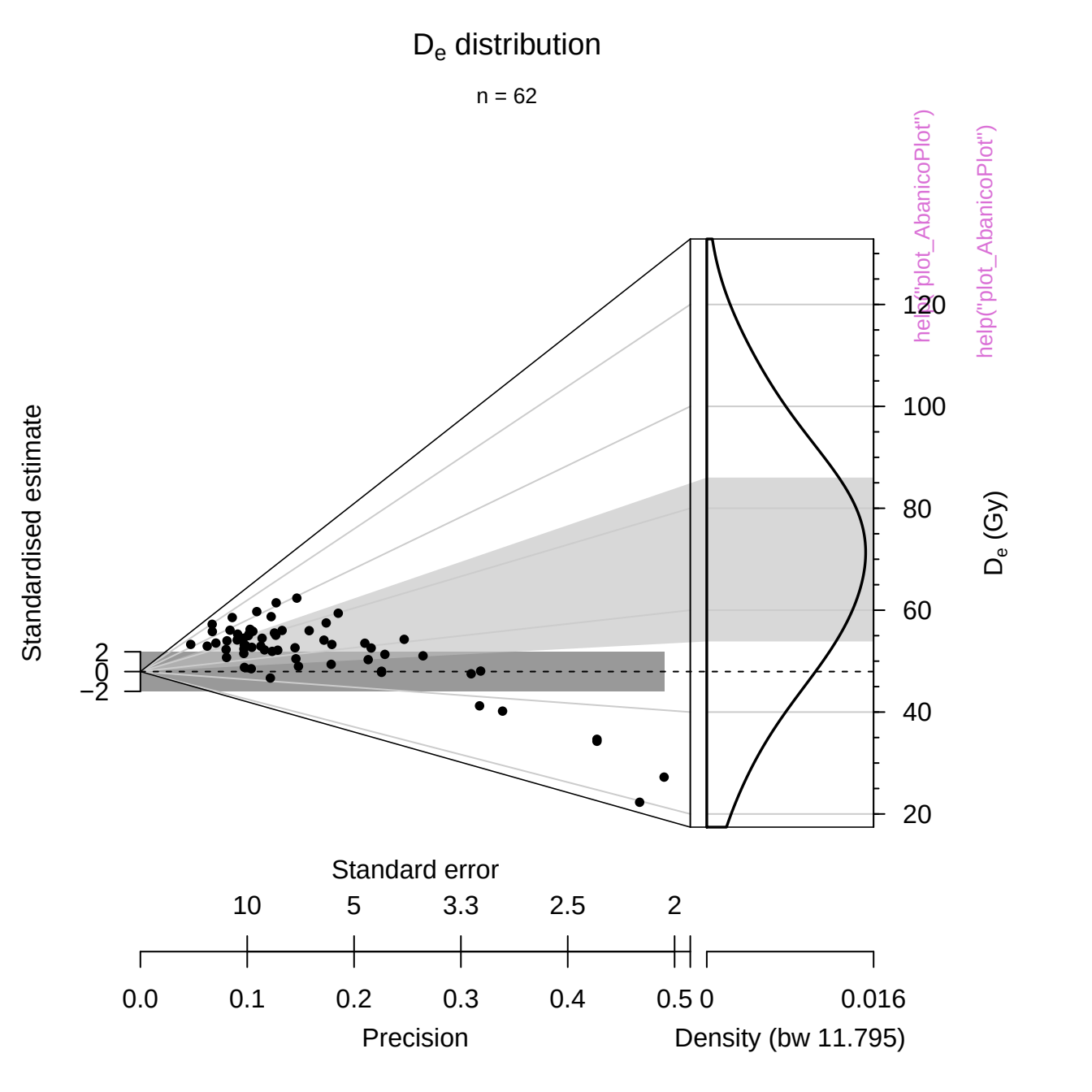

TL (UVVIS)
cts [1/ch]
0
500
1000
1500
0
20
40
60
80
100
120
t [s]
help("merge_RLum.Data.Curve")

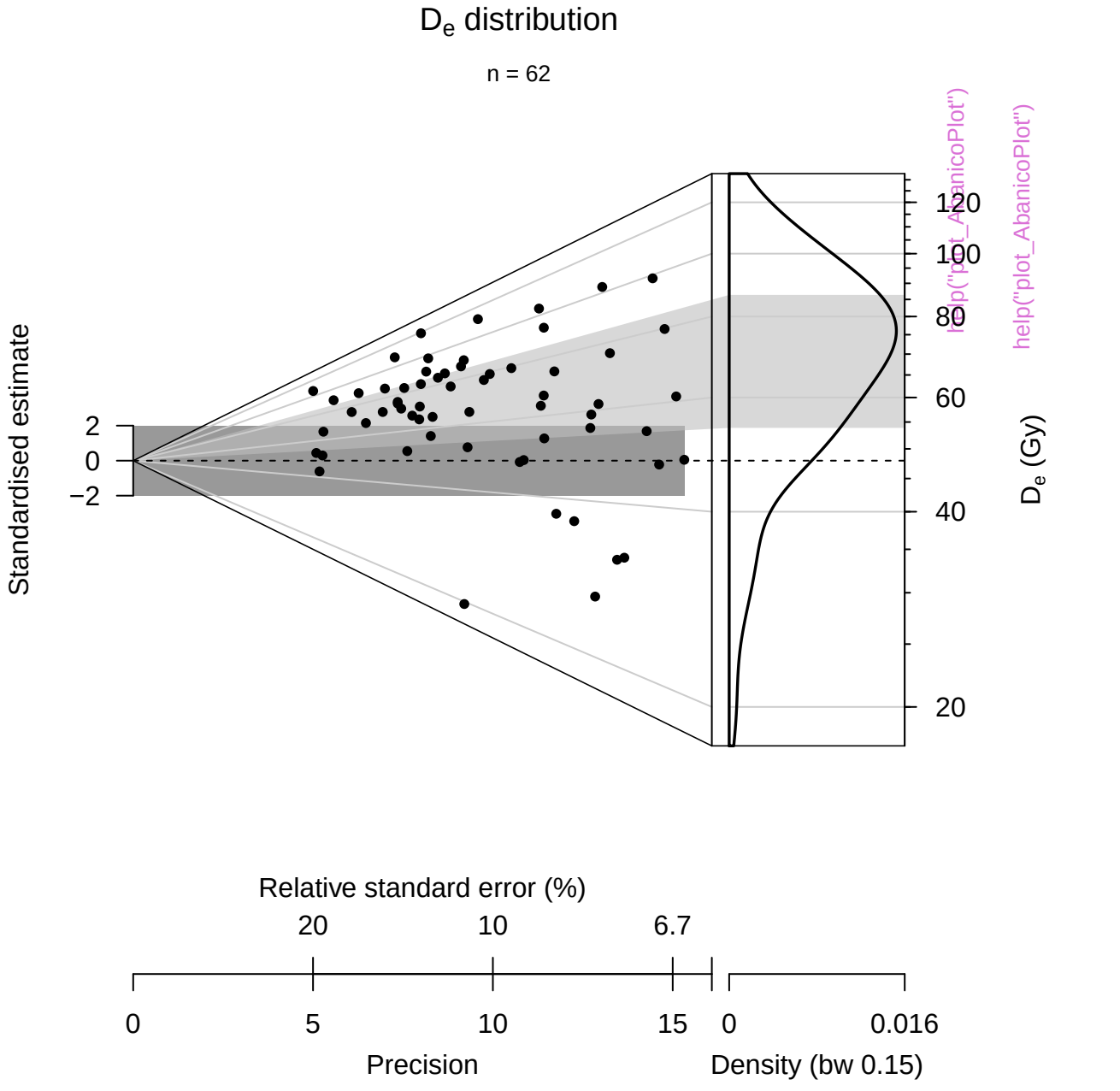

TL (UVVIS)
cts [1/ch]
0
100
200
300
400
500
600
0
20
40
60
80
100
120
t [s]
help("merge_RLum.Data.Curve")

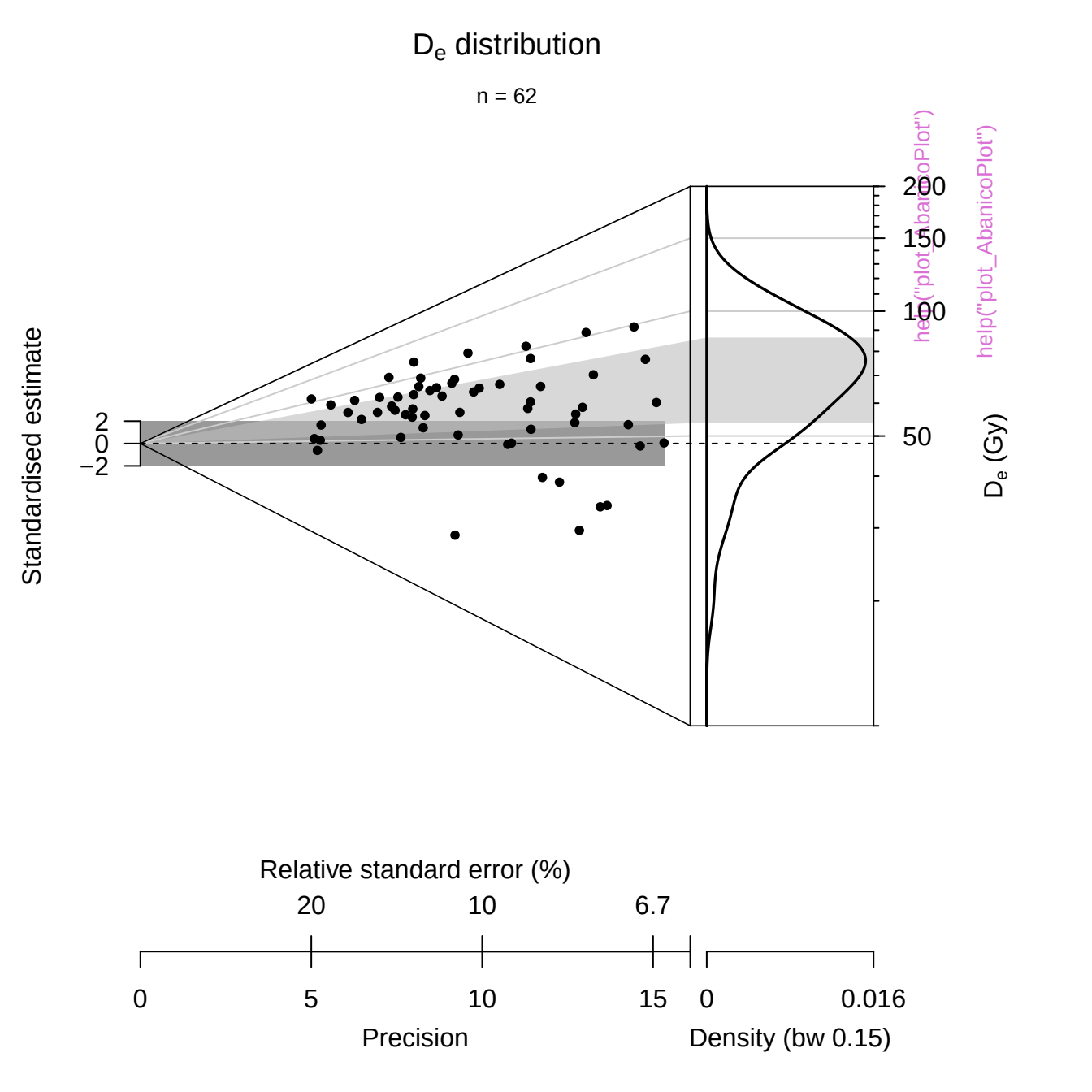

Profile log likelihood for σOD
Log likelihood
0
−5
−10
−15
−20
−25
28.82
34.71
42.5
20
25
30
35
40
45
50
55
σOD [%]

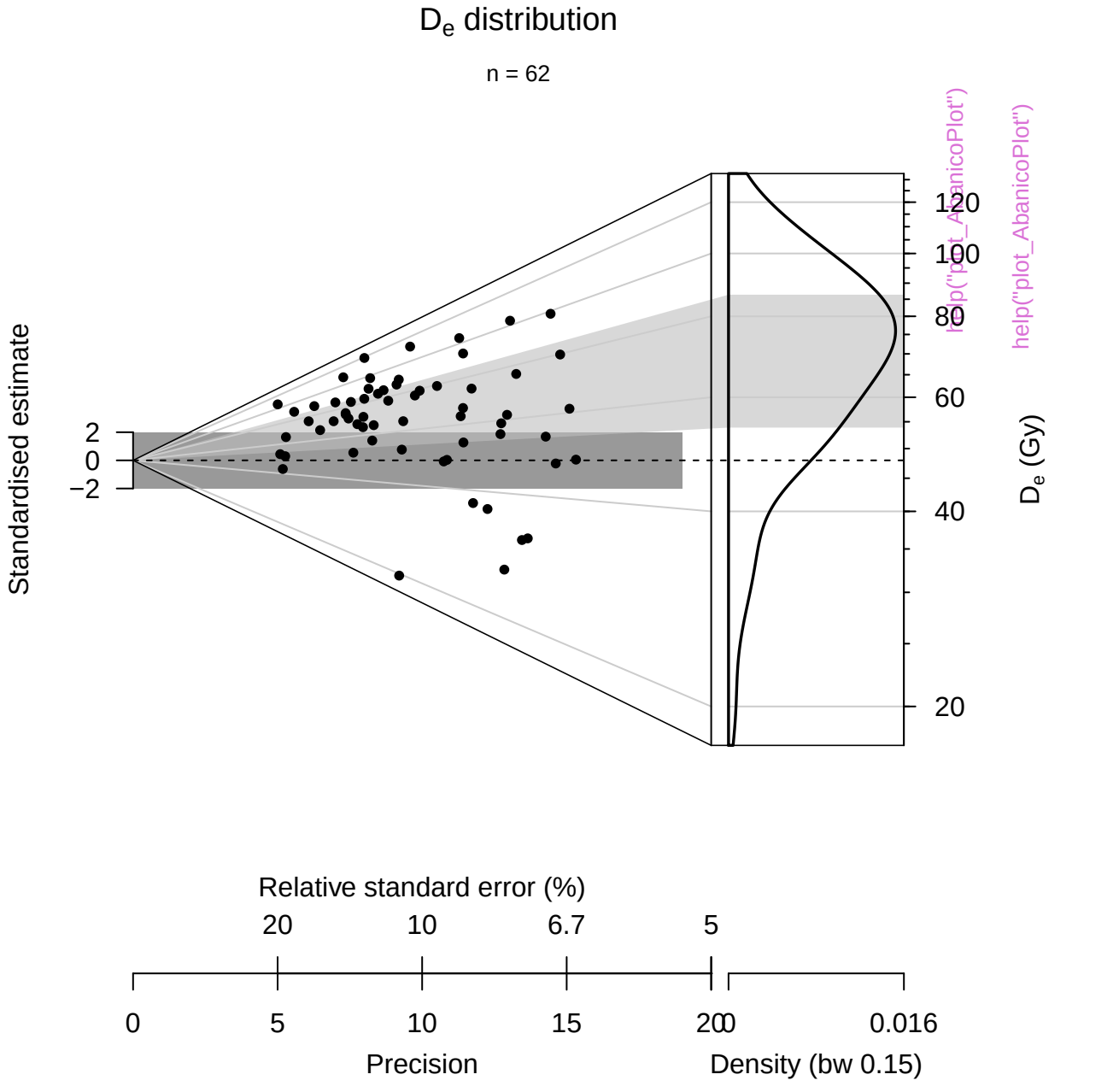

Profile log likelihood for σOD
Log likelihood
0
−5
−10
−15
−20
−25
28.82
34.71
42.5
20
25
30
35
40
45
50
55
σOD [%]

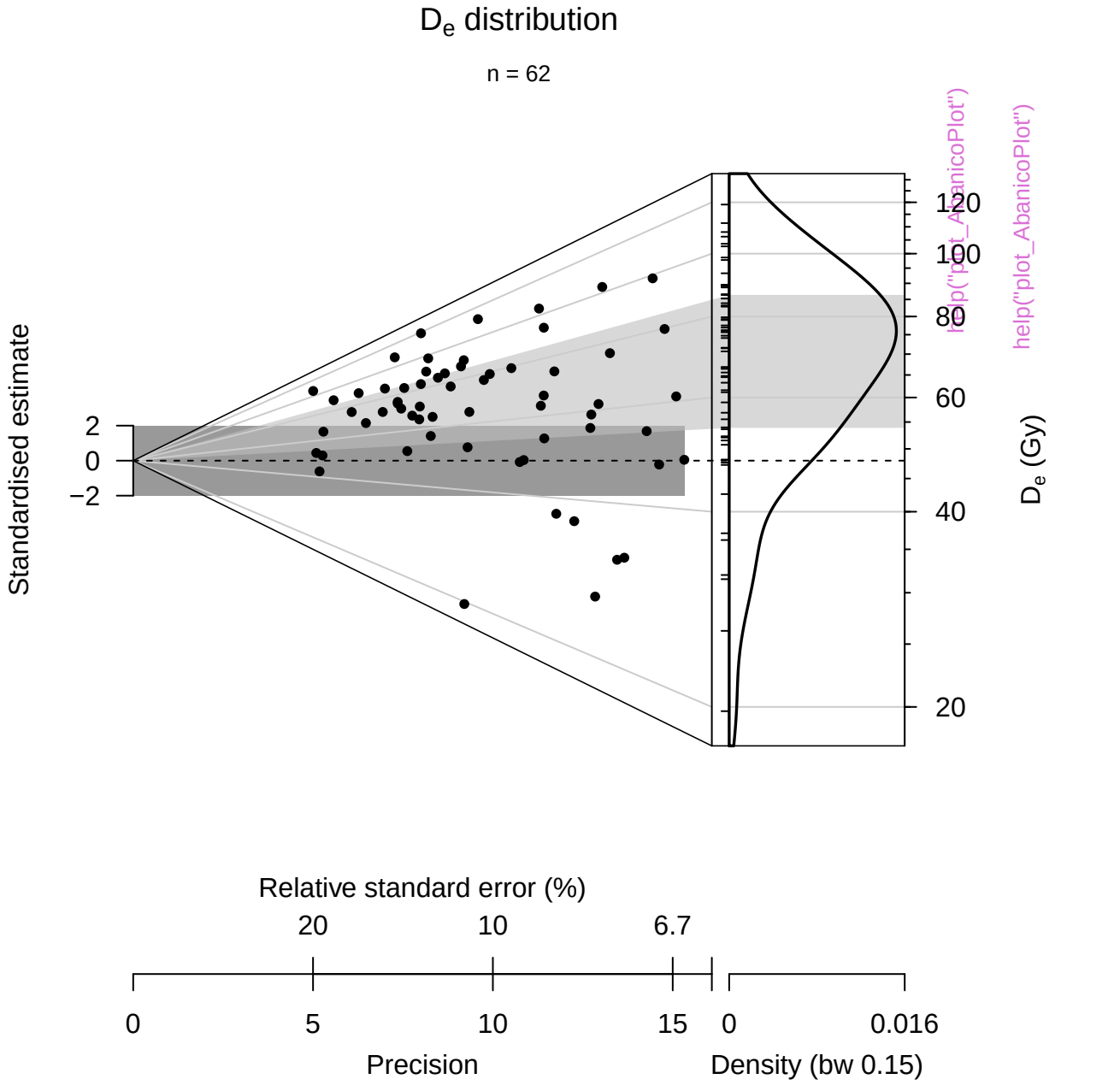

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

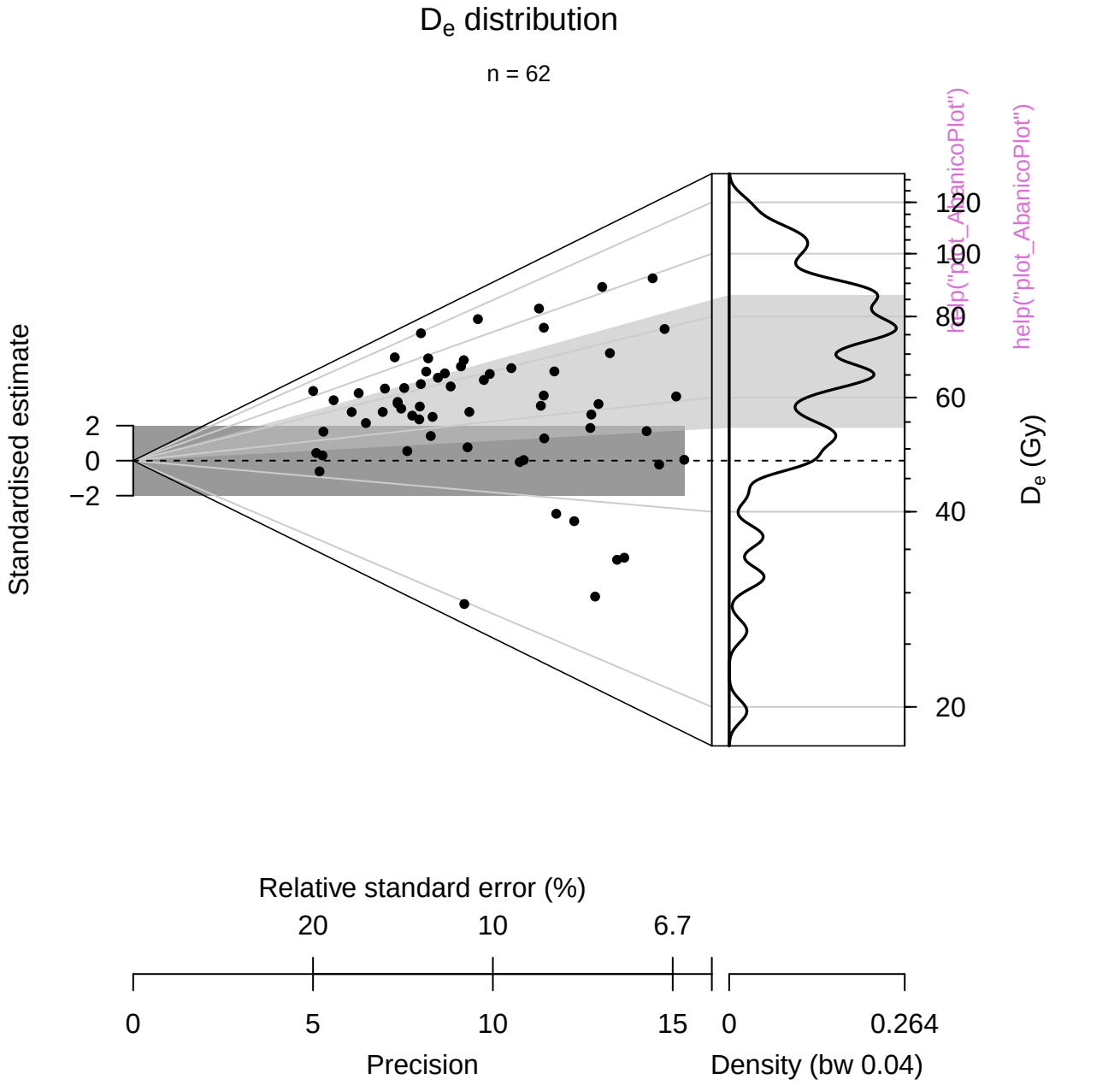

De distribution
n = 62
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Standardised estimate
2
0
−2
120
100
80
60
40
20
De (Gy)
Standard error
10
5
3.3
2.5
2
0.0
0.1
0.2
0.3
0.4
0.5
0
0.016
Precision
Density (bw 11.795)

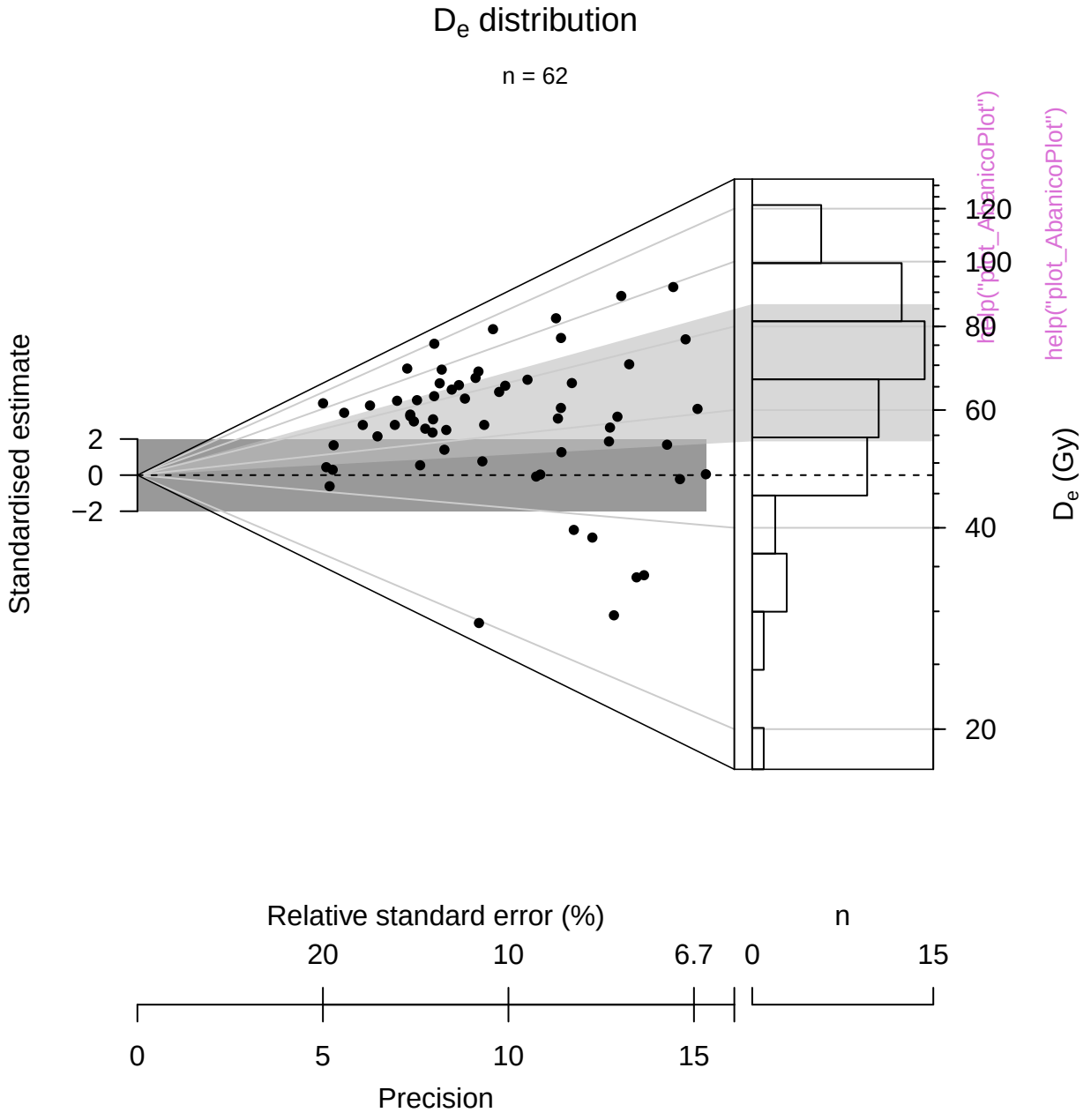

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

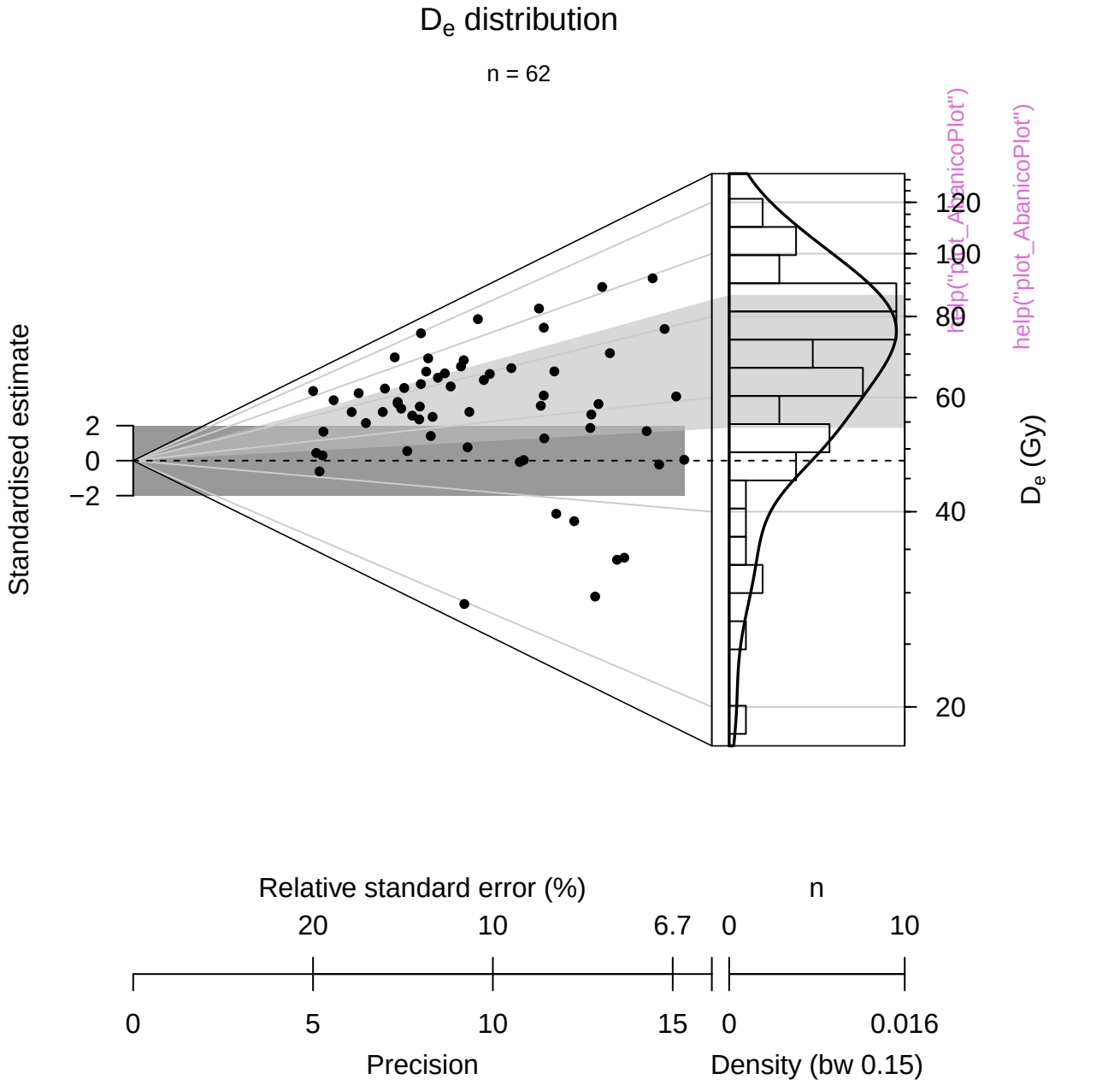

D$_e$ distribution
n = 62
Standardised estimate
2
0
−2
200
150
100
50
D$_e$ (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

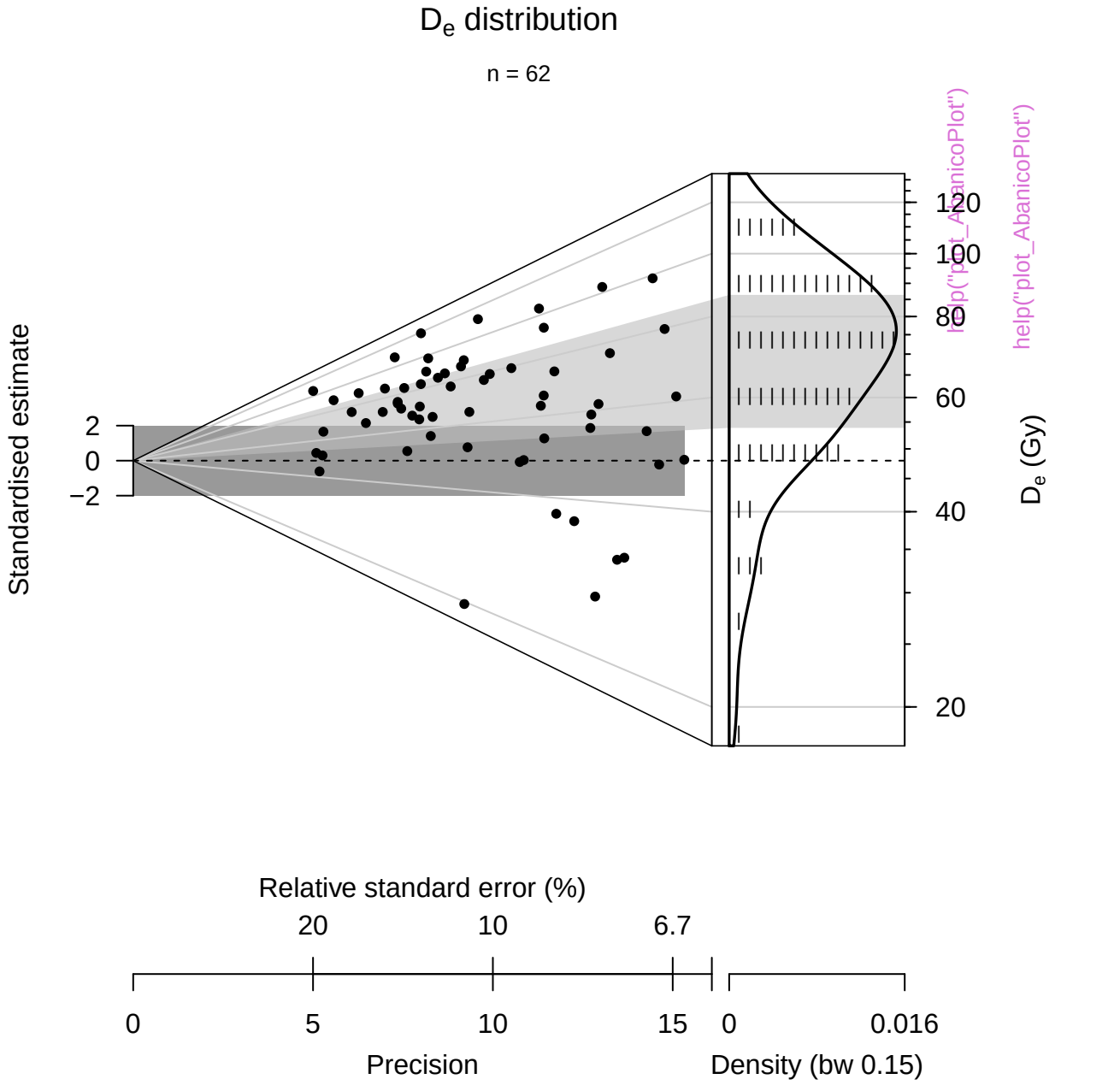

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
5
0
5
10
15
20
0
0.016
Precision
Density (bw 0.15)

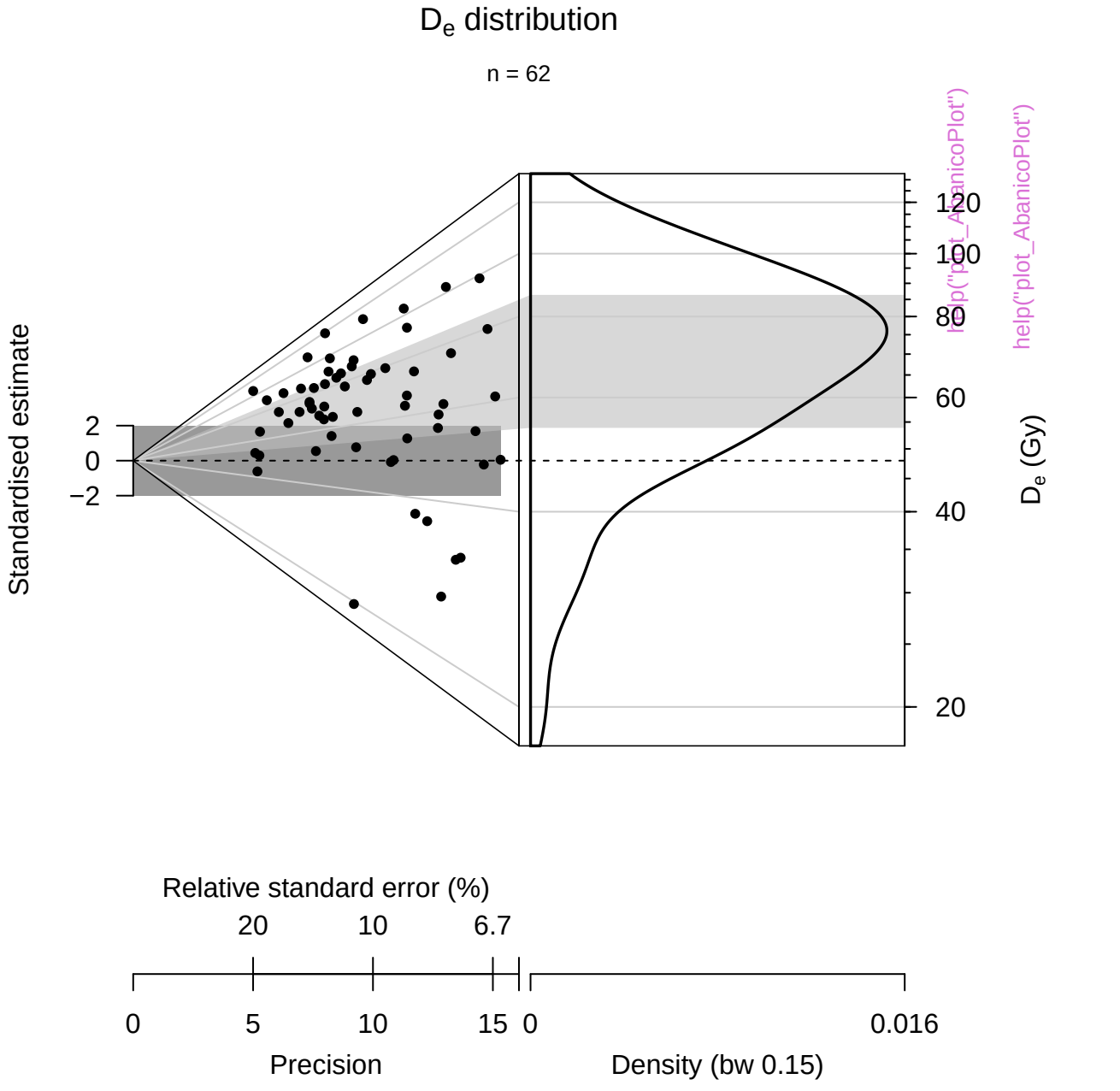

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

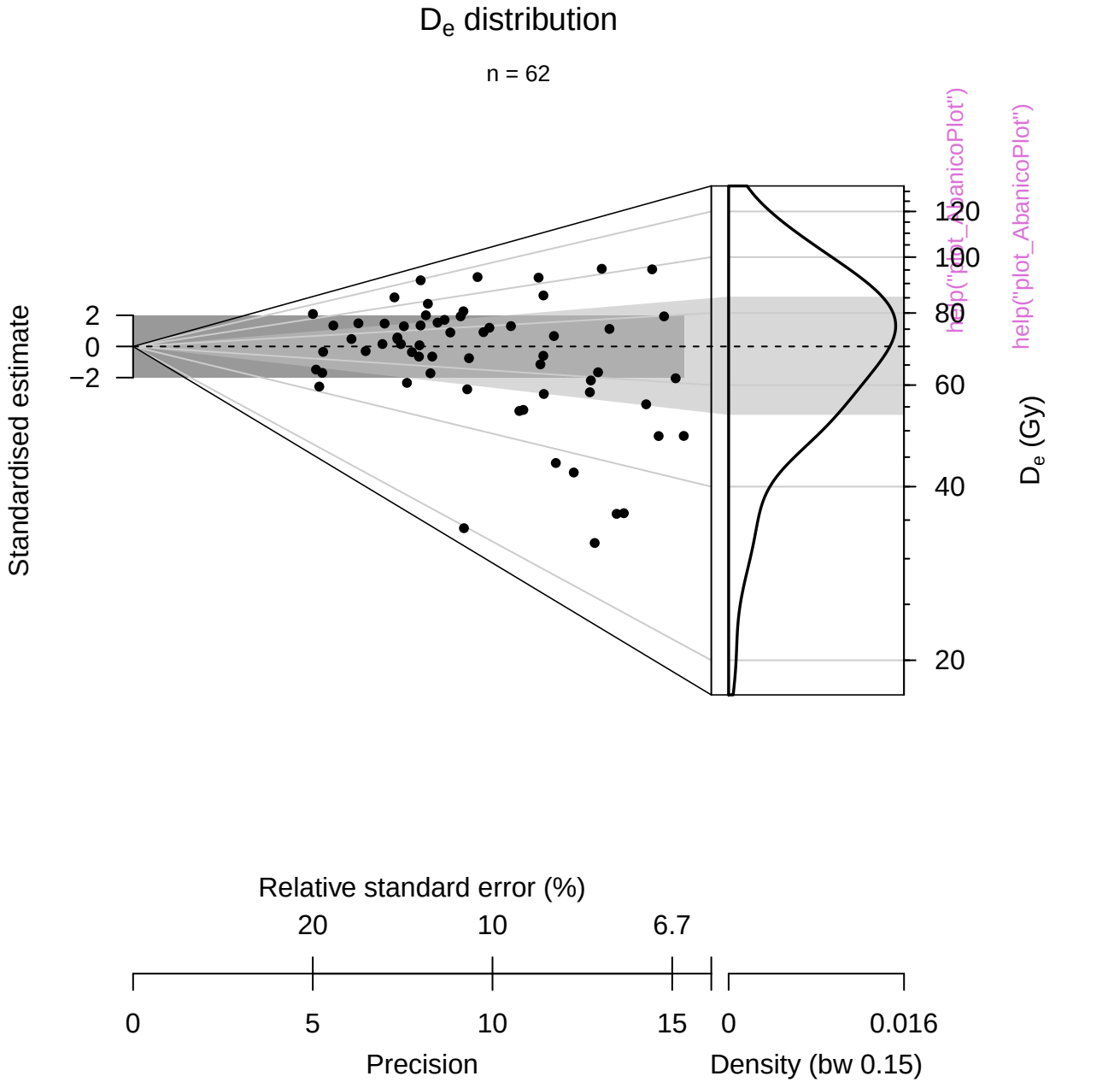

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.264
Density (bw 0.04)

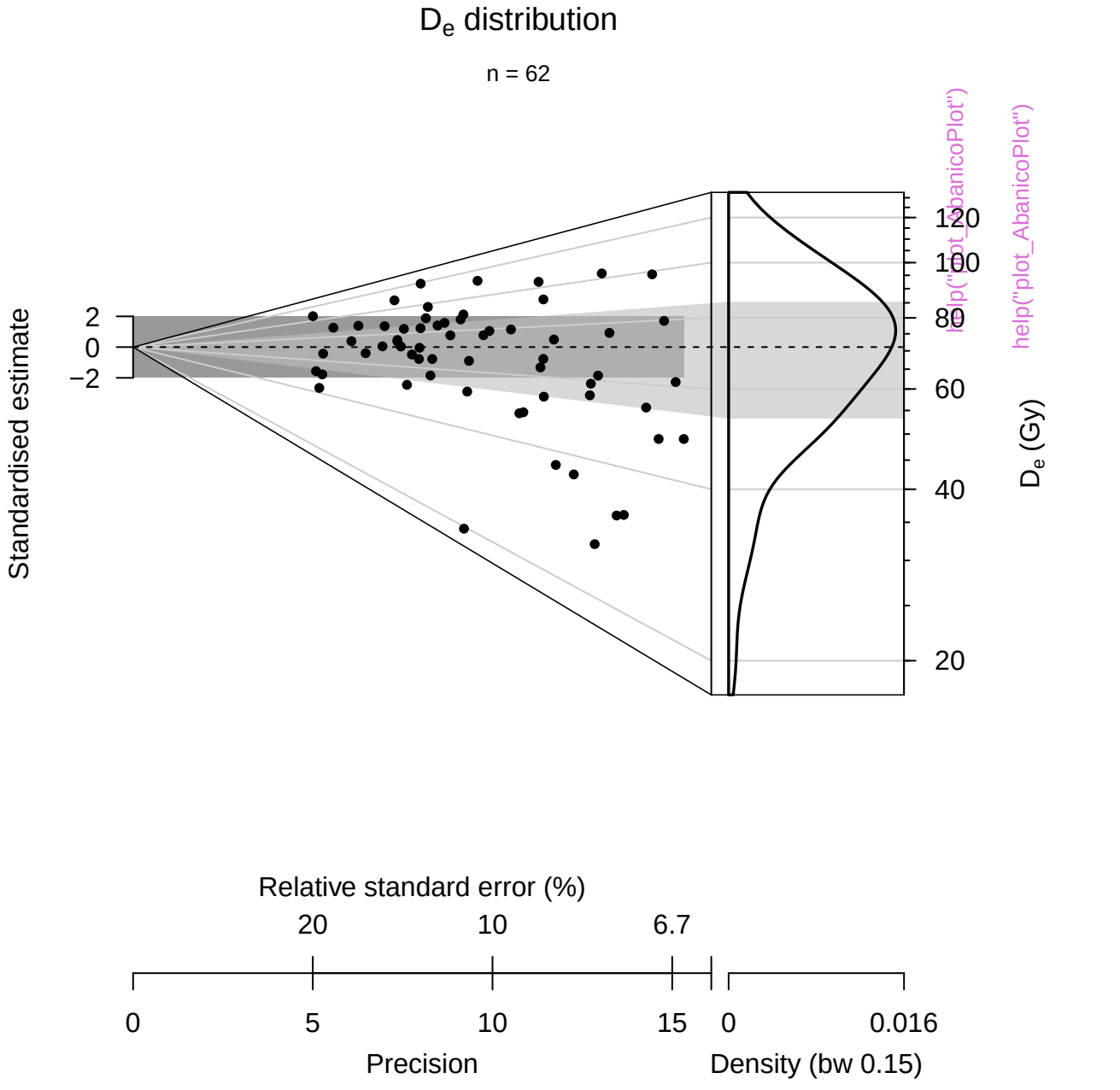

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
n
0
15

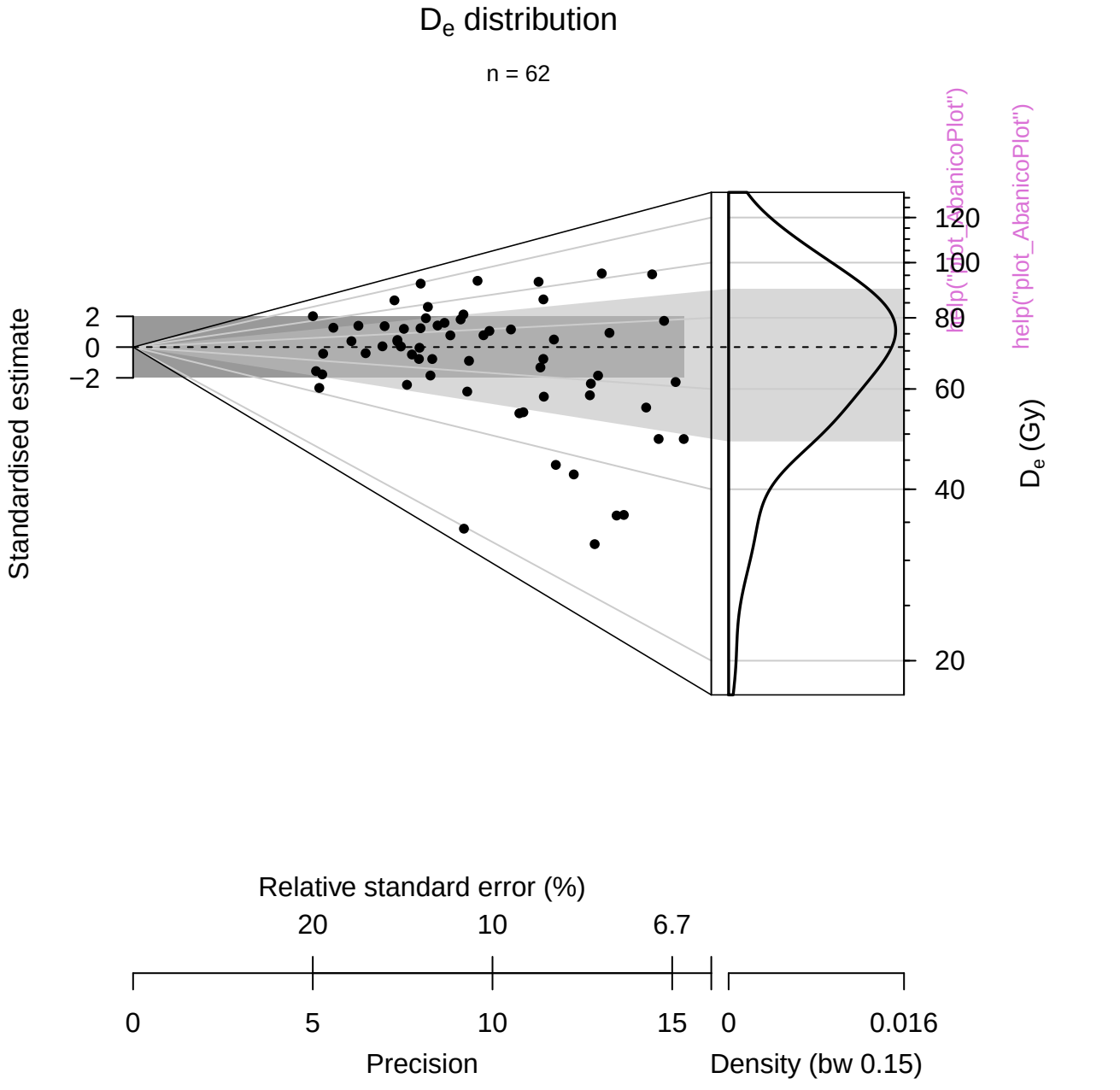

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
n
0
10
0
0.016
Density (bw 0.15)

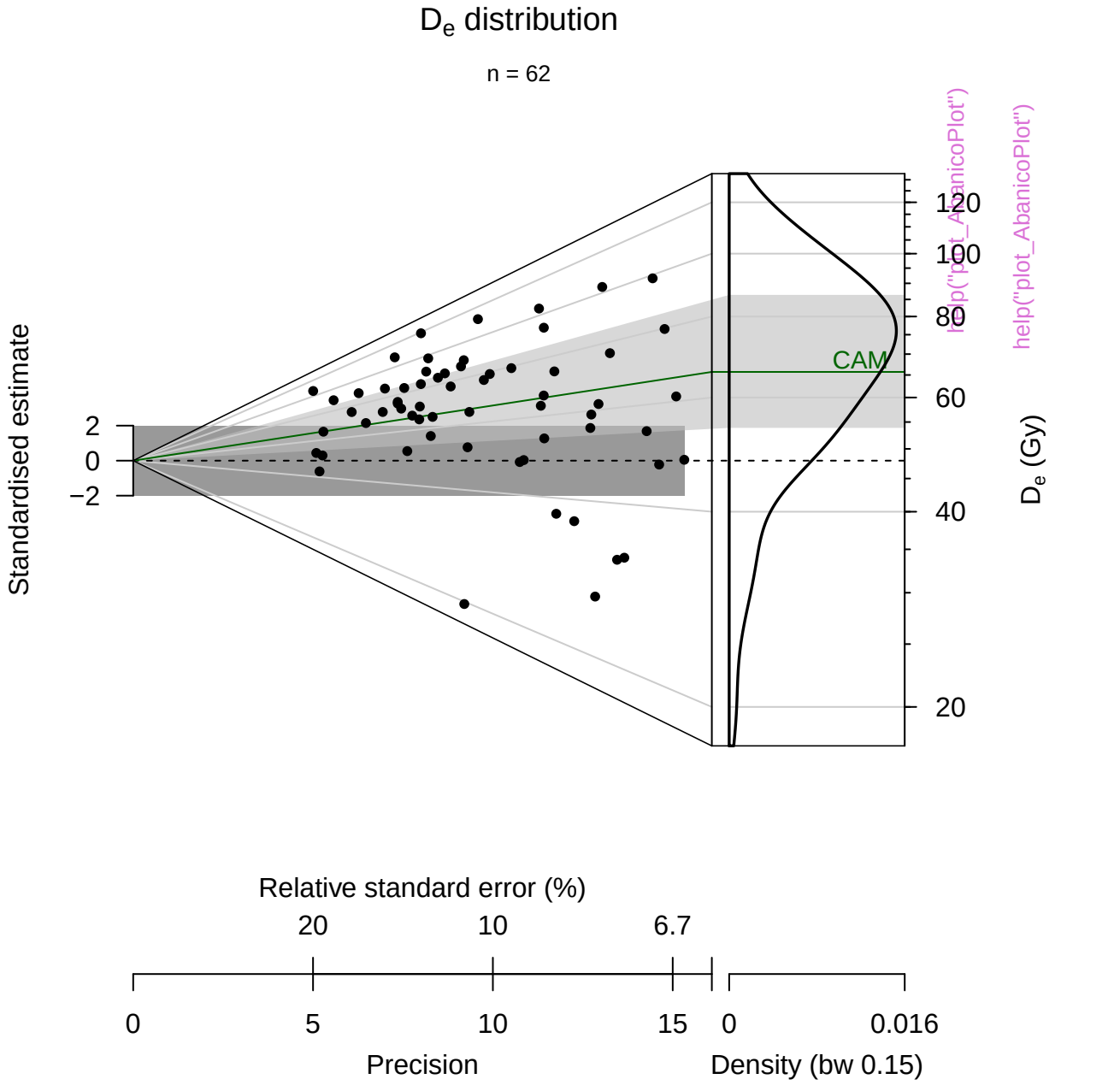

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

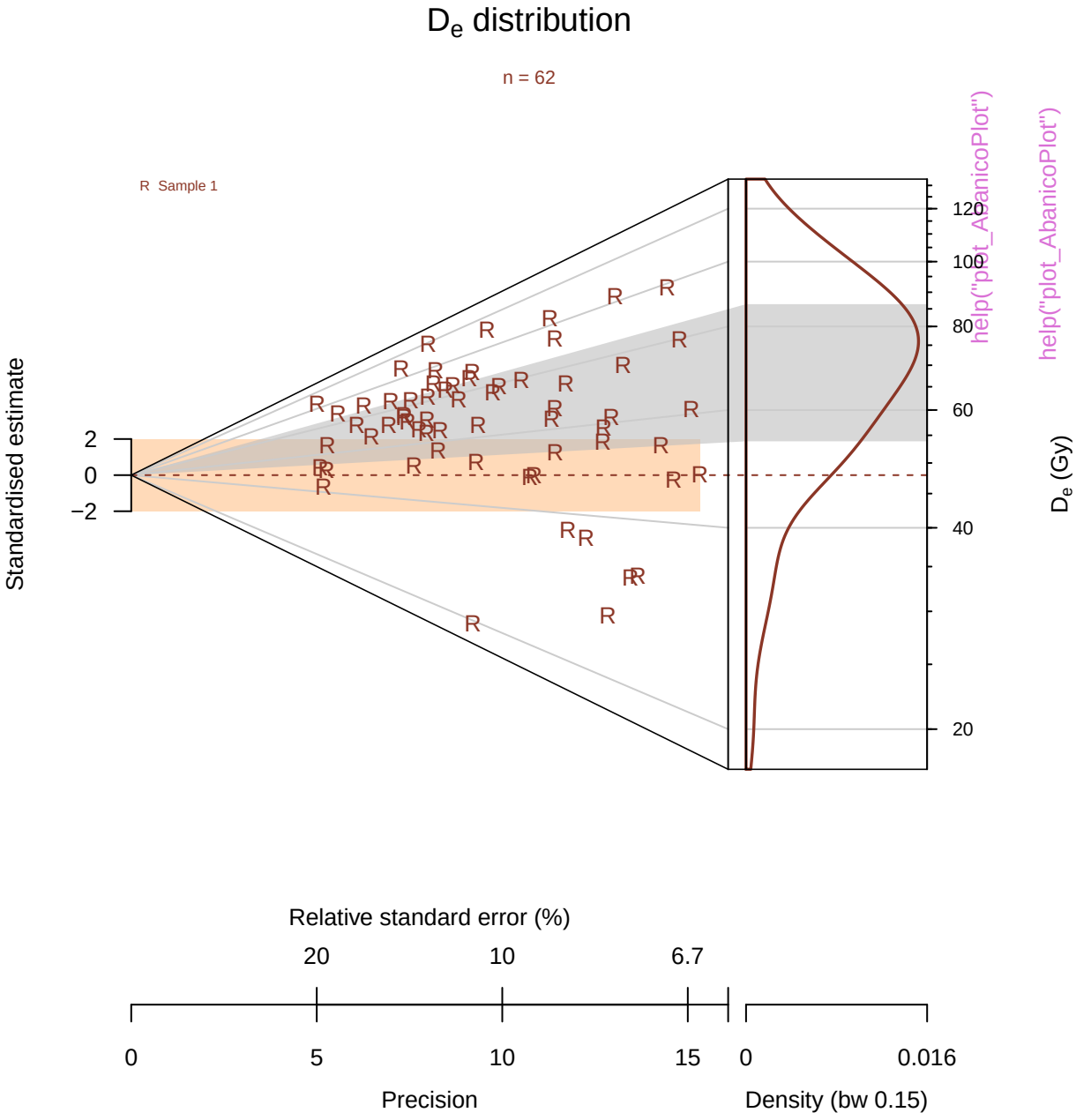

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

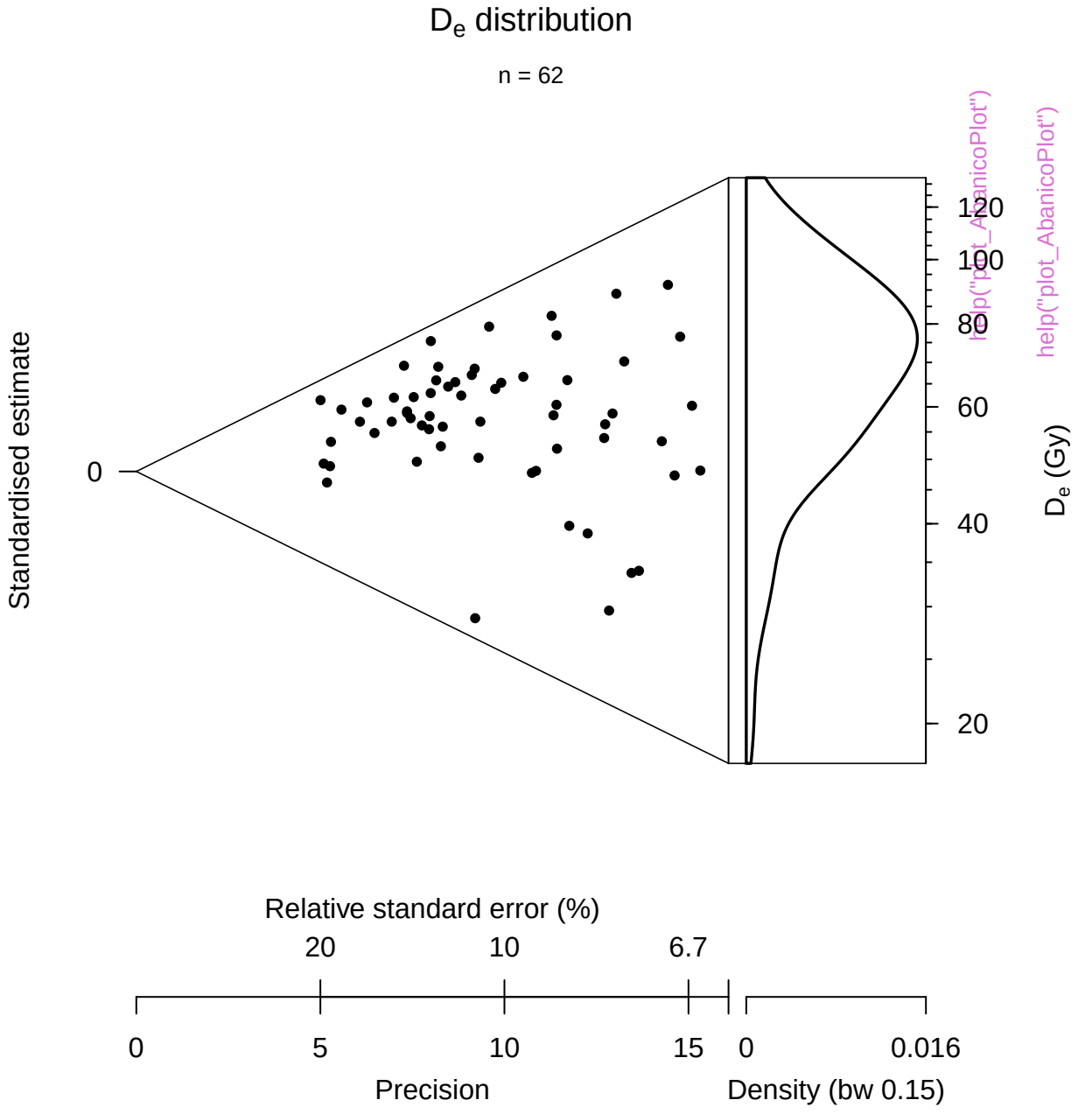

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

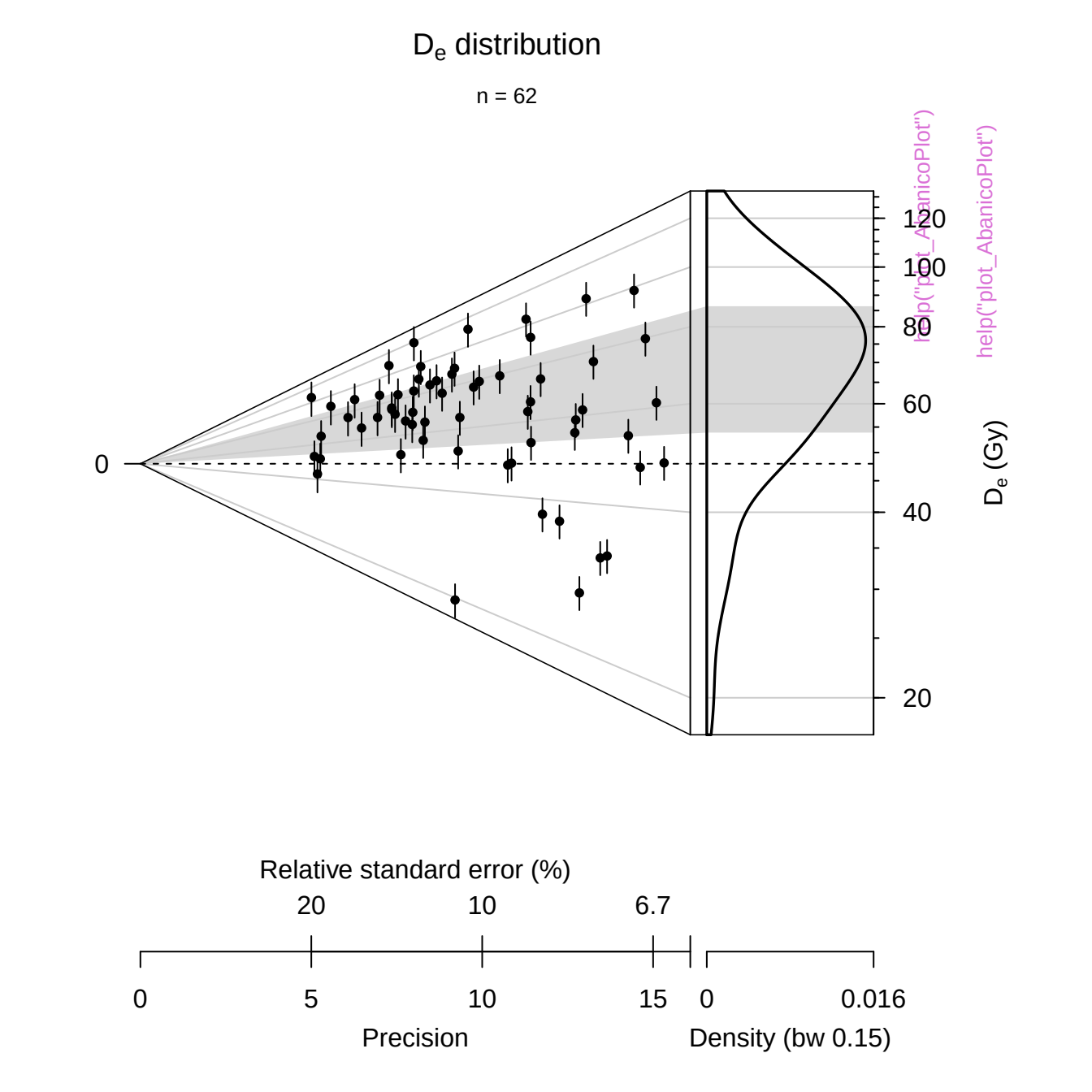

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

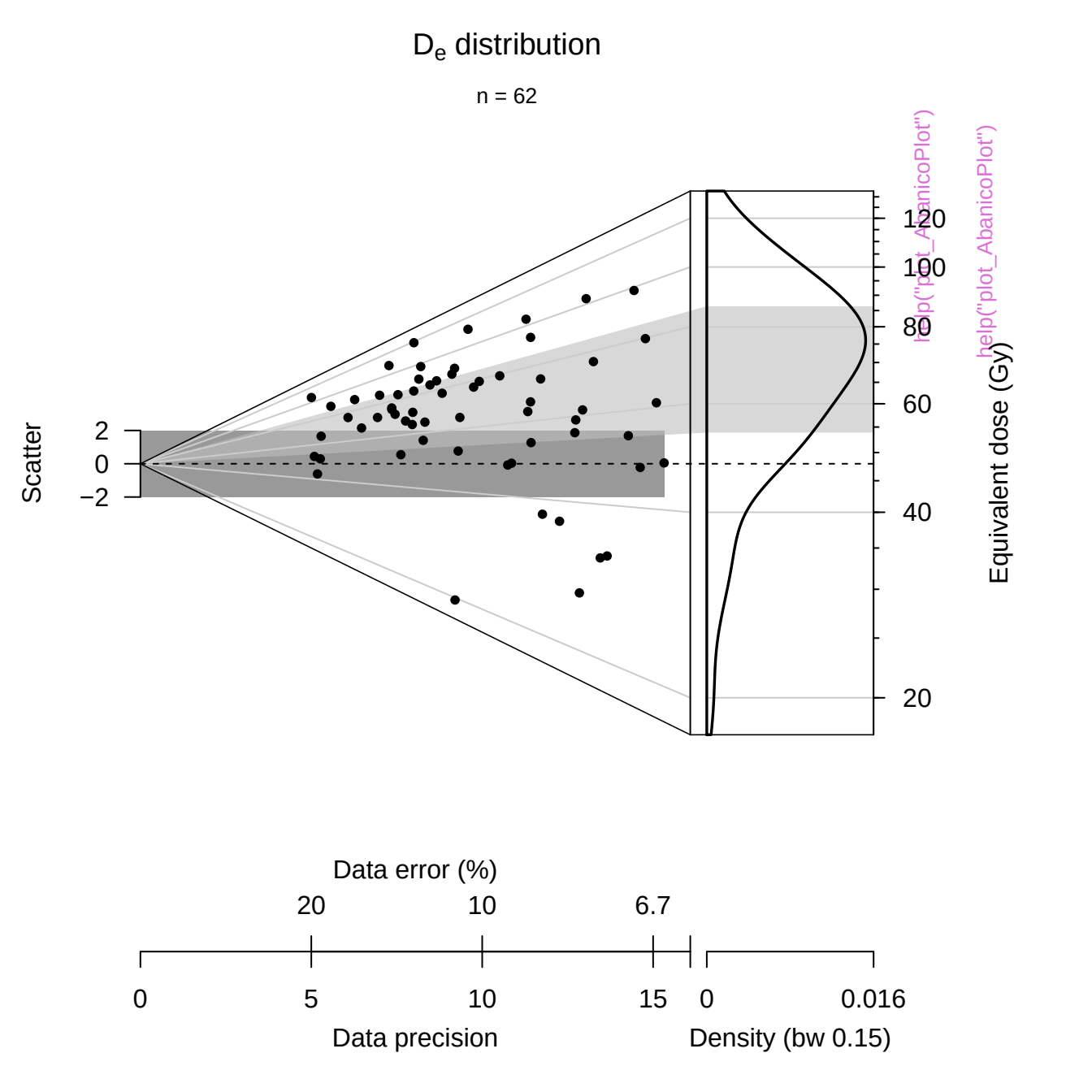

D$_e$ distribution
n = 62
Standardised estimate
2
0
−2
120
100
80
60
40
20
D$_e$ (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

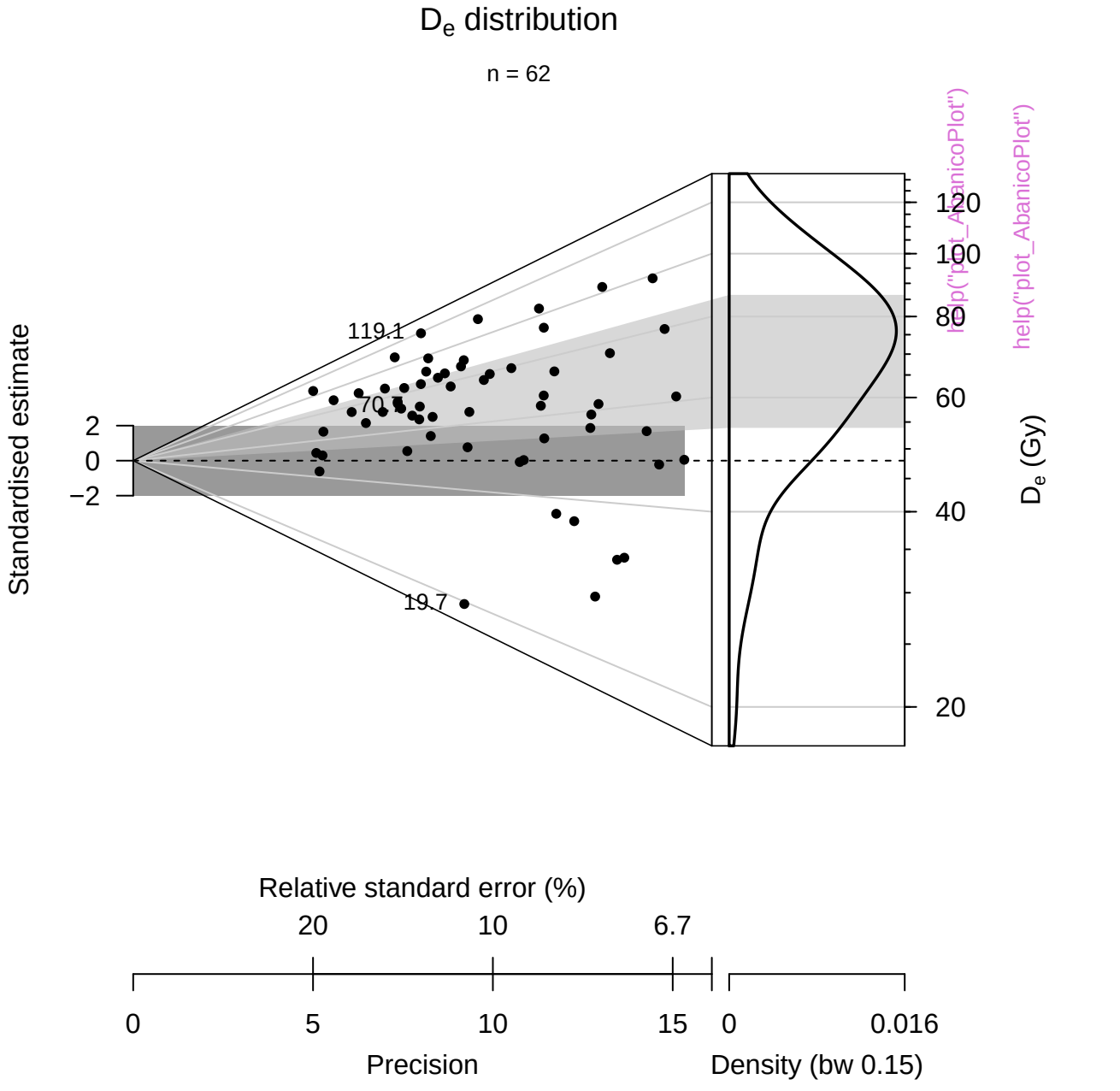

De distribution
n = 62
Standardised estimate
2
0
−2
CAM
120
100
80
60
40
20
De (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

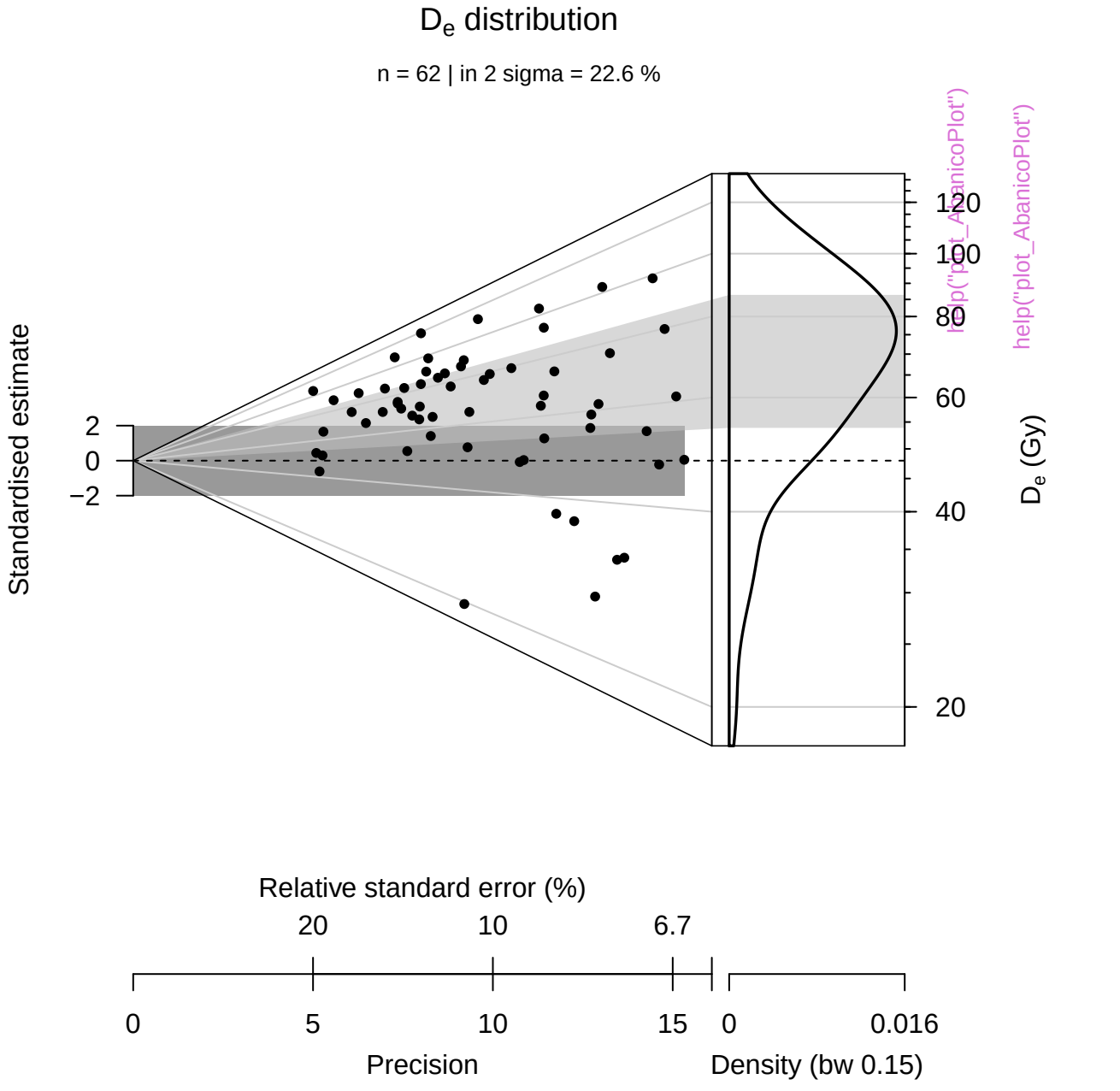

De distribution
n = 62
R Sample 1
Standardised estimate
2
0
−2
120
100
80
60
40
20
De (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

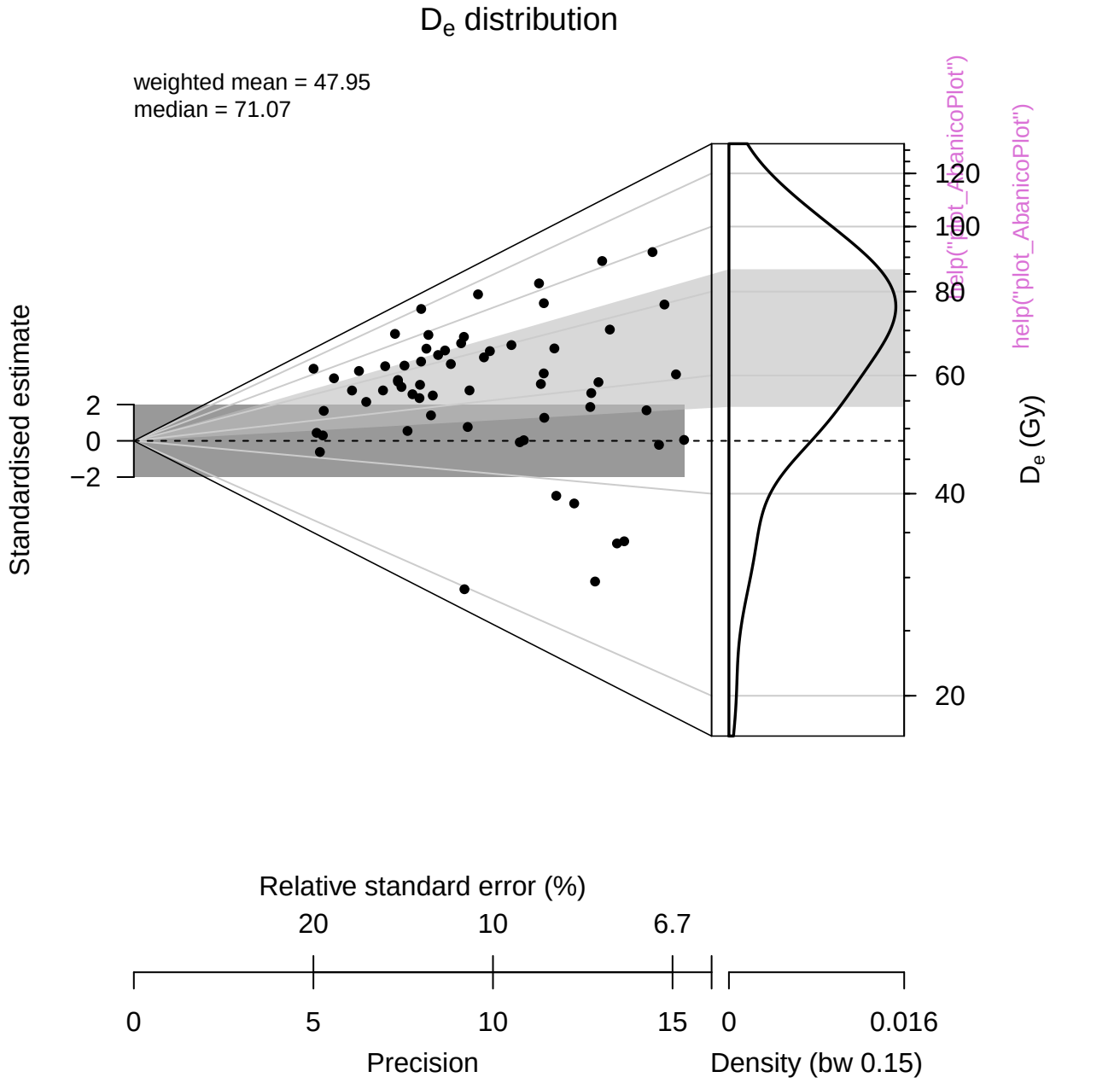

De distribution
n = 62
Standardised estimate
0
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

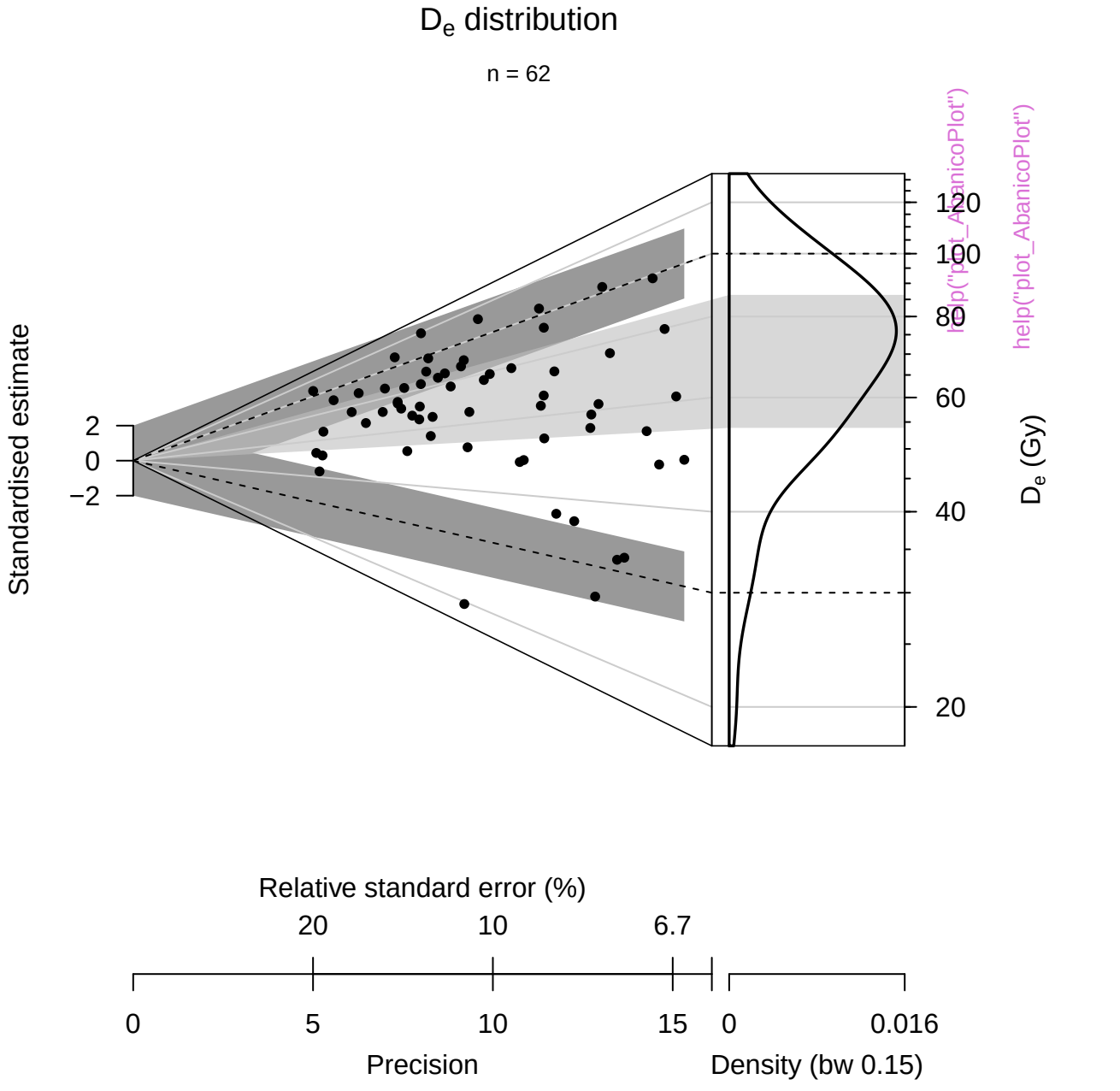

De distribution
n = 62
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
0
120
100
80
60
40
20
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

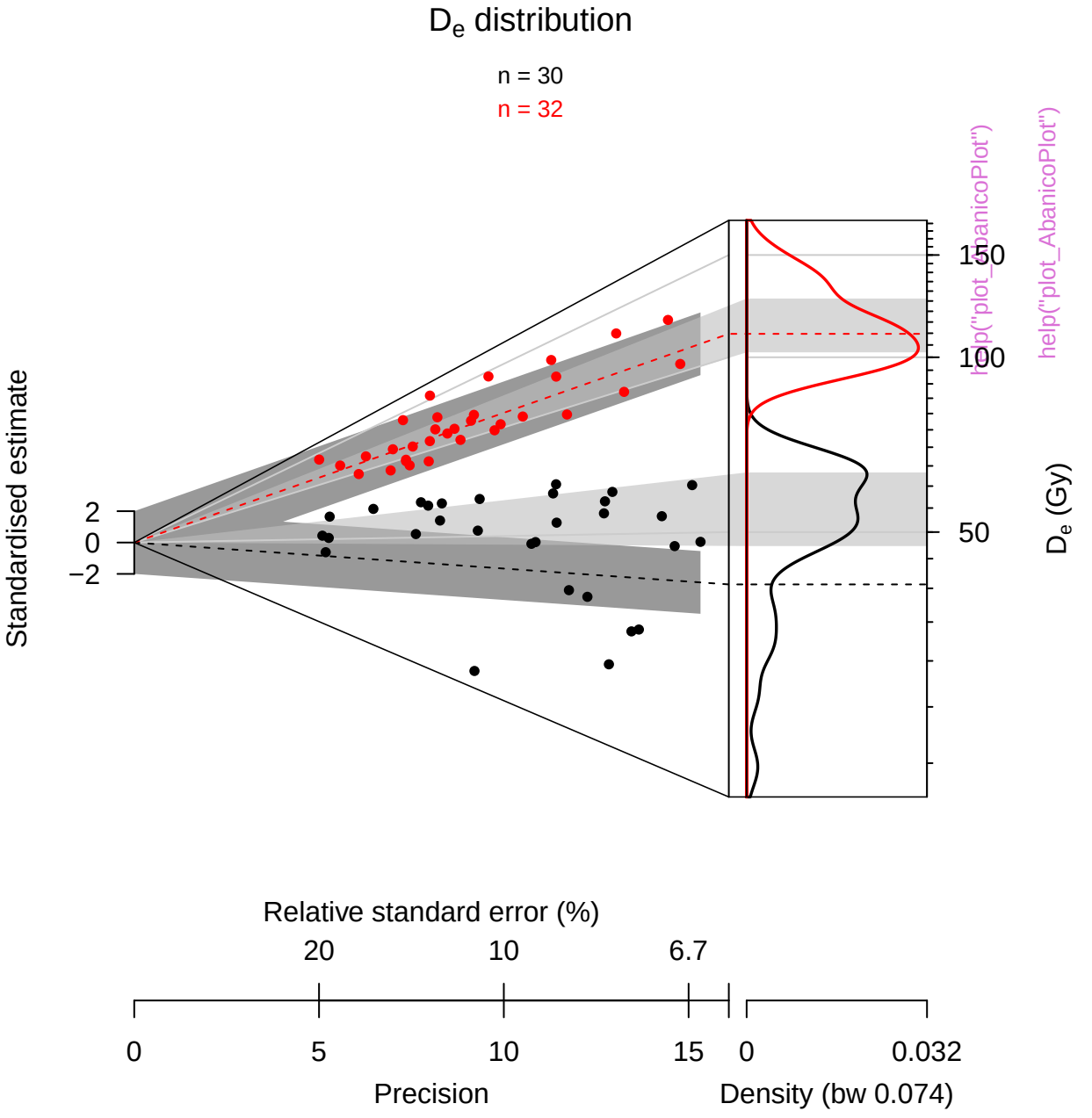

De distribution
n = 62
Scatter
2
0
−2
Equivalent dose (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Data error (%)
20
10
6.7
0
5
10
15
Data precision
0
0.016
Density (bw 0.15)

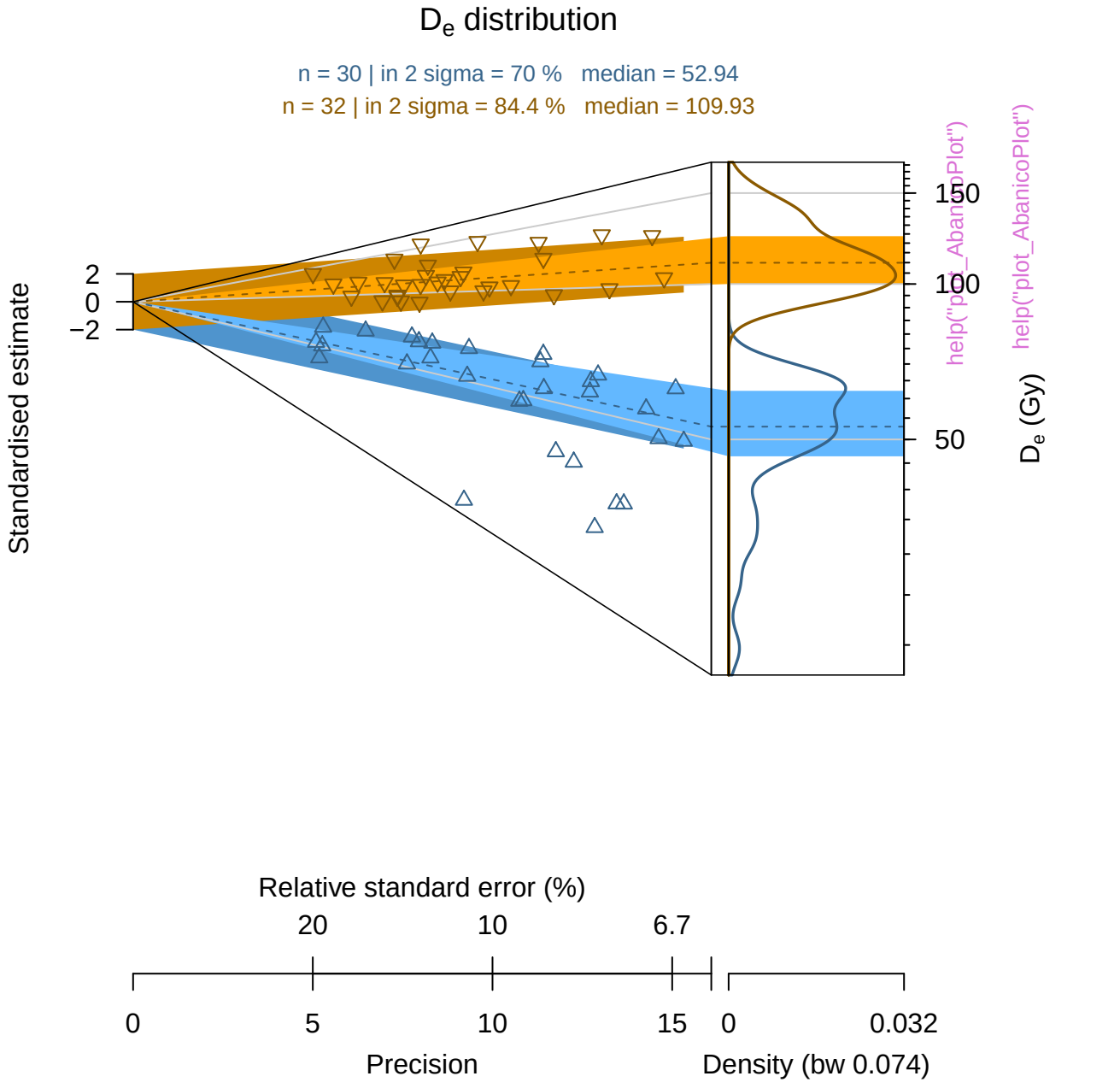

De distribution
n = 62
Standardised estimate
2
0
−2
119.1
70.7
19.7
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)


De distribution
n = 62 | in 2 sigma = 22.6 %
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

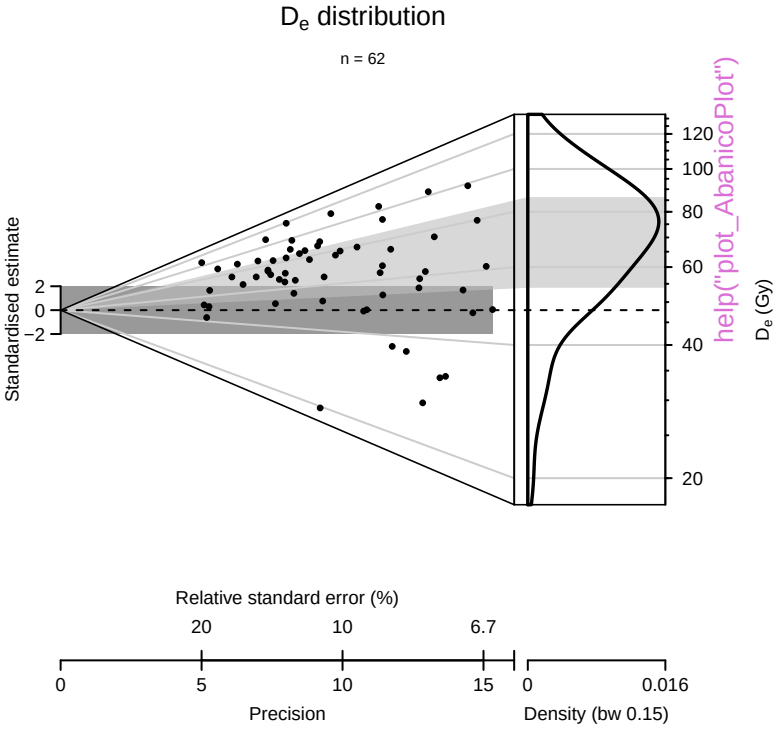

De distribution
weighted mean = 47.95
median = 71.07
Standardised estimate
2
0
−2
120
100
80
60
40
20
De (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)

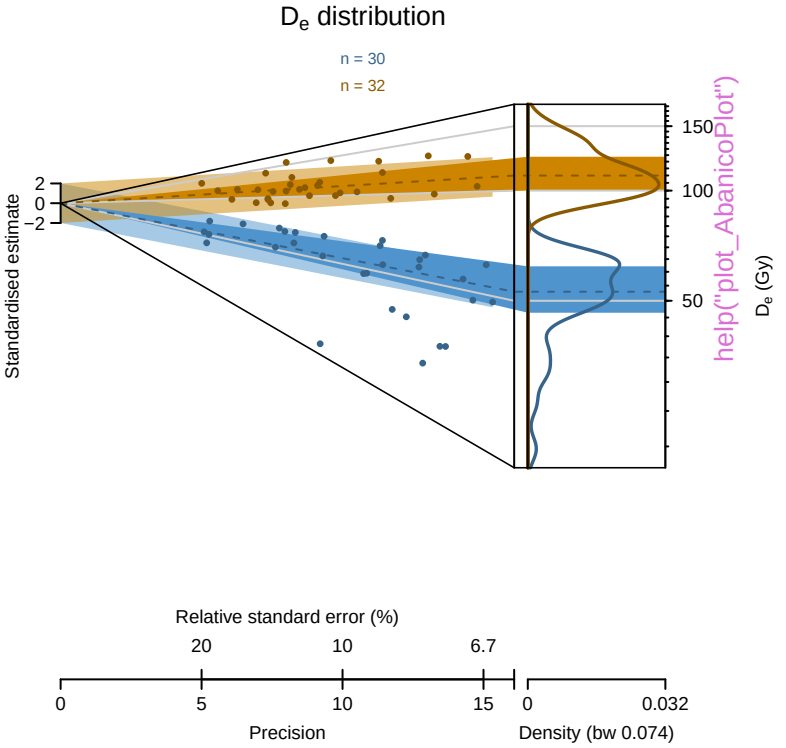

De distribution
n = 62
Standardised estimate
2
0
−2
De (Gy)
120
100
80
60
40
20
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)


De distribution
n = 30
n = 32
Standardised estimate
2
0
−2
150
100
50
De (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.032
Density (bw 0.074)


De distribution
n = 30 | in 2 sigma = 70 % median = 52.94
n = 32 | in 2 sigma = 84.4 % median = 109.93
Standardised estimate
2
0
−2
150
100
50
De (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.032
Density (bw 0.074)

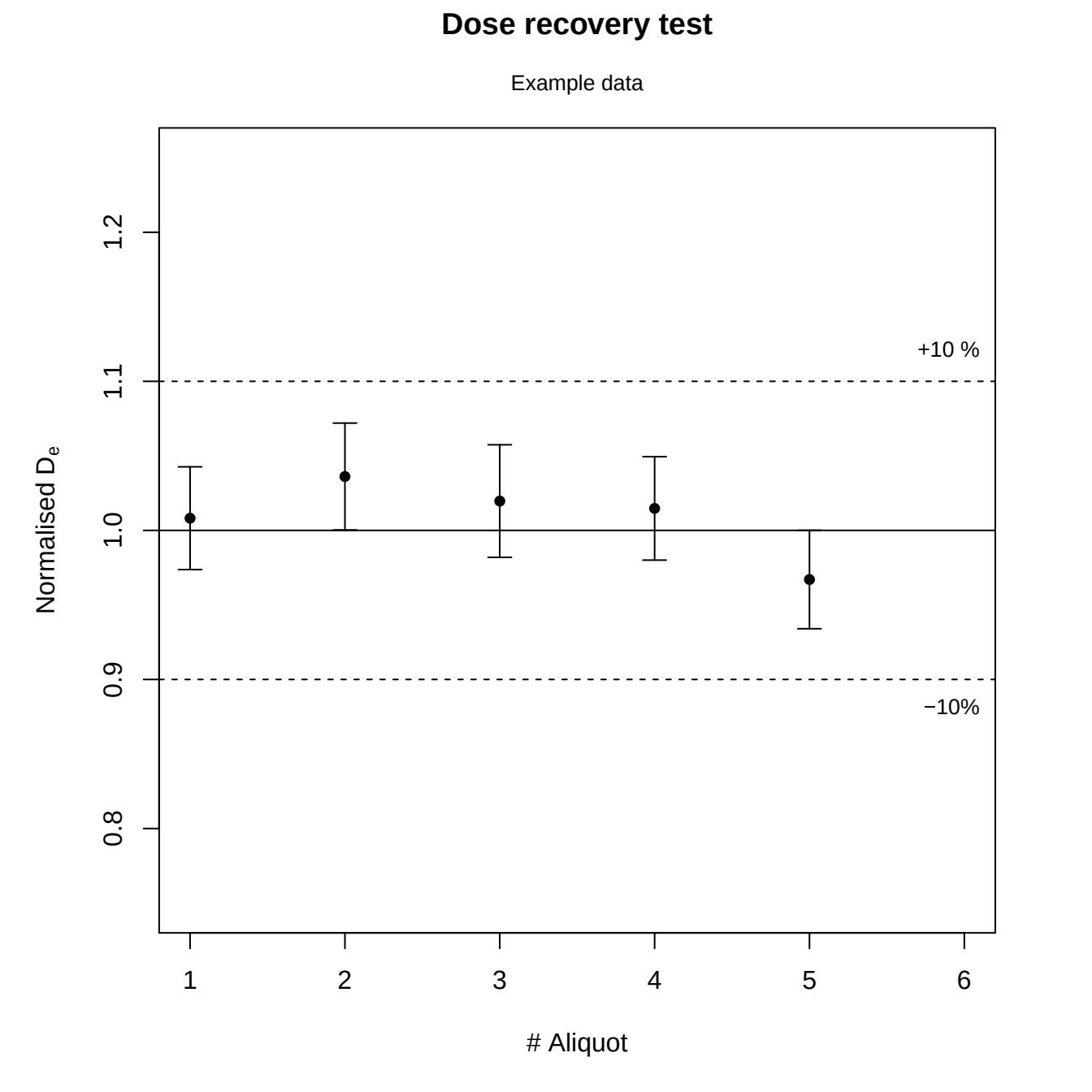
help("plot_AbanicoPlot")

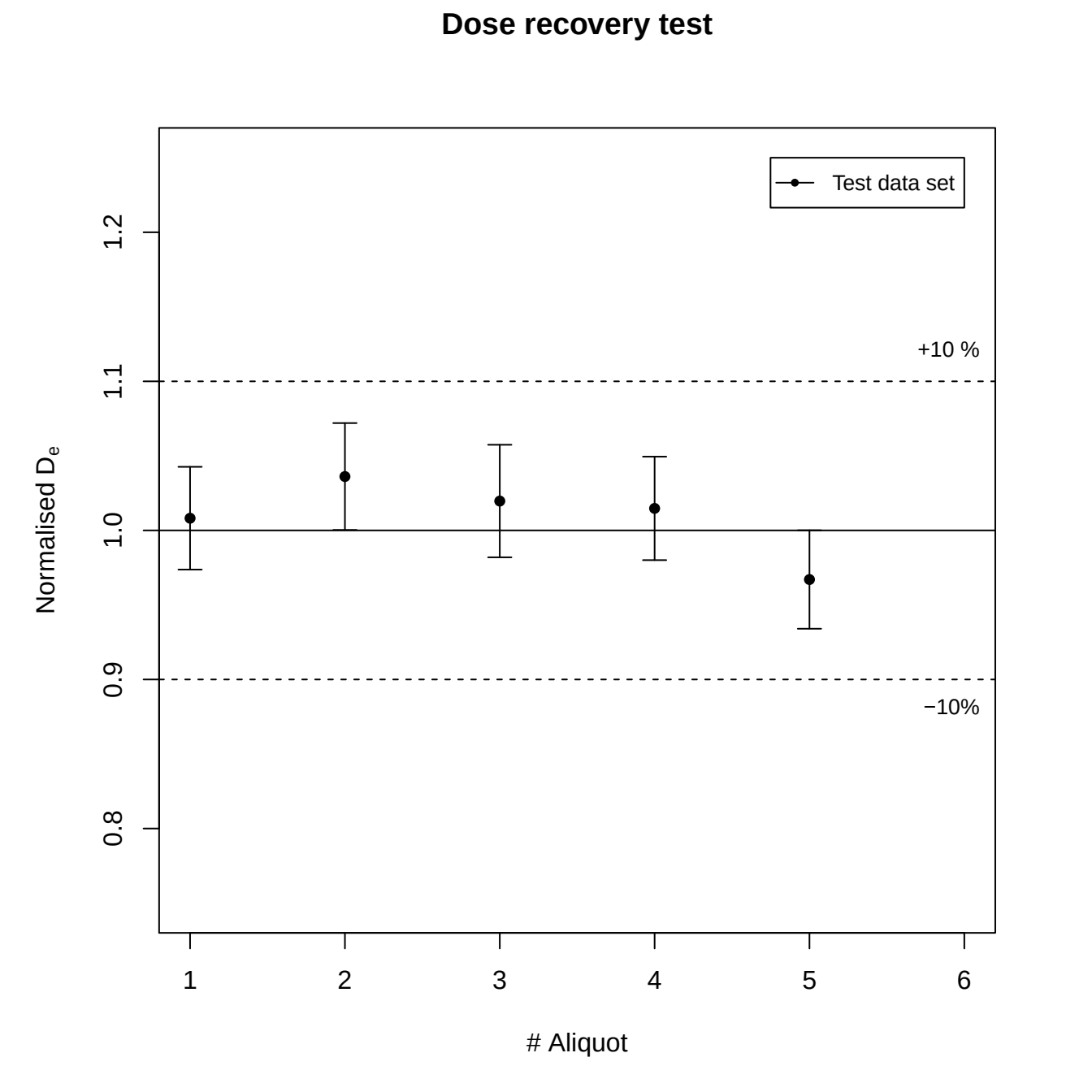


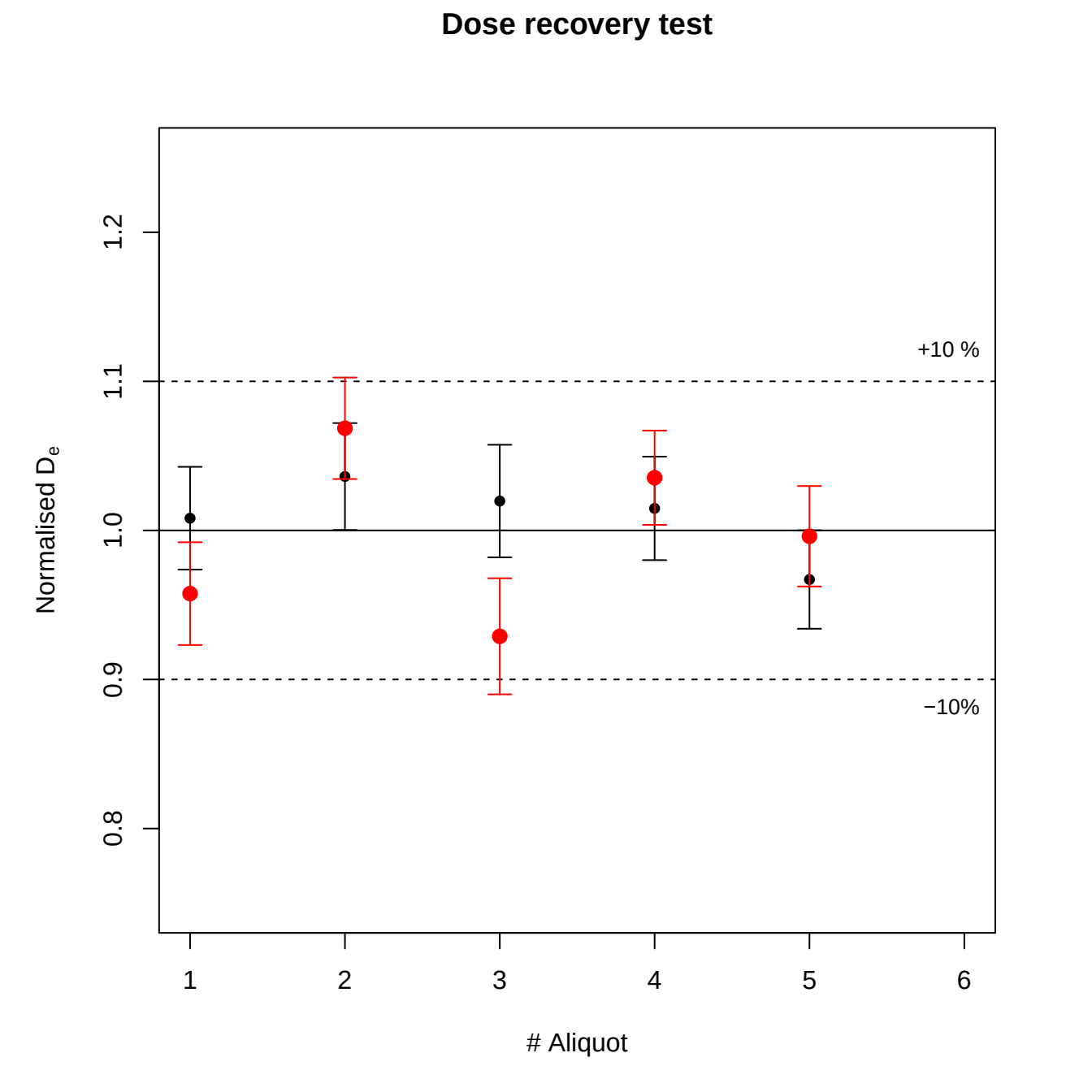


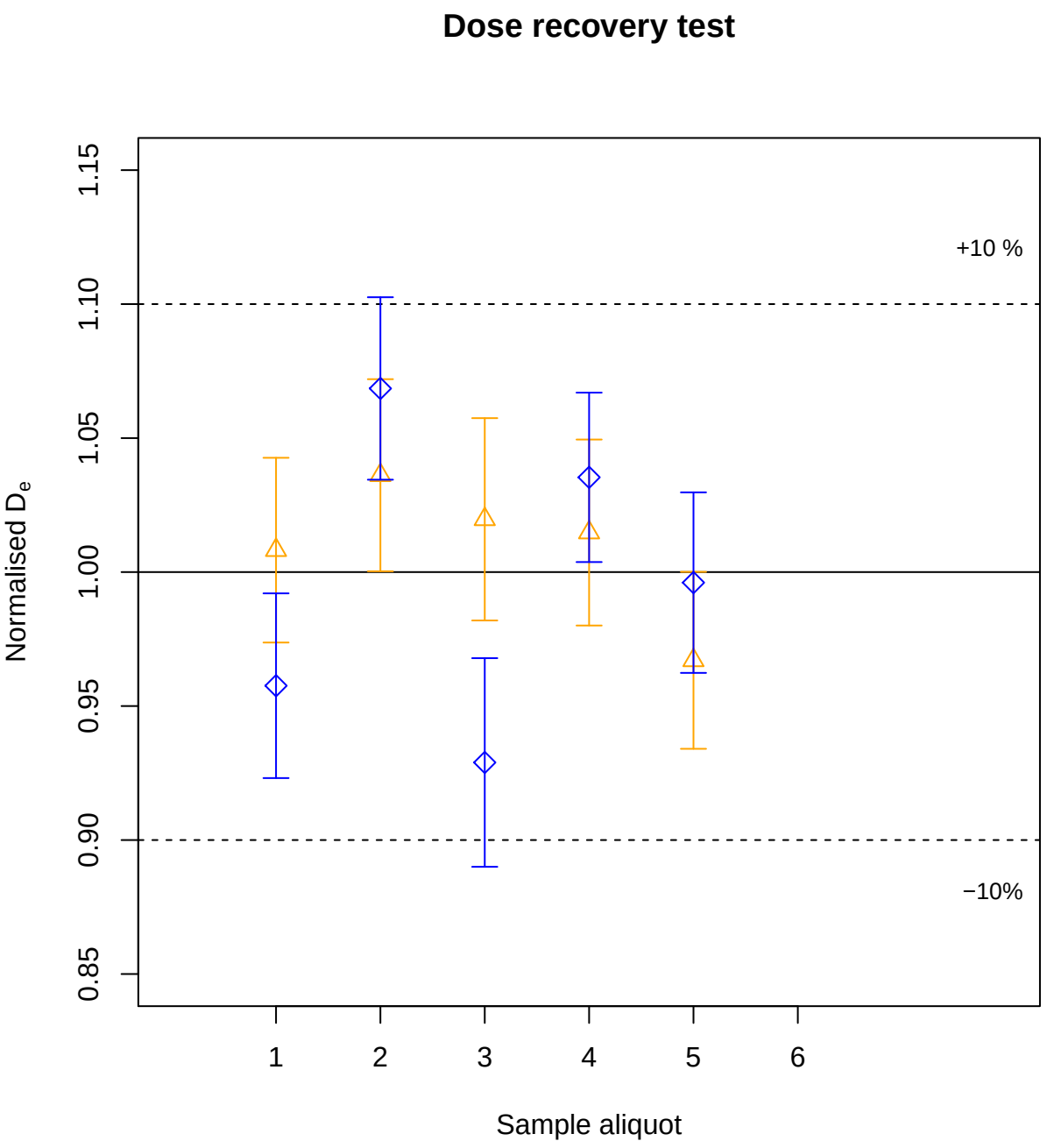
help("plot_AbanicoPlot")

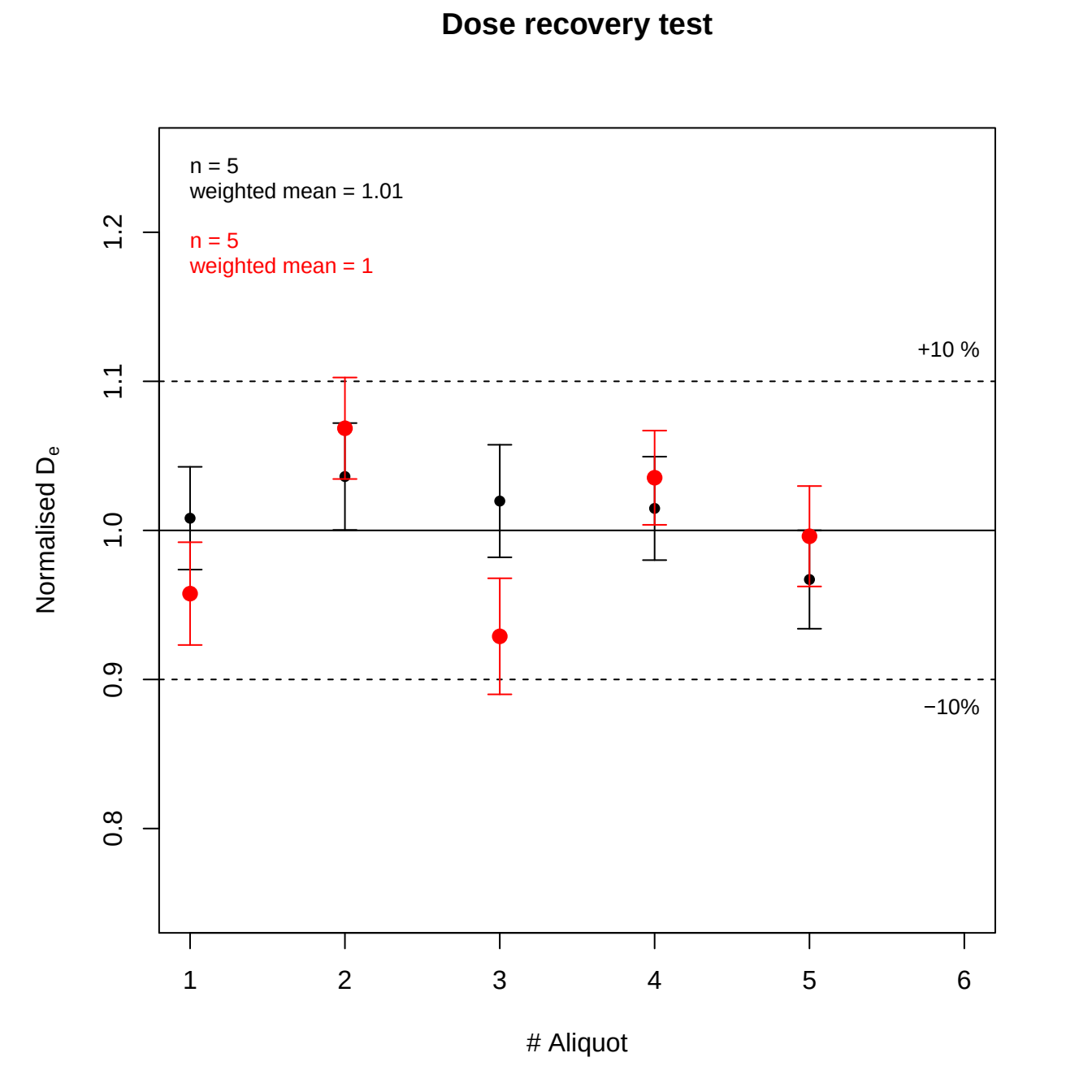
help("plot_AbanicoPlot")

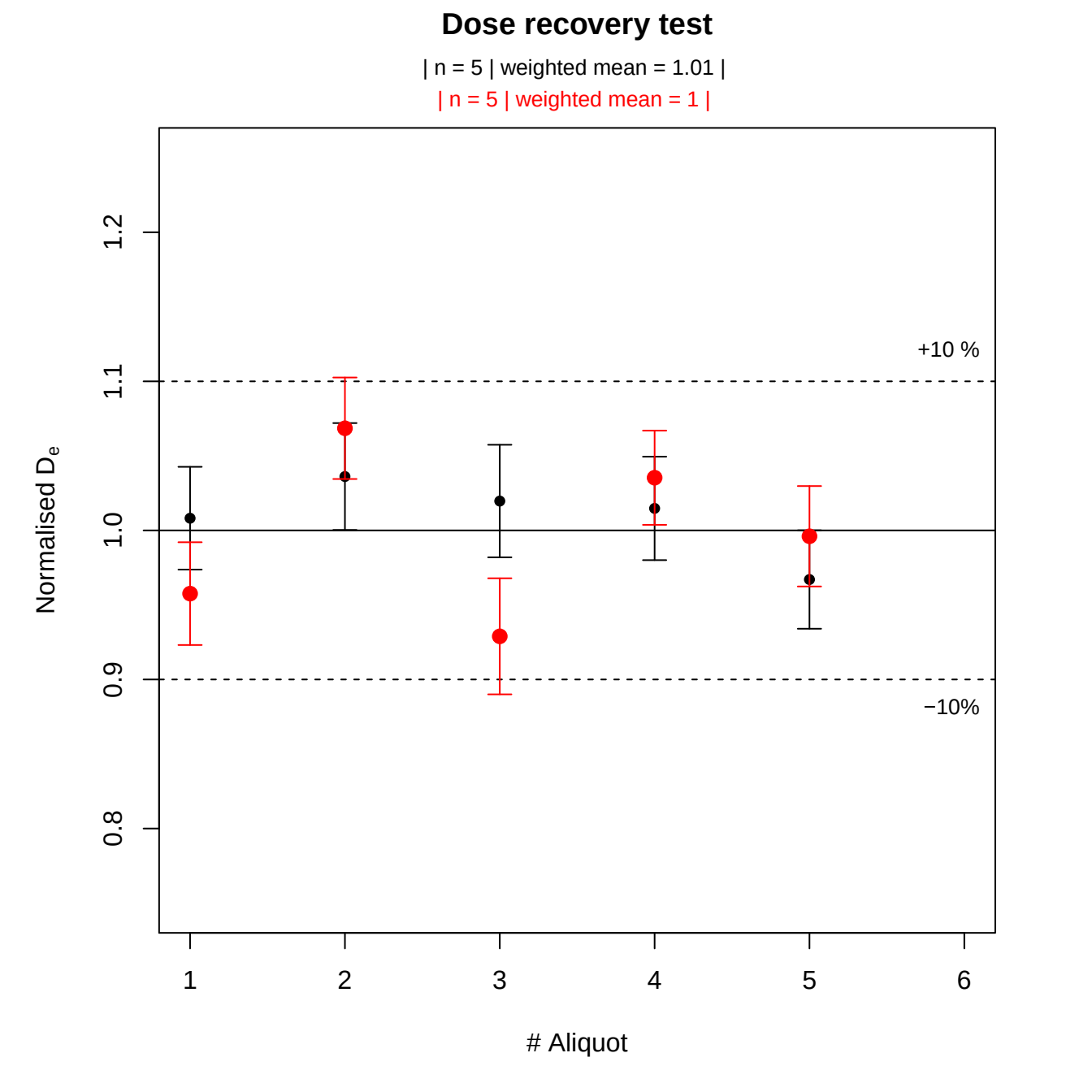

Dose recovery test
Example data
Normalised D_e
1.2
1.1
1.0
0.9
0.8
+10 %
−10%
1
2
3
4
5
6
Aliquot

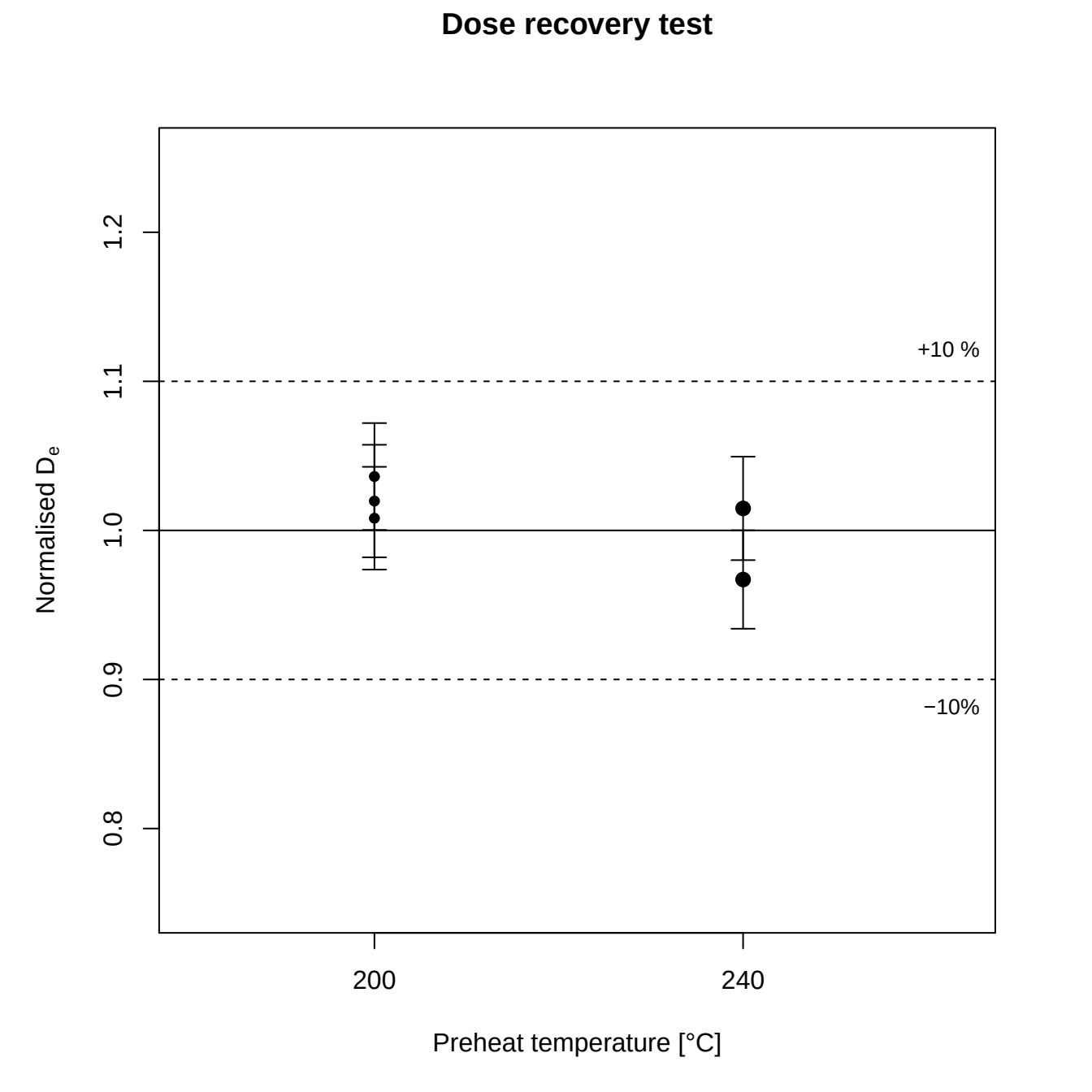

Dose recovery test
Test data set
+10 %
−10%
Normalised D_e
1.2
1.1
1.0
0.9
0.8
1
2
3
4
5
6
Aliquot

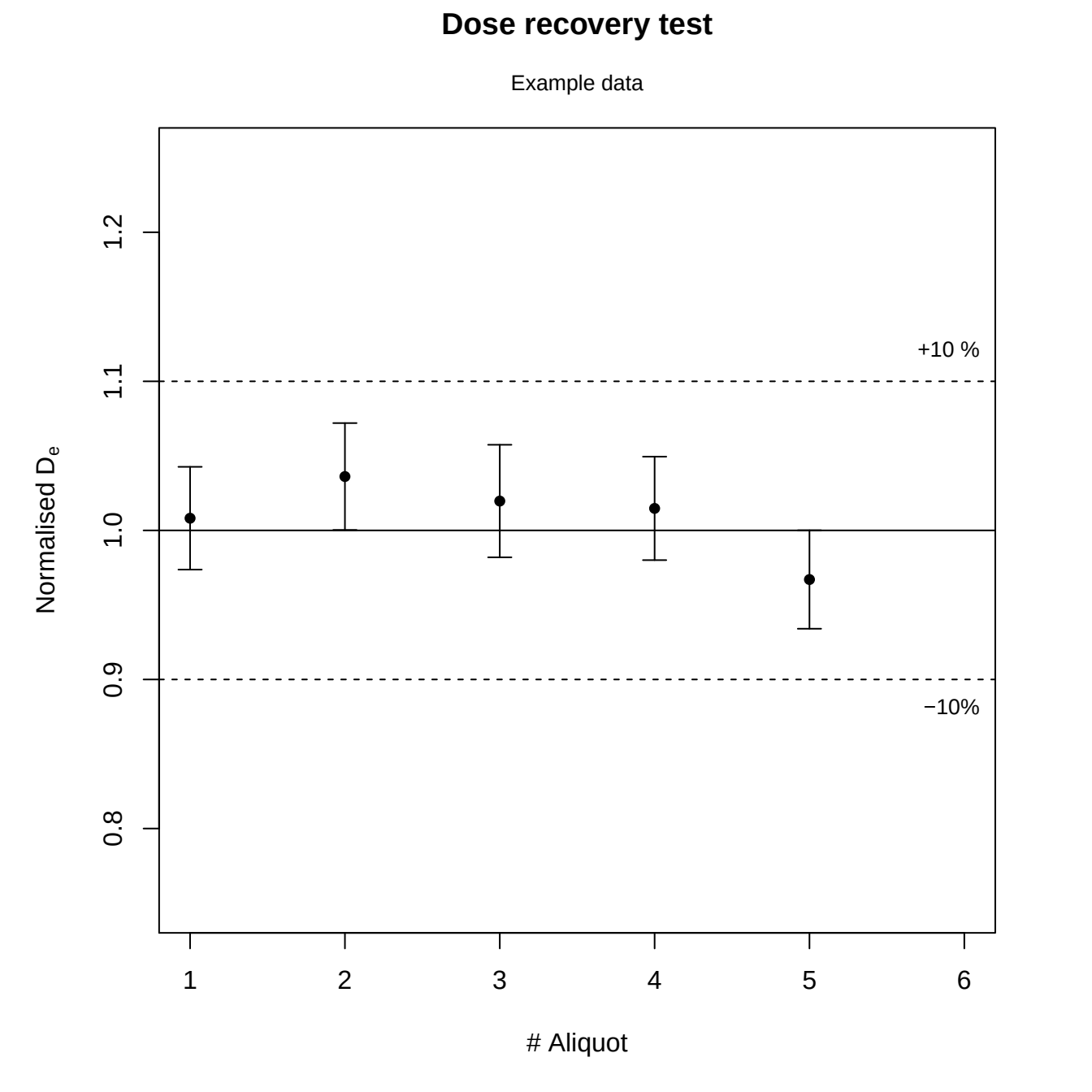

Dose recovery test
Normalised D_e
1.2
1.1
1.0
0.9
0.8
+10 %
−10%
1
2
3
4
5
6
Aliquot

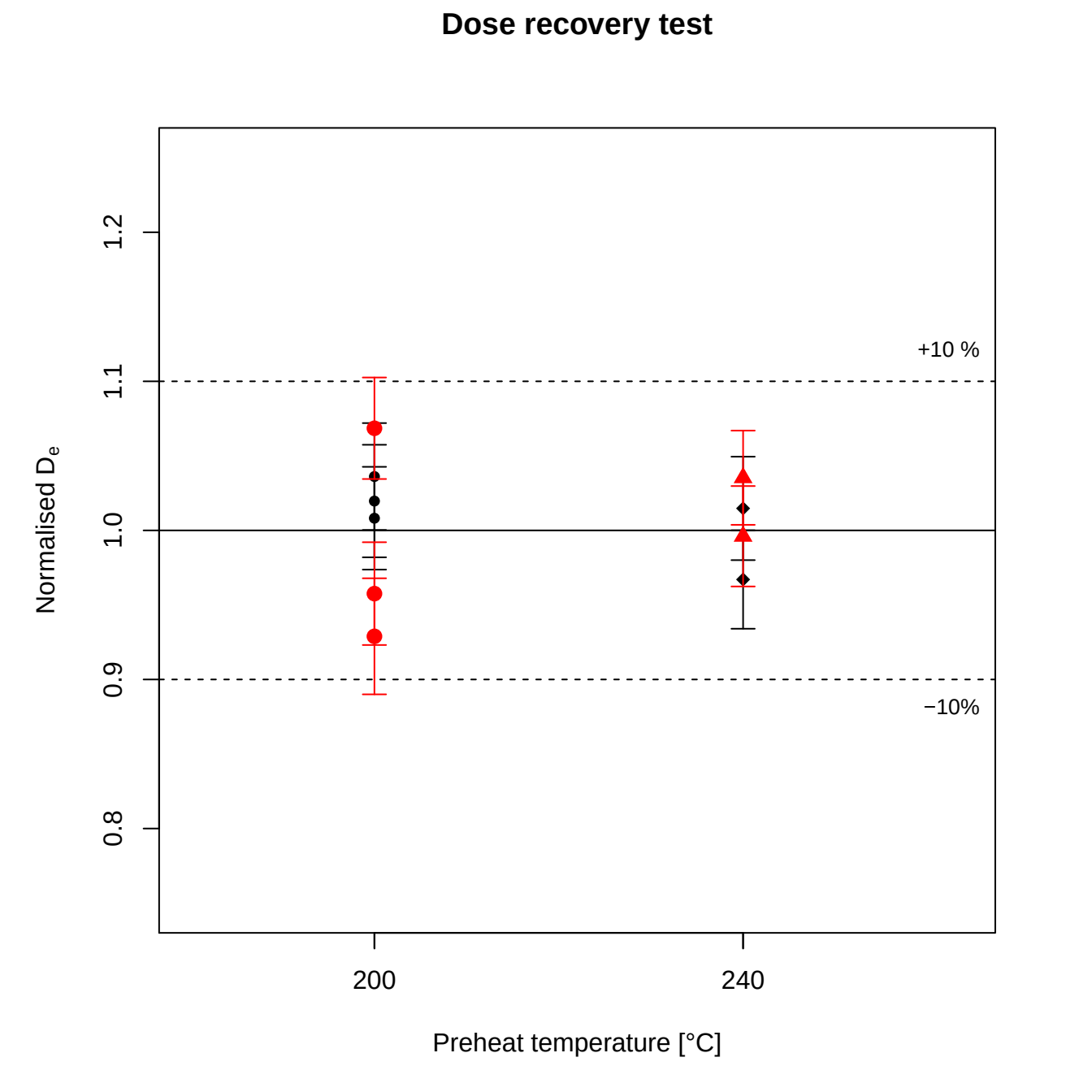

Dose recovery test
Normalised D_e
0.85
0.90
0.95
1.00
1.05
1.10
1.15
+10 %
−10%
1
2
3
4
5
6
Sample aliquot

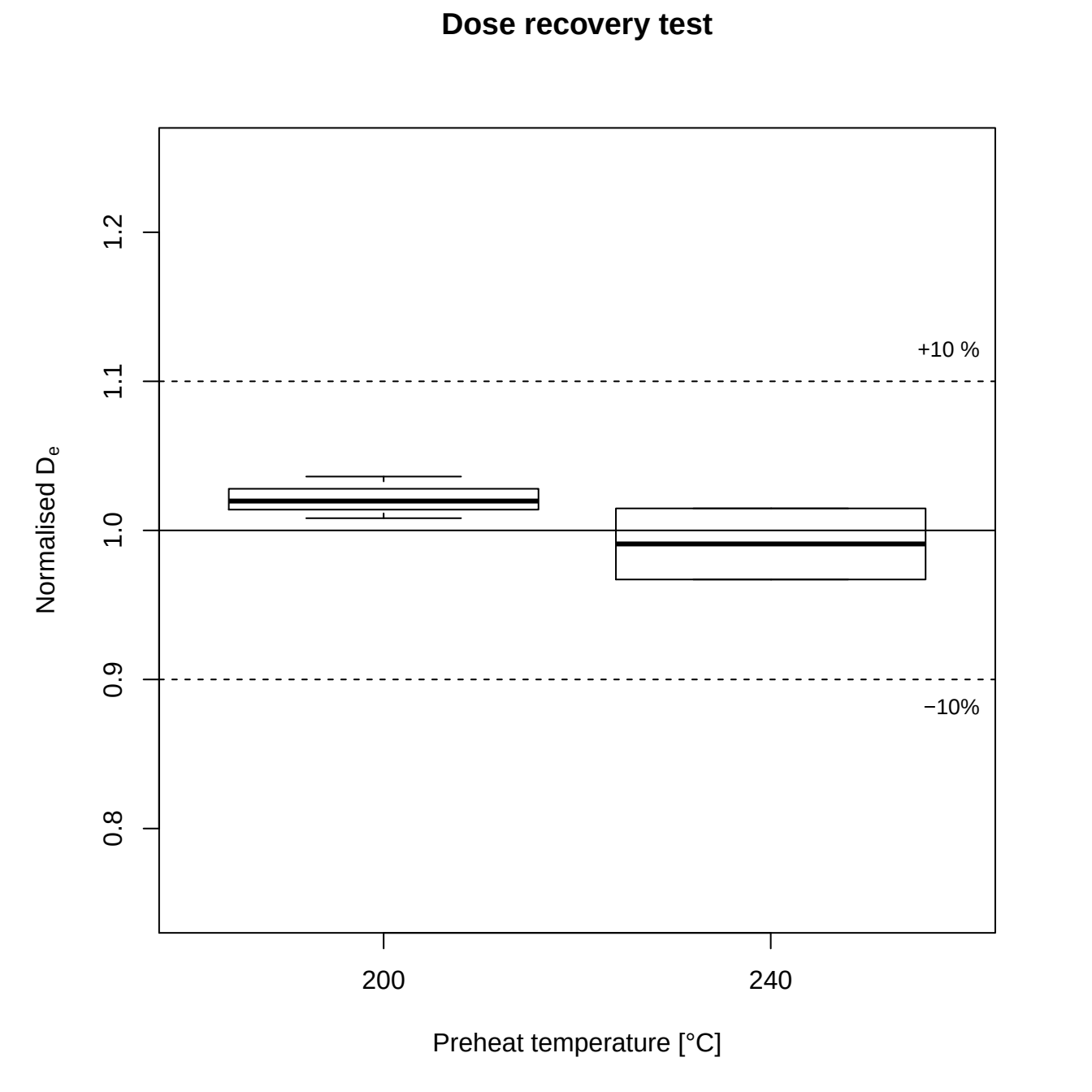

Dose recovery test
n = 5
weighted mean = 1.01
n = 5
weighted mean = 1
+10 %
−10%
Normalised D_e
0.8
0.9
1.0
1.1
1.2
1
2
3
4
5
6
Aliquot

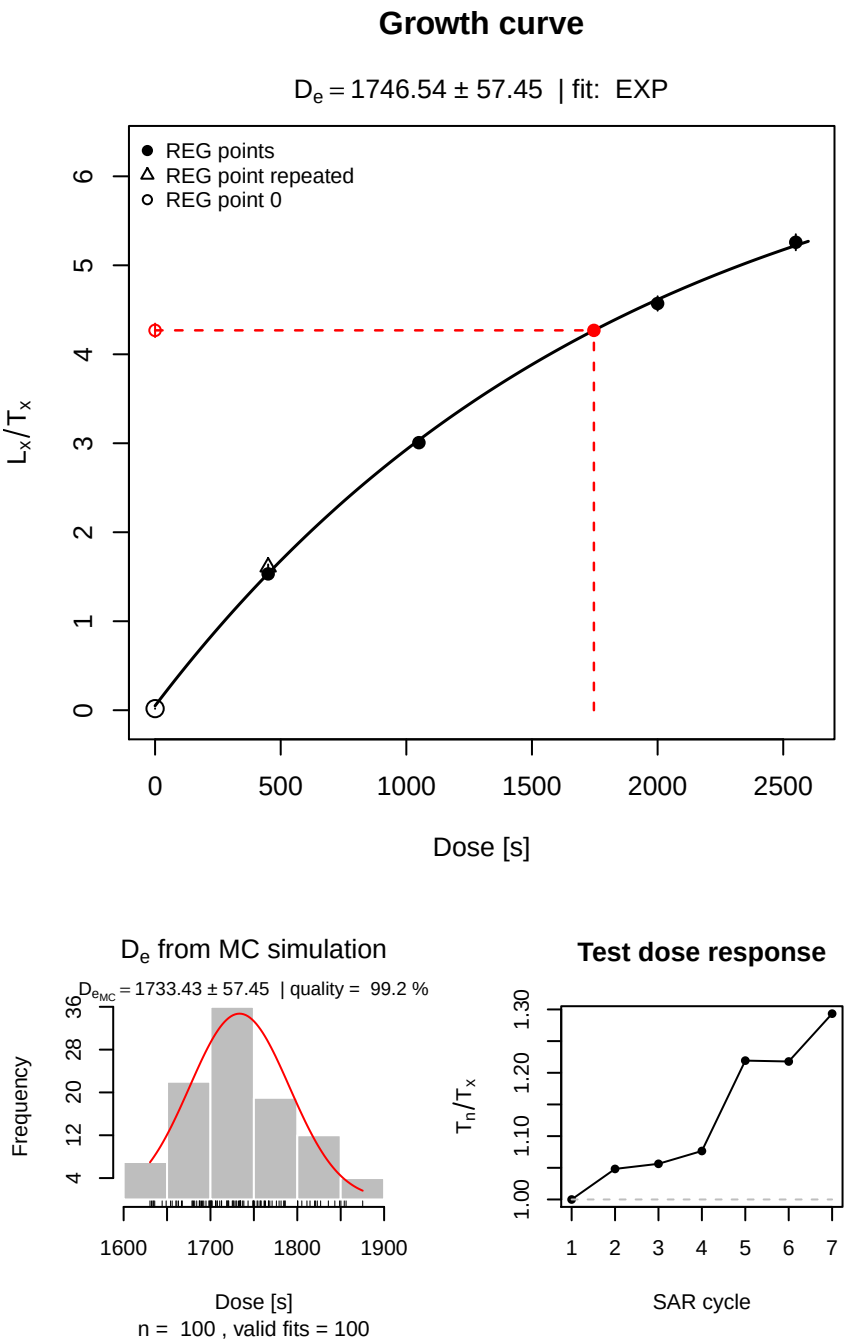

Dose recovery test
| n = 5 | weighted mean = 1.01 |
| n = 5 | weighted mean = 1 |
+10 %
−10%
Normalised D_e
0.8
0.9
1.0
1.1
1.2
1
2
3
4
5
6
Aliquot

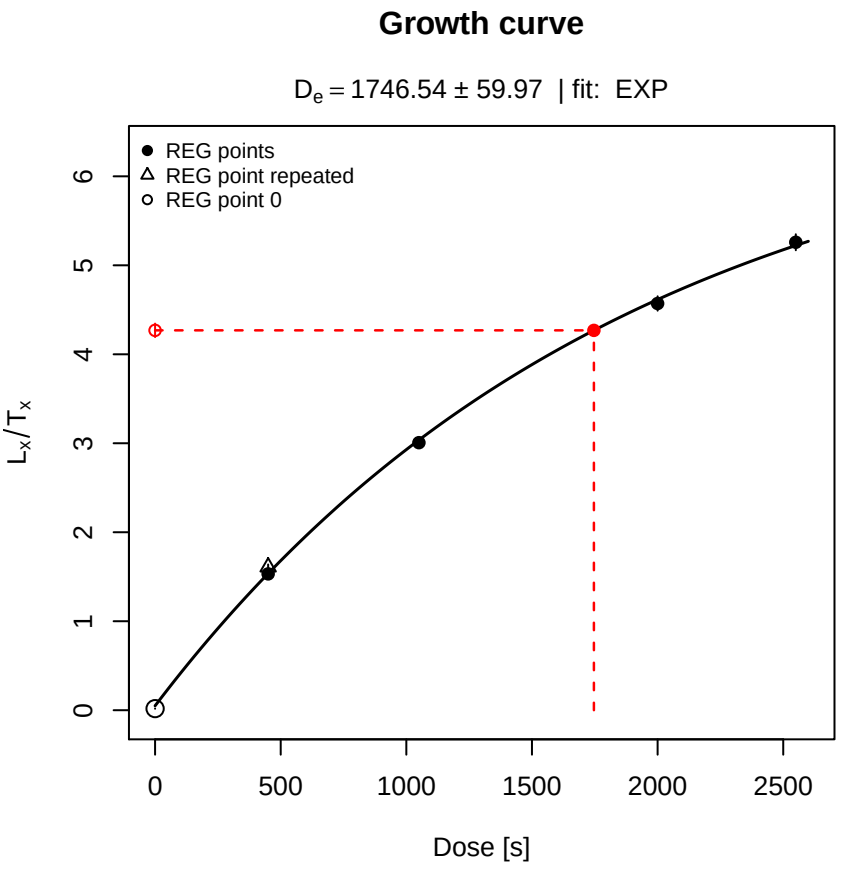

Dose recovery test
Normalised D_e
1.2
1.1
1.0
0.9
0.8
+10 %
−10%
200
240
Preheat temperature [°C]

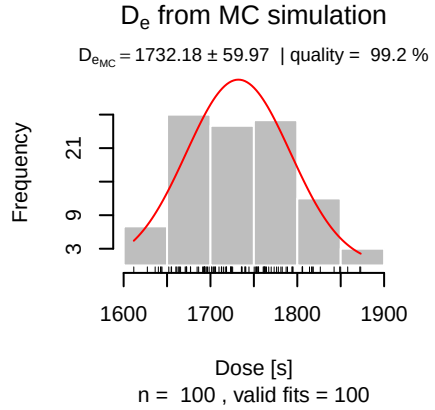

Dose recovery test
Example data
Normalised D_e
1.2
1.1
1.0
0.9
0.8
+10 %
−10%
1
2
3
4
5
6
Aliquot

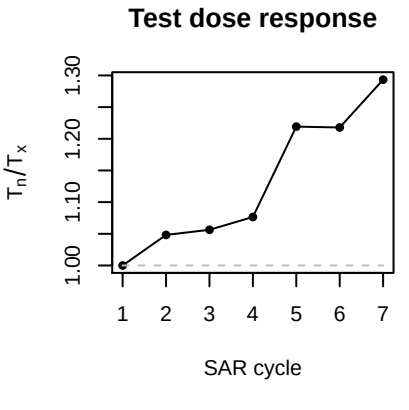

Dose recovery test
Normalised D_e
1.2
1.1
1.0
0.9
0.8
+10 %
−10%
200
240
Preheat temperature [°C]

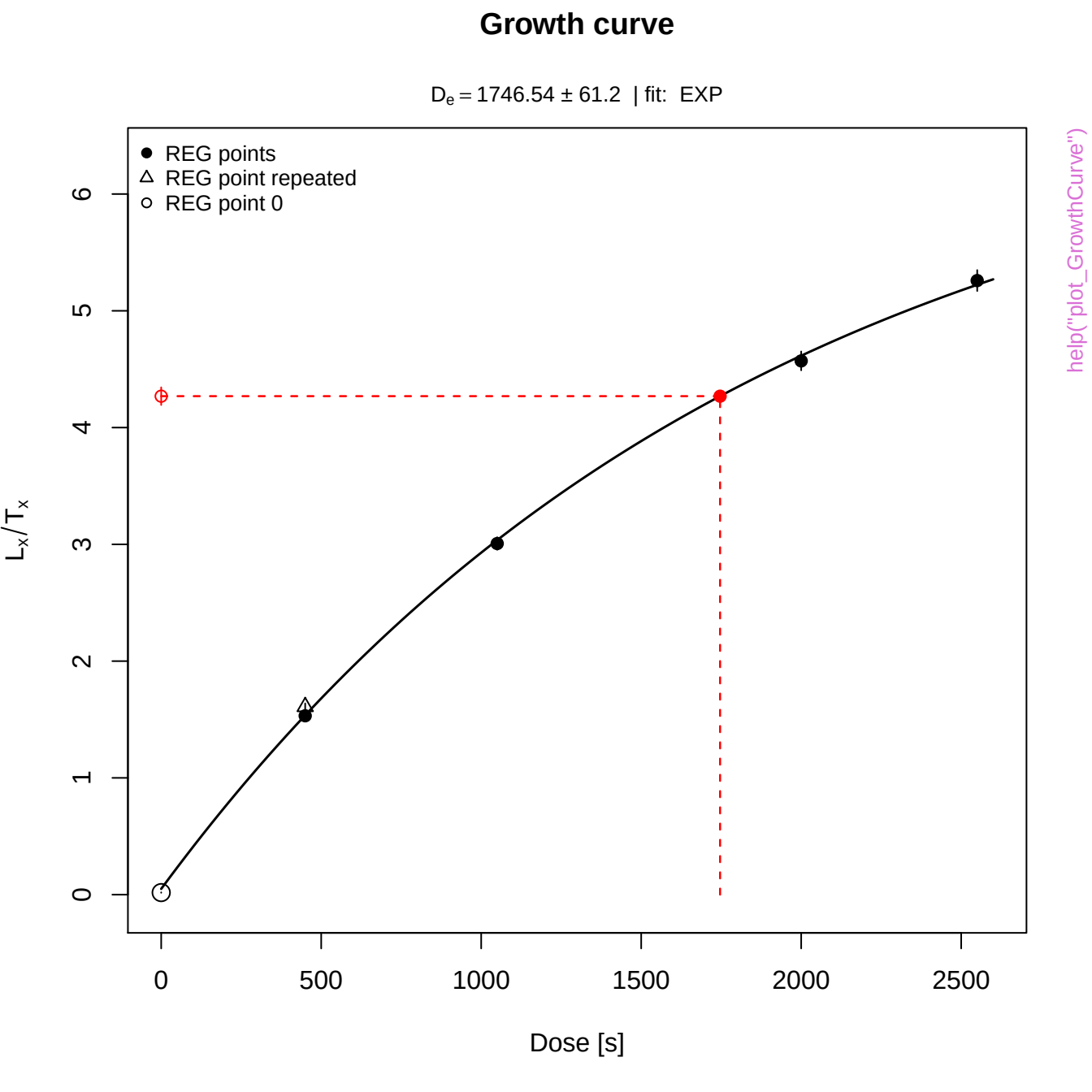

Dose recovery test
Normalised D_e
1.2
1.1
1.0
0.9
0.8
+10 %
−10%
200
240
Preheat temperature [°C]

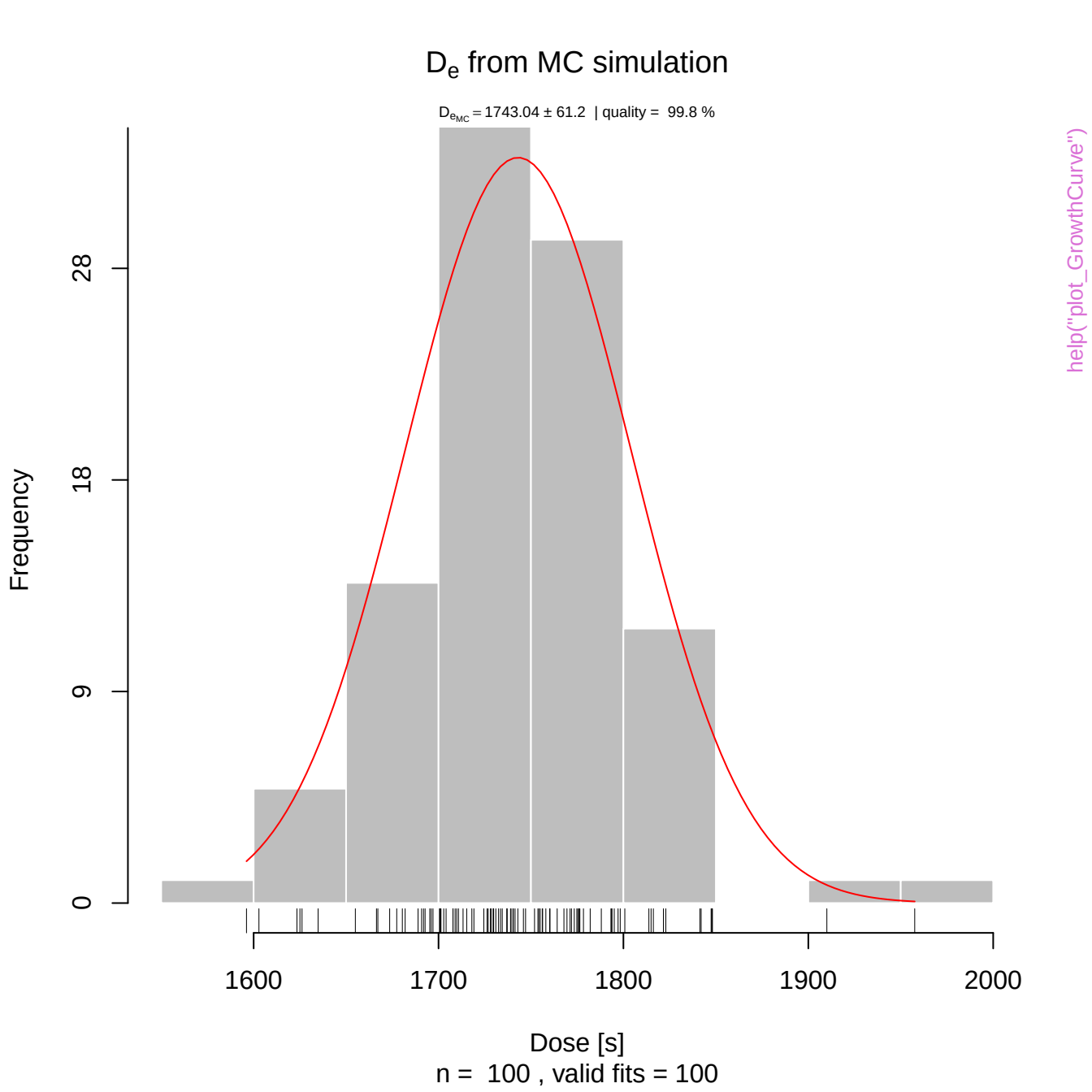

Growth curve
$D_e = 1746.54 \pm 57.45$ | fit: EXP
REG points
REG point repeated
REG point 0
L_x/T_x
0
1
2
3
4
5
6
0
500
1000
1500
2000
2500
Dose [s]
D_e from MC simulation
$D_{e_{MC}} = 1733.43 \pm 57.45$ | quality = 99.2 %
Frequency
4
12
20
28
36
1600
1700
1800
1900
Dose [s]
n = 100 , valid fits = 100
Test dose response
T_n/T_x
1.00
1.10
1.20
1.30
1
2
3
4
5
6
7
SAR cycle

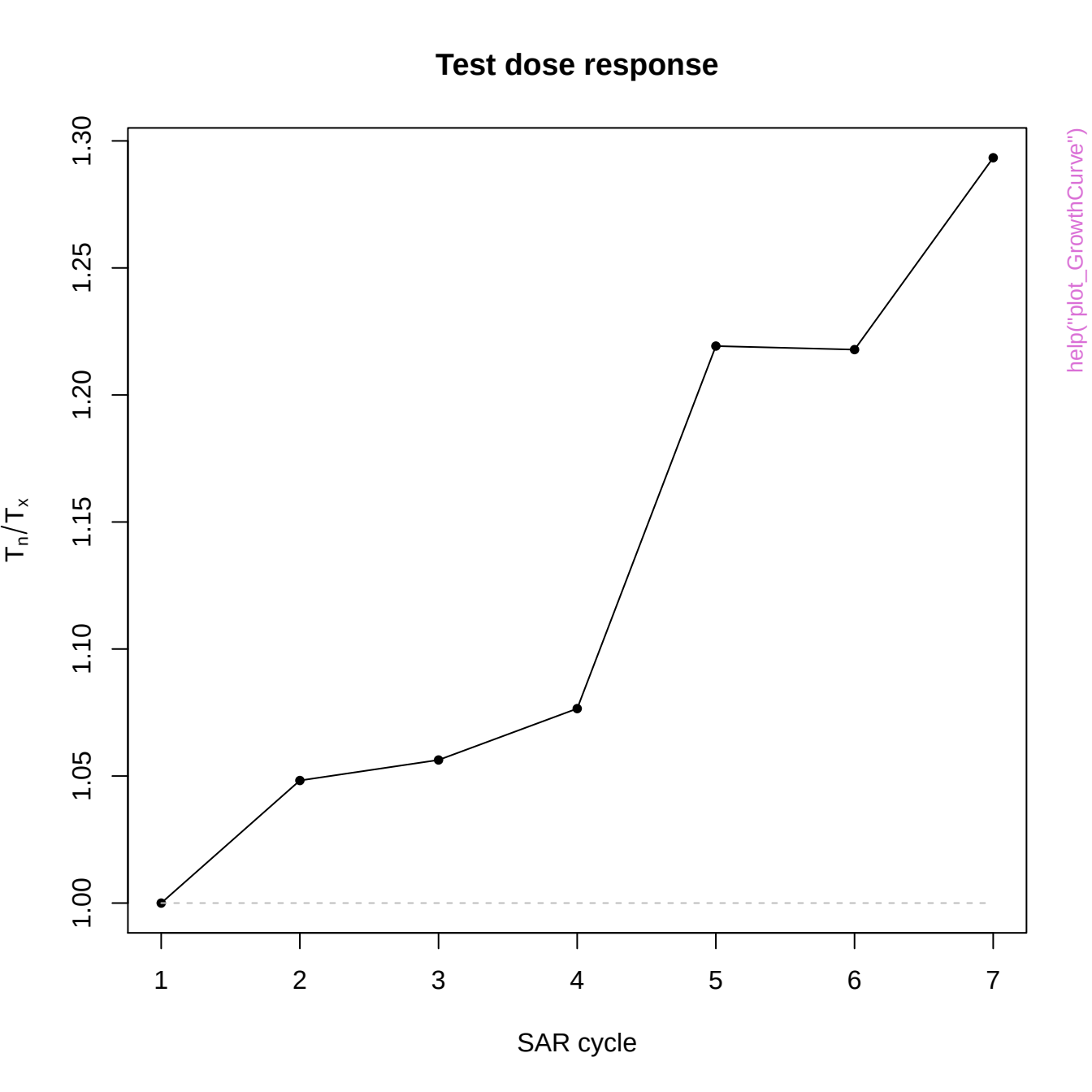

Growth curve
$D_e = 1746.54 \pm 59.97$ | fit: EXP
REG points
REG point repeated
REG point 0
L_x/T_x
0
1
2
3
4
5
6
0
500
1000
1500
2000
2500
Dose [s]

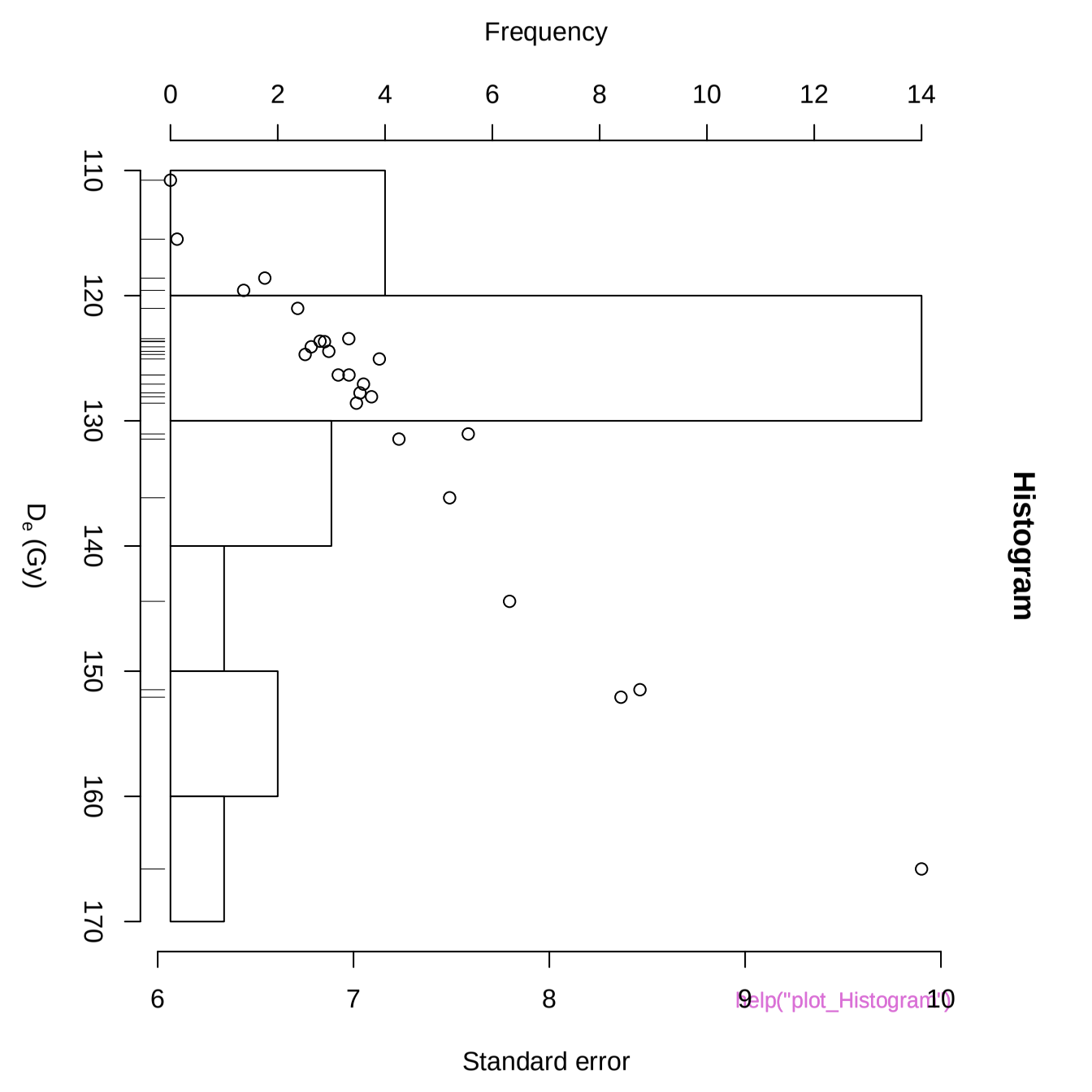

D_e from MC simulation
$D_{e_{MC}} = 1732.18 \pm 59.97$ | quality = 99.2 %
Frequency
3
9
21
1600
1700
1800
1900
Dose [s]
n = 100 , valid fits = 100

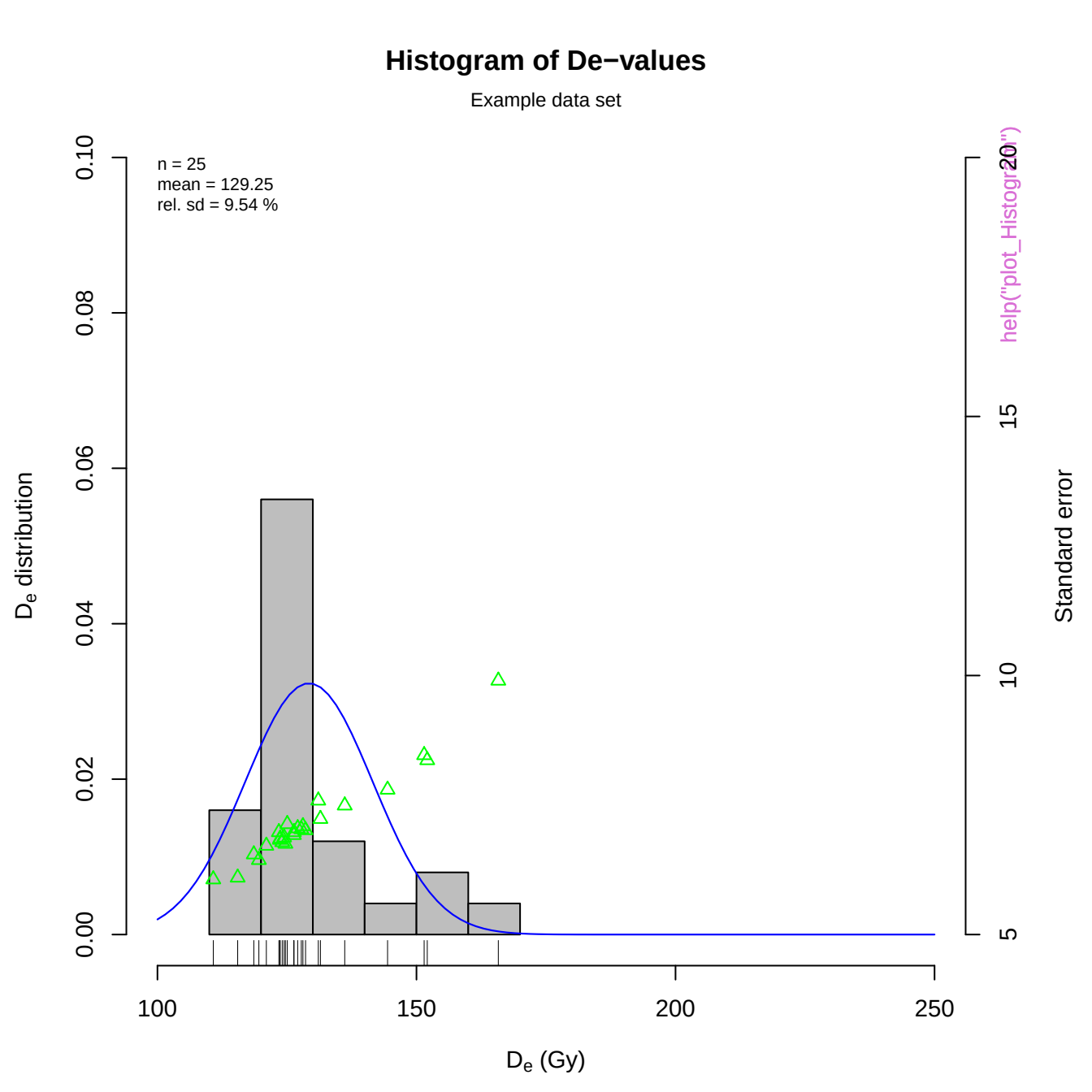

Test dose response
T_n/T_x
1.00
1.10
1.20
1.30
1
2
3
4
5
6
7
SAR cycle

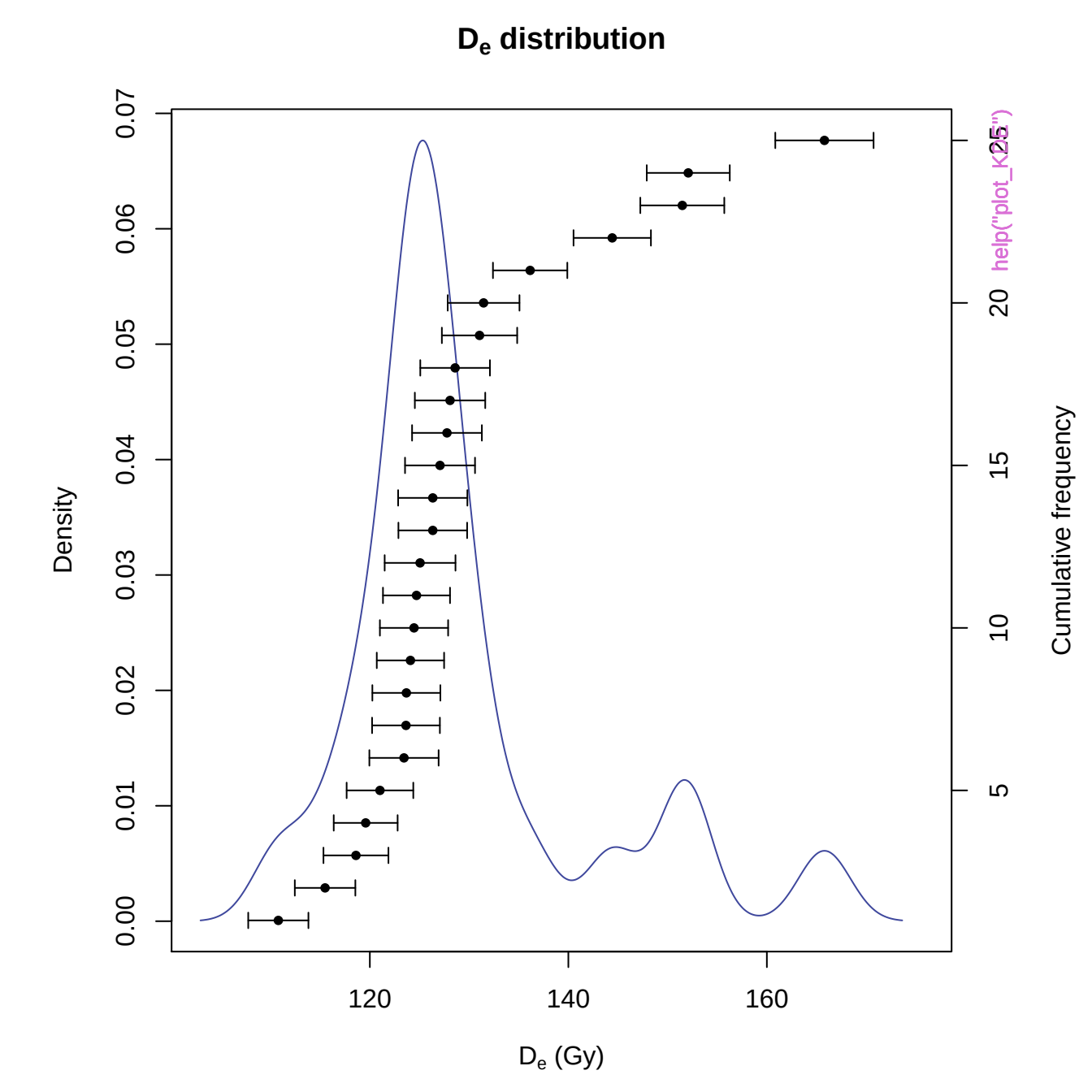

Growth curve
De = 1746.54 ± 61.2 | fit: EXP
REG points
REG point repeated
REG point 0
Lx/Tx
0
1
2
3
4
5
6
0
500
1000
1500
2000
2500
Dose [s]
help("plot_GrowthCurve")

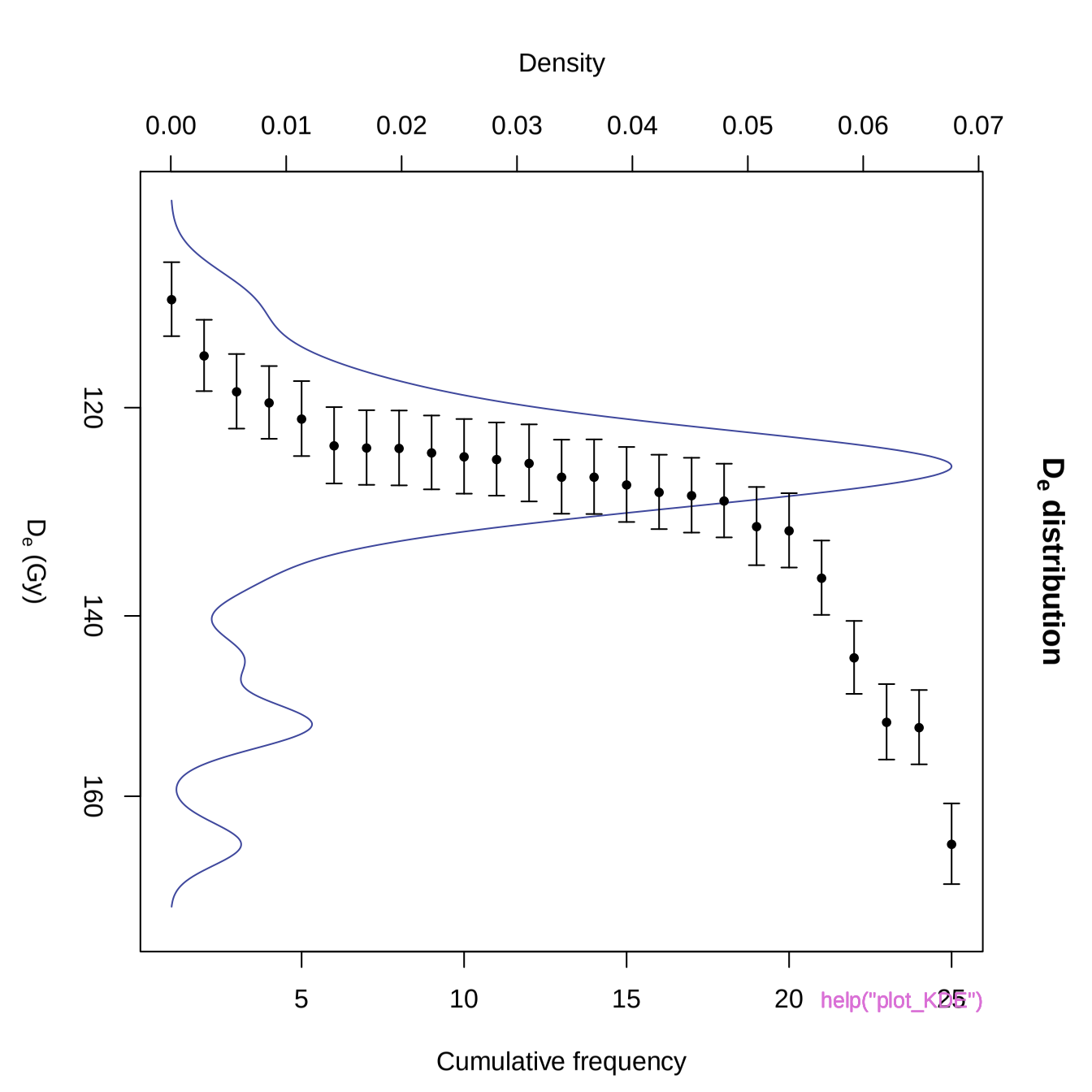

De from MC simulation
De_MC = 1743.04 ± 61.2 | quality = 99.8 %
Frequency
0
9
18
28
1600
1700
1800
1900
2000
Dose [s]
n = 100 , valid fits = 100
help("plot_GrowthCurve")

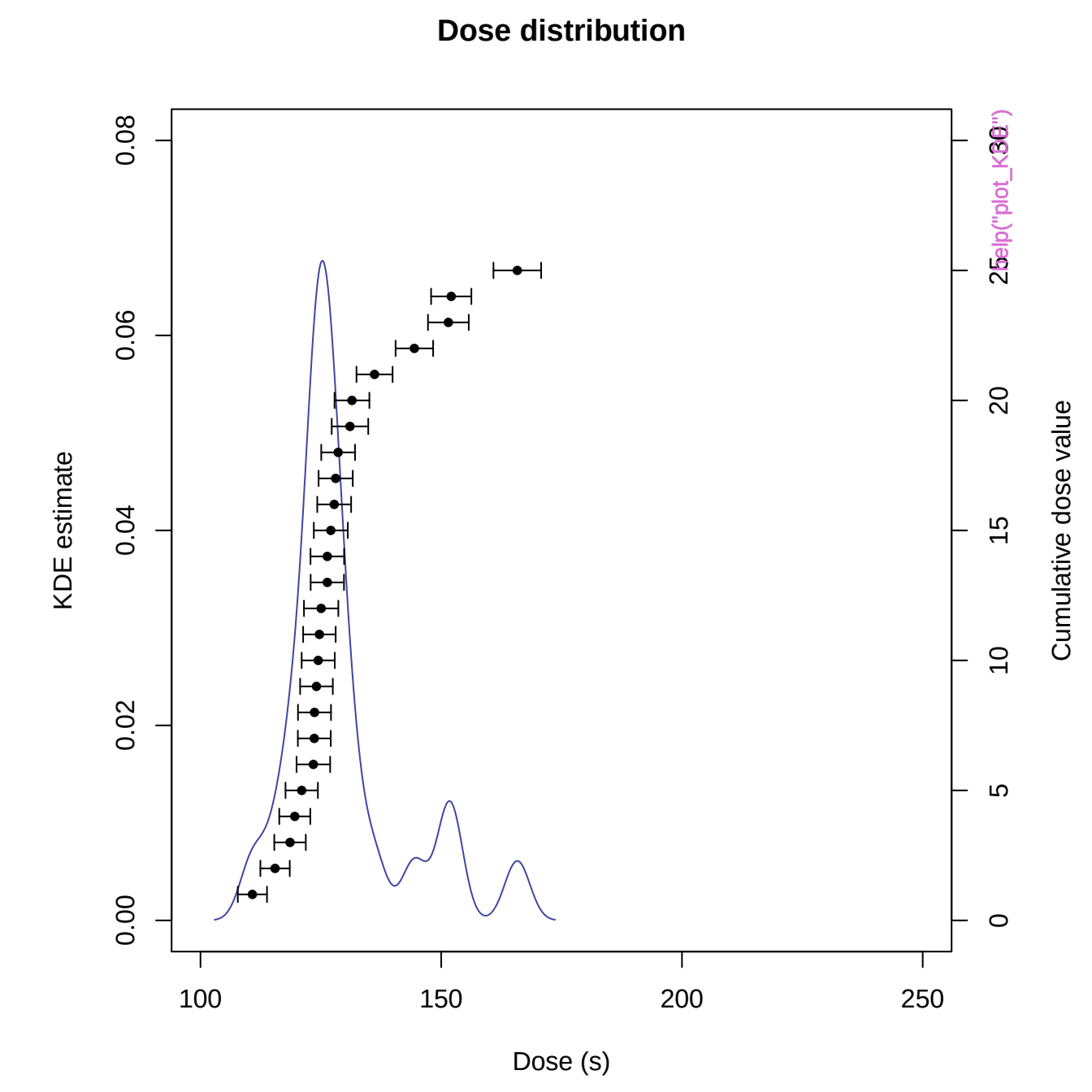

Test dose response
1.30
1.25
1.20
1.15
1.10
1.05
1.00
T_n/T_x
1
2
3
4
5
6
7
SAR cycle
help("plot_GrowthCurve")

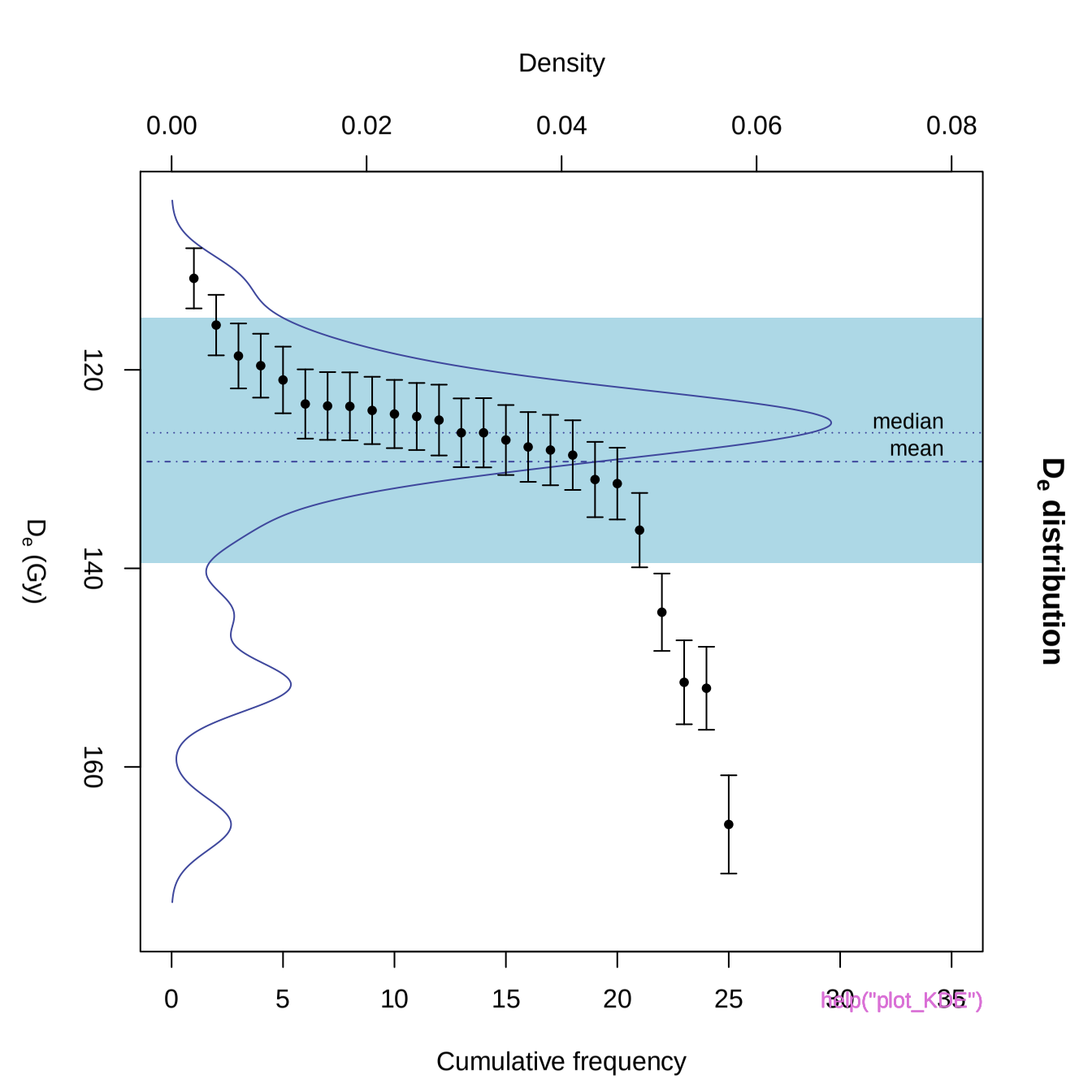

Frequency
0
2
4
6
8
10
12
14
110
120
130
140
150
160
170
De (Gy)
Histogram
6
7
8
9
10
Standard error
Help("plot_Histogram")

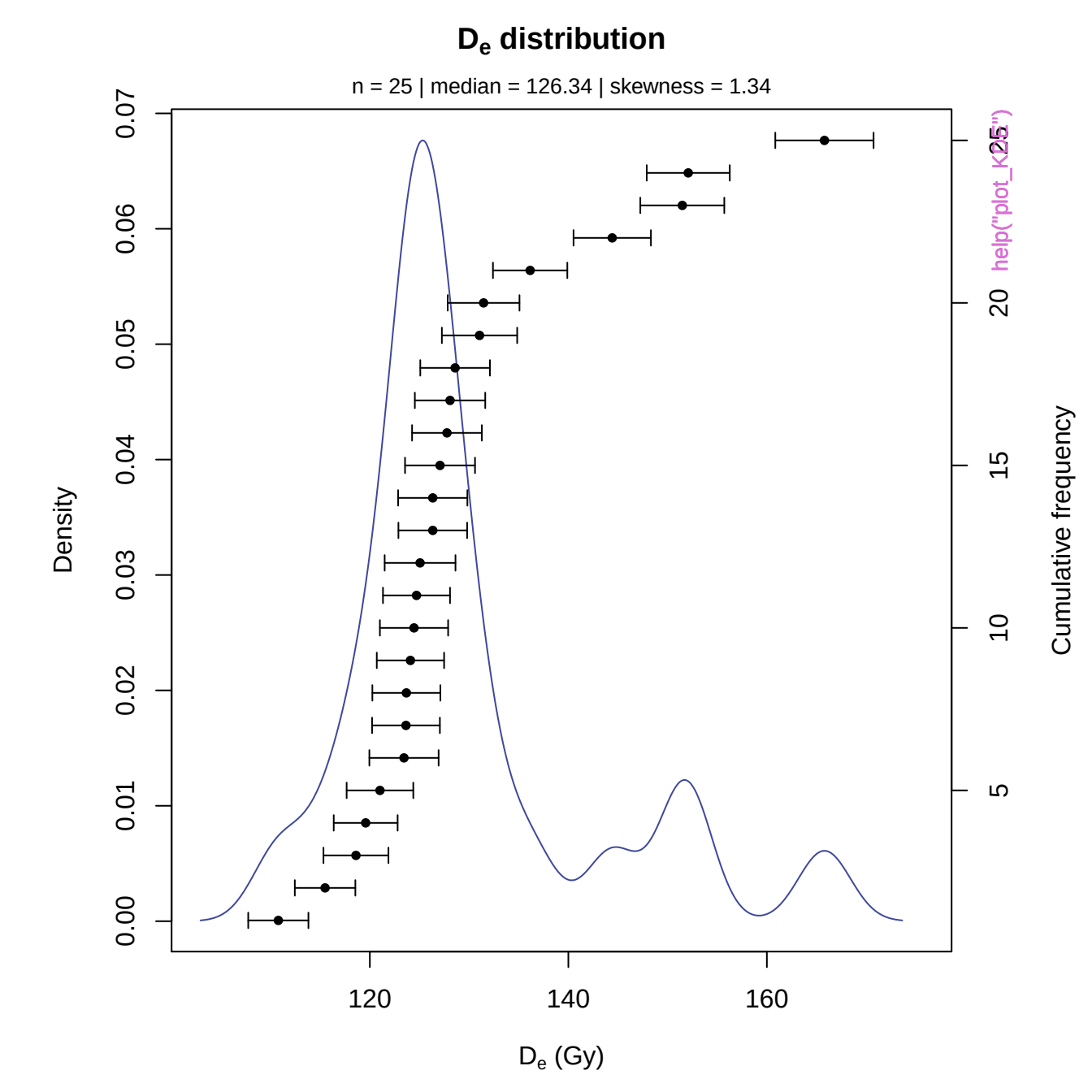

Histogram of De−values
Example data set
n = 25
mean = 129.25
rel. sd = 9.54 %
De distribution
Standard error
De (Gy)
0.00
0.02
0.04
0.06
0.08
0.10
5
10
15
20
100
150
200
250
help("plot_Histogram")

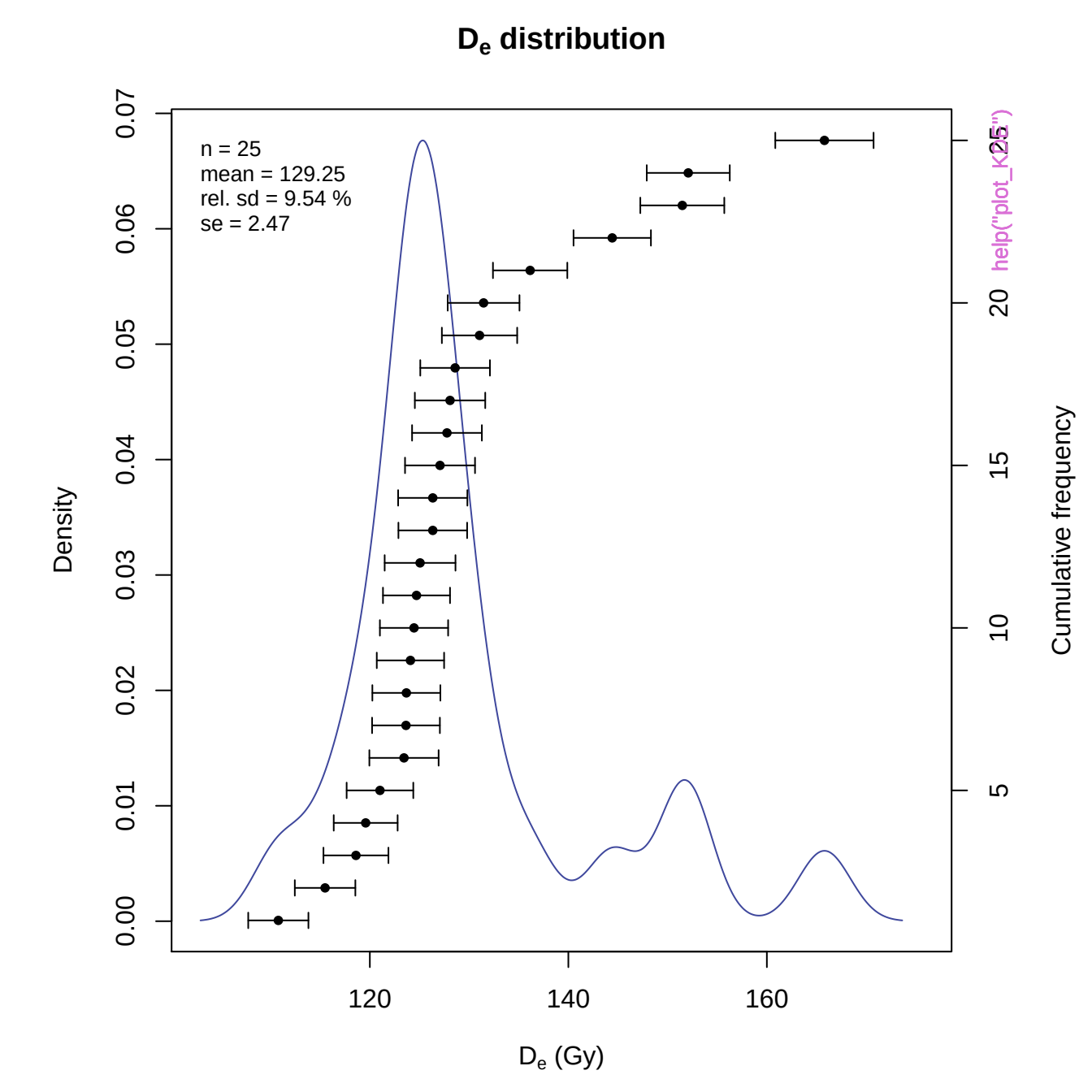

De distribution
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
120
140
160
De (Gy)
Cumulative frequency
5
10
15
20
25
help("plot_KDE")

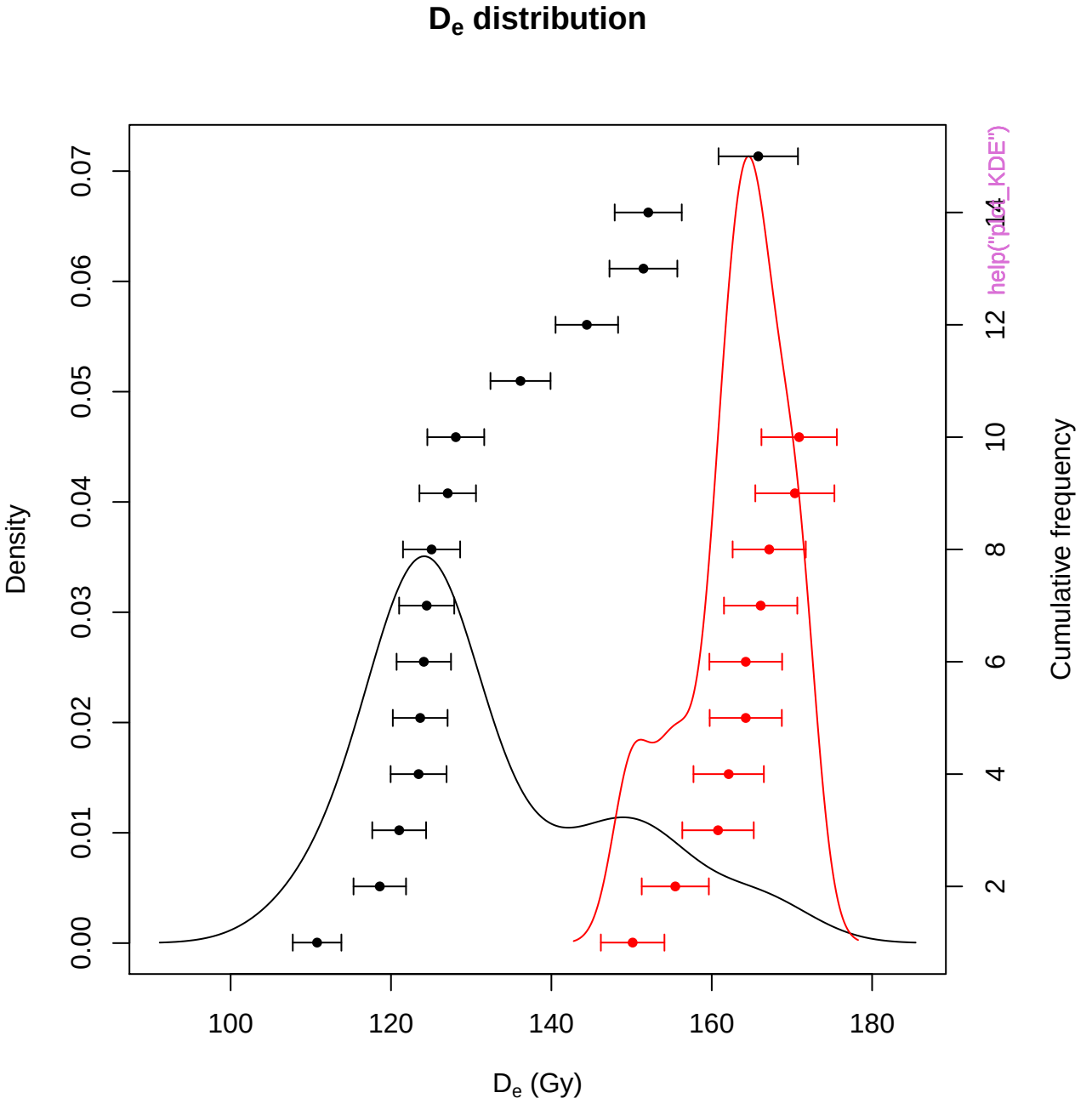

Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
De (Gy)
120
140
160
De distribution
5
10
15
20
25
Cumulative frequency
help("plot_KDE")

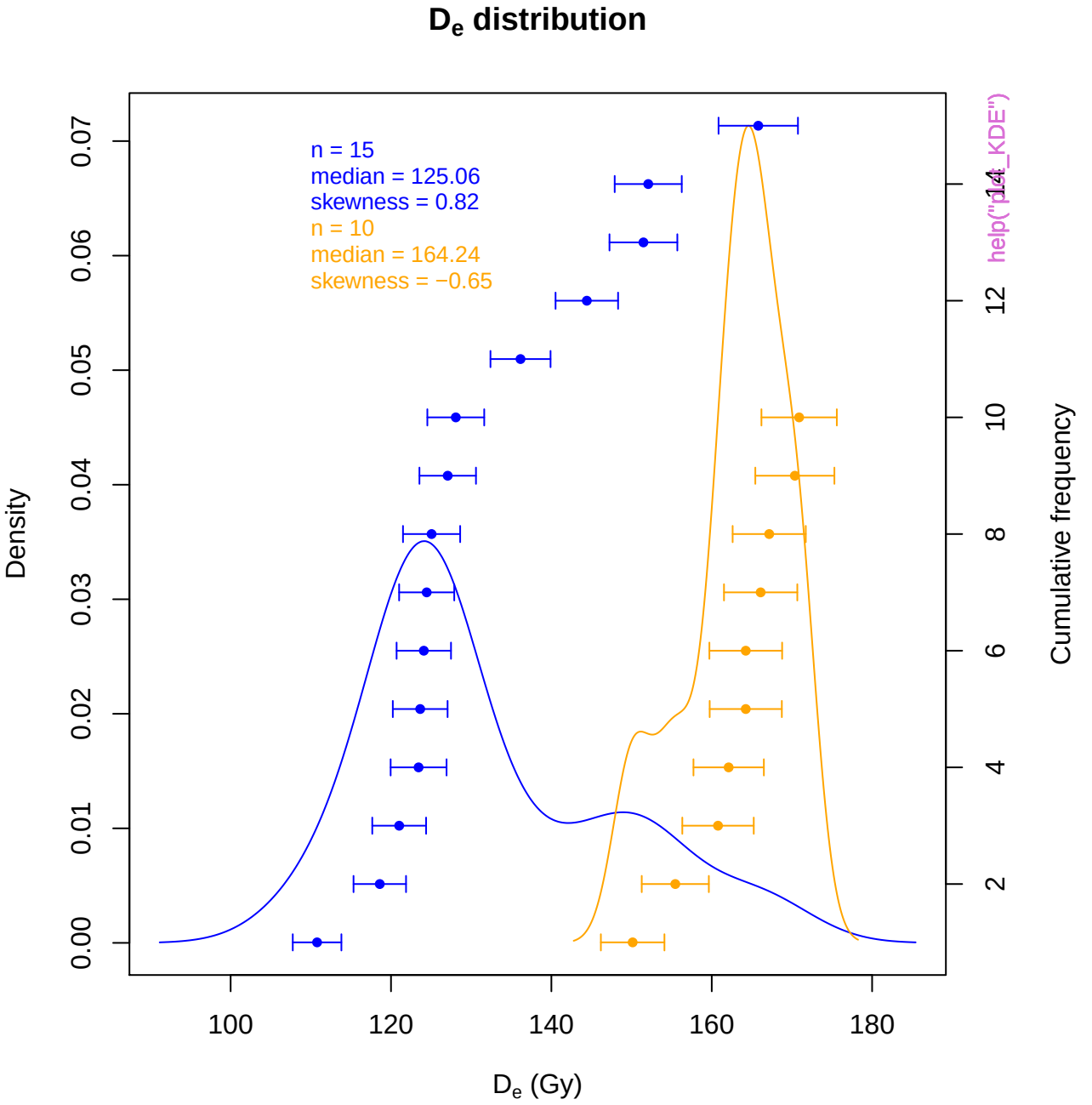

Dose distribution
KDE estimate
0.00
0.02
0.04
0.06
0.08
Cumulative dose value
0
5
10
15
20
25
30
help("plot_KDE")
100
150
200
250
Dose (s)

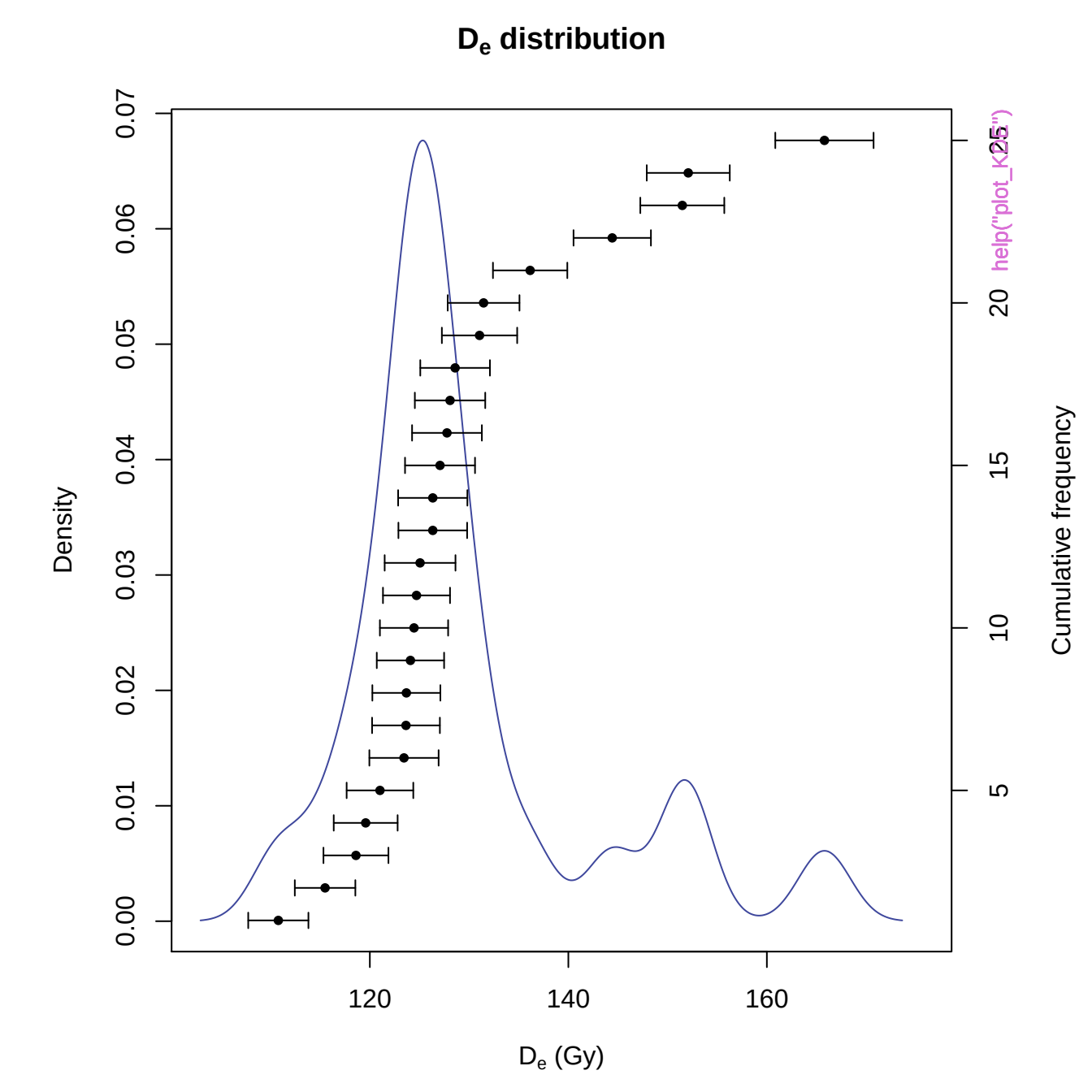

Density
0.00
0.02
0.04
0.06
0.08
120
140
160
De (Gy)
median
mean
De distribution
0
5
10
15
20
25
30
35
Cumulative frequency
help("plot_KDE")

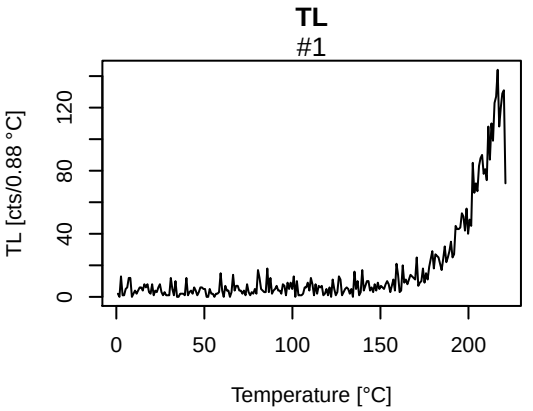

D$_e$ distribution
n = 25 | median = 126.34 | skewness = 1.34
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
Cumulative frequency
5
10
15
20
25
help("plot_KDE")
120
140
160
D$_e$ (Gy)

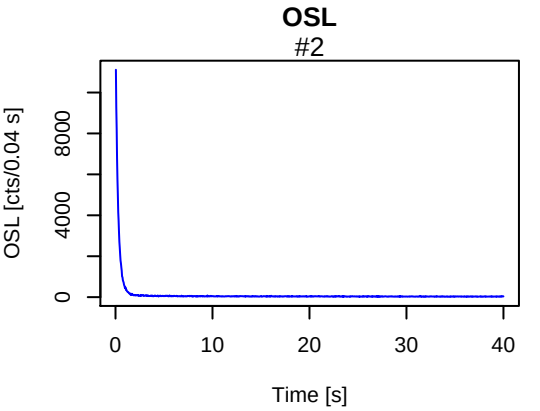

D$_e$ distribution
n = 25
mean = 129.25
rel. sd = 9.54 %
se = 2.47
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
Cumulative frequency
5
10
15
20
25
help("plot_KDE")
120
140
160
D$_e$ (Gy)


De distribution
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
100
120
140
160
180
De (Gy)
2
4
6
8
10
12
14
Cumulative frequency
help("plot_KDE")

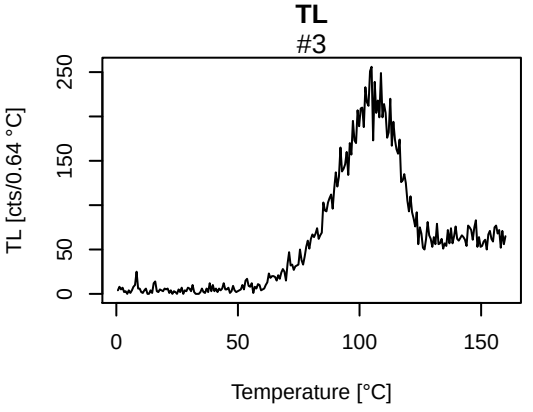

D$_e$ distribution
n = 15
median = 125.06
skewness = 0.82
n = 10
median = 164.24
skewness = −0.65
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
Cumulative frequency
2
4
6
8
10
12
14
help("plot_KDE")
100
120
140
160
180
D$_e$ (Gy)

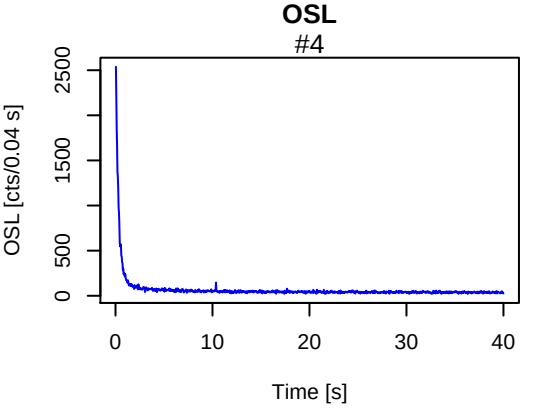

De distribution
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
120
140
160
De (Gy)
Cumulative frequency
5
10
15
20
25
help("plot_KDE")

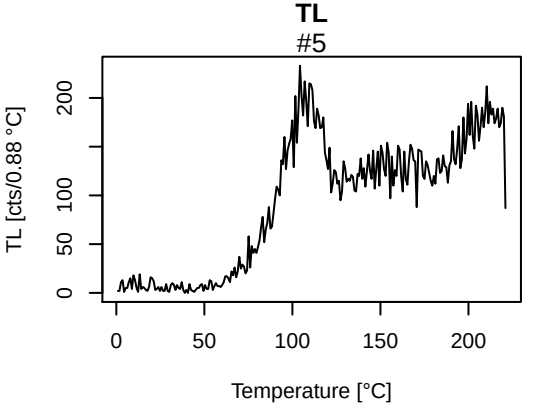


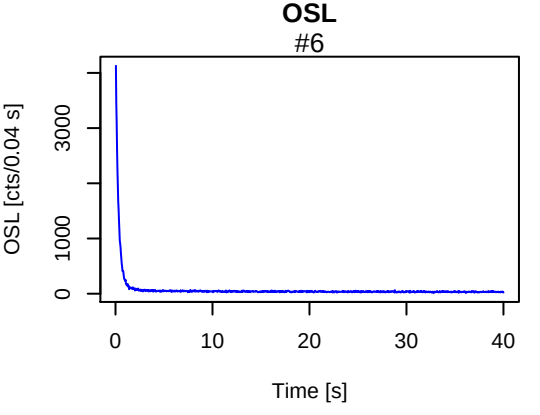


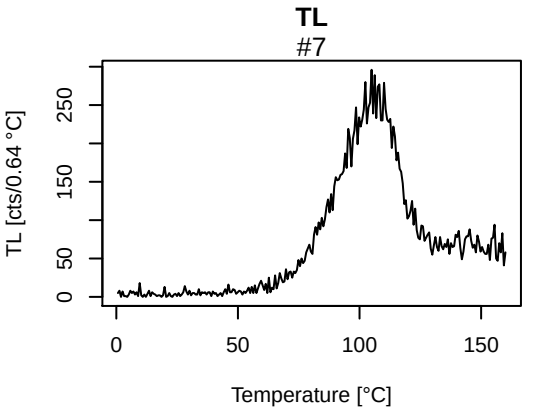
help("plot_RLum.Analysis")

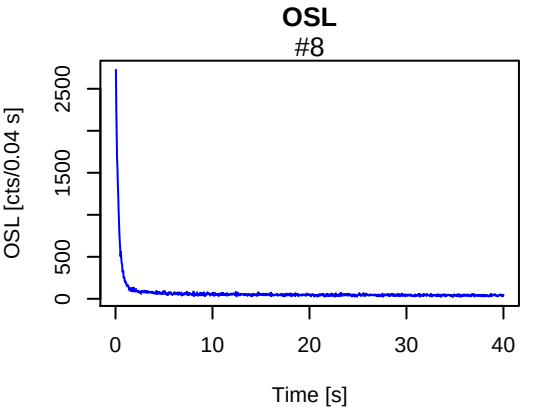




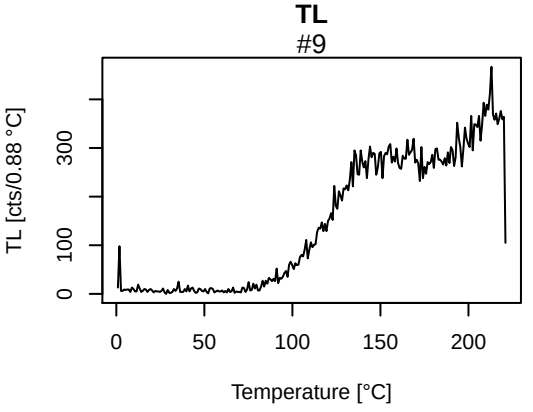


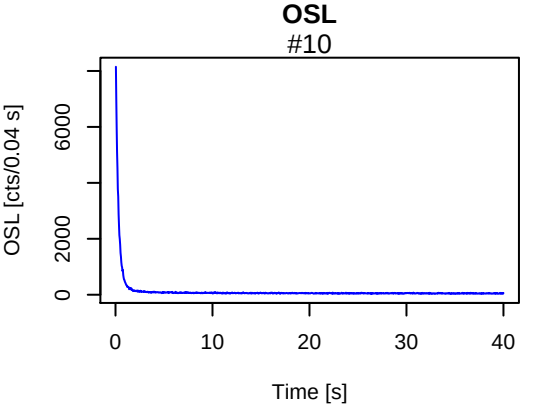


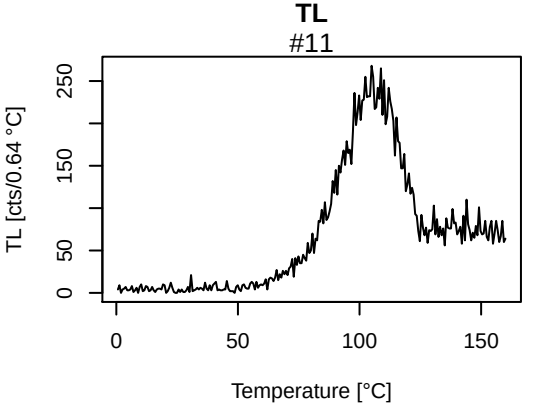


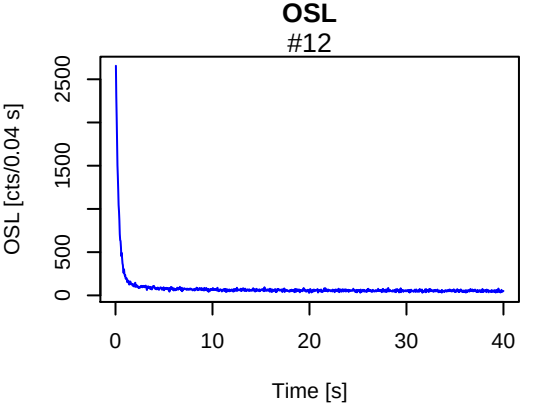


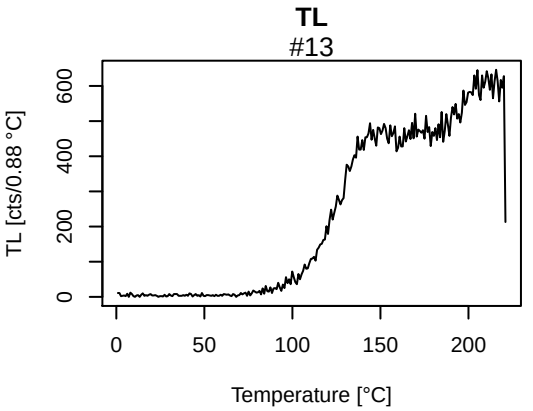
help("plot_RLum.Analysis")

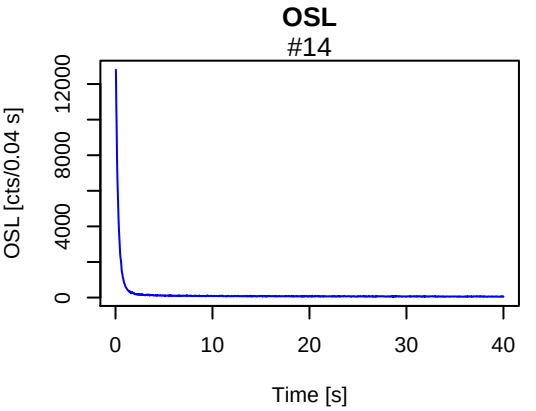




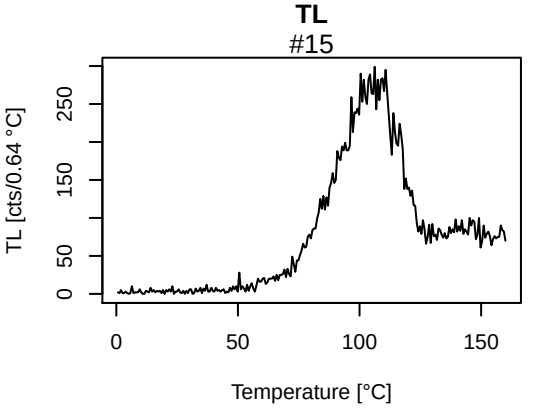


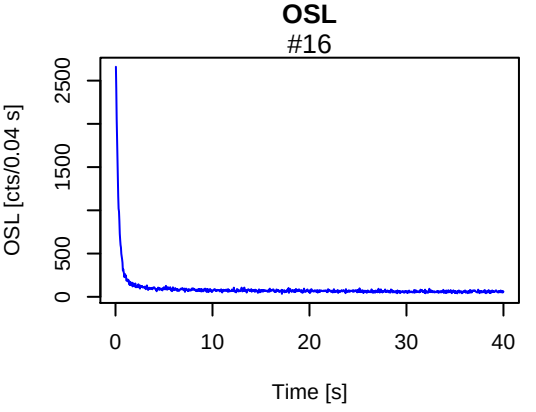


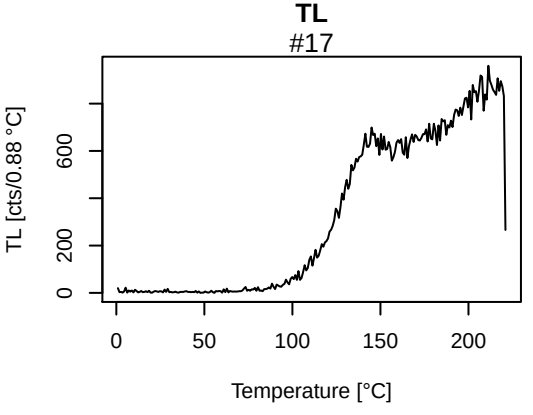


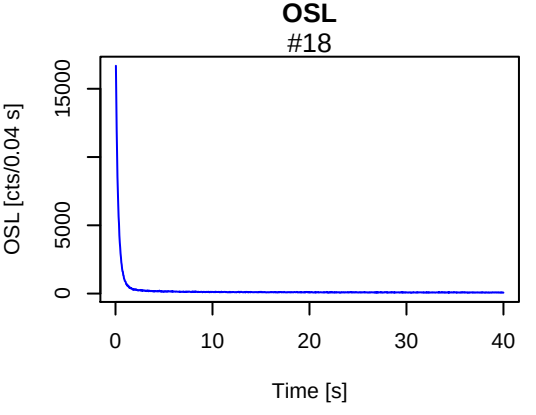


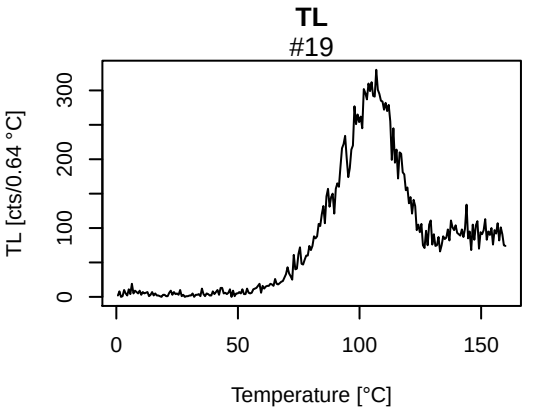
help("plot_RLum.Analysis")

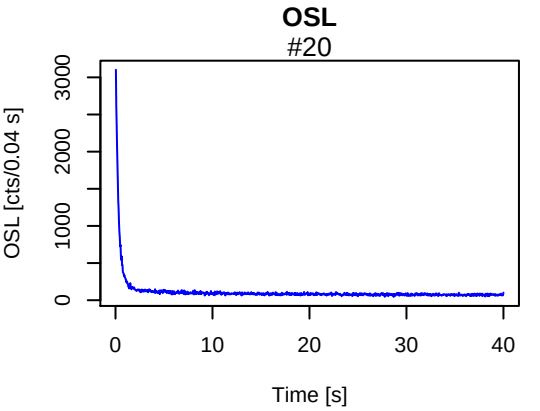




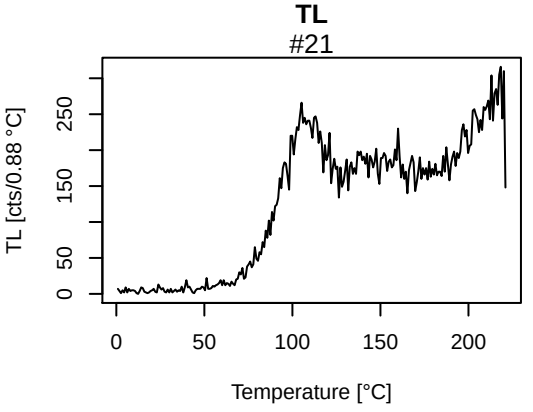


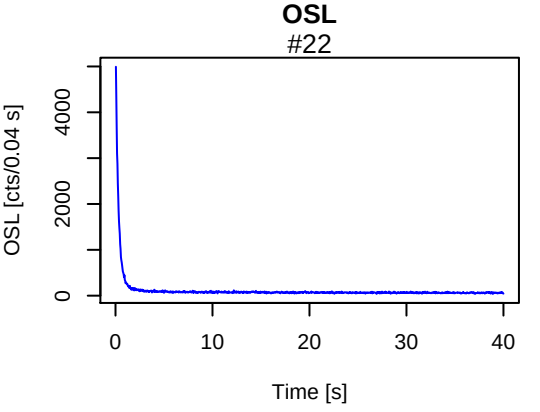


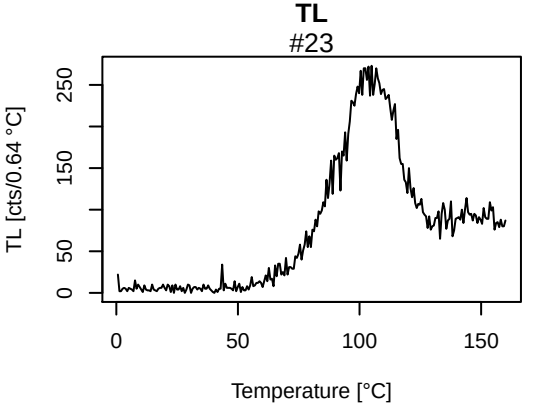


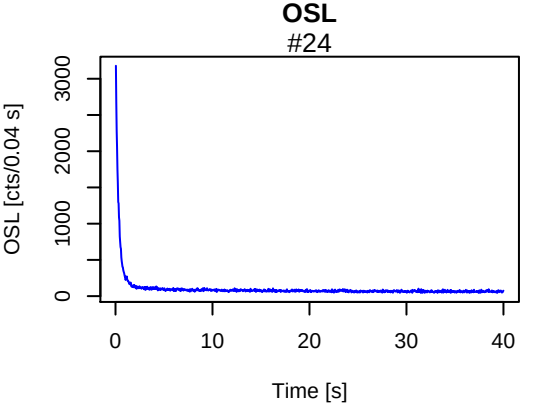


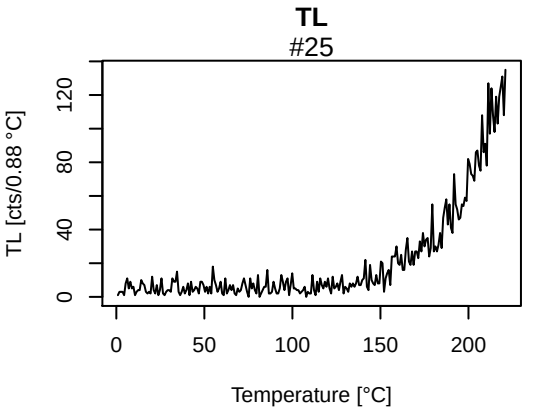
help("plot_RLum.Analysis")

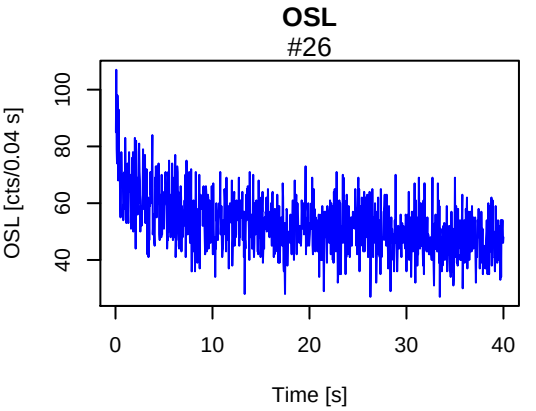




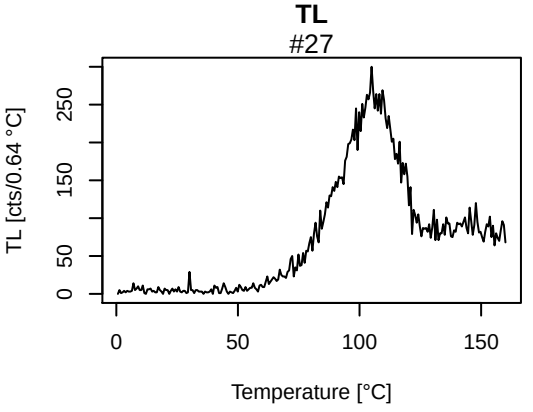


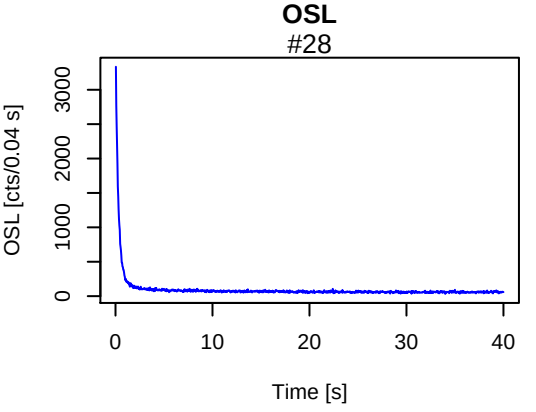


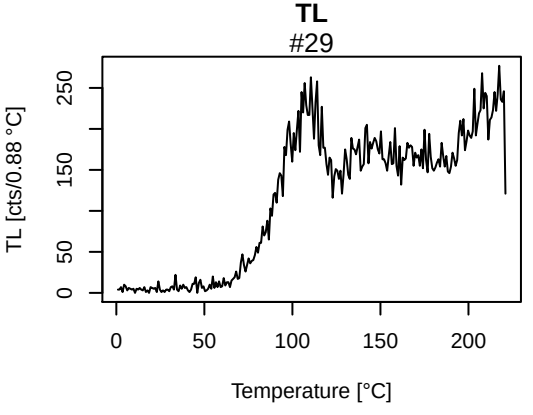


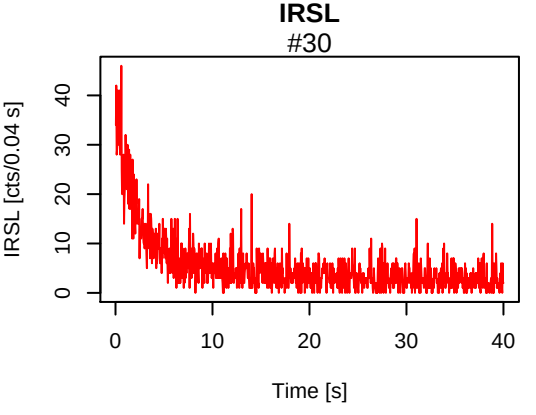


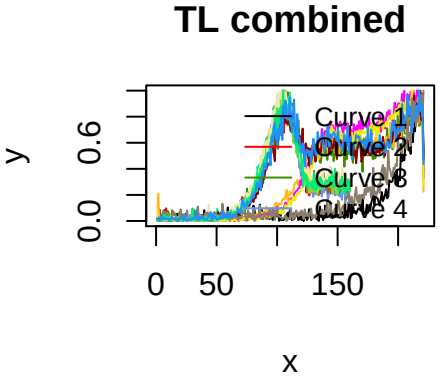
help("plot_RLum.Analysis")

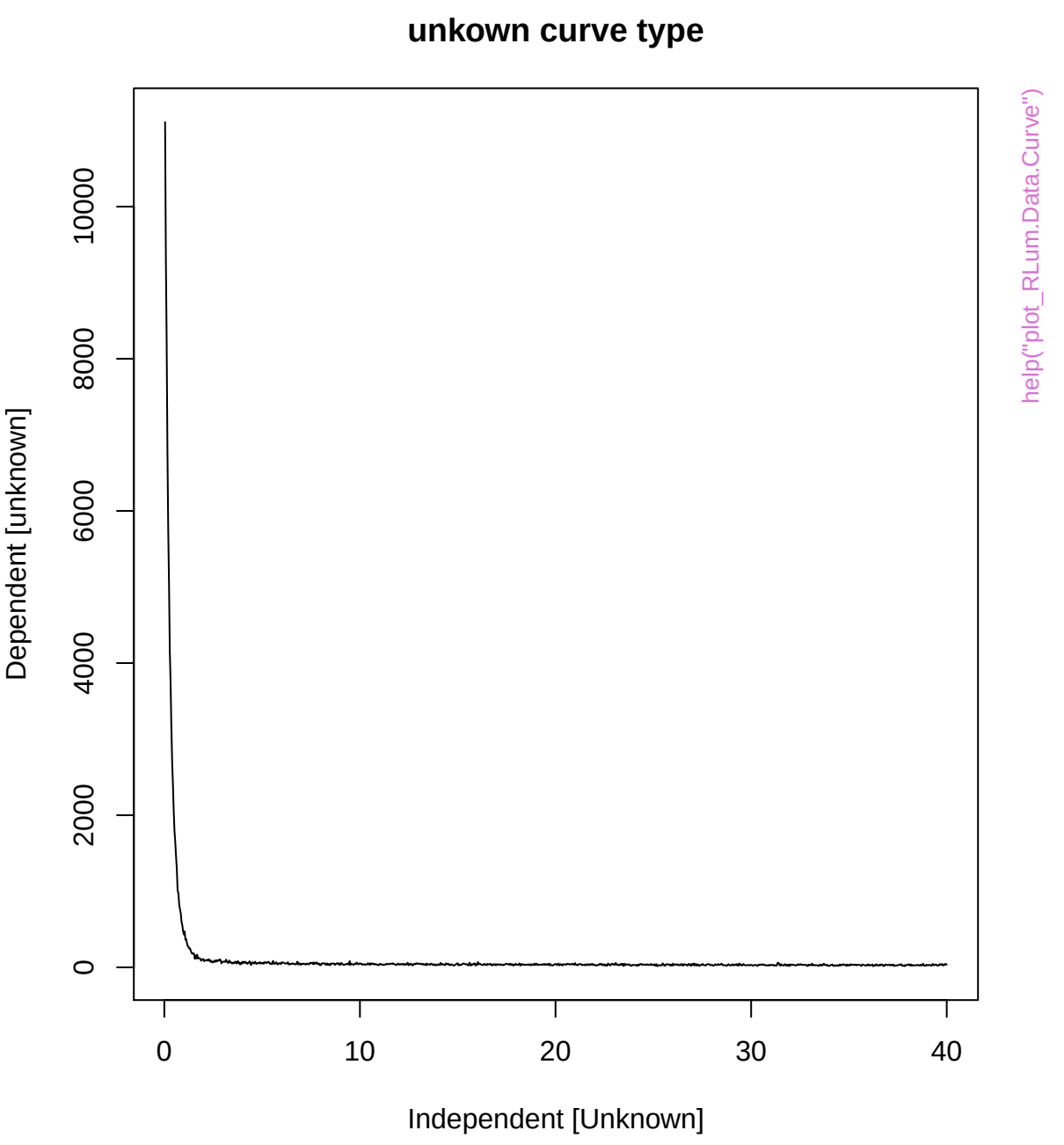


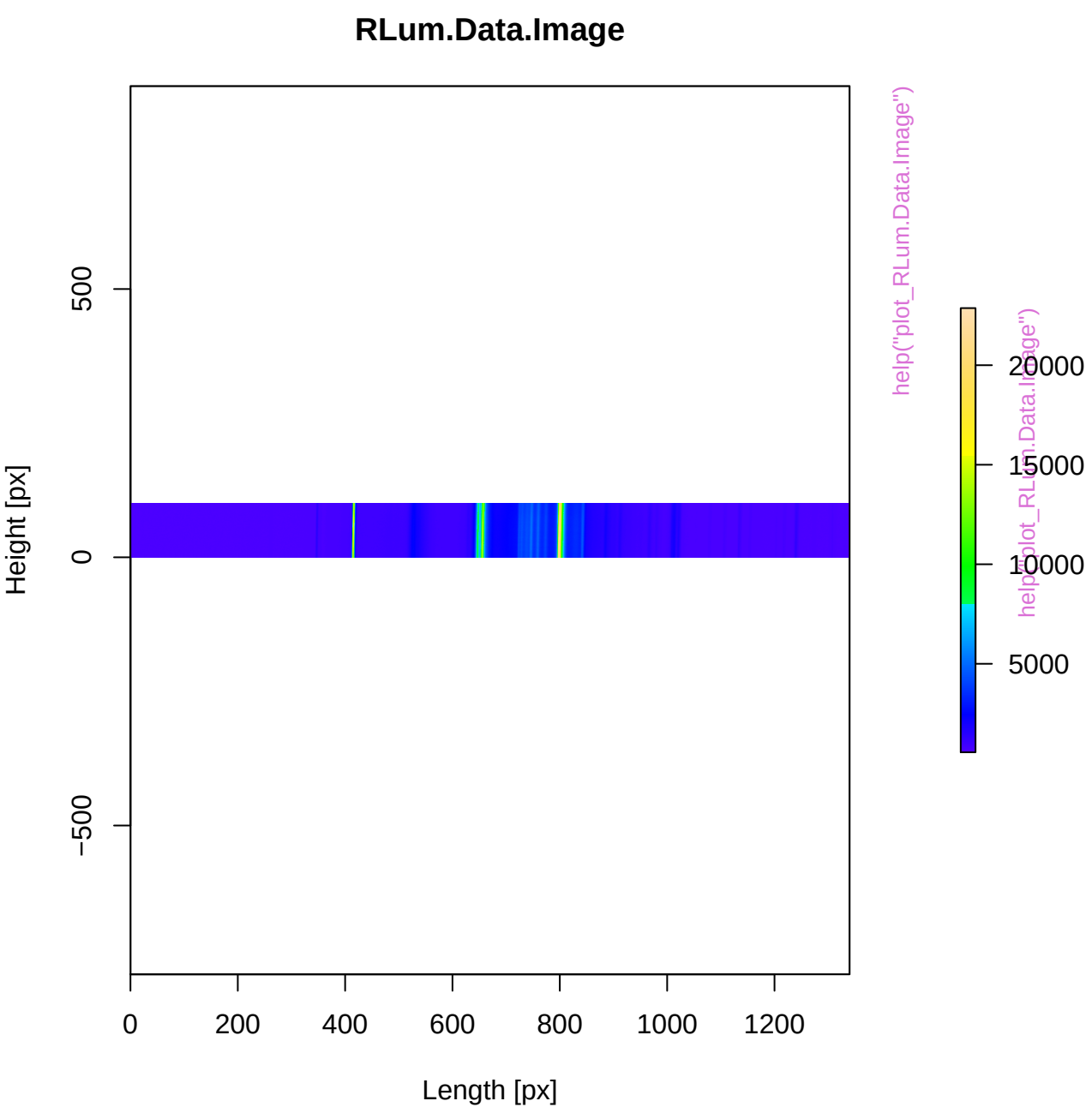


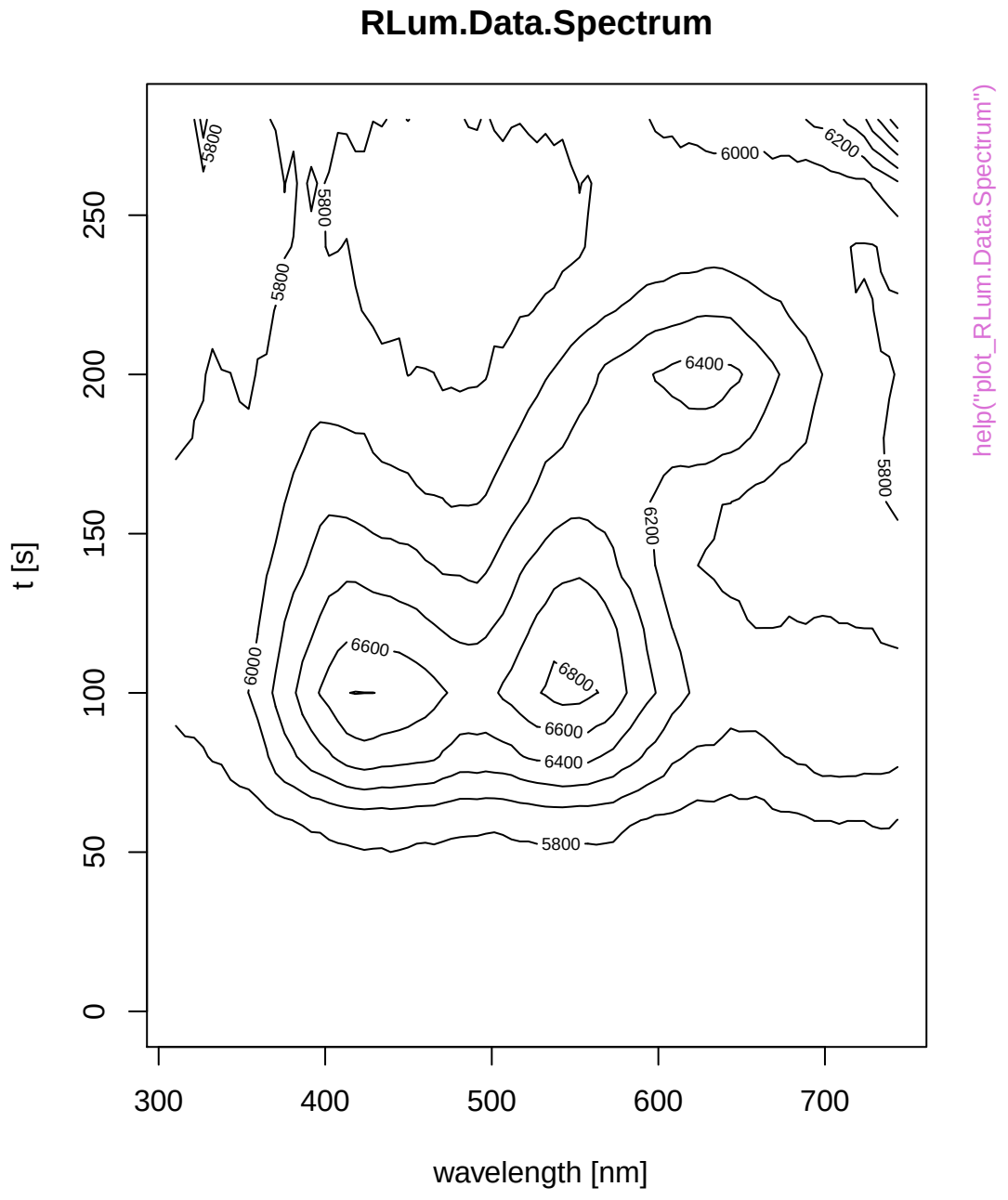




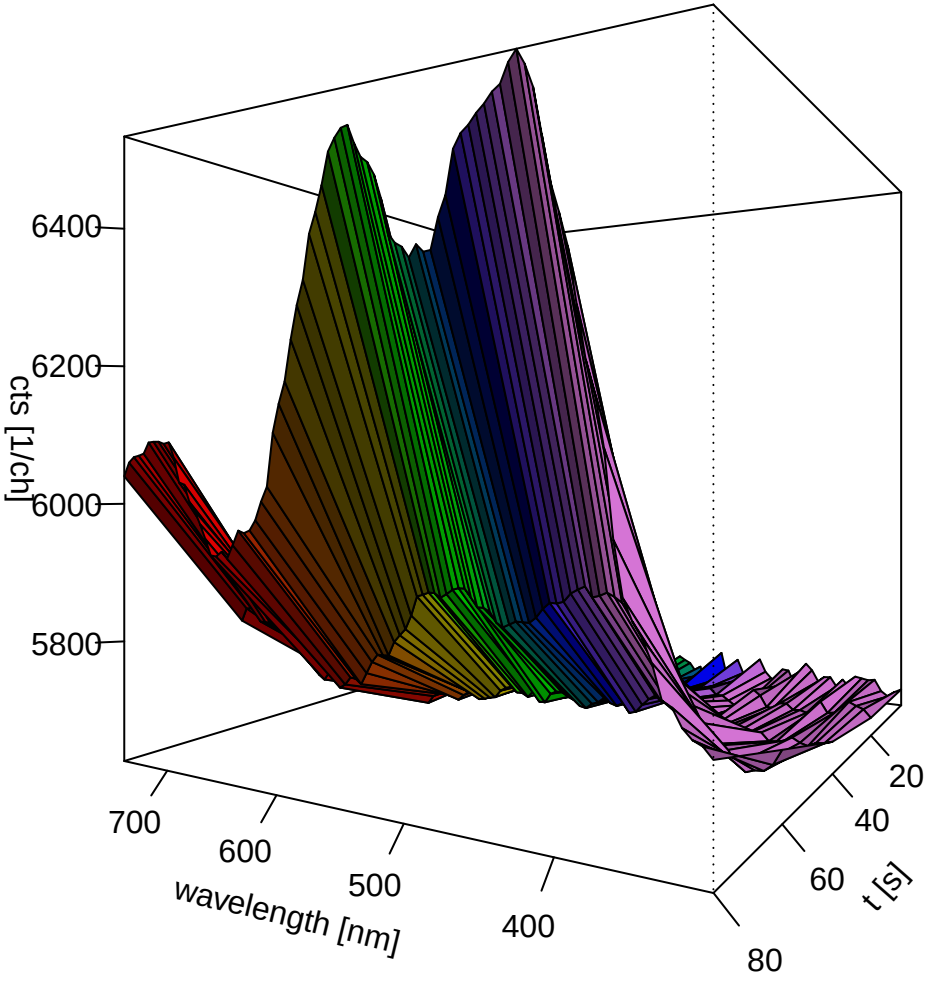

TL combined
y
0.0
0.6
0
50
150
x
Curve 1
Curve 2
Curve 3
Curve 4


unkown curve type
Dependent [unknown]
0
2000
4000
6000
8000
10000
0
10
20
30
40
Independent [Unknown]
help("plot_RLum.Data.Curve")

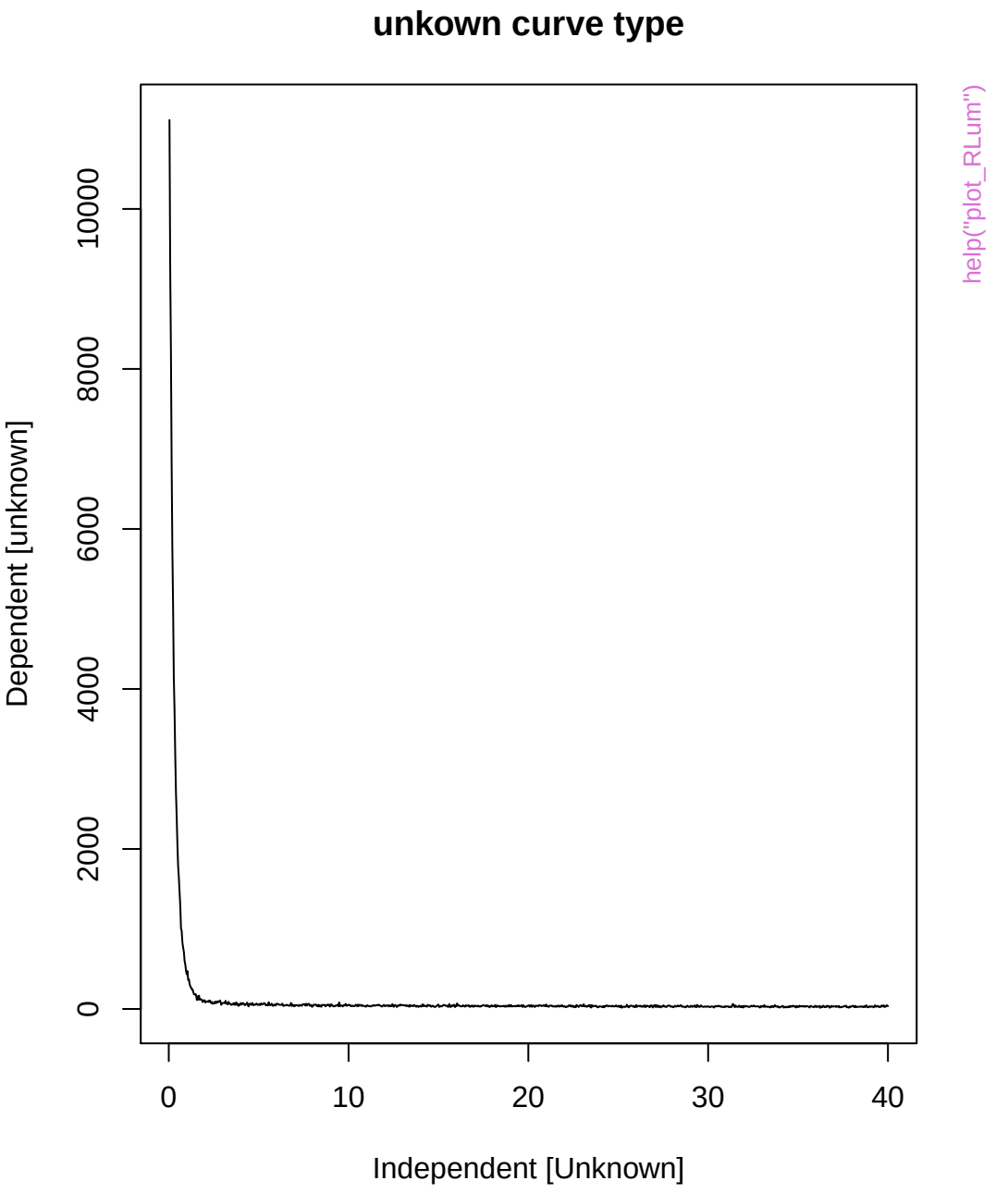

RLum.Data.Image
Height [px]
500
0
−500
0
200
400
600
800
1000
1200
Length [px]
help("plot_RLum.Data.Image")
20000
15000
10000
5000
help("plot_RLum.Data.Image")

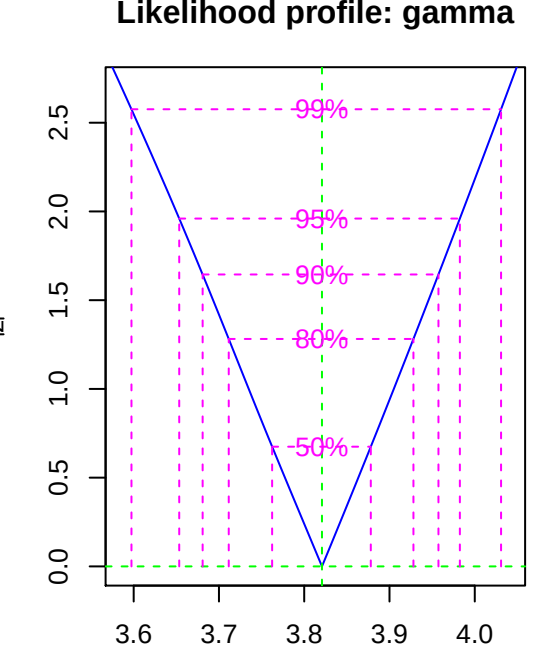

RLum.Data.Spectrum
t [s]
0
50
100
150
200
250
300
400
500
600
700
wavelength [nm]
5800
6000
6200
6400
6600
6800
help("plot_RLum.Data.Spectrum")

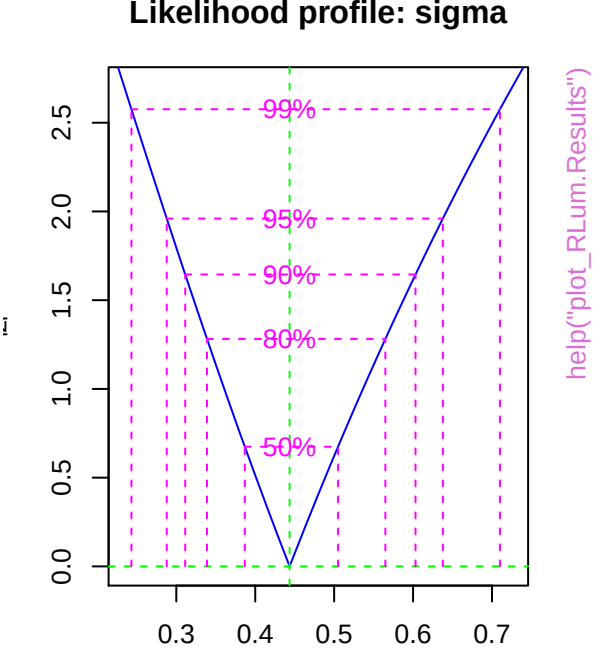
RLum.Data.Spectrum

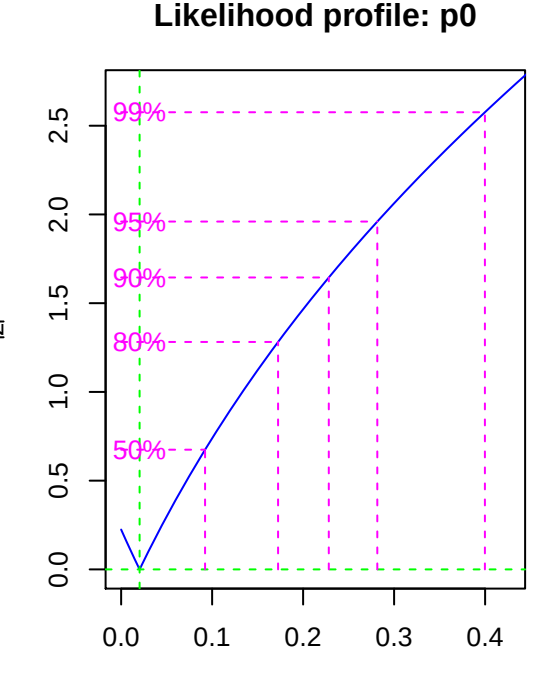


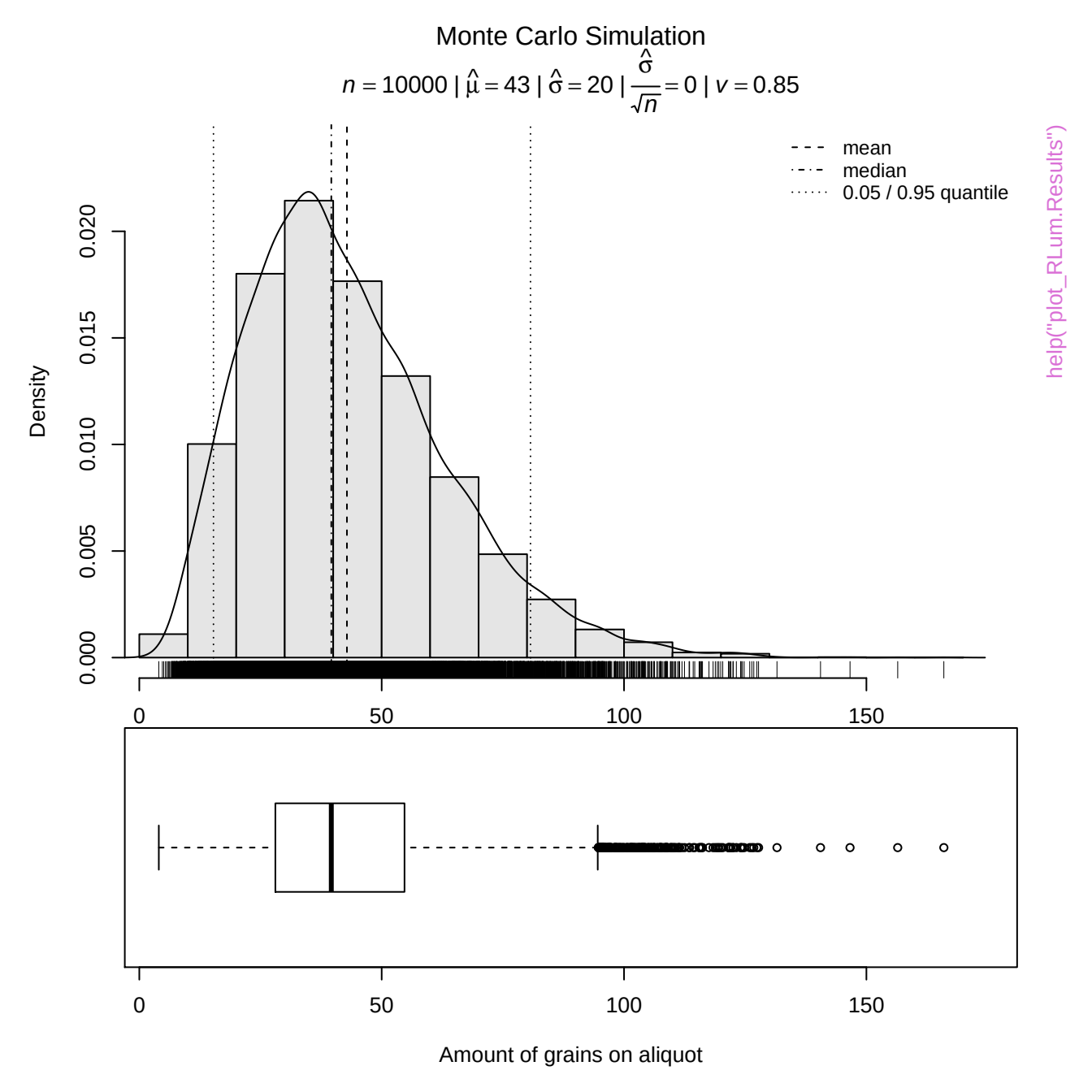
help("plot_RLum.Data.Spectrum")

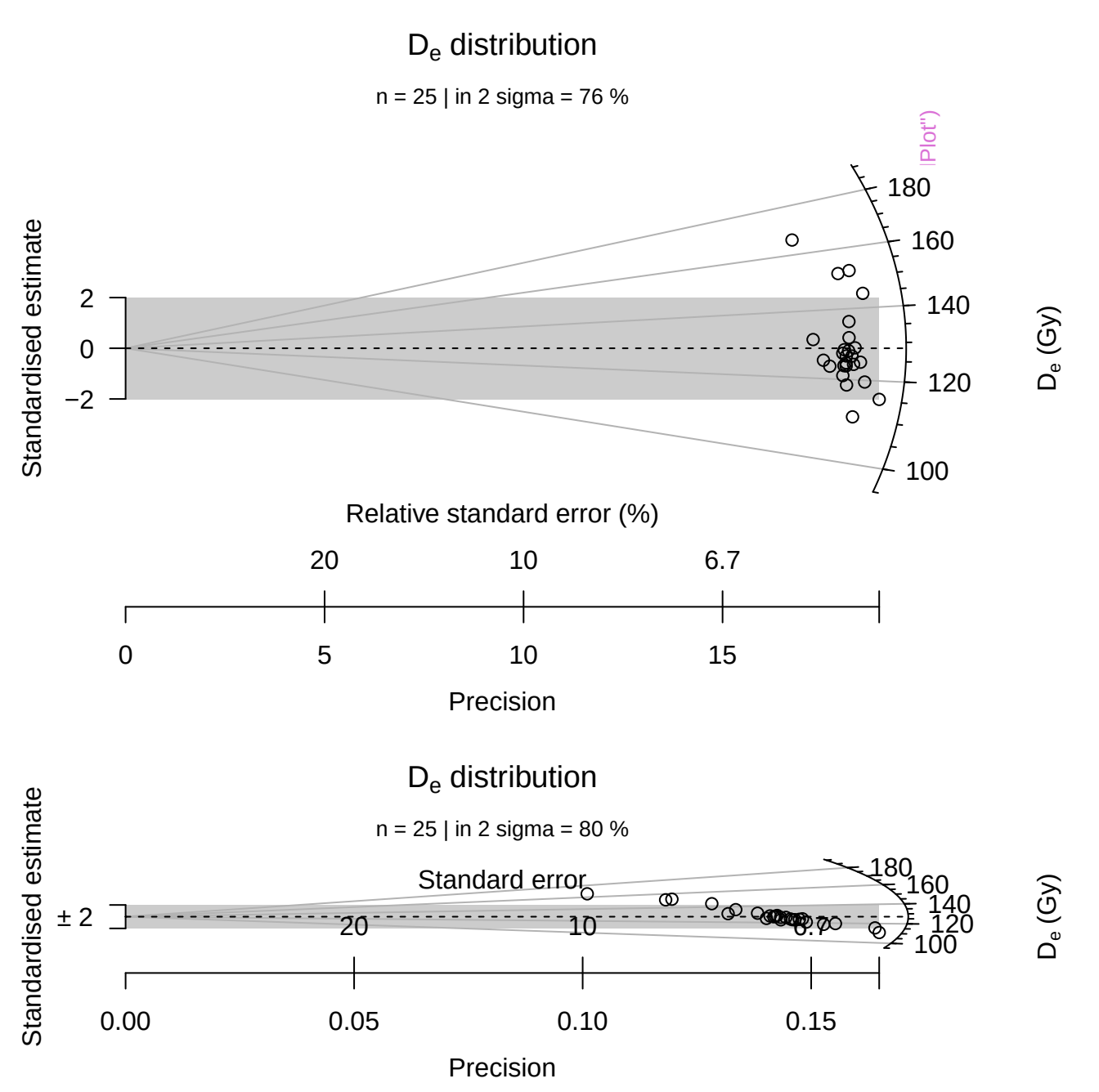

unkown curve type
Dependent [unknown]
0
2000
4000
6000
8000
10000
0
10
20
30
40
Independent [Unknown]
help("plot_RLum")

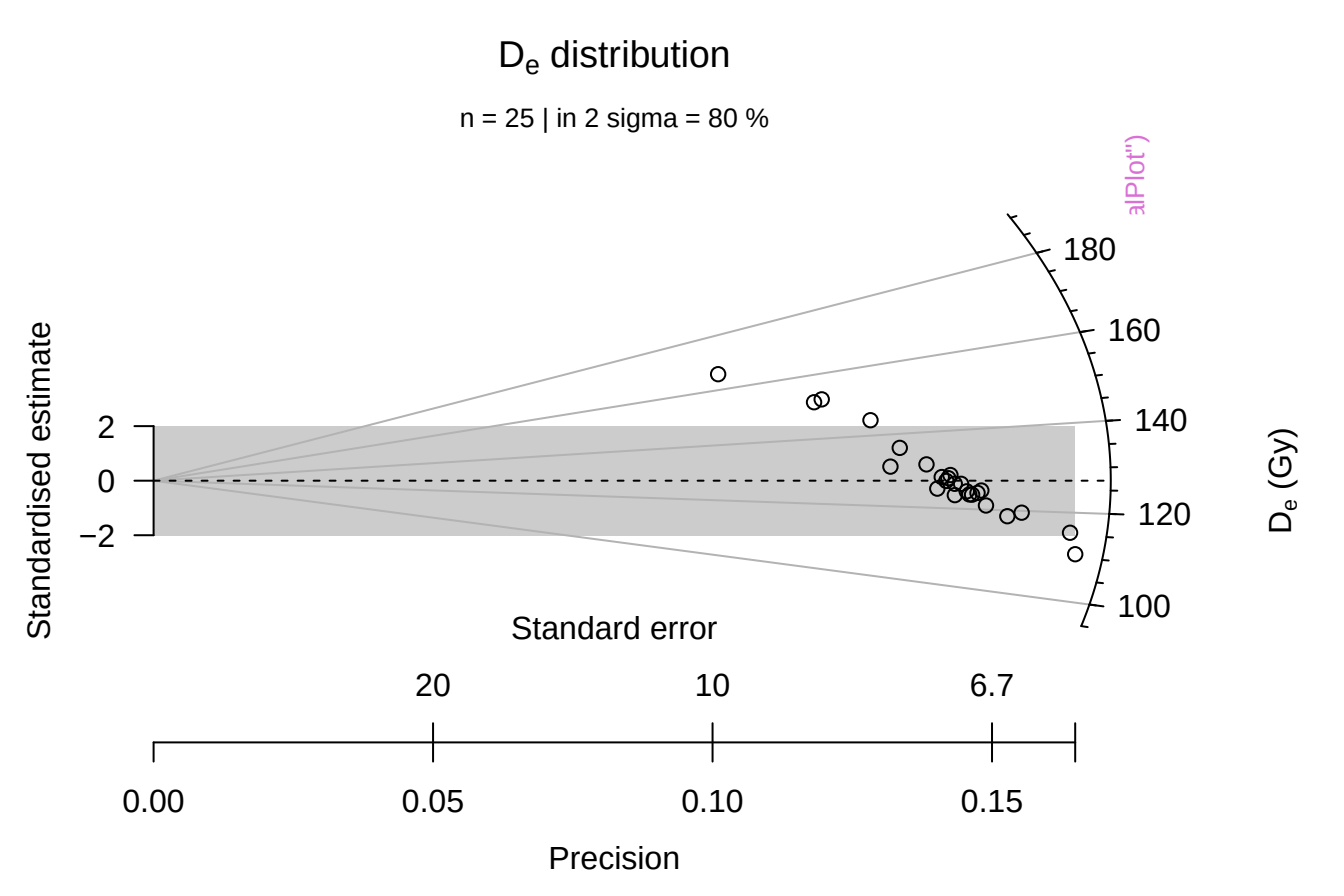

Likelihood profile: gamma
99%
95%
90%
80%
50%
0.0
0.5
1.0
1.5
2.0
2.5
3.6
3.7
3.8
3.9
4.0

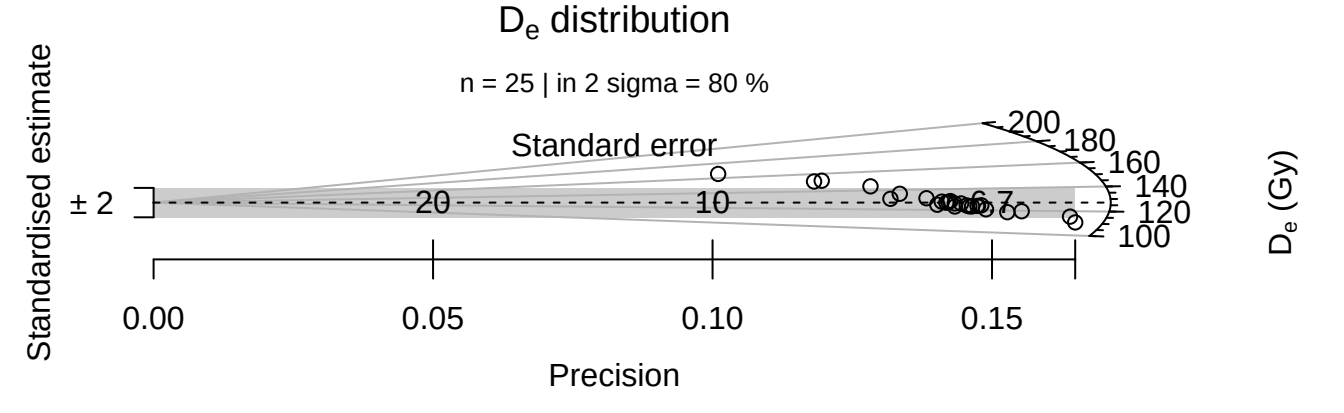

Likelihood profile: sigma
99%
95%
90%
80%
50%
0.0
0.5
1.0
1.5
2.0
2.5
0.3
0.4
0.5
0.6
0.7
help("plot_RLum.Results")

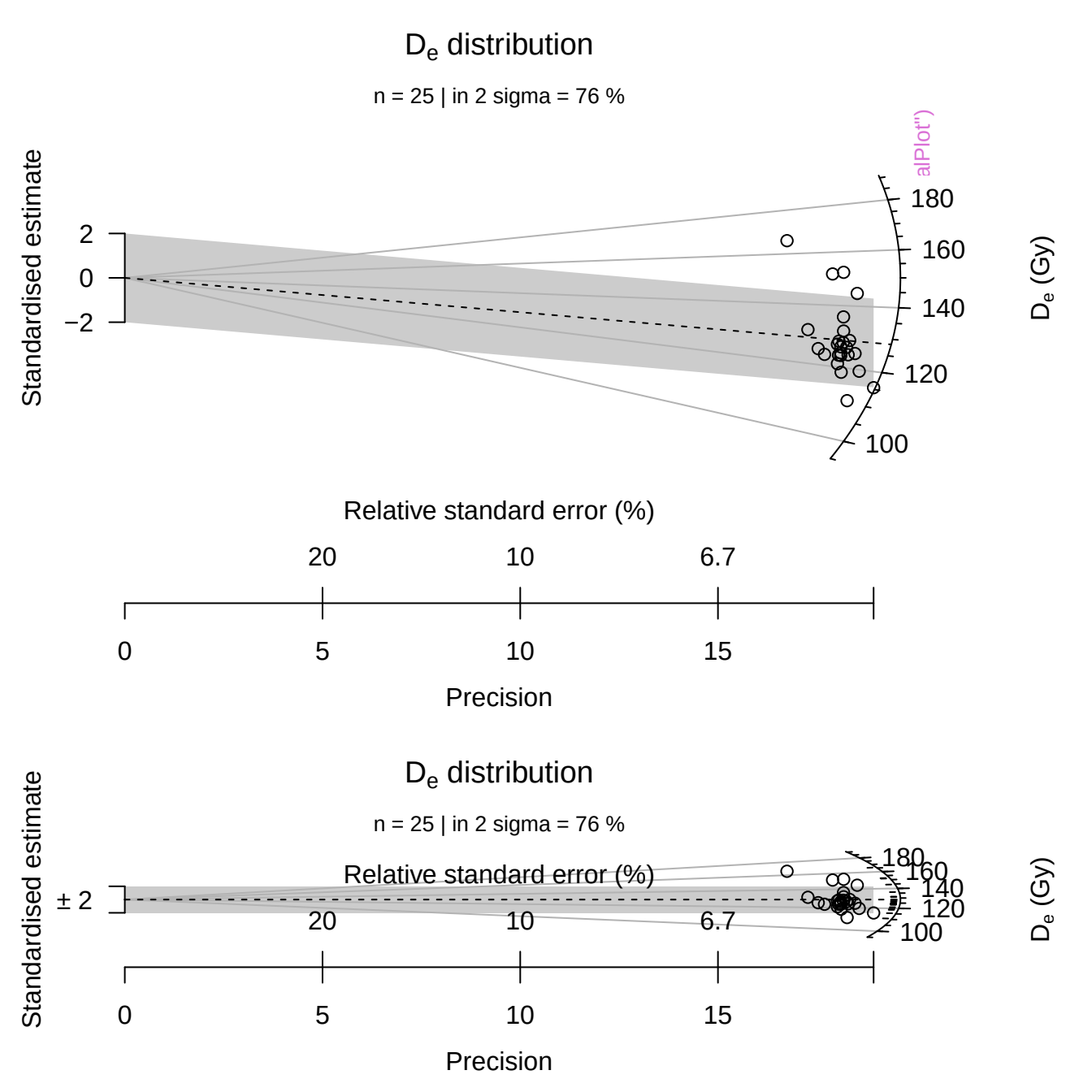

Likelihood profile: p0
99%
95%
90%
80%
50%
0.0
0.5
1.0
1.5
2.0
2.5
0.0
0.1
0.2
0.3
0.4

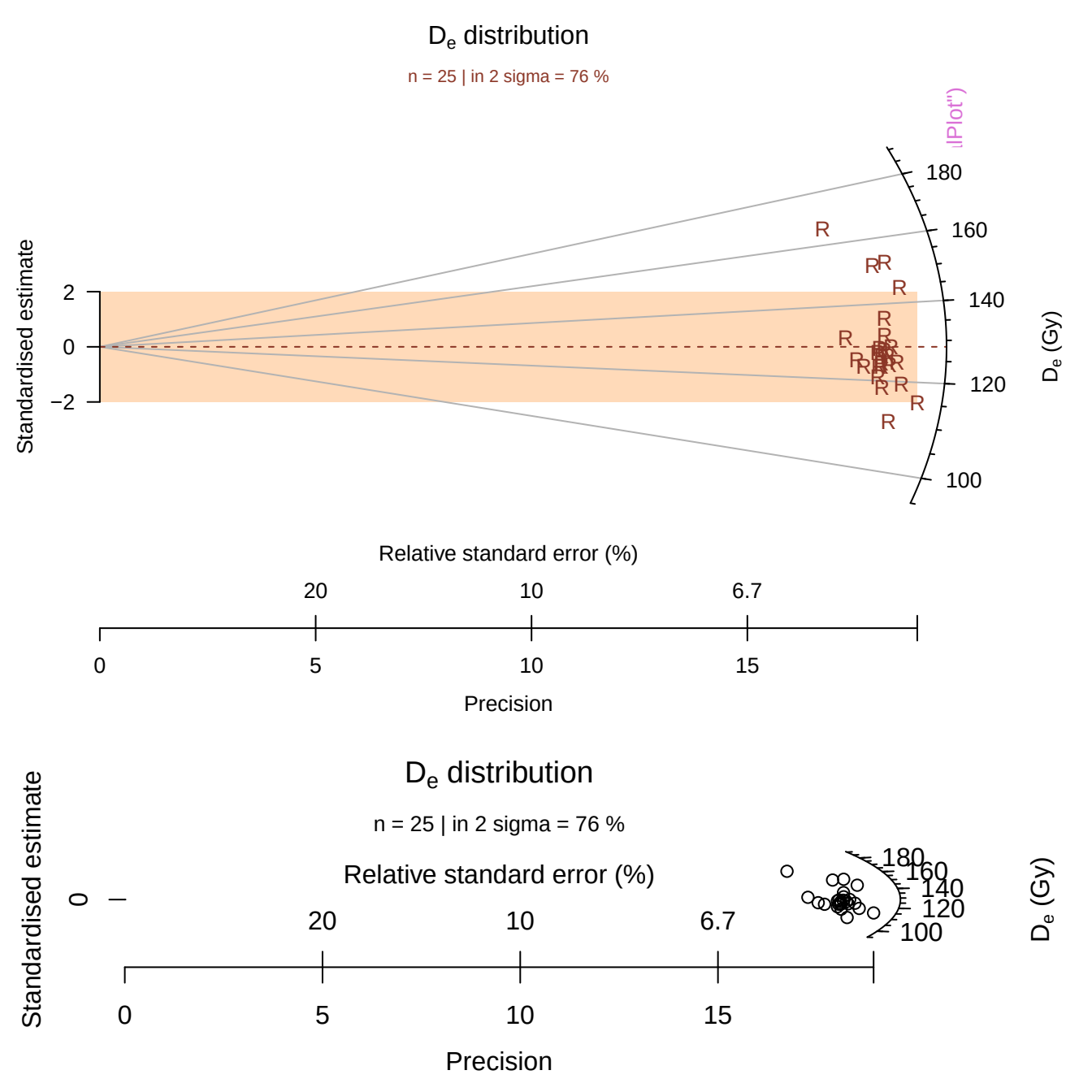

Monte Carlo Simulation
$n = 10000 \mid \hat{\mu} = 43 \mid \hat{\sigma} = 20 \mid \frac{\hat{\sigma}}{\sqrt{n}} = 0 \mid v = 0.85$
mean
median
0.05 / 0.95 quantile
Density
0.000
0.005
0.010
0.015
0.020
0
50
100
150
Amount of grains on aliquot
help("plot_RLum.Results")

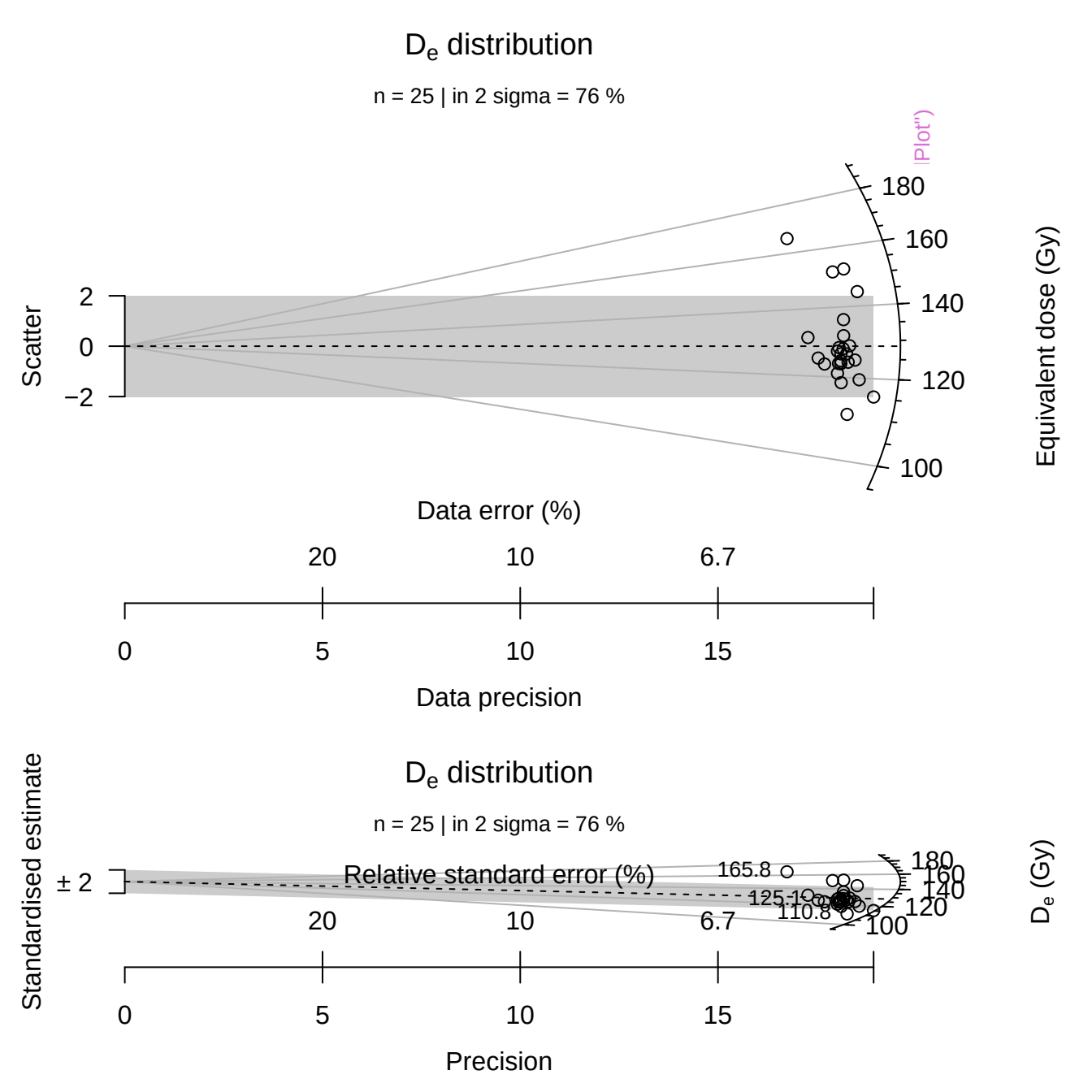

D$_e$ distribution
n = 25 | in 2 sigma = 76 %
Standardised estimate
2
0
−2
180
160
140
120
100
D$_e$ (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
D$_e$ distribution
n = 25 | in 2 sigma = 80 %
Standardised estimate
± 2
Standard error
20
10
6.7
180
160
140
120
100
D$_e$ (Gy)
0.00
0.05
0.10
0.15
Precision

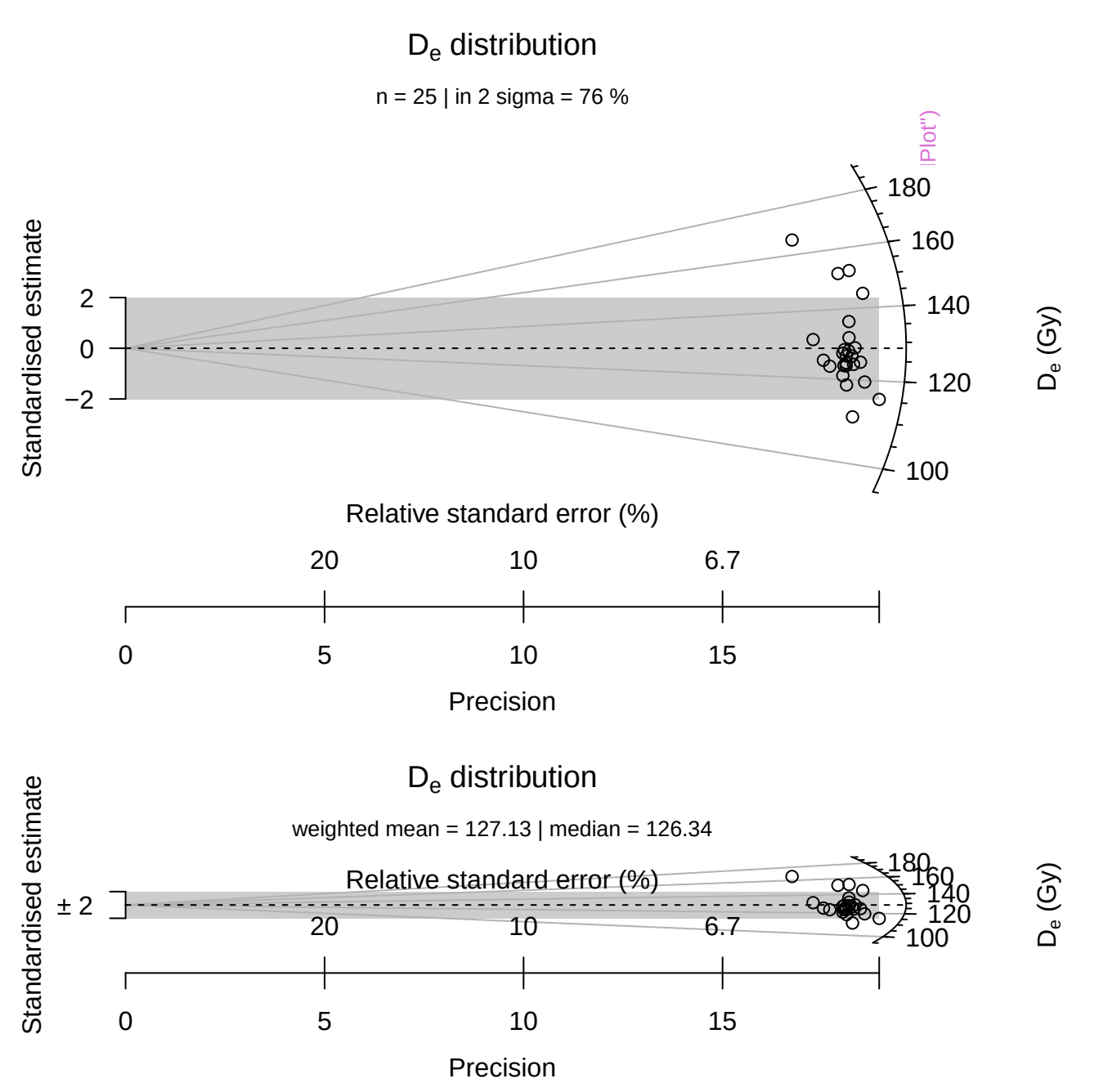

D$_e$ distribution
n = 25 | in 2 sigma = 80 %
Standardised estimate
2
0
−2
Standard error
20
10
6.7
0.00
0.05
0.10
0.15
Precision
180
160
140
120
100
D$_e$ (Gy)

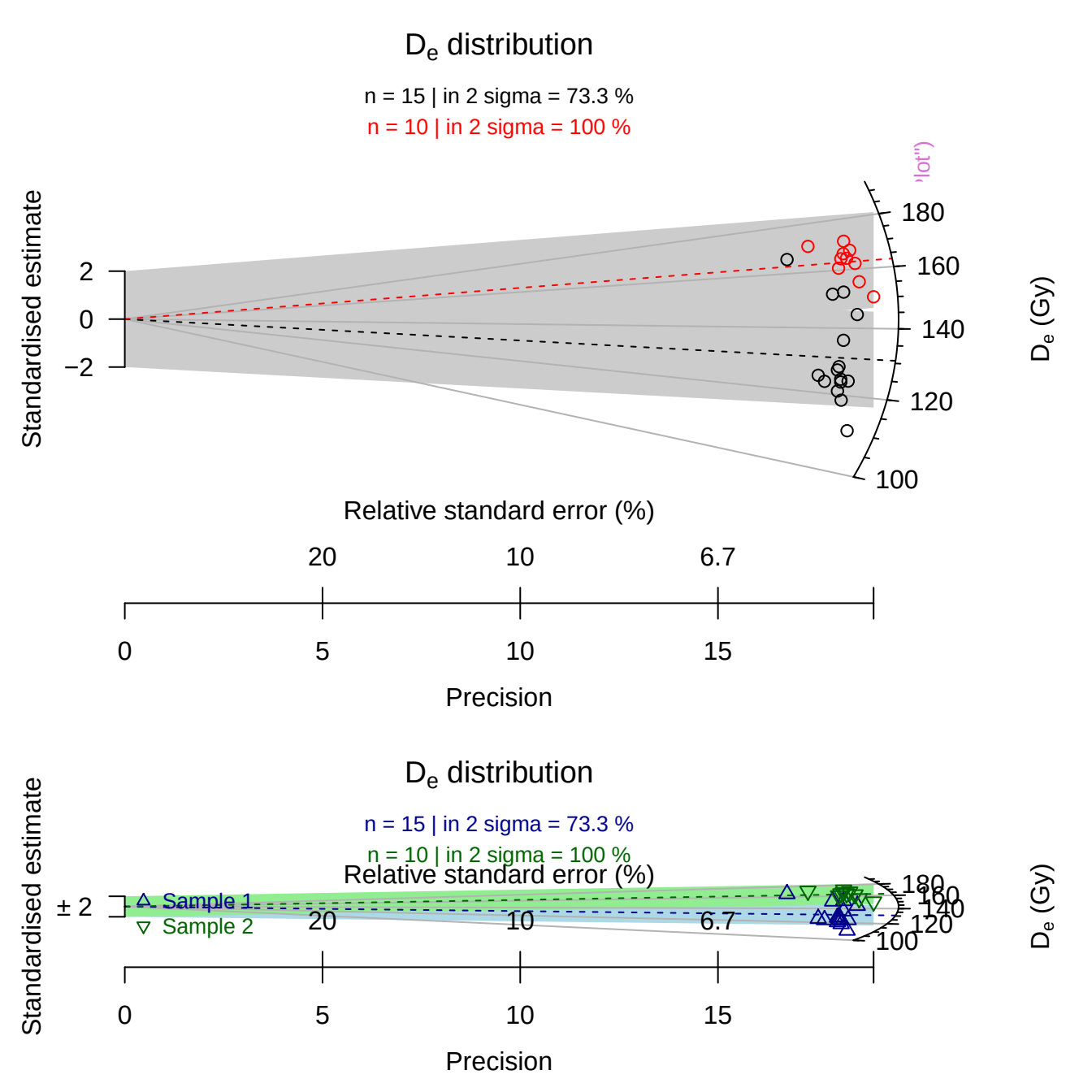

D$_e$ distribution
n = 25 | in 2 sigma = 80 %
Standardised estimate
± 2
Standard error
20
10
6.7
0.00
0.05
0.10
0.15
Precision
200
180
160
140
120
100
D$_e$ (Gy)


De distribution
n = 25 | in 2 sigma = 76 %
Standardised estimate
2
0
−2
180
160
140
120
100
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
De distribution
n = 25 | in 2 sigma = 76 %
Standardised estimate
± 2
Relative standard error (%)
20
10
6.7
180
160
140
120
100
De (Gy)
0
5
10
15
Precision


De distribution
n = 25 | in 2 sigma = 76 %
Standardised estimate
2
0
−2
180
160
140
120
100
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
De distribution
n = 25 | in 2 sigma = 76 %
Standardised estimate
Relative standard error (%)
0
20
10
6.7
180
160
140
120
100
De (Gy)
0
5
10
15
Precision


De distribution
n = 25 | in 2 sigma = 76 %
Scatter
2
0
−2
Equivalent dose (Gy)
180
160
140
120
100
Data error (%)
20
10
6.7
0
5
10
15
Data precision
De distribution
n = 25 | in 2 sigma = 76 %
Standardised estimate
± 2
Relative standard error (%)
165.8
125.1
110.8
De (Gy)
Precision


De distribution
n = 25 | in 2 sigma = 76 %
Standardised estimate
2
0
−2
180
160
140
120
100
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
De distribution
weighted mean = 127.13 | median = 126.34
Standardised estimate
± 2
Relative standard error (%)
20
10
6.7
180
160
140
120
100
De (Gy)
0
5
10
15
Precision


D$_e$ distribution
n = 15 | in 2 sigma = 73.3 %
n = 10 | in 2 sigma = 100 %
Standardised estimate
2
0
−2
180
160
140
120
100
D$_e$ (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
D$_e$ distribution
n = 15 | in 2 sigma = 73.3 %
n = 10 | in 2 sigma = 100 %
Relative standard error (%)
Standardised estimate
± 2
Sample 1
Sample 2
20
10
6.7
180
160
140
120
100
D$_e$ (Gy)
0
5
10
15
Precision