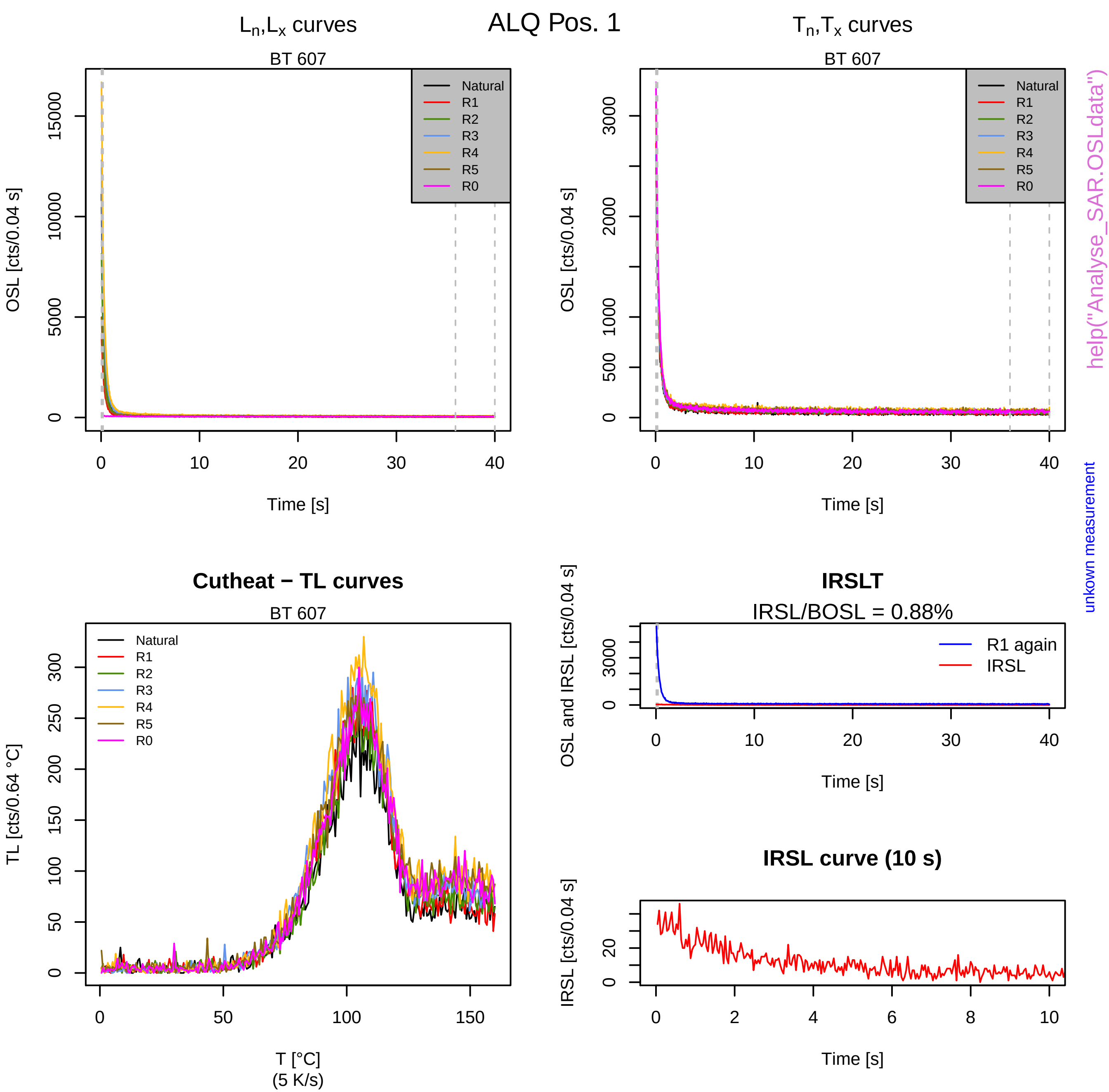
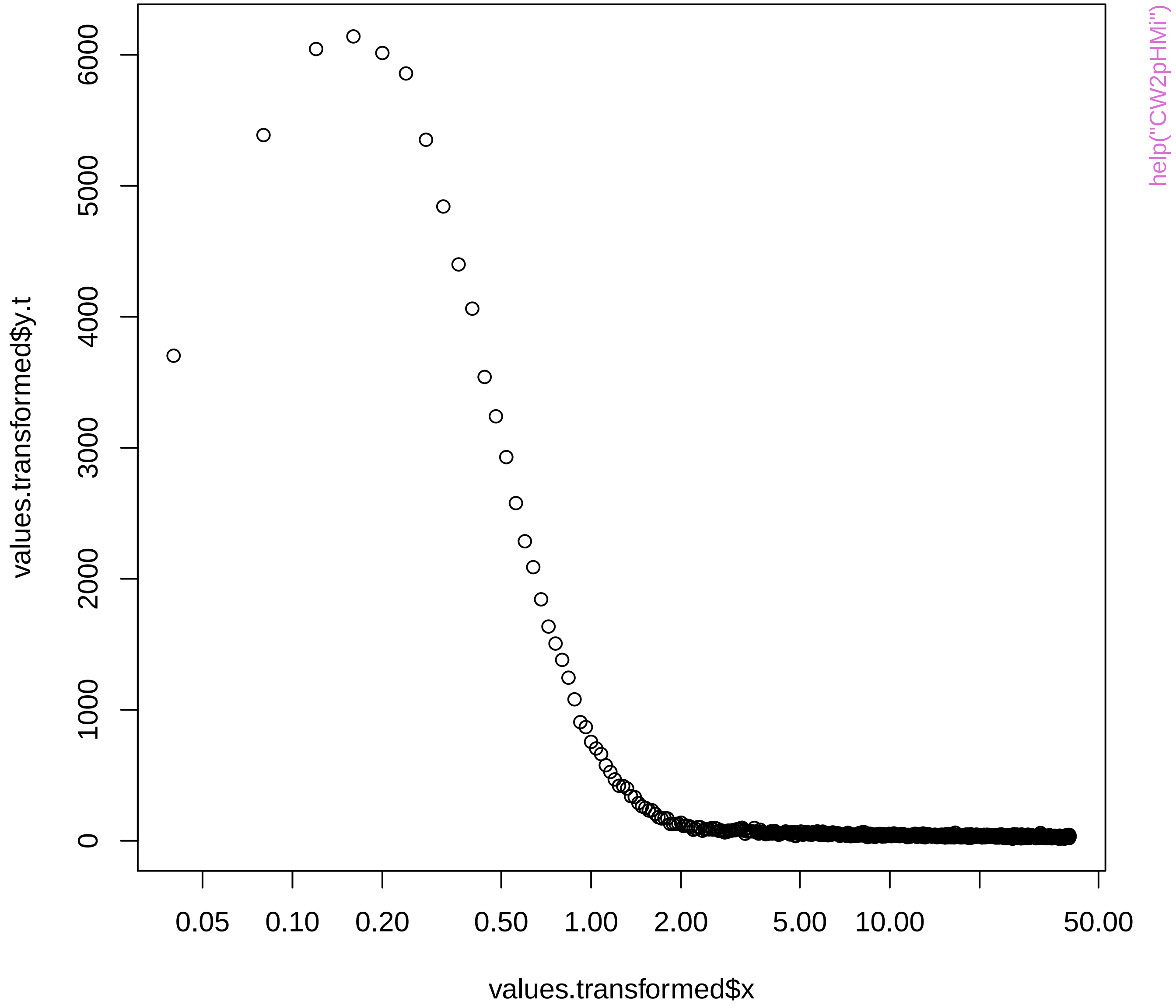
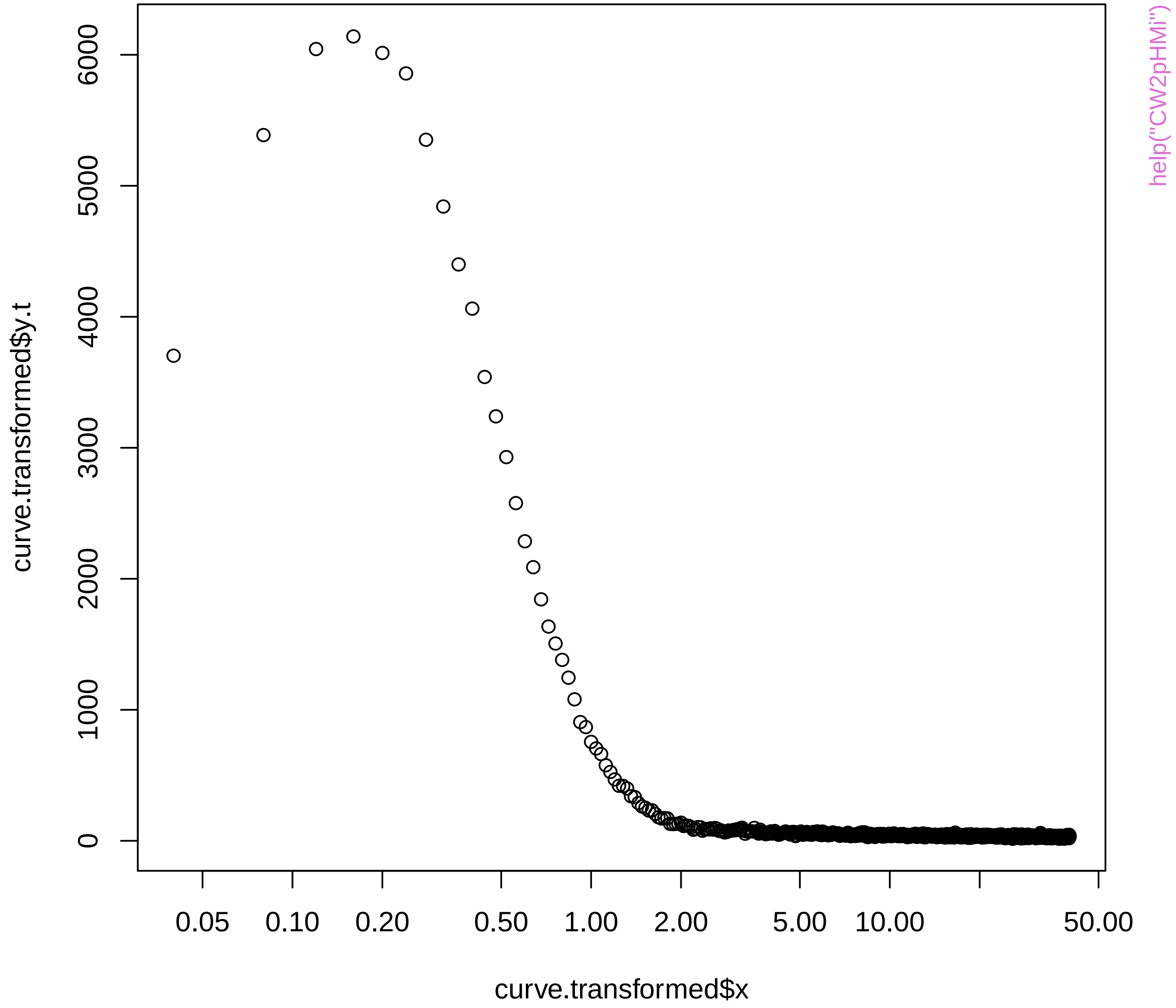

ALQ Pos. 1
L_n, L_x curves
BT 607
Natural
R1
R2
R3
R4
R5
R0
OSL [cts/0.04 s]
Time [s]
T_n, T_x curves
BT 607
help("Analyse_SAR.OSLdata")
unkown measurement
Cutheat − TL curves
BT 607
TL [cts/0.64 °C]
T [°C]
(5 K/s)
IRSLT
IRSL/BOSL = 0.88%
R1 again
IRSL
OSL and IRSL [cts/0.04 s]
IRSL curve (10 s)
IRSL [cts/0.04 s]


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



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

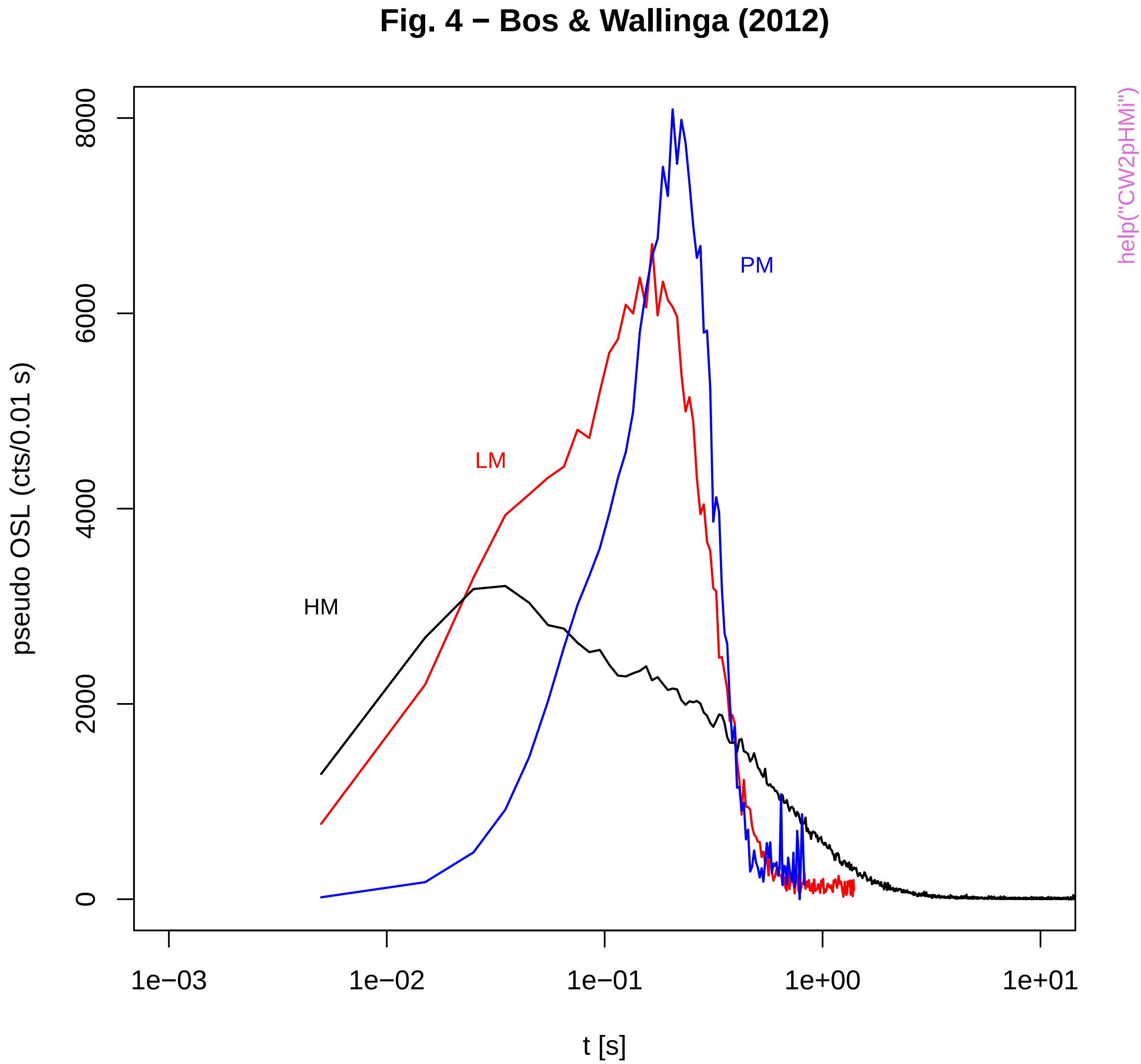
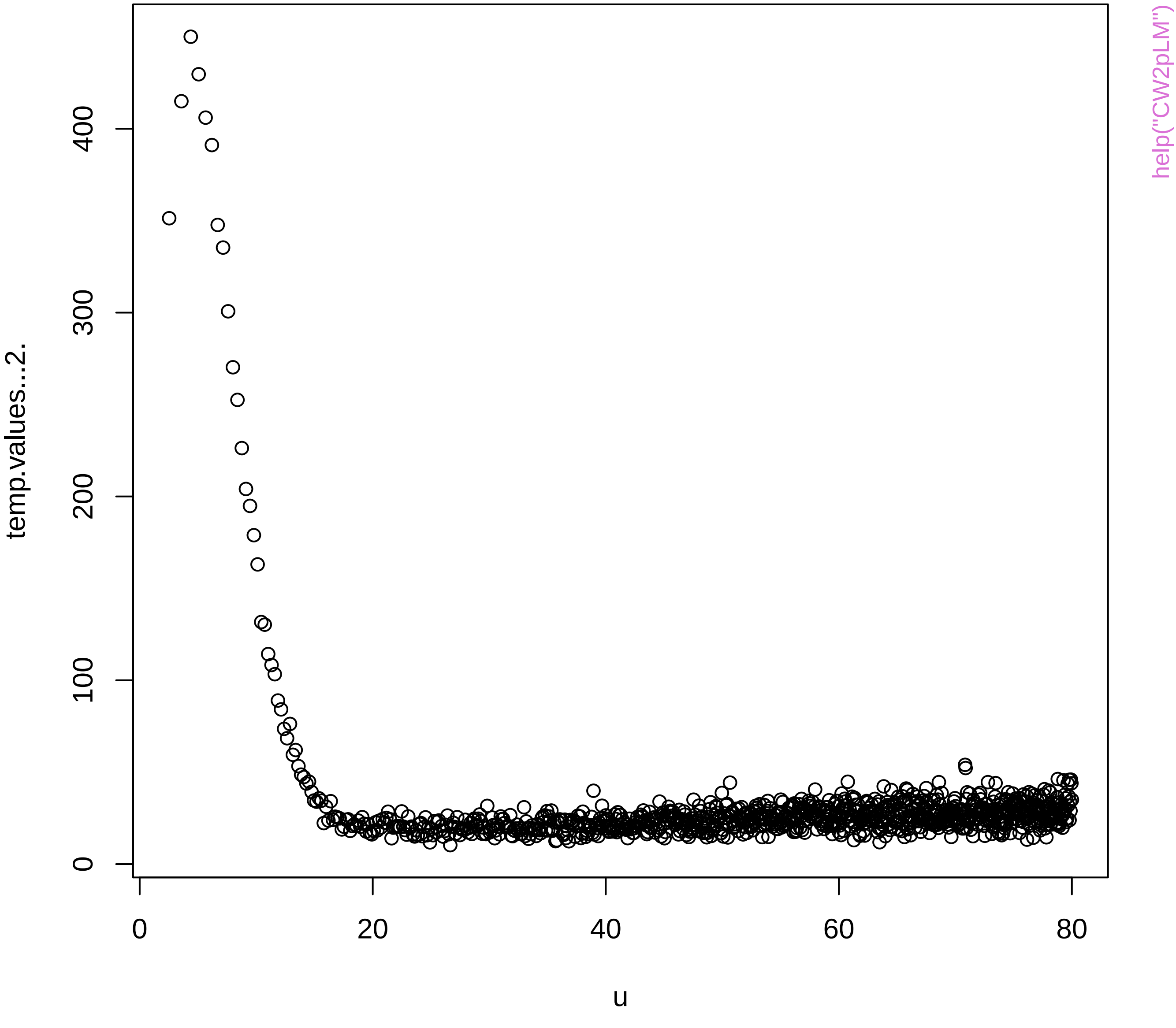
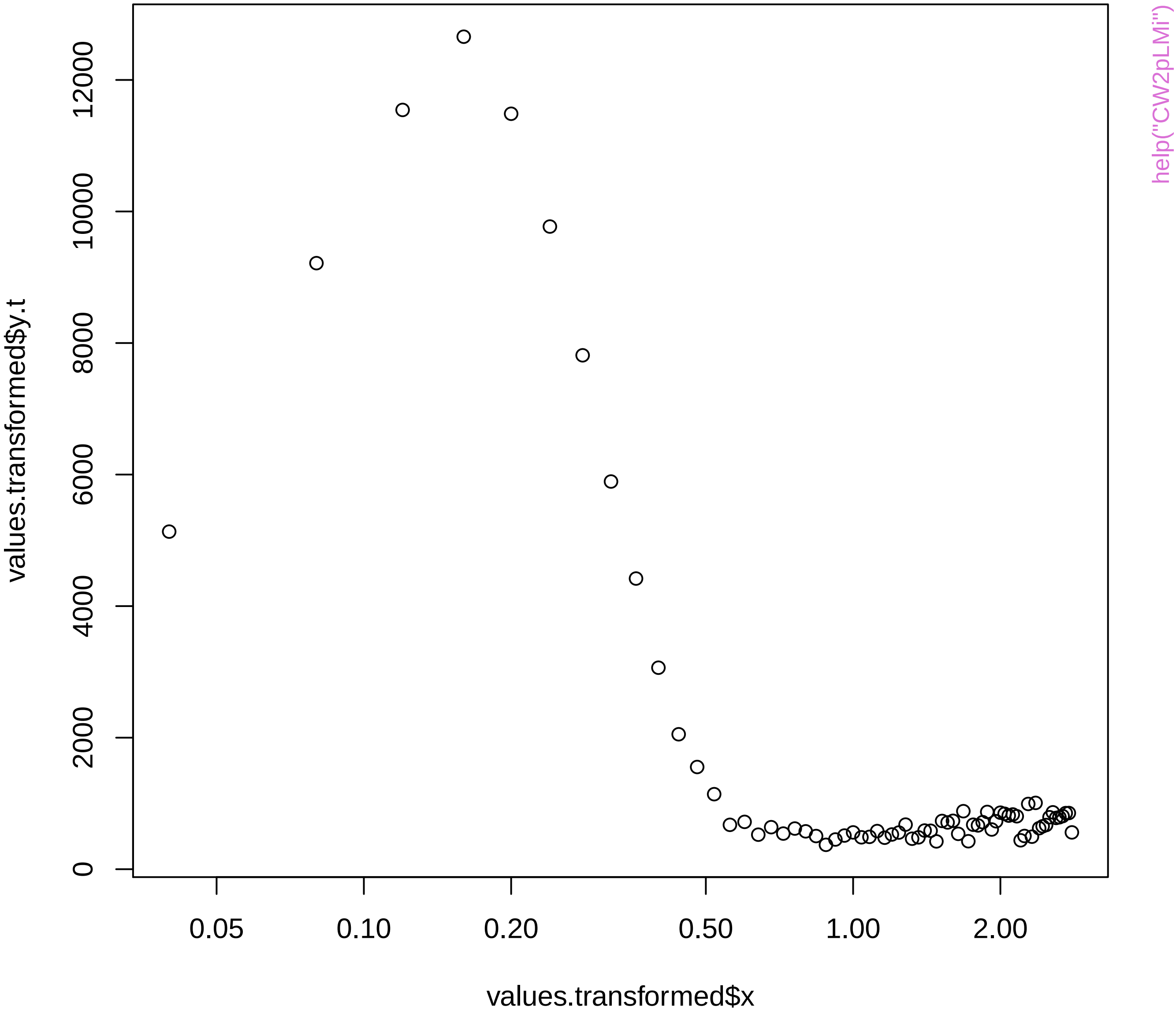


Fig. 4 − Bos & Wallinga (2012)
pseudo OSL (cts/0.01 s)
0
2000
4000
6000
8000
t [s]
1e−03
1e−02
1e−01
1e+00
1e+01
HM
LM
PM
help("CW2pHMi")



temp.values...2.
u
0
100
200
300
400
0
20
40
60
80
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")

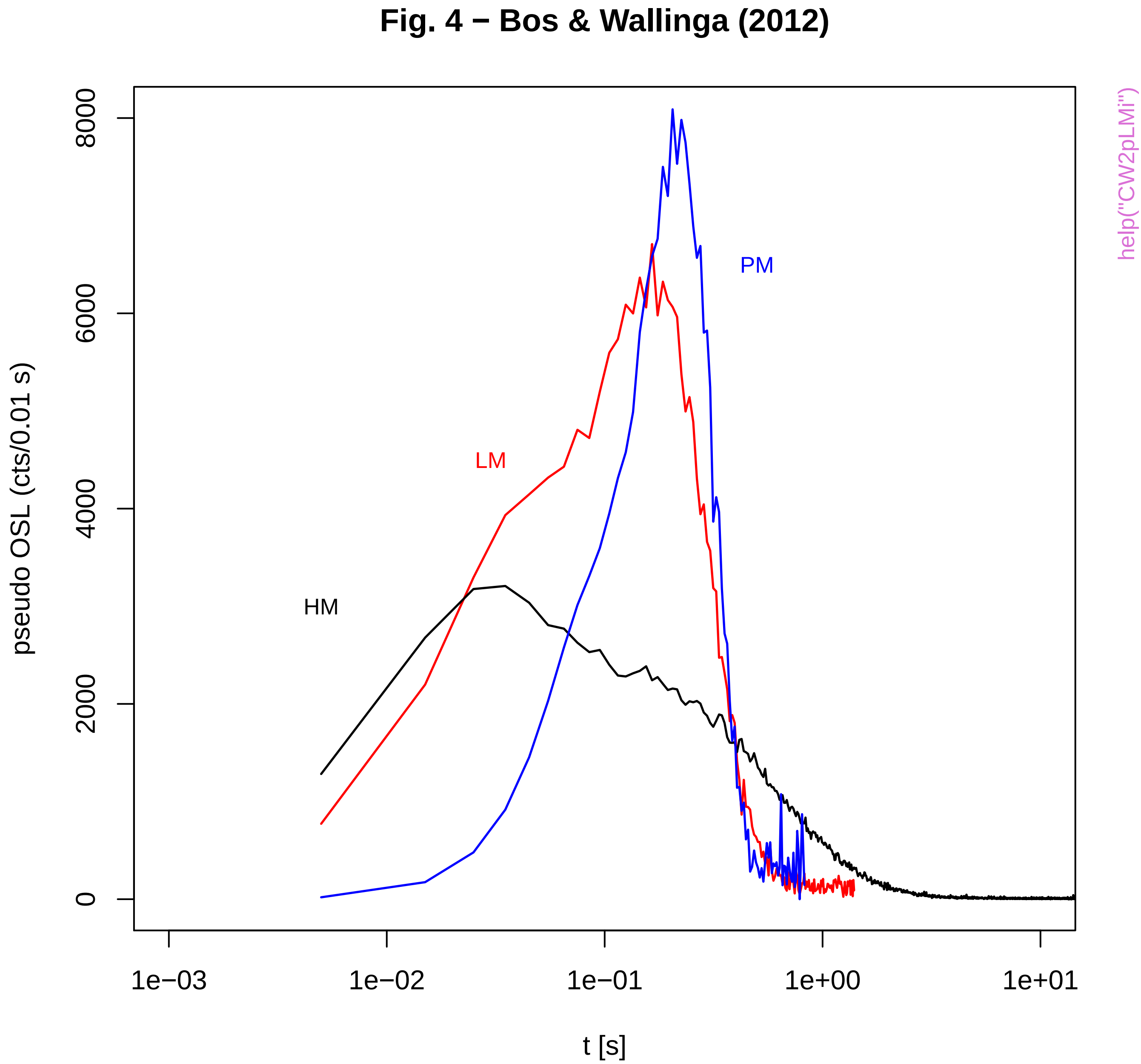
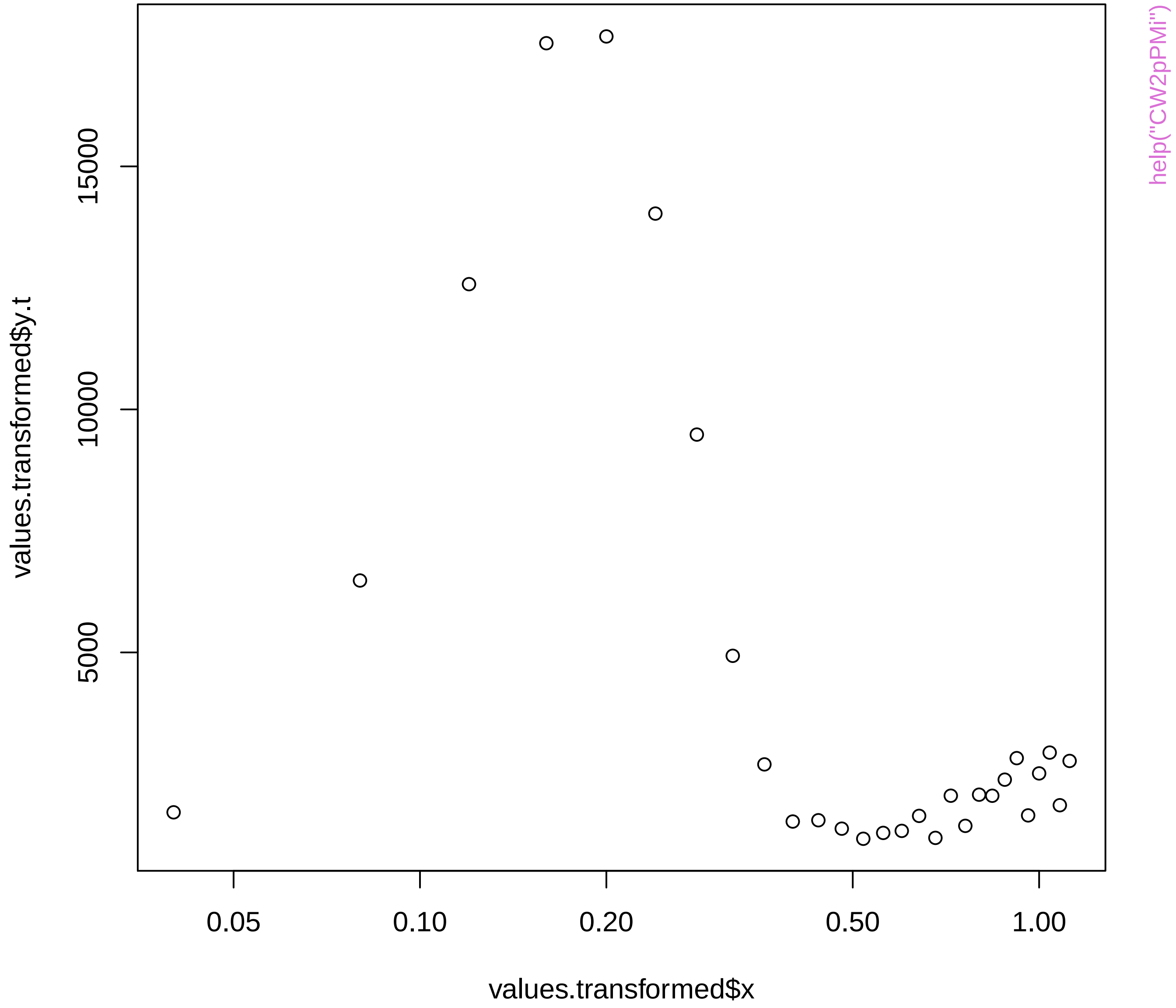


Fig. 4 − Bos & Wallinga (2012)
pseudo OSL (cts/0.01 s)
8000
6000
4000
2000
0
PM
LM
HM
1e−03
1e−02
1e−01
1e+00
1e+01
t [s]
help("CW2pLMi")


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

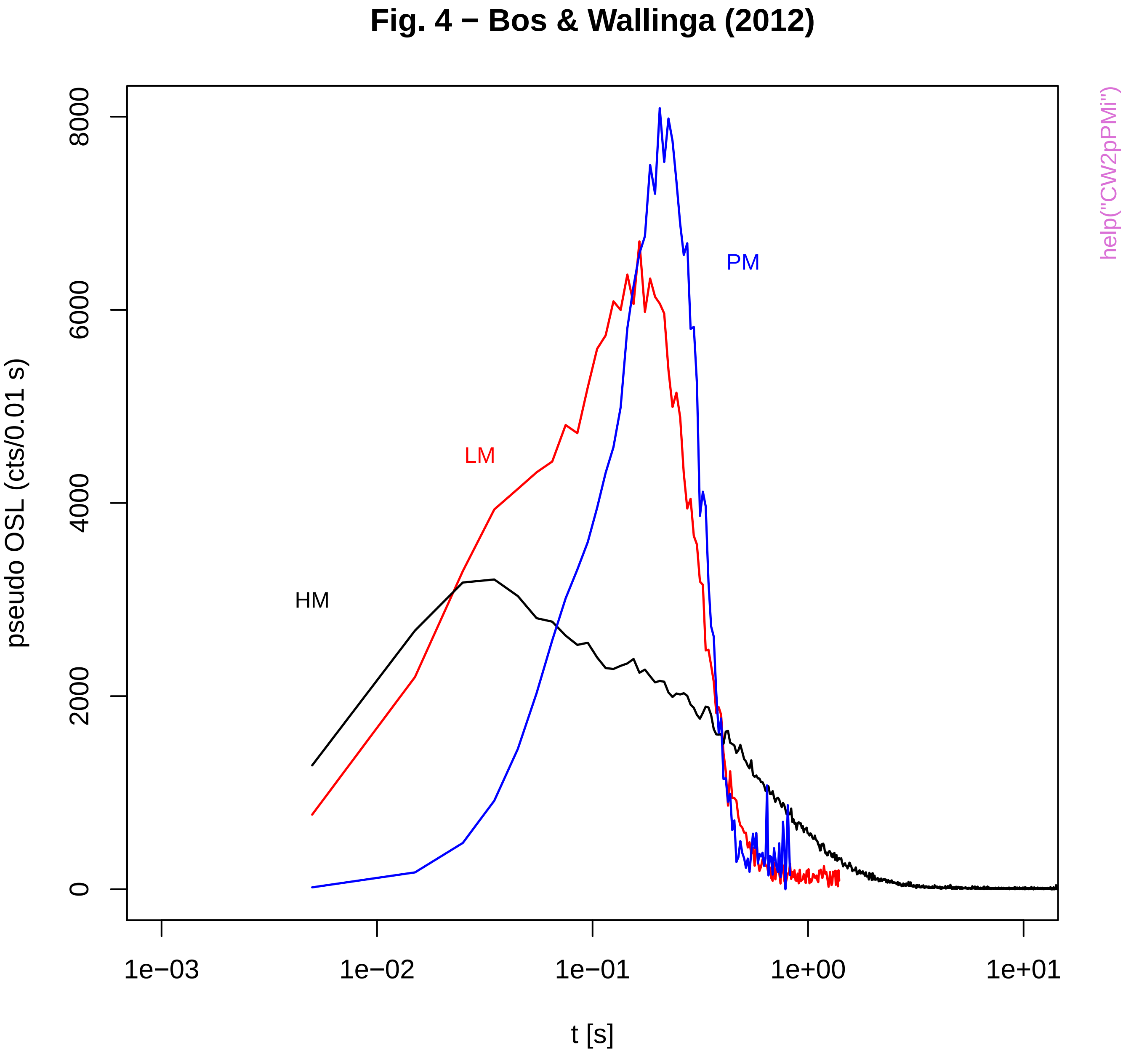
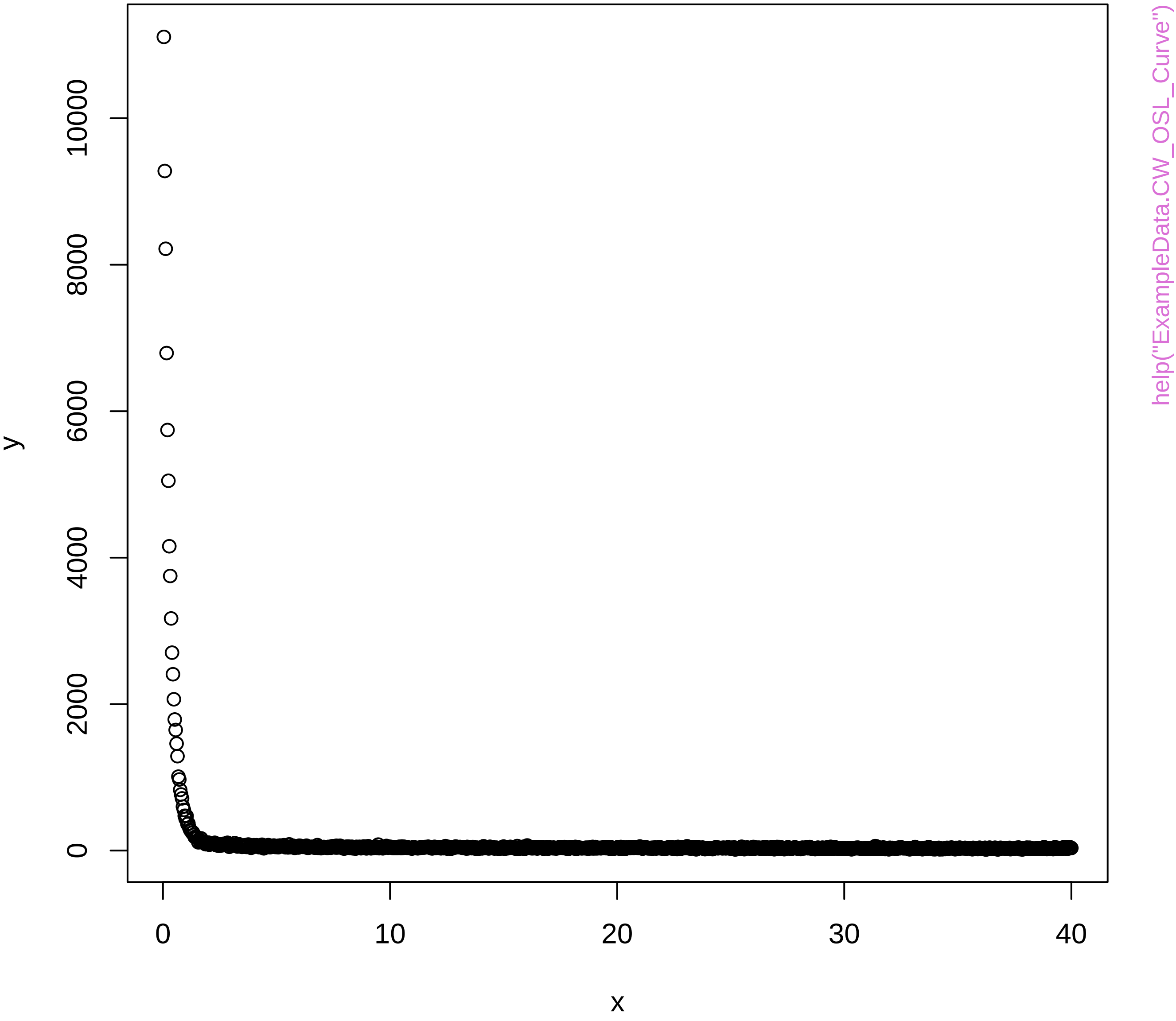
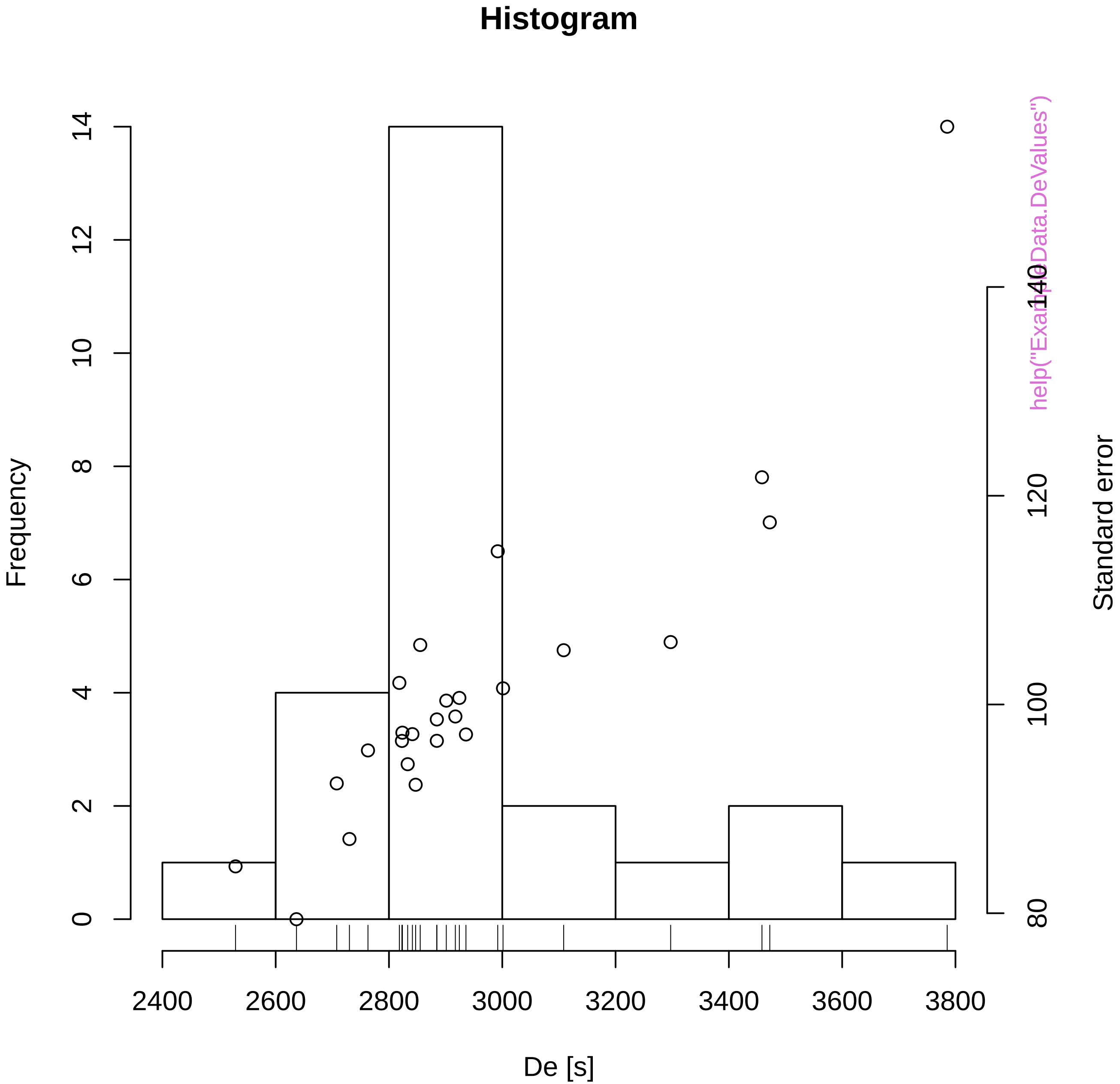
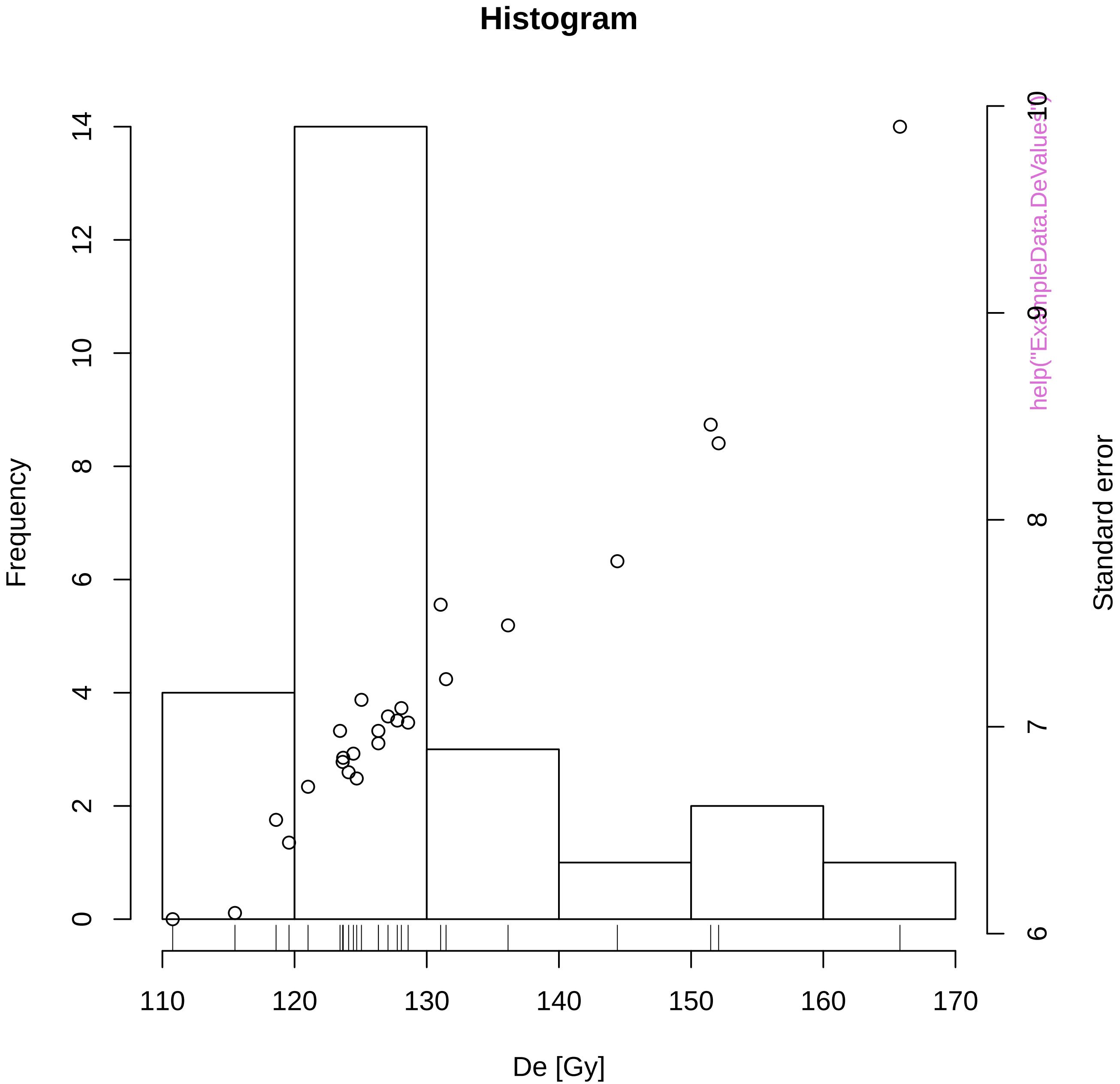


Fig. 4 − Bos & Wallinga (2012)
pseudo OSL (cts/0.01 s)
0
2000
4000
6000
8000
t [s]
1e−03
1e−02
1e−01
1e+00
1e+01
HM
LM
PM
help("CW2pPMi")

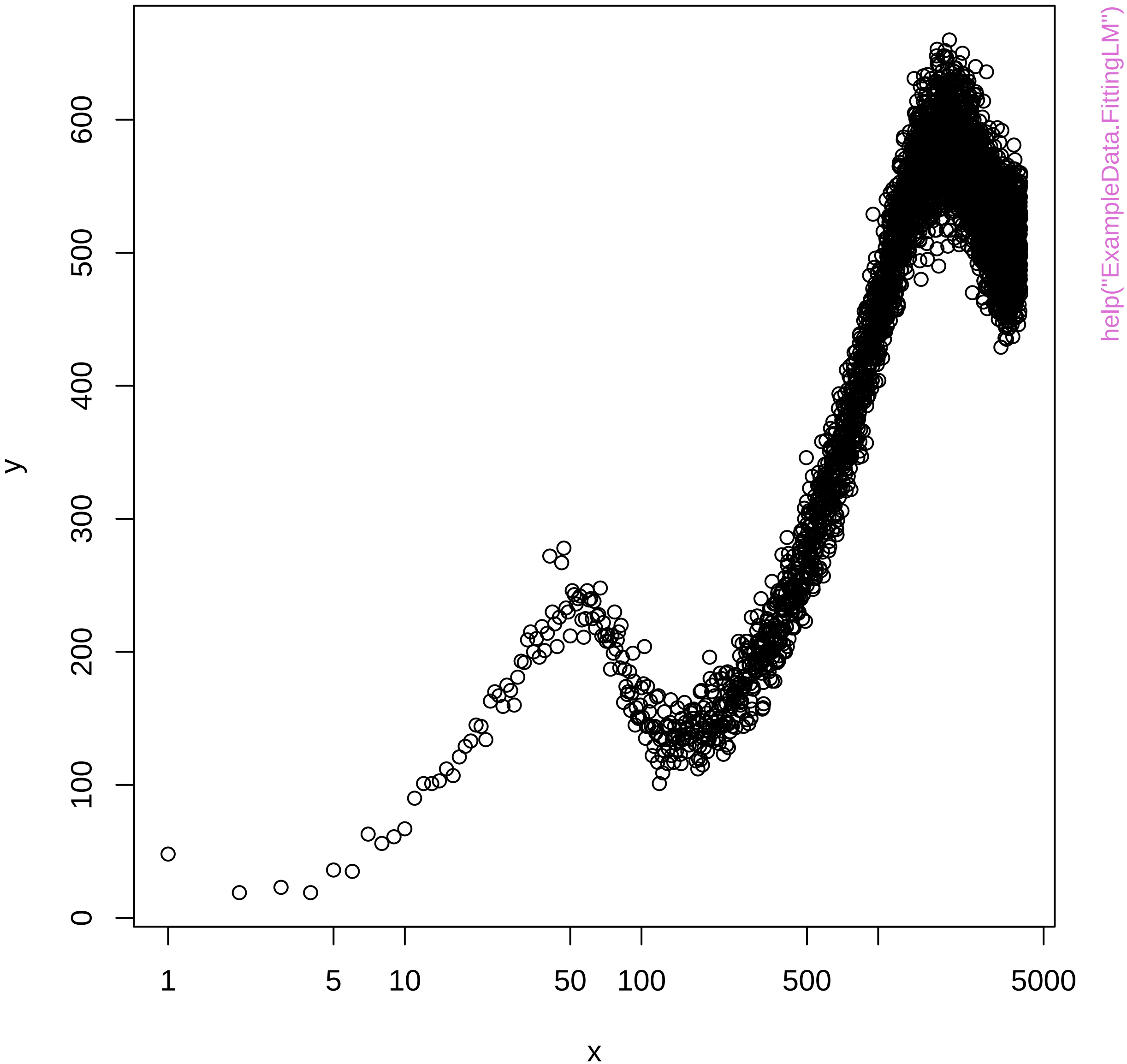


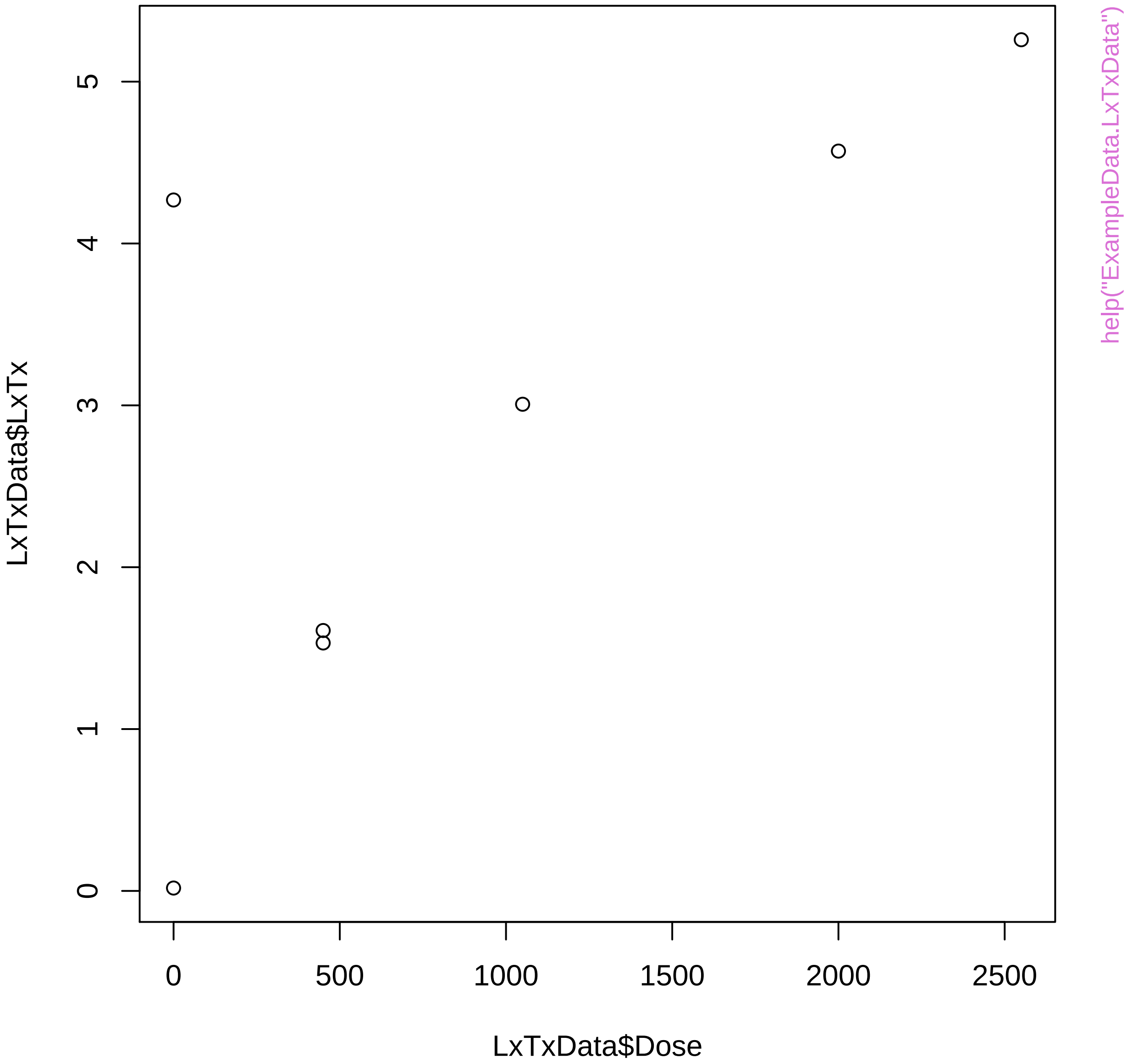
y
x
0
2000
4000
6000
8000
10000
0
10
20
30
40
help("ExampleData.CW_OSL_Curve")


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

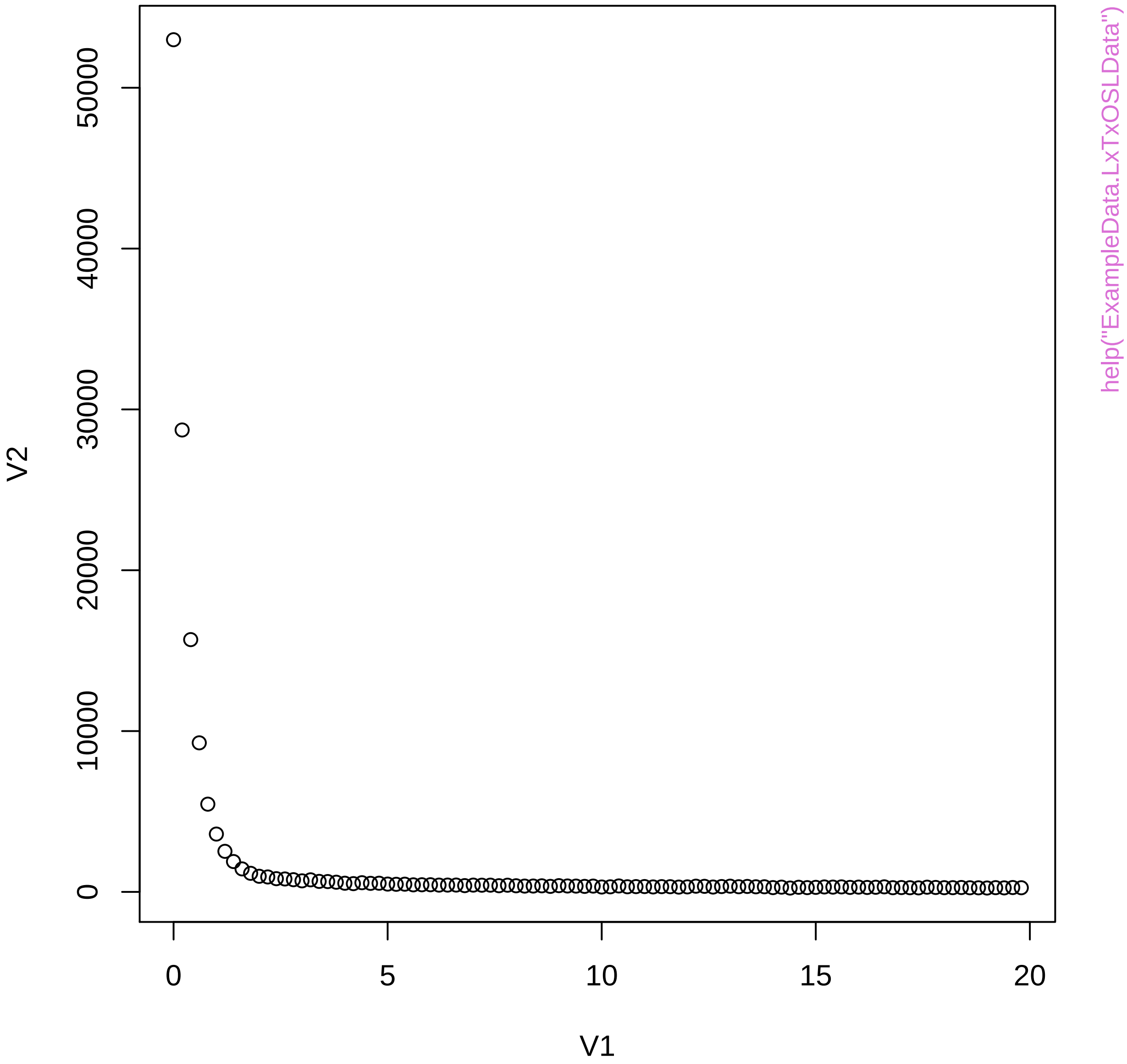


Histogram
Frequency
0
2
4
6
8
10
12
14
110
120
130
140
150
160
170
De [Gy]
Standard error
6
7
8
9
10
help("ExampleData.DeValues")

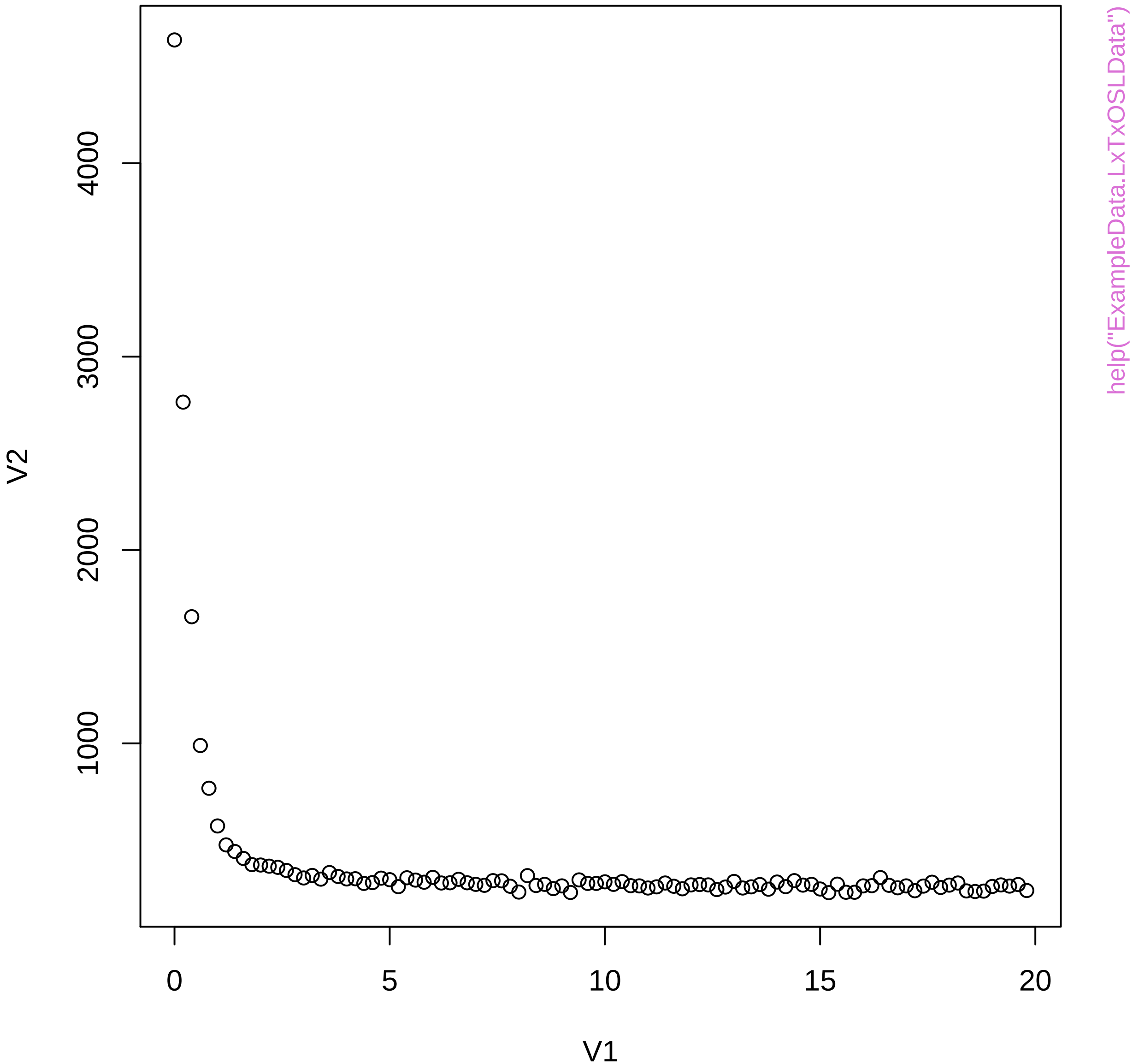

help("ExampleData.FittingLM")
y
0
100
200
300
400
500
600
x
1
5
10
50
100
500
5000



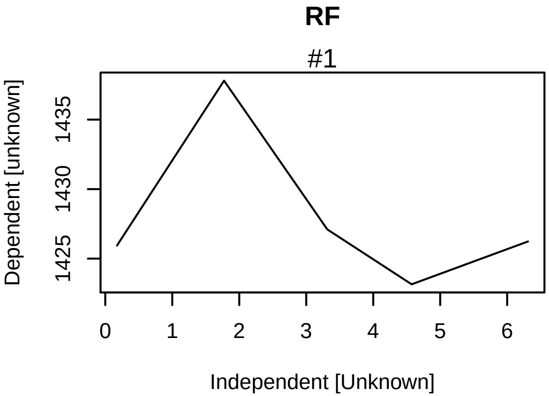
LxTxData$LxTx
LxTxData$Dose
0
1
2
3
4
5
0
500
1000
1500
2000
2500
help("ExampleData.LxTxData")

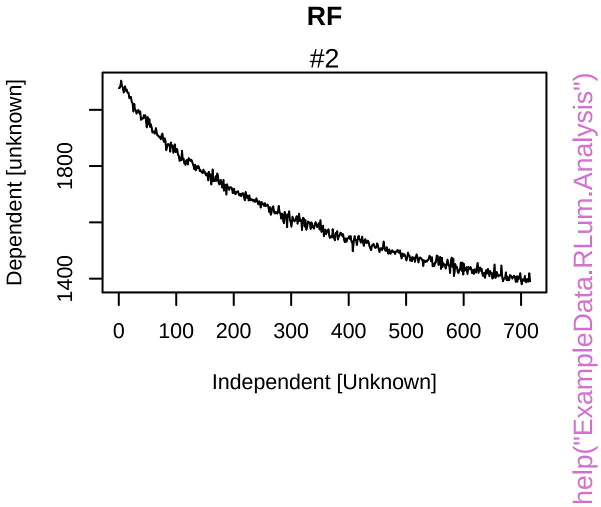


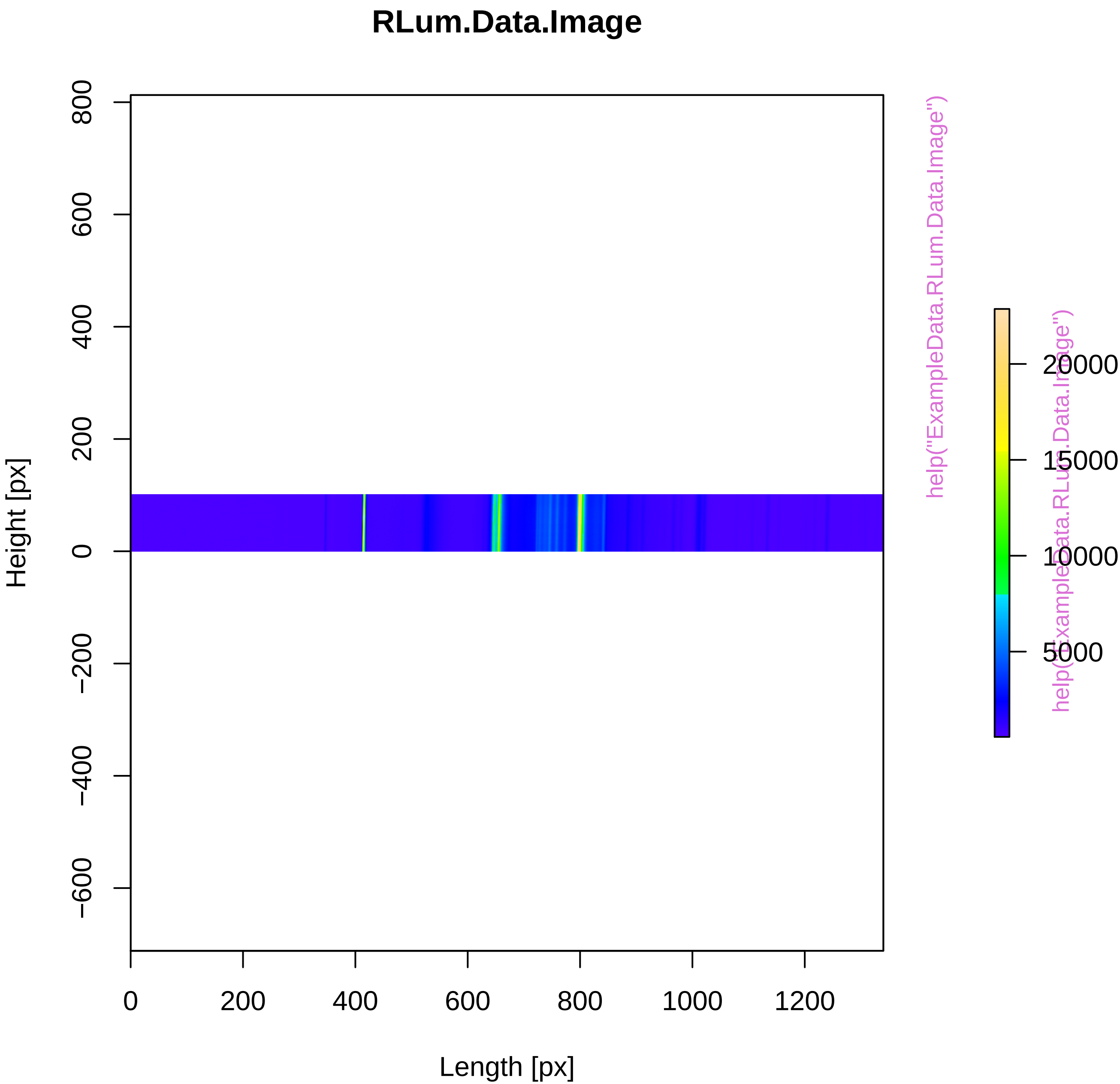
V2
50000
40000
30000
20000
10000
0
0
5
10
15
20
V1
help("ExampleData.LxTxOSLData")

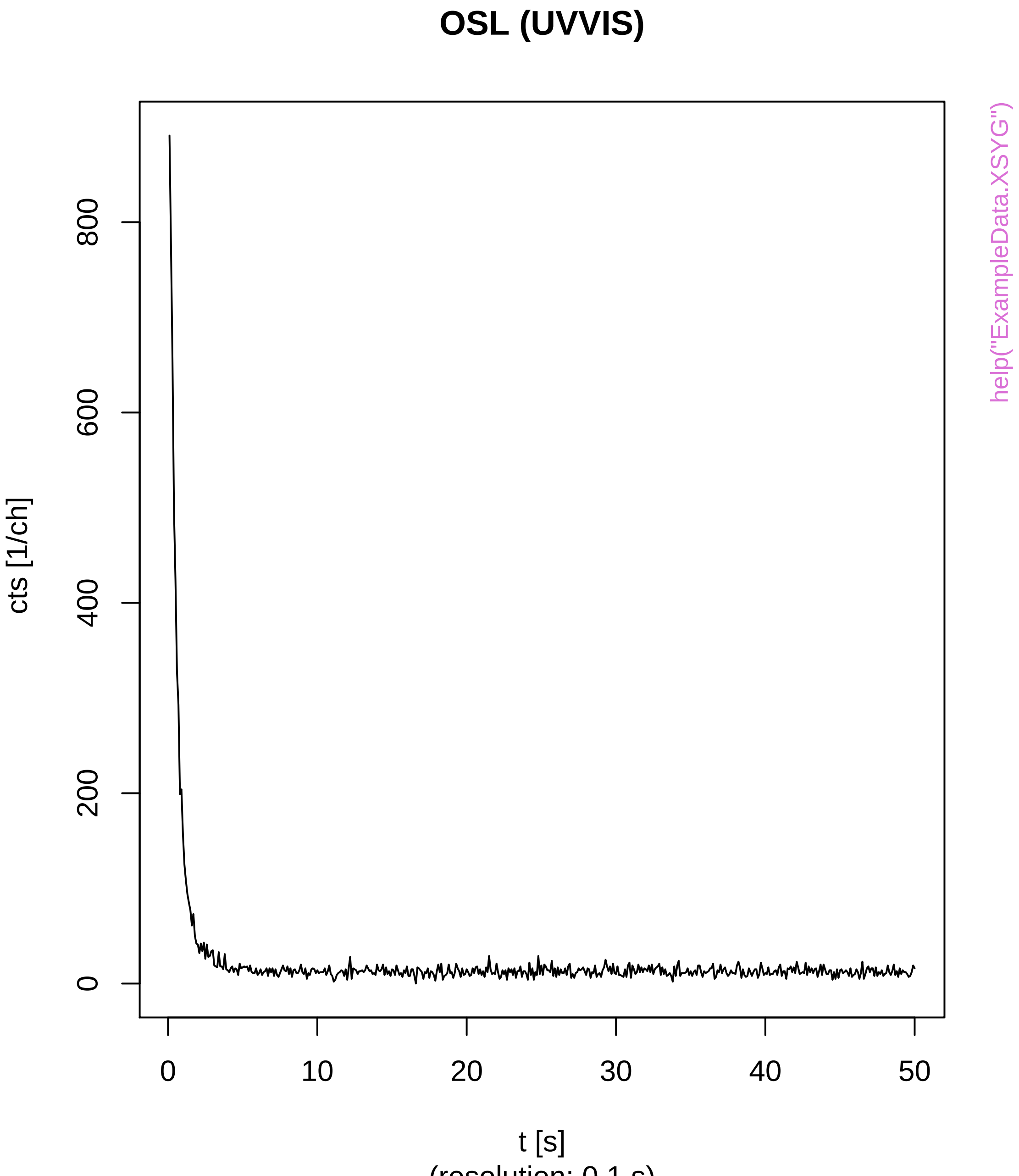


V2
4000
3000
2000
1000
0
5
10
15
20
V1
help("ExampleData.LxTxOSLData")

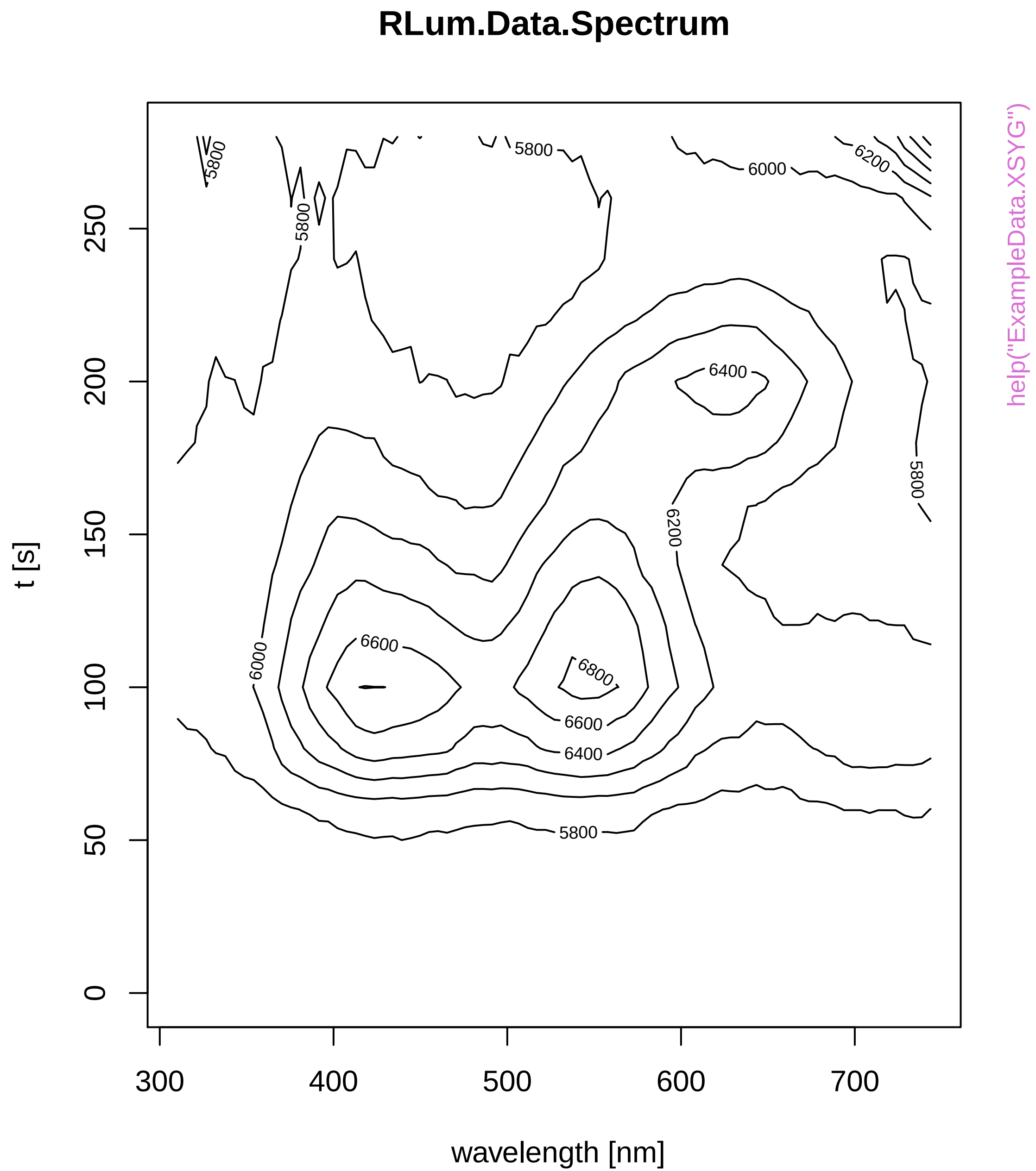

RF
#1
Dependent [unknown]
1425
1430
1435
0
1
2
3
4
5
6
Independent [Unknown]


RF
#2
Dependent [unknown]
1400
1800
0
100
200
300
400
500
600
700
Independent [Unknown]
help("ExampleData.RLum.Analysis")

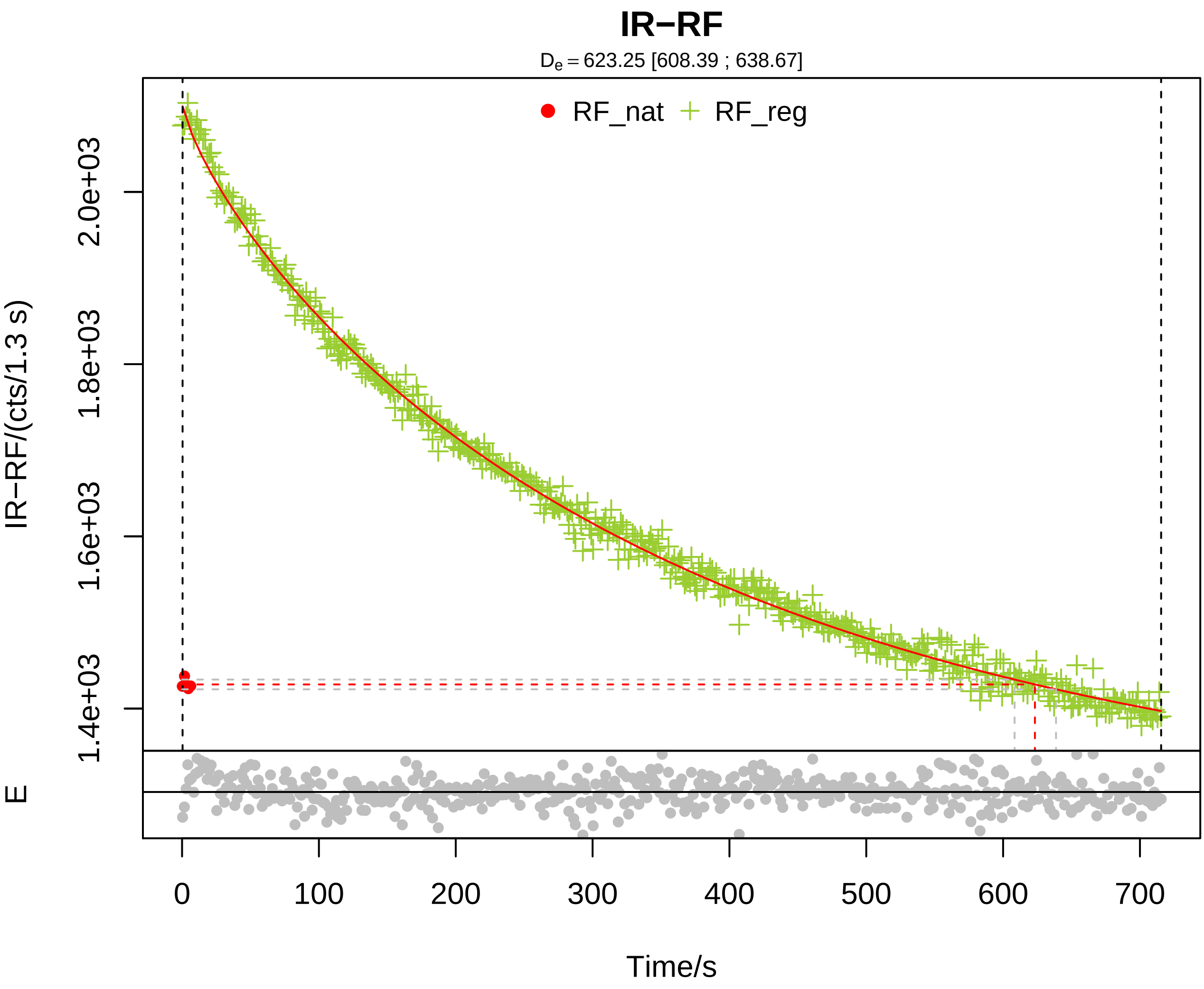

RLum.Data.Image
Height [px]
Length [px]
800
600
400
200
0
−200
−400
−600
0
200
400
600
800
1000
1200
help("ExampleData.RLum.Data.Image")
20000
15000
10000
5000
help("ExampleData.RLum.Data.Image")



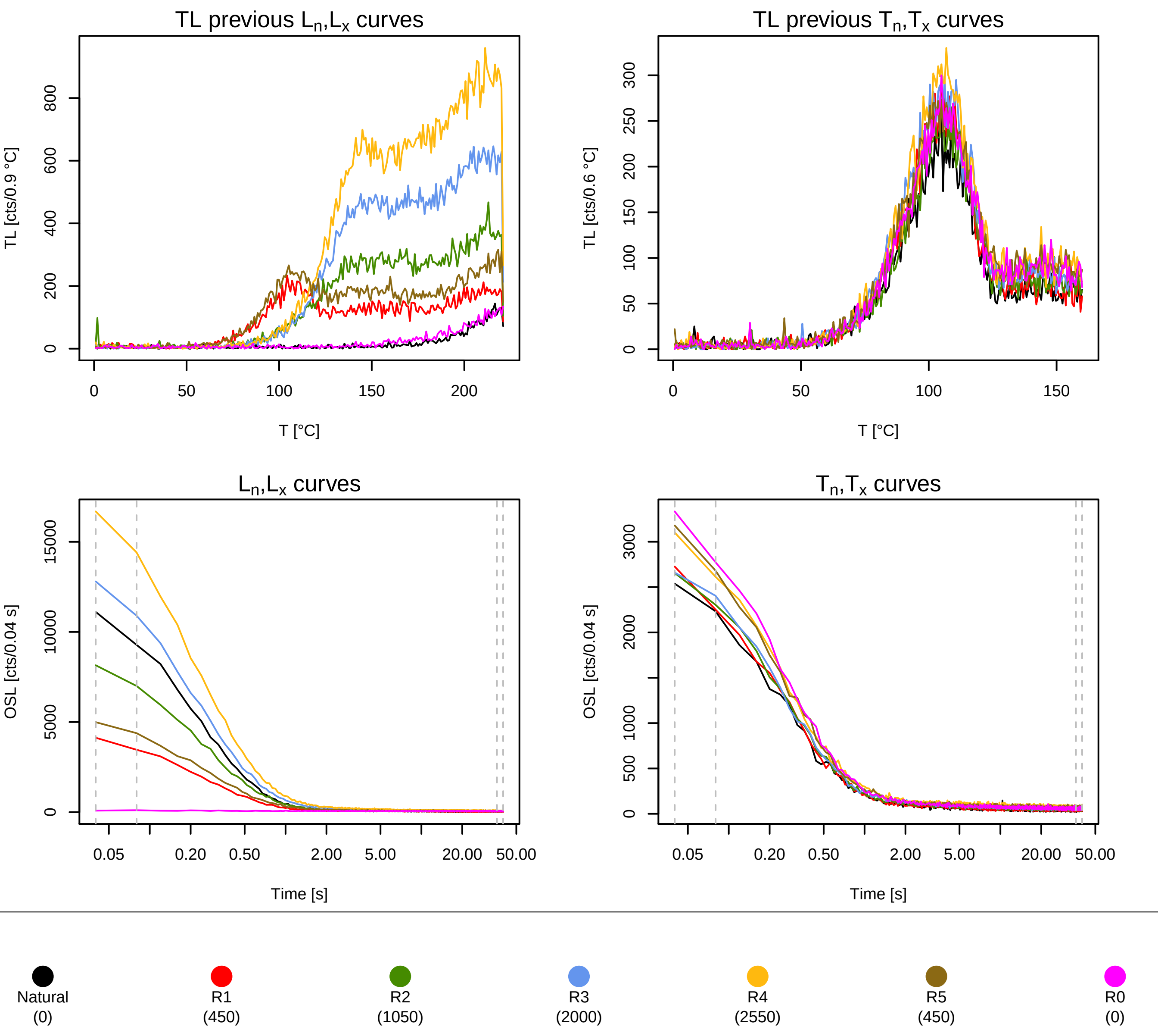
OSL (UVVIS)
cts [1/ch]
0
200
400
600
800
0
10
20
30
40
50
t [s]
(resolution: 0.1 s)
help("ExampleData.XSYG")



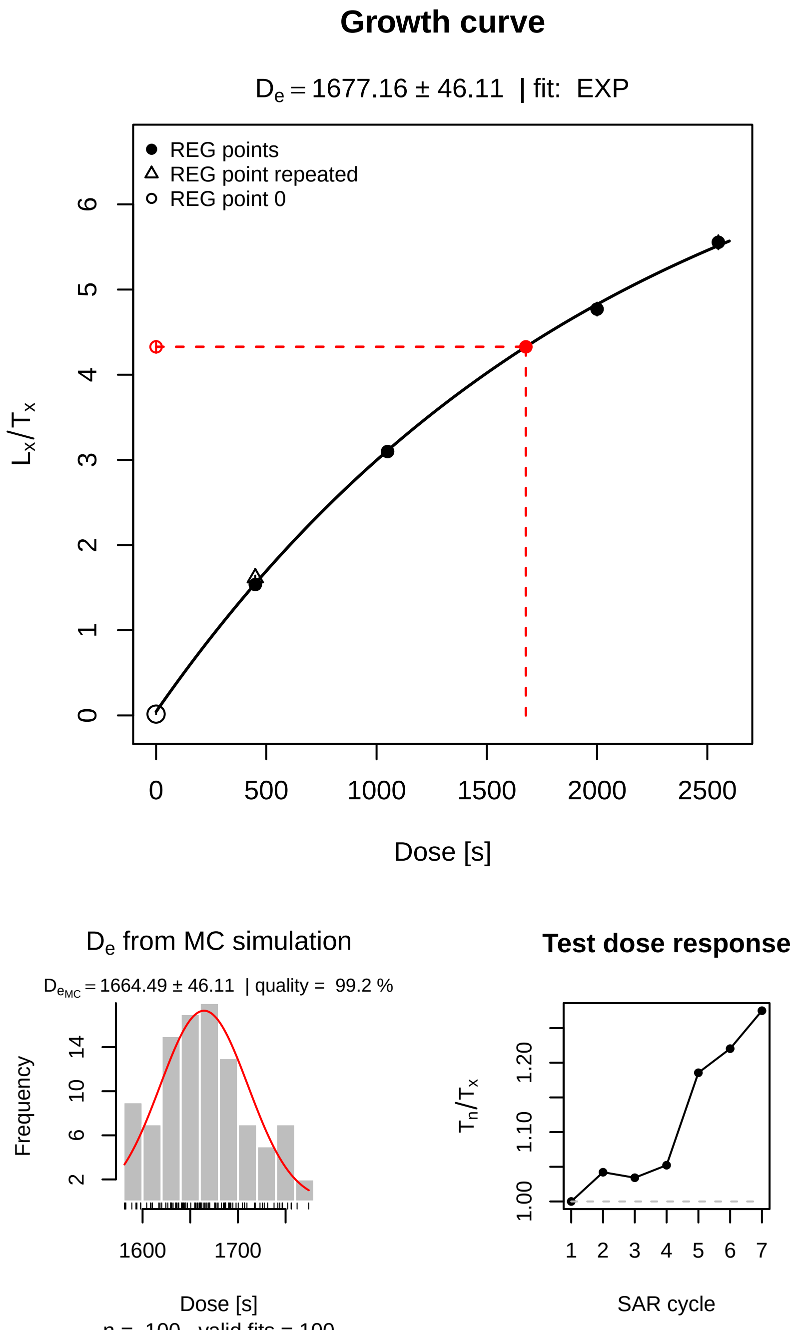
RLum.Data.Spectrum
t [s]
wavelength [nm]
help("ExampleData.XSYG")
0
50
100
150
200
250
300
400
500
600
700
5800
6000
6200
6400
6600
6800

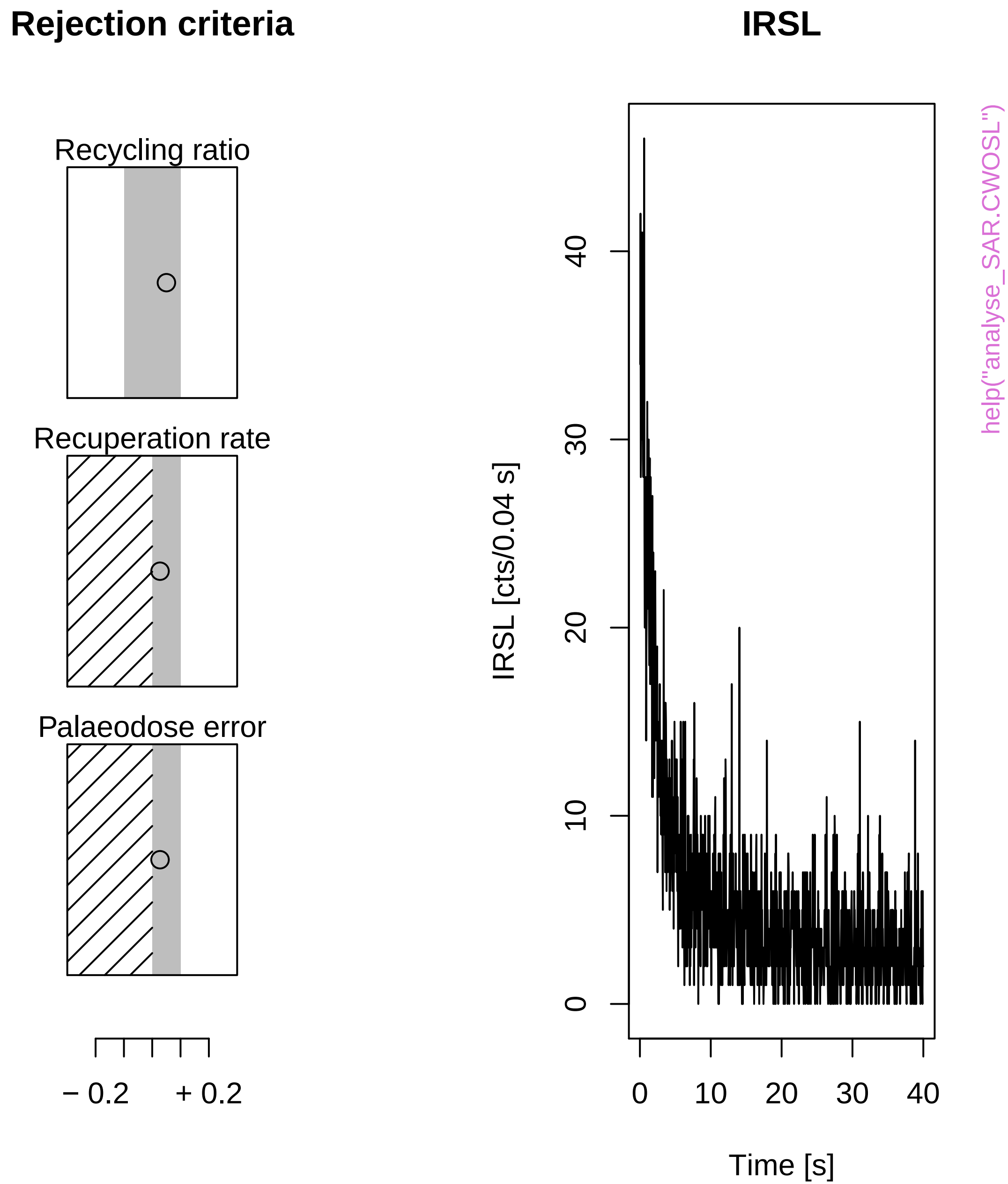


IR−RF
D_e = 623.25 [608.39 ; 638.67]
RF_nat
RF_reg
IR−RF/(cts/1.3 s)
2.0e+03
1.8e+03
1.6e+03
1.4e+03
E
0
100
200
300
400
500
600
700
Time/s

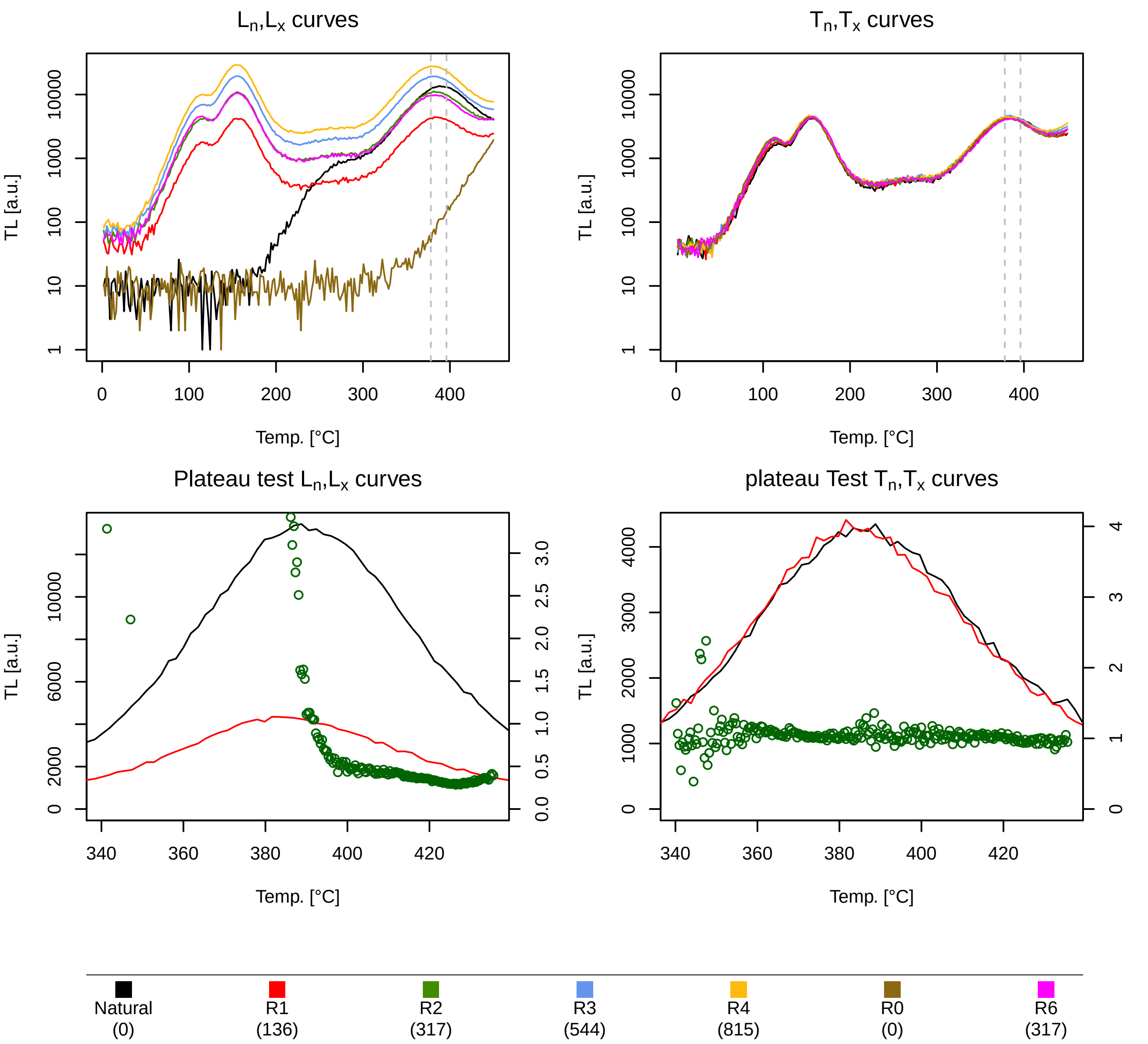


TL previous L_n,L_x curves
TL [cts/0.9 °C]
0
200
400
600
800
0
50
100
150
200
T [°C]
TL previous T_n,T_x curves
TL [cts/0.6 °C]
0
50
100
150
200
250
300
0
50
100
150
T [°C]
L_n,L_x curves
OSL [cts/0.04 s]
0
5000
10000
15000
0.05
0.20
0.50
2.00
5.00
20.00
50.00
Time [s]
T_n,T_x curves
OSL [cts/0.04 s]
0
500
1000
2000
3000
0.05
0.20
0.50
2.00
5.00
20.00
50.00
Time [s]
Natural
(0)
R1
(450)
R2
(1050)
R3
(2000)
R4
(2550)
R5
(450)
R0
(0)

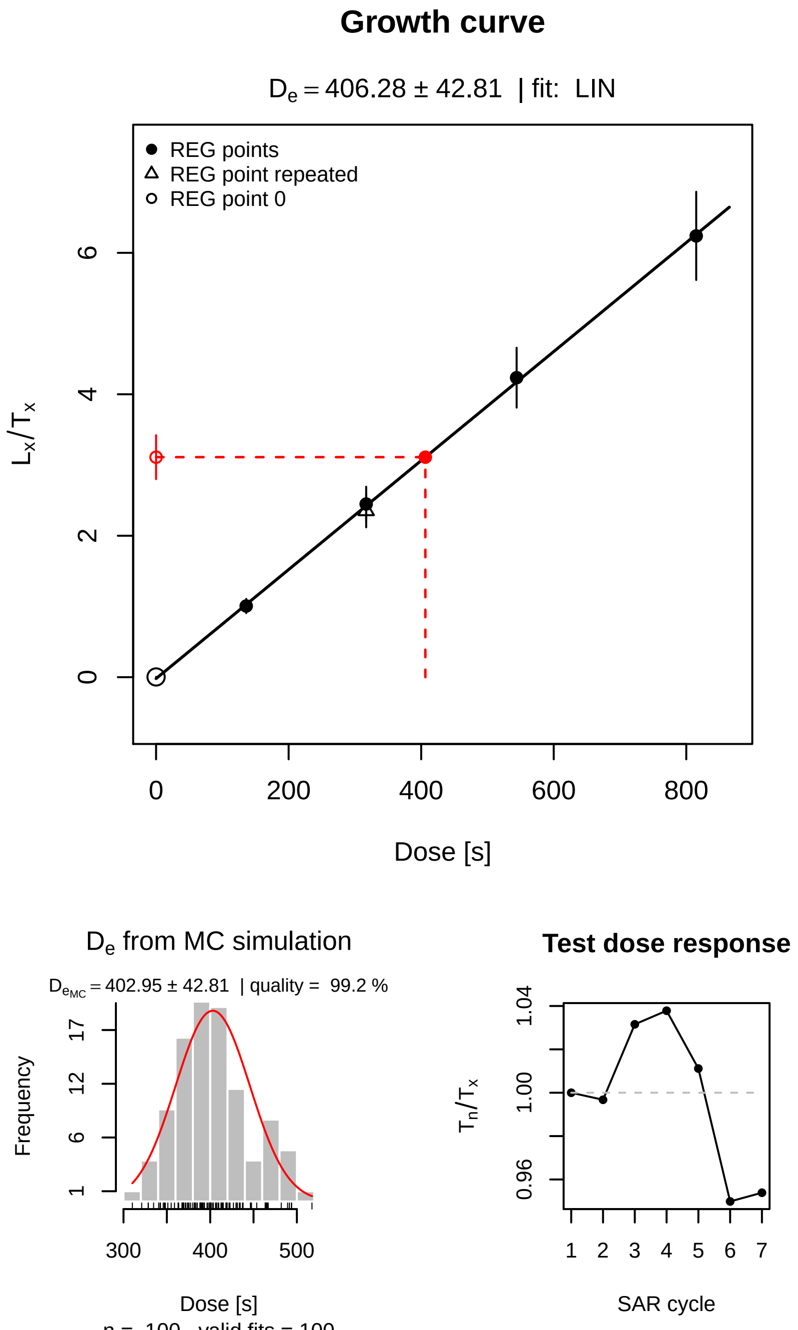

Growth curve
De = 1677.16 ± 46.11 | fit: EXP
REG points
REG point repeated
REG point 0
Lx/Tx
0
1
2
3
4
5
6
0
500
1000
1500
2000
2500
Dose [s]
De from MC simulation
DeMC = 1664.49 ± 46.11 | quality = 99.2 %
Frequency
2
6
10
14
1600
1700
Dose [s]
Test dose response
Tn/Tx
1.00
1.10
1.20
1
2
3
4
5
6
7
SAR cycle



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]
0
10
20
30
40
help("analyse_SAR.CWOSL")



L_n,L_x curves
T_n,T_x curves
Plateau test L_n,L_x curves
plateau Test T_n,T_x curves
TL [a.u.]
Temp. [°C]
Natural (0)
R1 (136)
R2 (317)
R3 (544)
R4 (815)
R0 (0)
R6 (317)

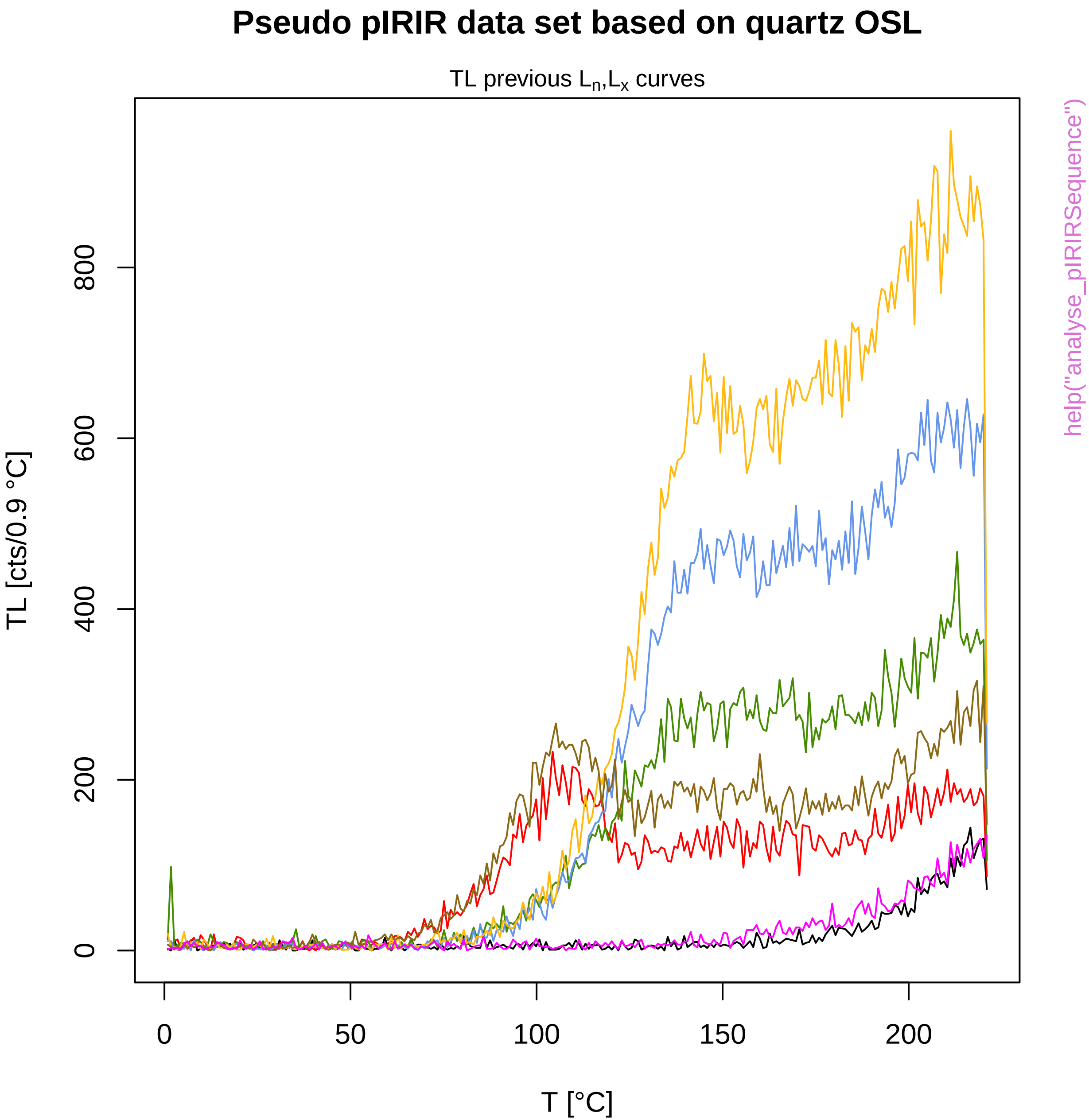


Growth curve
De = 406.28 ± 42.81 | fit: LIN
REG points
REG point repeated
REG point 0
Lx/Tx
0
2
4
6
0
200
400
600
800
Dose [s]
De from MC simulation
DeMC = 402.95 ± 42.81 | quality = 99.2 %
Frequency
1
6
12
17
300
400
500
Dose [s]
Test dose response
Tn/Tx
0.96
1.00
1.04
1
2
3
4
5
6
7
SAR cycle

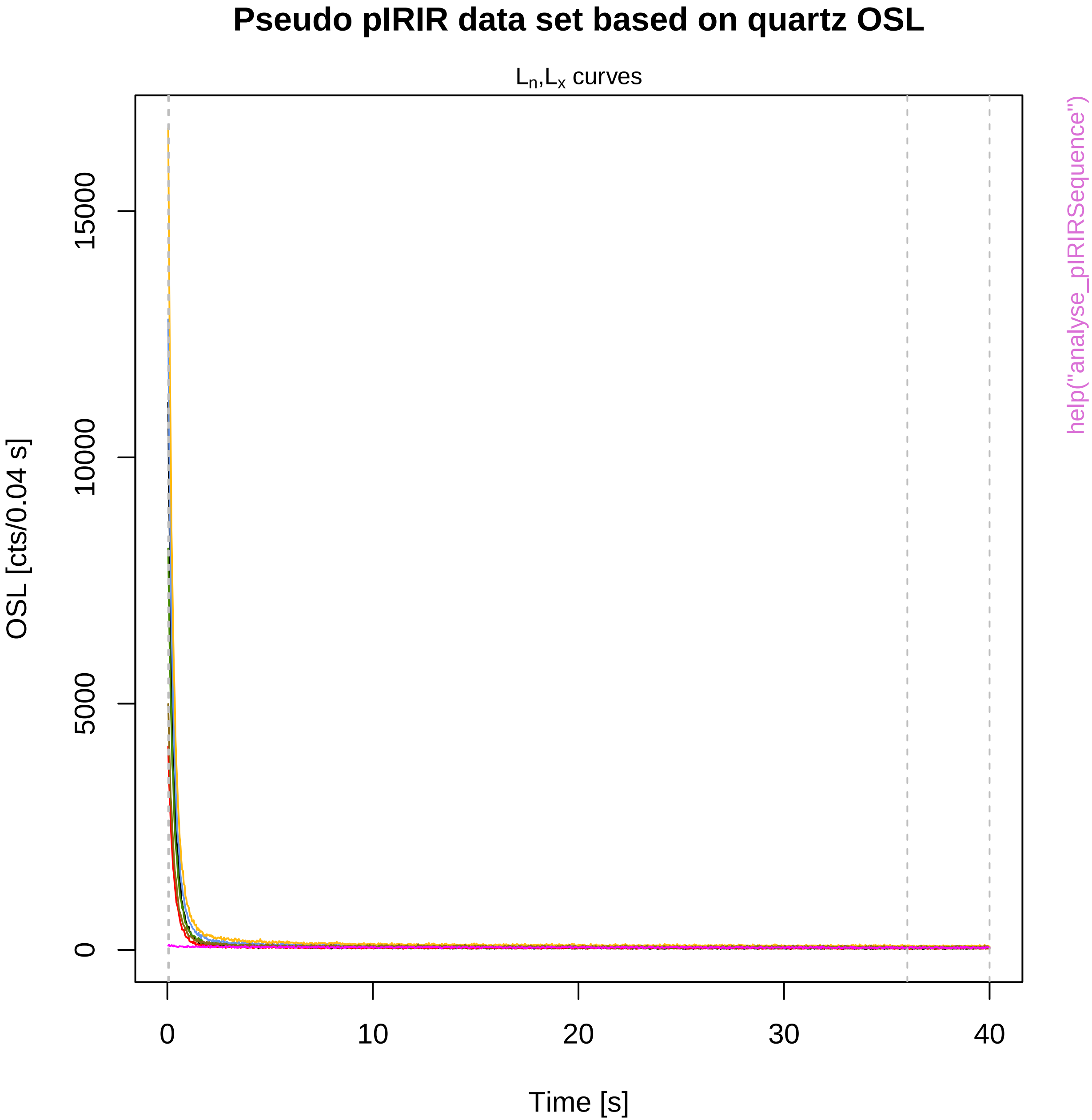
Pseudo pIRIR data set based on quartz OSL

help("analyse_pIRIRSequence")

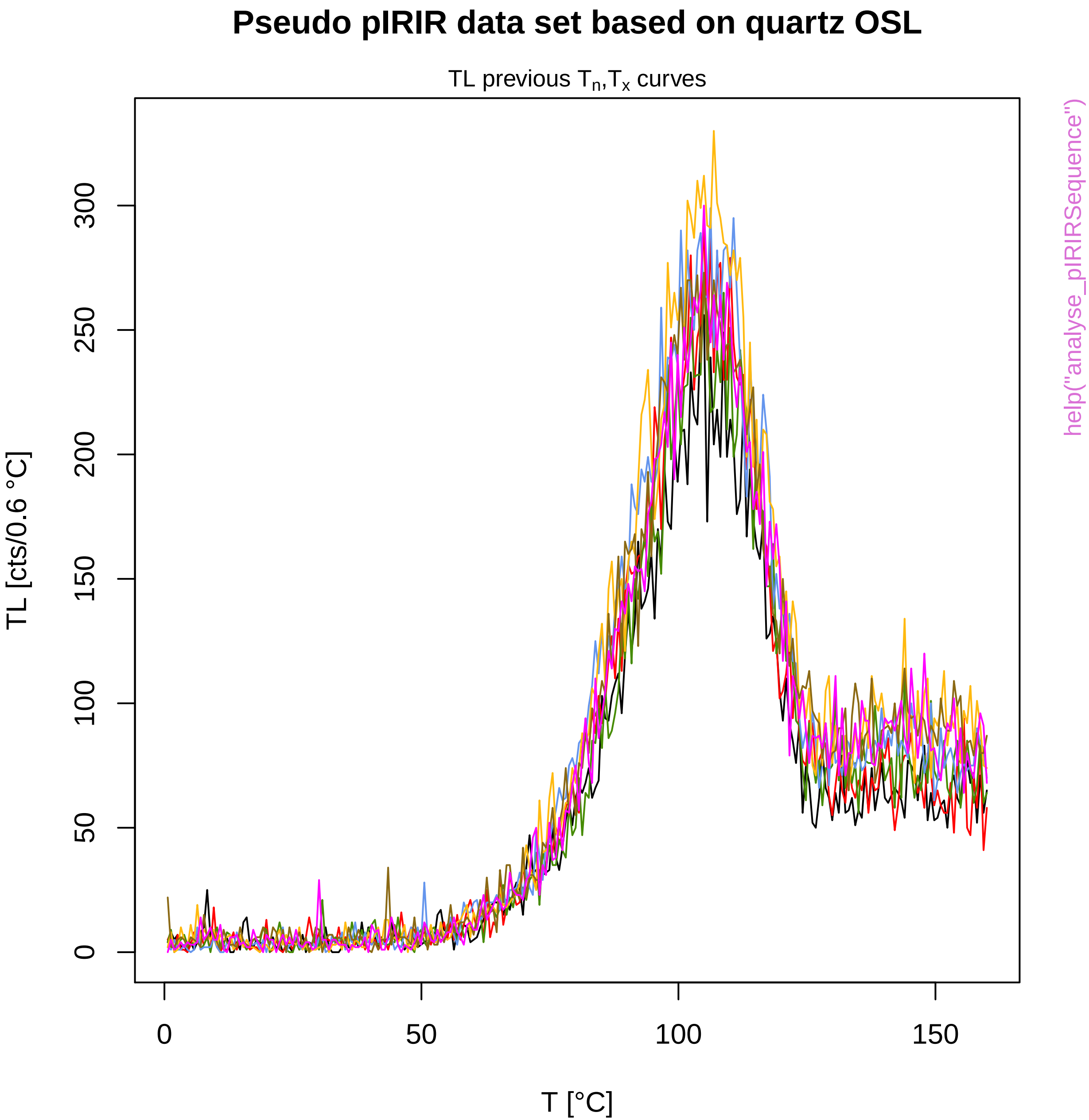
TL
pseudoIRSL1
pseudoIRSL2

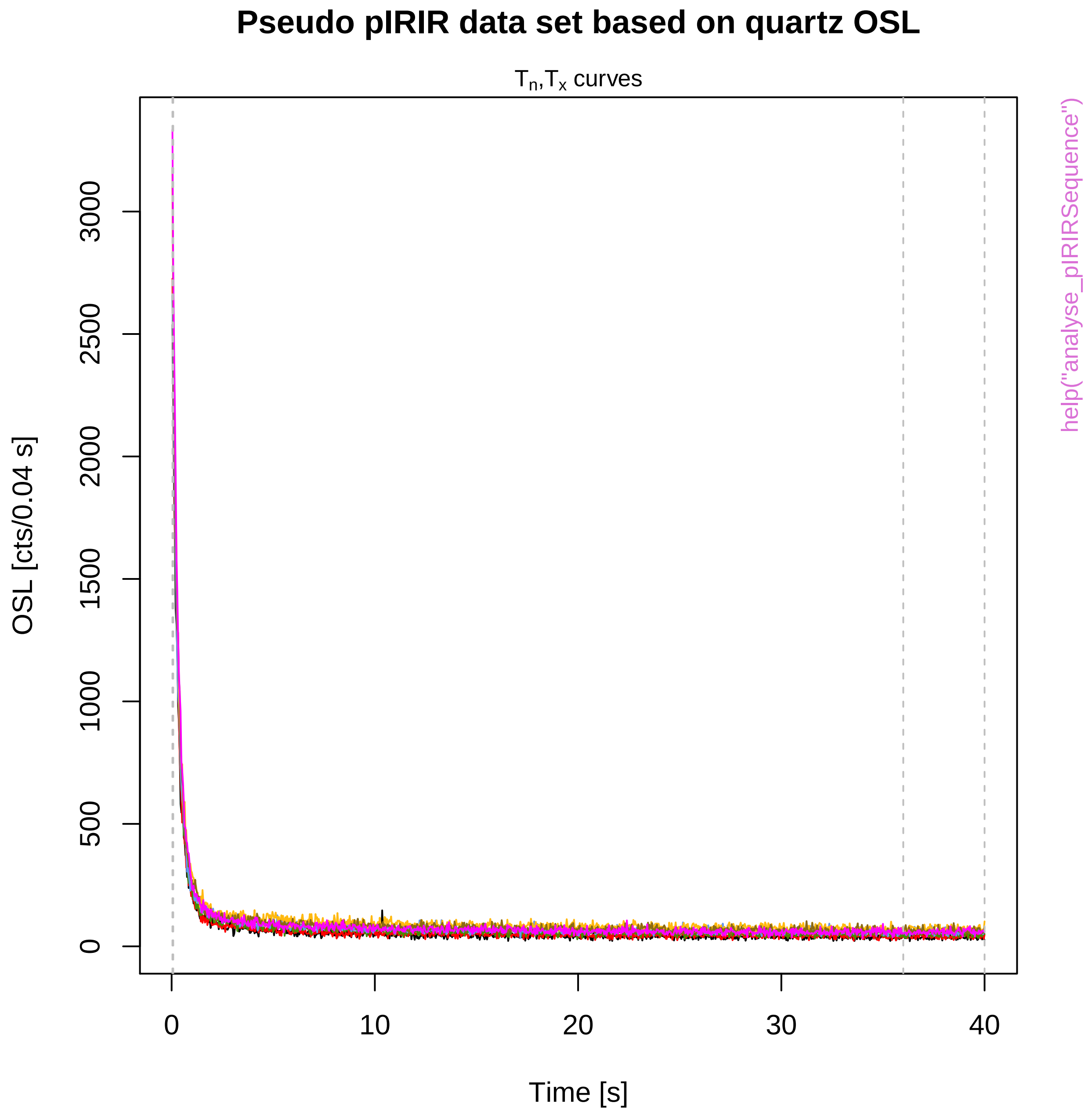


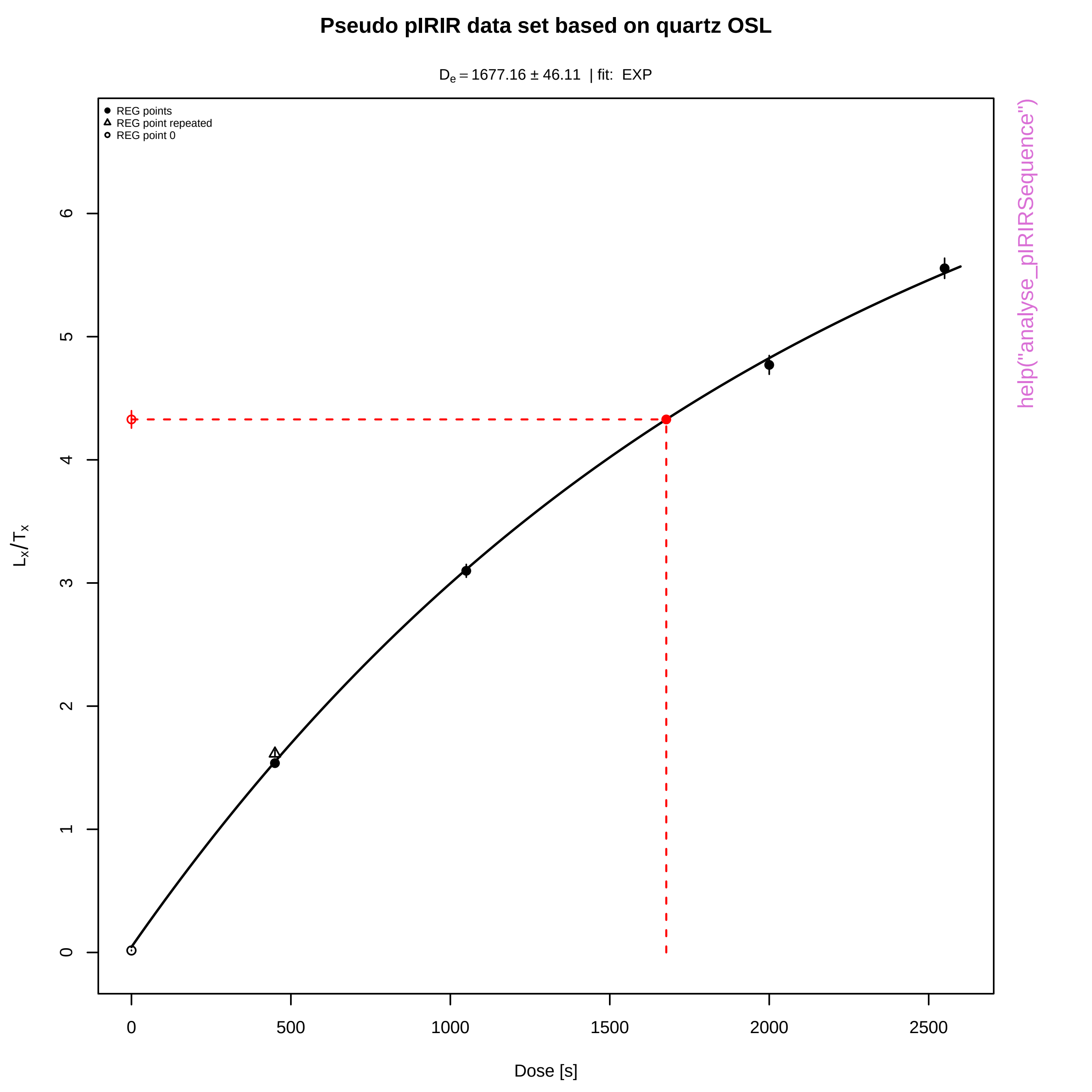
Pseudo pIRIR data set based on quartz OSL
TL previous Ln,Lx curves
TL [cts/0.9 °C]
T [°C]
0
200
400
600
800
0
50
100
150
200
help("analyse_pIRIRSequence")



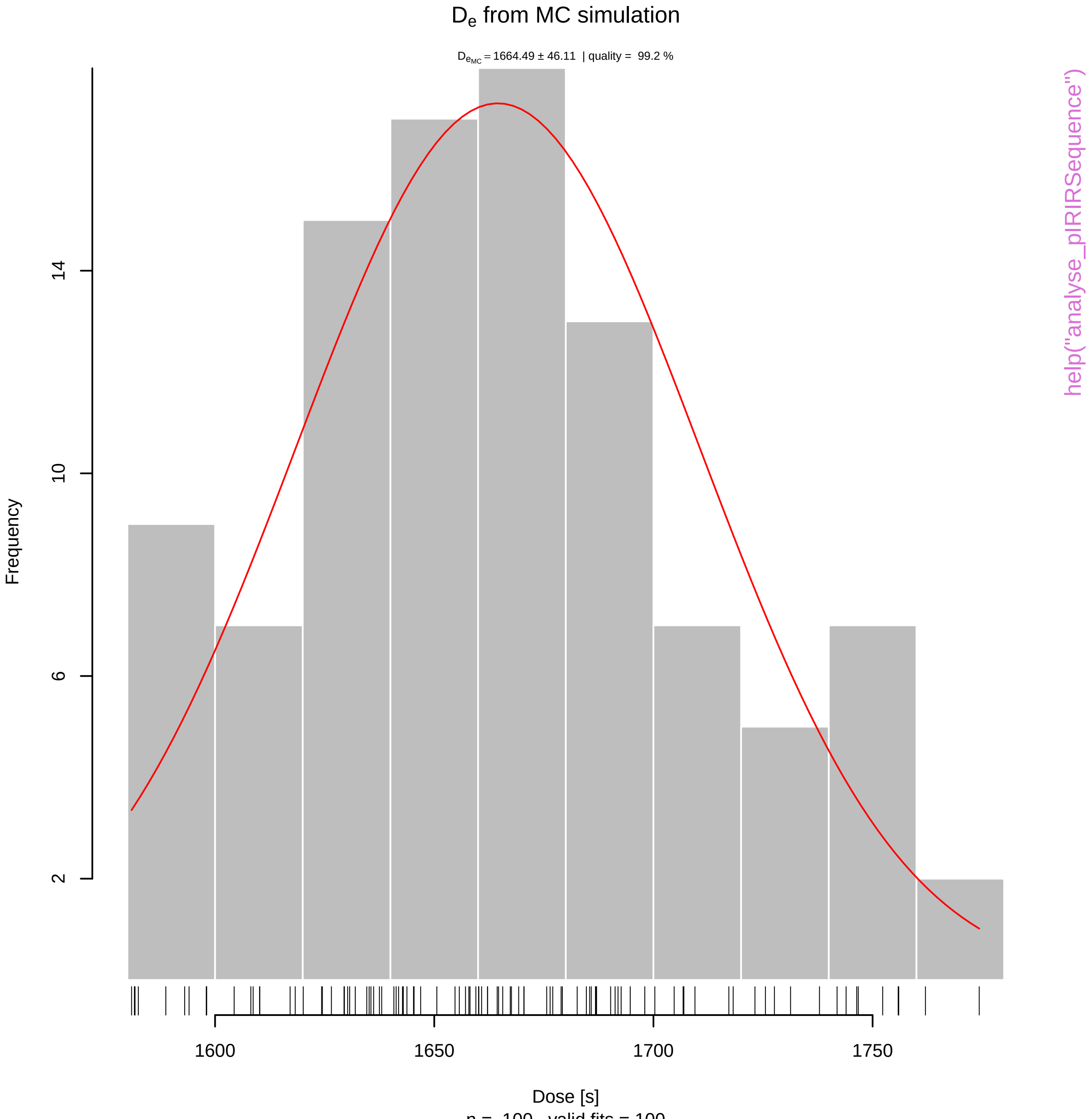
Pseudo pIRIR data set based on quartz OSL
L_n,L_x curves
OSL [cts/0.04 s]
0
5000
10000
15000
0
10
20
30
40
Time [s]
help("analyse_pIRIRSequence")


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

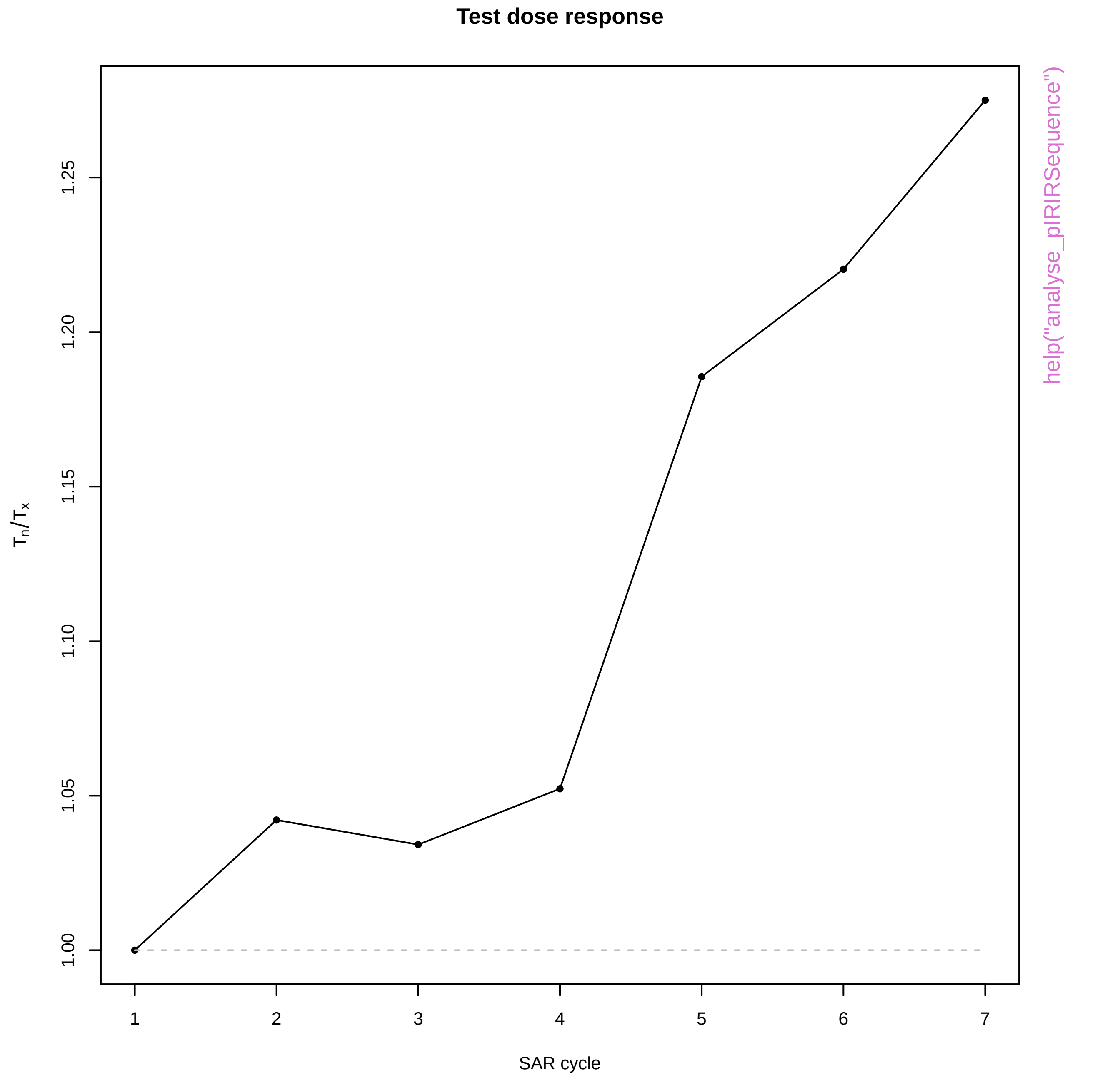

Pseudo pIRIR data set based on quartz OSL
T_n,T_x curves
OSL [cts/0.04 s]
0
500
1000
1500
2000
2500
3000
0
10
20
30
40
Time [s]
help("analyse_pIRIRSequence")

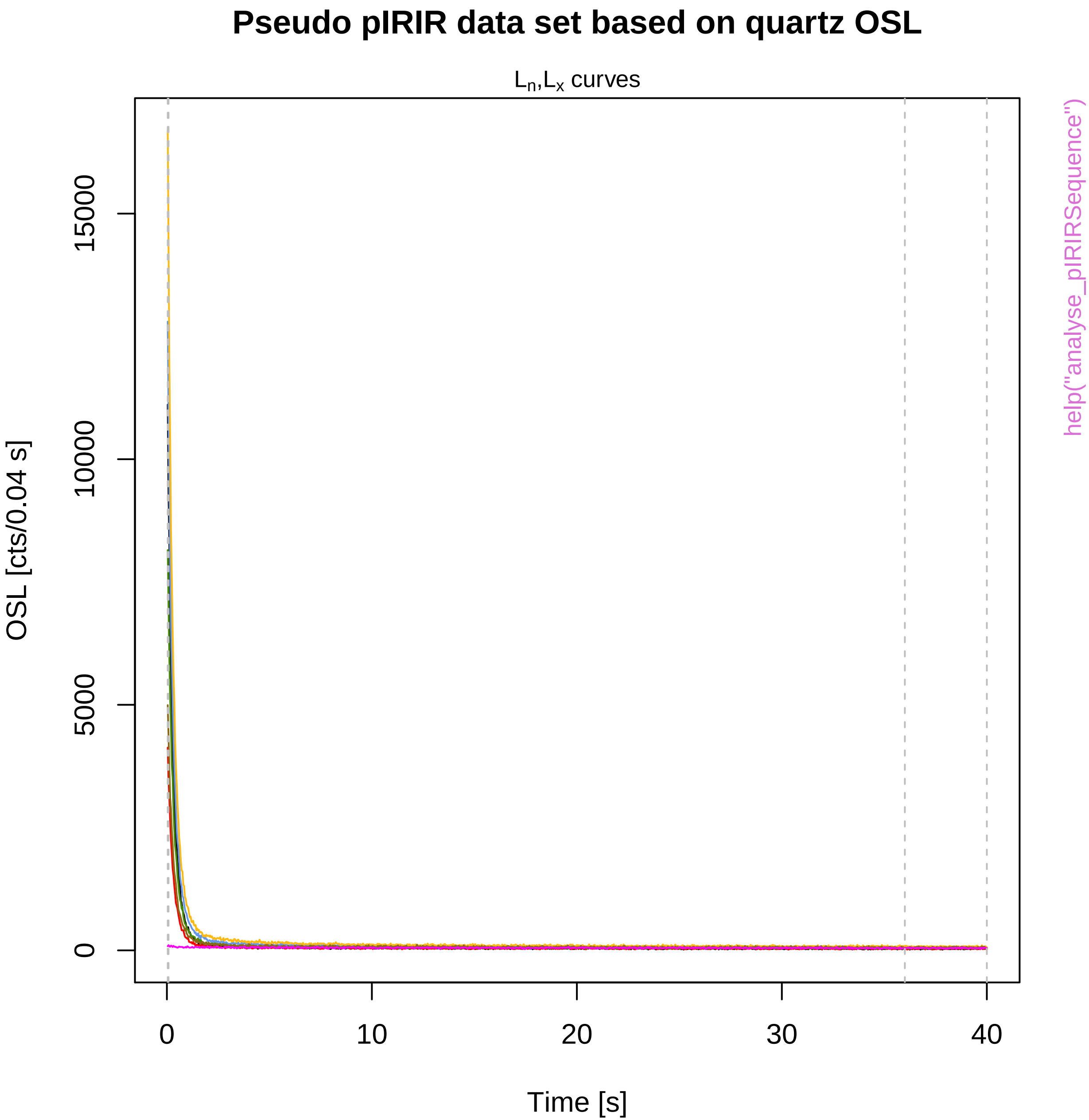


Pseudo pIRIR data set based on quartz OSL
$D_e = 1677.16 \pm 46.11$ | fit: EXP
REG points
REG point repeated
REG point 0
0
1
2
3
4
5
6
L_x/T_x
0
500
1000
1500
2000
2500
Dose [s]
help("analyse_pIRIRSequence")

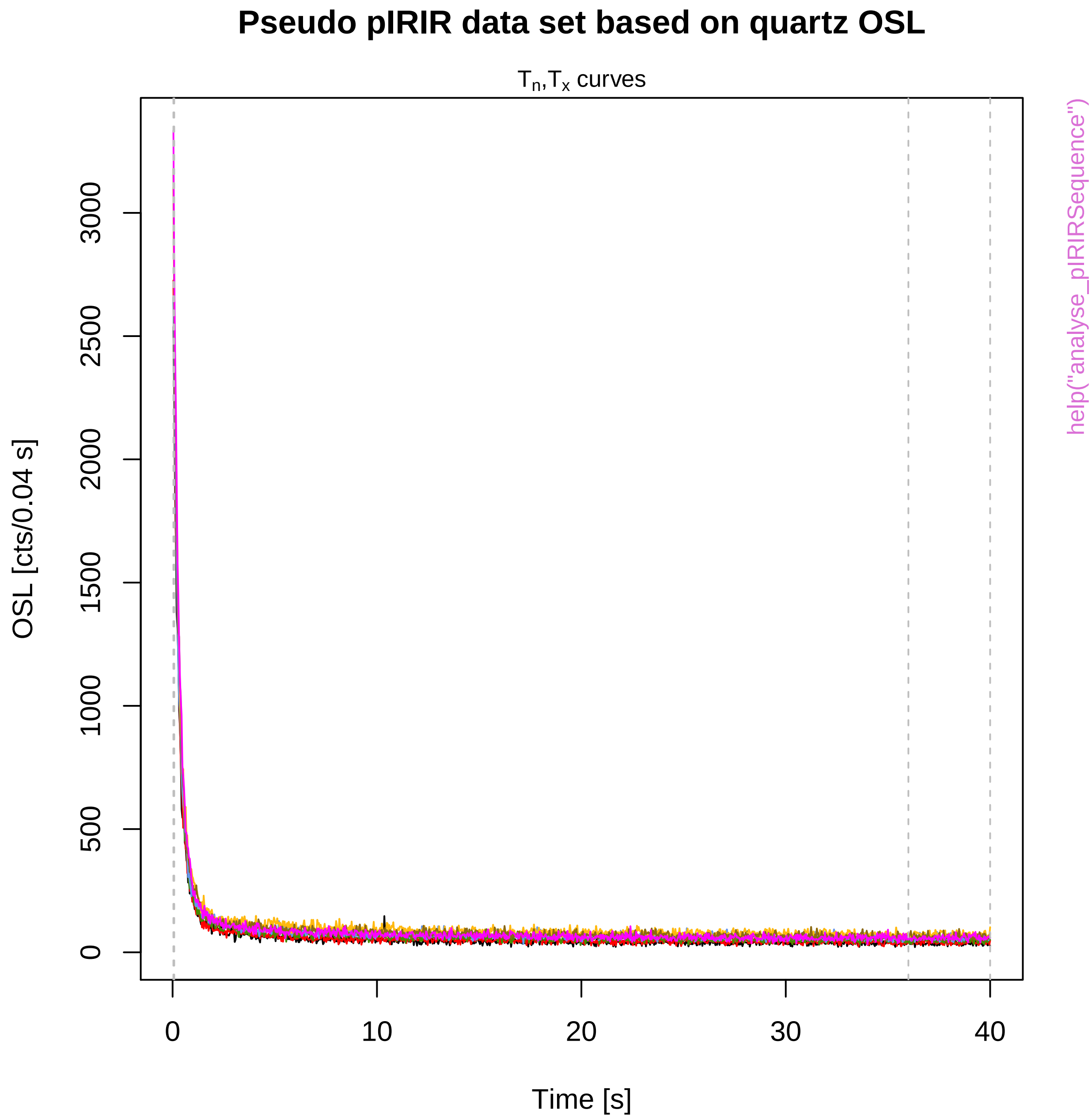


D_e from MC simulation
$D_{e_{MC}}$ = 1664.49 ± 46.11 | quality = 99.2 %
help("analyse_pIRIRSequence")
Frequency
2
6
10
14
1600
1650
1700
1750
Dose [s]
n = 100 , valid fits = 100


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

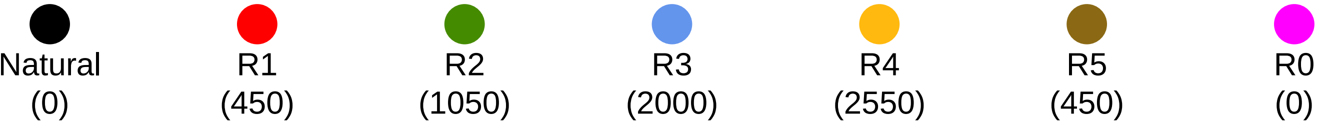


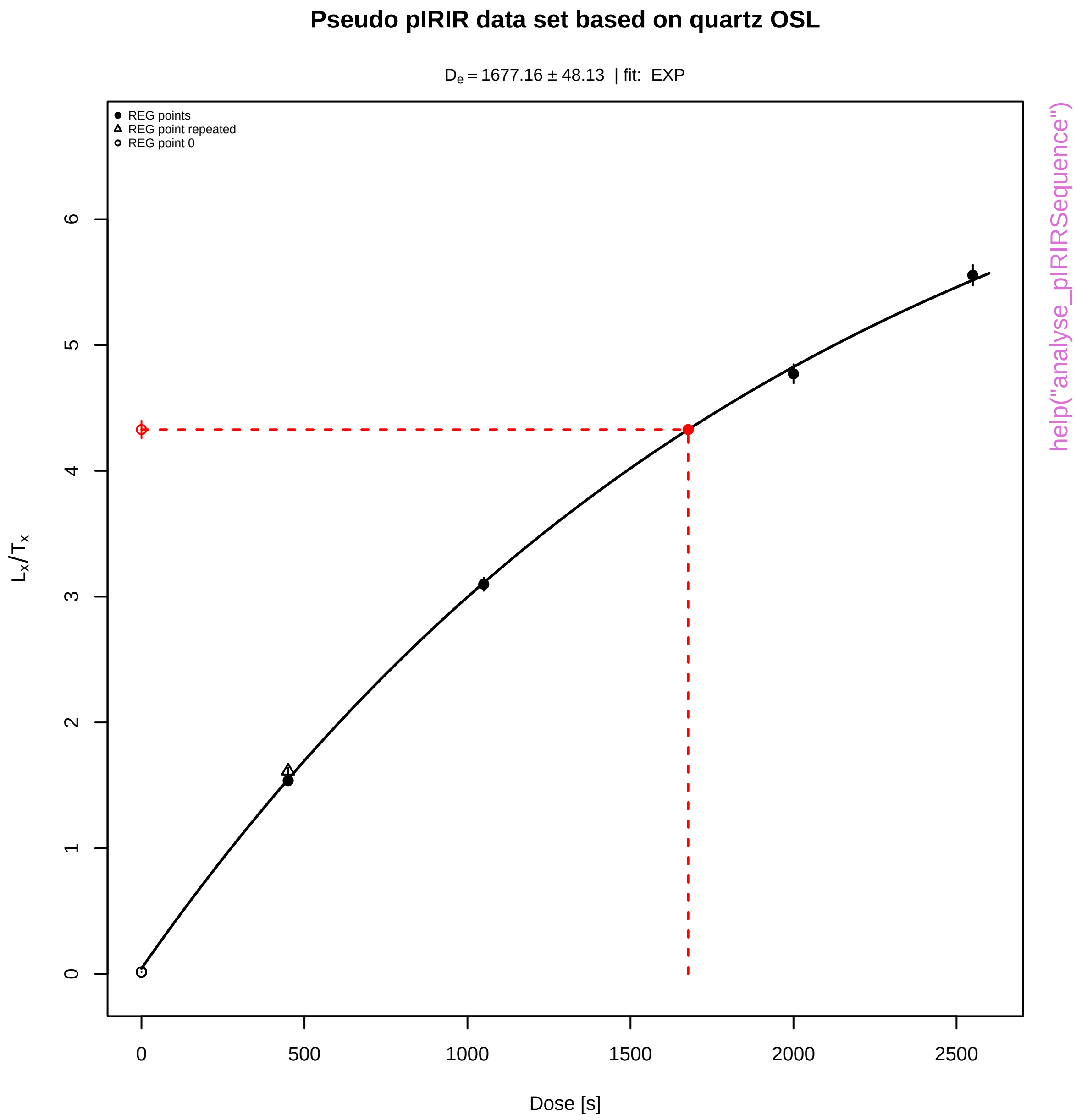
Pseudo pIRIR data set based on quartz OSL
L_n,L_x curves
OSL [cts/0.04 s]
15000
10000
5000
0
0
10
20
30
40
Time [s]
help("analyse_pIRIRSequence")

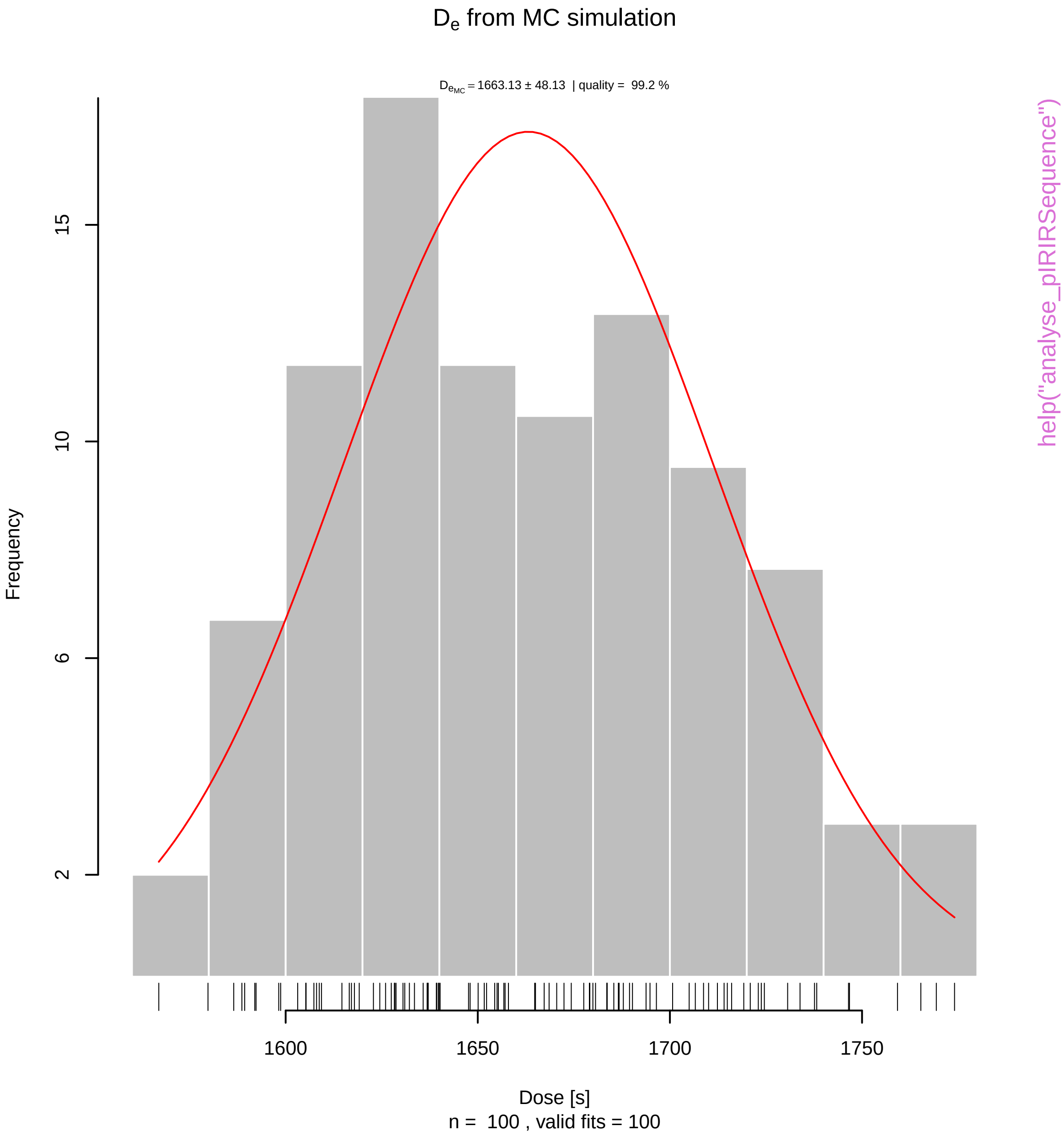


Pseudo pIRIR data set based on quartz OSL
T_n,T_x curves
OSL [cts/0.04 s]
0
500
1000
1500
2000
2500
3000
0
10
20
30
40
Time [s]
help("analyse_pIRIRSequence")

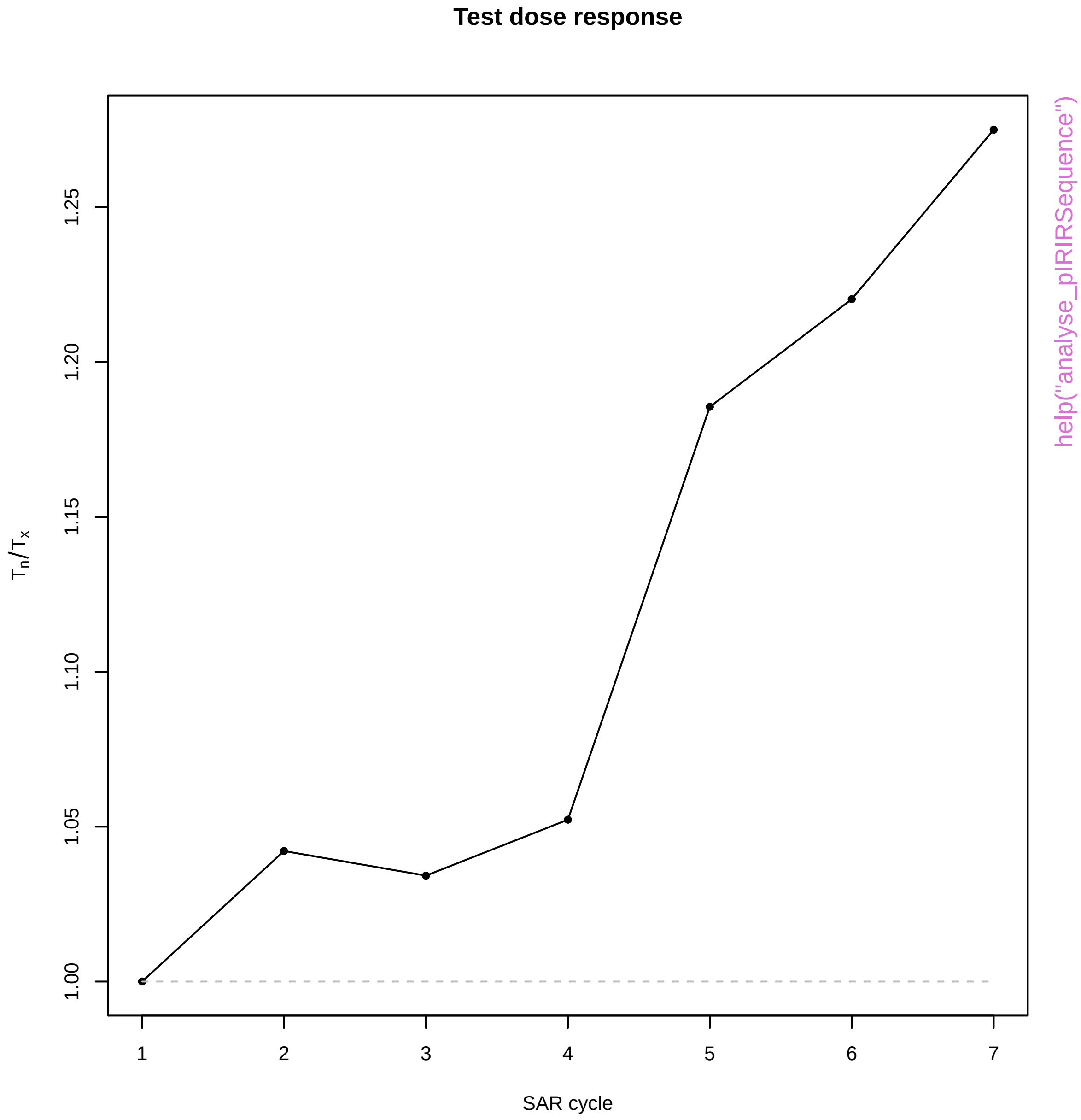
help("analyse_pIRIRSequence")

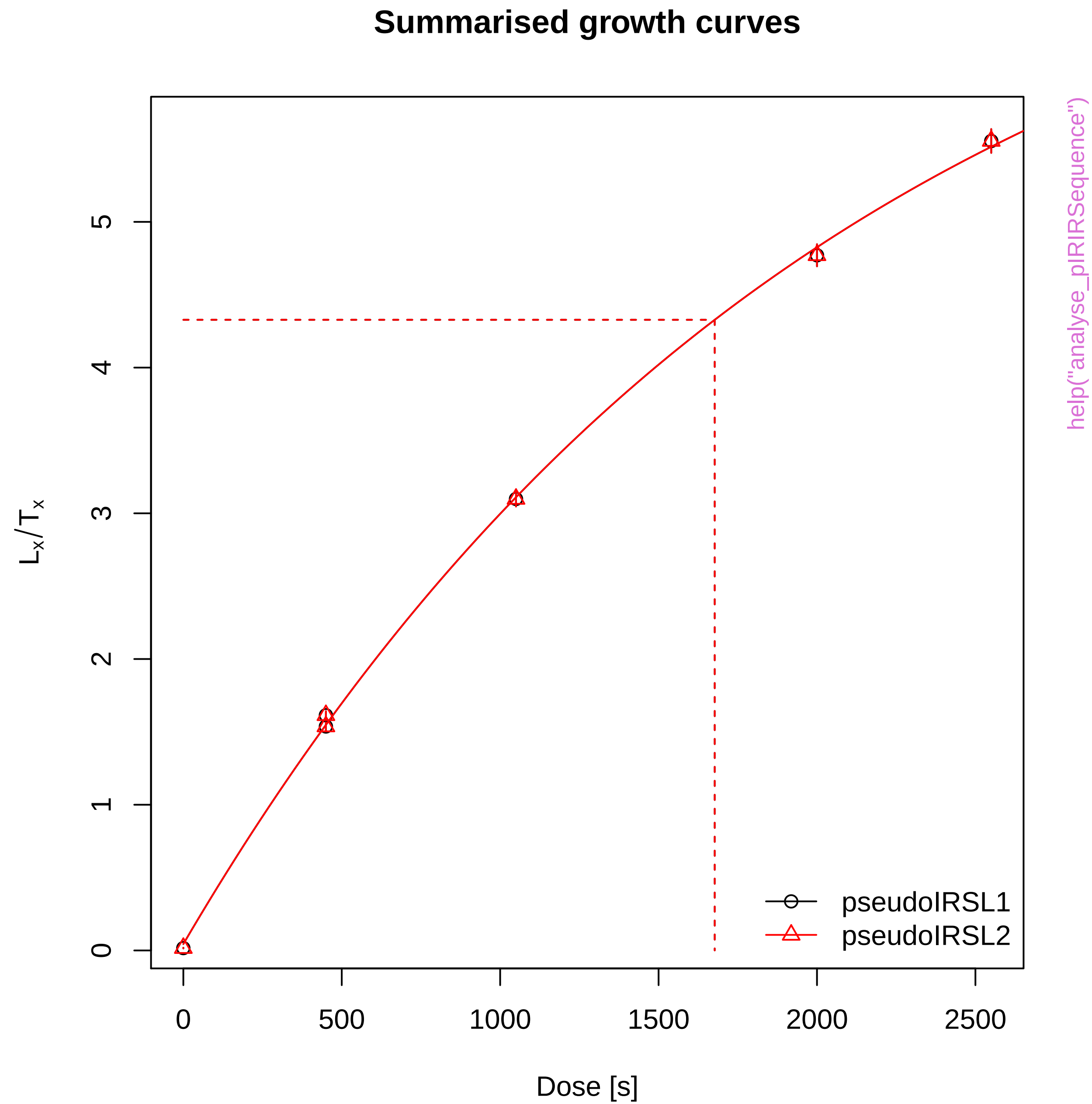



Pseudo pIRIR data set based on quartz OSL
$D_e = 1677.16 \pm 48.13$ | fit: EXP
REG points
REG point repeated
REG point 0
L_x/T_x
Dose [s]
0
500
1000
1500
2000
2500
0
1
2
3
4
5
6
help("analyse_pIRIRSequence")

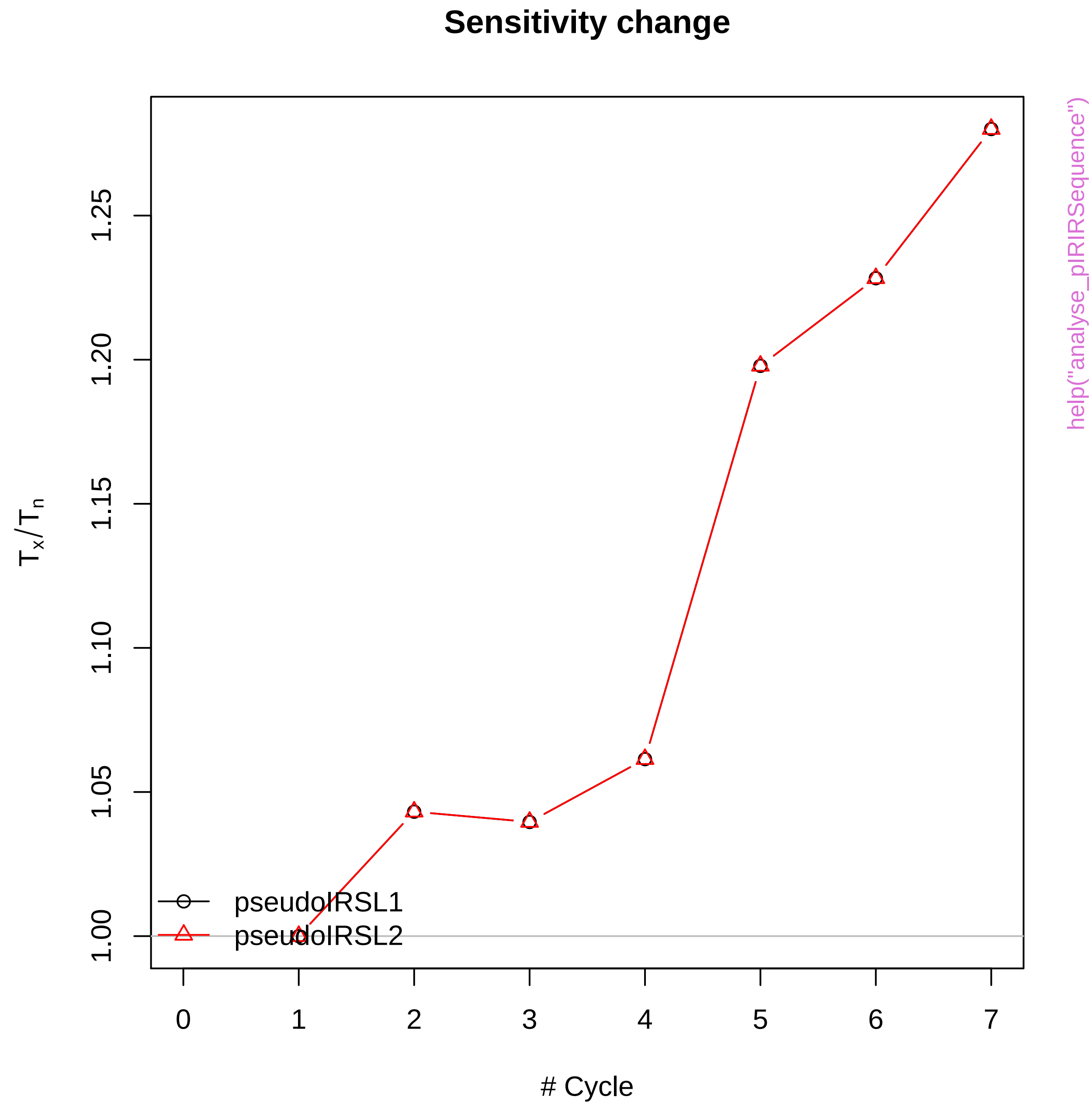


D_e from MC simulation
$D_{e_{MC}}$ = 1663.13 ± 48.13 | quality = 99.2 %
help("analyse_pIRIRSequence")
Frequency
2
6
10
15
1600
1650
1700
1750
Dose [s]
n = 100 , valid fits = 100

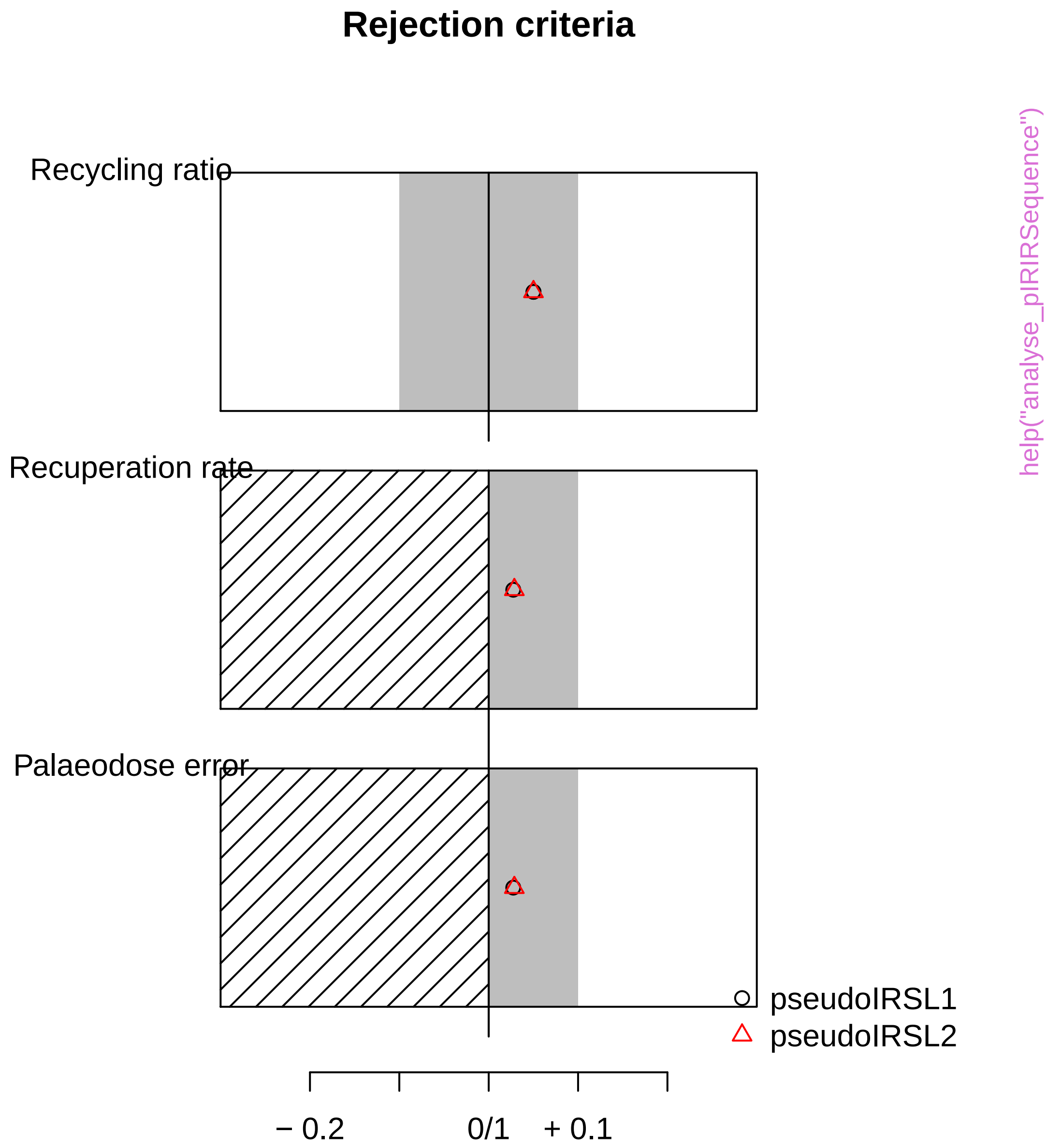

Test dose response
T_n/T_x
1.00
1.05
1.10
1.15
1.20
1.25
1
2
3
4
5
6
7
SAR cycle
help("analyse_pIRIRSequence")



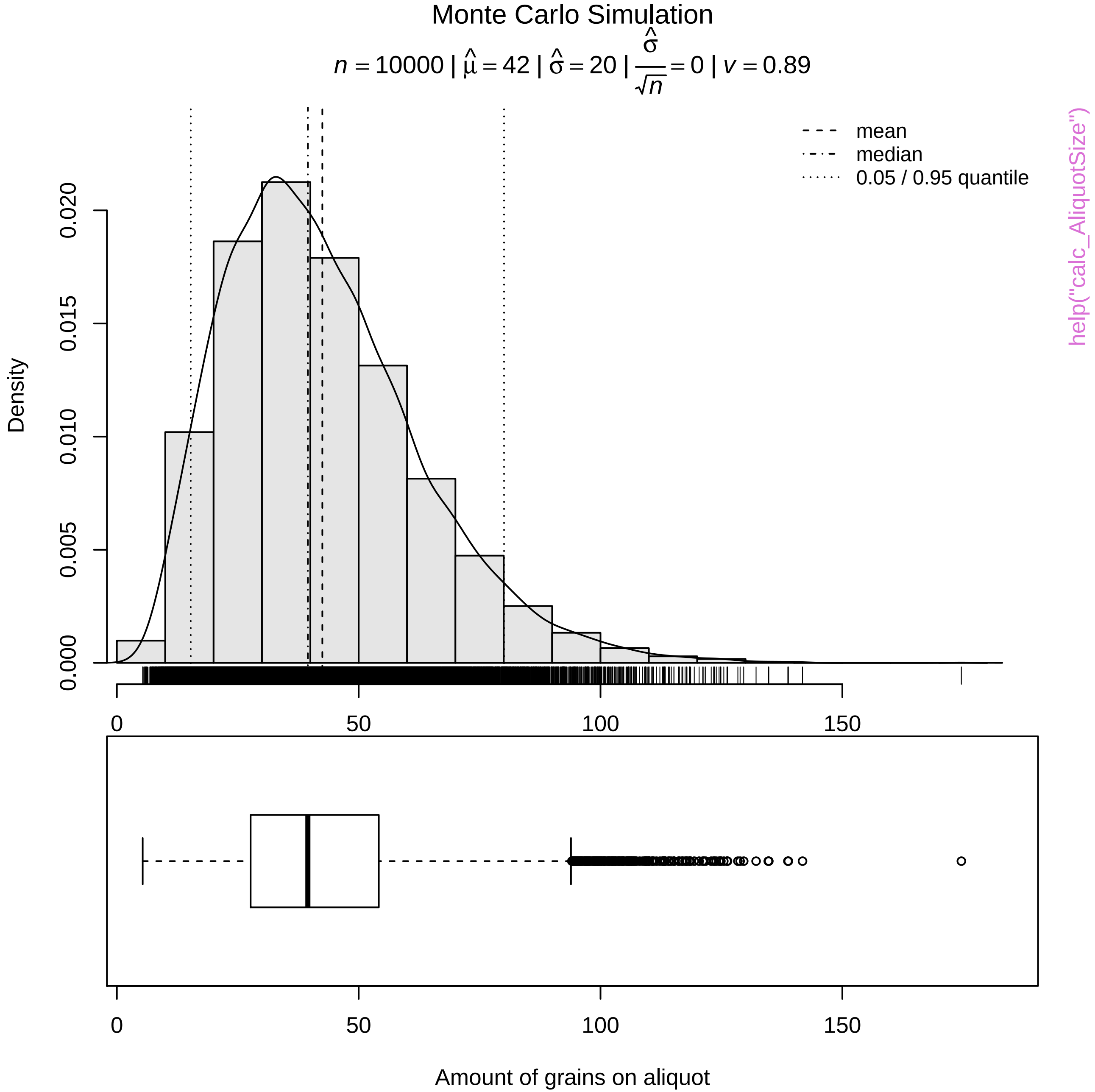
Summarised growth curves
L_x/T_x
0
1
2
3
4
5
0
500
1000
1500
2000
2500
Dose [s]
pseudoIRSL1
pseudoIRSL2
help("analyse_pIRIRSequence")

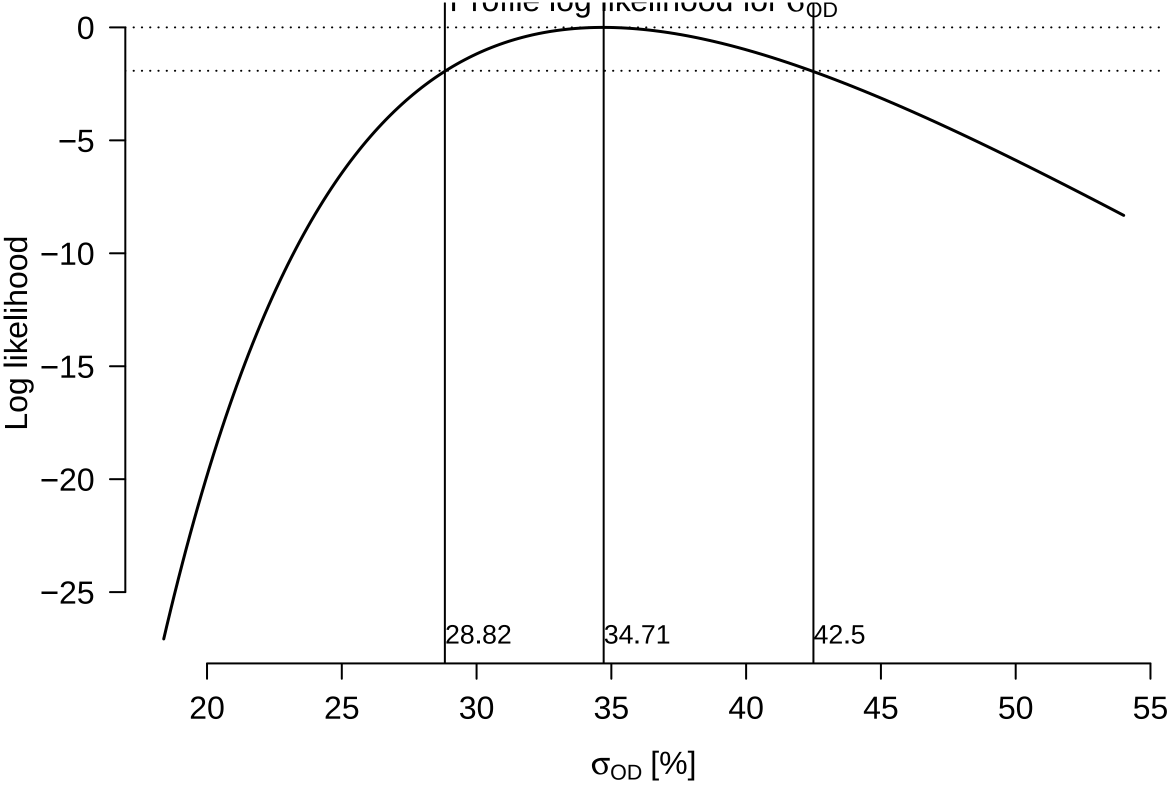


Sensitivity change
help("analyse_pIRIRSequence")
1.00
1.05
1.10
1.15
1.20
1.25
T_x/T_n
0
1
2
3
4
5
6
7
Cycle
pseudoIRSL1
pseudoIRSL2

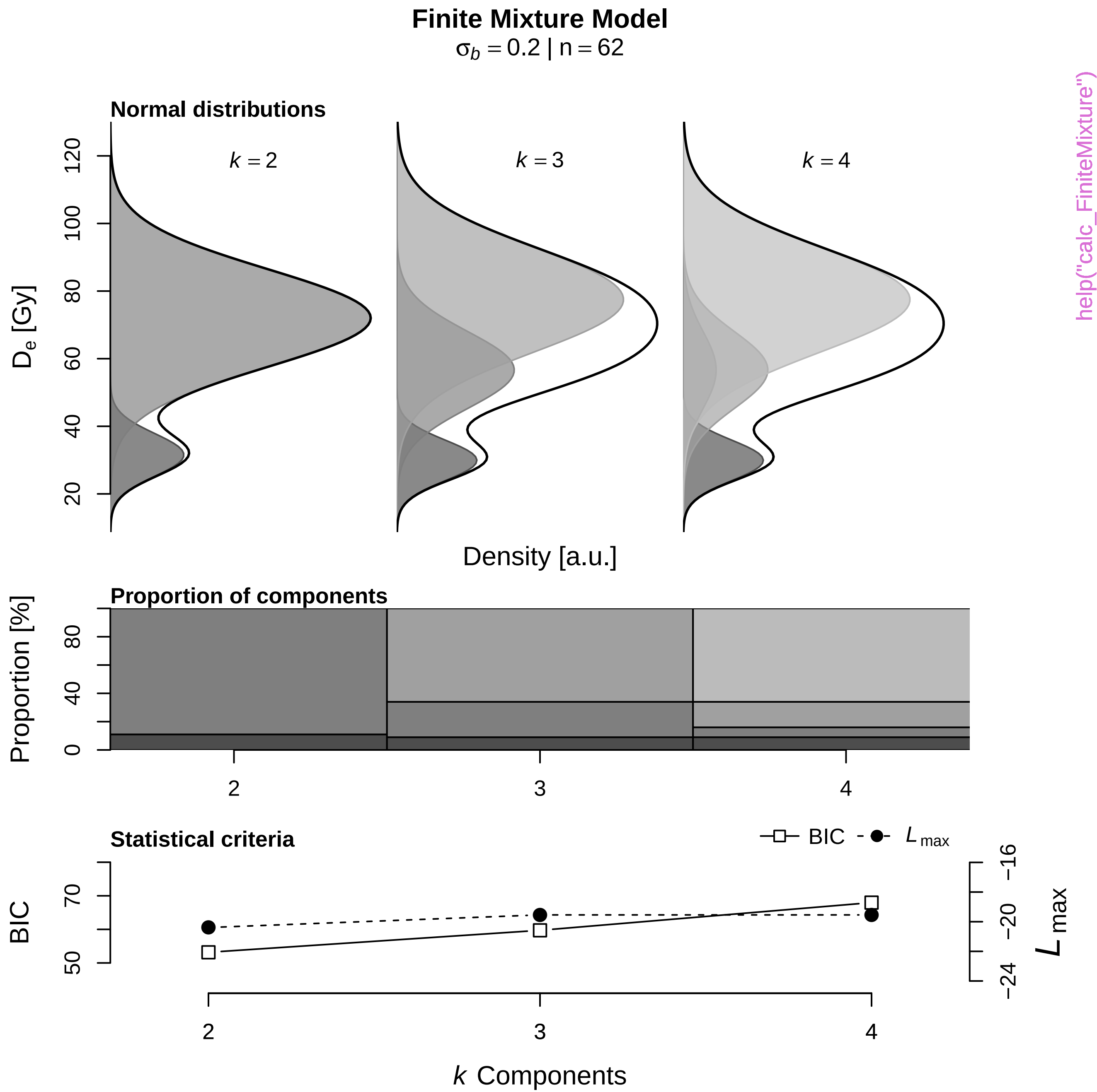


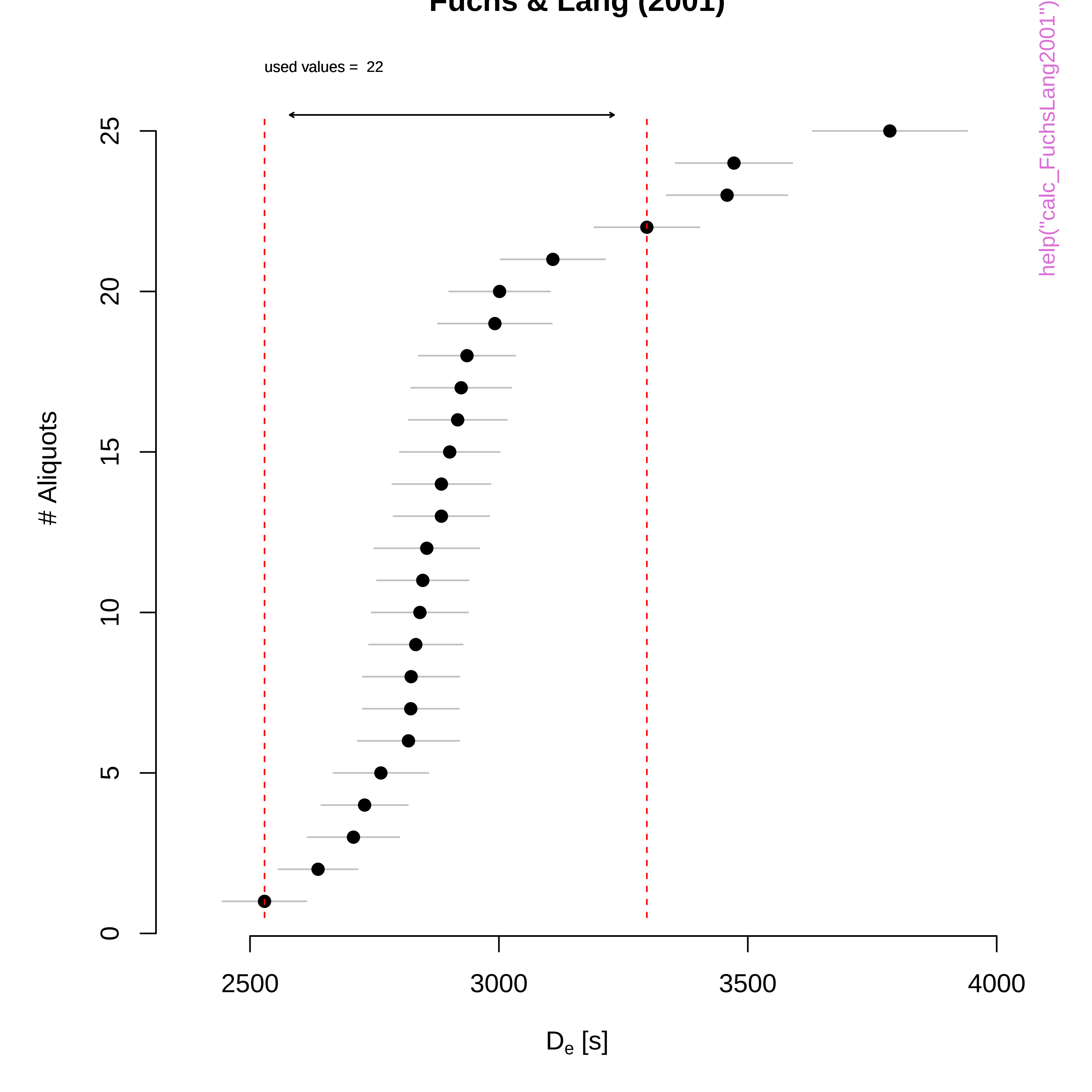
Rejection criteria
Recycling ratio
Recuperation rate
Palaeodose error
pseudoIRSL1
pseudoIRSL2
− 0.2
0/1
+ 0.1
help("analyse_pIRIRSequence")


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
0
50
100
150
Amount of grains on aliquot

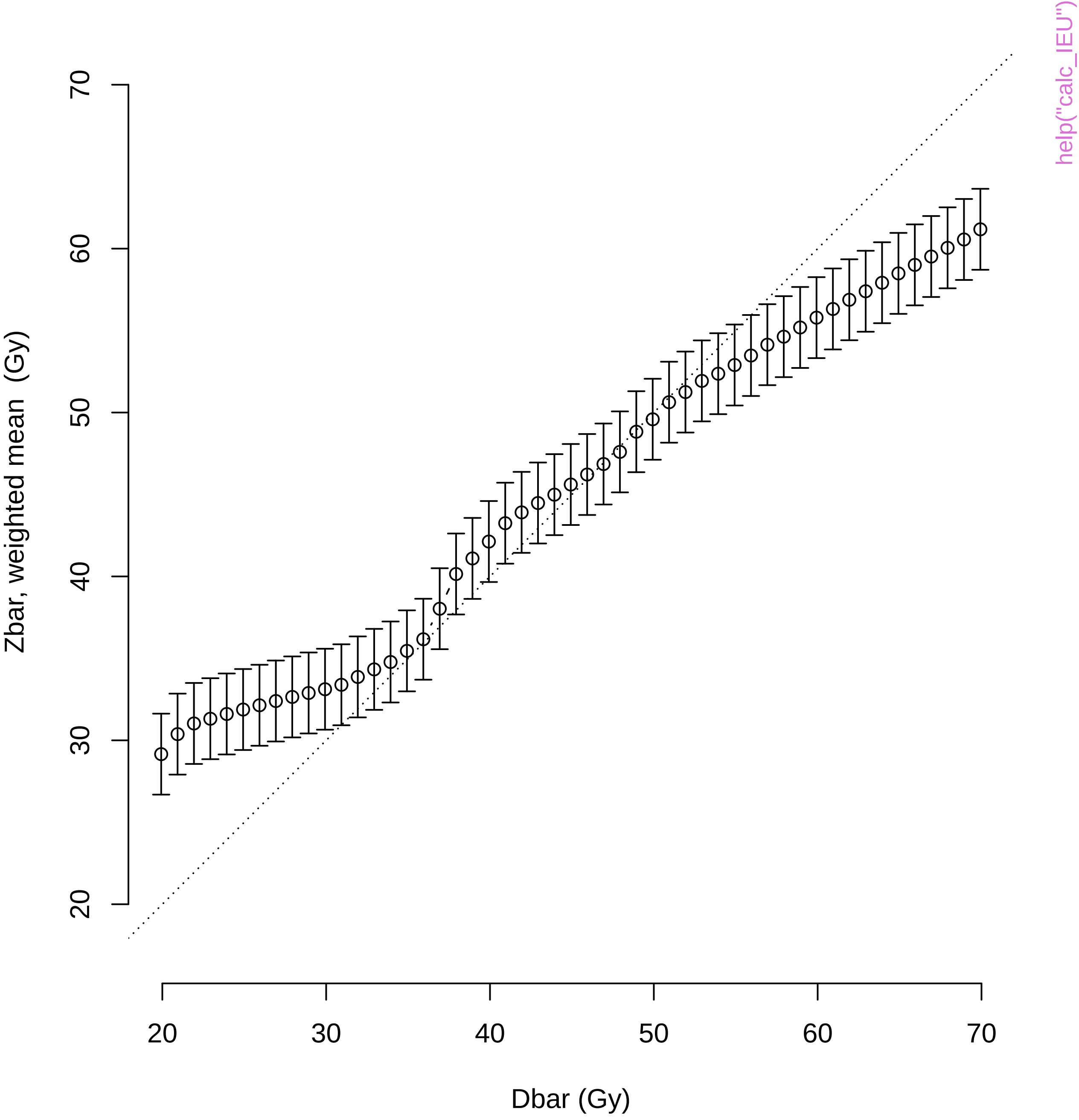


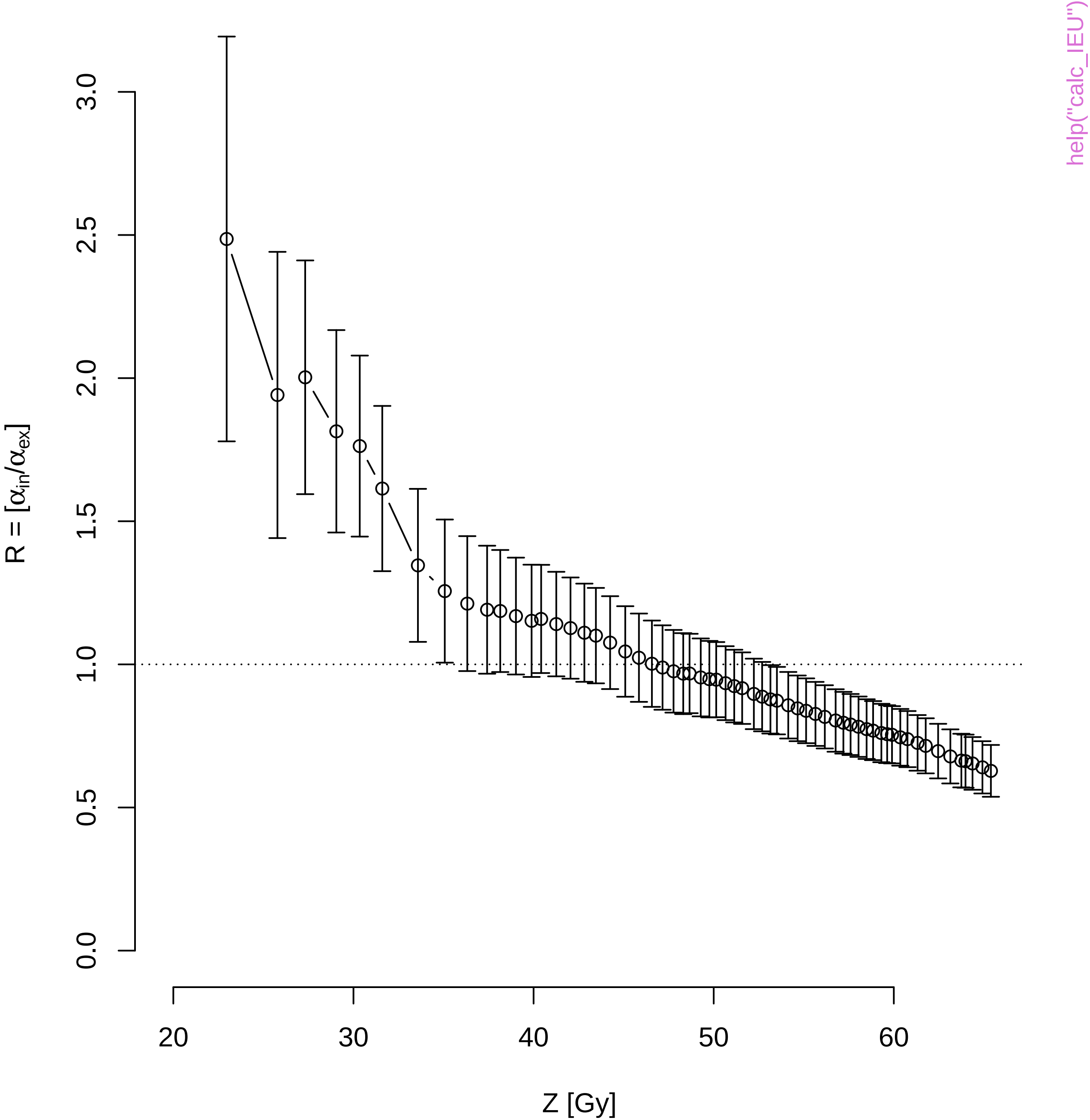
Profile log likelihood for σ_{OD}
Log likelihood
0
−5
−10
−15
−20
−25
28.82
34.71
42.5
20
25
30
35
40
45
50
55
σ_{OD} [%]


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

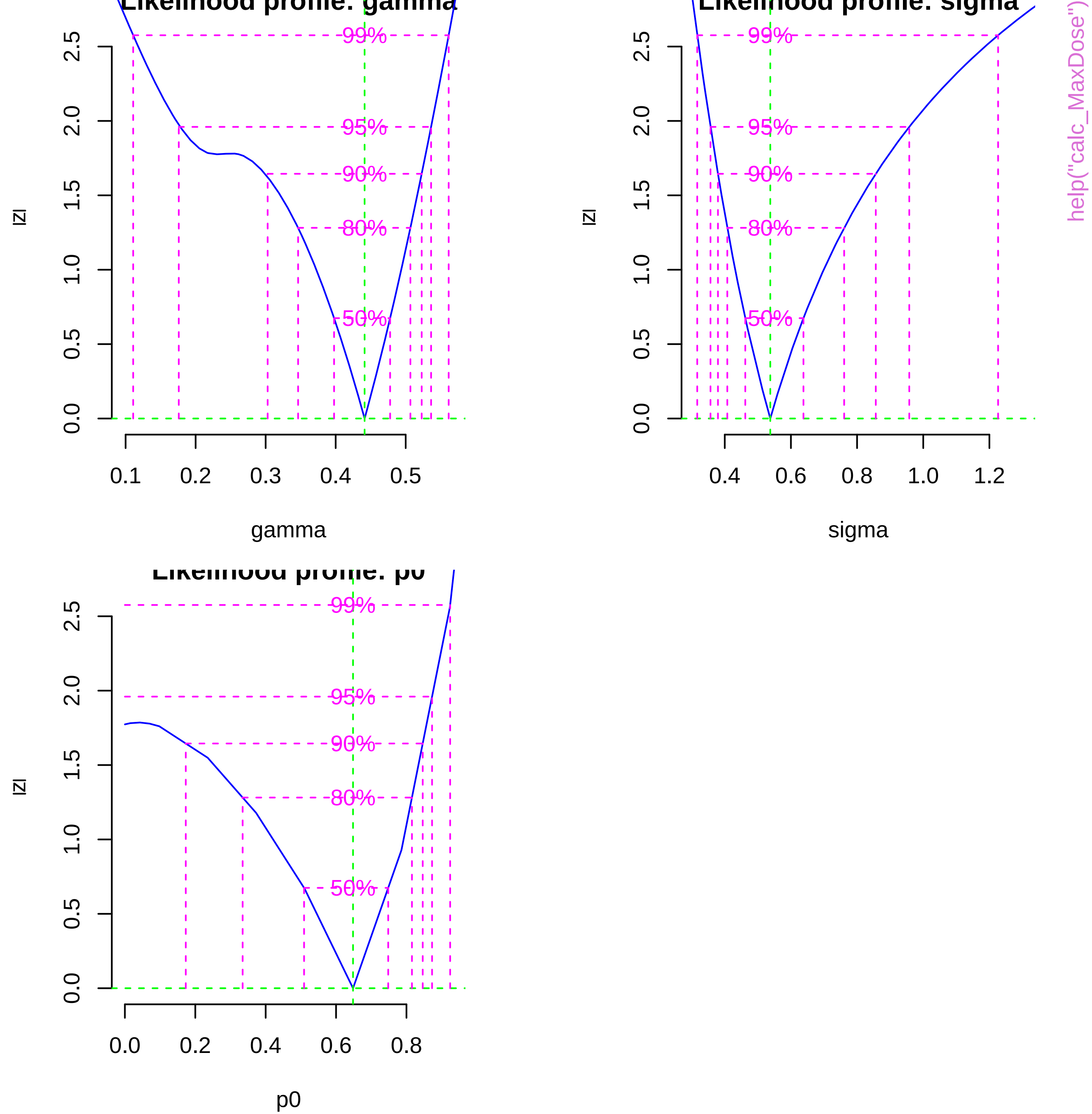


Fuchs & Lang (2001)
used values = 22
help("calc_FuchsLang2001")
# Aliquots
0
5
10
15
20
25
2500
3000
3500
4000
D_e [s]

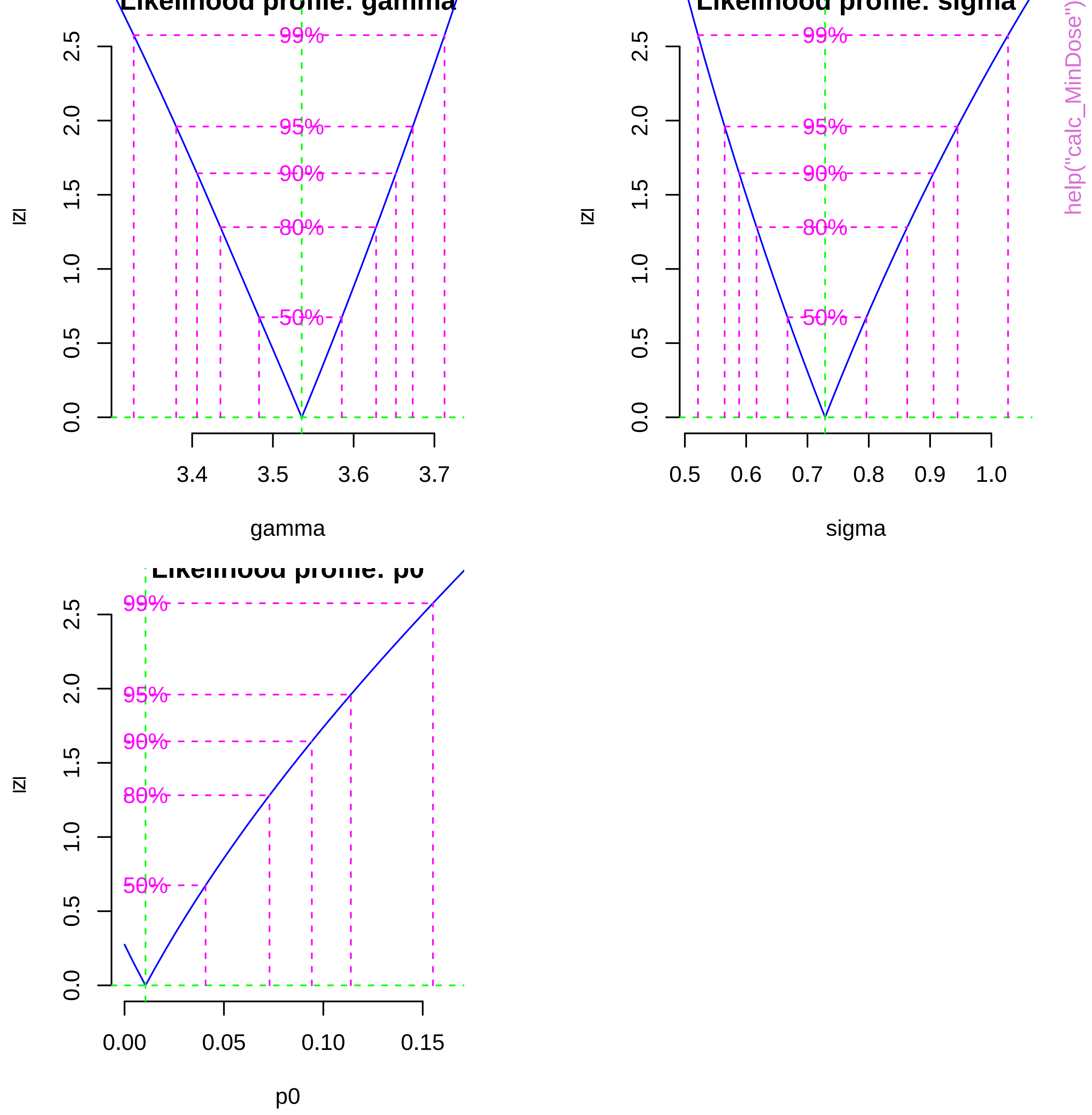

help("calc_IEU")
Zbar, weighted mean (Gy)
Dbar (Gy)
20
30
40
50
60
70
20
30
40
50
60
70



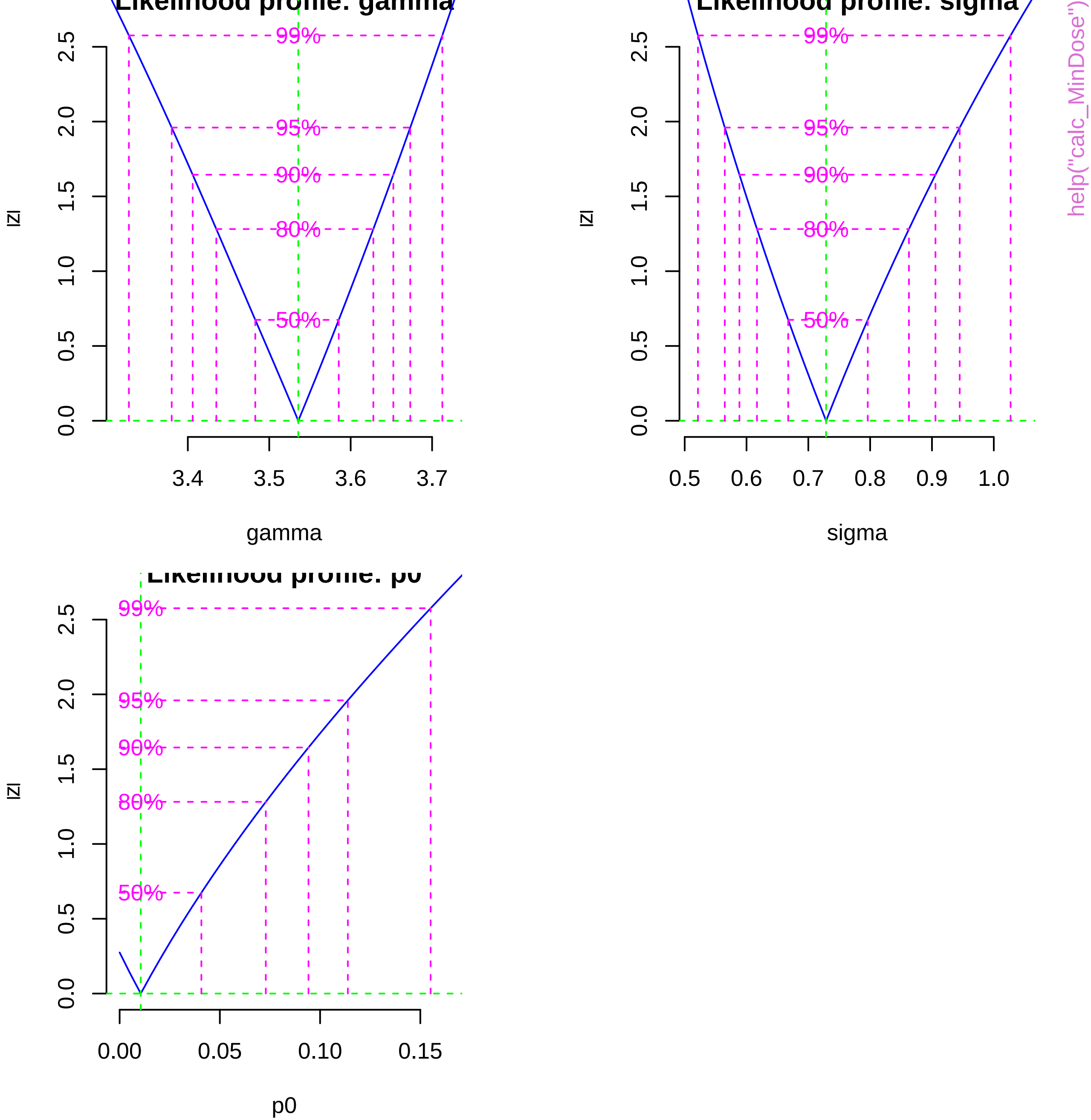
help("calc_IEU")
R = [α_{in}/α_{ex}]
0.0
0.5
1.0
1.5
2.0
2.5
3.0
20
30
40
50
60
Z [Gy]

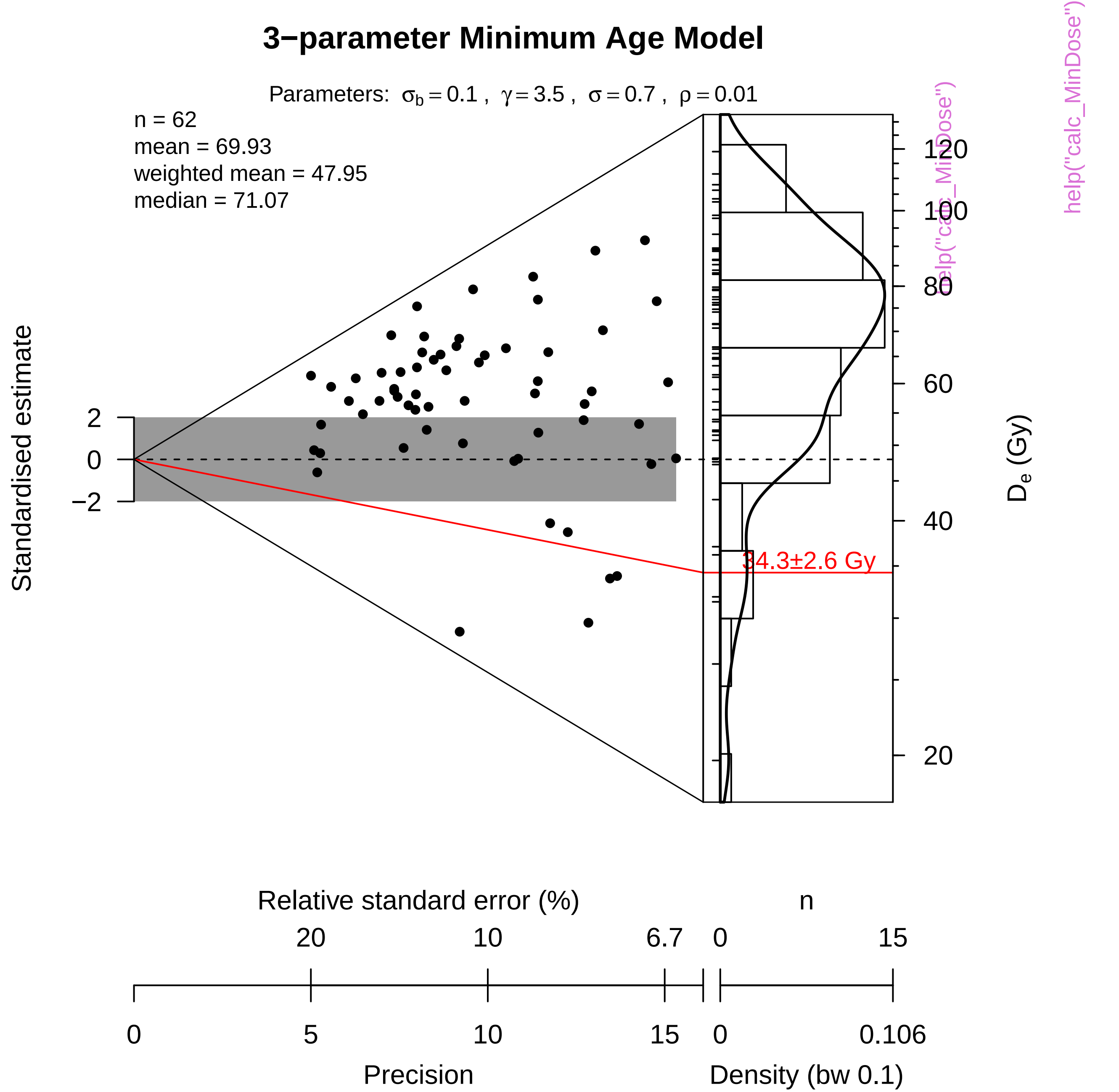


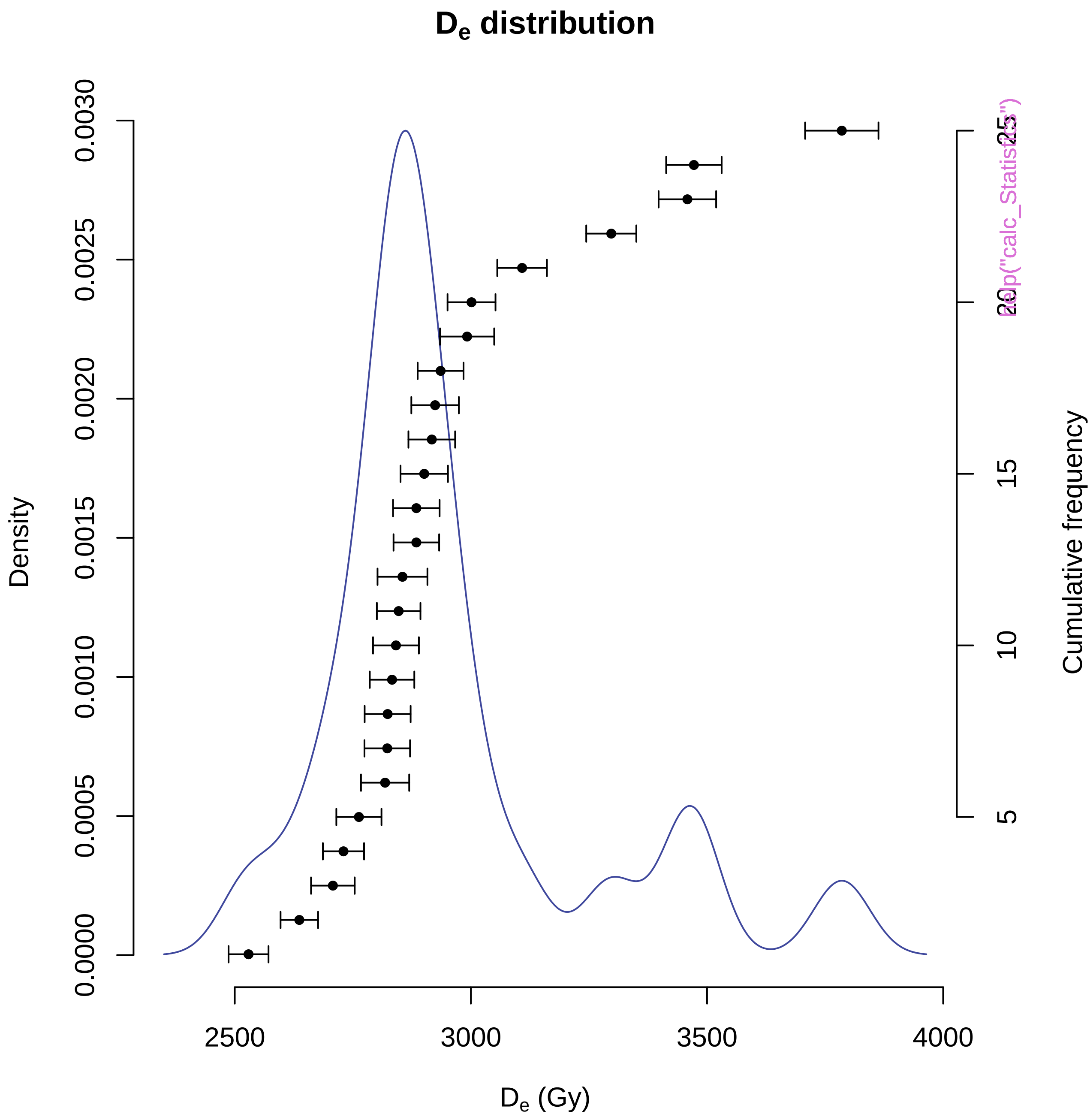
Likelihood profile: gamma
|z|
gamma
0.0
0.5
1.0
1.5
2.0
2.5
0.1
0.2
0.3
0.4
0.5
50%
80%
90%
95%
99%
Likelihood profile: sigma
|z|
sigma
0.4
0.6
0.8
1.0
1.2
Likelihood profile: p0
|z|
p0
0.0
0.2
0.4
0.6
0.8
help("calc_MaxDose")



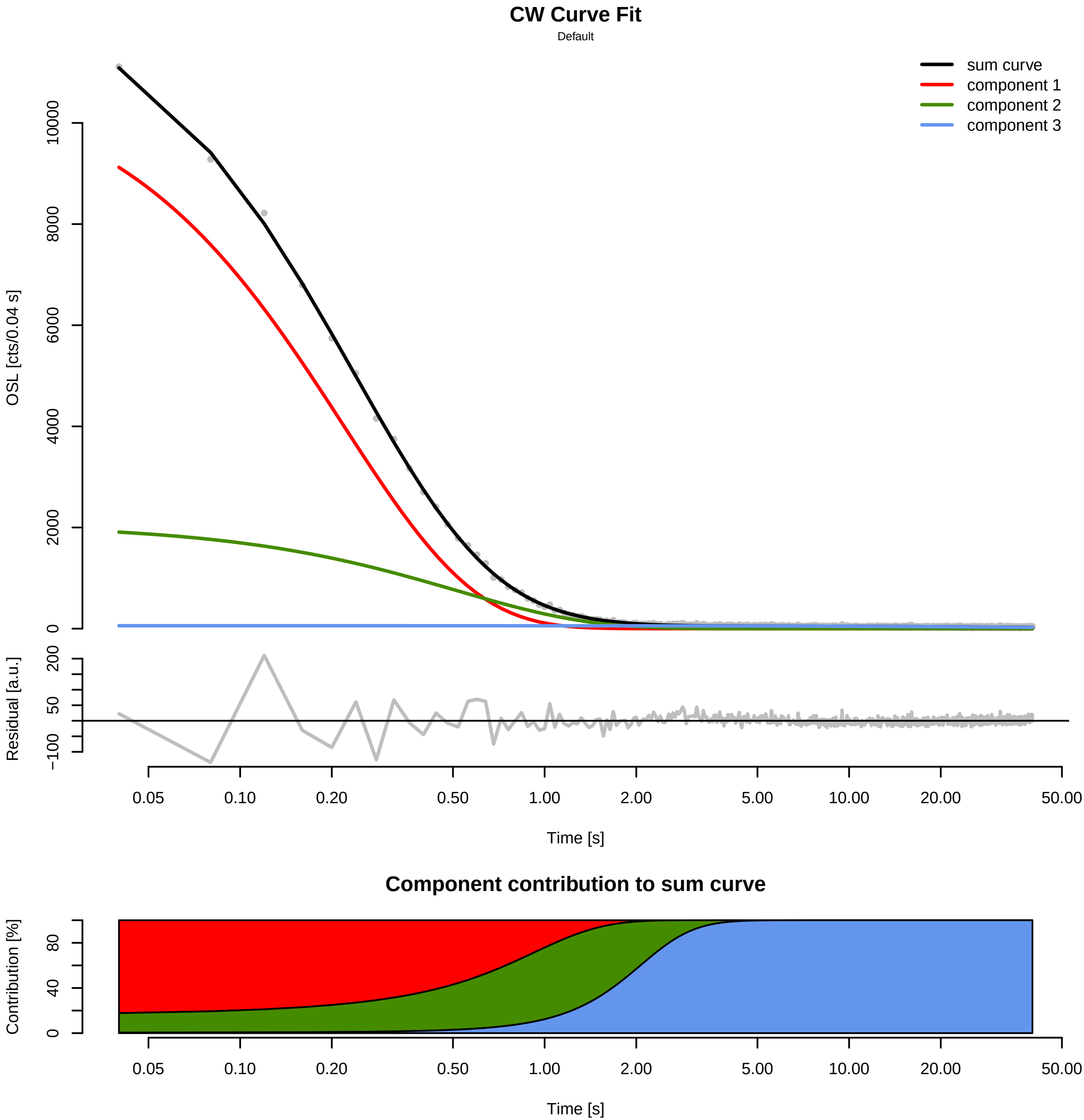
Likelihood profile: gamma
Likelihood profile: sigma
Likelihood profile: p0
|z|
gamma
sigma
p0
99%
95%
90%
80%
50%
help("calc_MinDose")


Likelihood profile: gamma
99%
95%
90%
80%
50%
|z|
0.0
0.5
1.0
1.5
2.0
2.5
3.4
3.5
3.6
3.7
gamma
Likelihood profile: sigma
99%
95%
90%
80%
50%
|z|
0.0
0.5
1.0
1.5
2.0
2.5
0.5
0.6
0.7
0.8
0.9
1.0
sigma
help("calc_MinDose")
Likelihood profile: p0
99%
95%
90%
80%
50%
|z|
0.0
0.5
1.0
1.5
2.0
2.5
0.00
0.05
0.10
0.15
p0

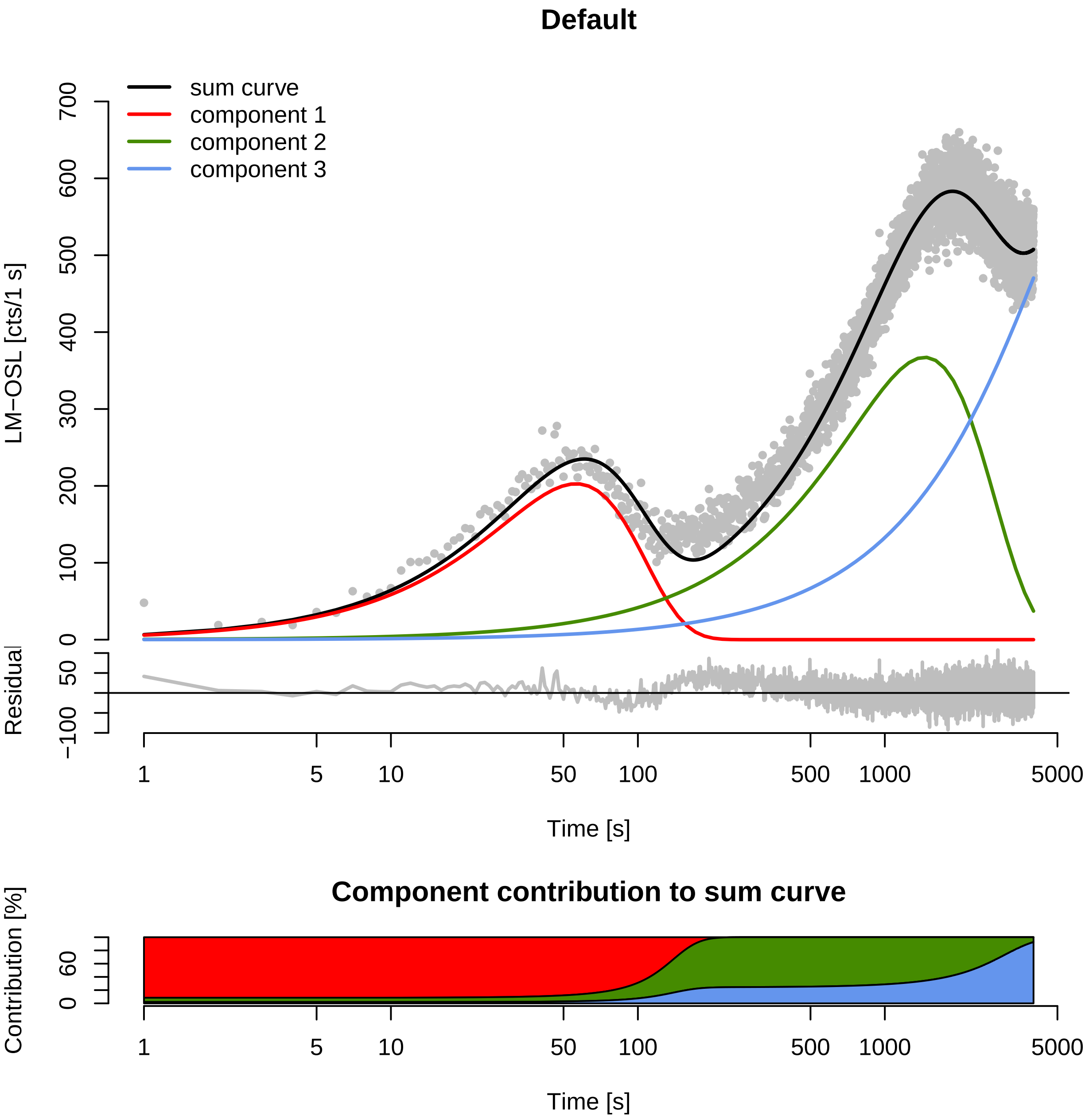

3−parameter Minimum Age Model
Parameters: $\sigma_b = 0.1$, $\gamma = 3.5$, $\sigma = 0.7$, $\rho = 0.01$
n = 62
mean = 69.93
weighted mean = 47.95
median = 71.07
Standardised estimate
2
0
−2
34.3±2.6 Gy
120
100
80
60
40
20
D_e (Gy)
help("calc_MinDose")
help("calc_MinDose")
Relative standard error (%)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



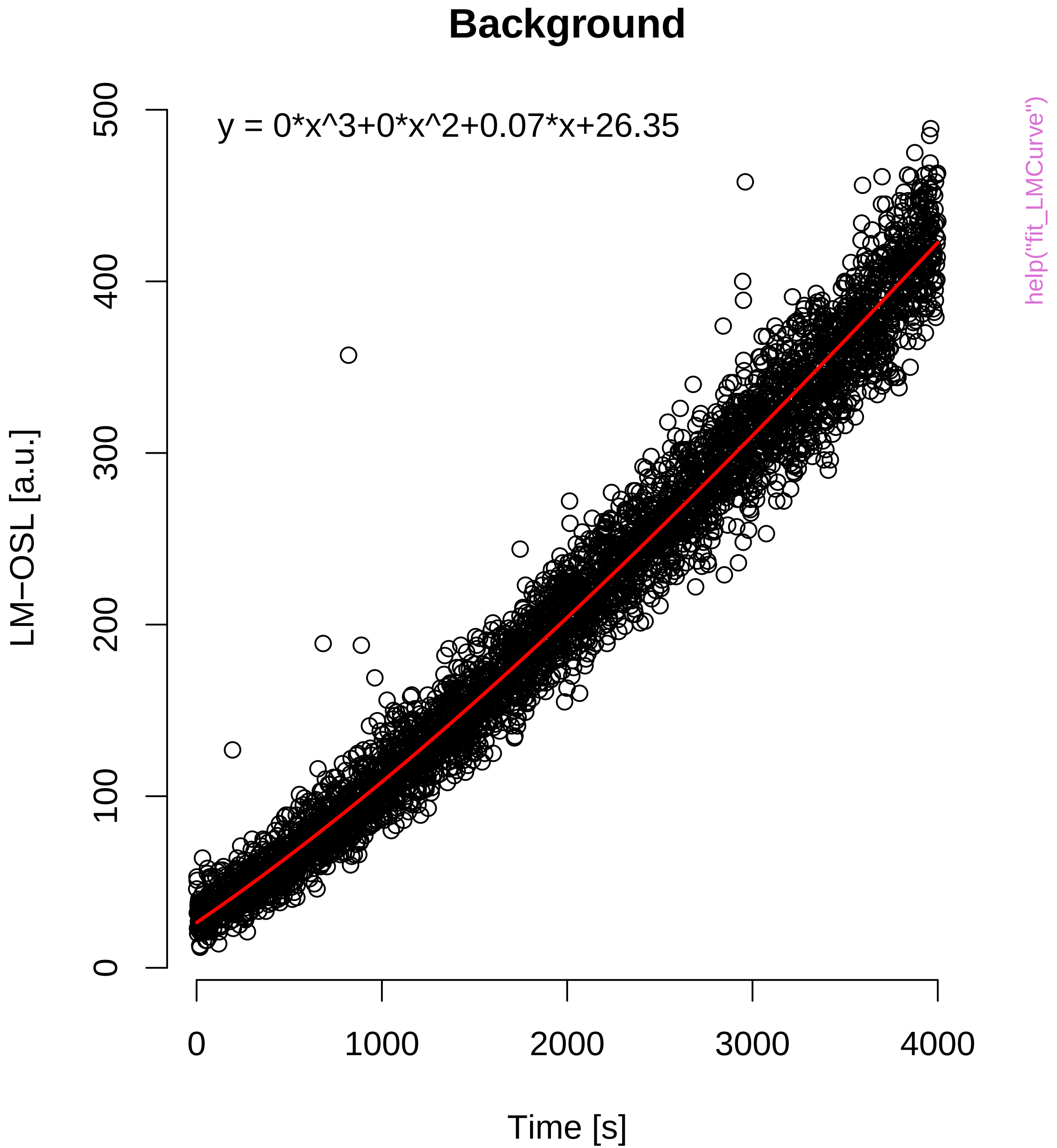
D_e distribution
Density
0.0000
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
2500
3000
3500
4000
D_e (Gy)
Cumulative frequency
5
10
15
20
25
help("calc_Statistics")



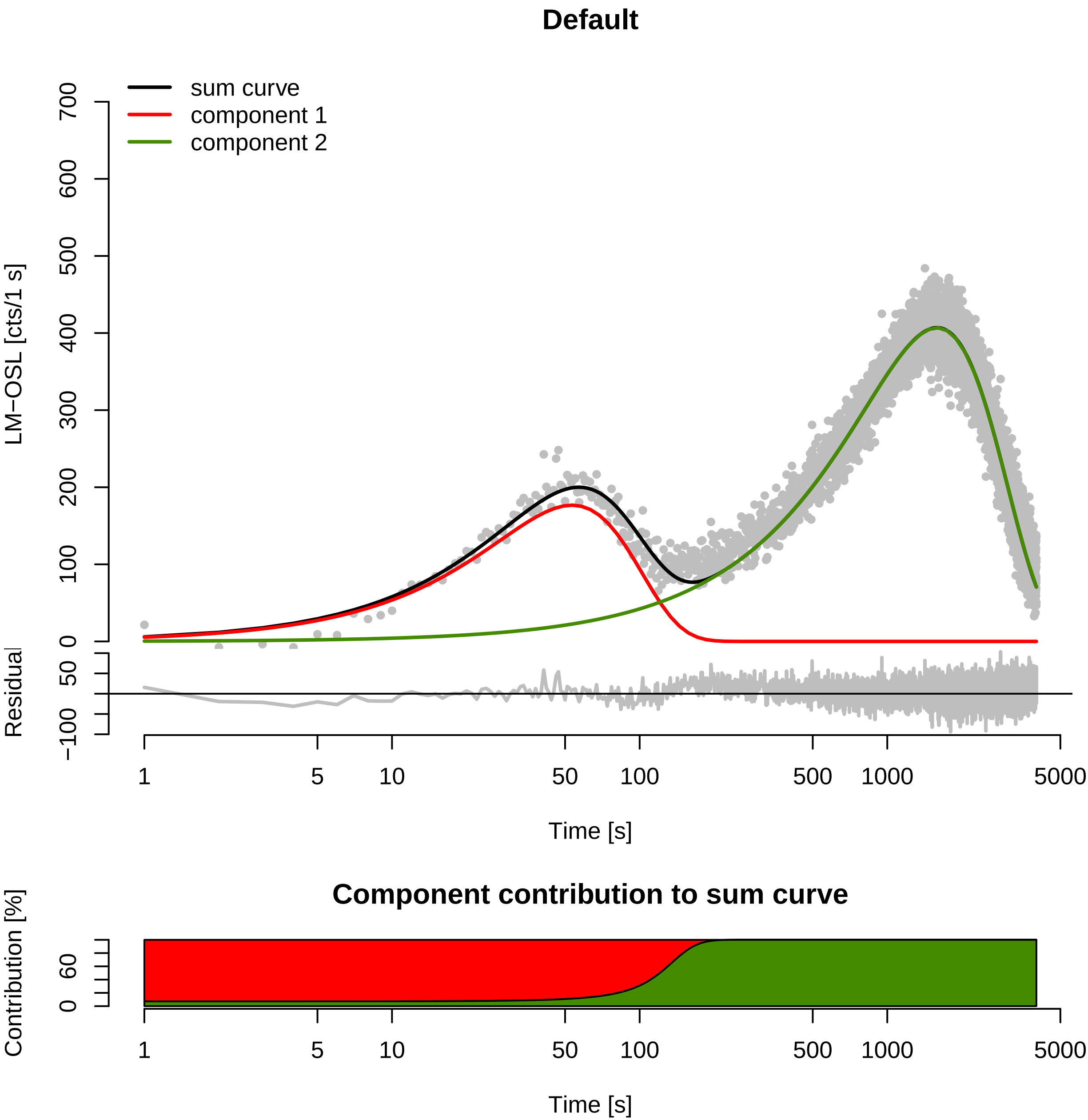
CW Curve Fit
Default
sum curve
component 1
component 2
component 3
OSL [cts/0.04 s]
0
2000
4000
6000
8000
10000
Residual [a.u.]
−100
50
200
0.05
0.10
0.20
0.50
1.00
2.00
5.00
10.00
20.00
50.00
Time [s]
Component contribution to sum curve
Contribution [%]
0
40
80
0.05
0.10
0.20
0.50
1.00
2.00
5.00
10.00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



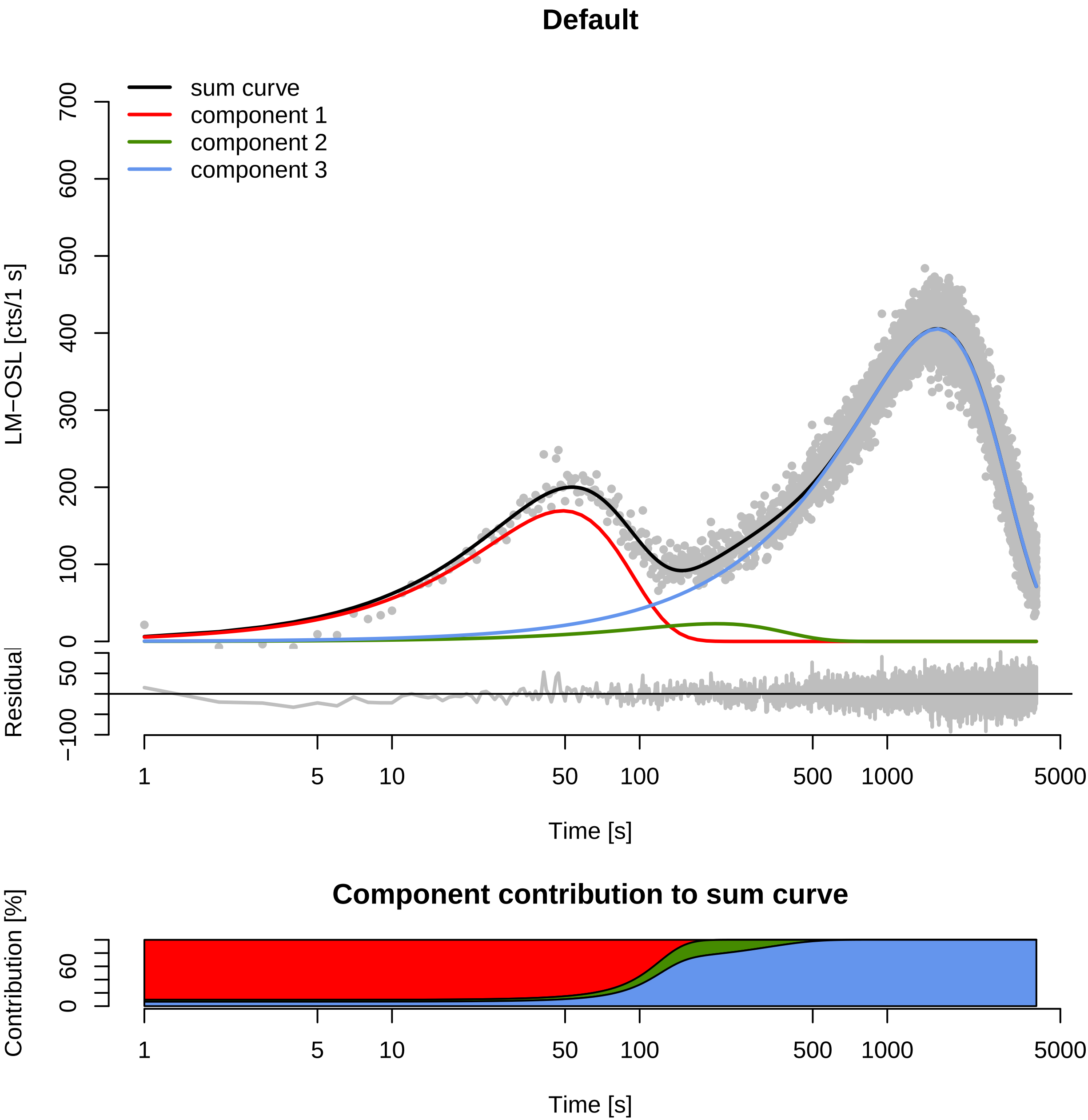
Default
sum curve
component 1
component 2
component 3
LM−OSL [cts/1 s]
0
100
200
300
400
500
600
700
Residual
−100
50
1
5
10
50
100
500
1000
5000
Time [s]
Component contribution to sum curve
Contribution [%]
0
60
1
5
10
50
100
500
1000
5000
Time [s]

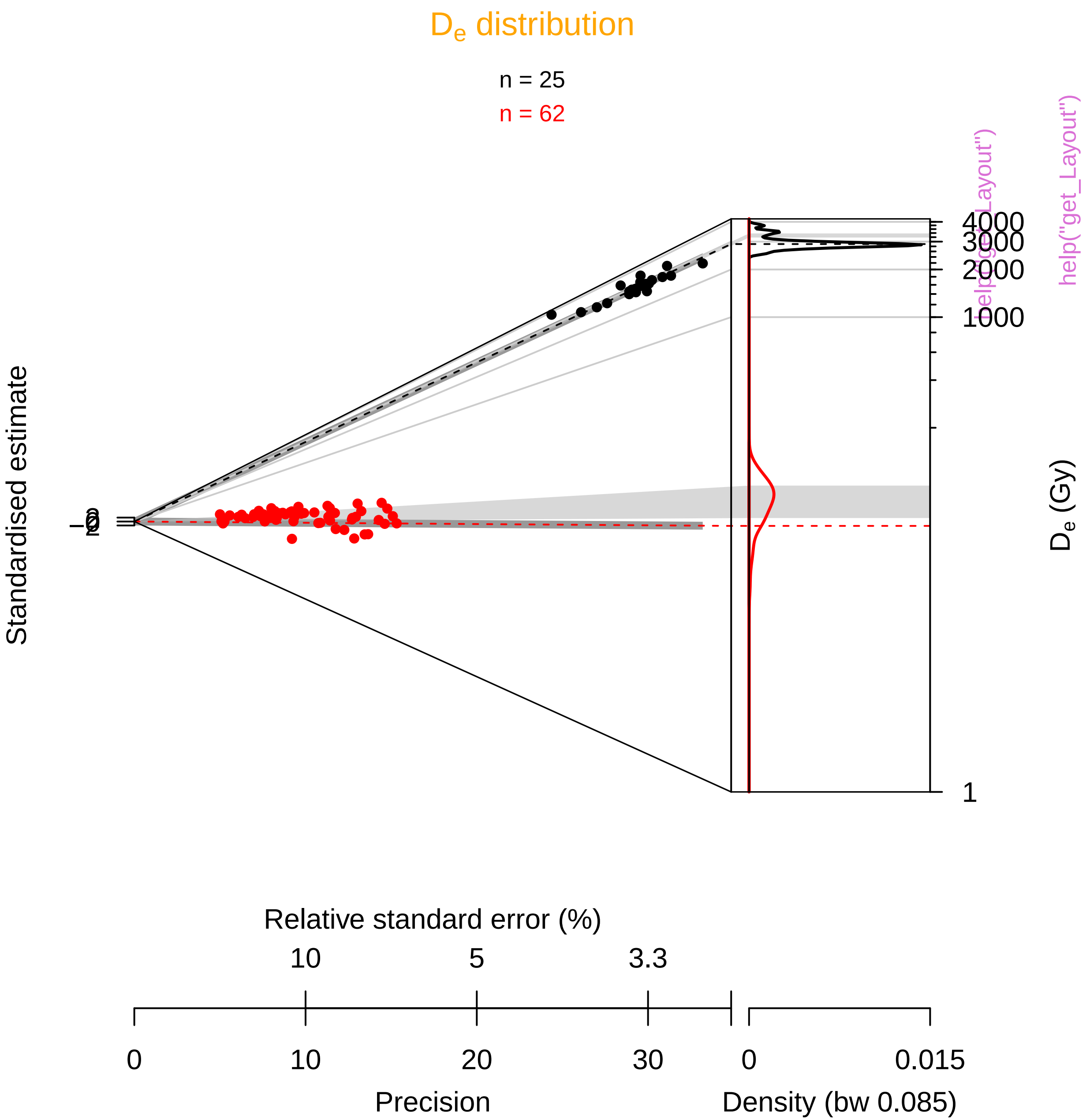


Background
y = 0*x^3+0*x^2+0.07*x+26.35
LM−OSL [a.u.]
0
100
200
300
400
500
0
1000
2000
3000
4000
Time [s]
help("fit_LMCurve")

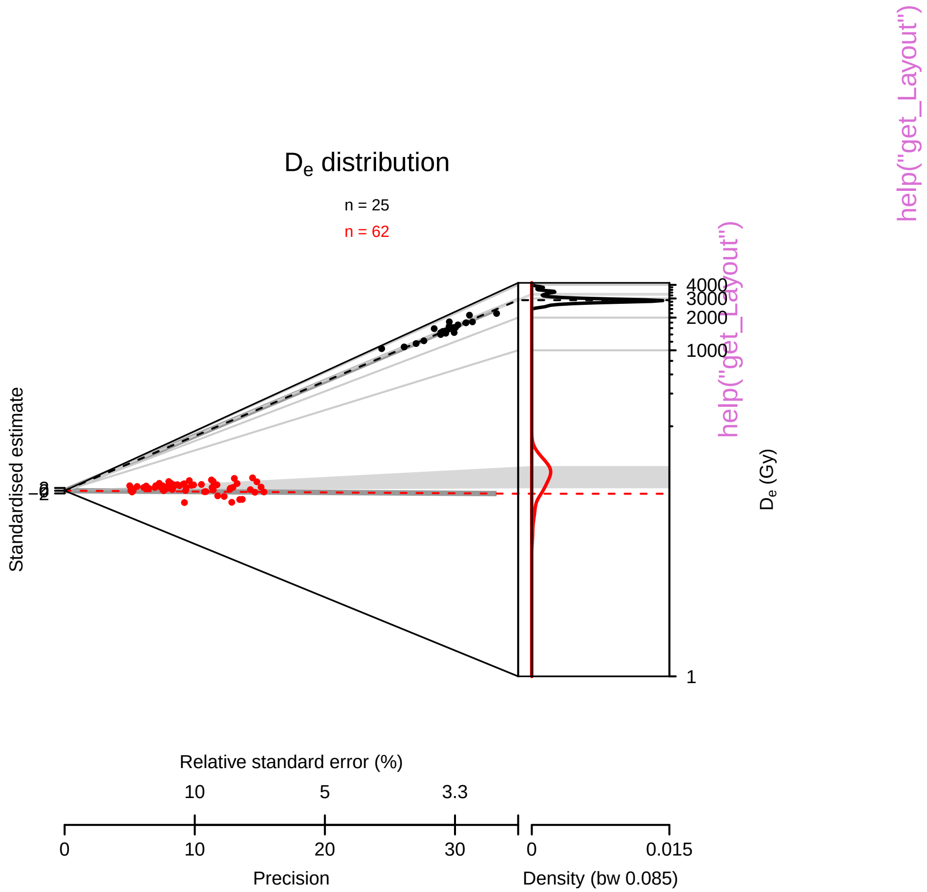


Default
sum curve
component 1
component 2
LM−OSL [cts/1 s]
0
100
200
300
400
500
600
700
Residual
50
−100
1
5
10
50
100
500
1000
5000
Time [s]
Component contribution to sum curve
Contribution [%]
0
60
1
5
10
50
100
500
1000
5000
Time [s]

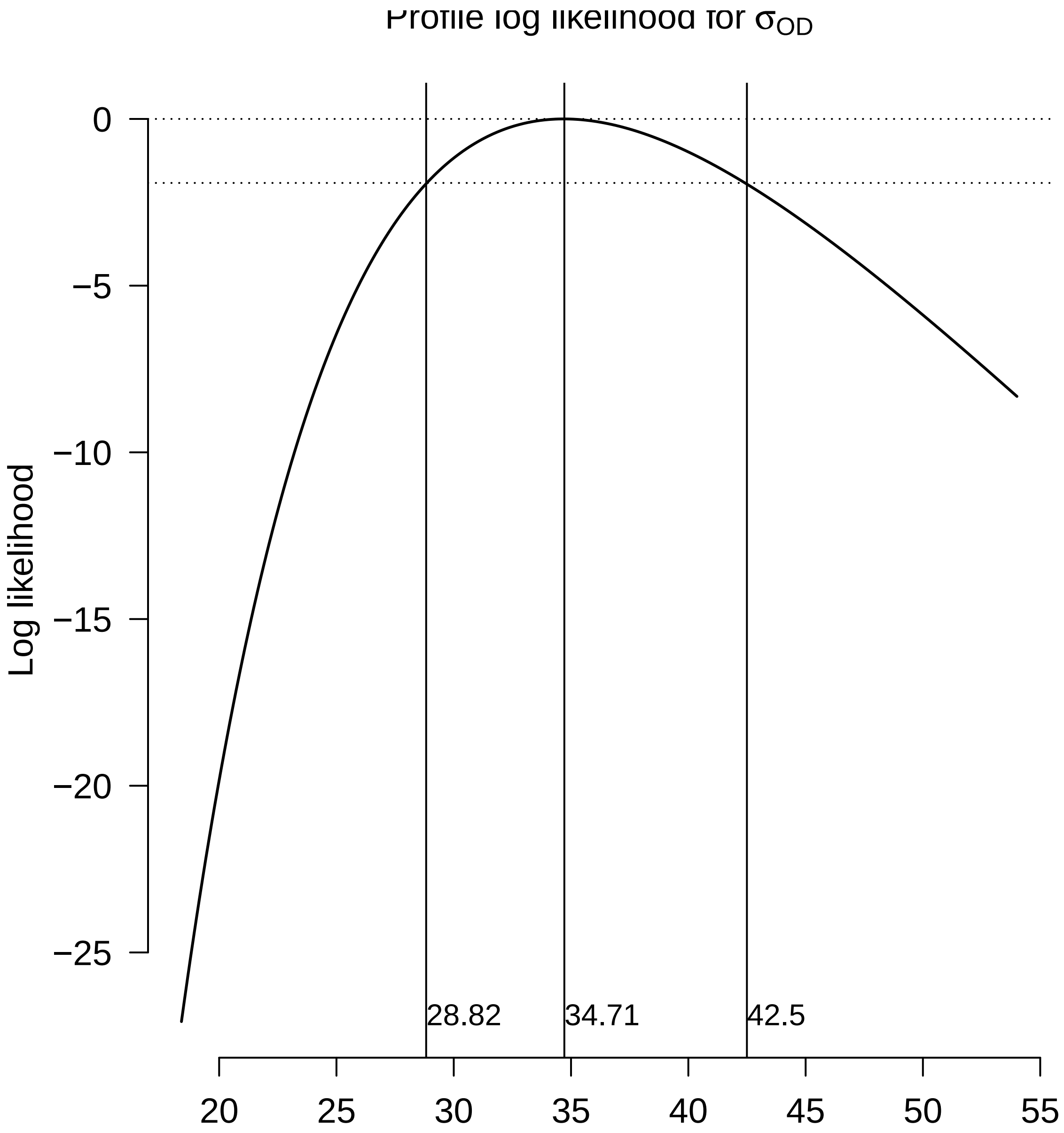

Default
sum curve
component 1
component 2
component 3
LM−OSL [cts/1 s]
700
600
500
400
300
200
100
0
Residual
50
−100
1
5
10
50
100
500
1000
5000
Time [s]
Component contribution to sum curve
Contribution [%]
60
0
1
5
10
50
100
500
1000
5000
Time [s]

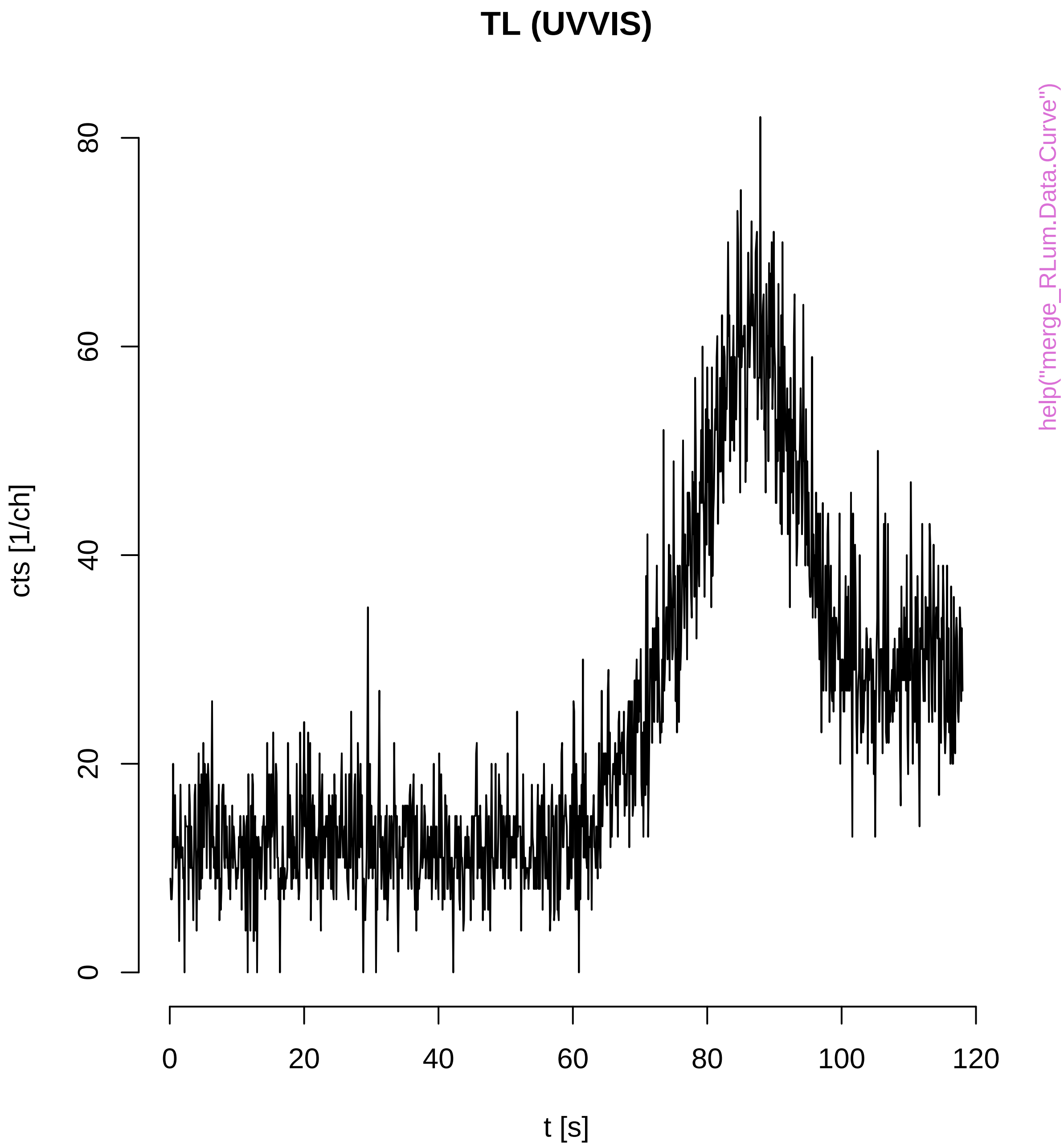


De distribution
n = 25
n = 62
Standardised estimate
-2
0
2
4000
3000
2000
1000
1
De (Gy)
help("get_Layout")
help("get_Layout")
Relative standard error (%)
10
5
3.3
0
10
20
30
0
0.015
Precision
Density (bw 0.085)

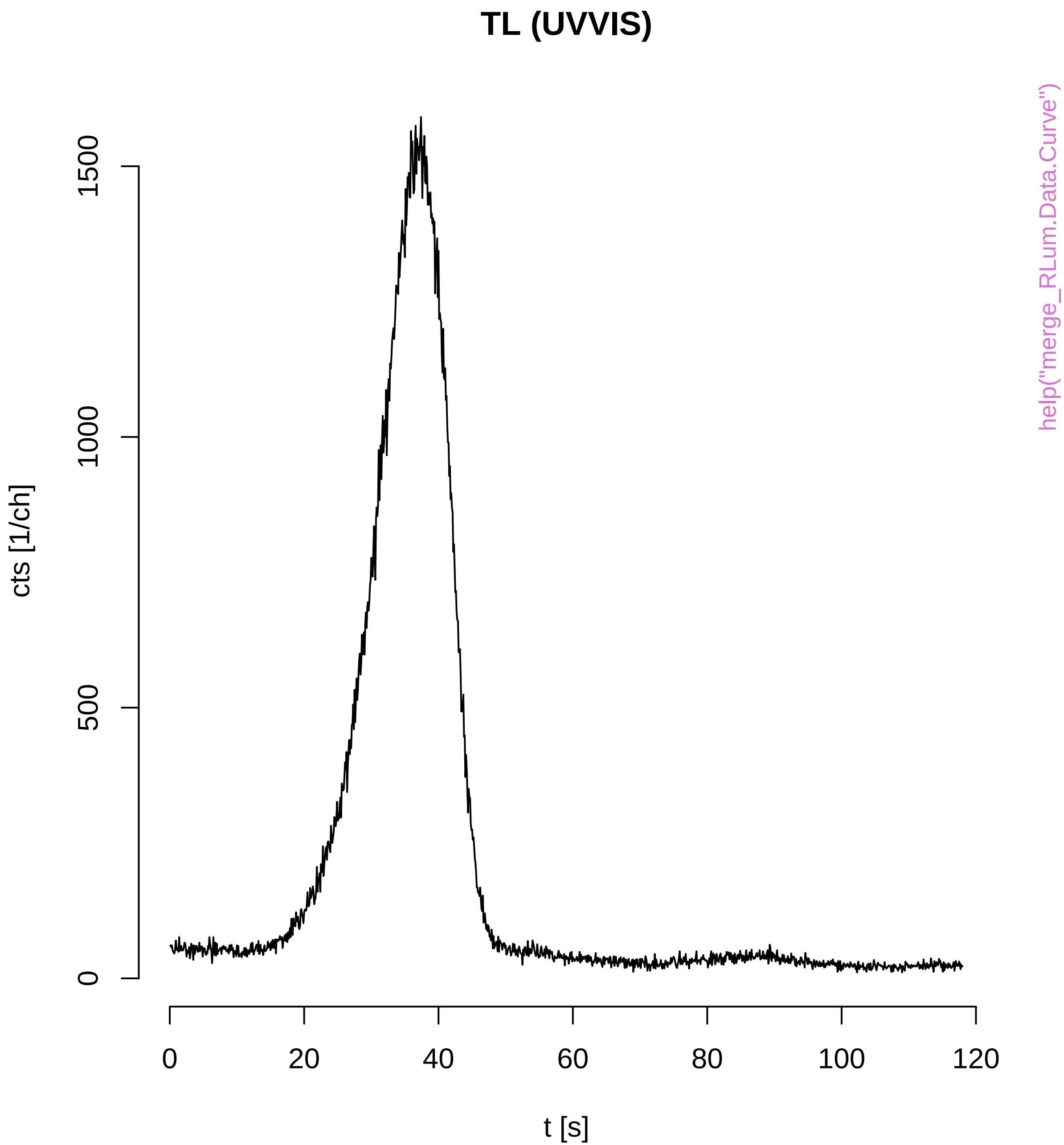


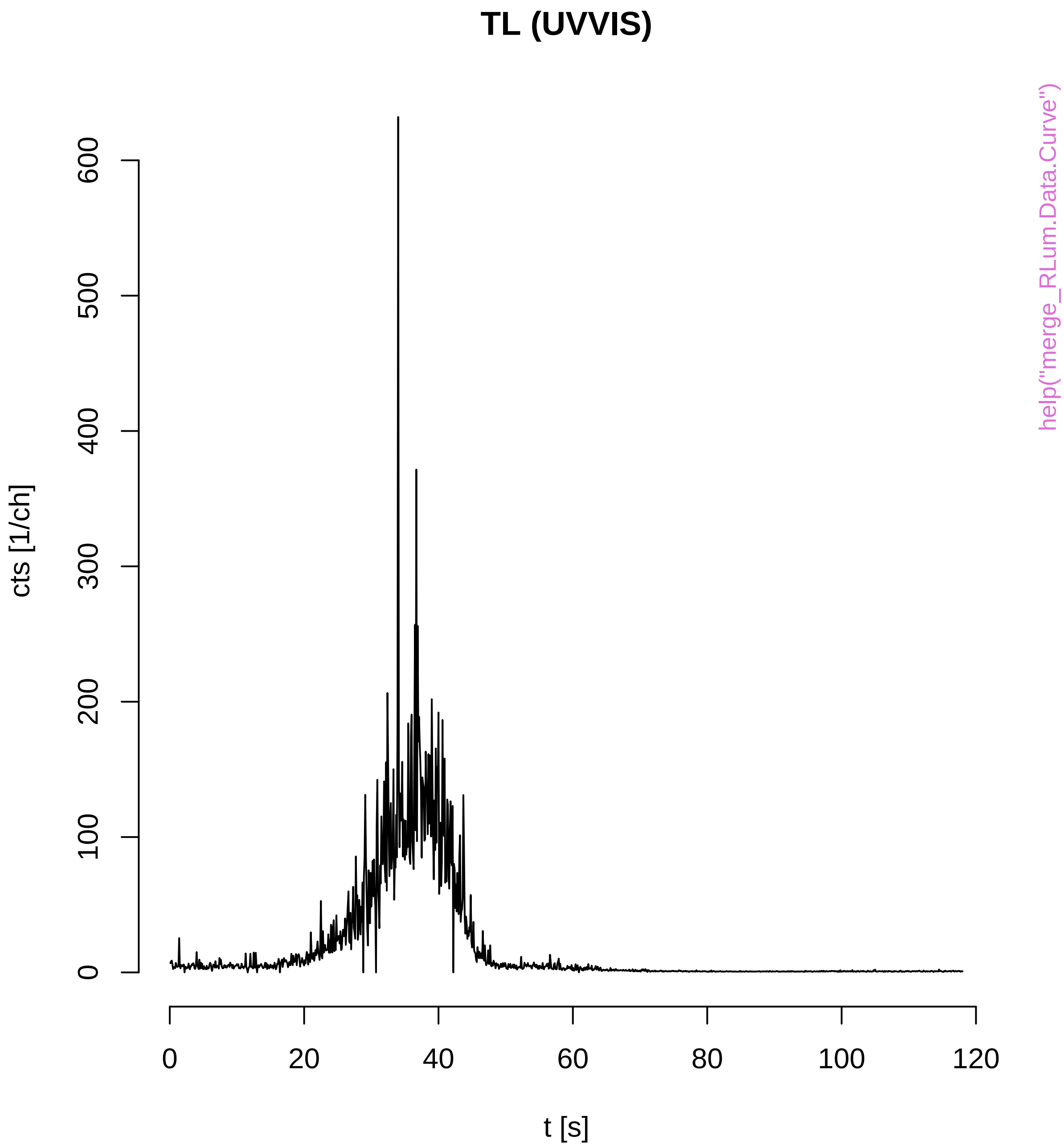
help("get_Layout")
De distribution
n = 25
n = 62
Standardised estimate
4000
3000
2000
1000
1
help("get_Layout")
De (Gy)
Relative standard error (%)
10
5
3.3
0
10
20
30
0
0.015
Precision
Density (bw 0.085)

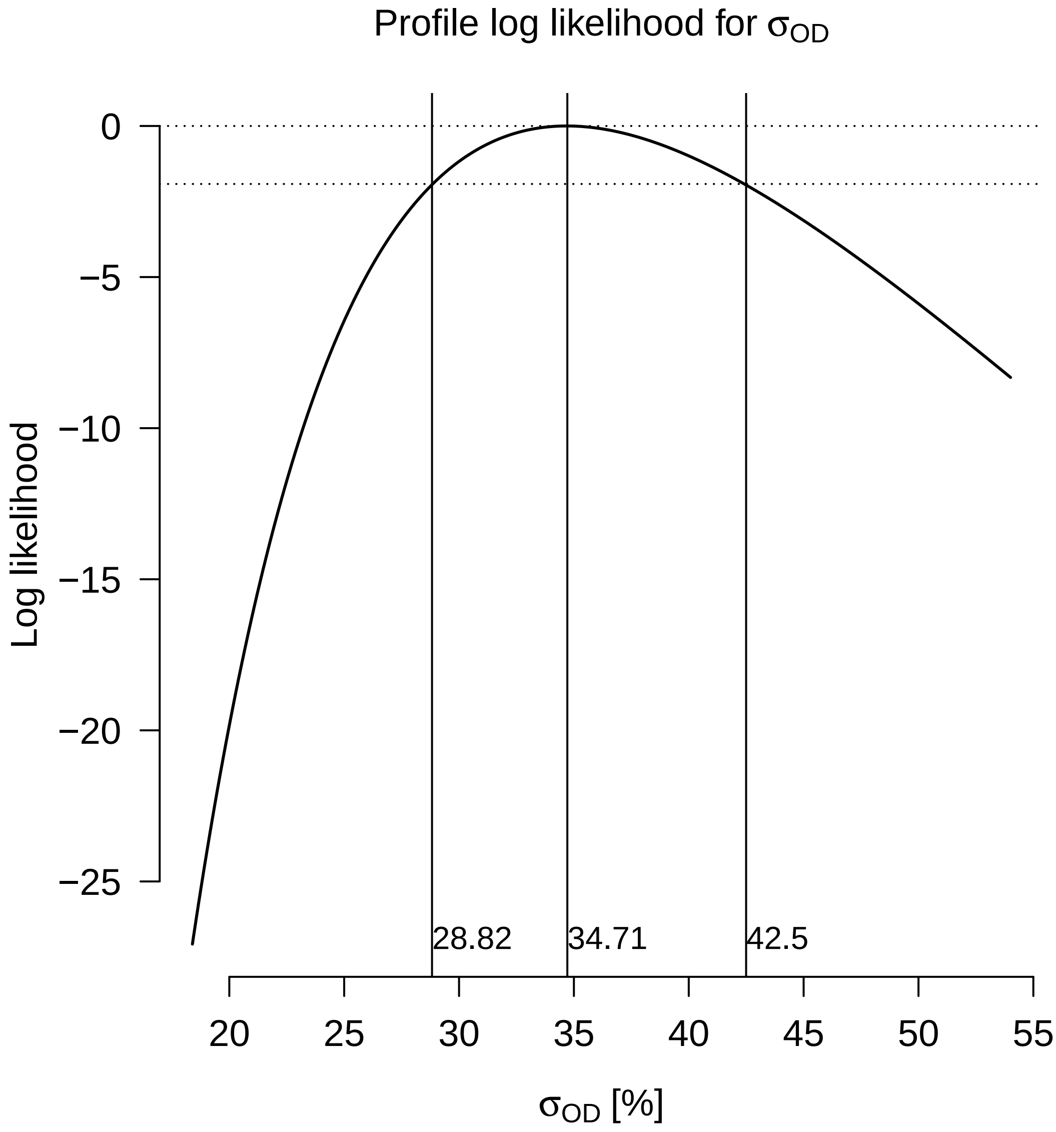

Profile log likelihood for σ_{OD}
Log likelihood
0
−5
−10
−15
−20
−25
28.82
34.71
42.5
20
25
30
35
40
45
50
55



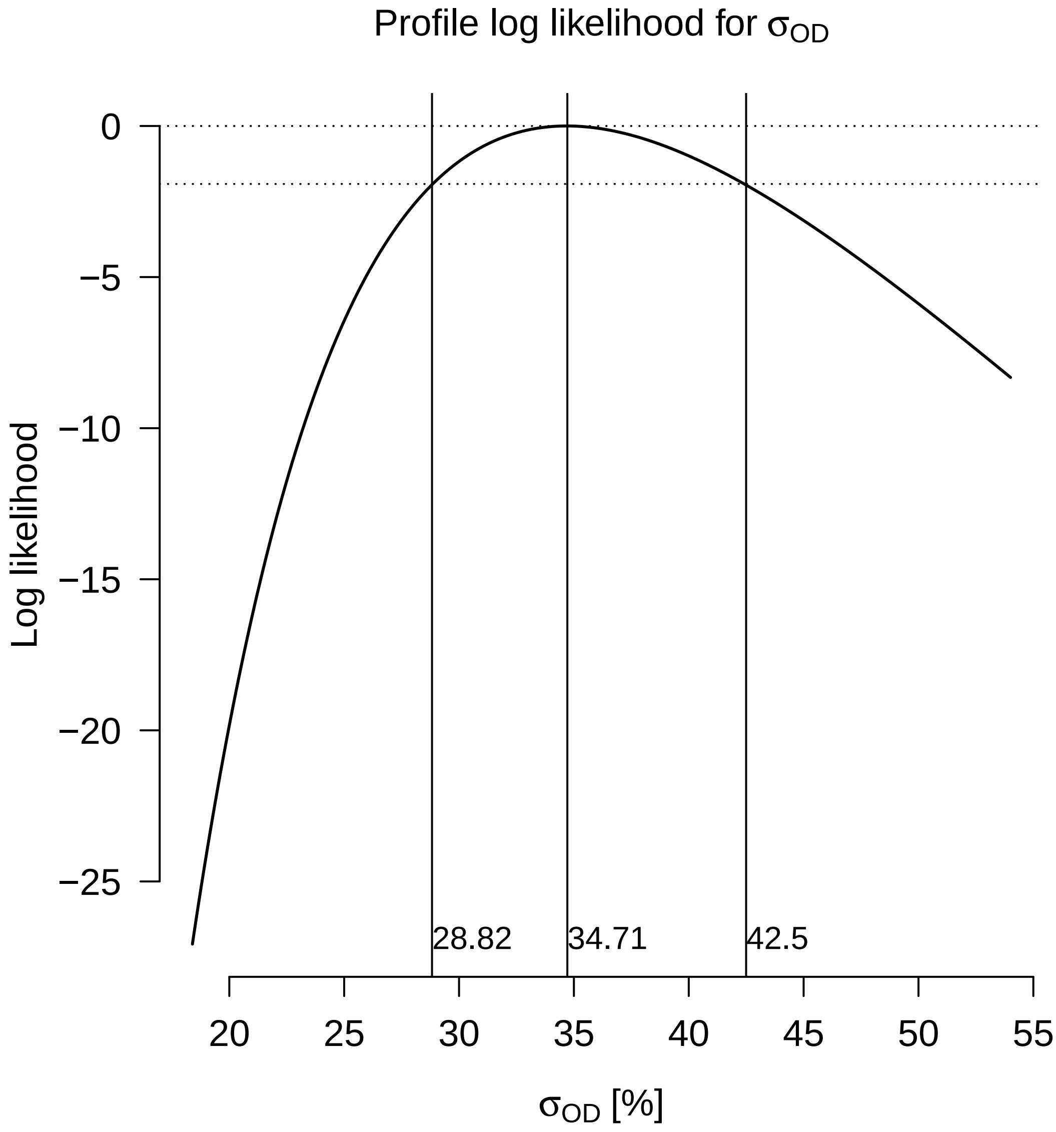
TL (UVVIS)
cts [1/ch]
0
20
40
60
80
0
20
40
60
80
100
120
t [s]
help("merge_RLum.Data.Curve")

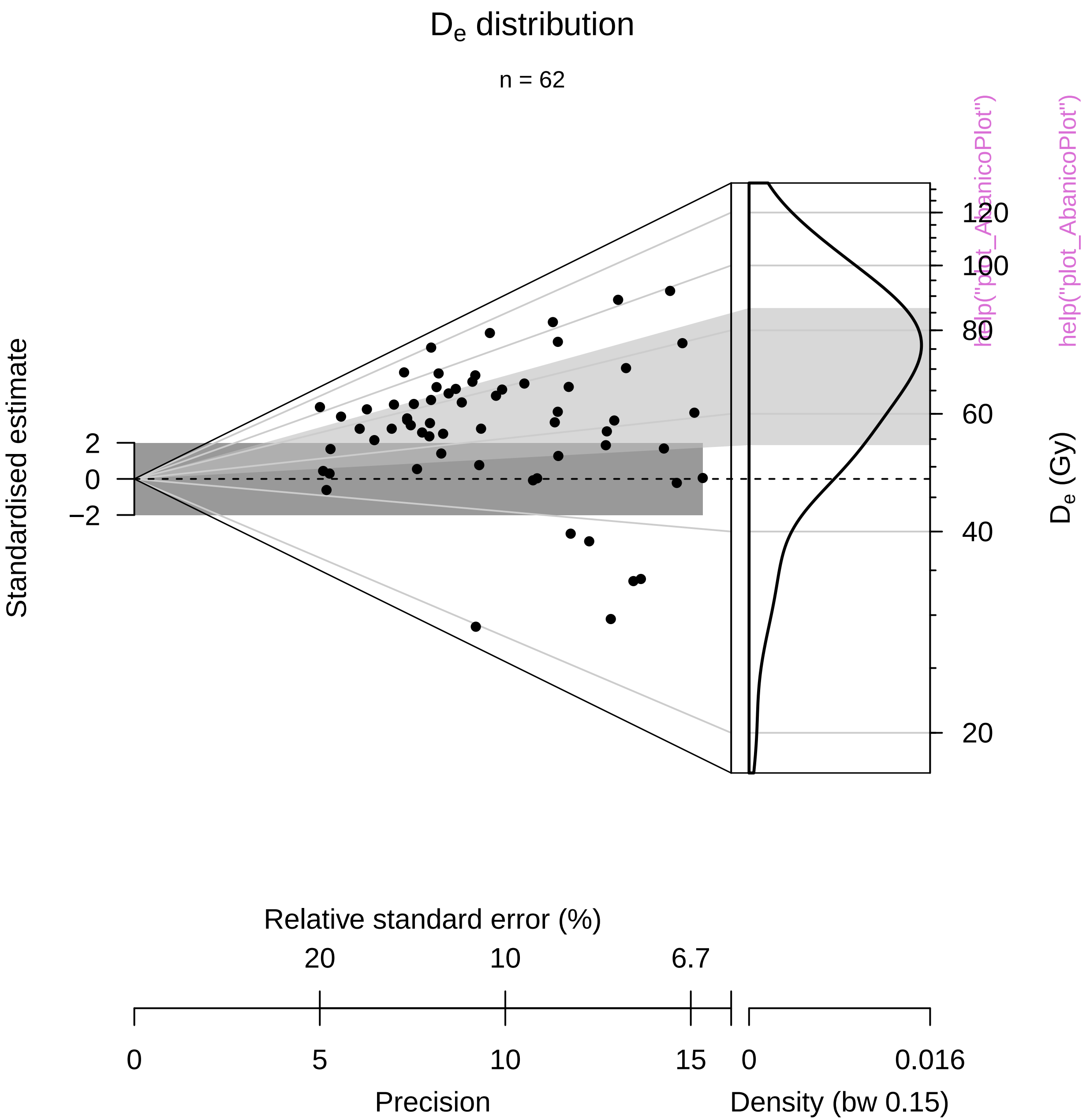

TL (UVVIS)
cts [1/ch]
1500
1000
500
0
0
20
40
60
80
100
120
t [s]
help("merge_RLum.Data.Curve")


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")

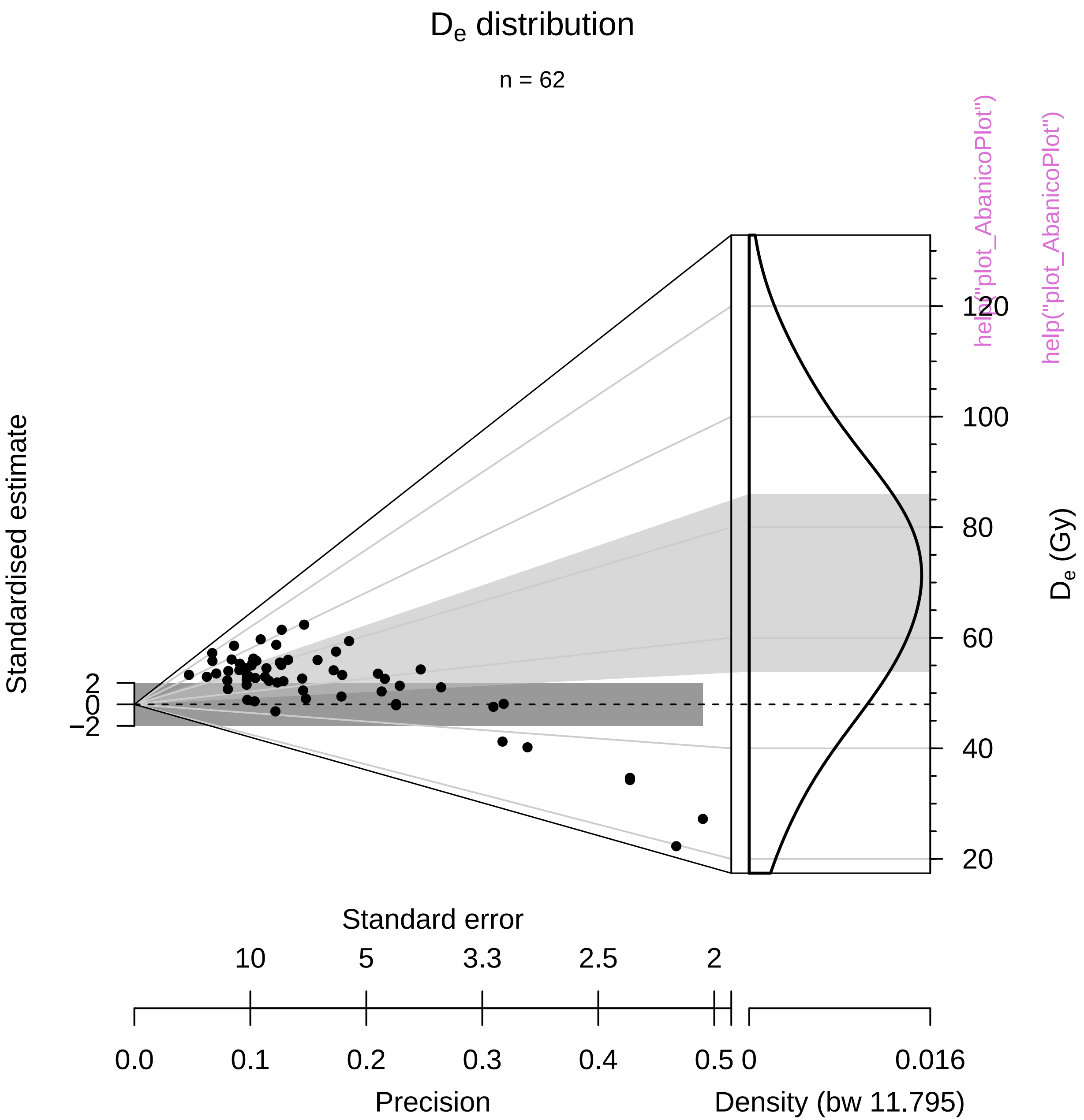


Profile log likelihood for σ_{OD}
Log likelihood
0
−5
−10
−15
−20
−25
28.82
34.71
42.5
20
25
30
35
40
45
50
55
σ_{OD} [%]

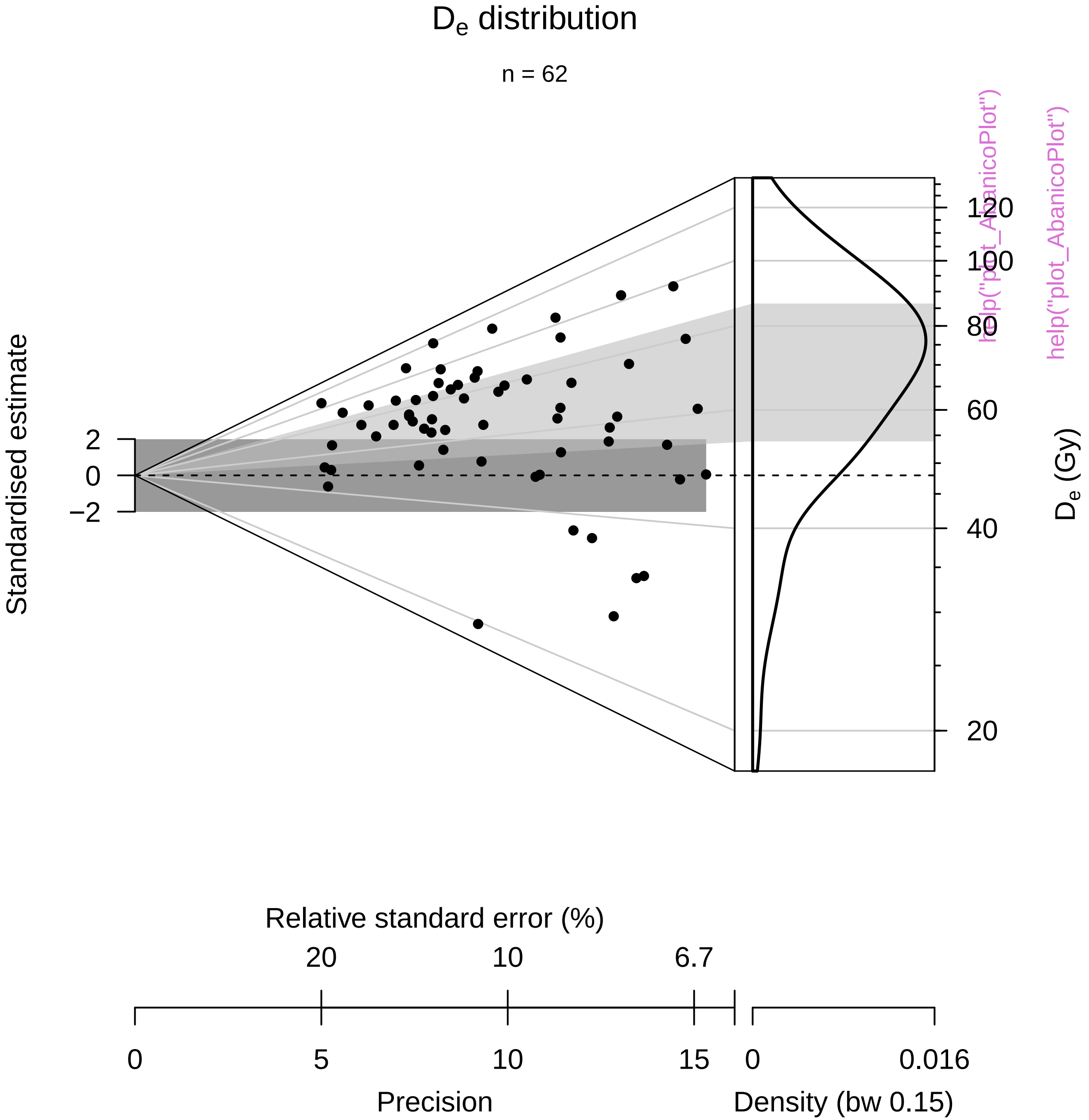

Profile log likelihood for σ_{OD}
0
−5
−10
−15
−20
−25
Log likelihood
28.82
34.71
42.5
20
25
30
35
40
45
50
55
σ_{OD} [%]



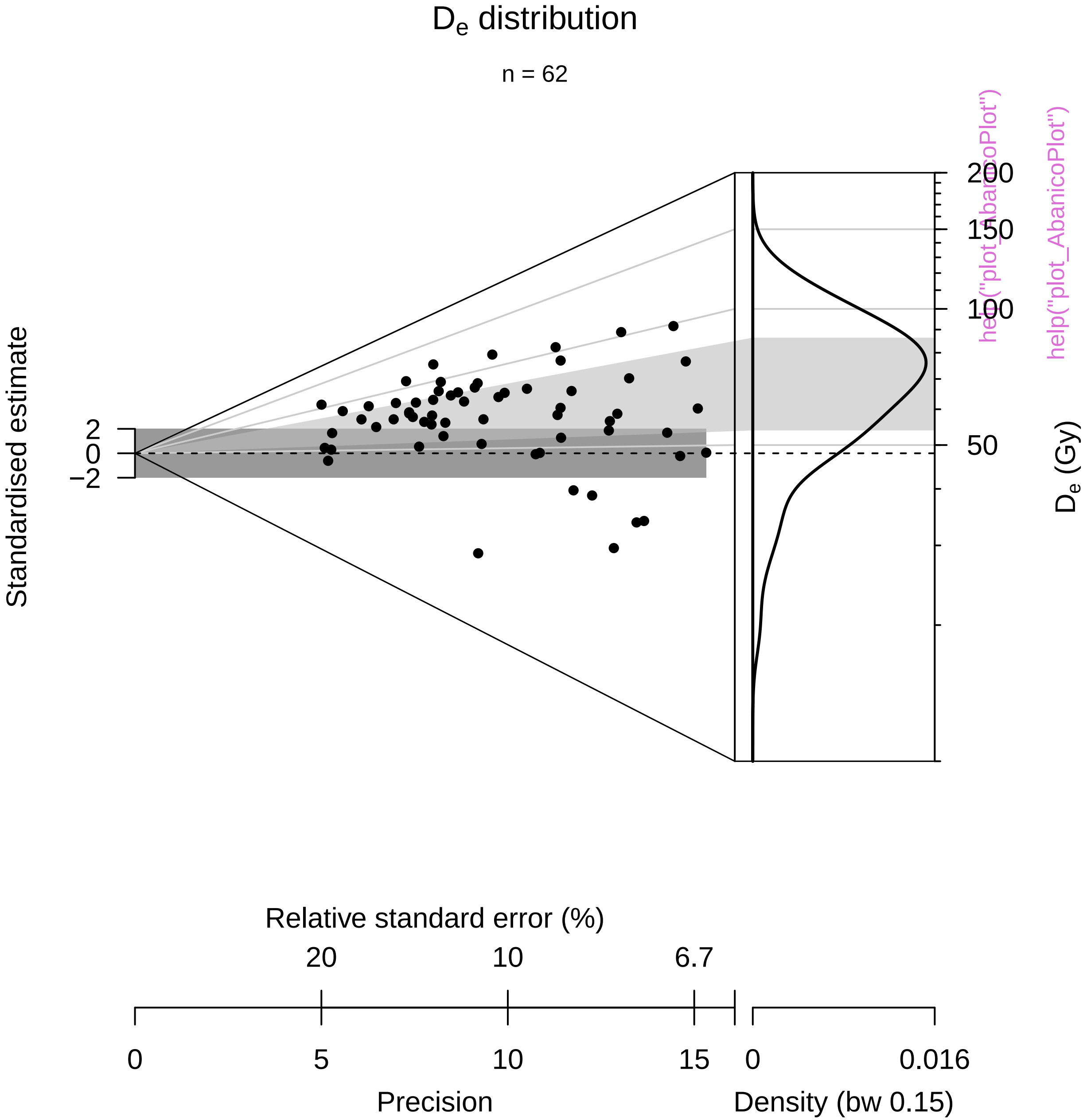
D_e distribution
n = 62
Standardised estimate
2
0
−2
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
120
100
80
60
40
20
D_e (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
0
0.016
Precision
Density (bw 0.15)



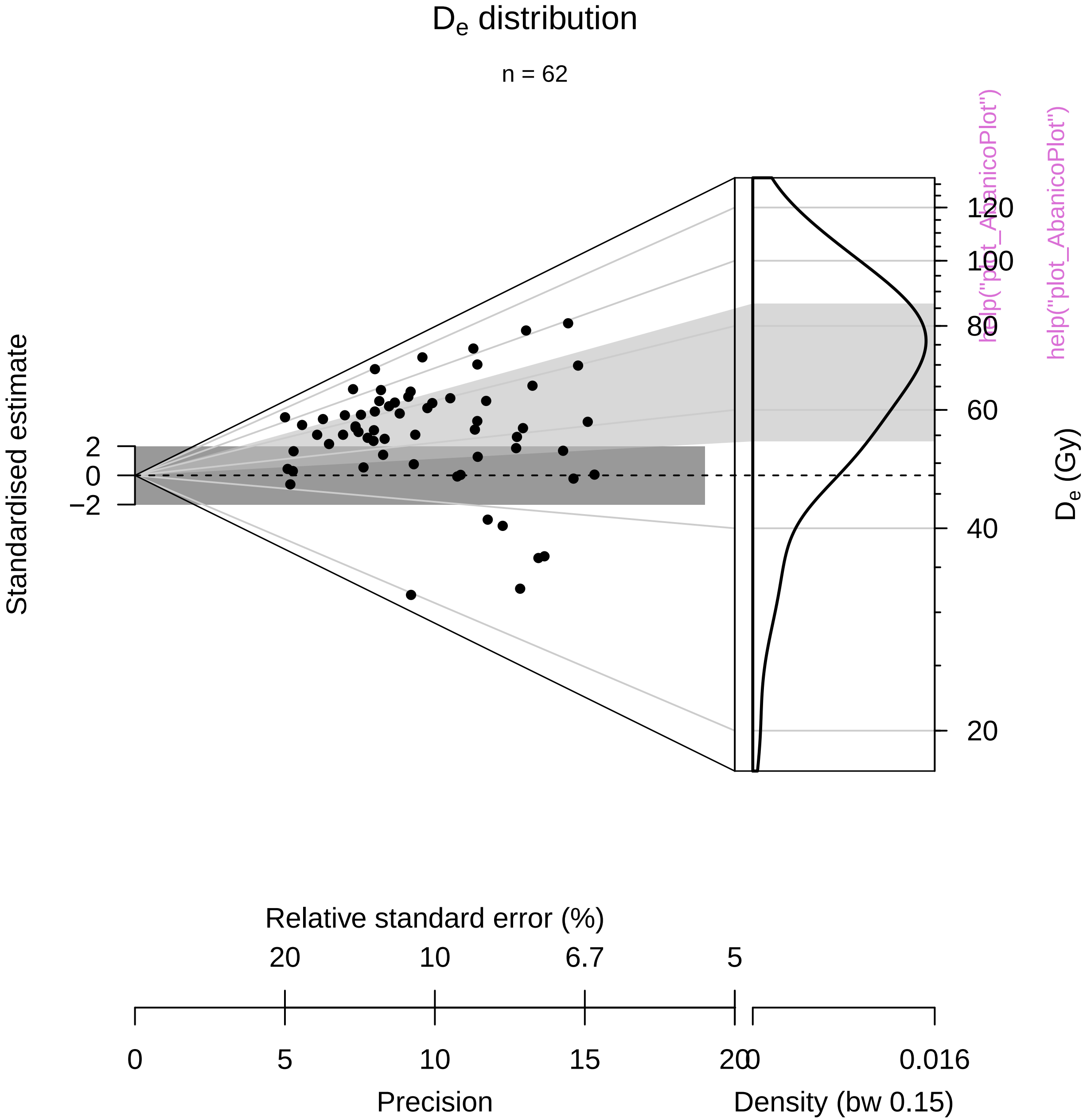
D_e distribution
n = 62
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Standardised estimate
2
0
-2
120
100
80
60
40
20
D_e (Gy)
Standard error
10
5
3.3
2.5
2
0.0
0.1
0.2
0.3
0.4
0.5
0
0.016
Precision
Density (bw 11.795)



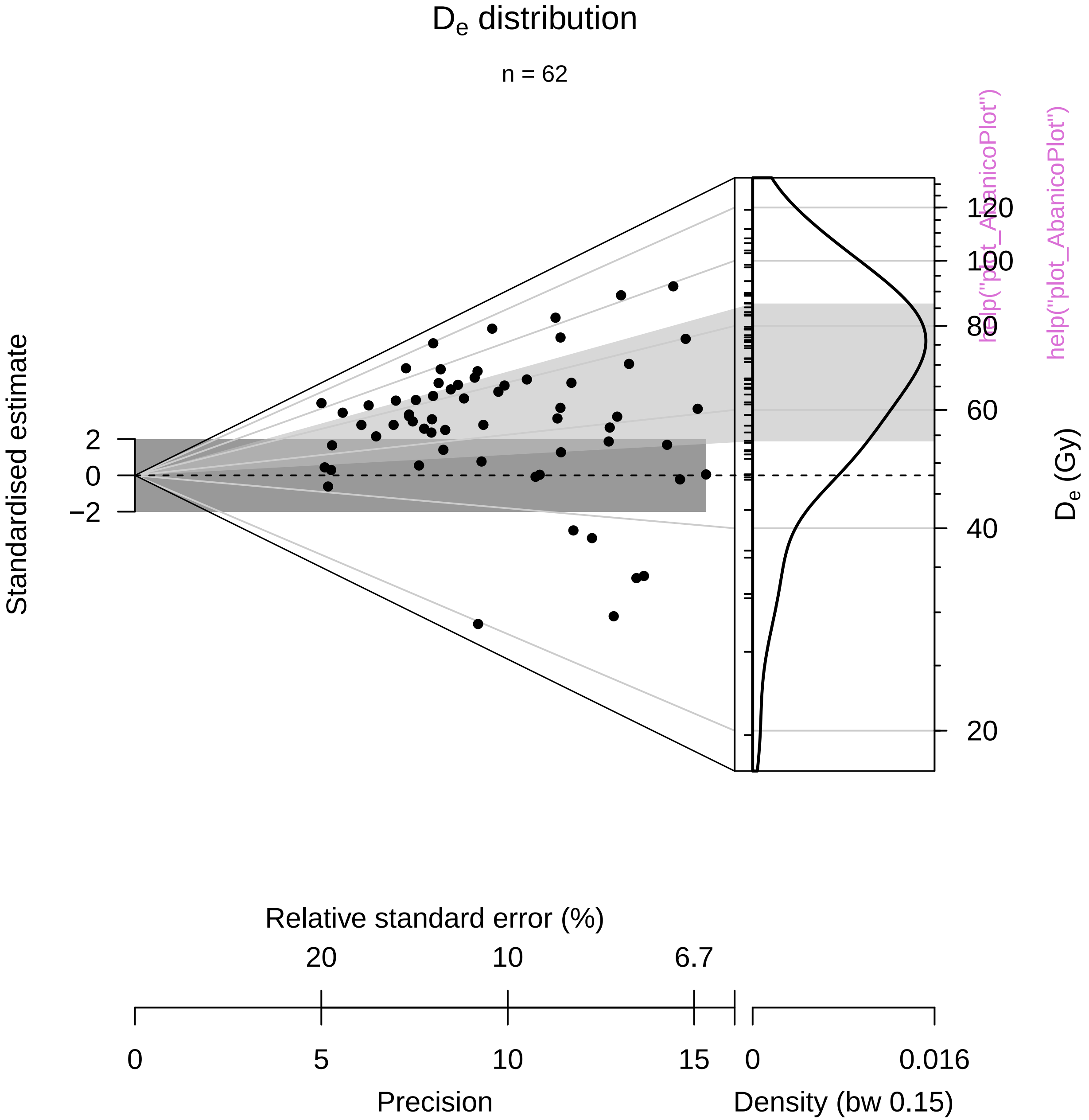
D$_e$ distribution
n = 62
Standardised estimate
2
0
−2
120
100
80
60
40
20
D$_e$ (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)



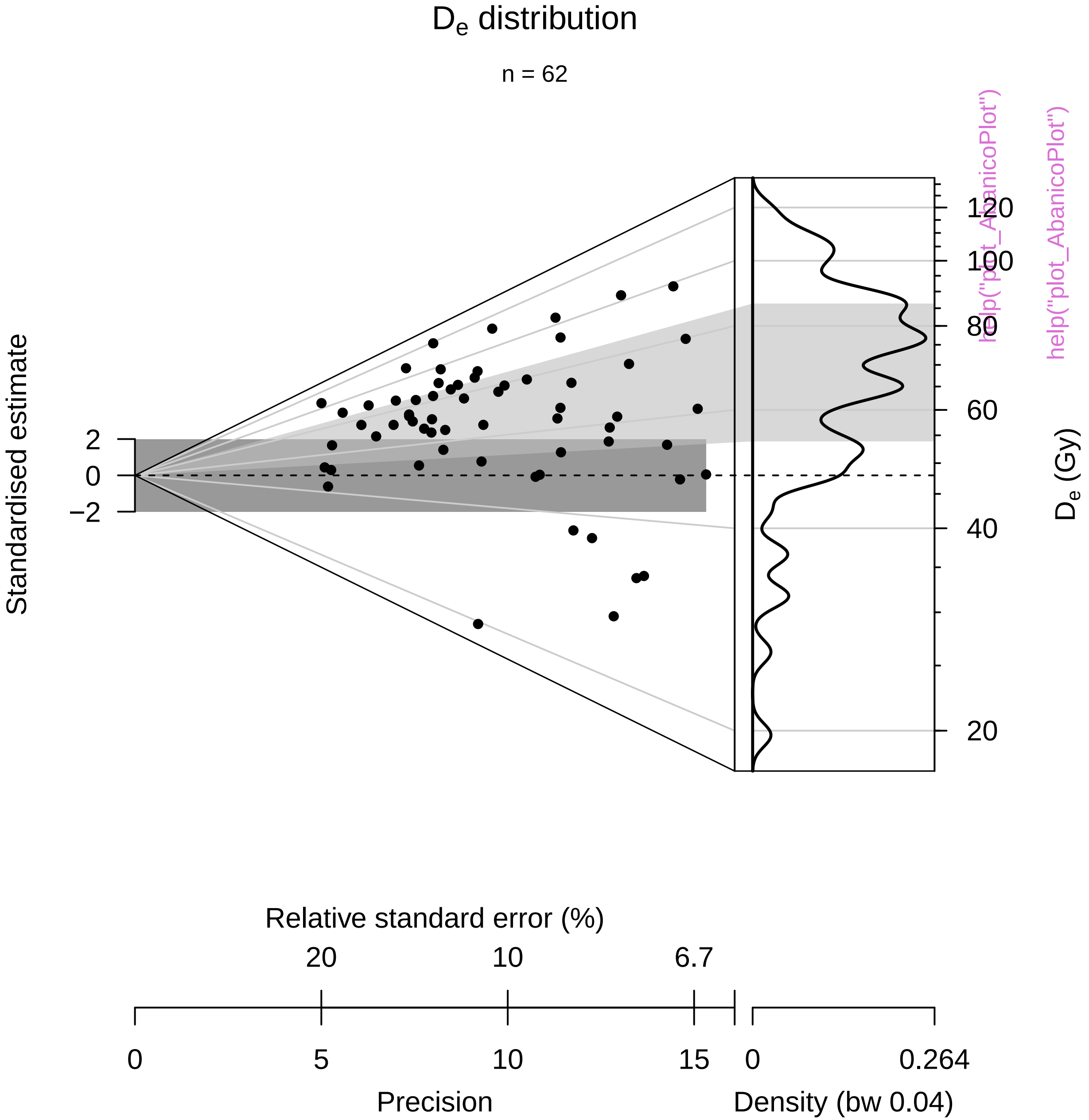
D$_e$ distribution
n = 62
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Standardised estimate
2
0
−2
200
150
100
50
D$_e$ (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)



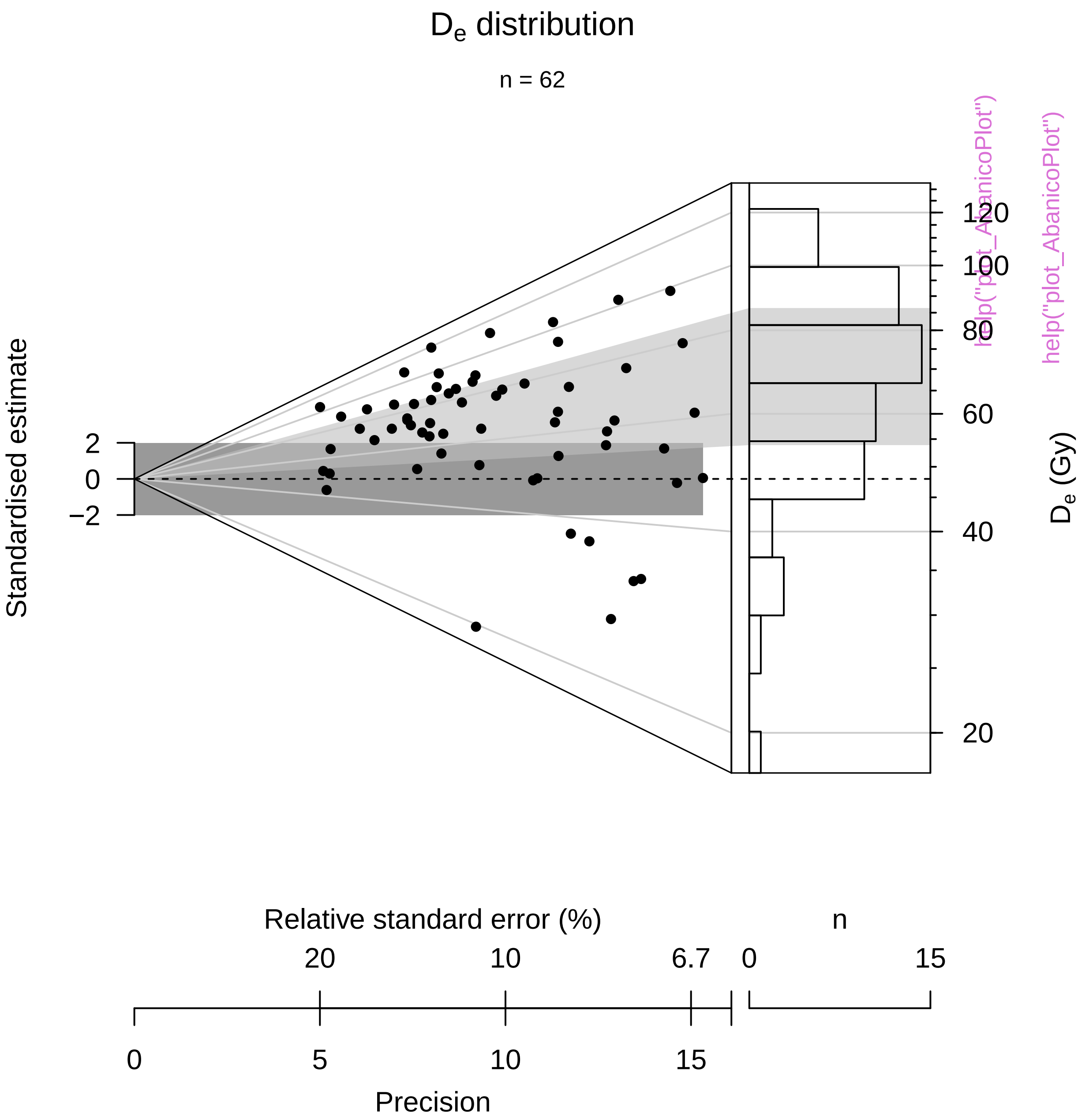
De distribution
n = 62
Standardised estimate
2
0
−2
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
120
100
80
60
40
20
De (Gy)
Relative standard error (%)
20
10
6.7
5
0
5
10
15
20
0
0.016
Precision
Density (bw 0.15)



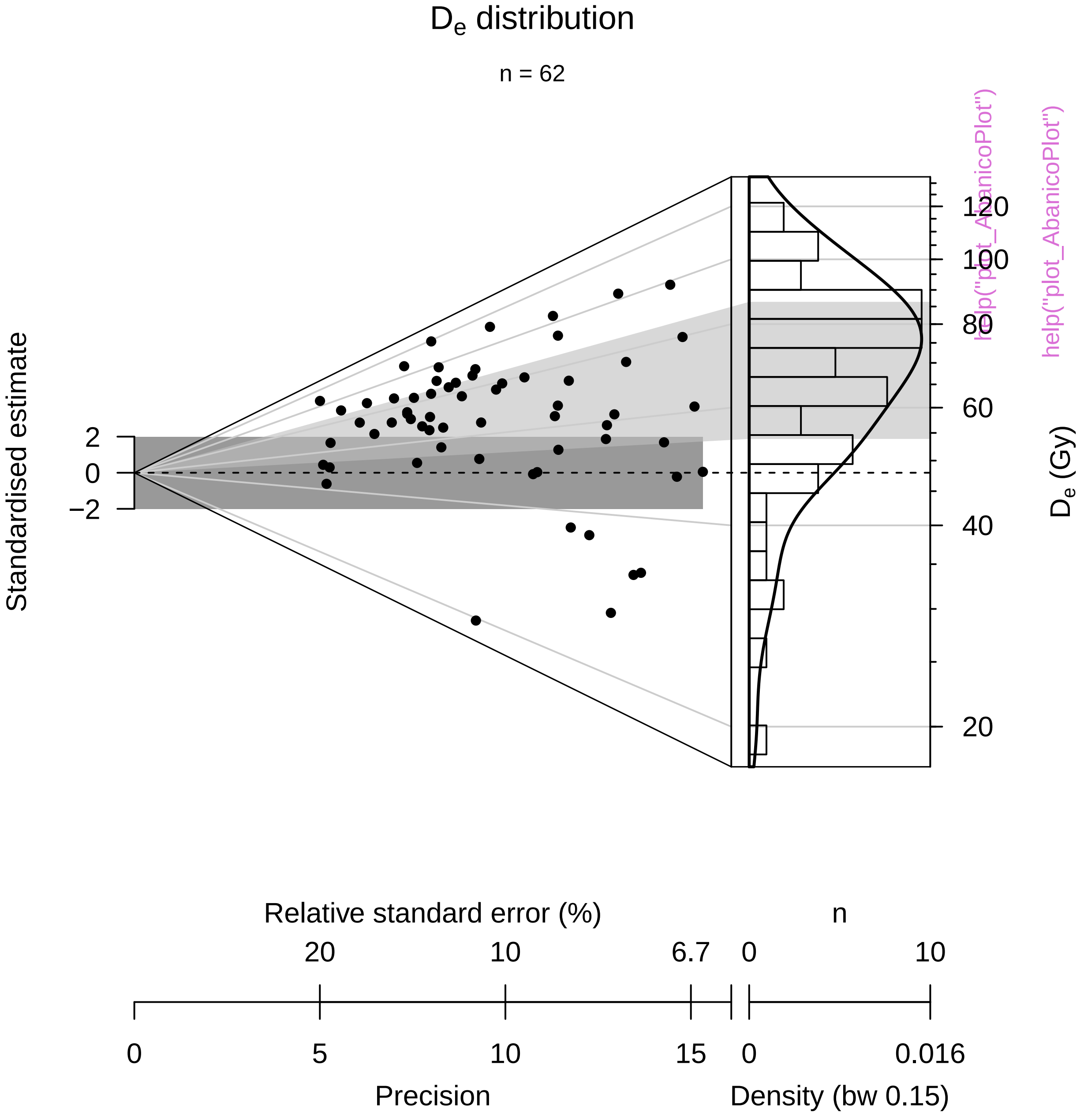
D_e distribution
n = 62
Standardised estimate
2
0
−2
120
100
80
60
40
20
D_e (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)



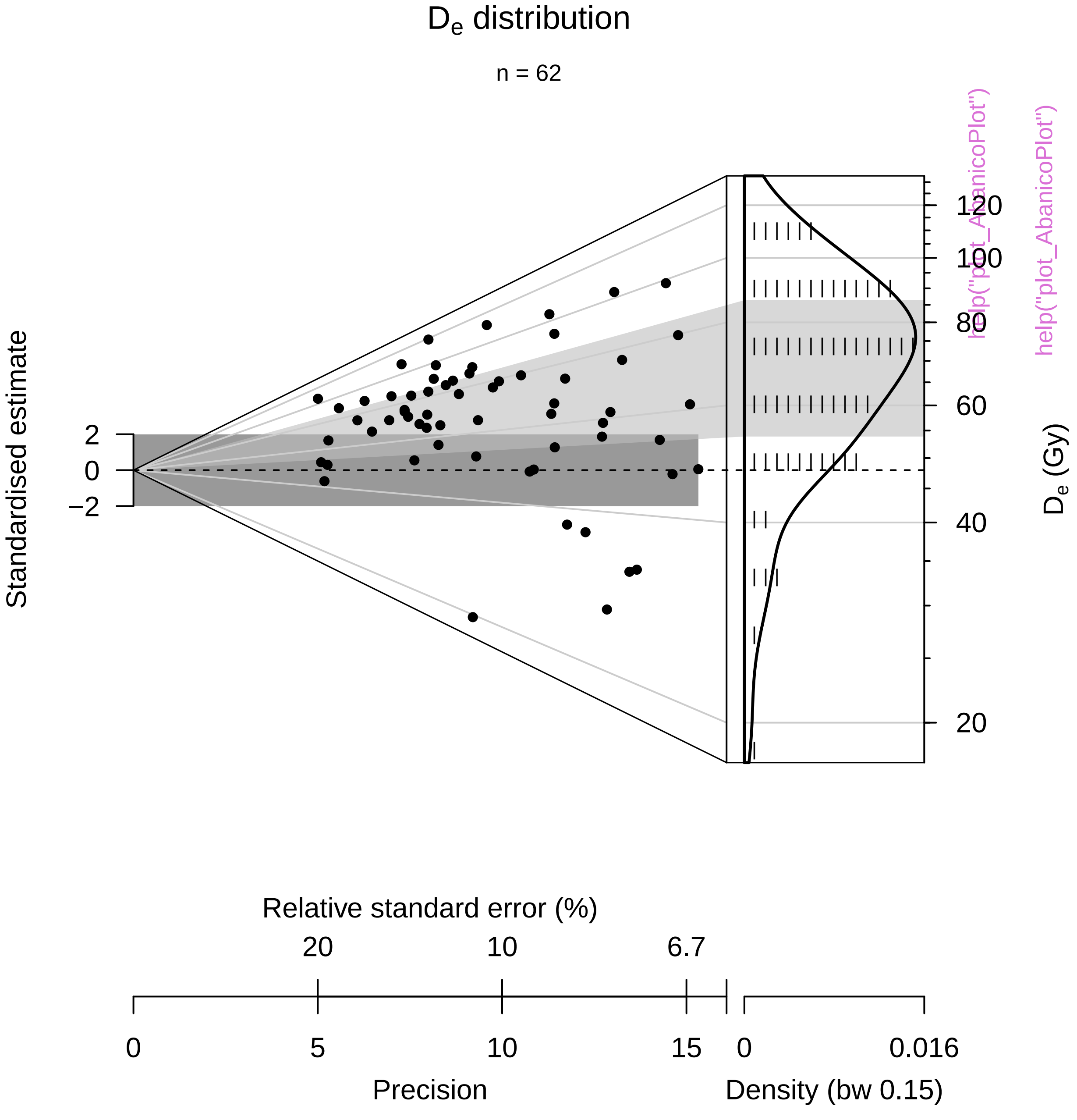
De distribution
n = 62
Standardised estimate
2
0
−2
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
120
100
80
60
40
20
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.264
Density (bw 0.04)



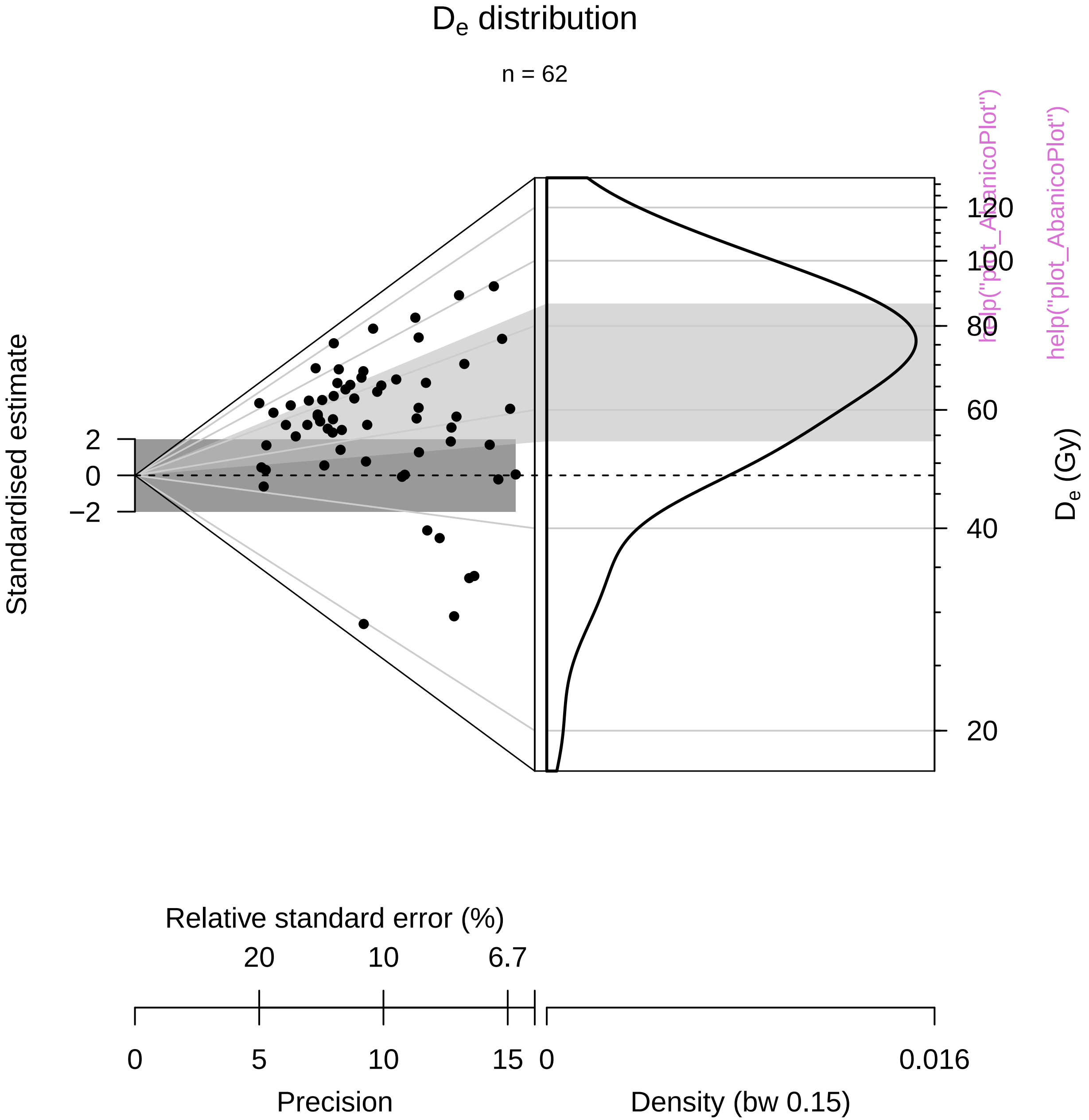
D_e distribution
n = 62
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Standardised estimate
2
0
−2
120
100
80
60
40
20
D_e (Gy)
Relative standard error (%)
20
10
6.7
n
0
15
0
5
10
15
Precision



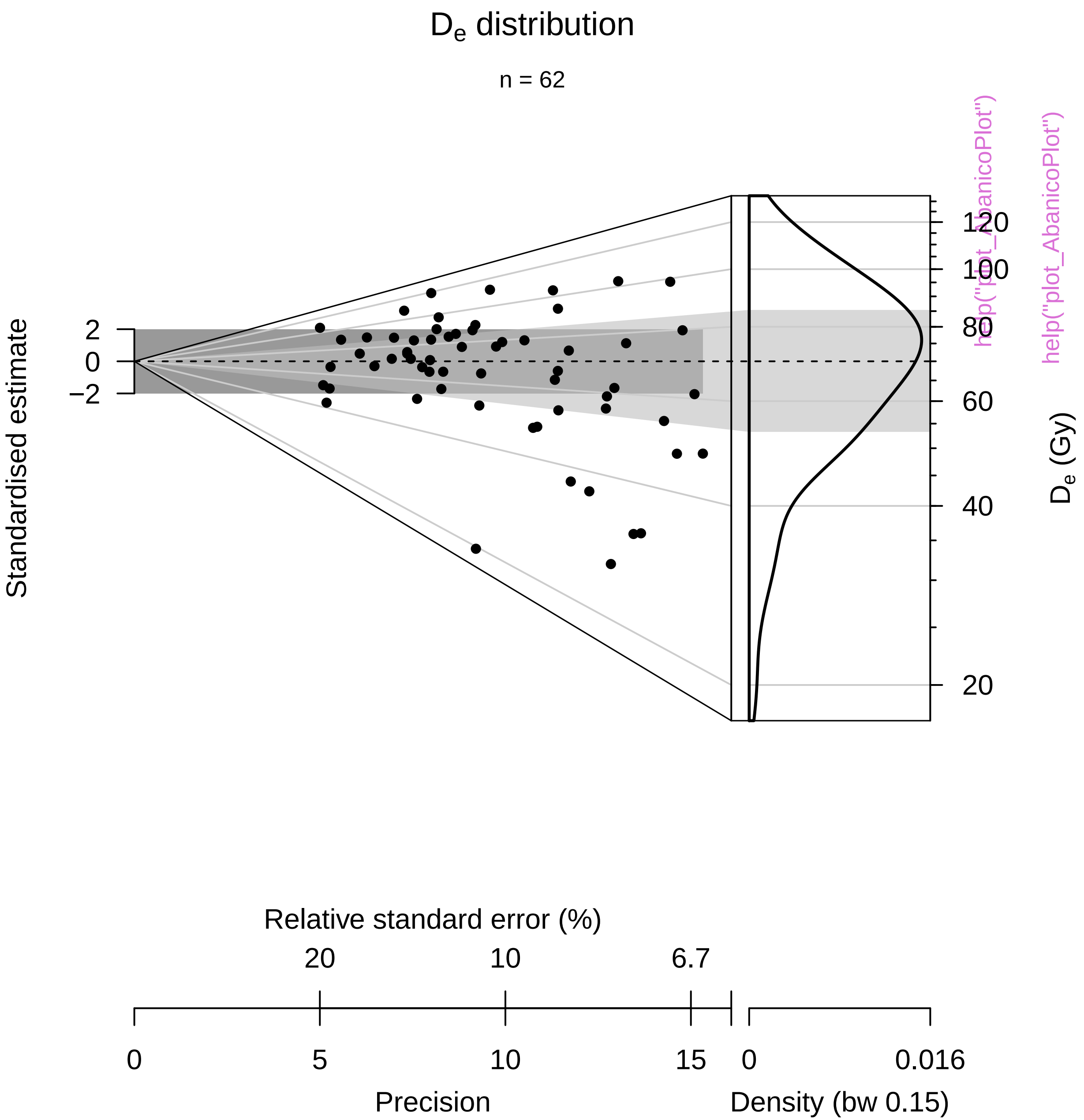
De distribution
n = 62
Standardised estimate
2
0
−2
120
100
80
60
40
20
De (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
n
0
10
0
5
10
15
0
0.016
Precision
Density (bw 0.15)



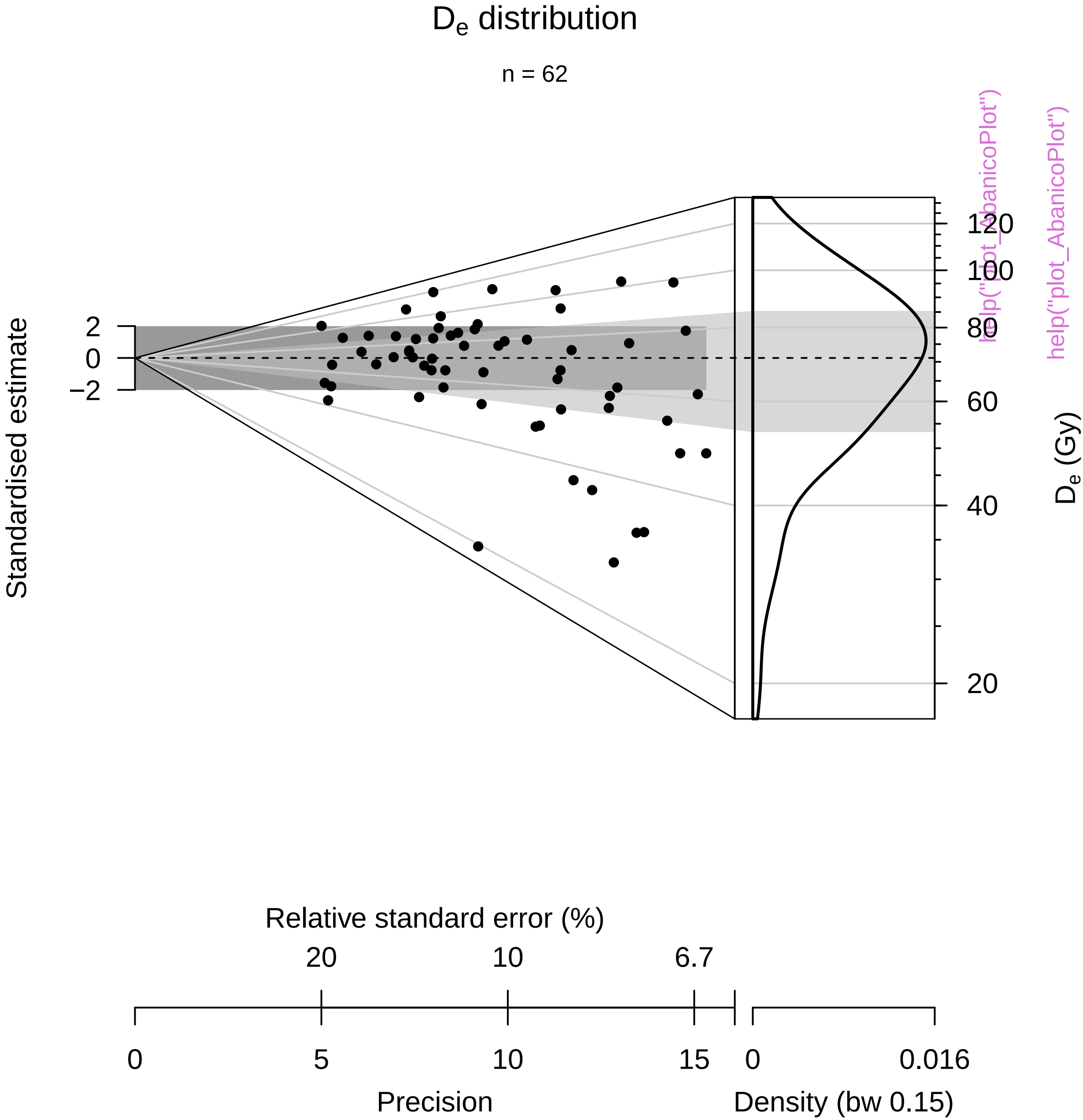
De distribution
n = 62
Standardised estimate
2
0
−2
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
120
100
80
60
40
20
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
0
0.016
Precision
Density (bw 0.15)



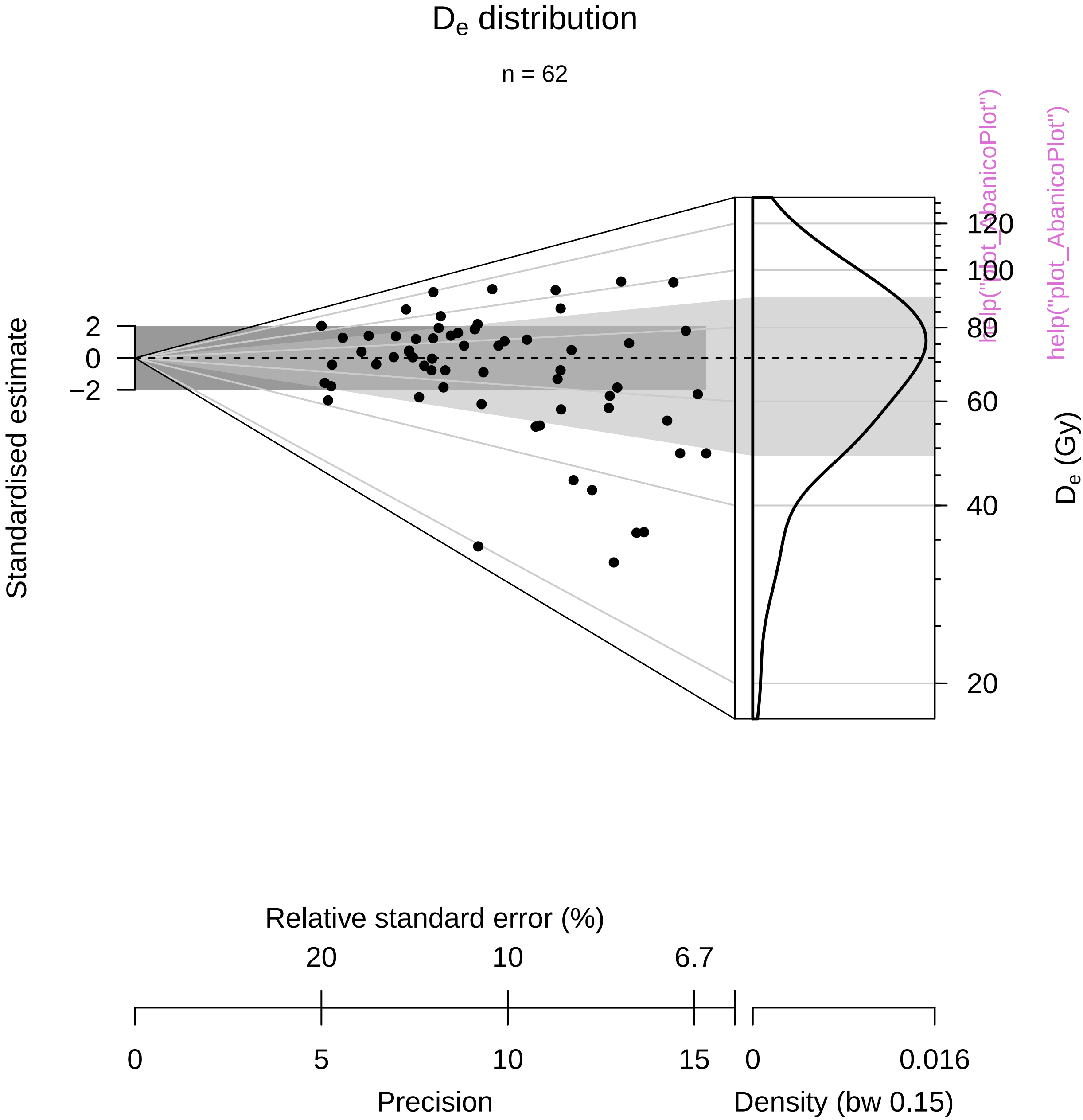
D_e distribution
n = 62
Standardised estimate
2
0
−2
120
100
80
60
40
20
D_e (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)



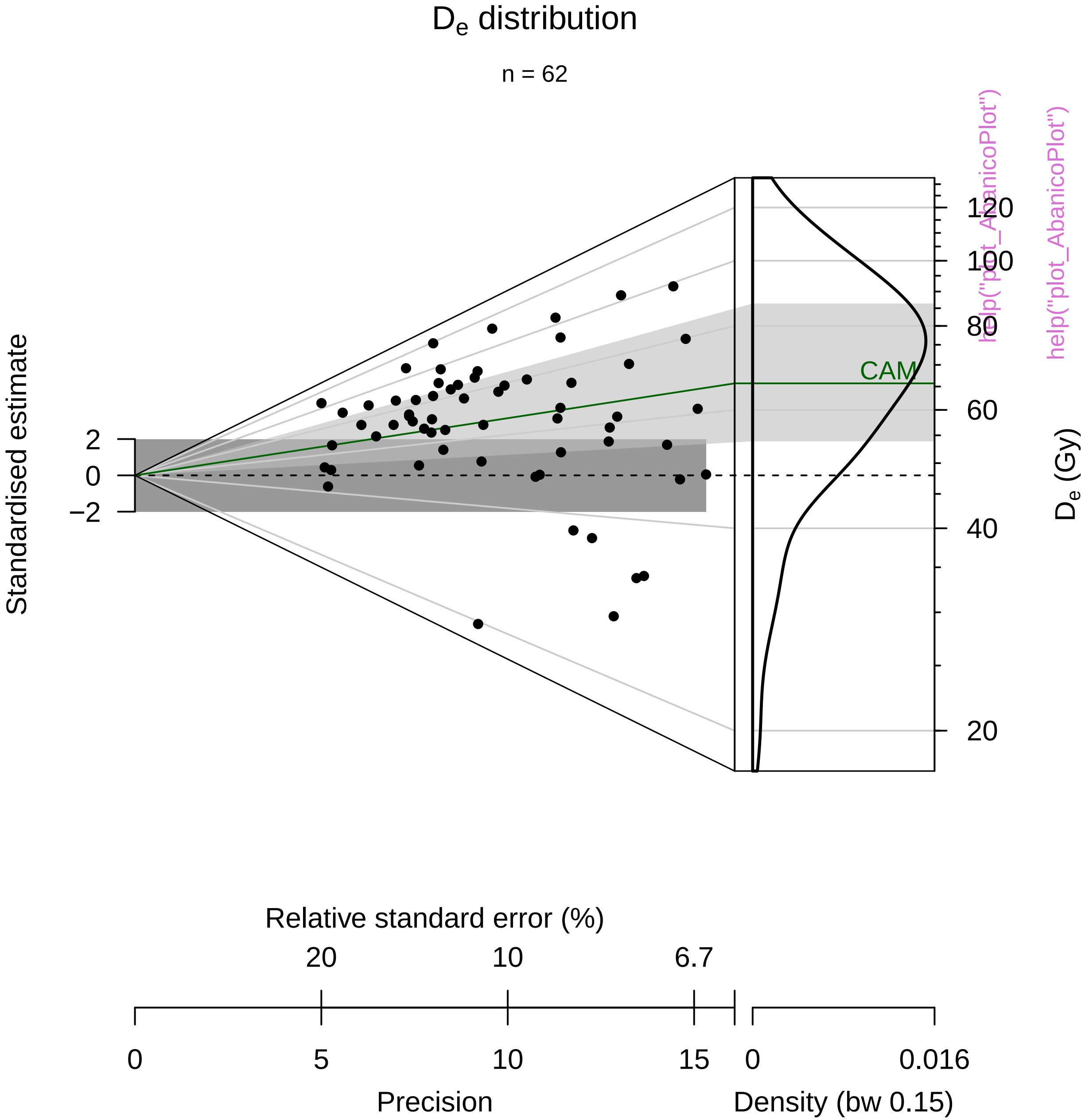
D_e distribution
n = 62
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Standardised estimate
2
0
−2
120
100
80
60
40
20
D_e (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)



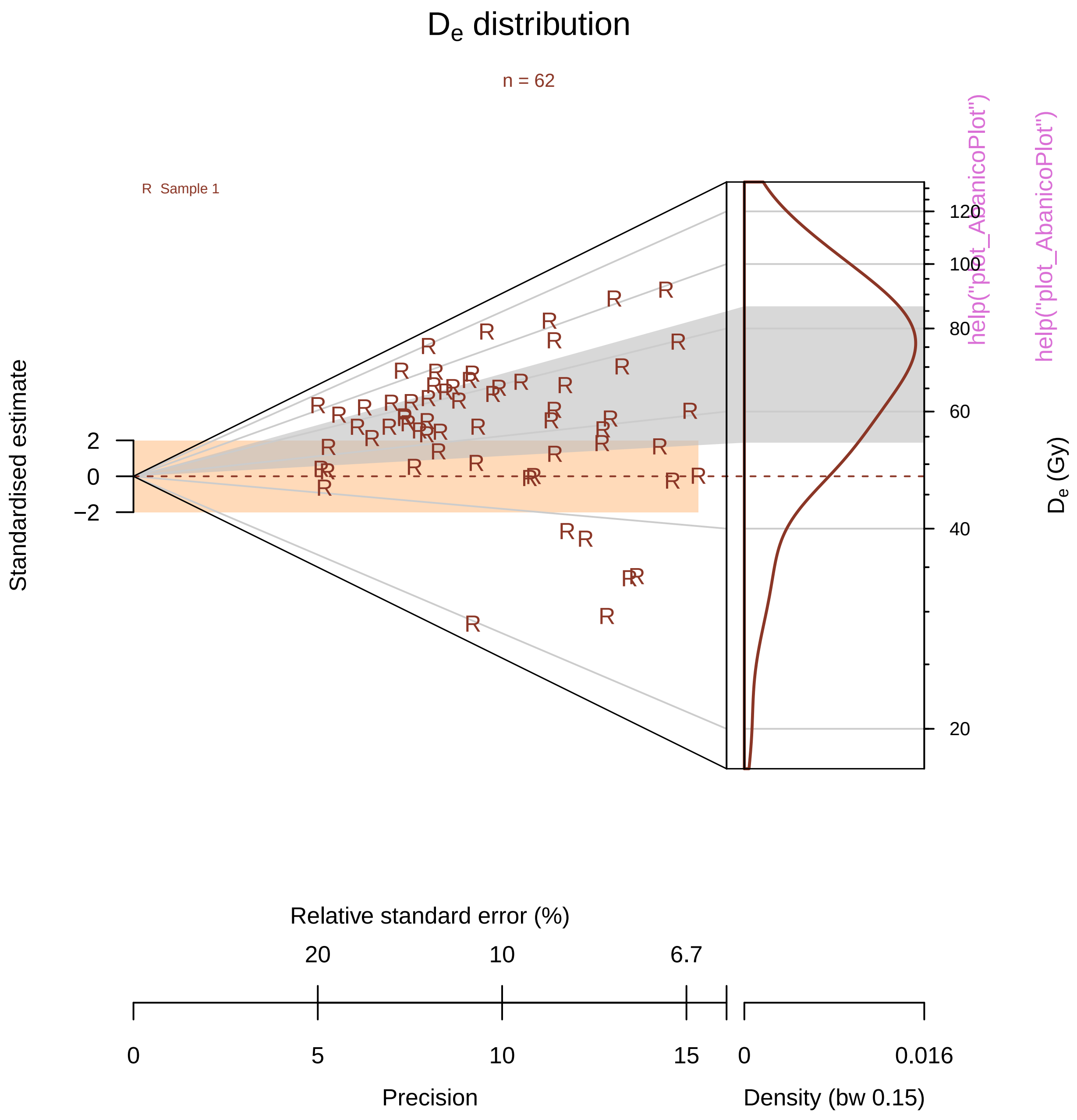
De distribution
n = 62
Standardised estimate
2
0
−2
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
120
100
80
60
40
20
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
0
0.016
Precision
Density (bw 0.15)



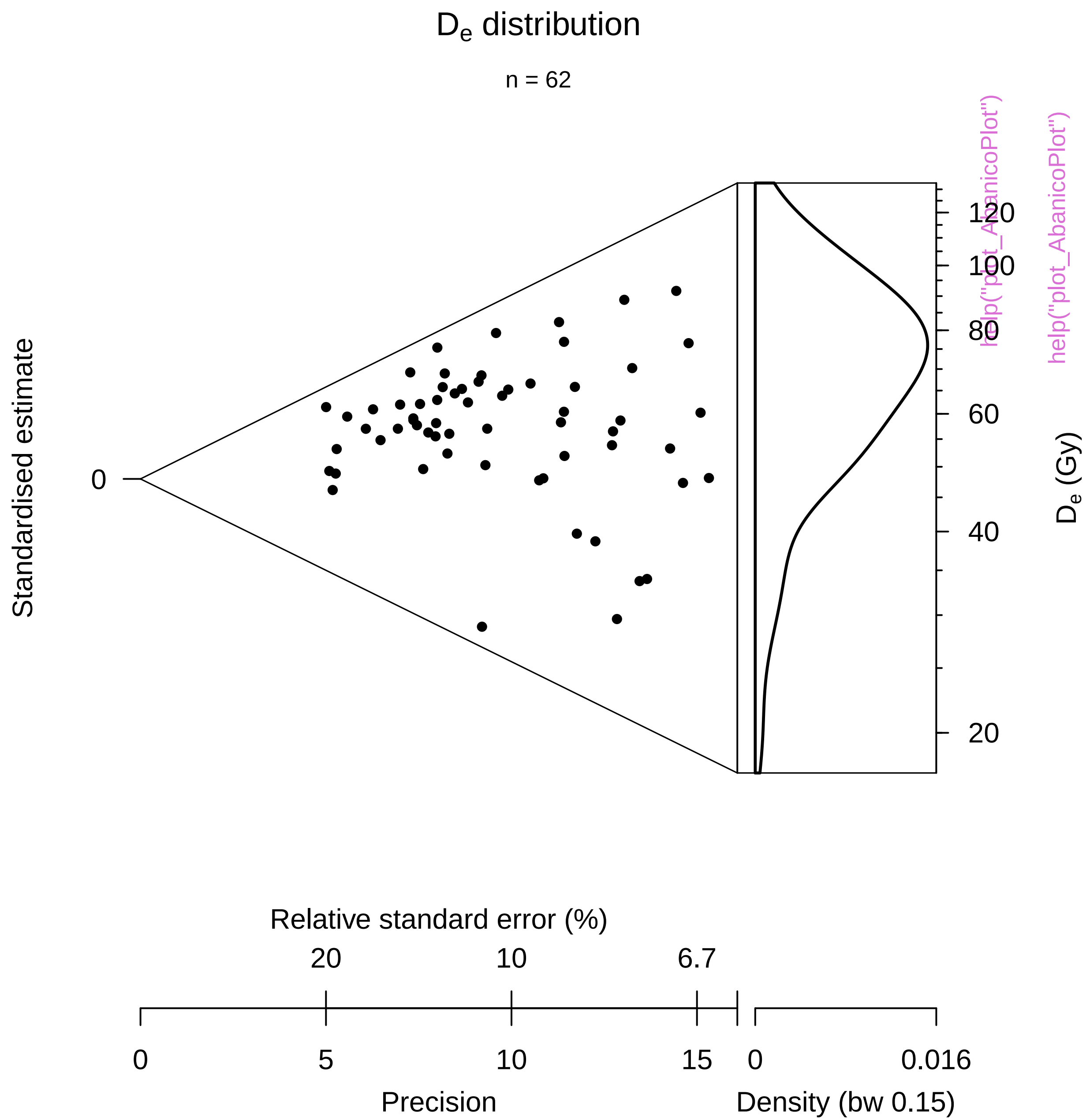
D_e distribution
n = 62
Standardised estimate
2
0
−2
120
100
80
60
40
20
D_e (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
0
0.016
Precision
Density (bw 0.15)



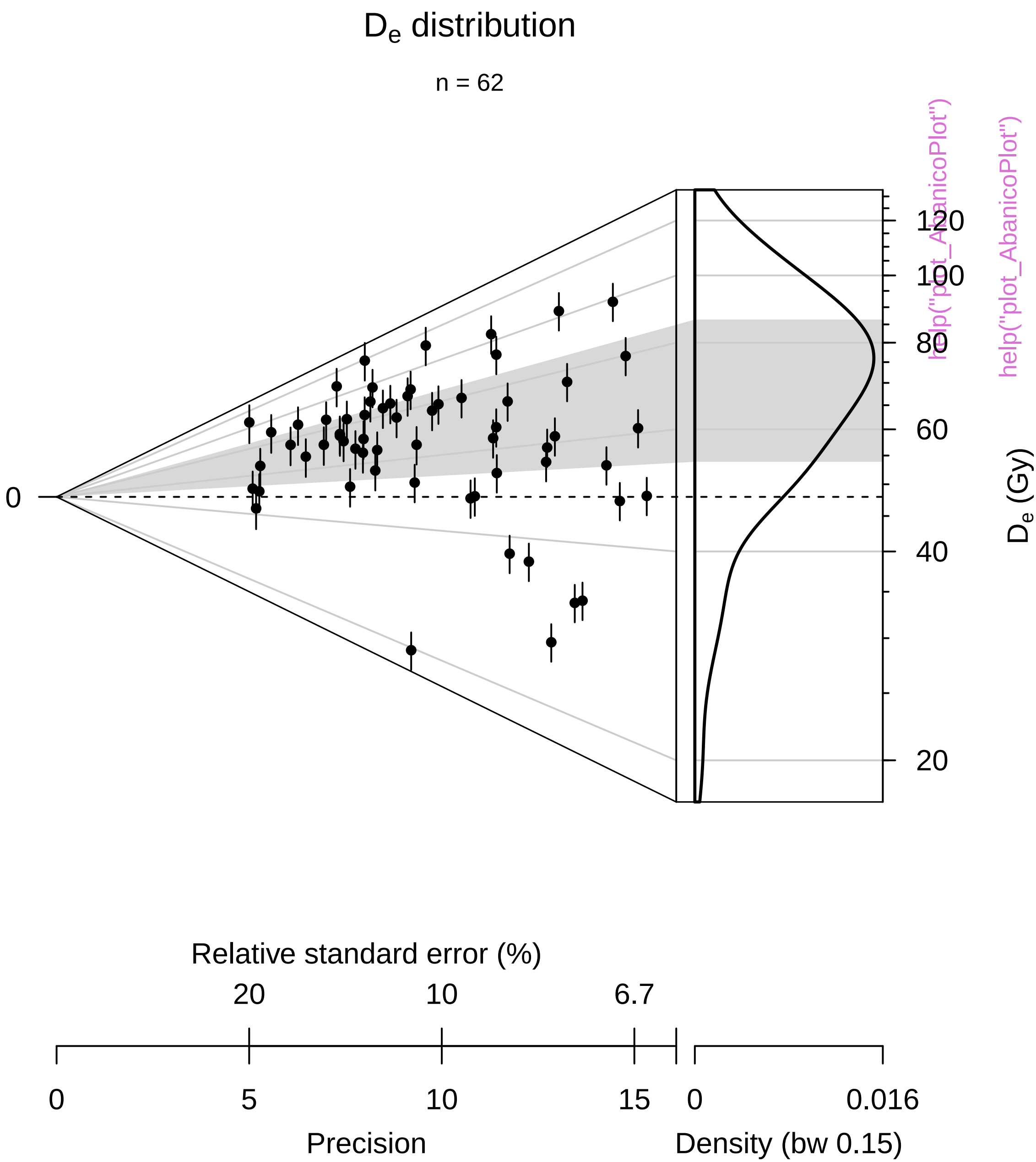
D_e distribution
n = 62
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
120
100
80
60
40
20
D_e (Gy)
CAM
Standardised estimate
2
0
−2
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)



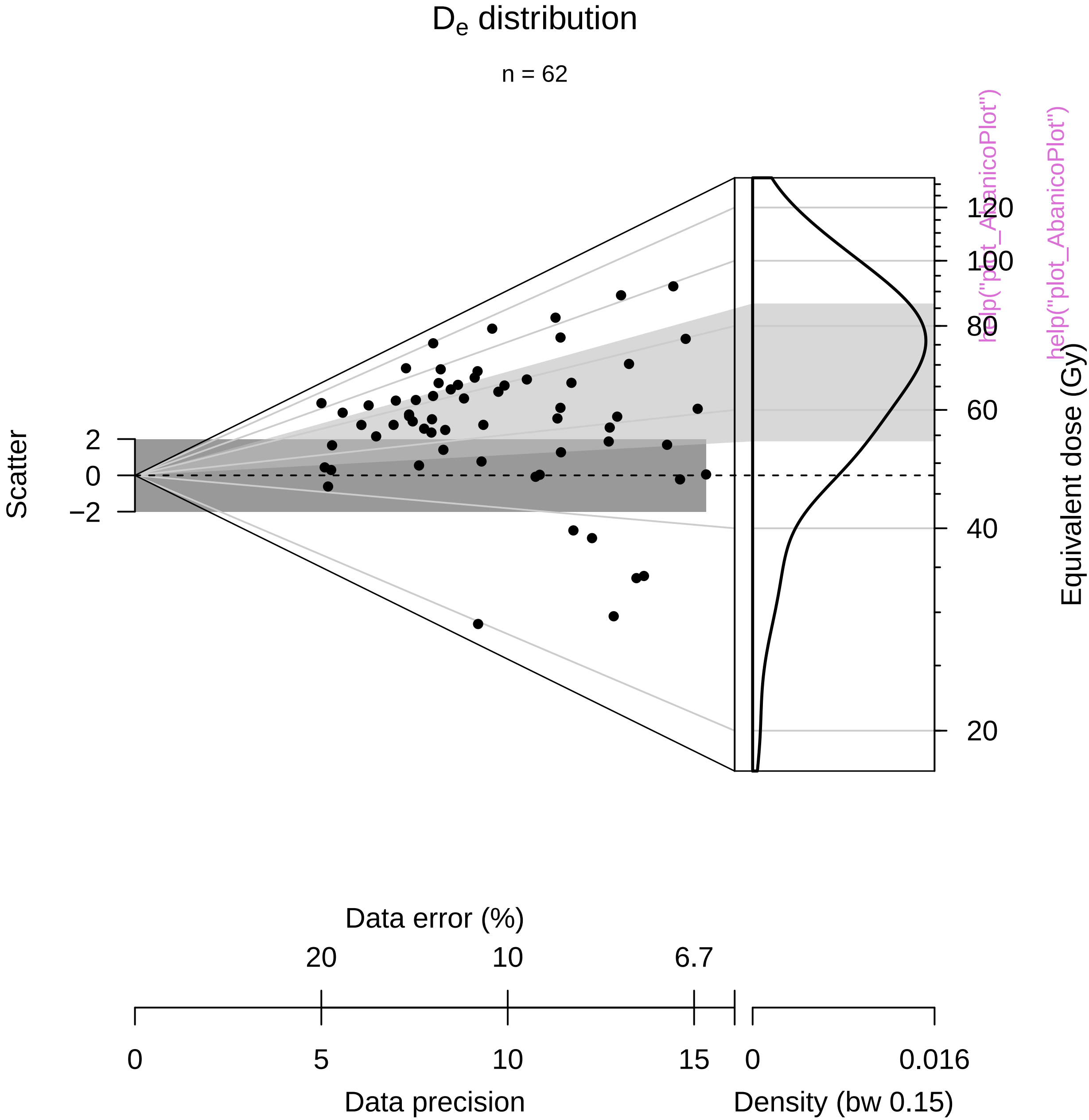
De distribution
n = 62
R Sample 1
Standardised estimate
2
0
−2
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
120
100
80
60
40
20
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
0
0.016
Precision
Density (bw 0.15)



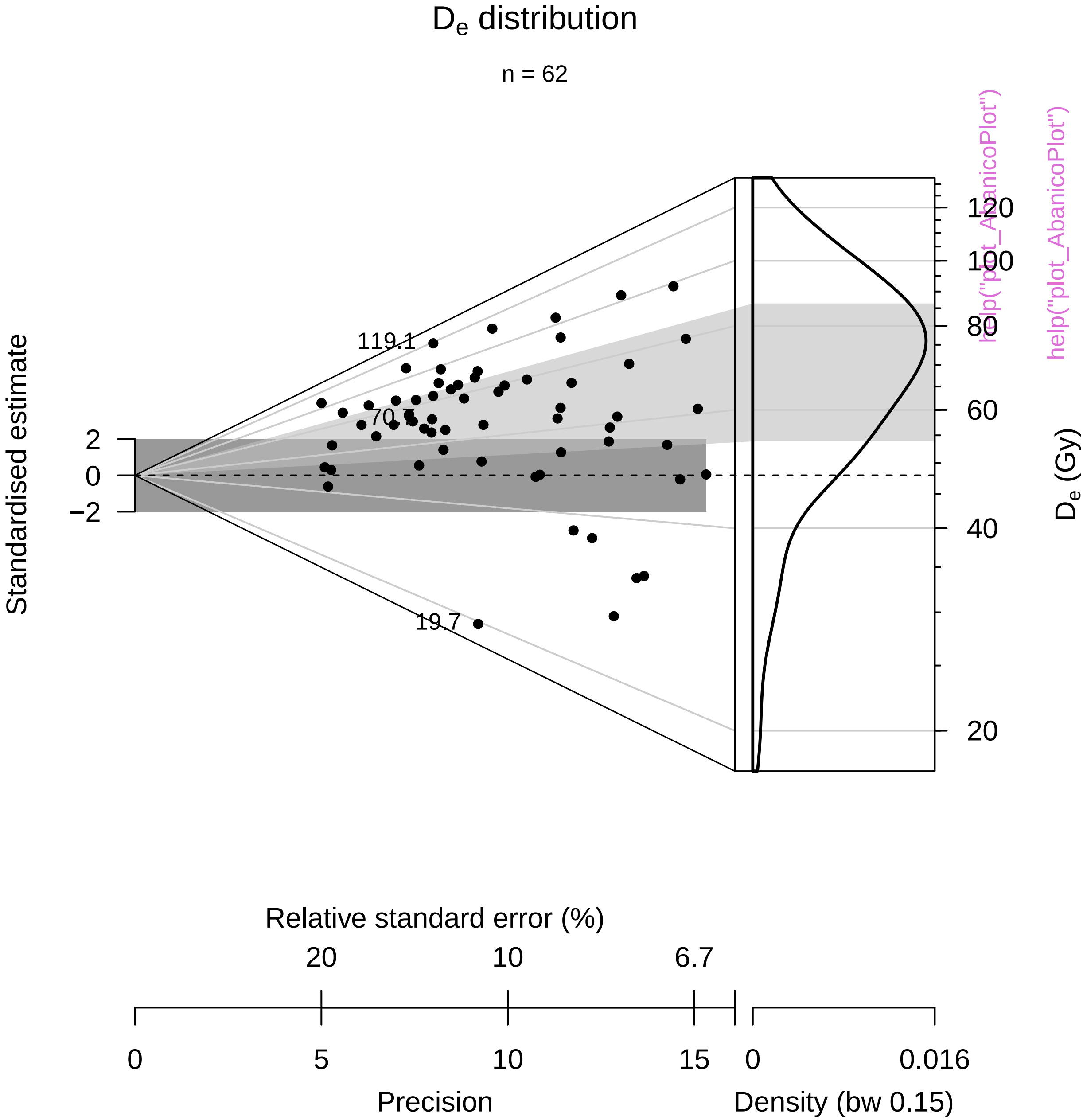
D_e distribution
n = 62
Standardised estimate
0
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
120
100
80
60
40
20
D_e (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
0
0.016
Precision
Density (bw 0.15)



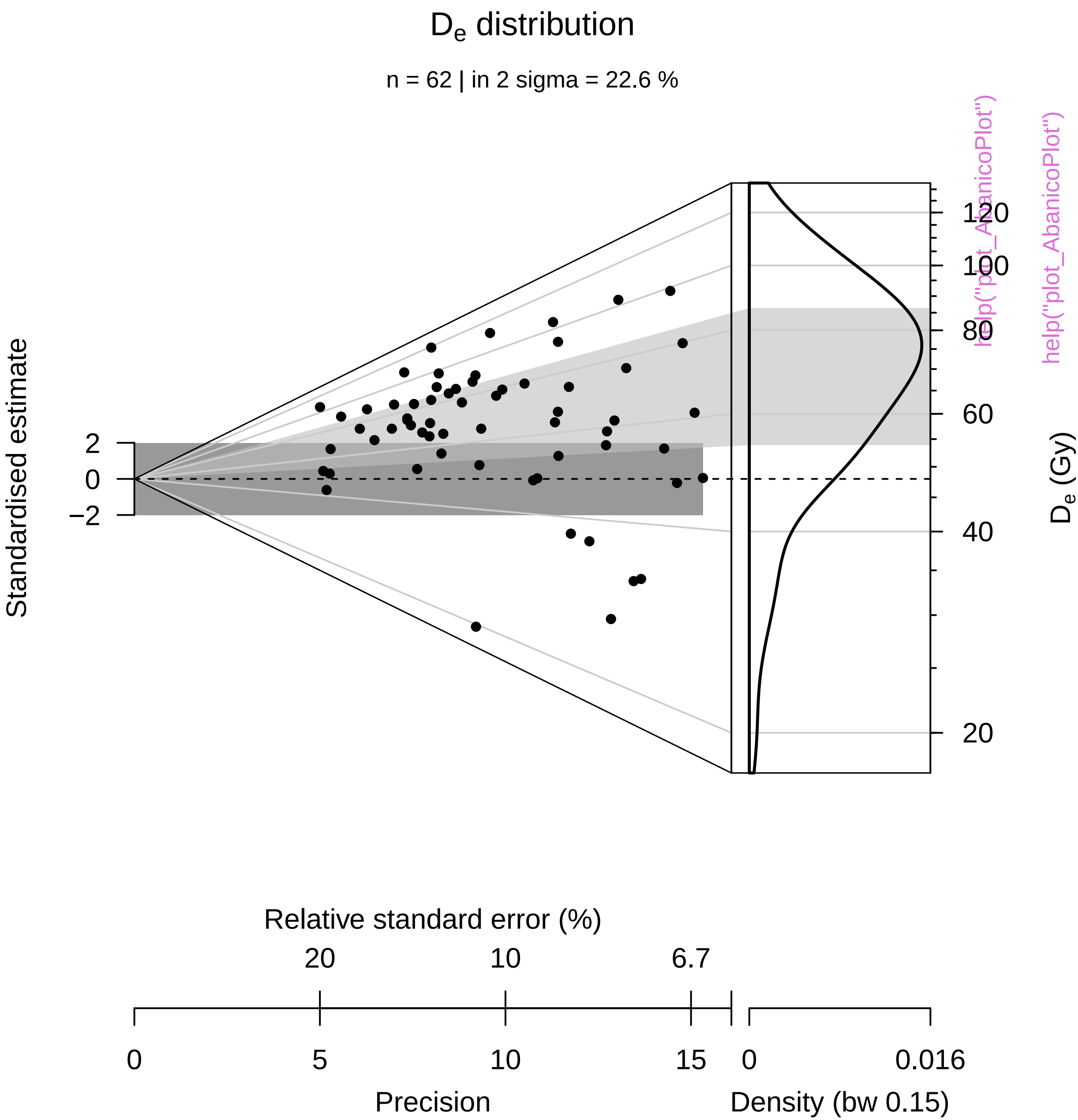
D_e distribution
n = 62
0
120
100
80
60
40
20
D_e (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
0
0.016
Precision
Density (bw 0.15)



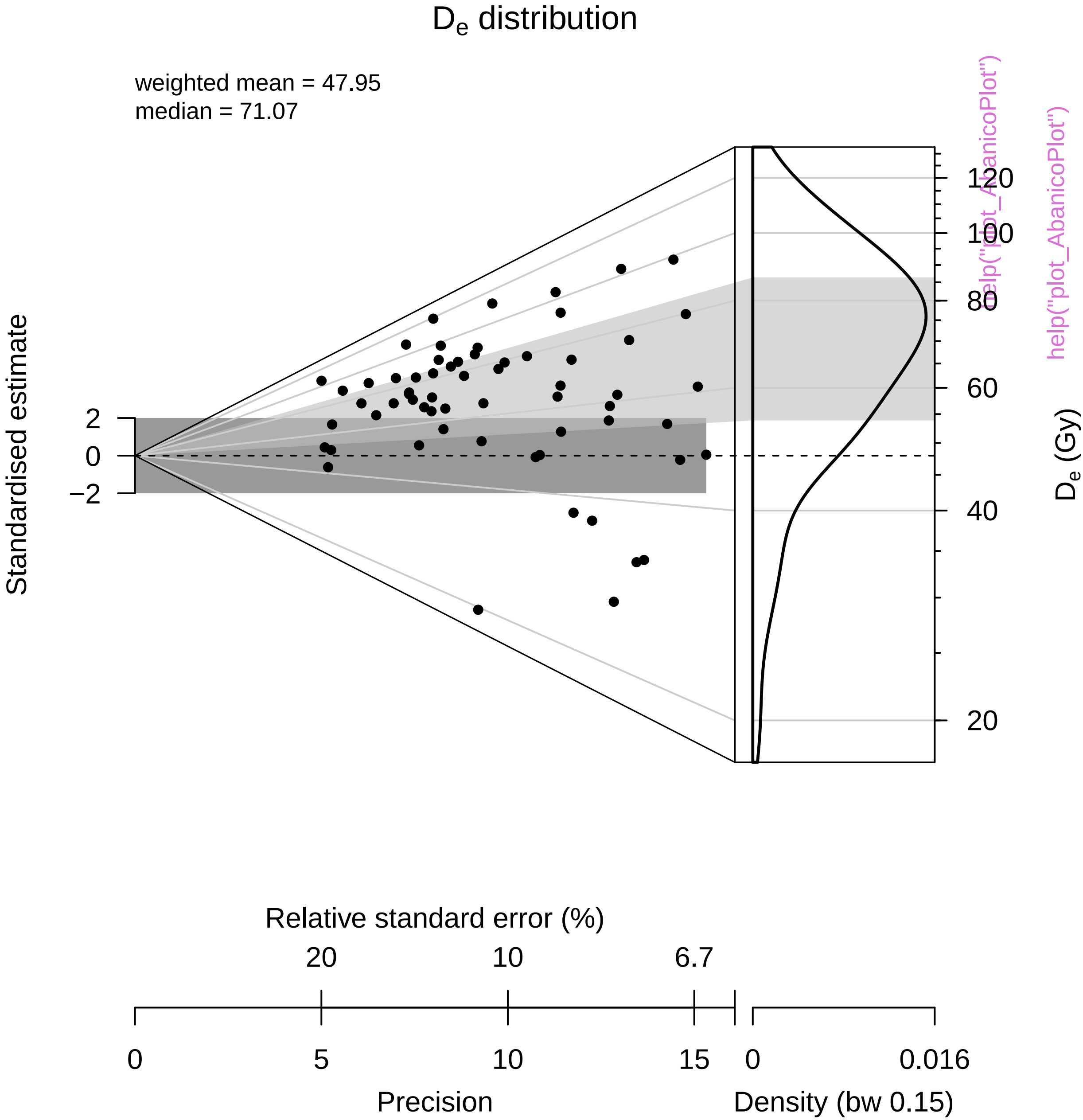
De distribution
n = 62
Scatter
2
0
−2
120
100
80
60
40
20
Equivalent dose (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Data error (%)
20
10
6.7
0
5
10
15
0
0.016
Data precision
Density (bw 0.15)



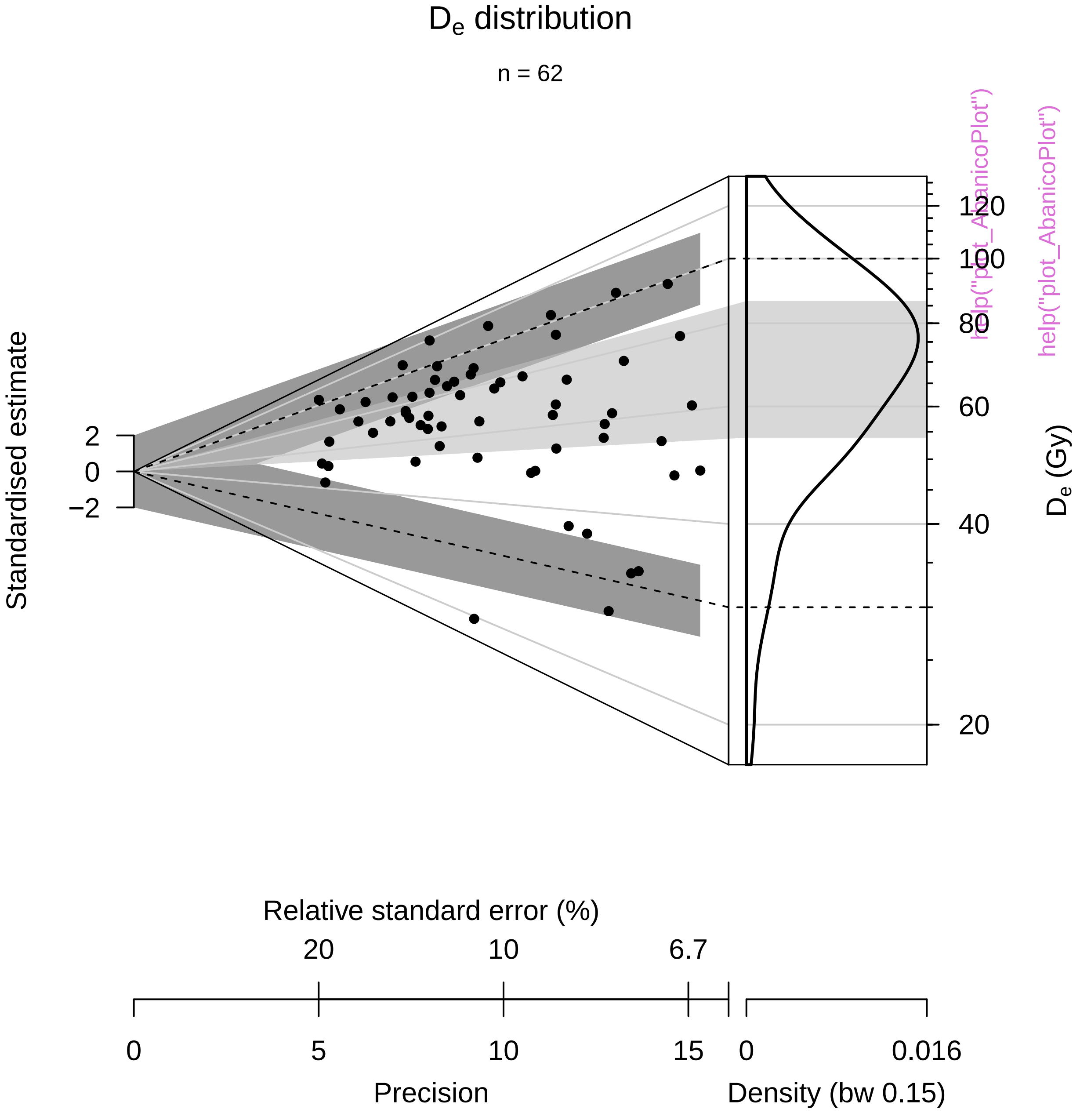
D_e distribution
n = 62
Standardised estimate
2
0
−2
119.1
70.7
19.7
120
100
80
60
40
20
D_e (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)



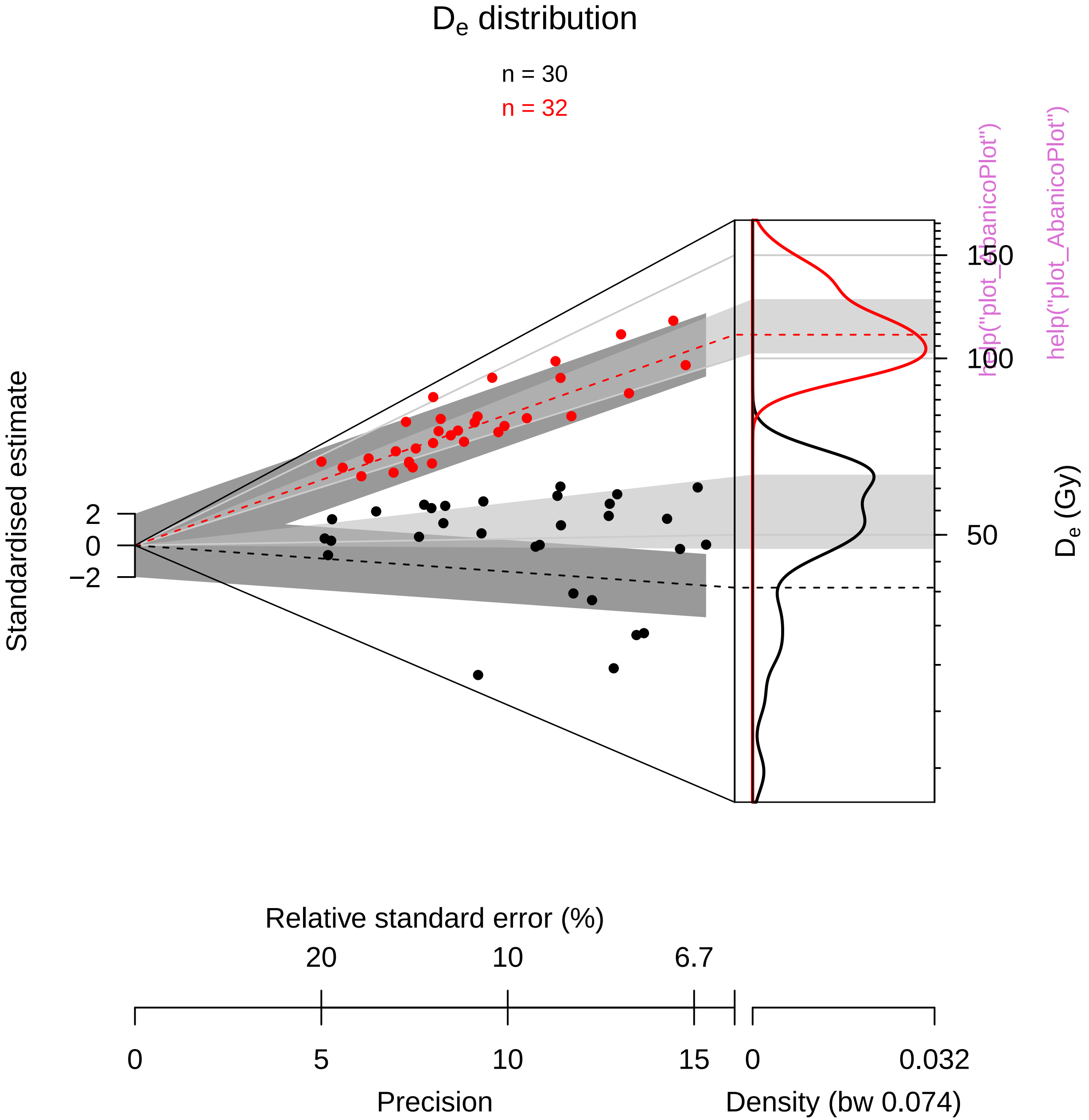
D_e distribution
n = 62 | in 2 sigma = 22.6 %
Standardised estimate
2
0
−2
120
100
80
60
40
20
D_e (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)



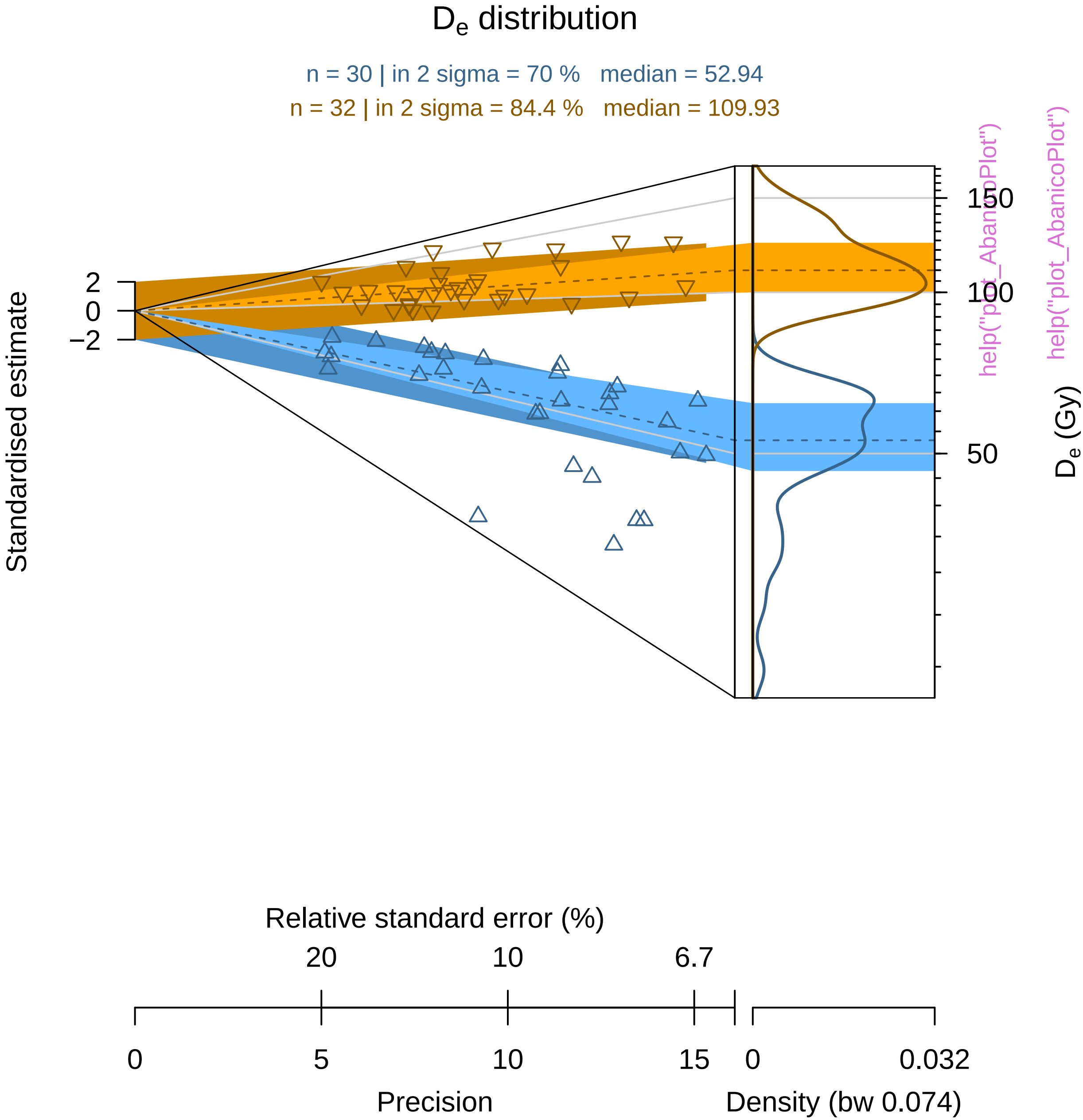
De distribution
weighted mean = 47.95
median = 71.07
Standardised estimate
2
0
−2
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
120
100
80
60
40
20
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
0
0.016
Precision
Density (bw 0.15)



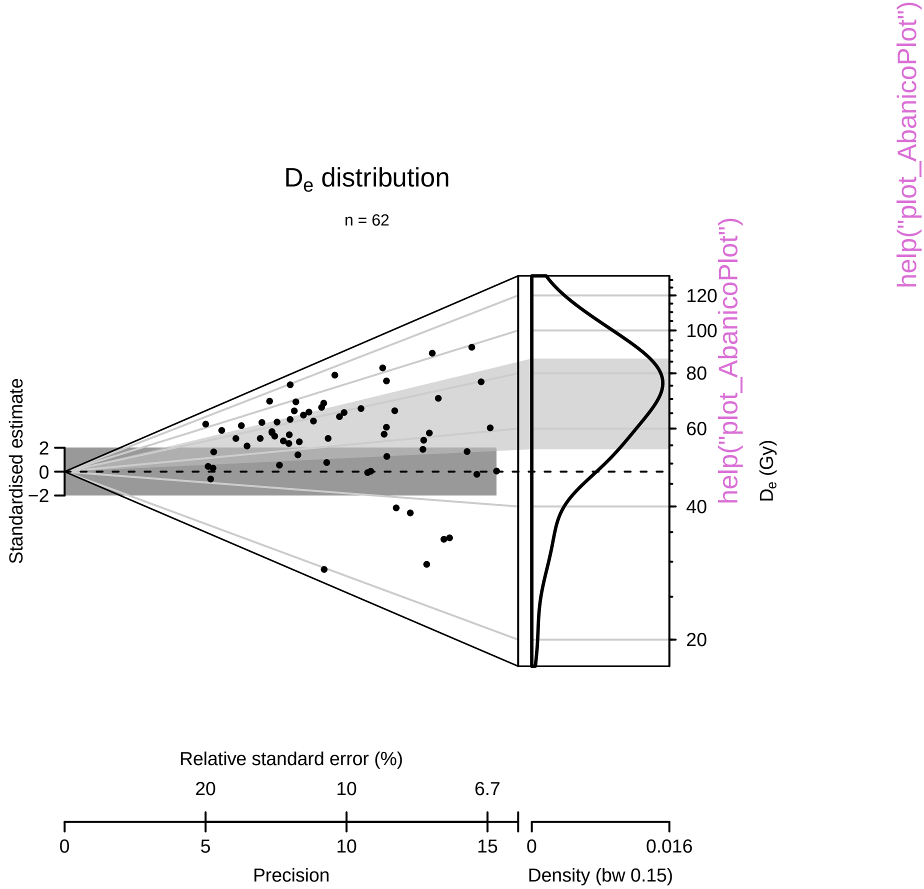
D_e distribution
n = 62
Standardised estimate
2
0
−2
120
100
80
60
40
20
D_e (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
0
0.016
Precision
Density (bw 0.15)



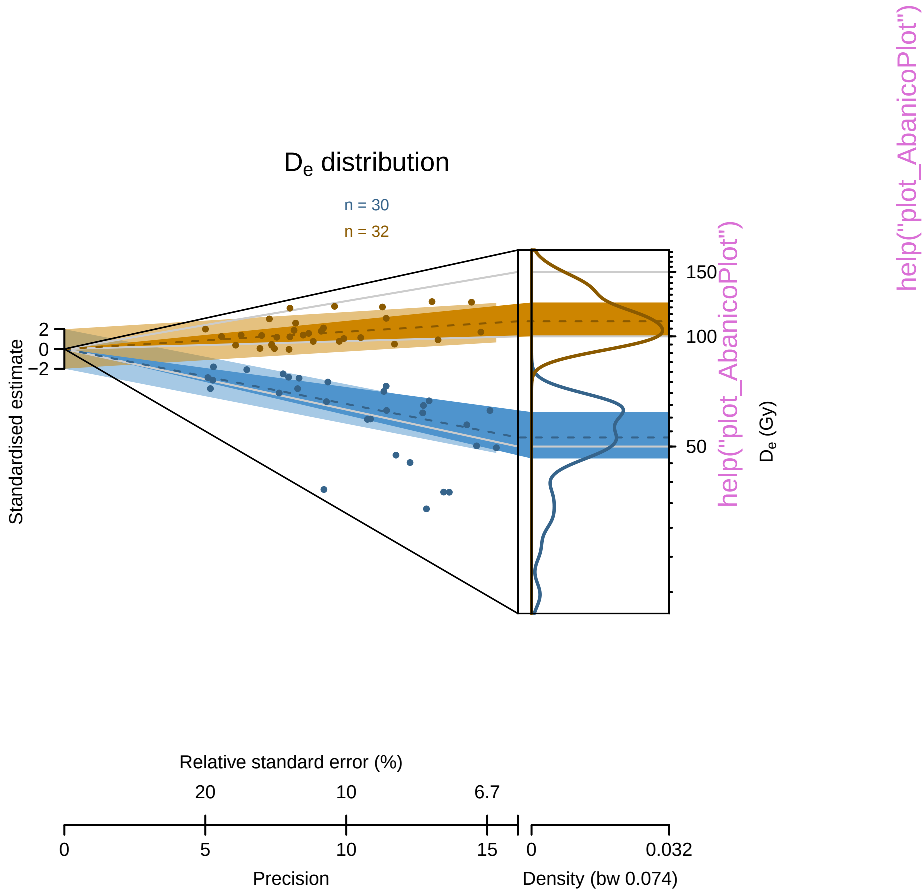
D_e distribution
n = 30
n = 32
Standardised estimate
2
0
−2
150
100
50
D_e (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.032
Density (bw 0.074)



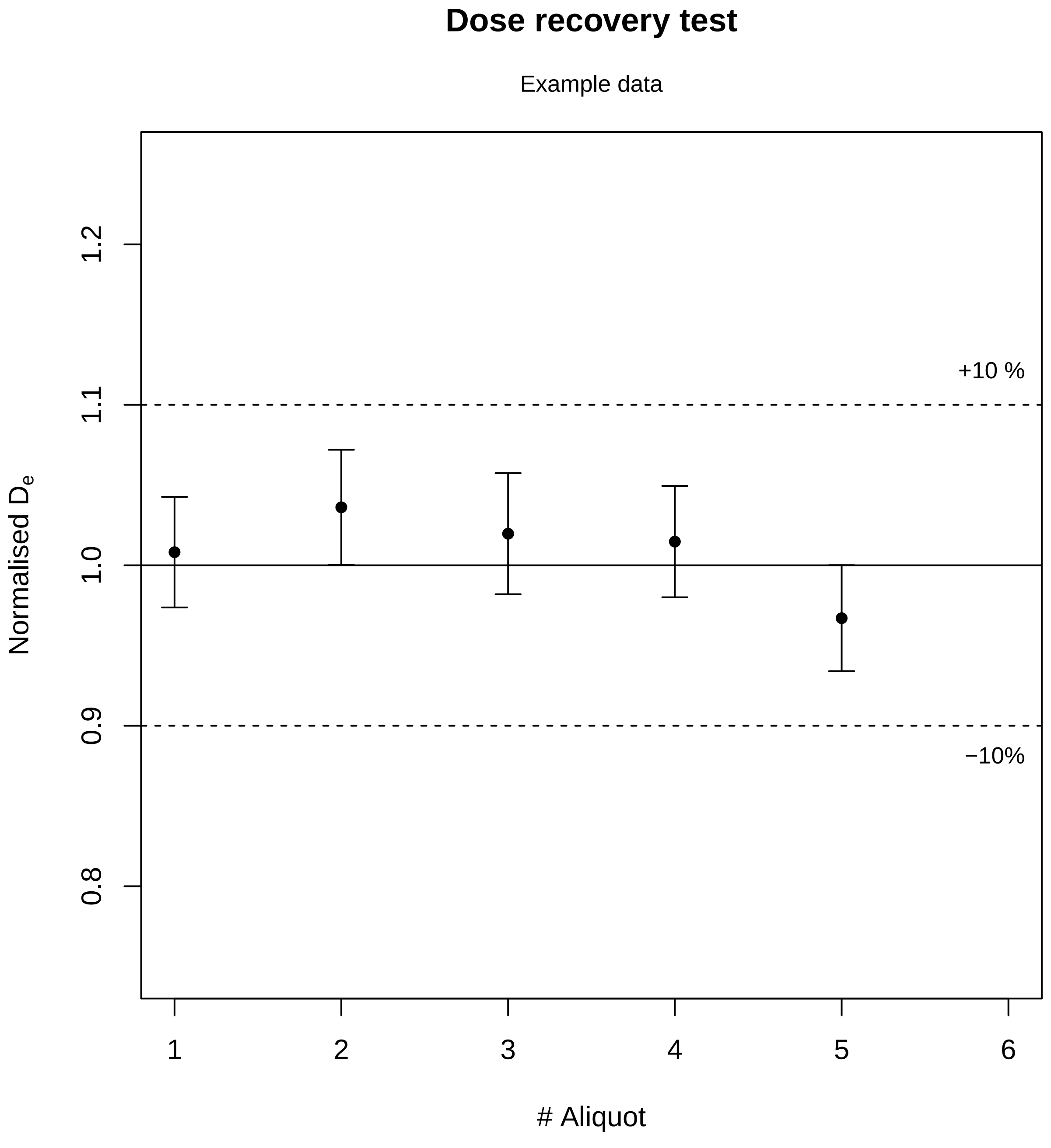
De distribution
n = 30 | in 2 sigma = 70 % median = 52.94
n = 32 | in 2 sigma = 84.4 % median = 109.93
Standardised estimate
2
0
−2
150
100
50
De (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.032
Density (bw 0.074)



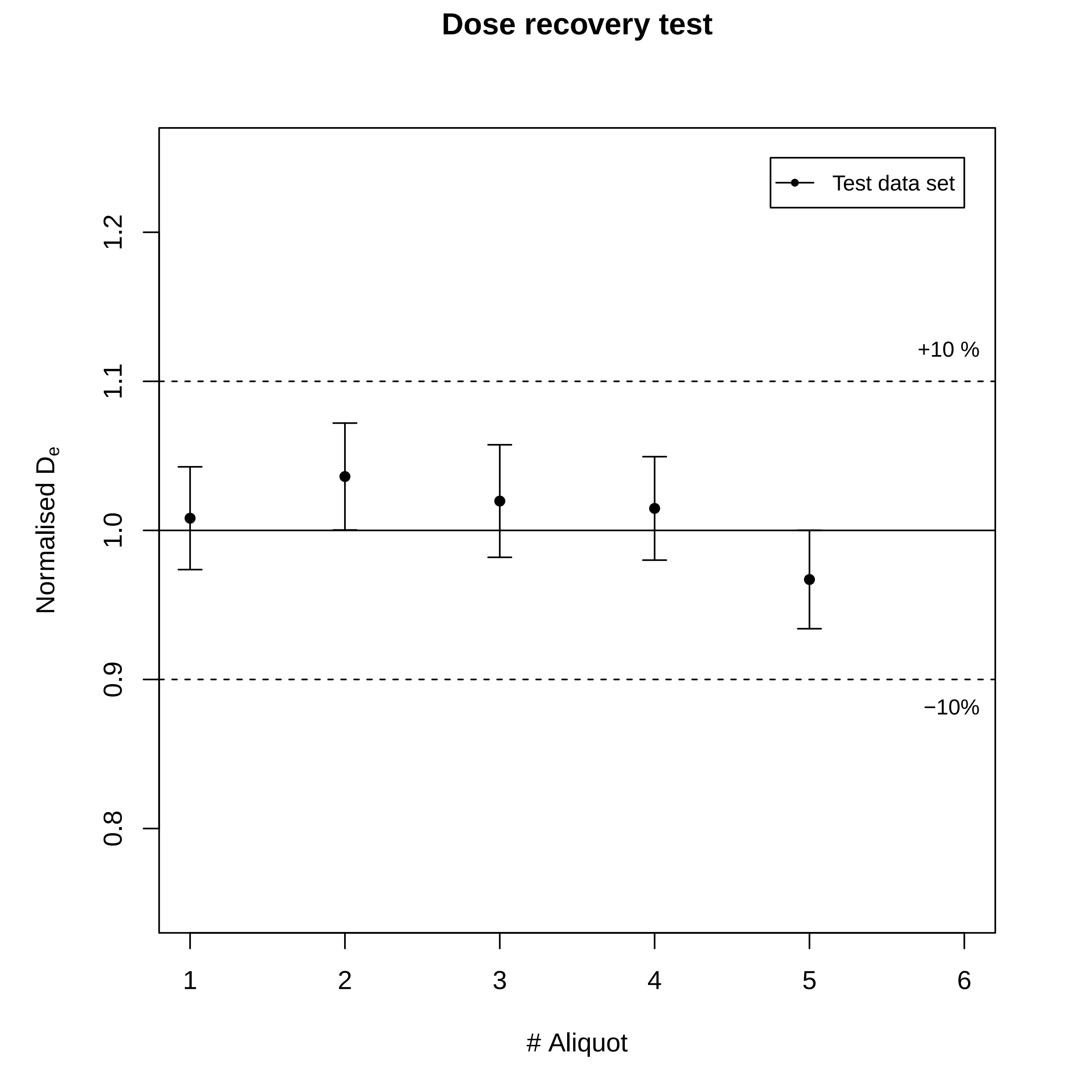
De distribution
n = 62
Standardised estimate
2
0
−2
120
100
80
60
40
20
De (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.016
Density (bw 0.15)



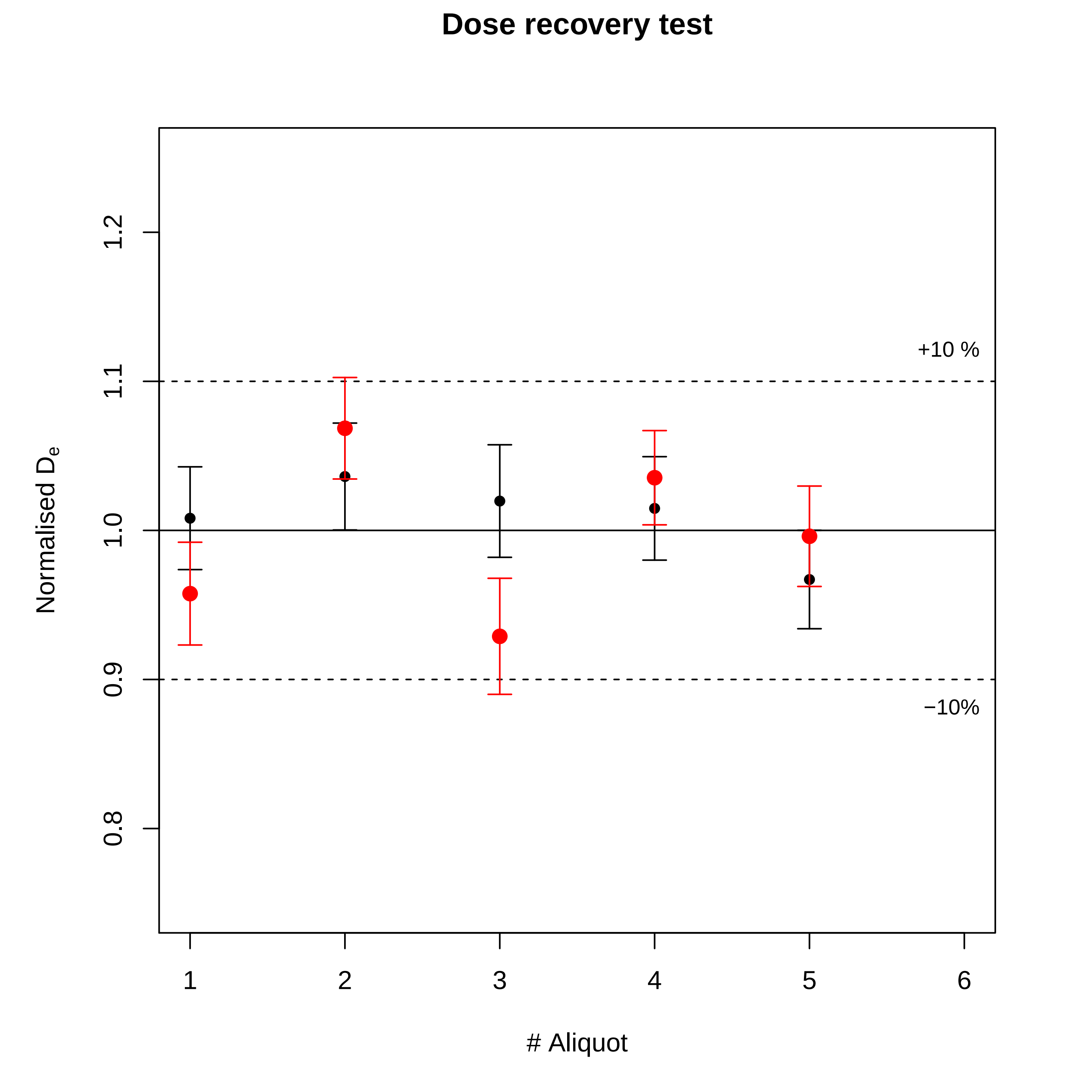
De distribution
n = 30
n = 32
Standardised estimate
2
0
−2
150
100
50
De (Gy)
help("plot_AbanicoPlot")
help("plot_AbanicoPlot")
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision
0
0.032
Density (bw 0.074)

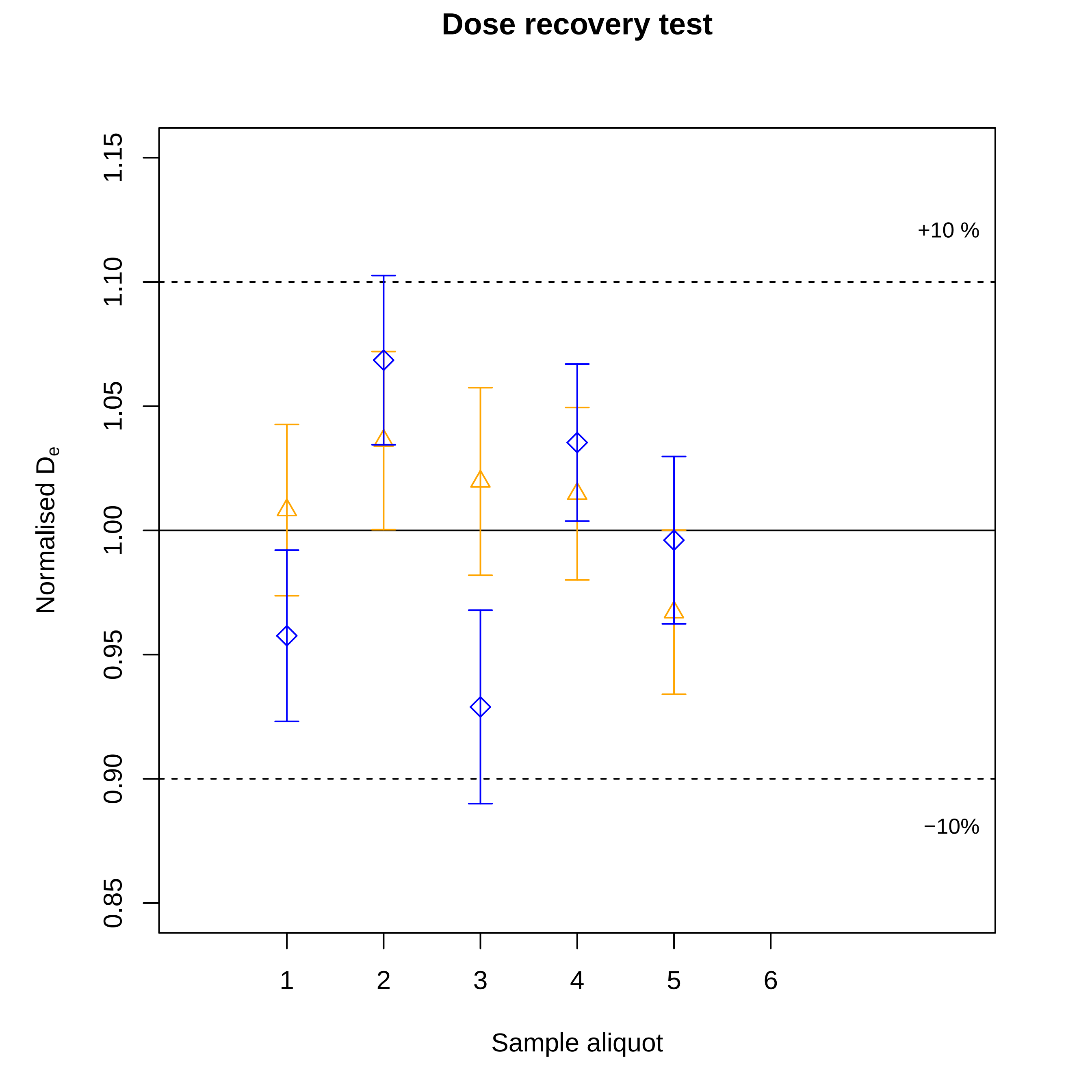


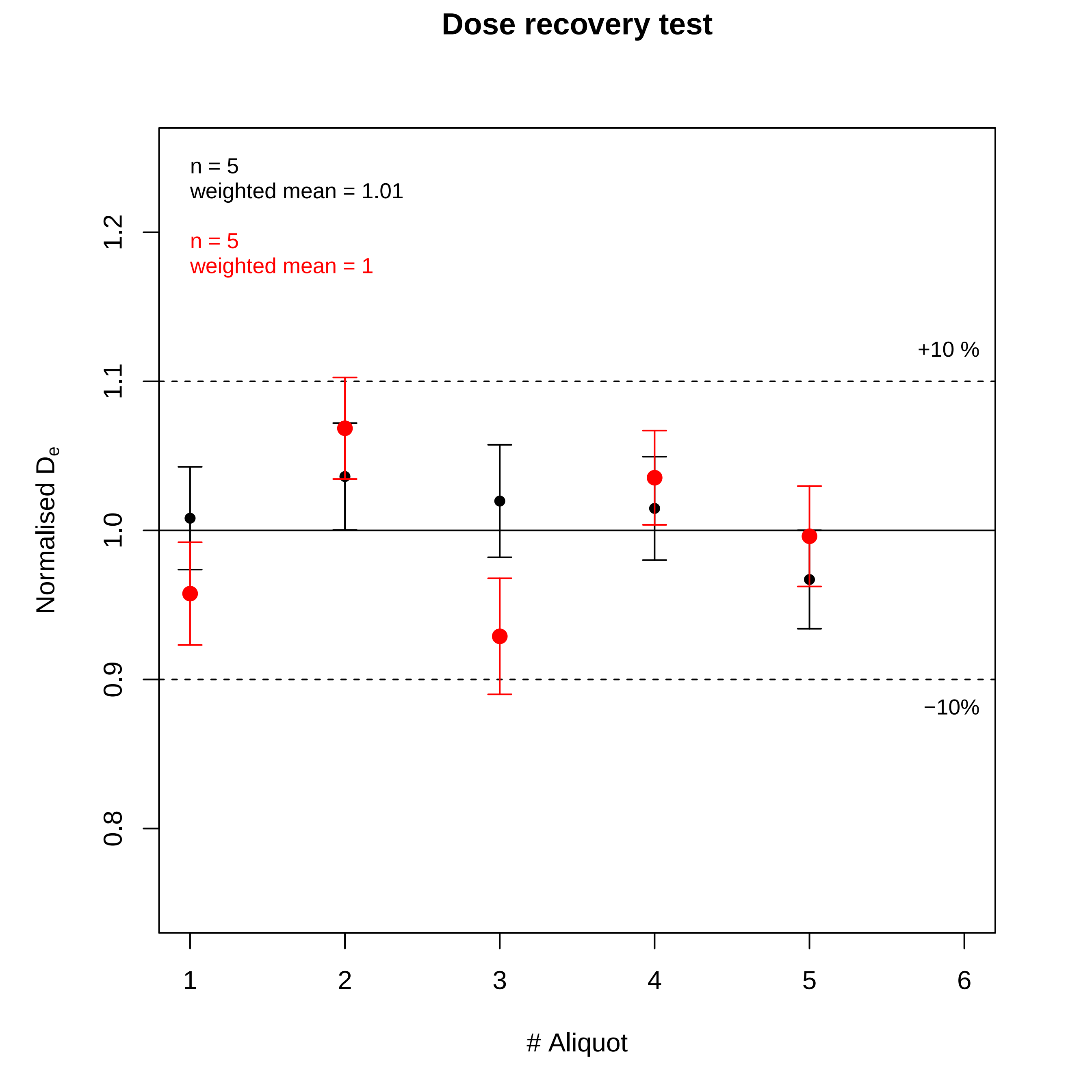
Dose recovery test
Example data
+10 %
−10%
Normalised D_e
1.2
1.1
1.0
0.9
0.8
1
2
3
4
5
6
Aliquot



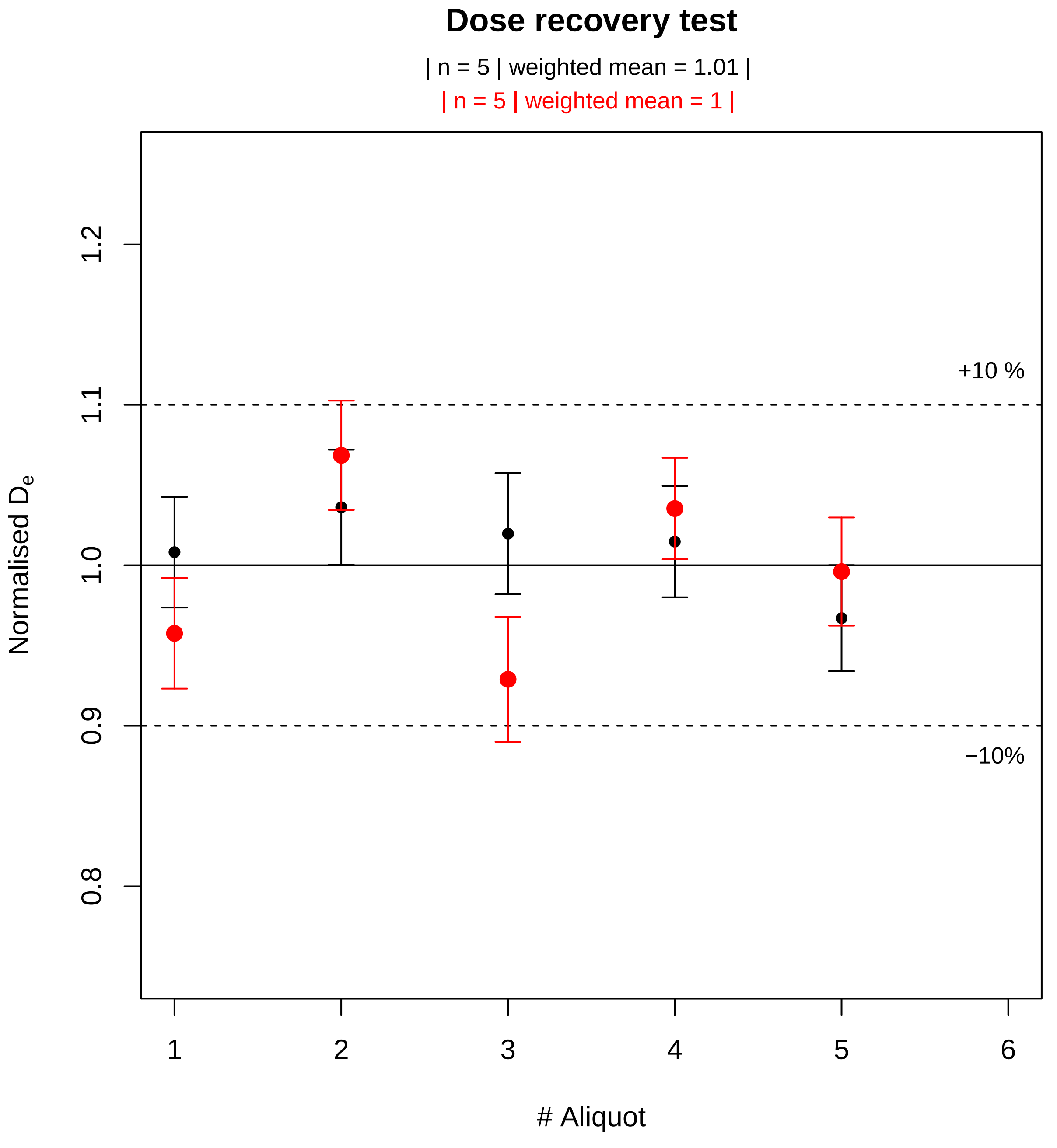
Dose recovery test
Test data set
+10 %
−10%
Normalised D_e
Aliquot
1.2
1.1
1.0
0.9
0.8
1
2
3
4
5
6


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

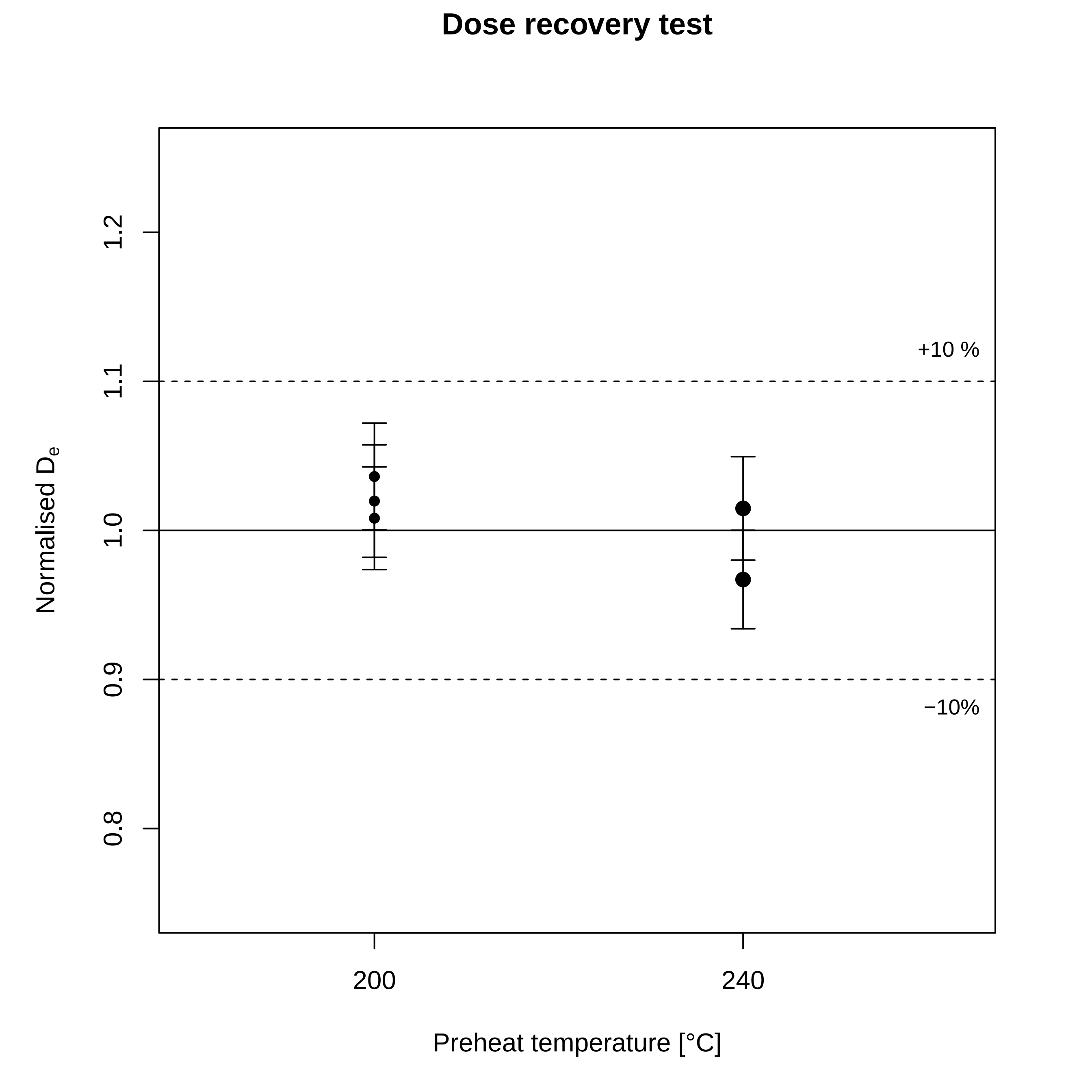

Dose recovery test
+10 %
−10%
Normalised D_e
1.15
1.10
1.05
1.00
0.95
0.90
0.85
1
2
3
4
5
6
Sample aliquot



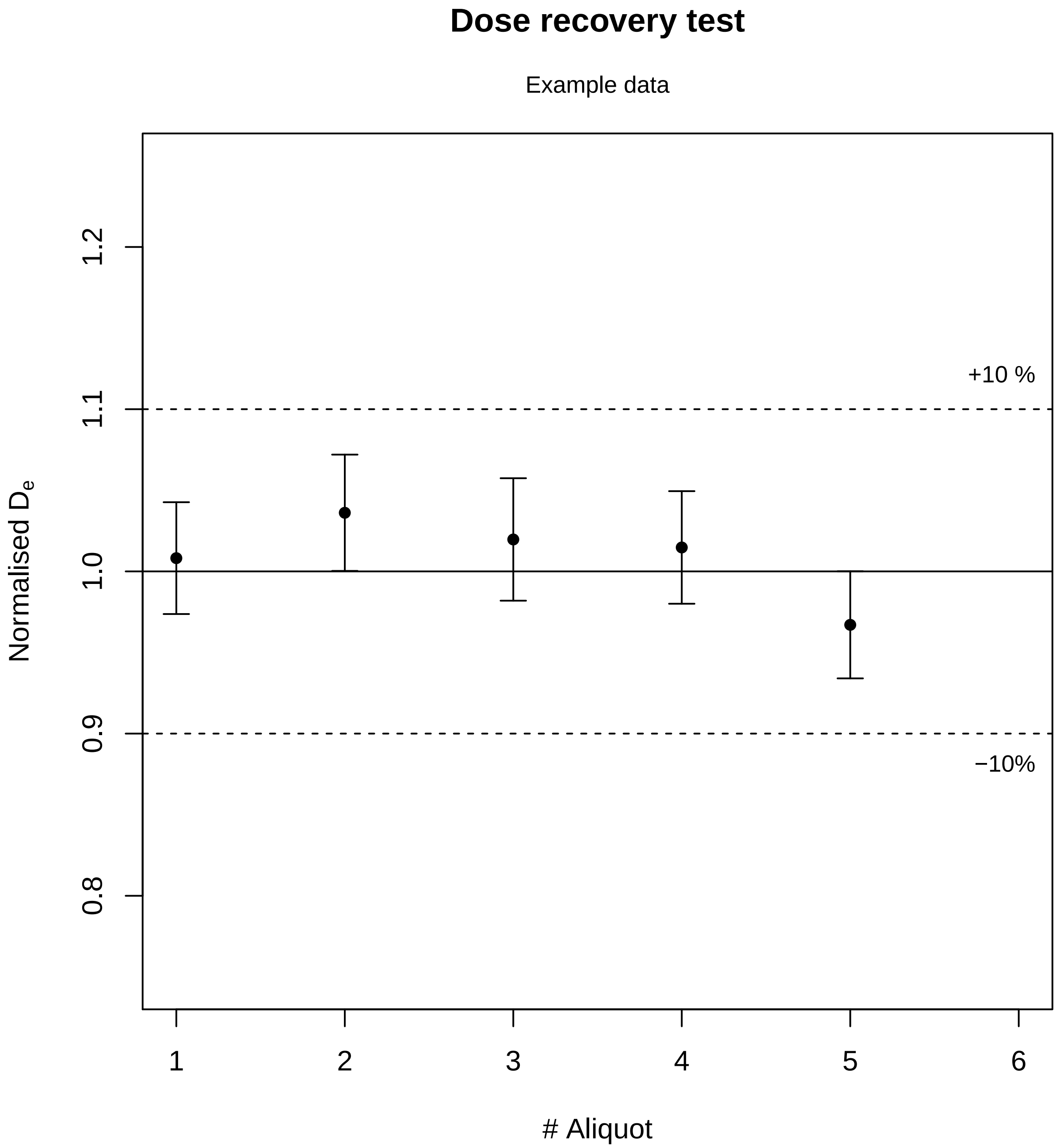
Dose recovery test
n = 5
weighted mean = 1.01
n = 5
weighted mean = 1
+10 %
−10%
1.2
1.1
1.0
0.9
0.8
Normalised D_e
1
2
3
4
5
6
Aliquot

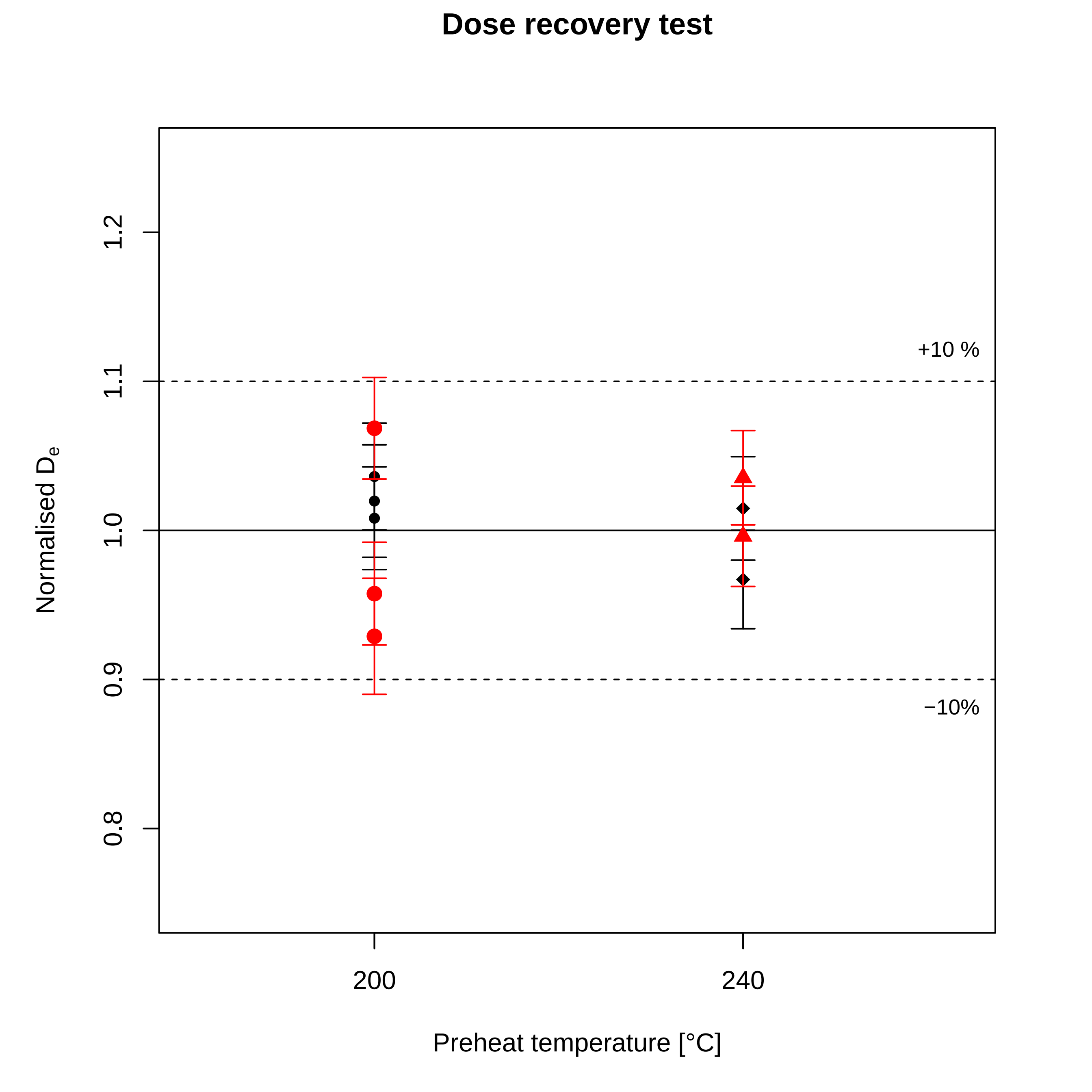


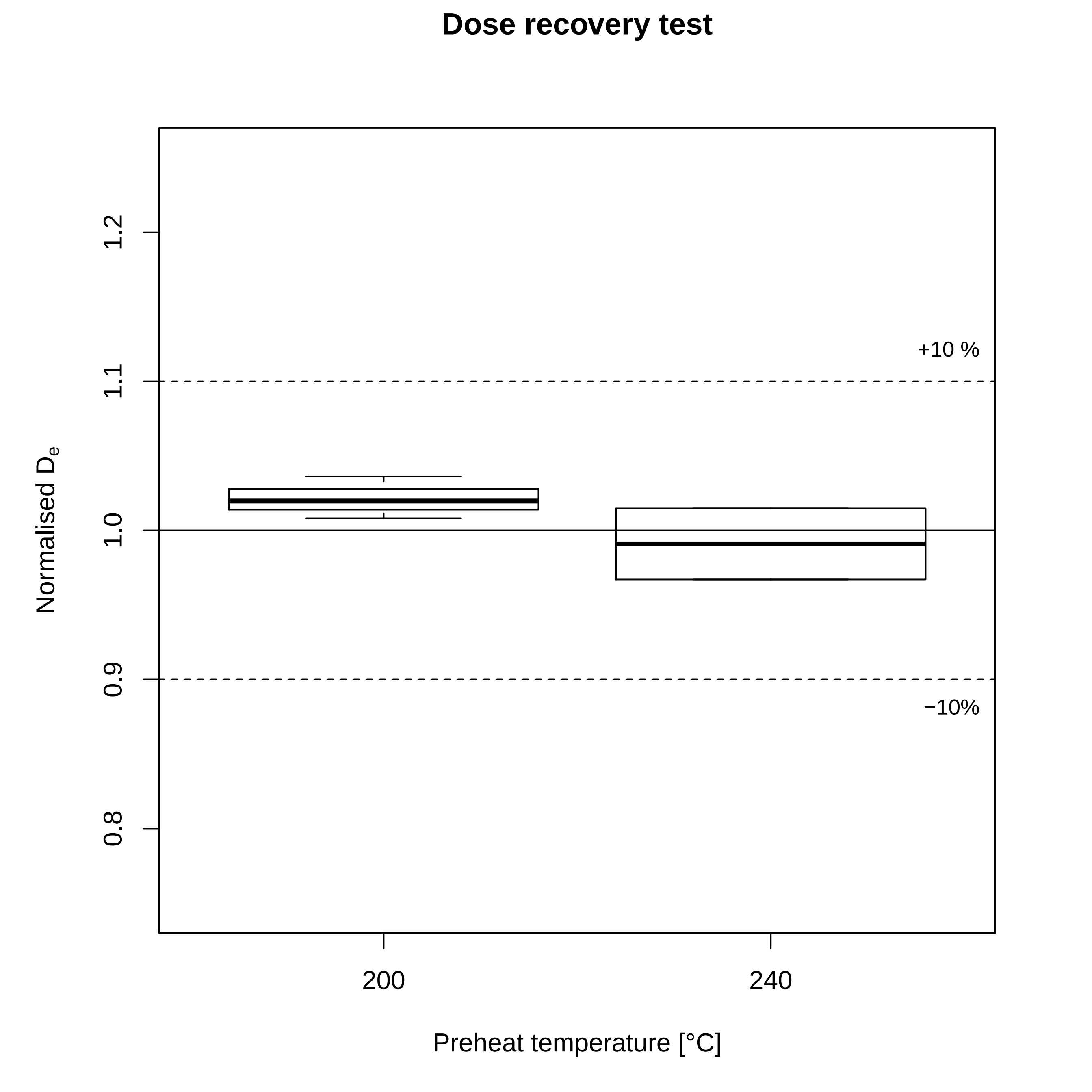
Dose recovery test
| n = 5 | weighted mean = 1.01 |
| n = 5 | weighted mean = 1 |
+10 %
−10%
Normalised D_e
Aliquot
0.8
0.9
1.0
1.1
1.2
1
2
3
4
5
6



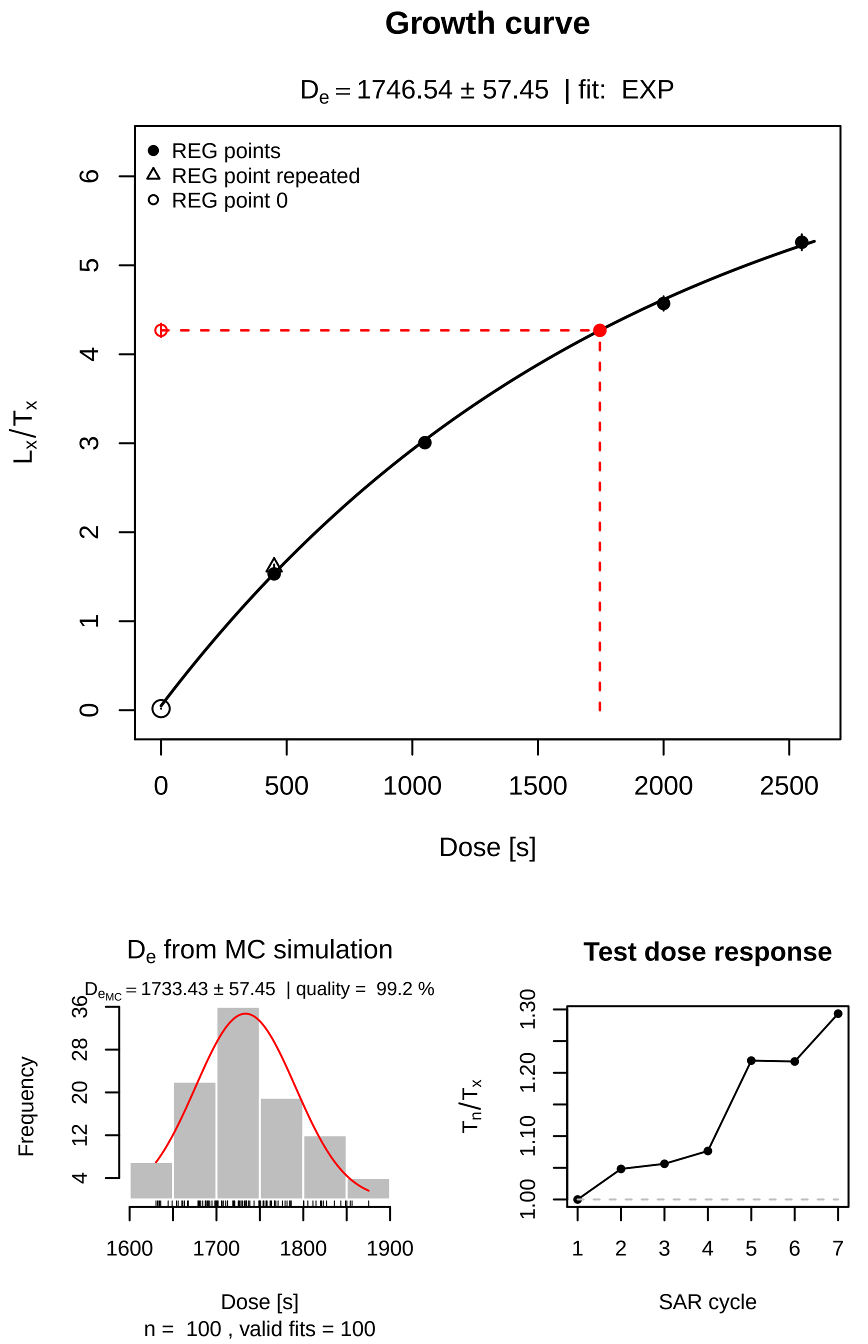
Dose recovery test
+10 %
−10%
1.2
1.1
1.0
0.9
0.8
Normalised D_e
200
240
Preheat temperature [°C]


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

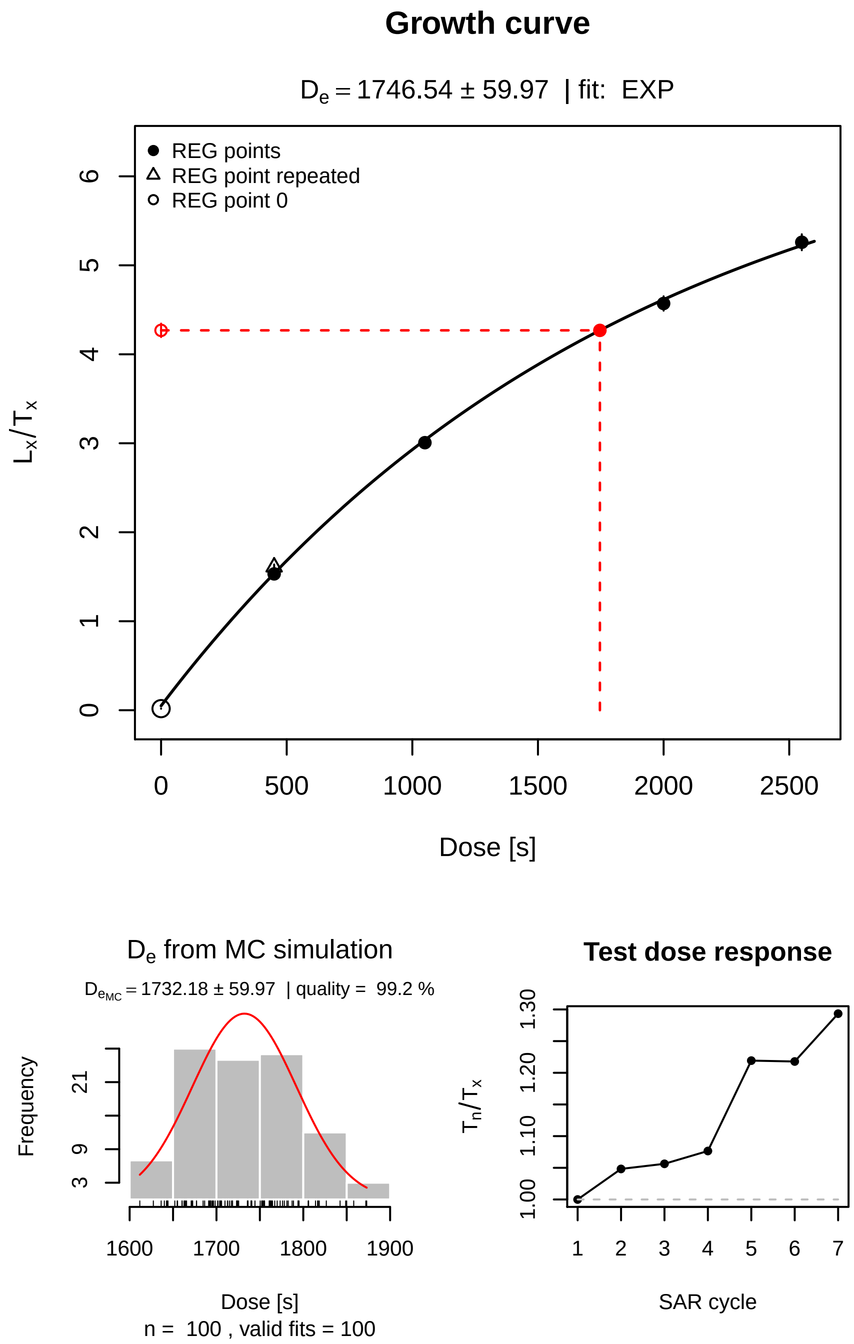

Dose recovery test
+10 %
−10%
1.2
1.1
1.0
0.9
0.8
Normalised D_e
200
240
Preheat temperature [°C]



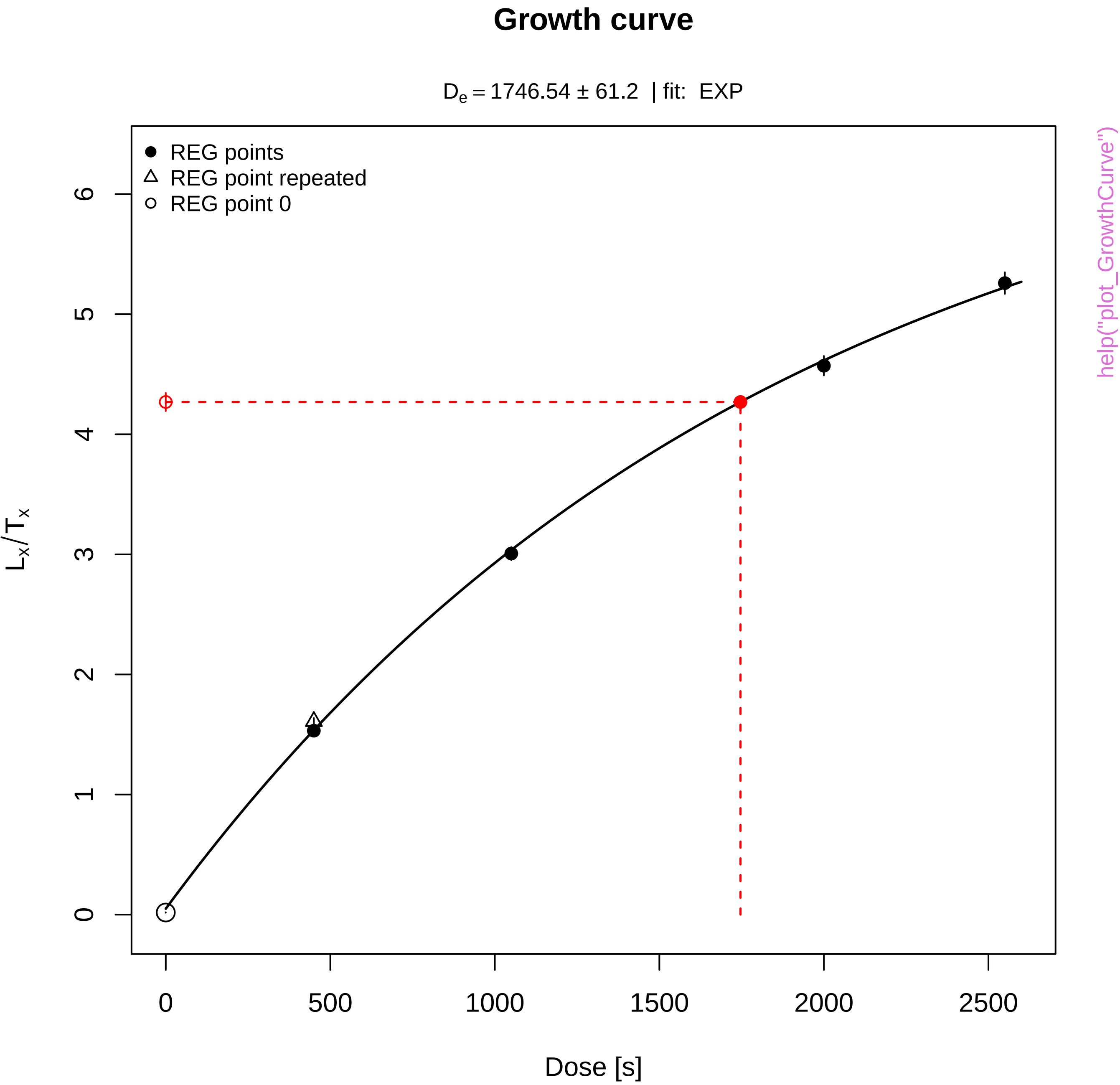
Dose recovery test
+10 %
−10%
1.2
1.1
1.0
0.9
0.8
Normalised D_e
200
240
Preheat temperature [°C]

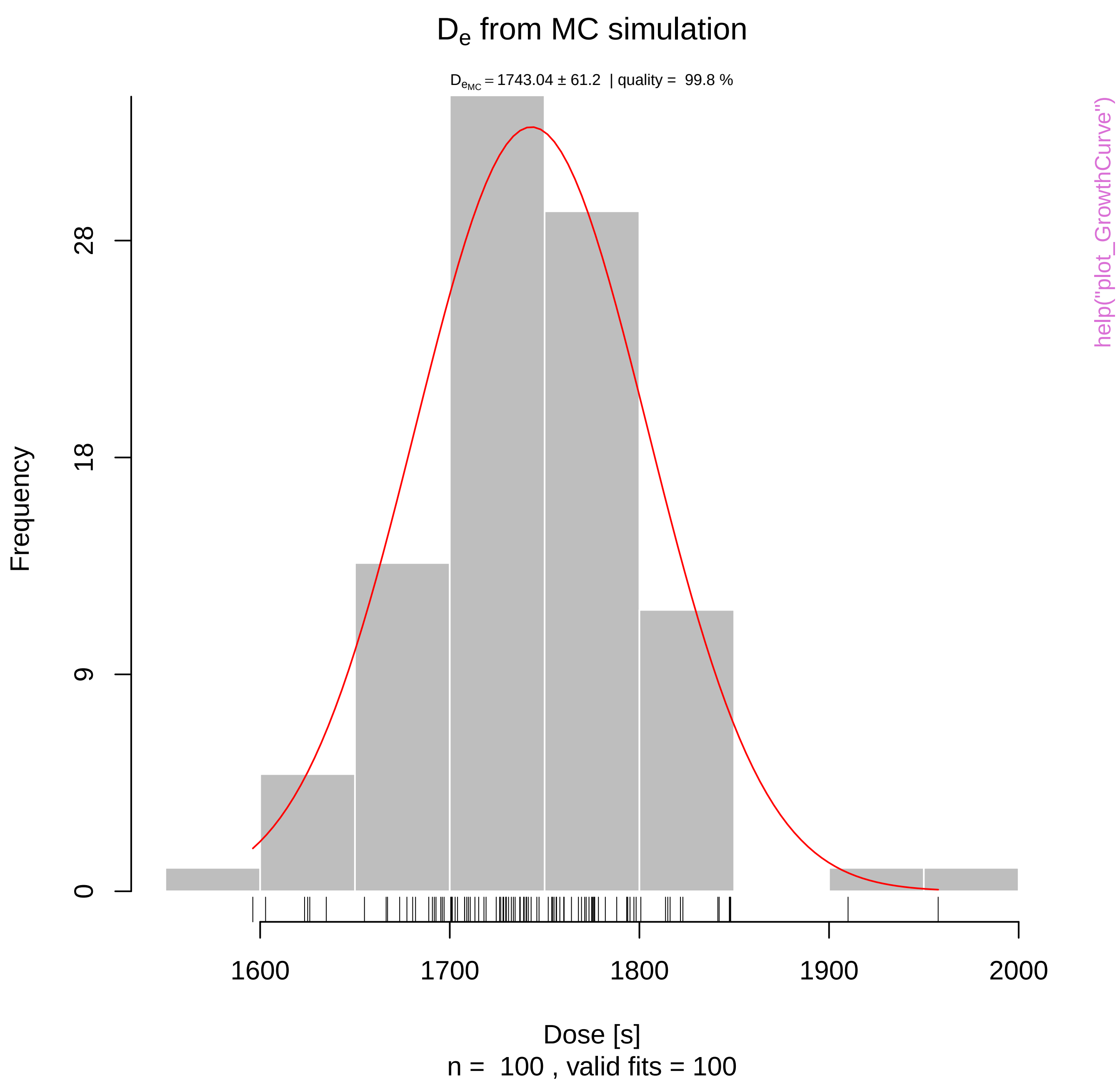


Growth curve
De = 1746.54 ± 57.45 | fit: EXP
REG points
REG point repeated
REG point 0
Lx/Tx
Dose [s]
0
500
1000
1500
2000
2500
0
1
2
3
4
5
6
De from MC simulation
DeMC = 1733.43 ± 57.45 | quality = 99.2 %
Frequency
4
12
20
28
36
1600
1700
1800
1900
Dose [s]
n = 100 , valid fits = 100
Test dose response
Tn/Tx
1.00
1.10
1.20
1.30
1
2
3
4
5
6
7
SAR cycle

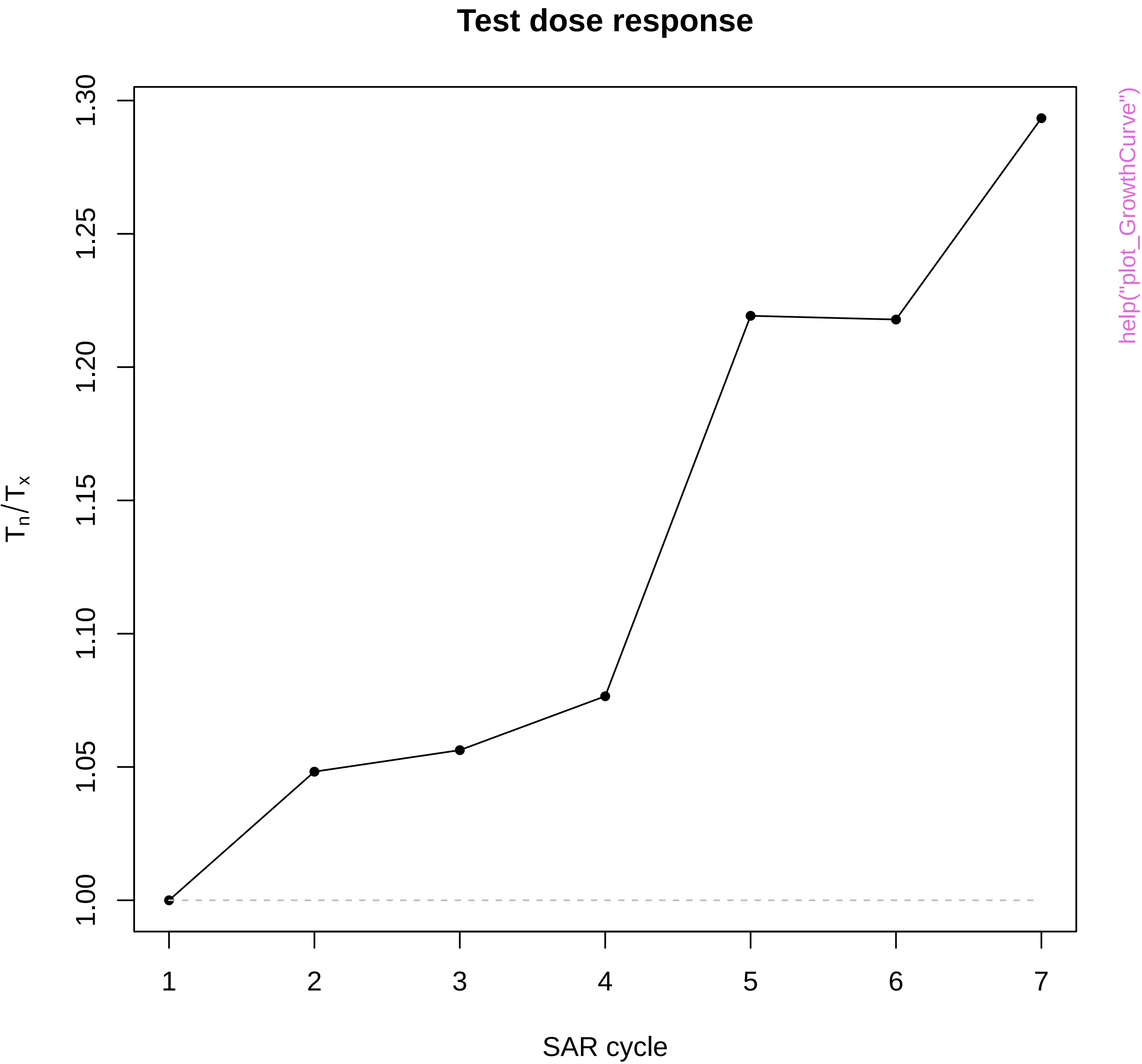


Growth curve
$D_e = 1746.54 \pm 59.97$ | fit: EXP
REG points
REG point repeated
REG point 0
L_x/T_x
Dose [s]
D_e from MC simulation
$D_{e_{MC}} = 1732.18 \pm 59.97$ | quality = 99.2 %
Frequency
Dose [s]
n = 100 , valid fits = 100
Test dose response
T_n/T_x
SAR cycle

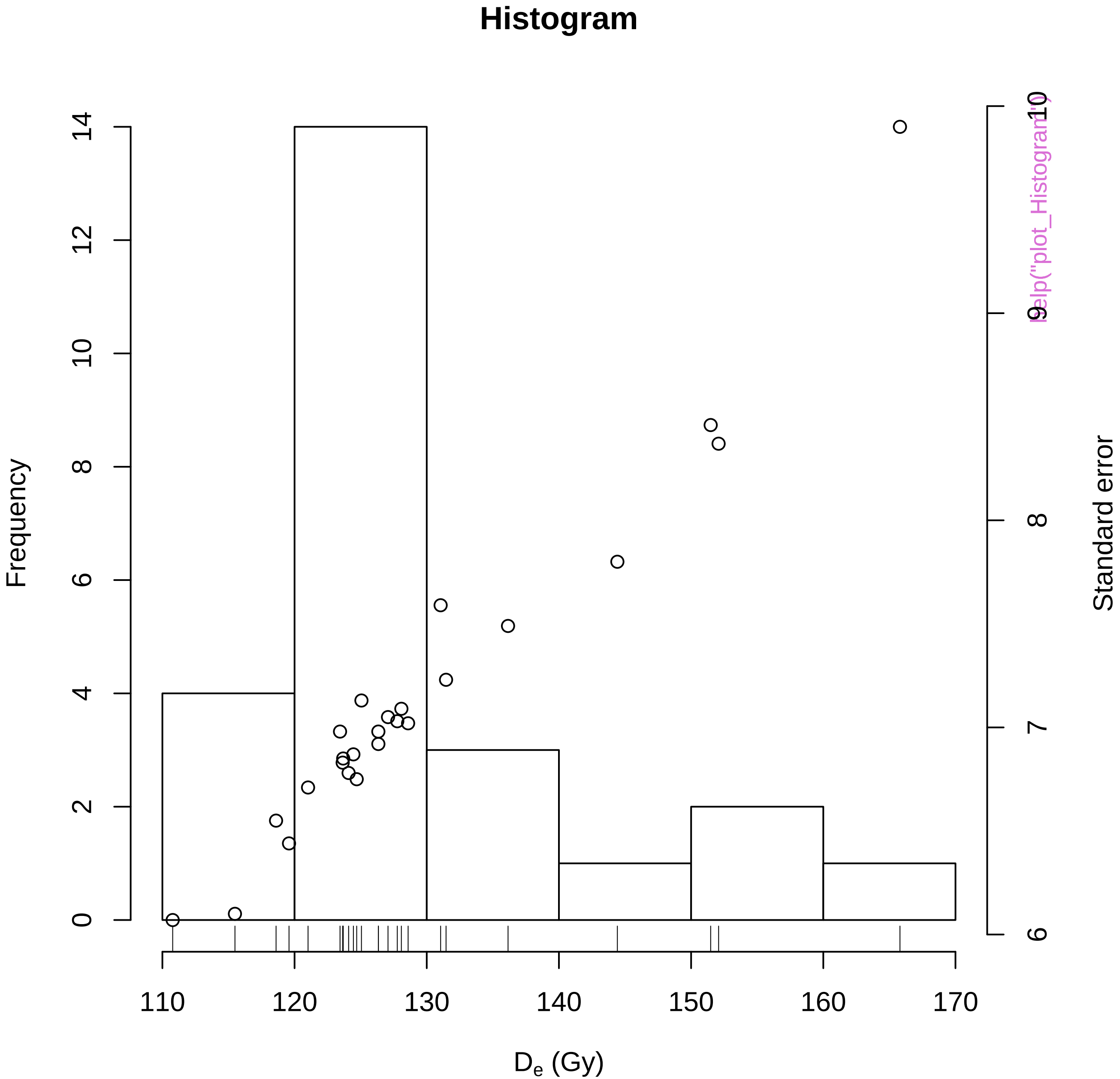

Growth curve
D_e = 1746.54 ± 61.2 | fit: EXP
REG points
REG point repeated
REG point 0
L_x/T_x
0
1
2
3
4
5
6
0
500
1000
1500
2000
2500
Dose [s]
help("plot_GrowthCurve")



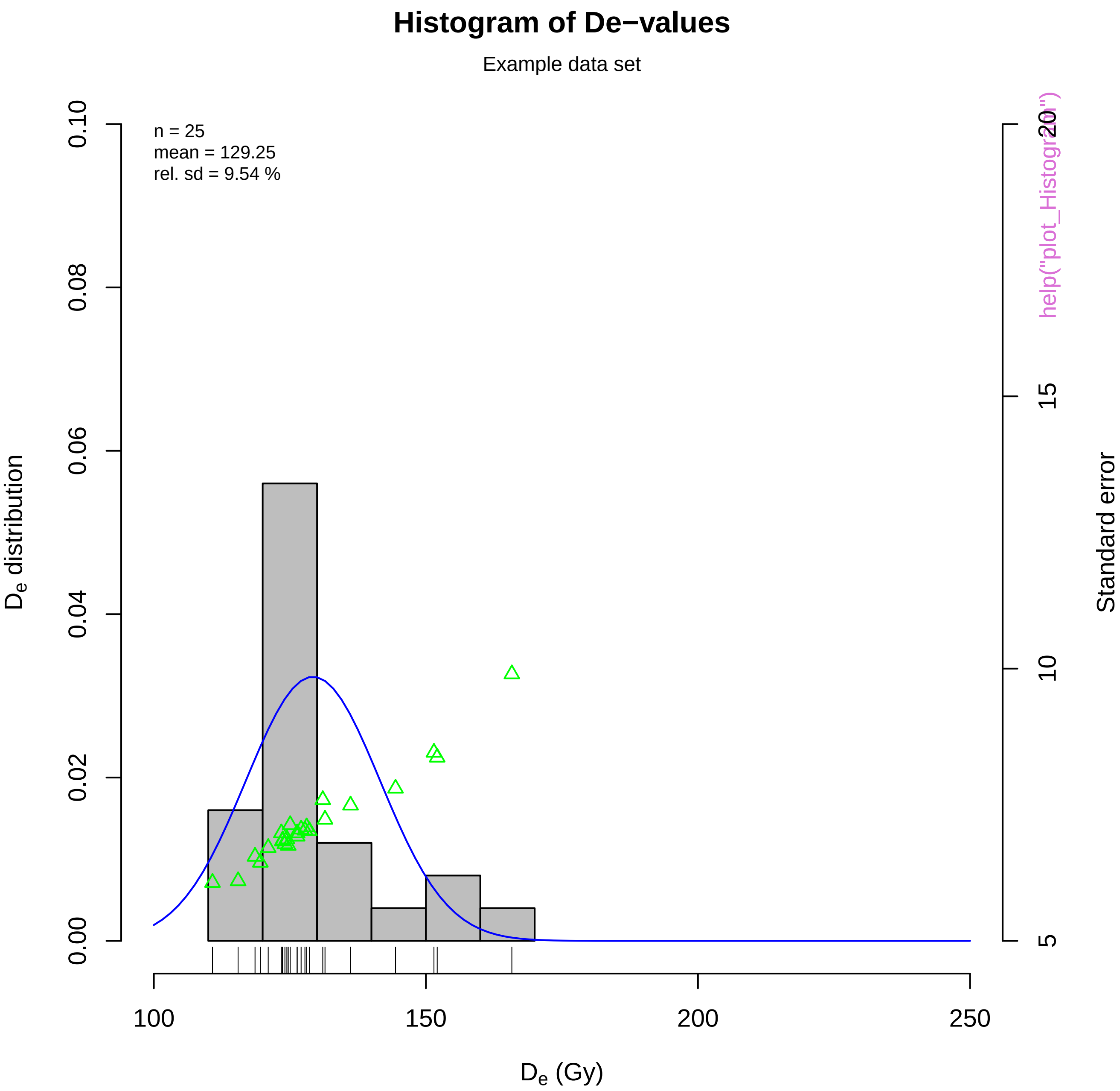
D_e from MC simulation
$D_{e_{MC}}$ = 1743.04 ± 61.2 | quality = 99.8 %
Frequency
0
9
18
28
1600
1700
1800
1900
2000
Dose [s]
n = 100 , valid fits = 100
help("plot_GrowthCurve")

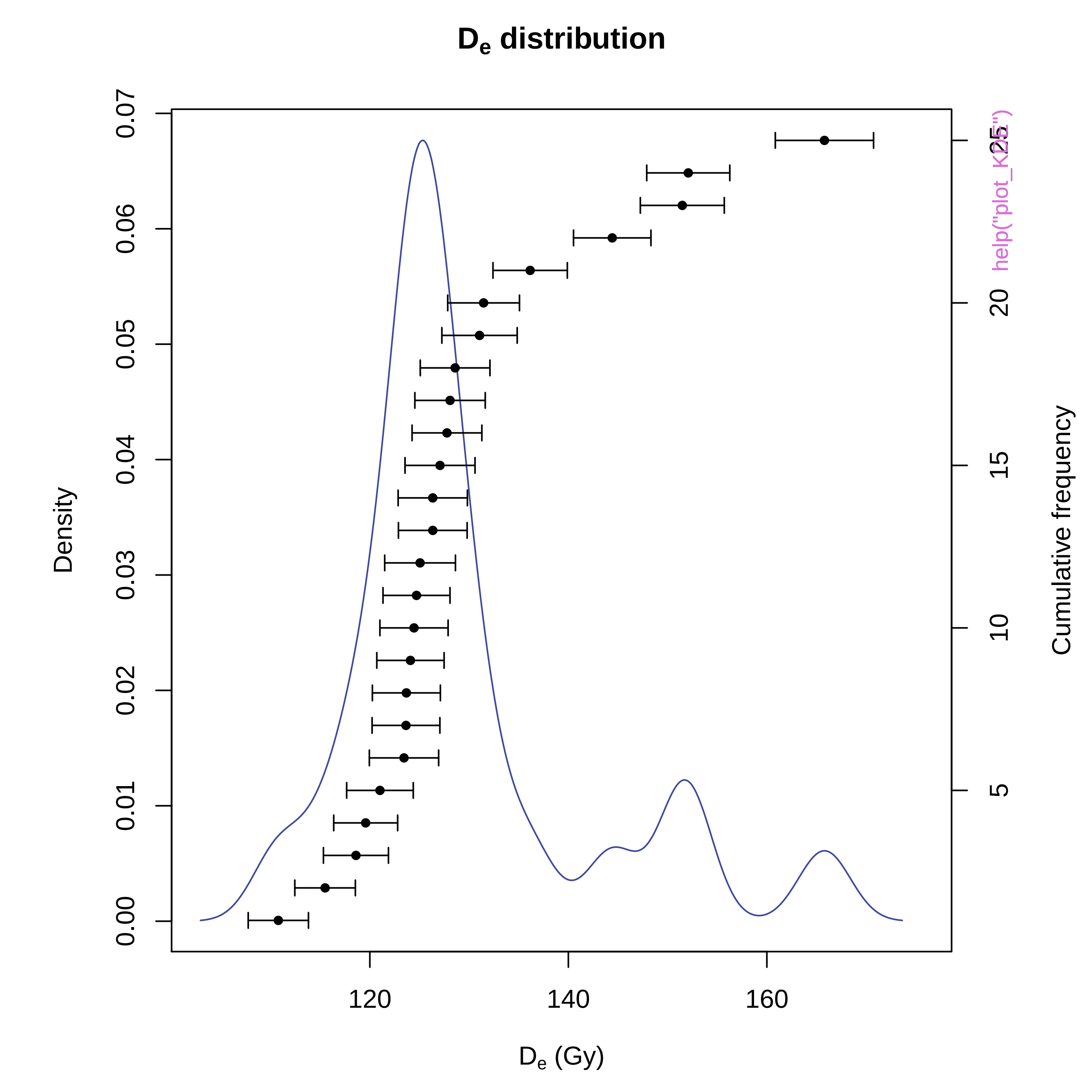


Test dose response
1.30
1.25
1.20
1.15
1.10
1.05
1.00
T_n/T_x
1
2
3
4
5
6
7
SAR cycle
help("plot_GrowthCurve")

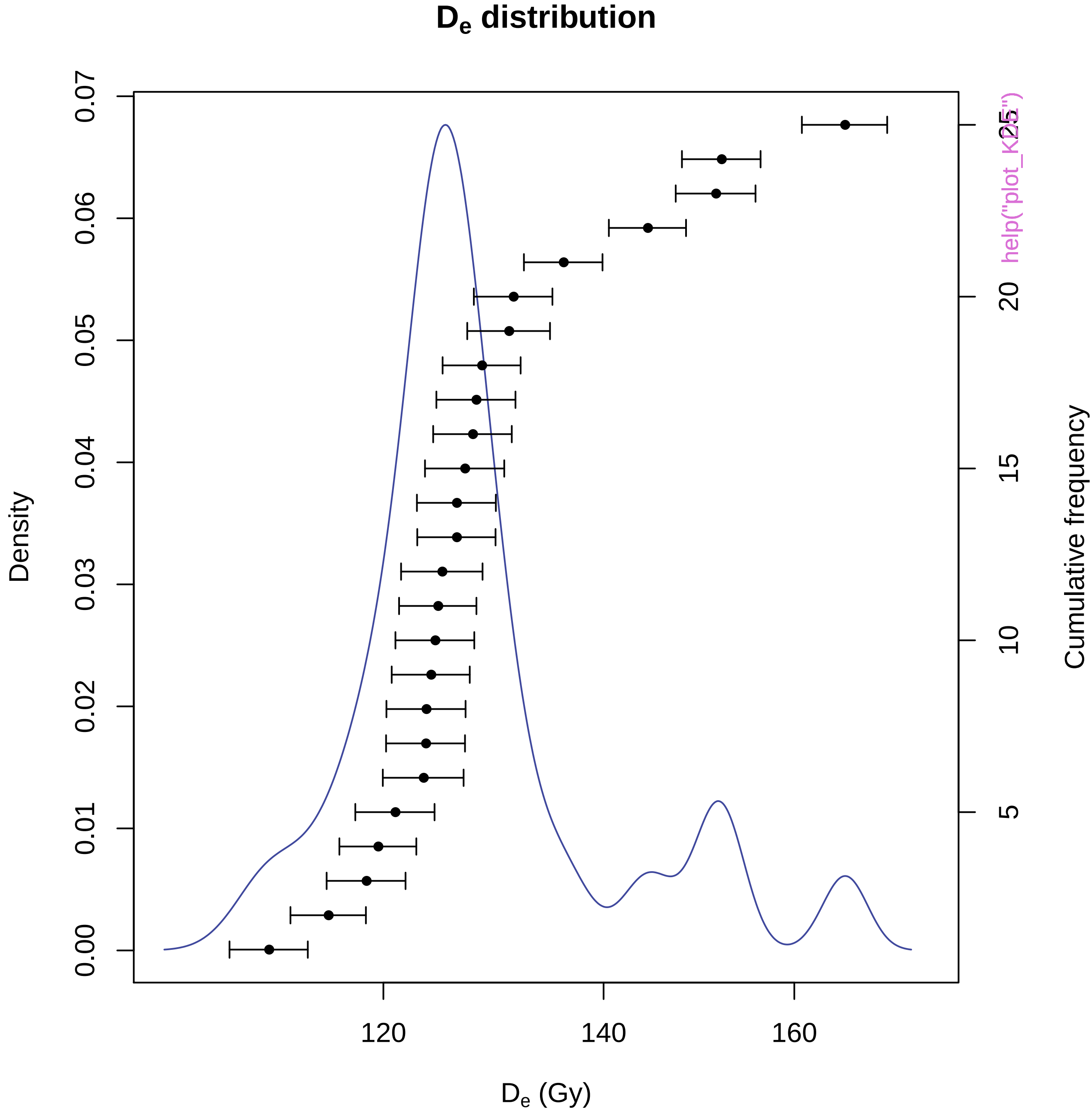


Histogram
Frequency
0
2
4
6
8
10
12
14
110
120
130
140
150
160
170
D_e (Gy)
Standard error
6
7
8
9
10
help("plot_Histogram")

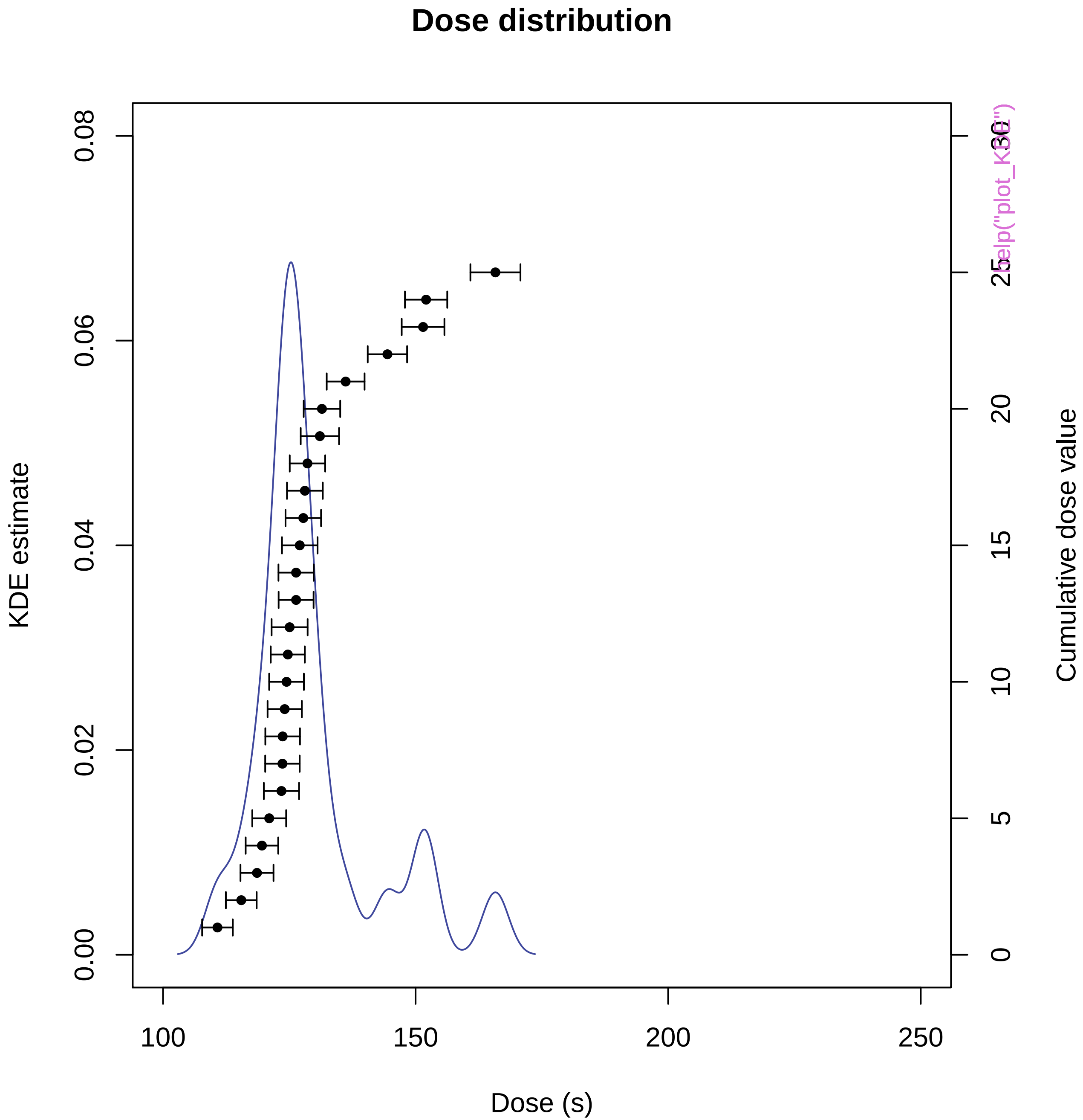

Histogram of De−values
Example data set
n = 25
mean = 129.25
rel. sd = 9.54 %
D_e distribution
0.00
0.02
0.04
0.06
0.08
0.10
Standard error
5
10
15
20
help("plot_Histogram")
100
150
200
250
D_e (Gy)

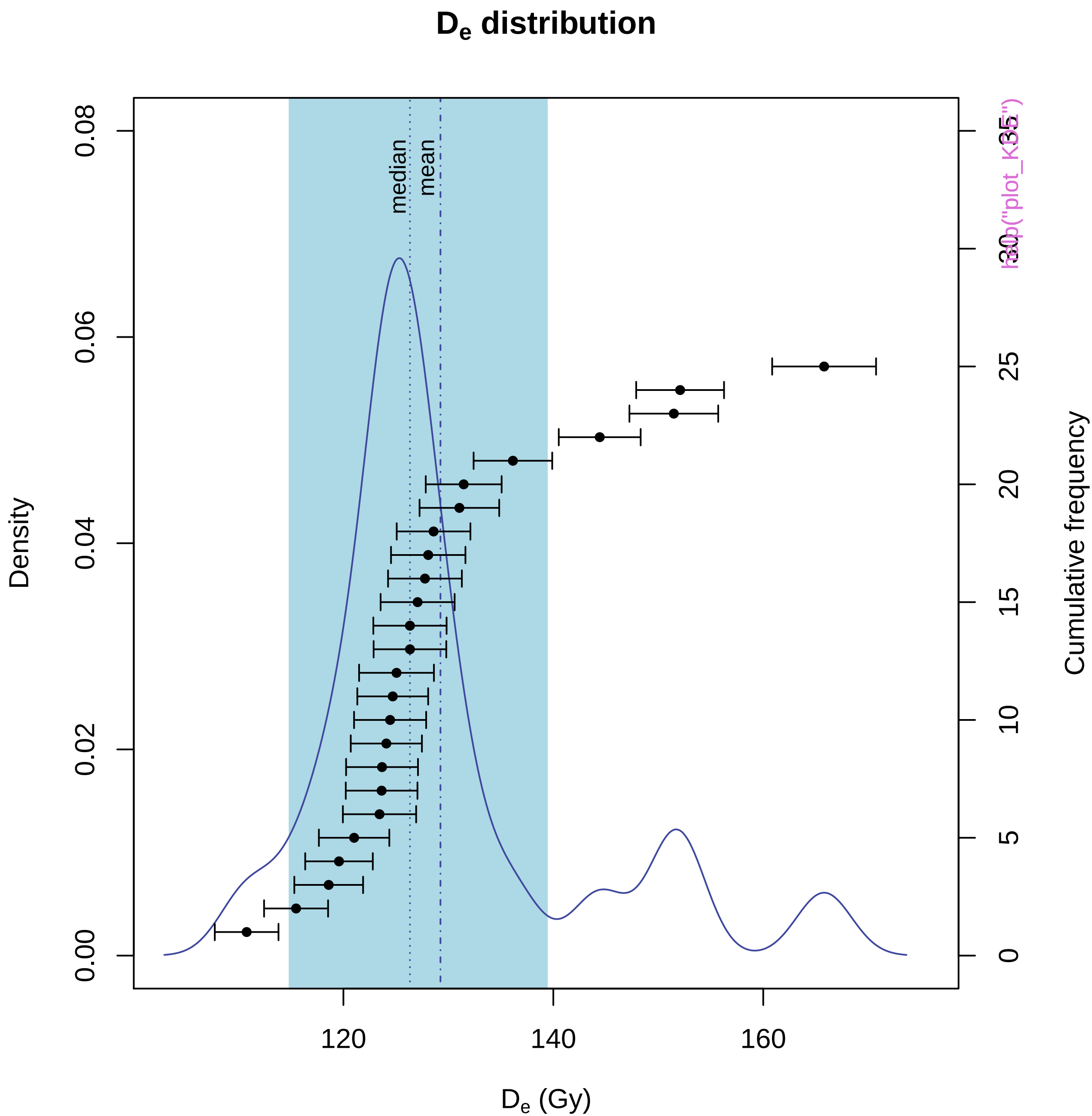


D_e distribution
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
120
140
160
D_e (Gy)
Cumulative frequency
5
10
15
20
25
help("plot_KDE")

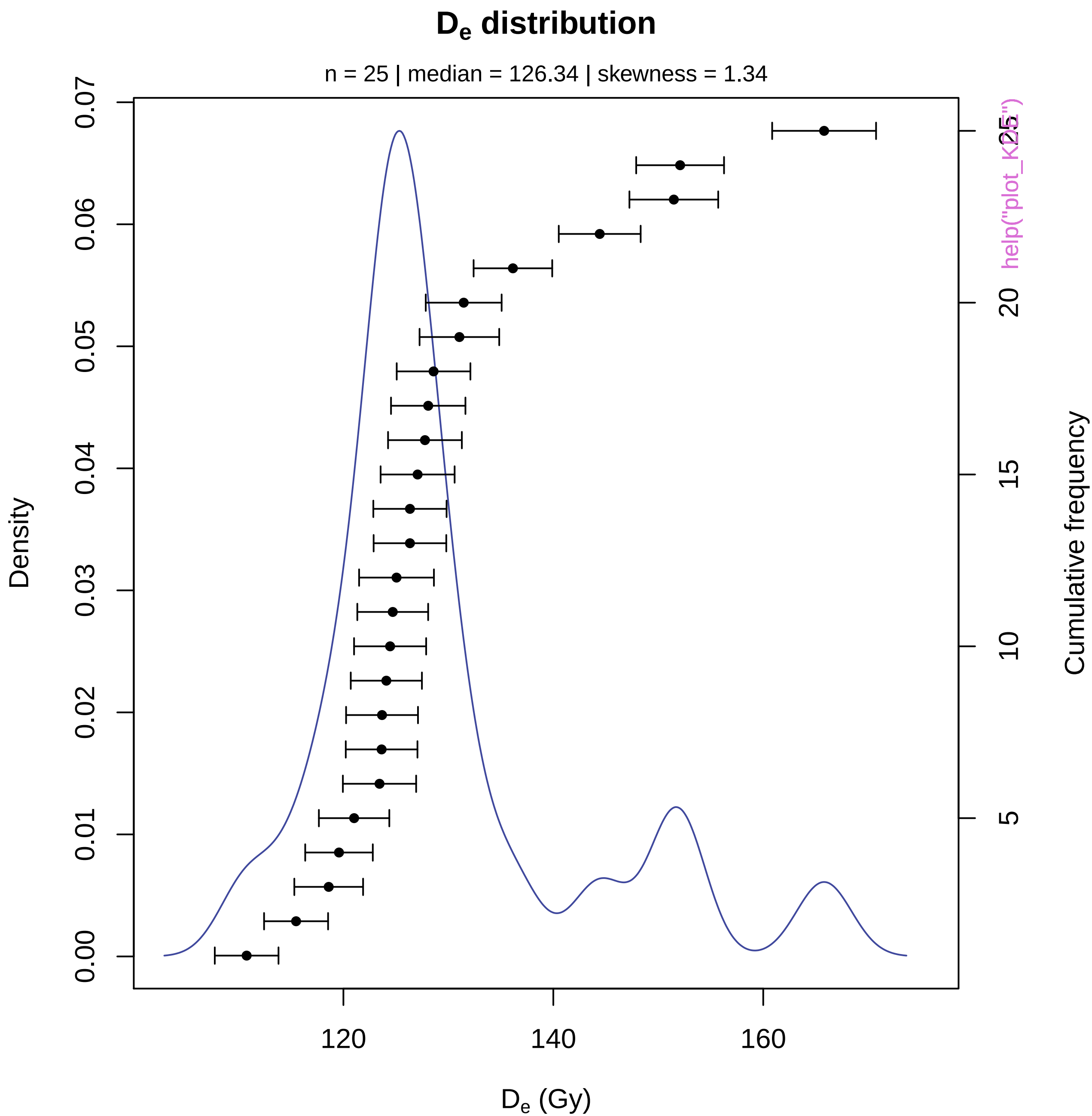


D_e distribution
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
120
140
160
D_e (Gy)
Cumulative frequency
5
10
15
20
25
help("plot_KDE")

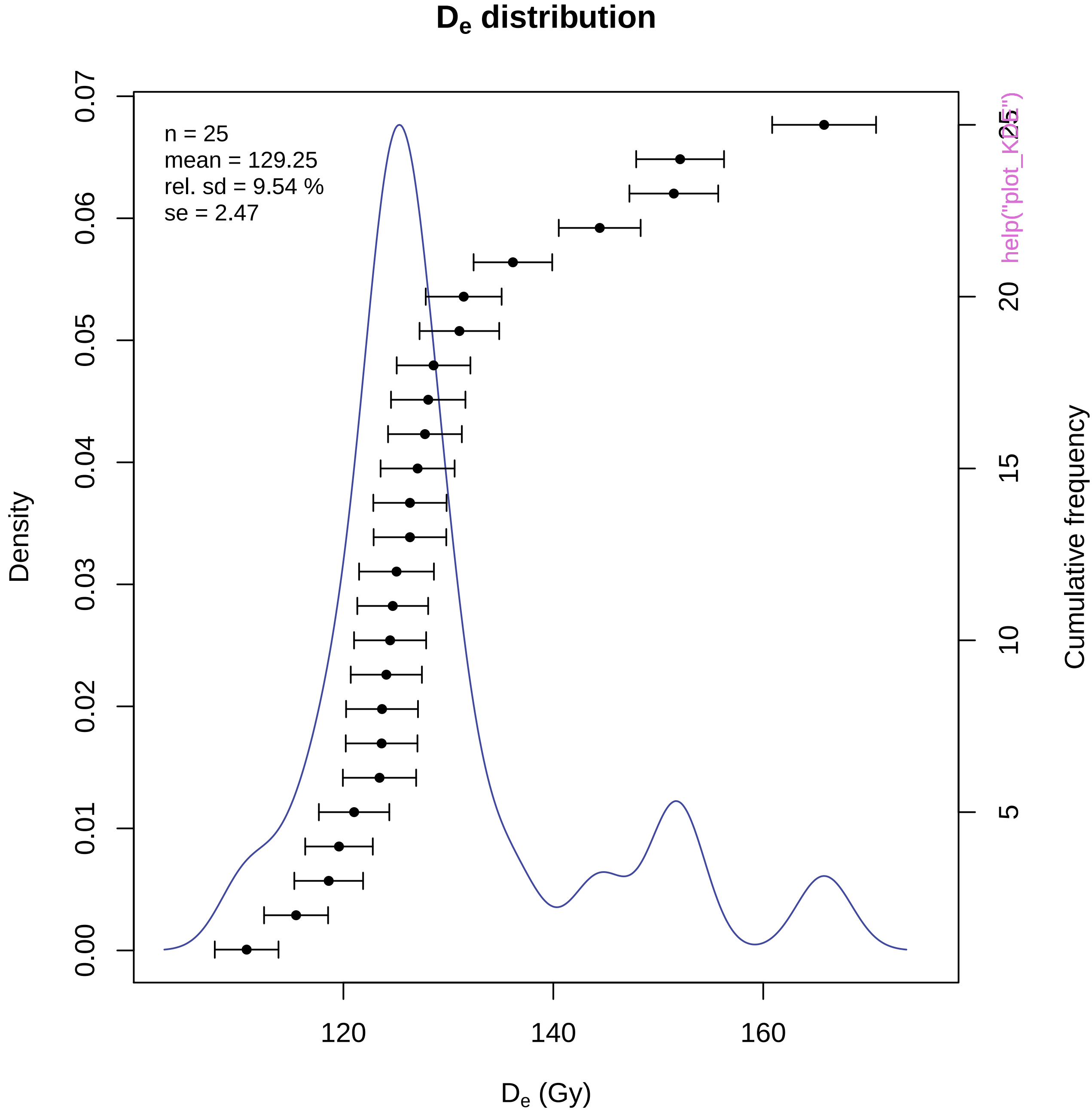

Dose distribution
KDE estimate
0.00
0.02
0.04
0.06
0.08
100
150
200
250
Dose (s)
Cumulative dose value
0
5
10
15
20
25
30
help("plot_KDE")



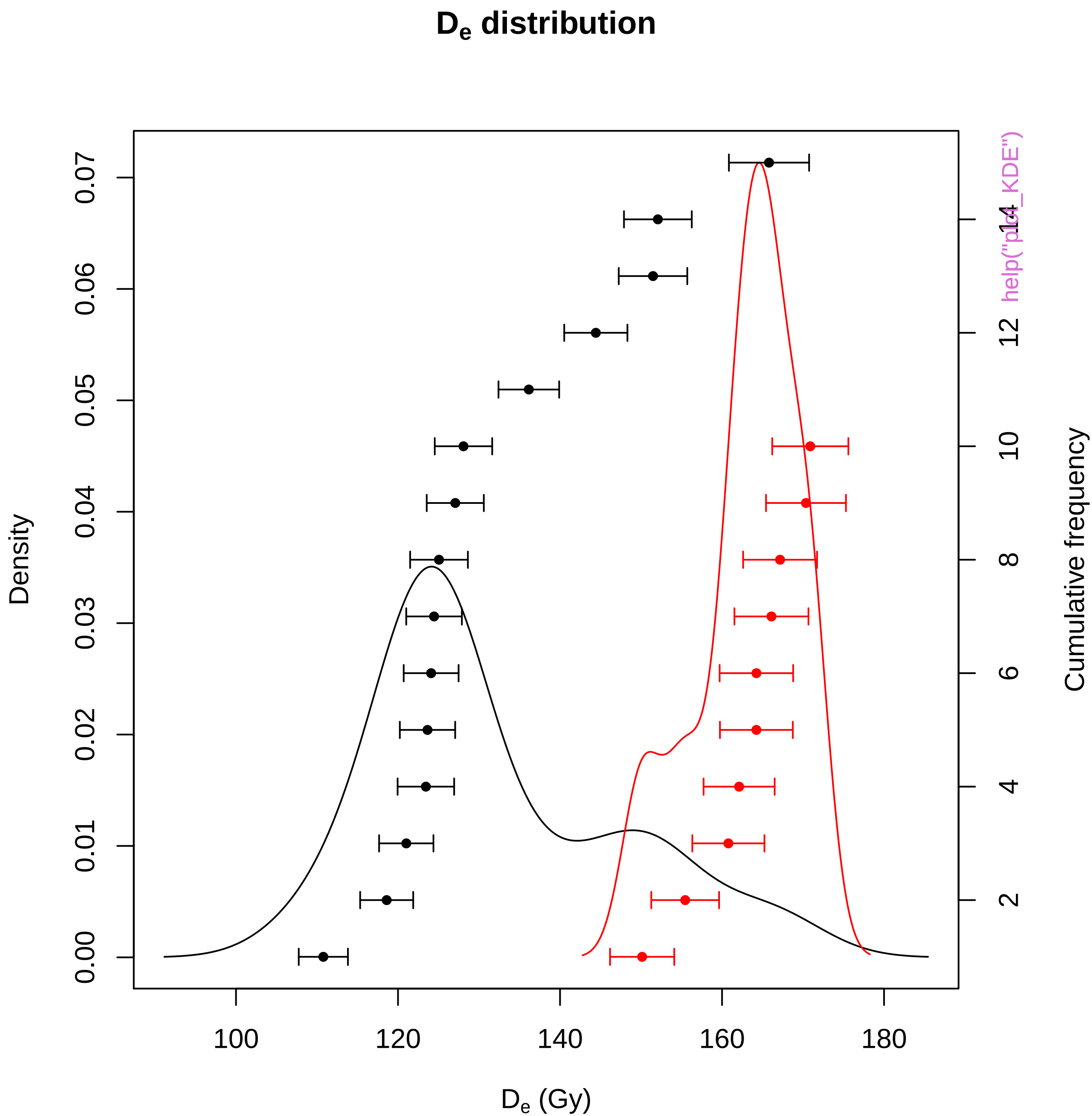
D_e distribution
median
mean
Density
0.00
0.02
0.04
0.06
0.08
120
140
160
D_e (Gy)
Cumulative frequency
0
5
10
15
20
25
30
35
help("plot_KDE")



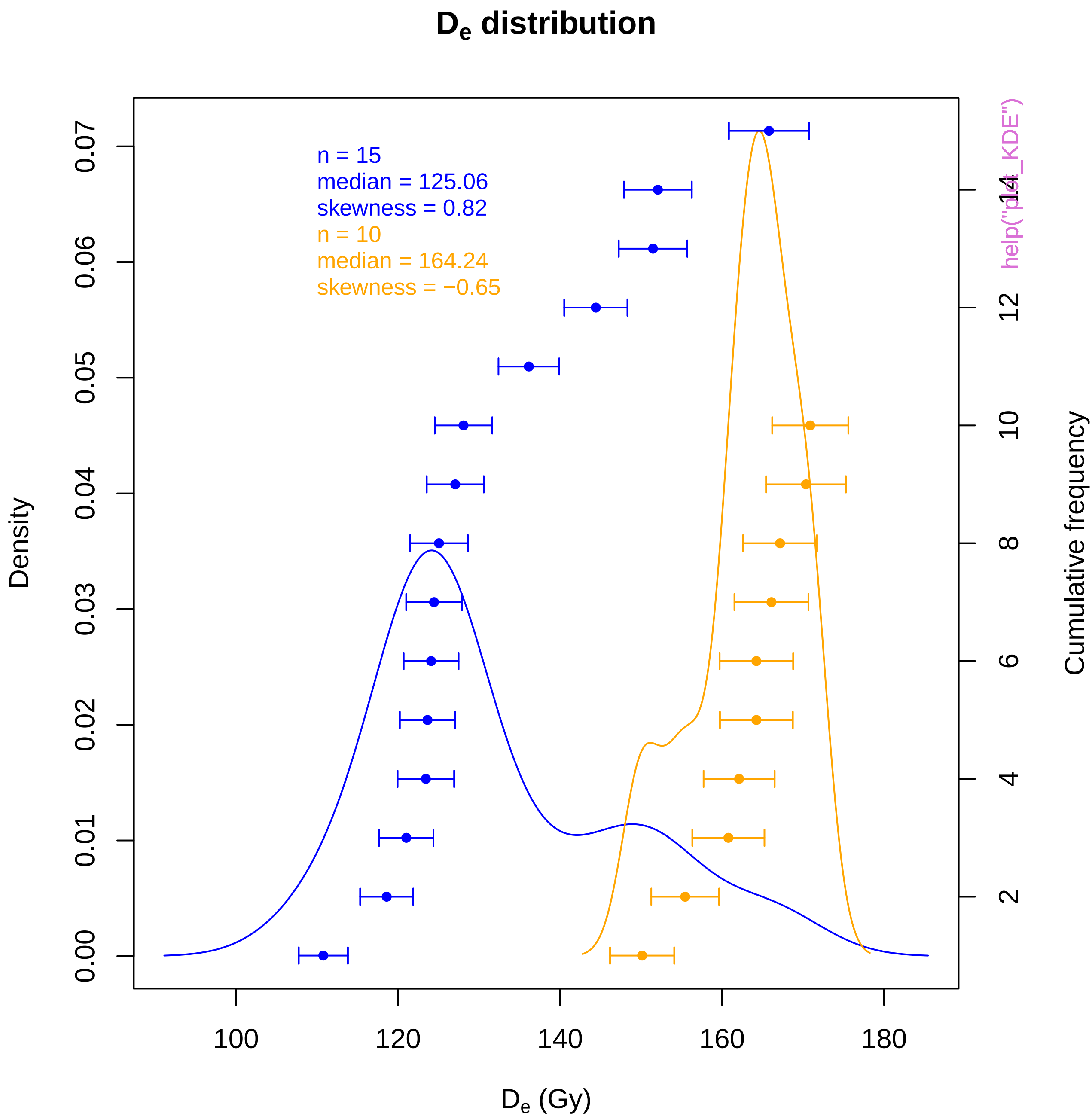
De distribution
n = 25 | median = 126.34 | skewness = 1.34
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
Cumulative frequency
5
10
15
20
25
help("plot_KDE")
120
140
160
De (Gy)



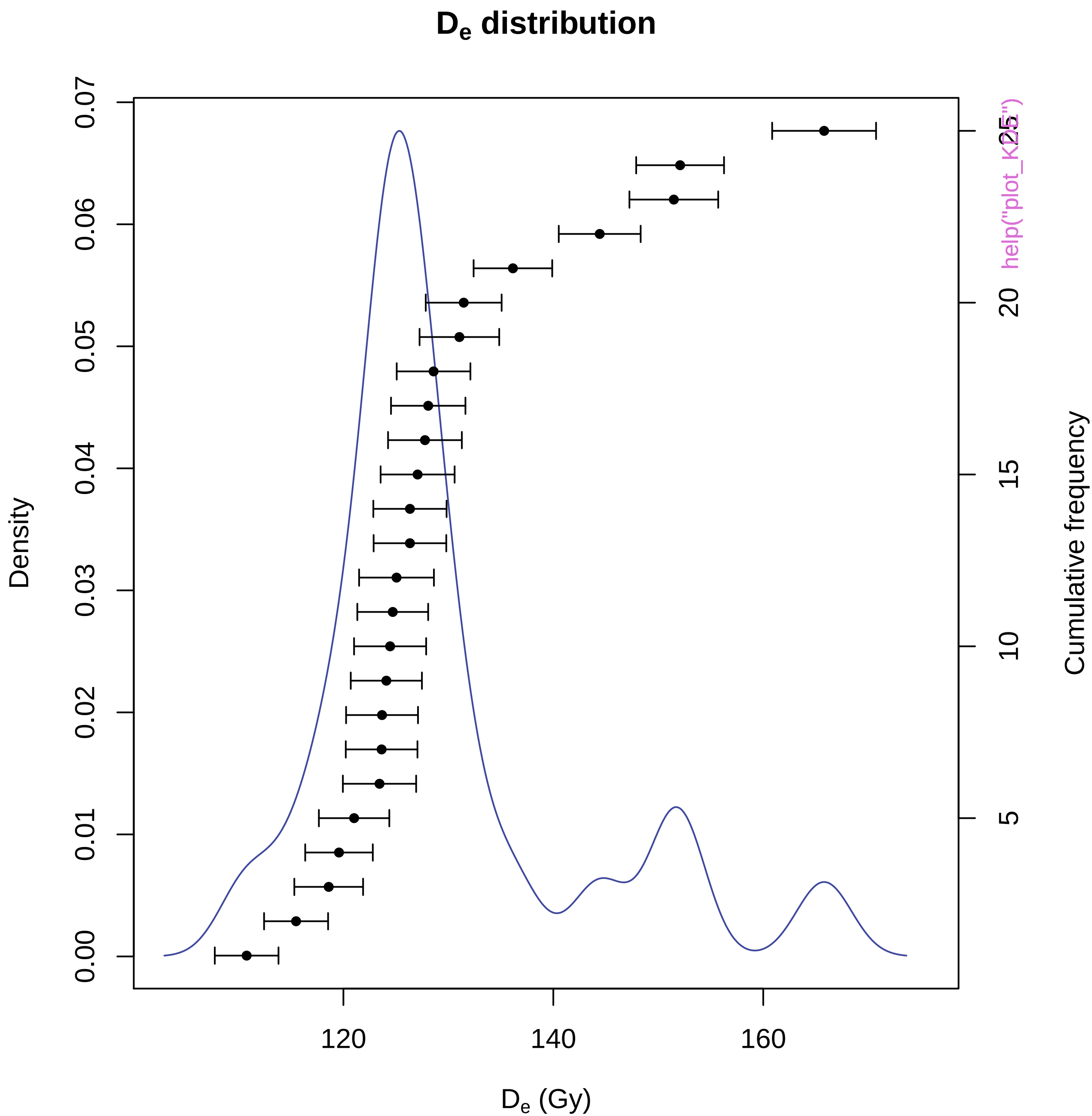
De distribution
n = 25
mean = 129.25
rel. sd = 9.54 %
se = 2.47
Density
Cumulative frequency
help("plot_KDE")
De (Gy)
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
5
10
15
20
25
120
140
160



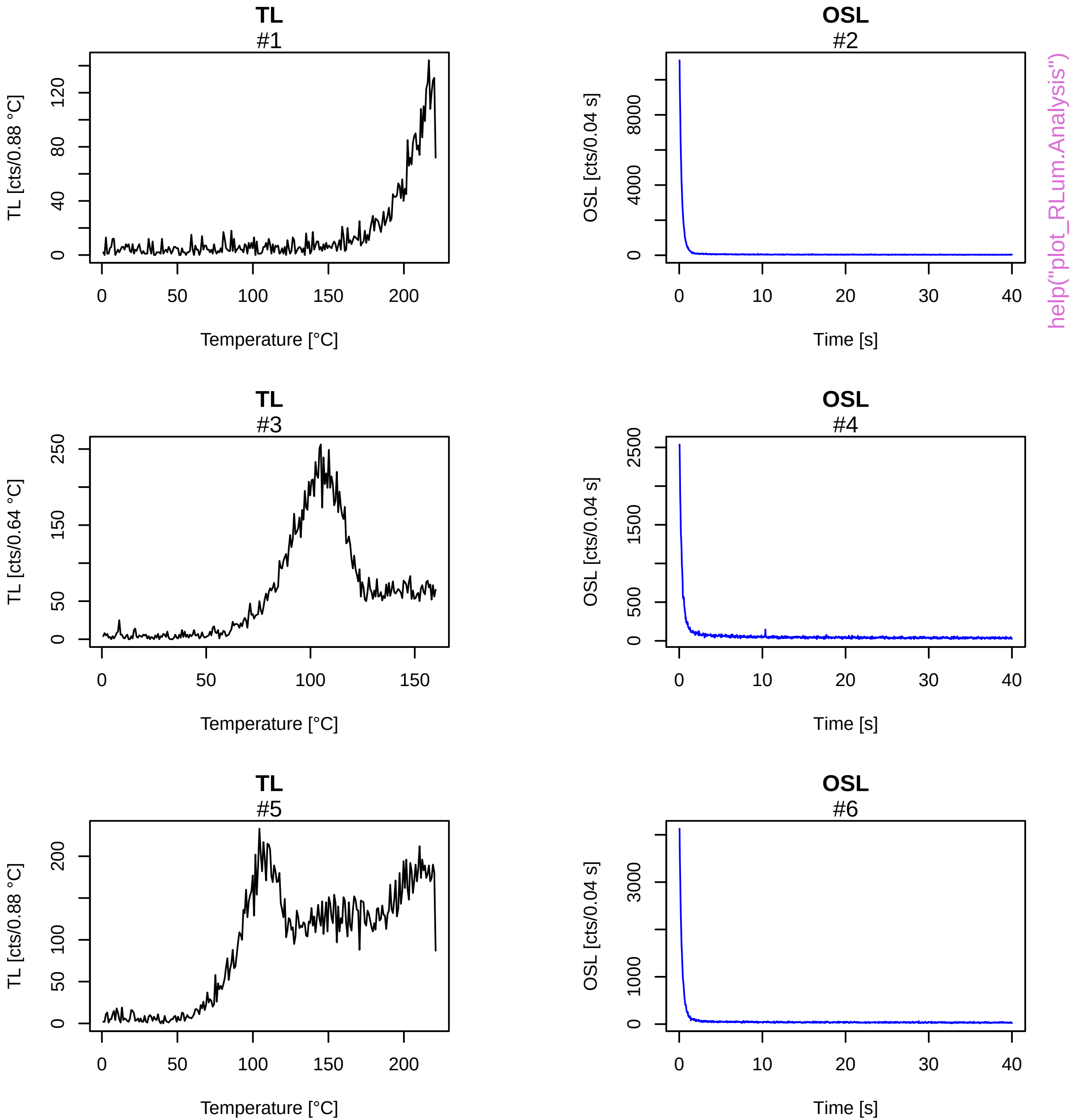
D_e distribution
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
100
120
140
160
180
D_e (Gy)
Cumulative frequency
2
4
6
8
10
12
14
help("plot_KDE")



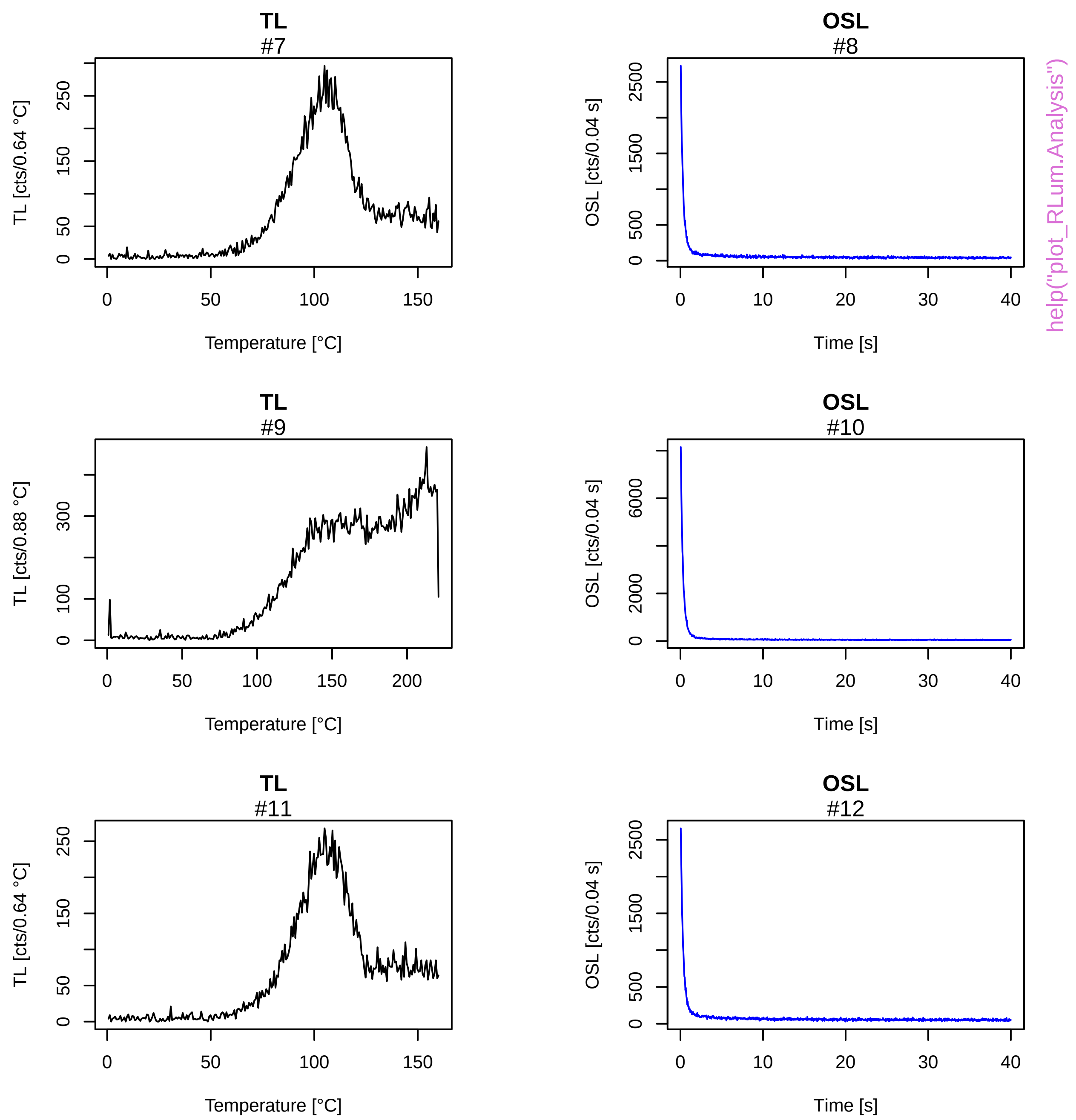
De distribution
n = 15
median = 125.06
skewness = 0.82
n = 10
median = 164.24
skewness = −0.65
help("plot_KDE")
Density
Cumulative frequency
De (Gy)
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
100
120
140
160
180
2
4
6
8
10
12
14

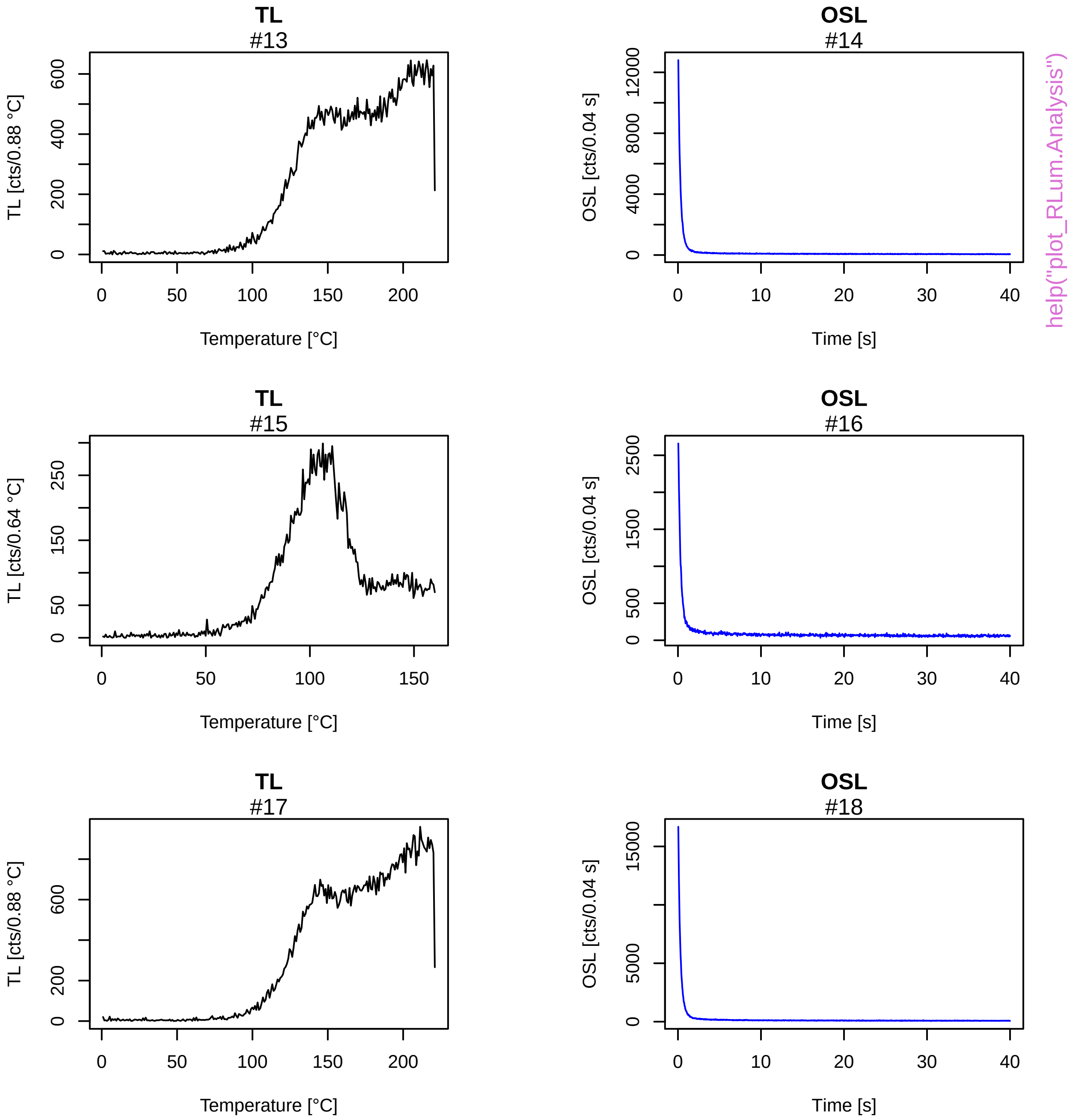


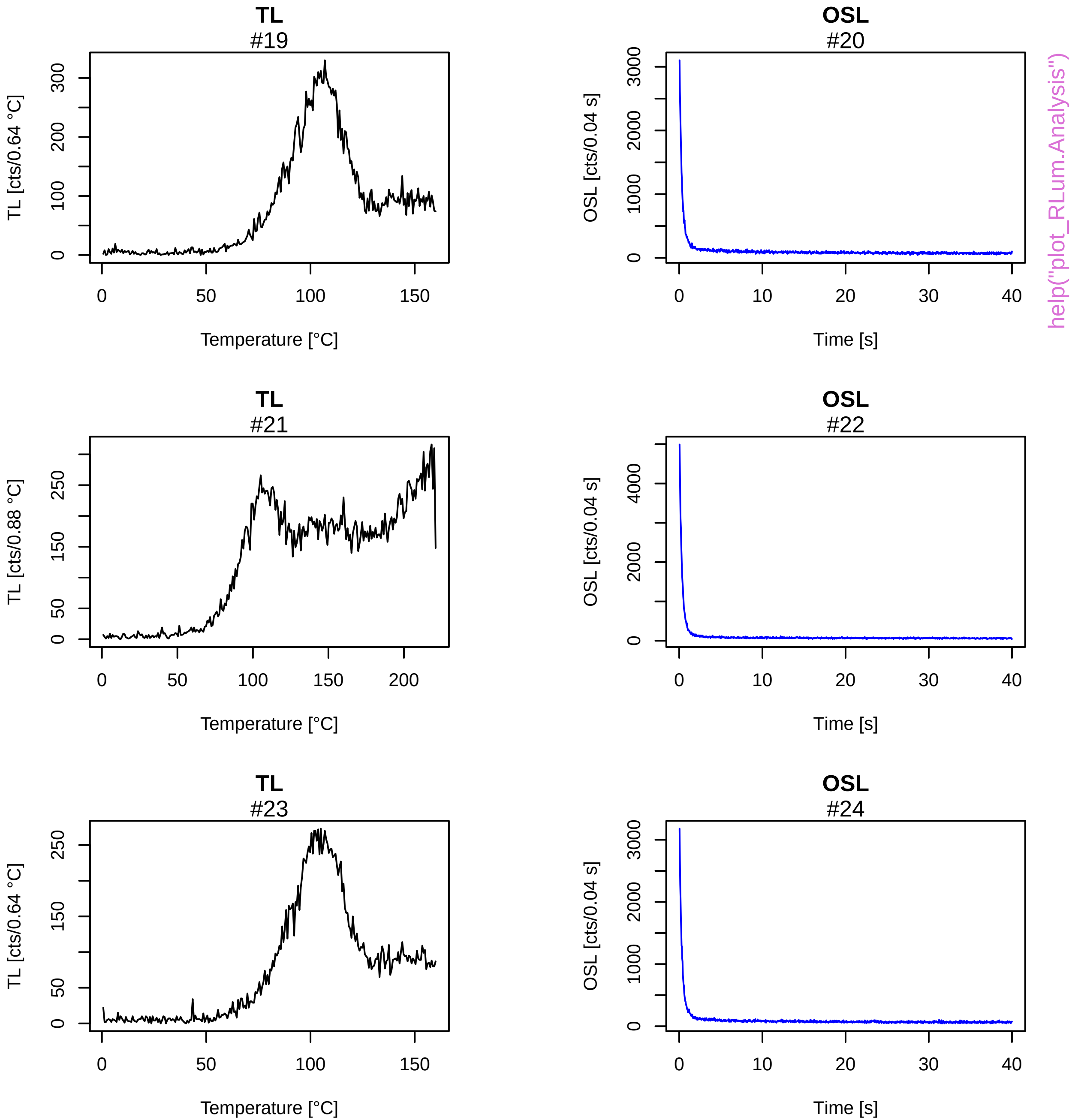
D_e distribution
Density
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
120
140
160
D_e (Gy)
5
10
15
20
25
Cumulative frequency
help("plot_KDE")

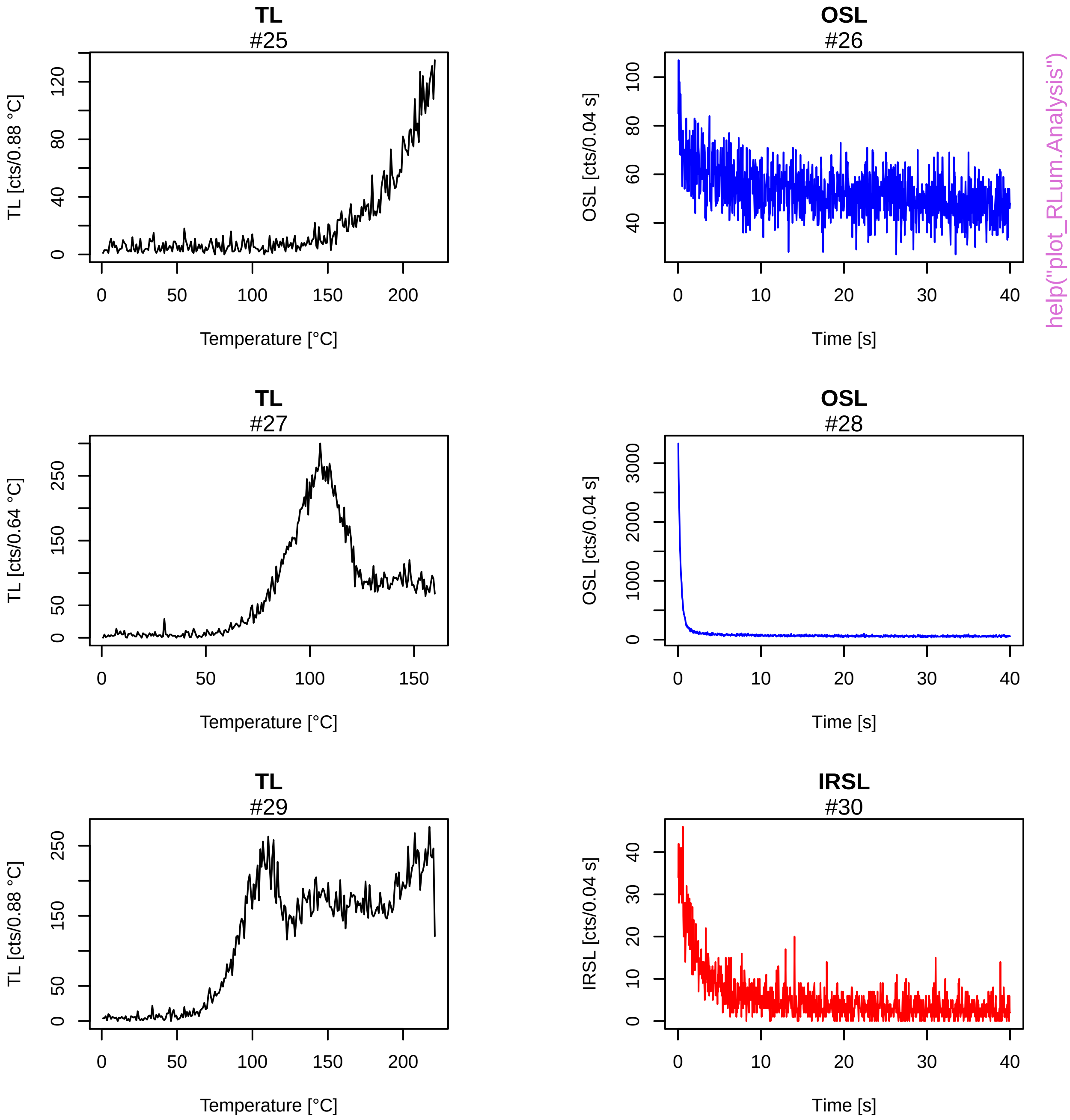


TL
#1
TL [cts/0.88 °C]
Temperature [°C]
OSL
#2
OSL [cts/0.04 s]
Time [s]
help("plot_RLum.Analysis")
TL
#3
TL [cts/0.64 °C]
Temperature [°C]
OSL
#4
OSL [cts/0.04 s]
Time [s]
TL
#5
TL [cts/0.88 °C]
Temperature [°C]
OSL
#6
OSL [cts/0.04 s]
Time [s]

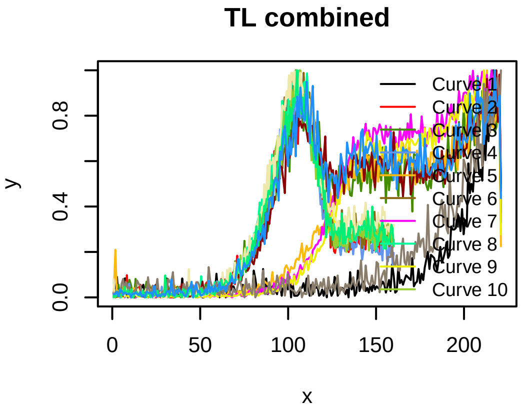

TL
#7
TL [cts/0.64 °C]
0
50
150
250
0
50
100
150
Temperature [°C]
OSL
#8
OSL [cts/0.04 s]
0
500
1500
2500
0
10
20
30
40
Time [s]
help("plot_RLum.Analysis")
TL
#9
TL [cts/0.88 °C]
0
100
300
0
50
100
150
200
Temperature [°C]
OSL
#10
OSL [cts/0.04 s]
0
2000
6000
0
10
20
30
40
Time [s]
TL
#11
TL [cts/0.64 °C]
0
50
150
250
0
50
100
150
Temperature [°C]
OSL
#12
OSL [cts/0.04 s]
0
500
1500
2500
0
10
20
30
40
Time [s]

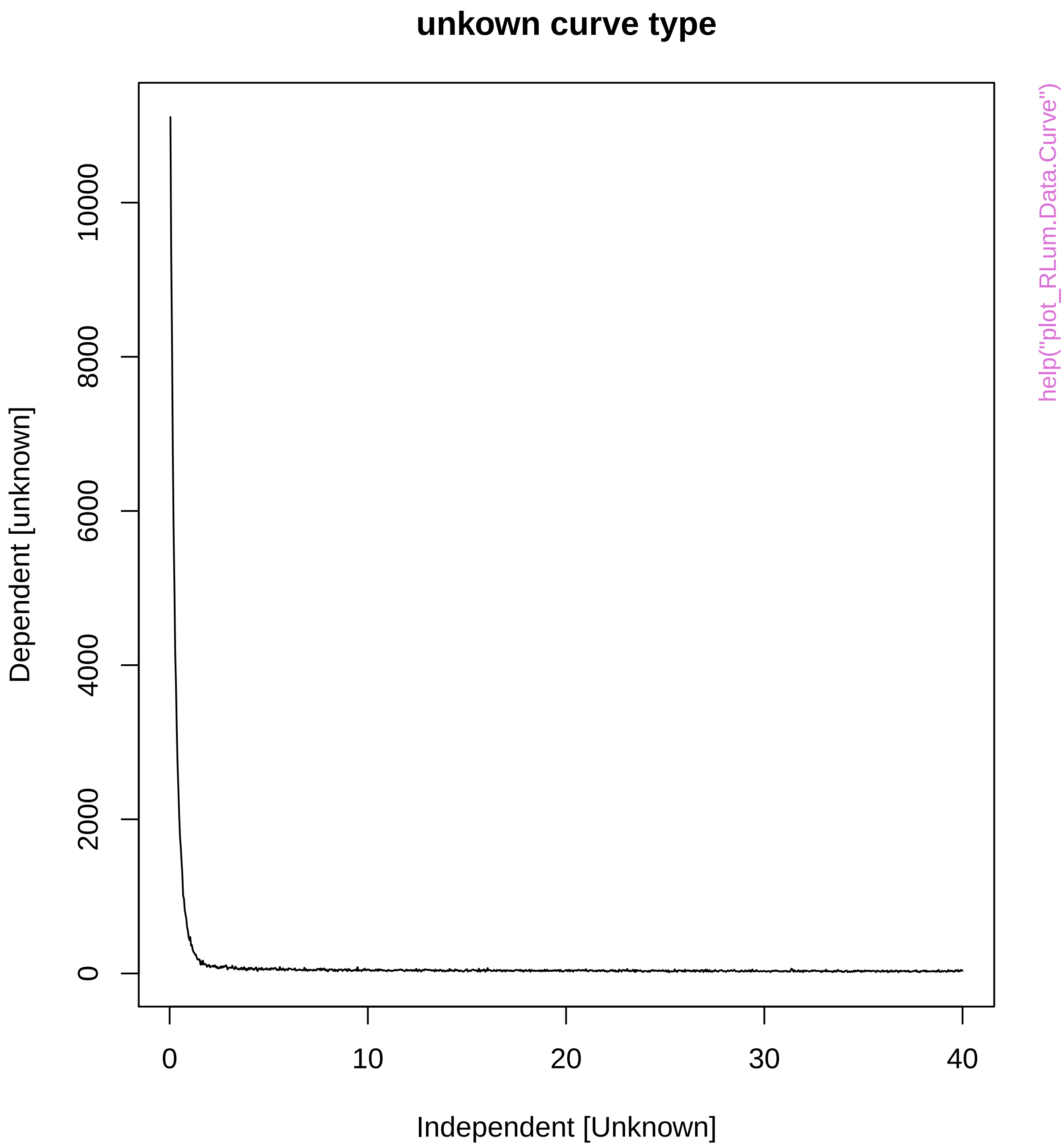

TL
#13
TL [cts/0.88 °C]
Temperature [°C]
OSL
#14
OSL [cts/0.04 s]
Time [s]
help("plot_RLum.Analysis")
TL
#15
TL [cts/0.64 °C]
Temperature [°C]
OSL
#16
OSL [cts/0.04 s]
Time [s]
TL
#17
TL [cts/0.88 °C]
Temperature [°C]
OSL
#18
OSL [cts/0.04 s]
Time [s]

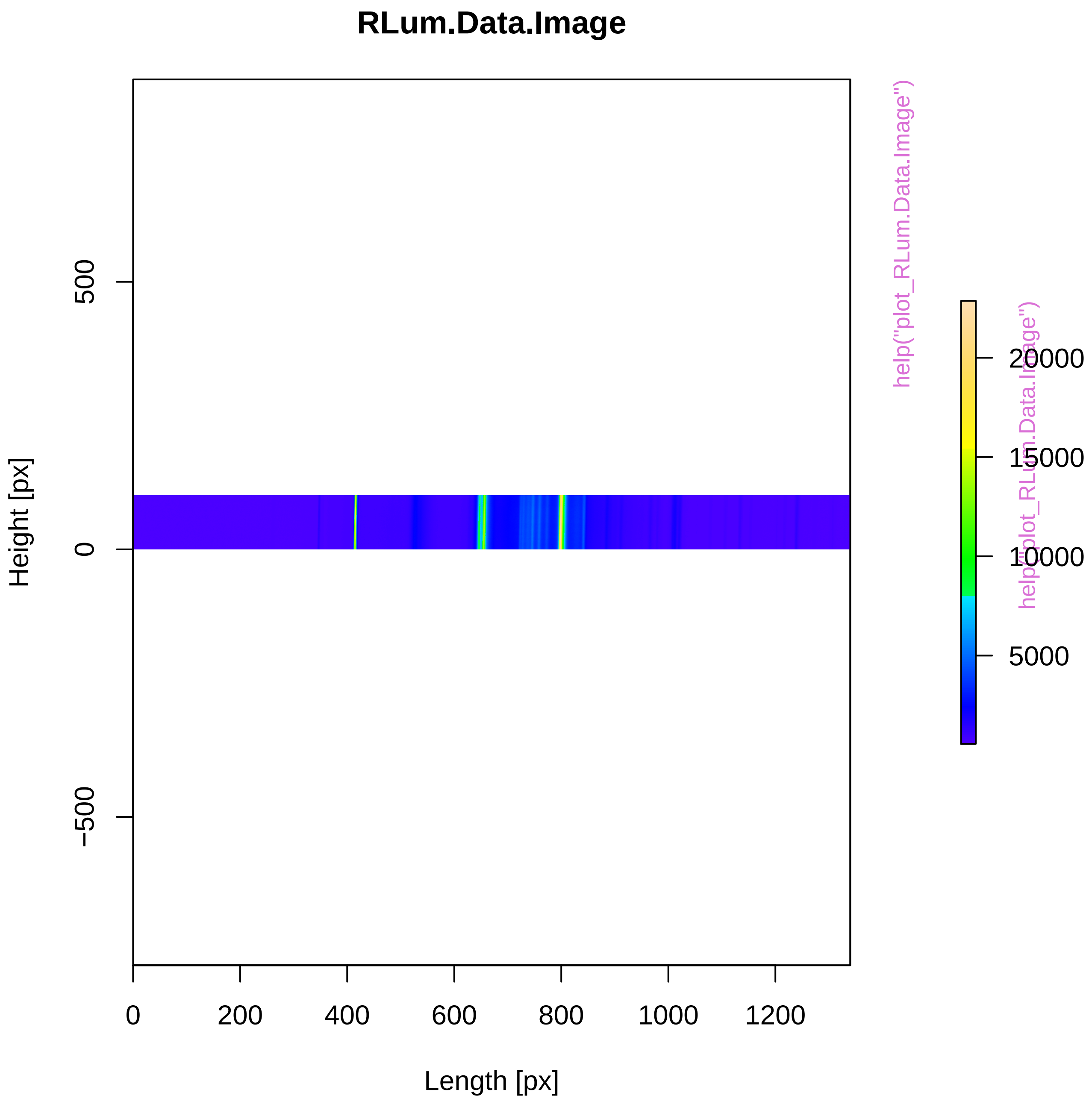

TL
#19
TL [cts/0.64 °C]
Temperature [°C]
OSL
#20
OSL [cts/0.04 s]
Time [s]
help("plot_RLum.Analysis")
TL
#21
TL [cts/0.88 °C]
Temperature [°C]
OSL
#22
OSL [cts/0.04 s]
Time [s]
TL
#23
TL [cts/0.64 °C]
Temperature [°C]
OSL
#24
OSL [cts/0.04 s]
Time [s]

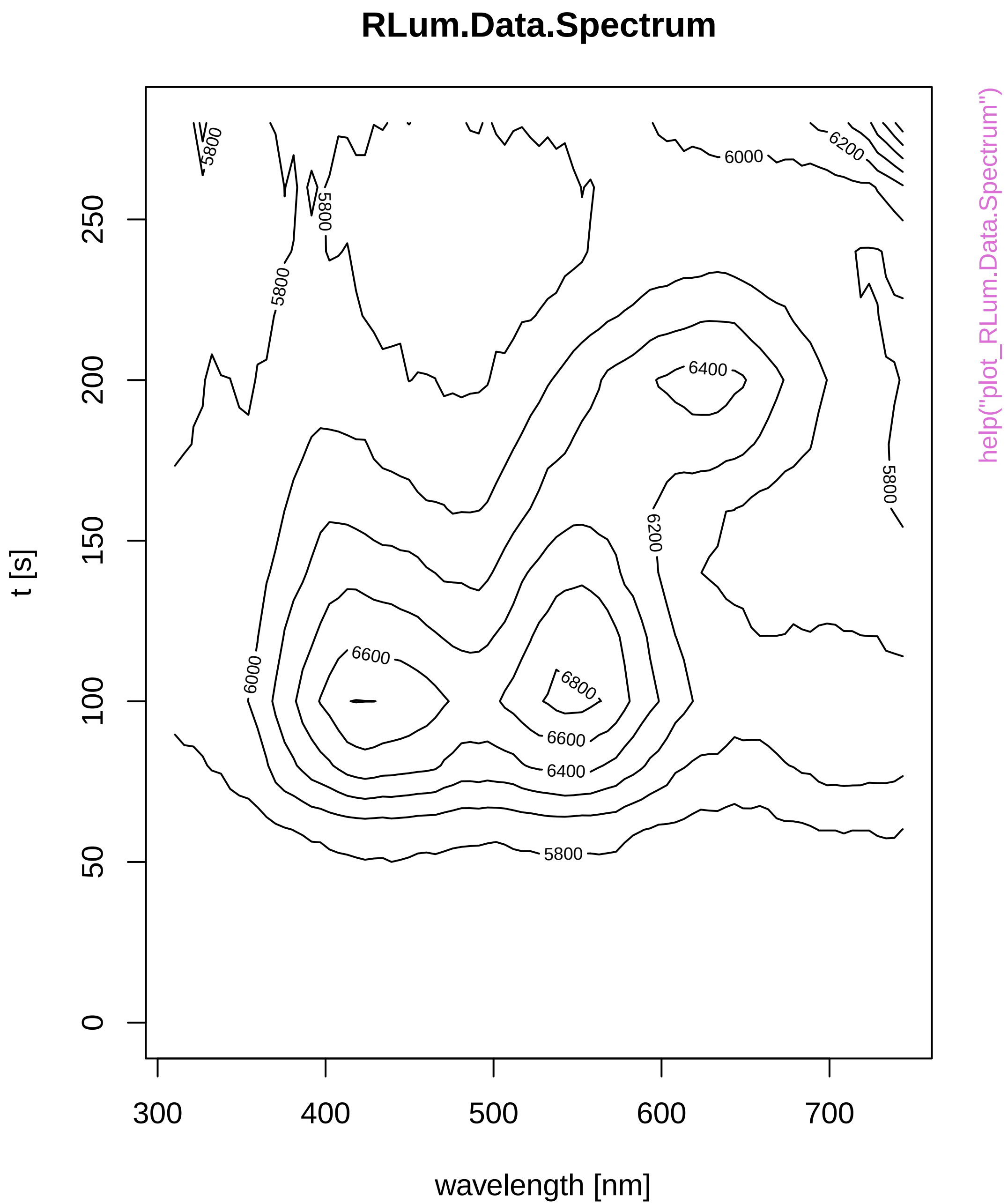


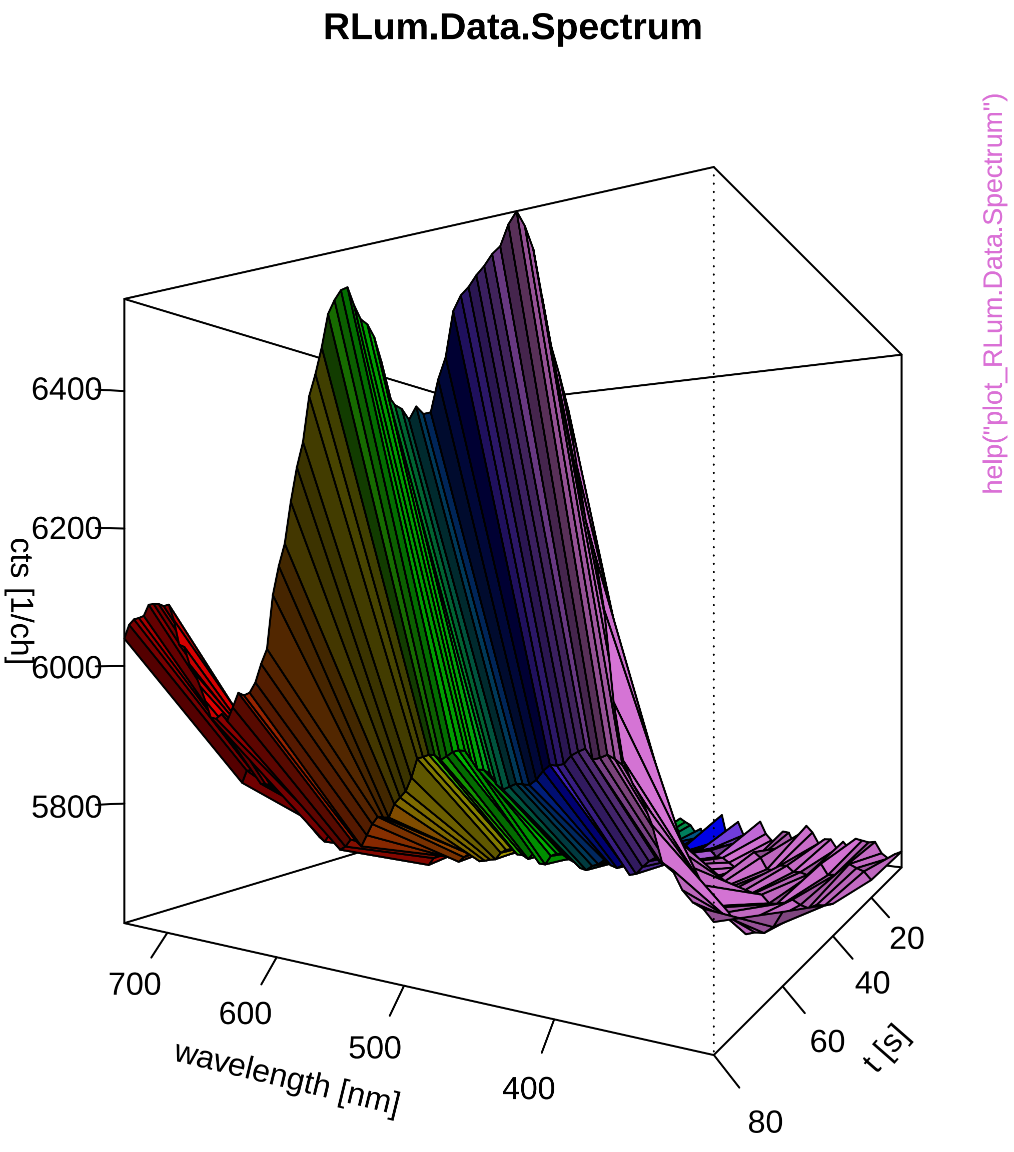
TL
#25
TL [cts/0.88 °C]
0
40
80
120
0
50
100
150
200
Temperature [°C]
OSL
#26
OSL [cts/0.04 s]
40
60
80
100
0
10
20
30
40
Time [s]
help("plot_RLum.Analysis")
TL
#27
TL [cts/0.64 °C]
0
50
150
250
0
50
100
150
Temperature [°C]
OSL
#28
OSL [cts/0.04 s]
0
1000
2000
3000
0
10
20
30
40
Time [s]
TL
#29
TL [cts/0.88 °C]
0
50
150
250
0
50
100
150
200
Temperature [°C]
IRSL
#30
IRSL [cts/0.04 s]
0
10
20
30
40
0
10
20
30
40
Time [s]

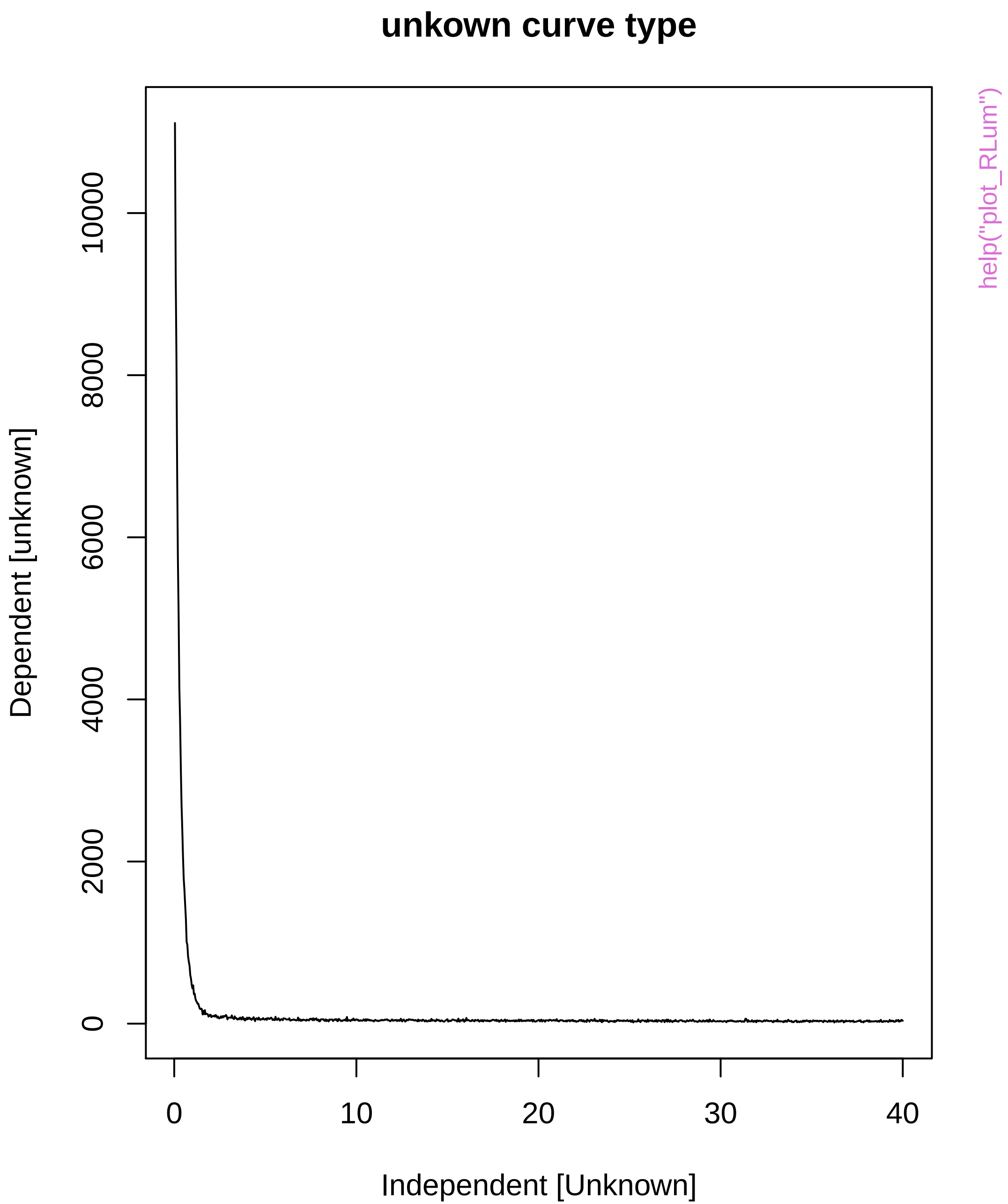

TL combined
y
x
0.0
0.4
0.8
0
50
100
150
200
Curve 1
Curve 2
Curve 3
Curve 4
Curve 5
Curve 6
Curve 7
Curve 8
Curve 9
Curve 10

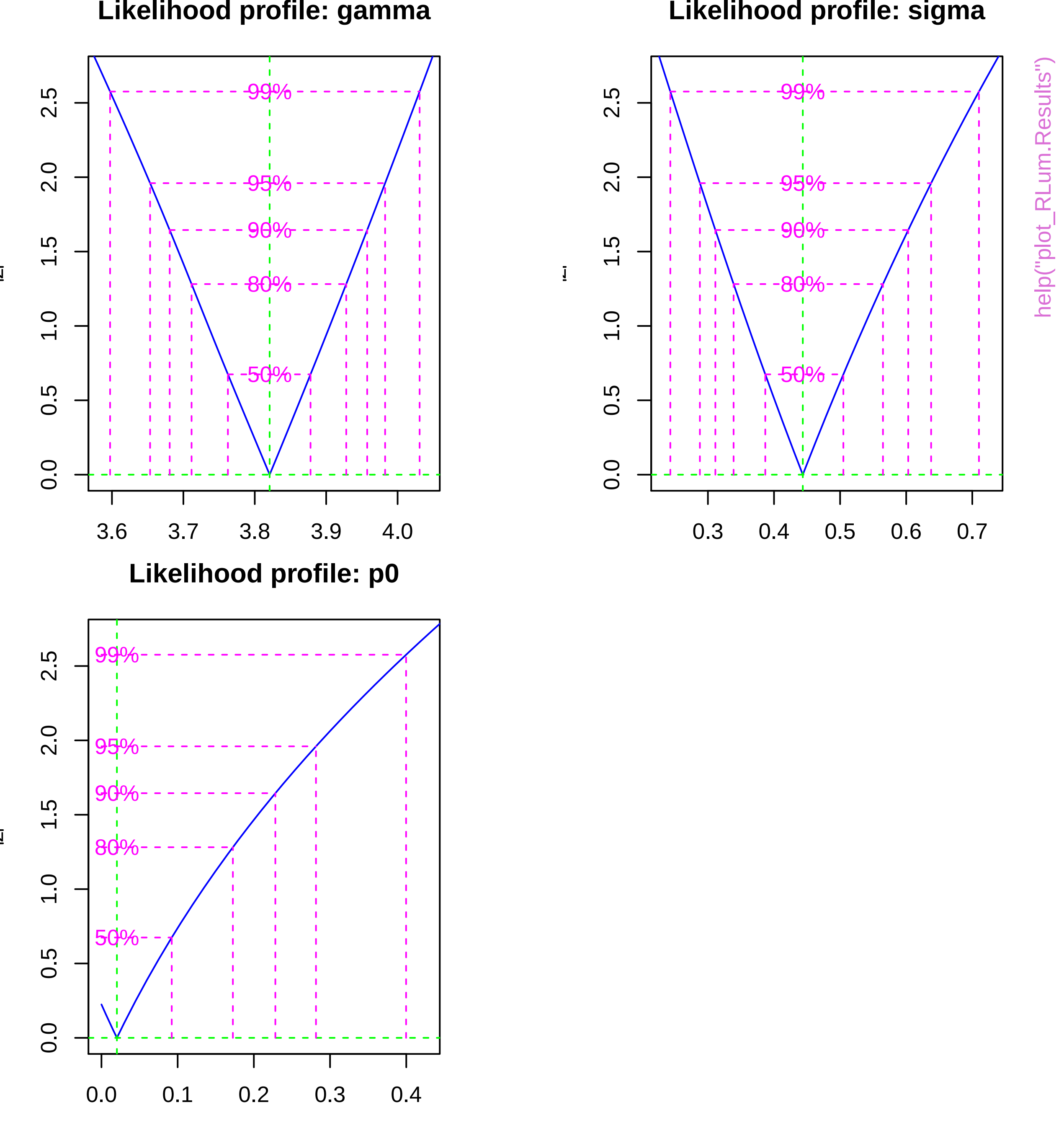

unkown curve type
Dependent [unknown]
0
2000
4000
6000
8000
10000
0
10
20
30
40
Independent [Unknown]
help("plot_RLum.Data.Curve")


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")

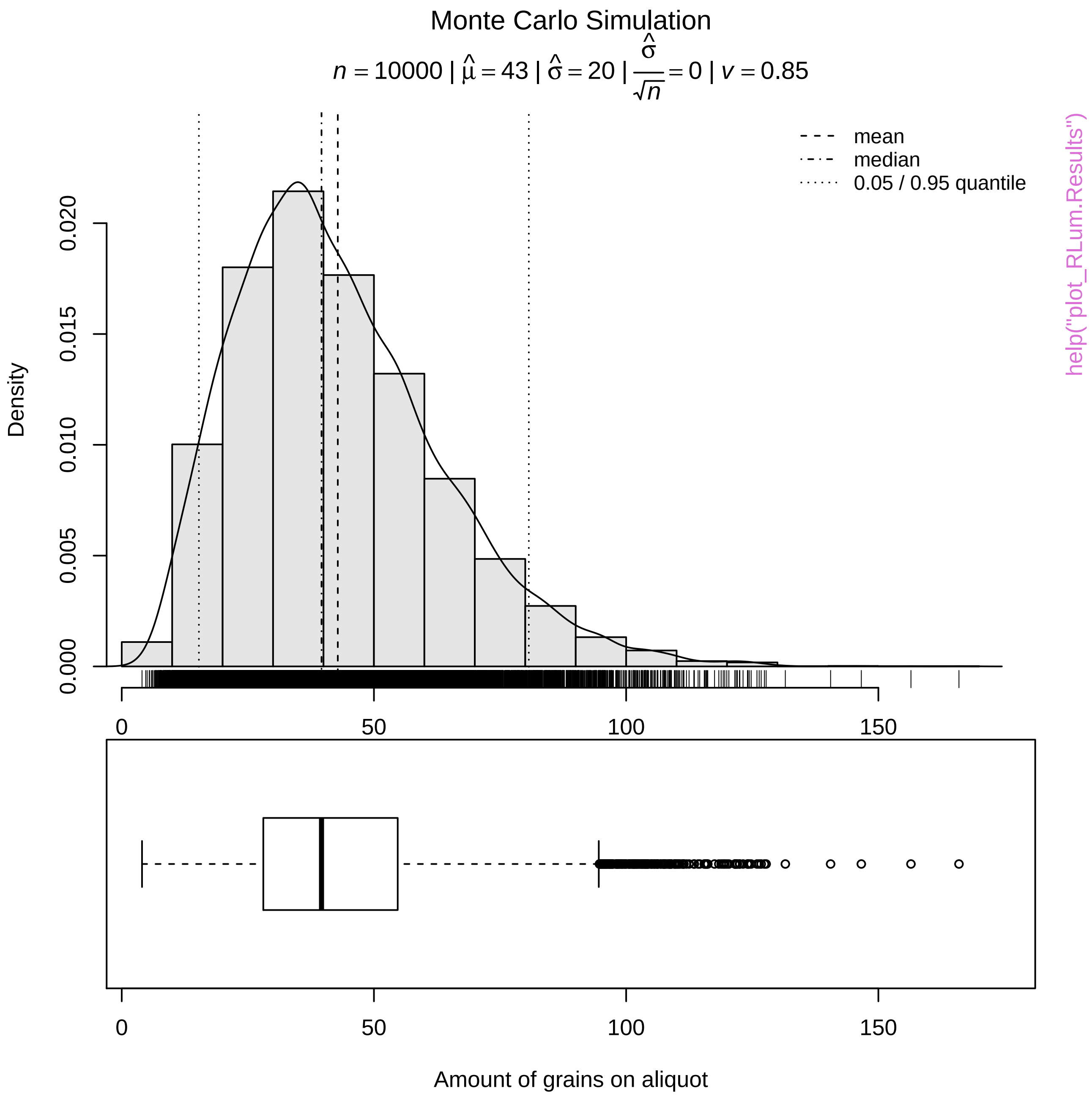

RLum.Data.Spectrum
t [s]
wavelength [nm]
help("plot_RLum.Data.Spectrum")
0
50
100
150
200
250
300
400
500
600
700
5800
6000
6200
6400
6600
6800


RLum.Data.Spectrum
help("plot_RLum.Data.Spectrum")
cts [1/ch]
6400
6200
6000
5800
700
600
500
400
wavelength [nm]
20
40
60
80
t [s]

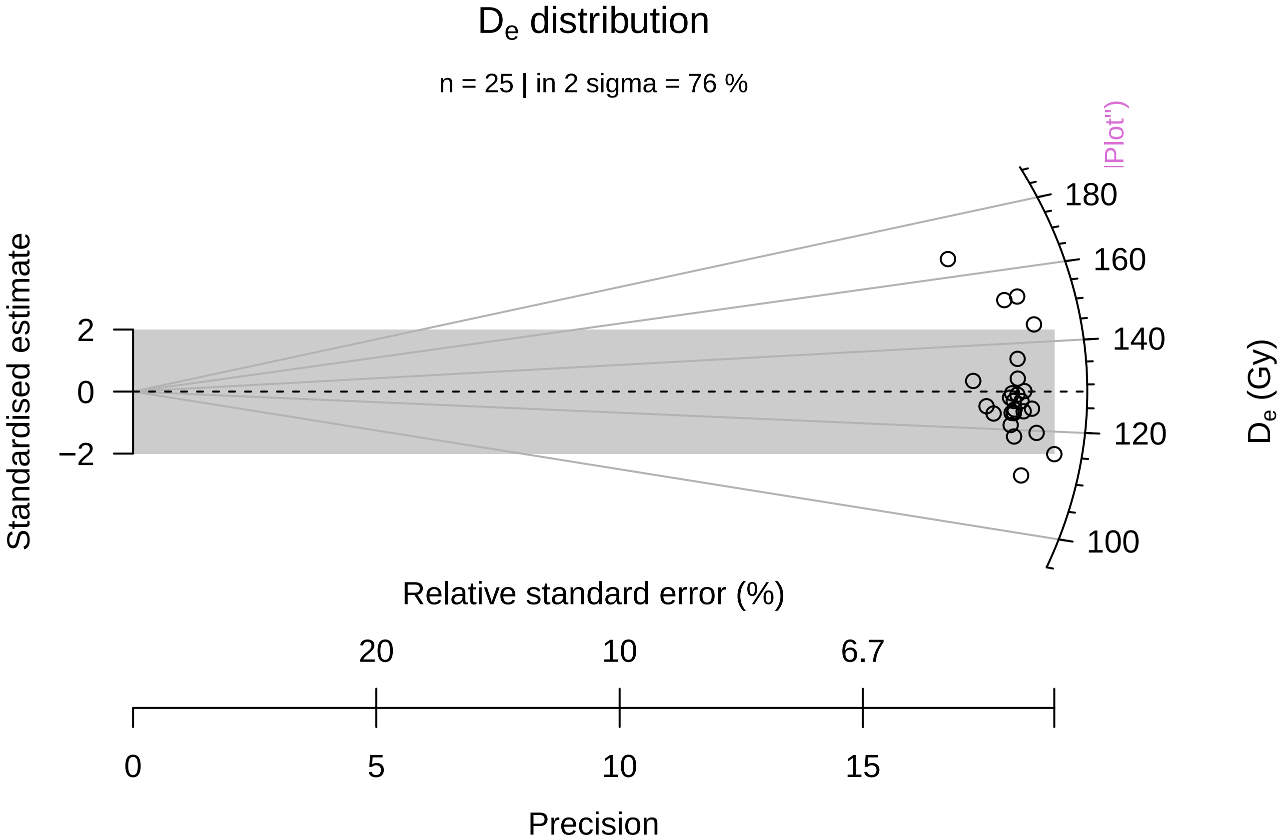

unkown curve type
Dependent [unknown]
0
2000
4000
6000
8000
10000
0
10
20
30
40
Independent [Unknown]
help("plot_RLum")

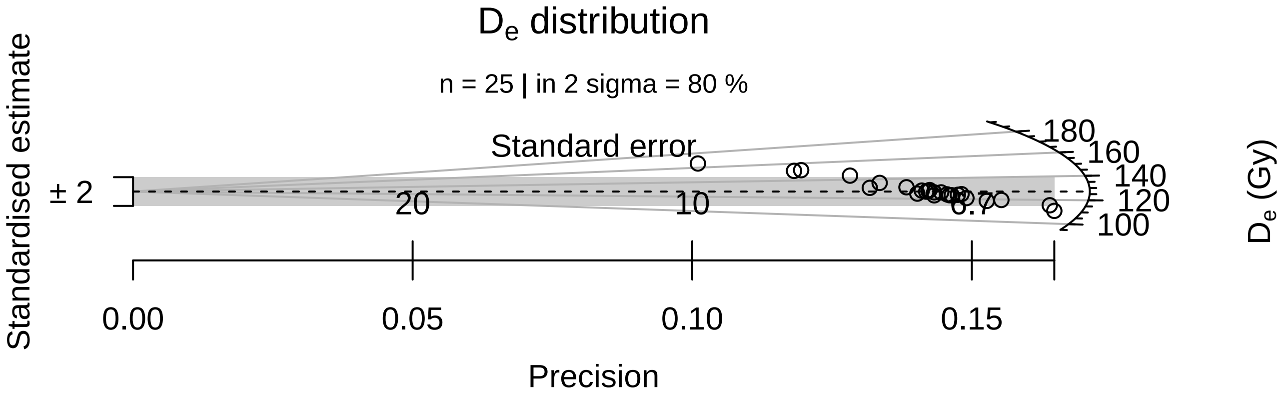


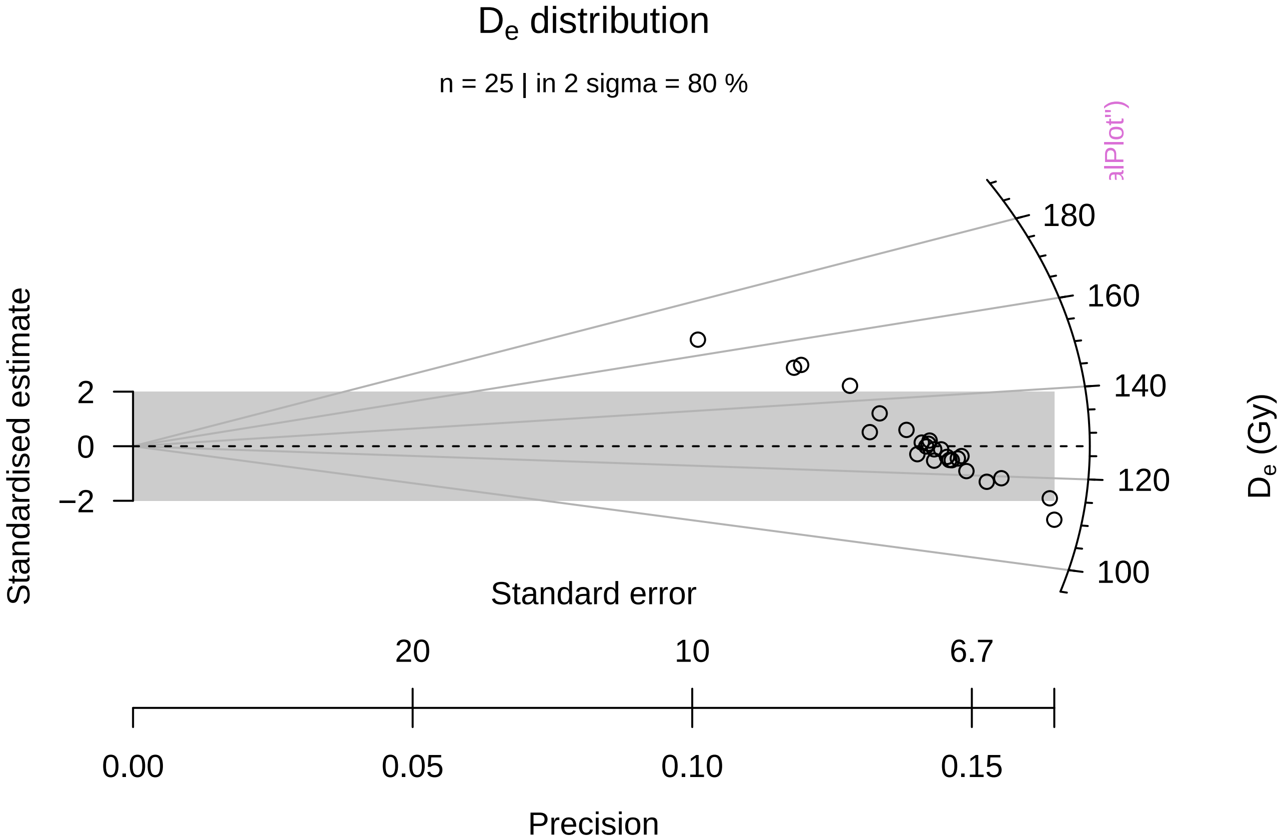
Likelihood profile: gamma
99%
95%
90%
80%
50%
0.0
0.5
1.0
1.5
2.0
2.5
3.6
3.7
3.8
3.9
4.0
Likelihood profile: sigma
99%
95%
90%
80%
50%
0.0
0.5
1.0
1.5
2.0
2.5
0.3
0.4
0.5
0.6
0.7
help("plot_RLum.Results")
Likelihood profile: p0
99%
95%
90%
80%
50%
0.0
0.5
1.0
1.5
2.0
2.5
0.0
0.1
0.2
0.3
0.4



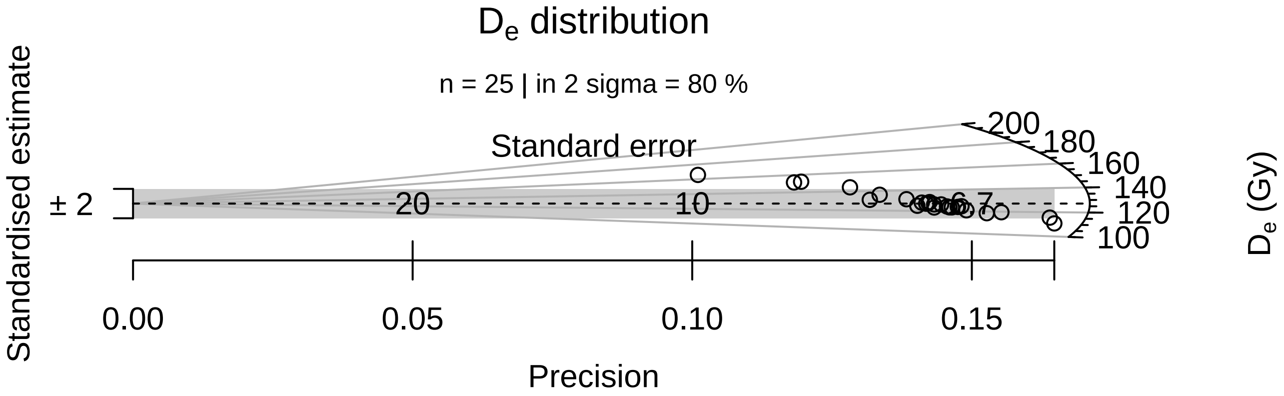
Monte Carlo Simulation
$n = 10000 \mid \hat{\mu} = 43 \mid \hat{\sigma} = 20 \mid \frac{\hat{\sigma}}{\sqrt{n}} = 0 \mid v = 0.85$
mean
median
0.05 / 0.95 quantile
help("plot_RLum.Results")
Density
0.000
0.005
0.010
0.015
0.020
0
50
100
150
Amount of grains on aliquot


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

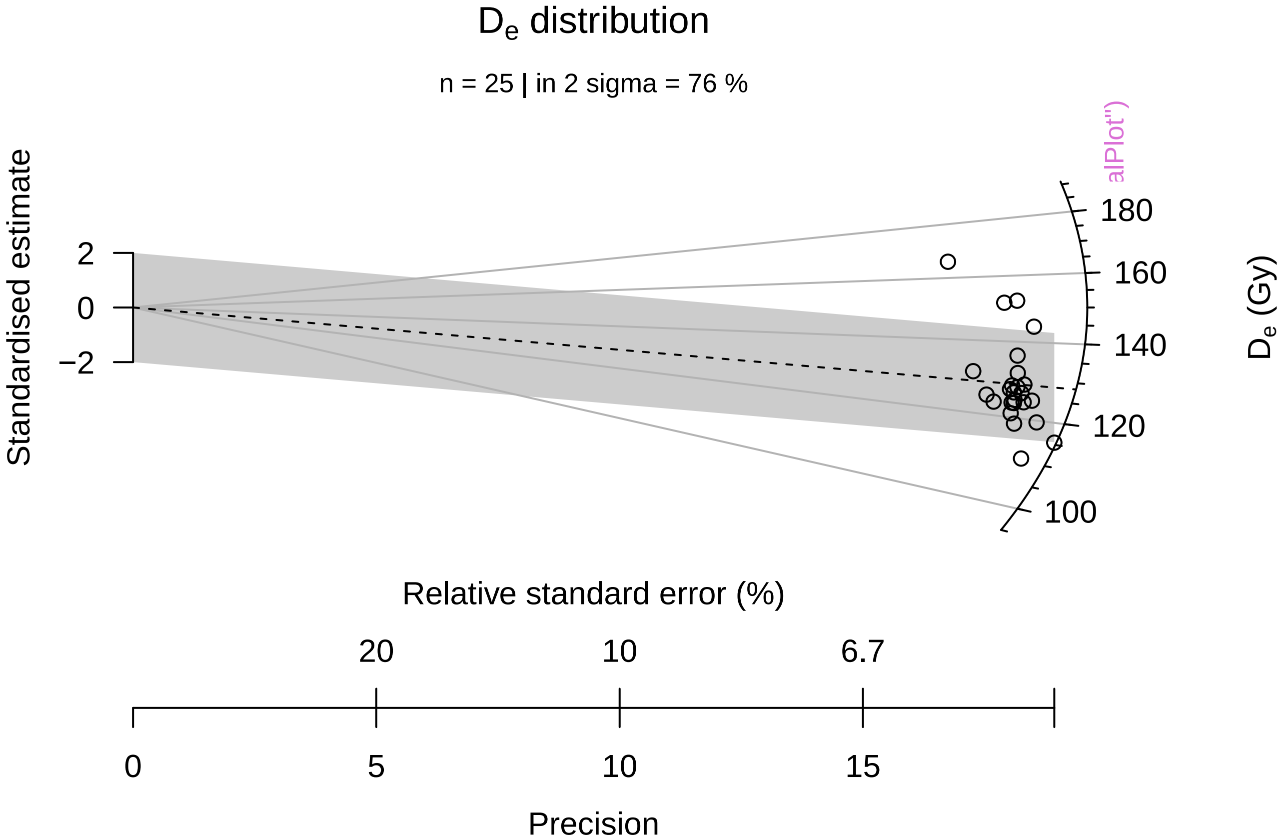

De distribution
n = 25 | in 2 sigma = 80 %
Standard error
Standardised estimate
± 2
20
10
6.7
180
160
140
120
100
De (Gy)
0.00
0.05
0.10
0.15
Precision



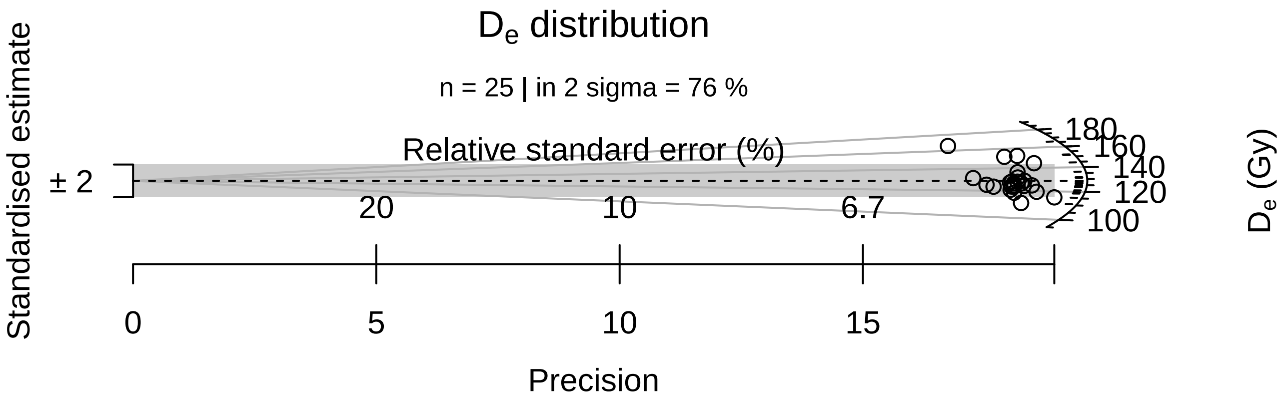
D$_e$ distribution
n = 25 | in 2 sigma = 80 %
Standardised estimate
2
0
−2
180
160
140
120
100
D$_e$ (Gy)
Standard error
20
10
6.7
0.00
0.05
0.10
0.15
Precision



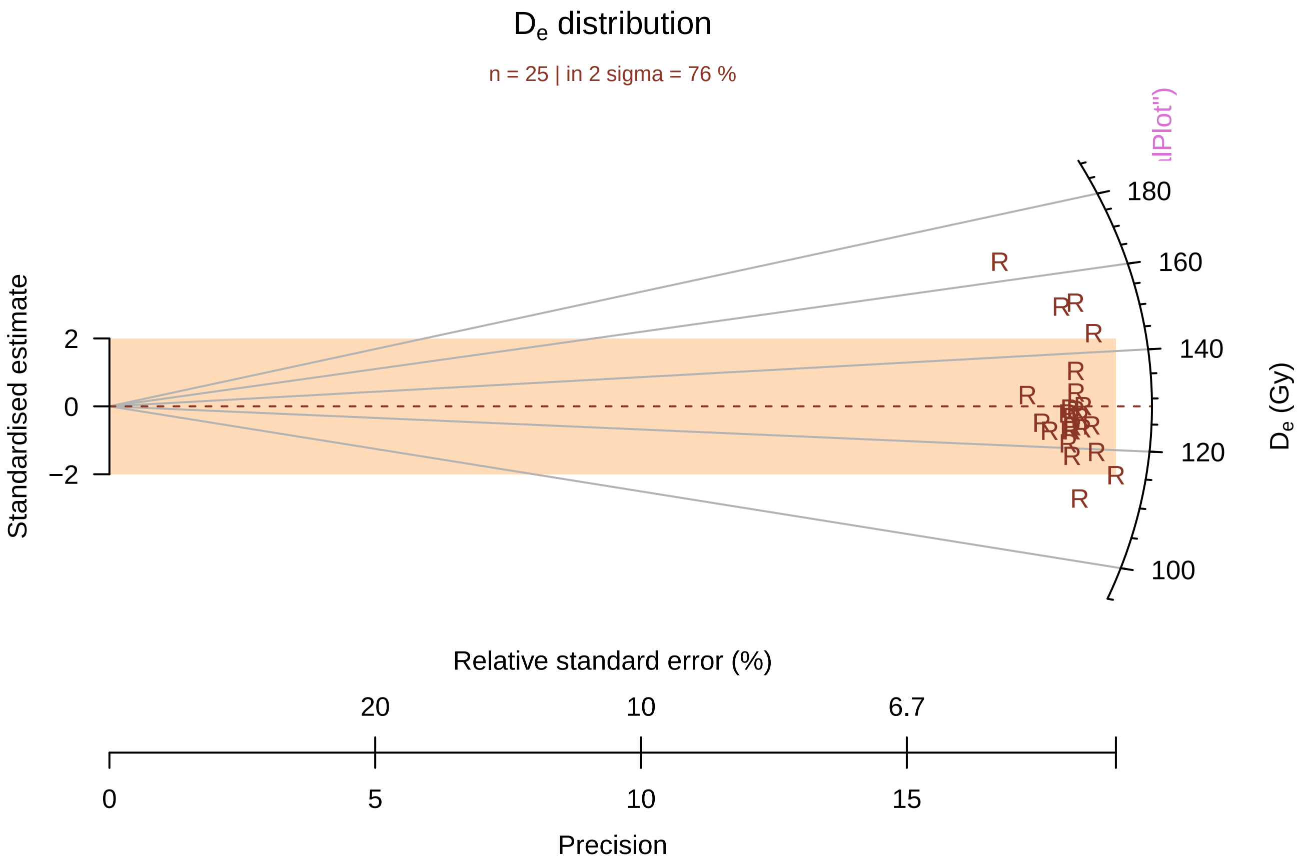
D$_e$ distribution
n = 25 | in 2 sigma = 80 %
Standardised estimate
± 2
Standard error
20
10
6.7
200
180
160
140
120
100
D$_e$ (Gy)
0.00
0.05
0.10
0.15
Precision



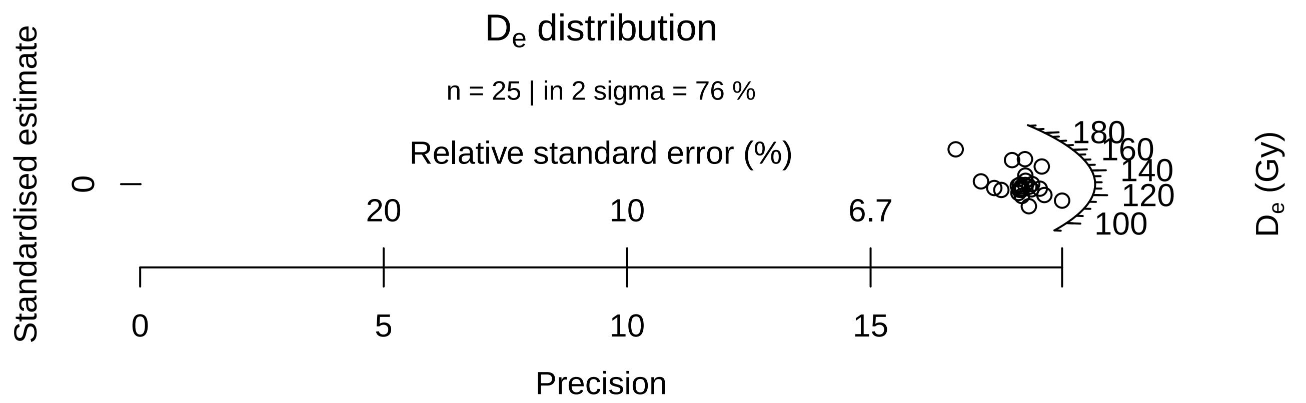
De distribution
n = 25 | in 2 sigma = 76 %
alPlot")
Standardised estimate
2
0
−2
180
160
140
120
100
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision



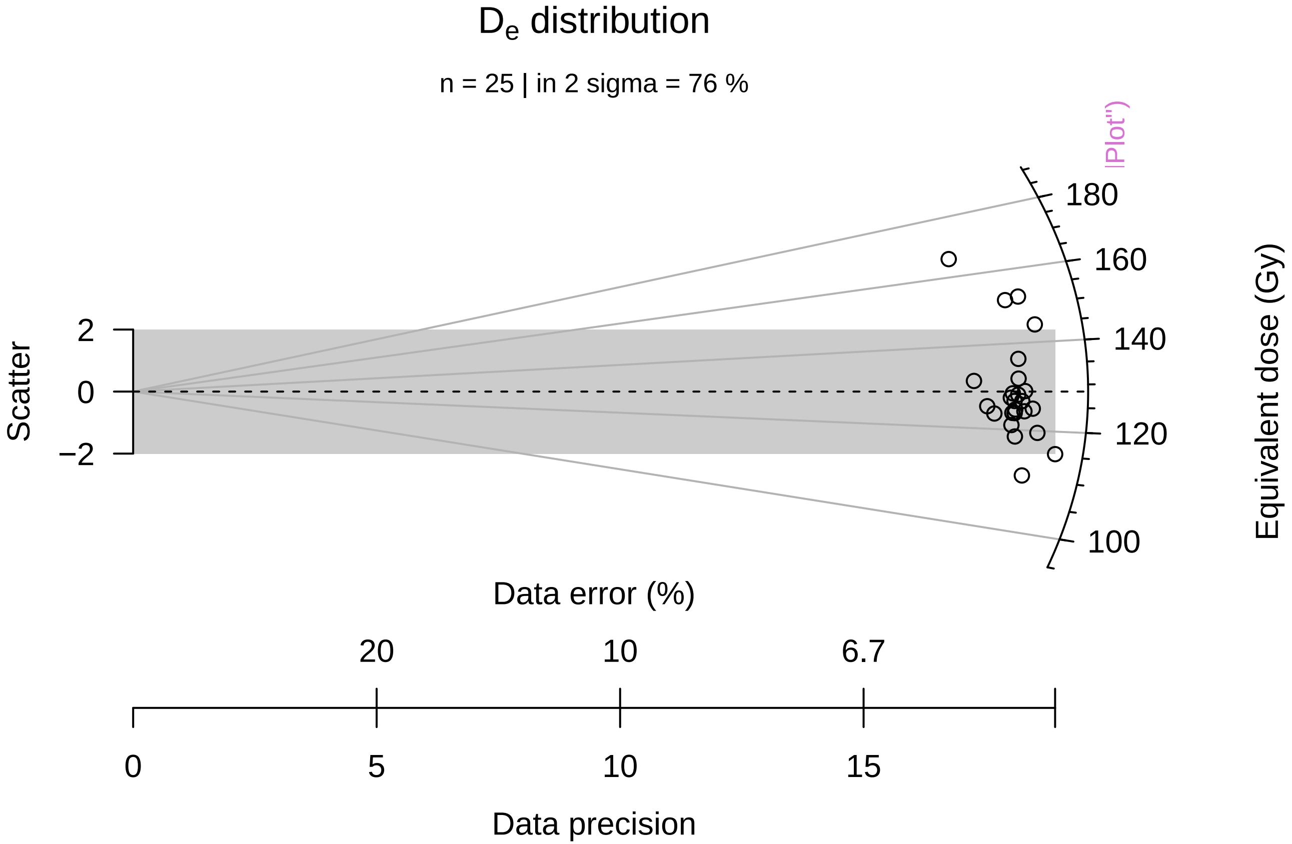
De distribution
n = 25 | in 2 sigma = 76 %
Standardised estimate
± 2
Relative standard error (%)
20
10
6.7
180
160
140
120
100
De (Gy)
0
5
10
15
Precision



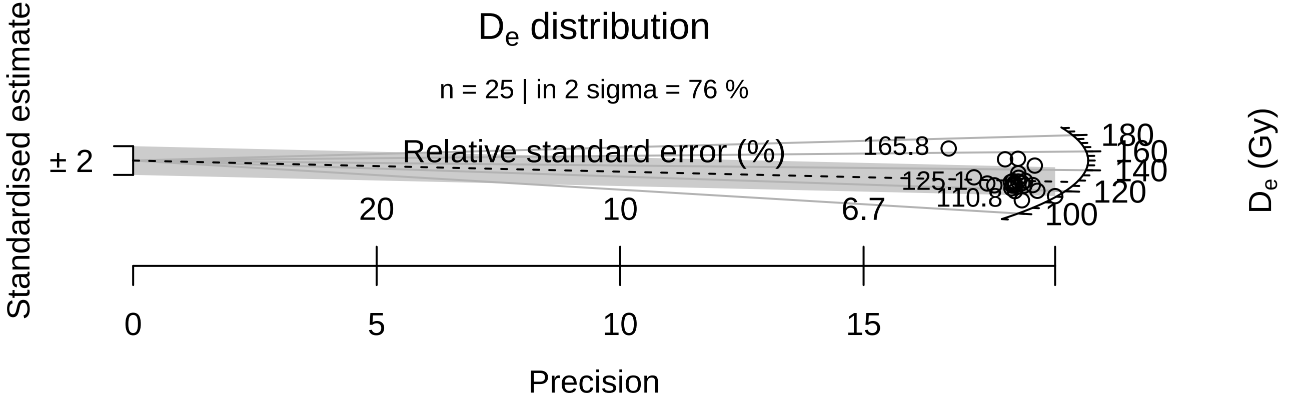
De distribution
n = 25 | in 2 sigma = 76 %
Standardised estimate
2
0
−2
180
160
140
120
100
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision



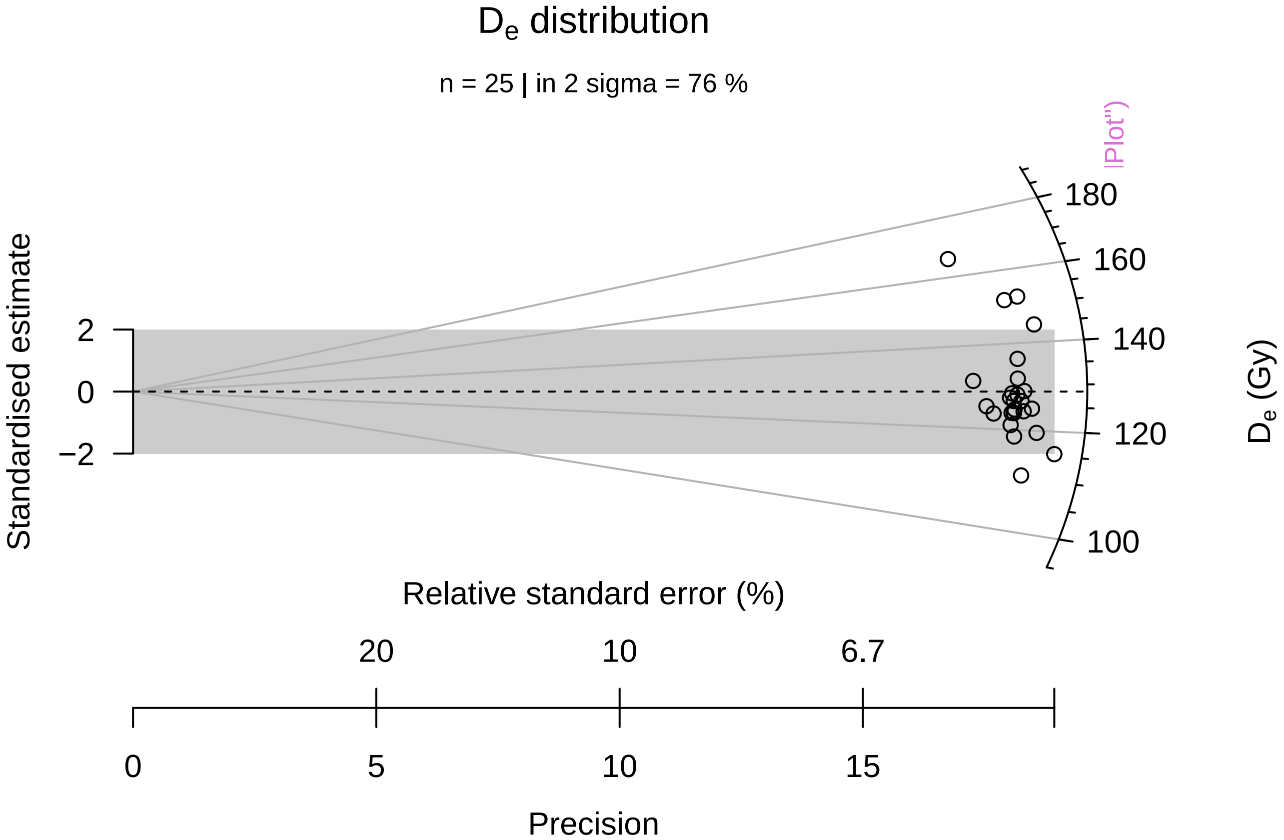
De distribution
n = 25 | in 2 sigma = 76 %
Standardised estimate
0
Relative standard error (%)
20
10
6.7
180
160
140
120
100
De (Gy)
0
5
10
15
Precision



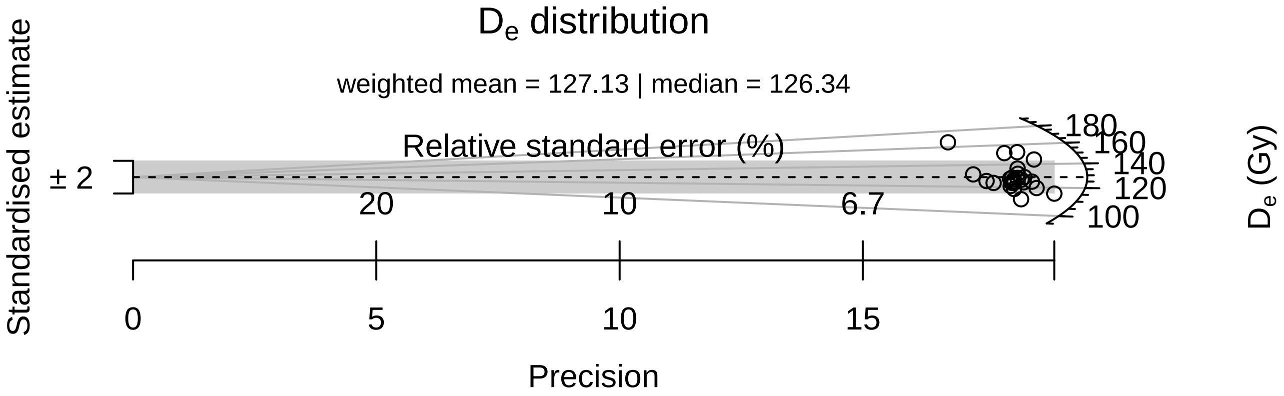
De distribution
n = 25 | in 2 sigma = 76 %
|Plot")
180
160
140
120
100
Equivalent dose (Gy)
2
0
−2
Scatter
Data error (%)
20
10
6.7
0
5
10
15
Data precision



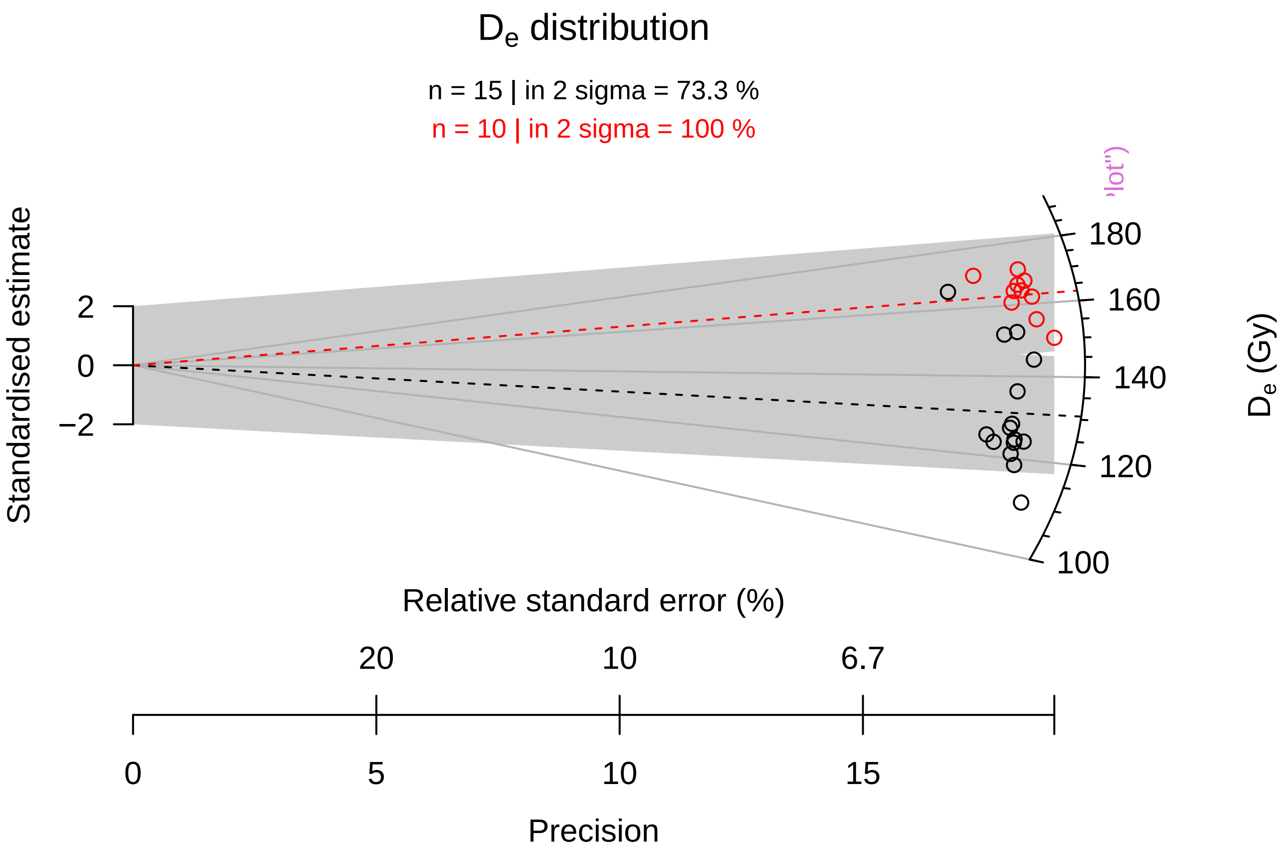
De distribution
n = 25 | in 2 sigma = 76 %
165.8
Relative standard error (%)
125.1
110.8
180
160
140
120
100
De (Gy)
± 2
Standardised estimate
20
10
6.7
0
5
10
15
Precision



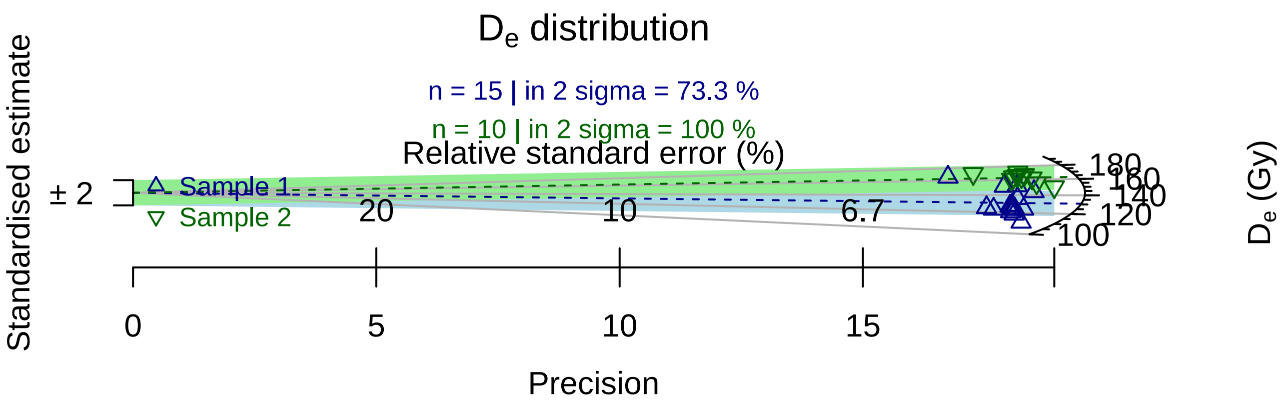
De distribution
n = 25 | in 2 sigma = 76 %
|Plot")
Standardised estimate
2
0
−2
180
160
140
120
100
De (Gy)
Relative standard error (%)
20
10
6.7
0
5
10
15
Precision



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



De distribution
n = 15 | in 2 sigma = 73.3 %
n = 10 | in 2 sigma = 100 %
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 = 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
De (Gy)
0
5
10
15
Precision