

L_n, L_x curves

ALQ Pos. 1

T_n, T_x curves



Cutheat – TL curves



IRSLT

IRSL/BOSL = 0.88%



IRSL curve (10 s)



help("Analyse_SAR_OSLdata")

unknown measurement





Fig. 4 – Bos & Wallinga (2012)





help("CW2pLM")



Fig. 4 – Bos & Wallinga (2012)





Fig. 4 – Bos & Wallinga (2012)





Histogram



Histogram





`help("ExampleData.FittingLM")`



`help("ExampleData.LxTxData")`



help("ExampleData.LxTxOSLData")



`help("ExampleData.LxTxOSLData")`

RF

#1



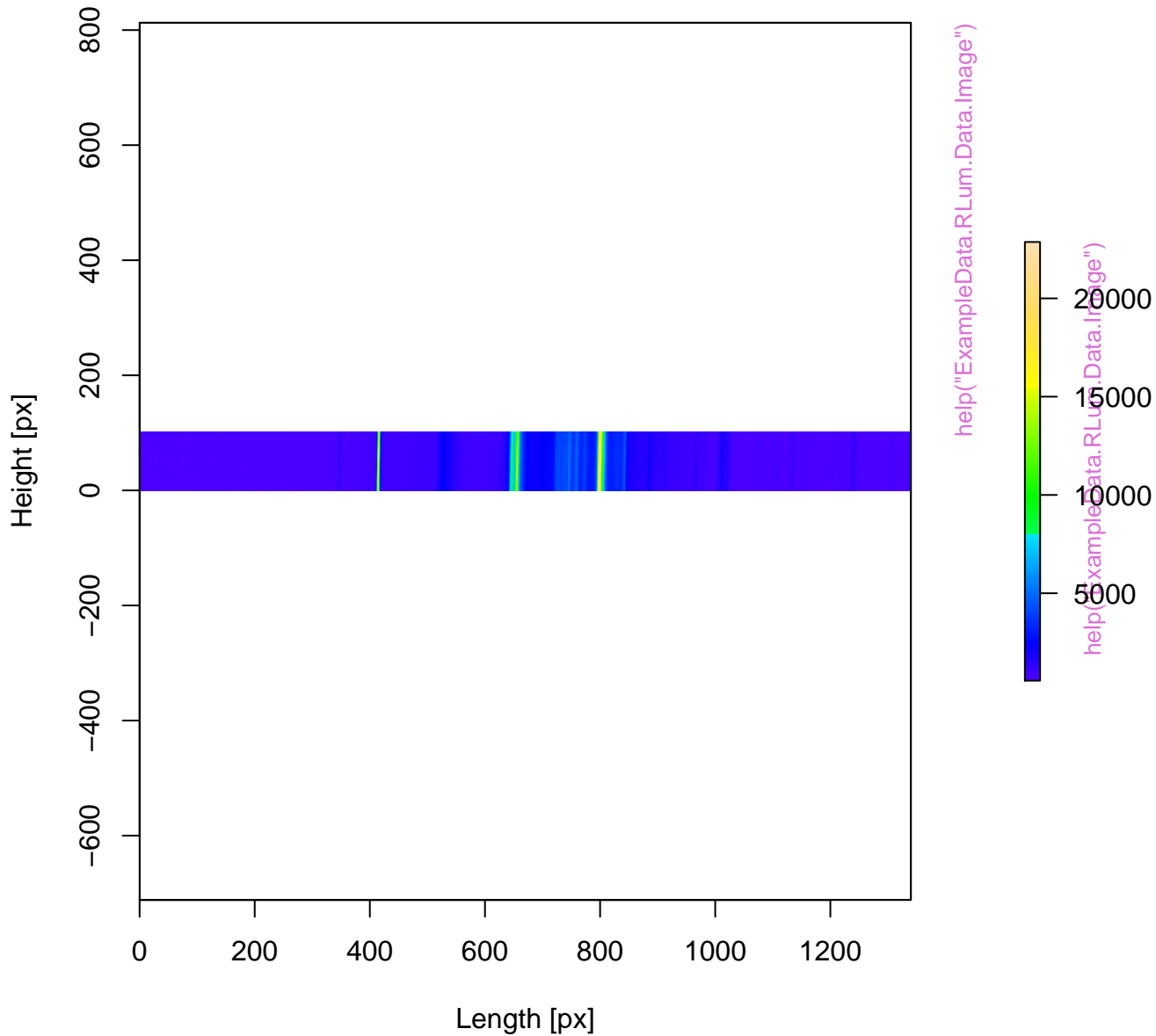
RF

#2



[help\("ExampleData.RLum.Analysis"\)](#)

RLum.Data.Image



OSL (UVVIS)



help("ExampleData.XSYG")

RLum.Data.Spectrum



help("ExampleData.XSYG")

USER

Record: 1



IRSL

Record: 1



help("ExampleData.portableOSL")

Record: 1



Record: 1



USER

Record: 2



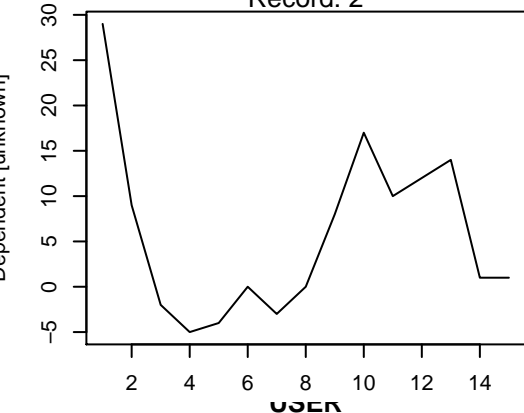
IRSL

Record: 2

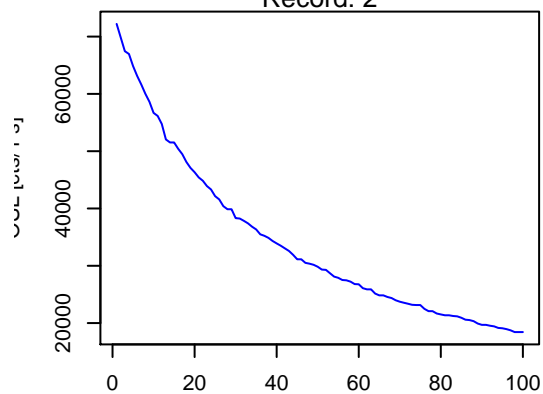


help("ExampleData.portableOSL")

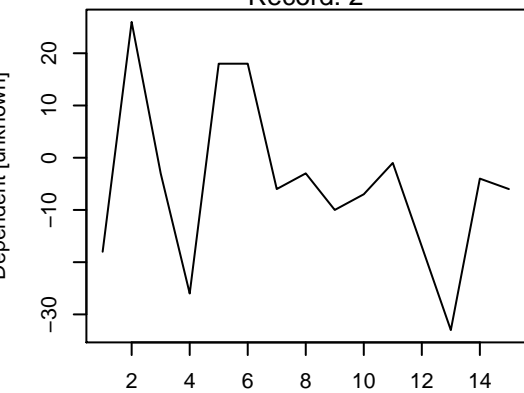
Record: 2



Record: 2



Record: 2





help("ExampleData.portableOSL")

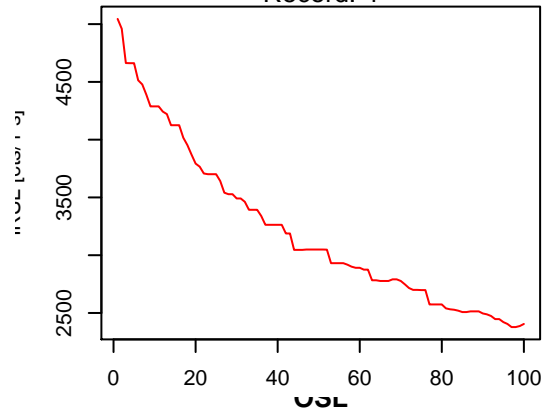
USER

Record: 4



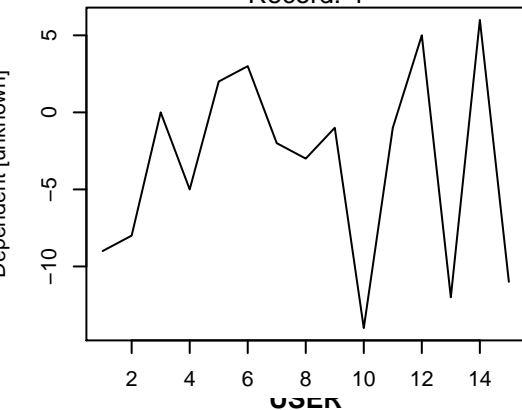
IRSL

Record: 4

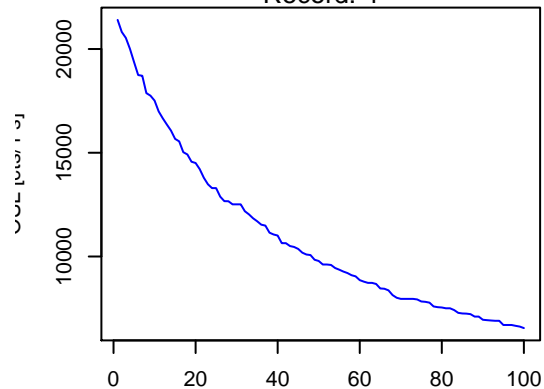


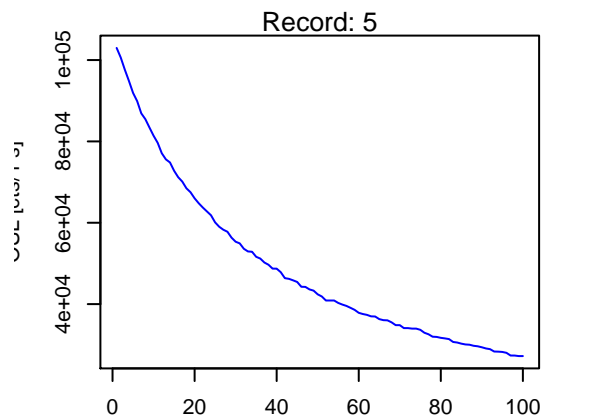
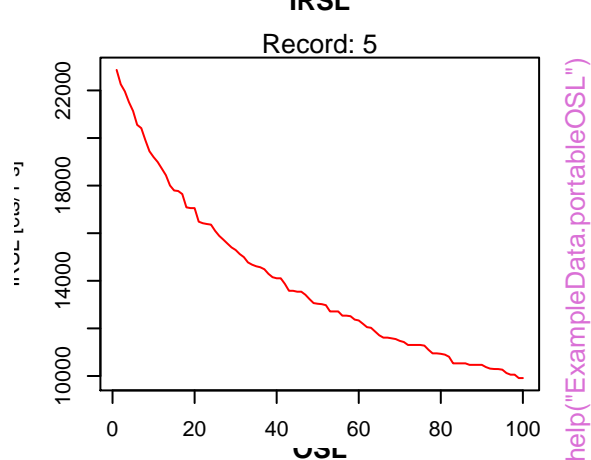
help("ExampleData.portableOSL")

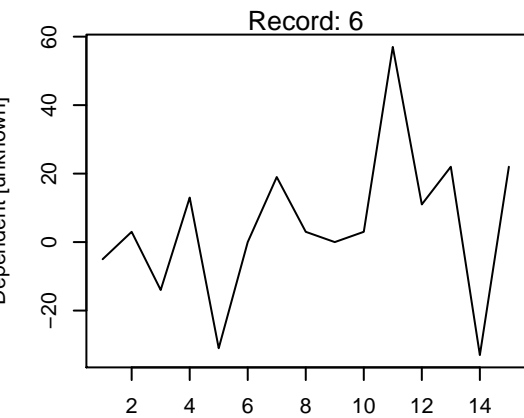
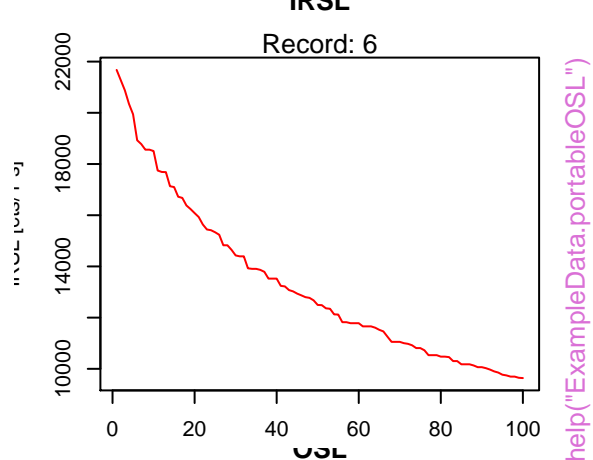
Record: 4



Record: 4







USER

Record: 7



IRSL

Record: 7



help("ExampleData.portableOSL")

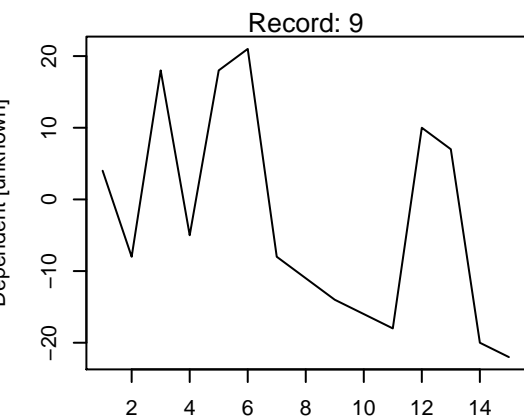
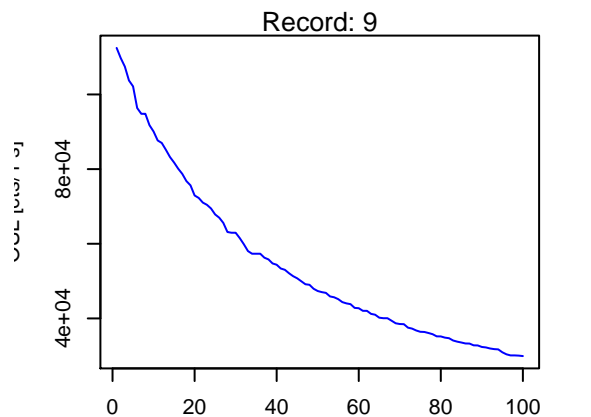
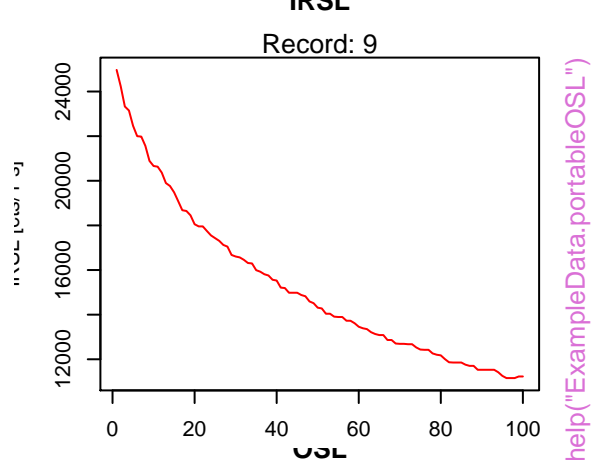
Record: 7

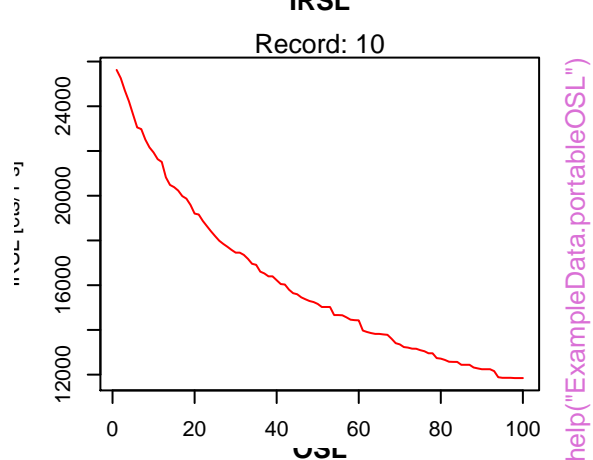


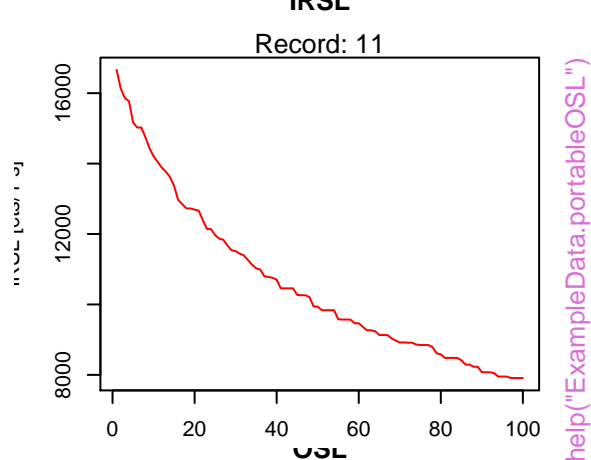
Record: 7











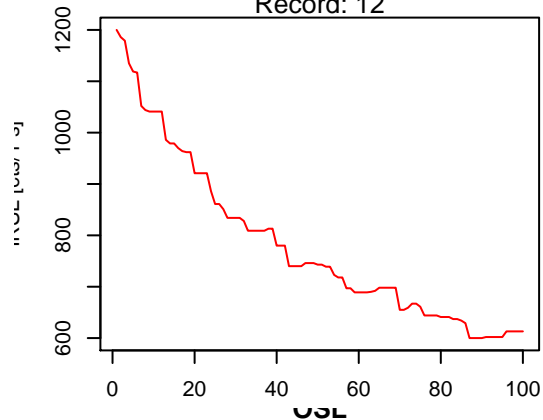
USER

Record: 12



IRSL

Record: 12

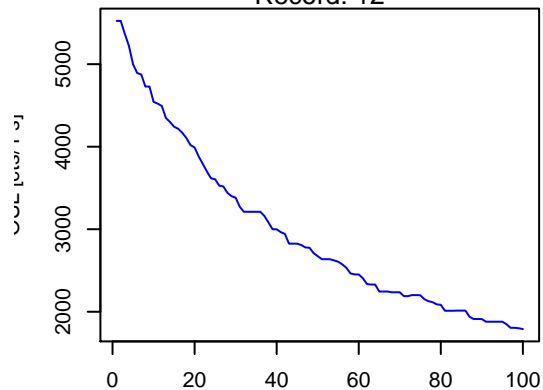


help("ExampleData.portableOSL")

Record: 12



Record: 12



USER

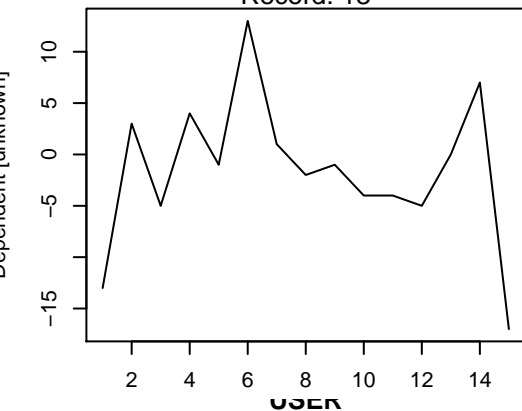
Record: 13



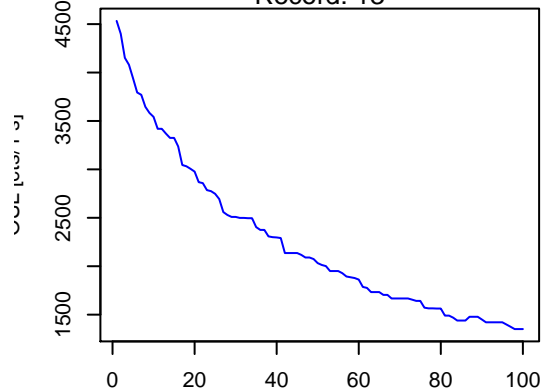
Record: 13



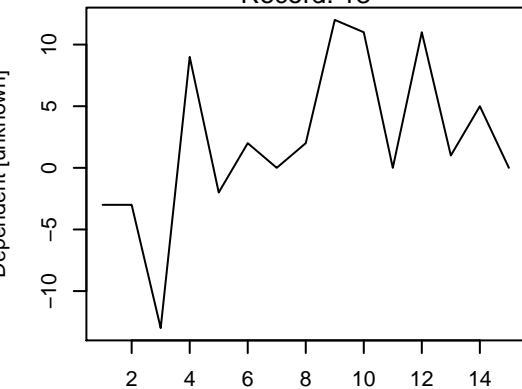
Record: 13



Record: 13



Record: 13



help("ExampleData.portableOSL")

USER

Record: 14



IRSL

Record: 14

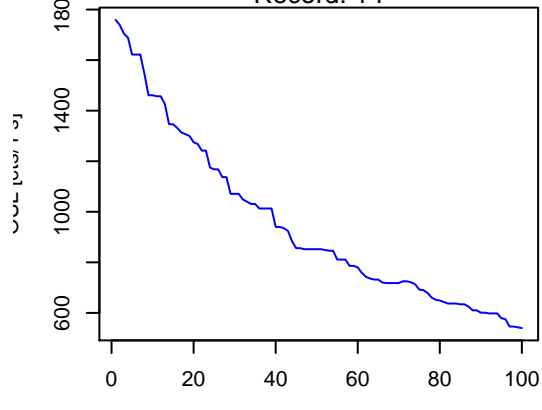


help("ExampleData.portableOSL")

Record: 14



Record: 14



USER

Record: 1



IRSL

Record: 1



help("PSL2Riseo.BinfileData")

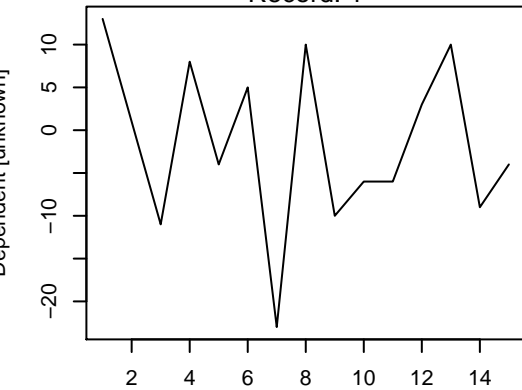
Record: 1



Record: 1



Record: 1



USER

Record: 2



IRSL

Record: 2



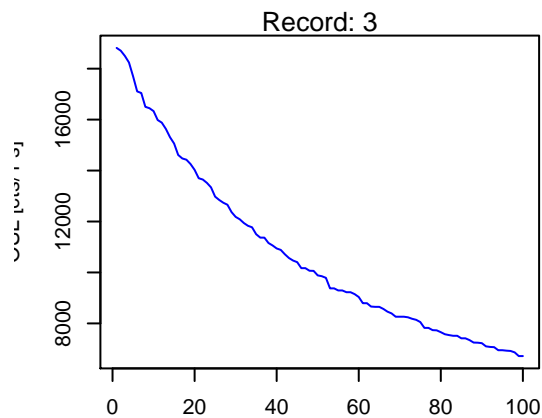
help("PSL2Riseo.BinfileData")

Record: 2



Record: 2





USER

Record: 4



Record: 4

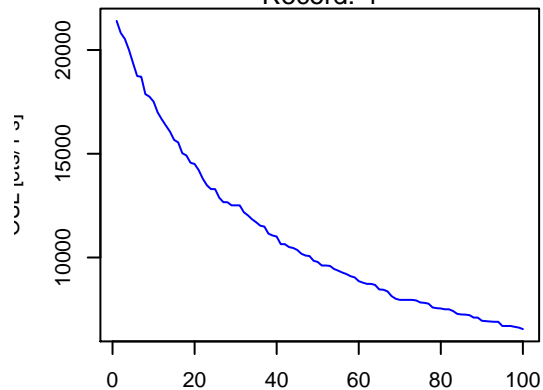


help("PSL2Risee.BINfileData")

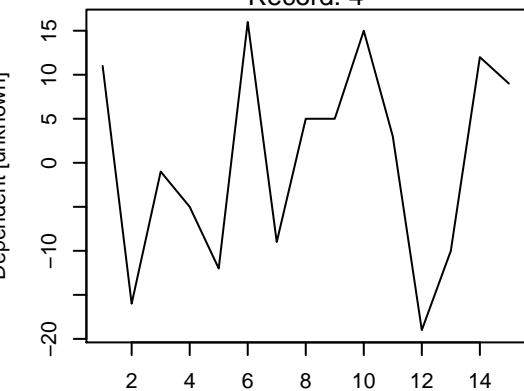
Record: 4

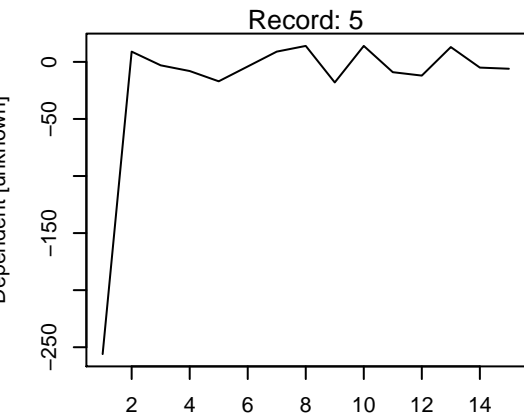
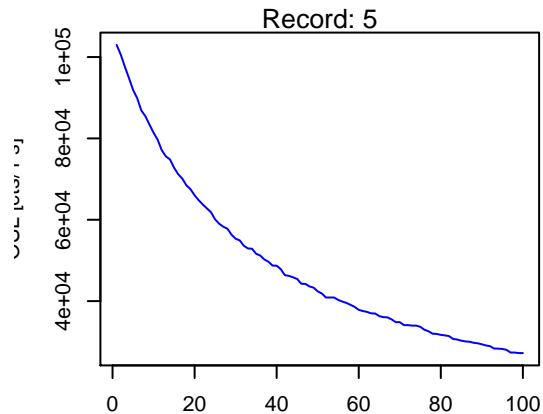


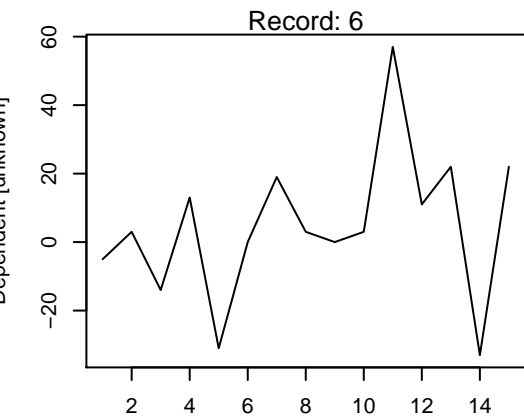
Record: 4



Record: 4







USER

Record: 7



IRSL

Record: 7

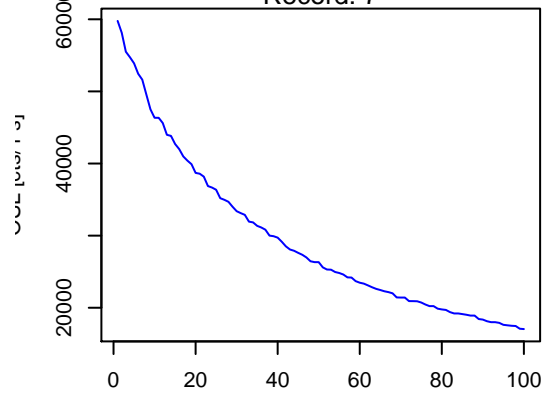


help("PSL2Riseo.BinfileData")

Record: 7



Record: 7



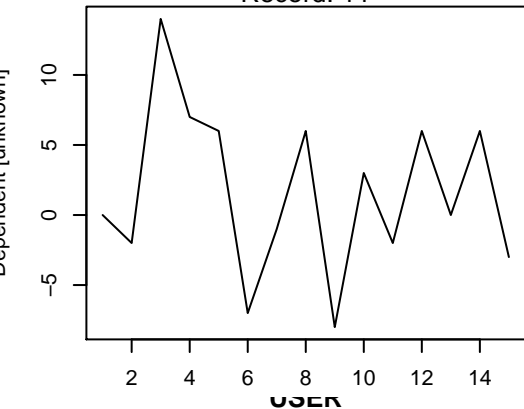






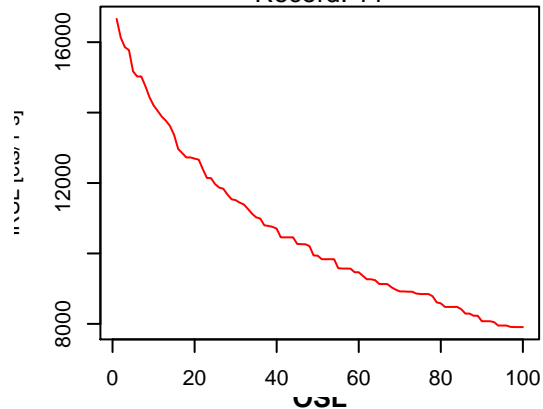
USER

Record: 11



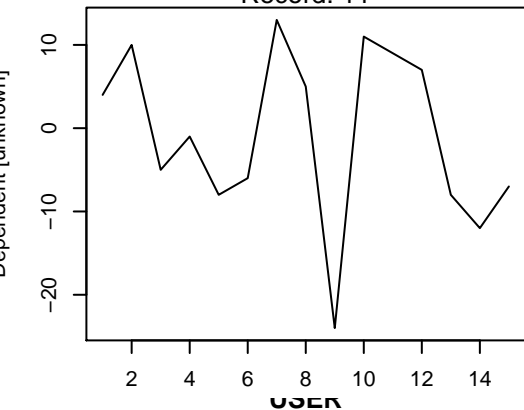
IRSL

Record: 11

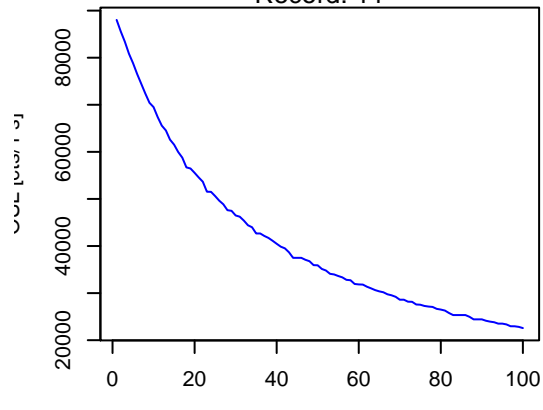


help("PSL2Riseo.BinfileData")

Record: 11



Record: 11



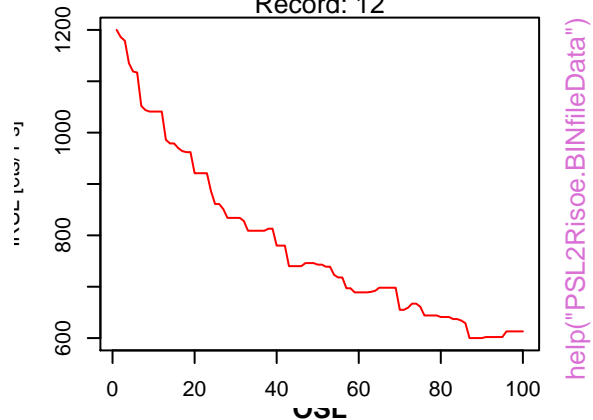
USER

Record: 12



IRSL

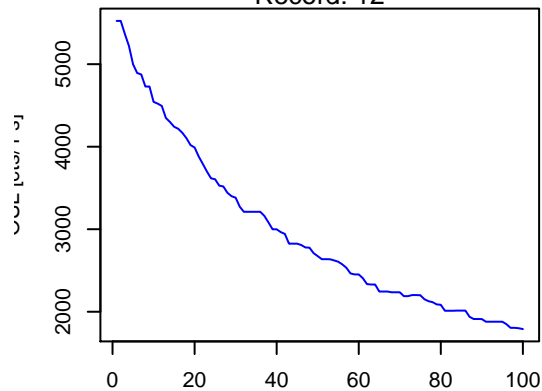
Record: 12



Record: 12

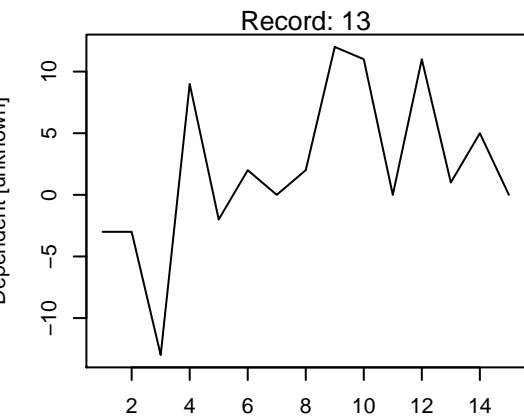
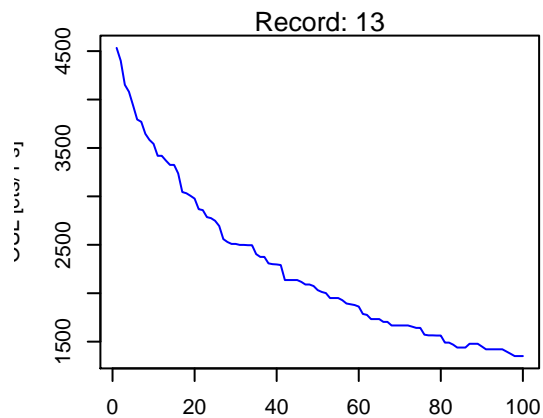
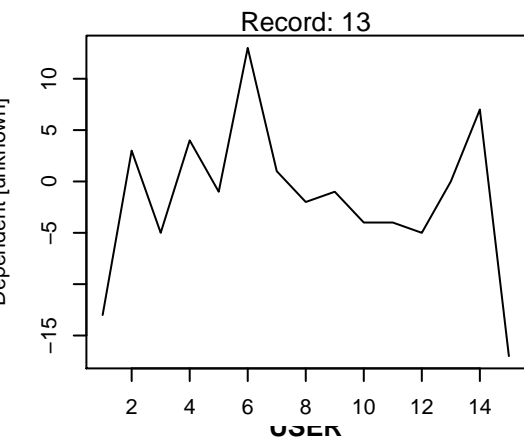
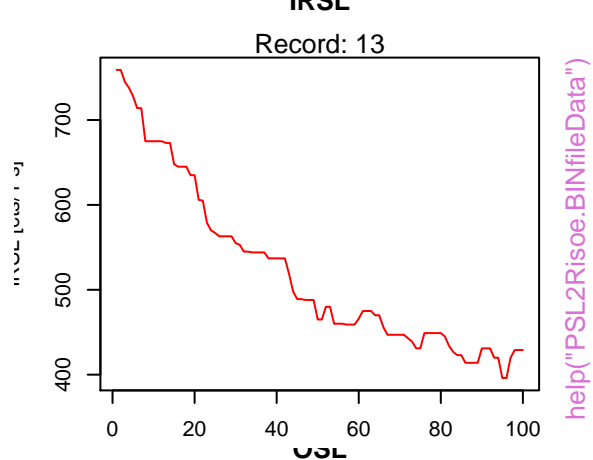
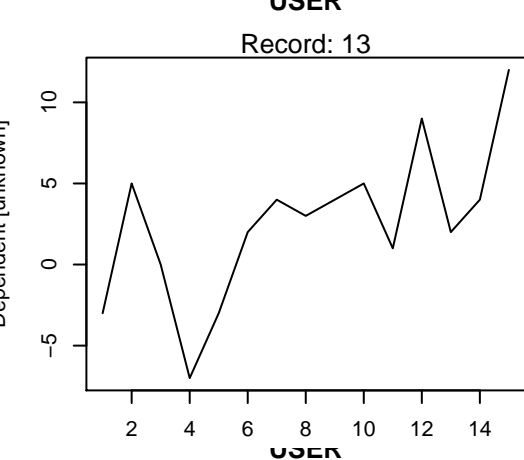


Record: 12



Record: 12





USER



IRSL



help("PSL2Riseo.BINfileData")



IR-RF

$D_e = 623.25$ [600.63 ; 635.8]

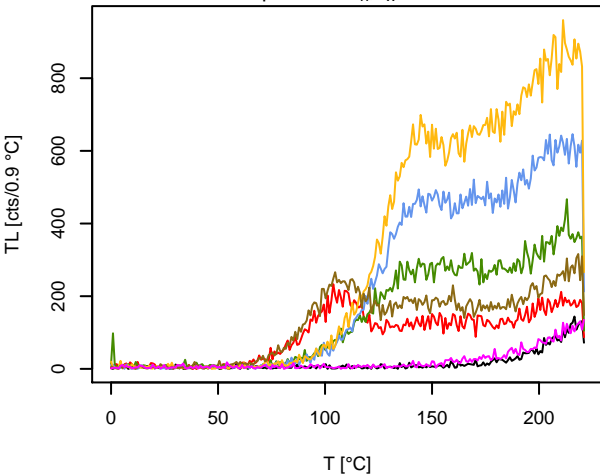


IR-RF

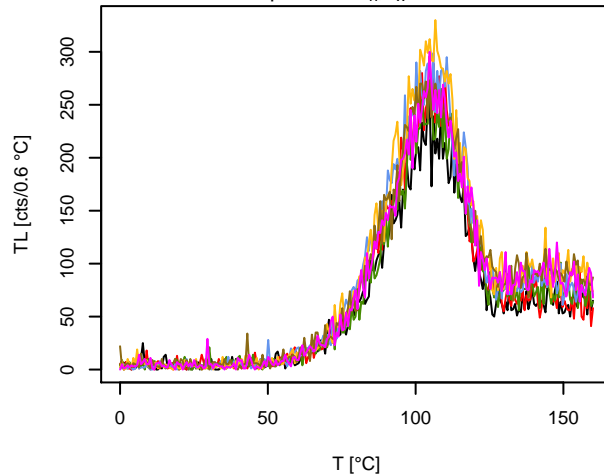
$D_e = 610.17$ [567.19 ; 653.15]



TL previous L_n, L_x curves



TL previous T_n, T_x curves



L_n, L_x curves



T_n, T_x curves



●
Natural
(0)

●
R1
(450)

●
R2
(1050)

●
R3
(2000)

●
R4
(2550)

●
R5
(450)

●
R0
(0)

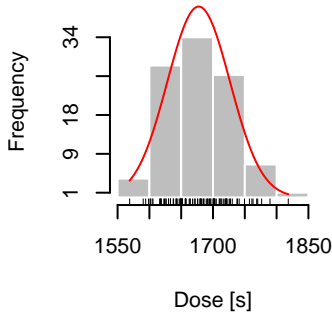
Growth curve

$D_e = 1668.25 \pm 49.22$ | fit: EXP

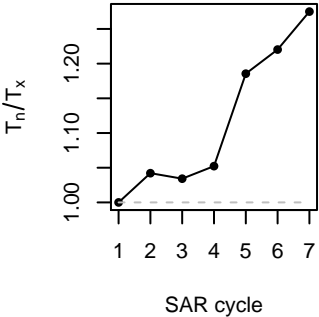


D_e from MC simulation

$D_{eMC} = 1677.48 \pm 49.22$ | quality = 99.4 %



Test dose response

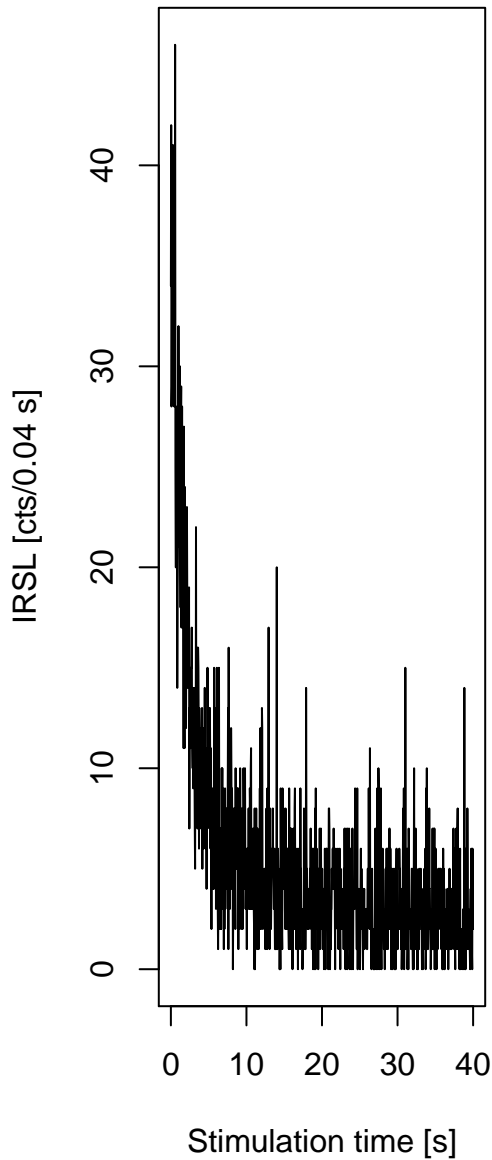


Rejection criteria



- 0.2 + 0.2

IRSL



[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



Natural
(0)

Natural
(136)

Natural
(317)

Natural
(544)

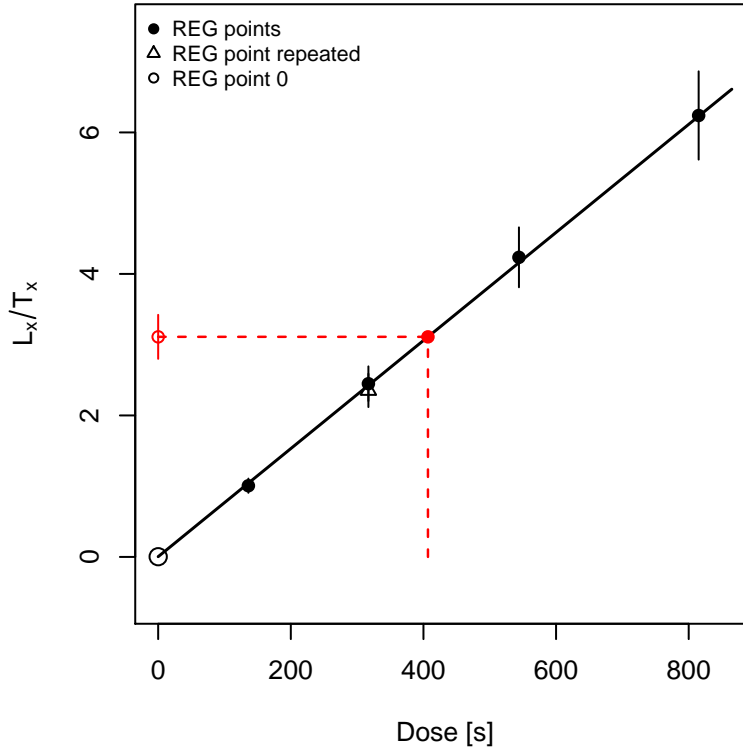
Natural
(815)

Natural
(0)

Natural
(317)

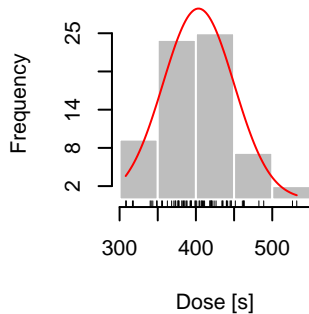
Growth curve

$D_e = 406.8 \pm 46.54$ | fit: EXP

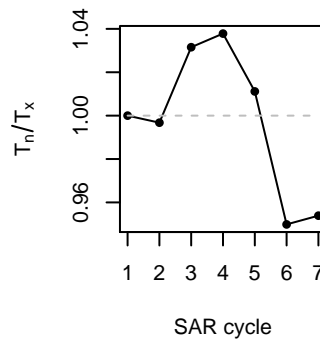


D_e from MC simulation

$D_{eMC} = 403.34 \pm 46.54$ | quality = 99.1 %



Test dose response



Pseudo pIRIR data set based on quartz OSL

TL
pseudolRSL1
pseudolRSL2

help("analyse_pIRIRSequence")

Pseudo pIRIR data set based on quartz OSL



Pseudo pIRIR data set based on quartz OSL



Pseudo pIRIR data set based on quartz OSL

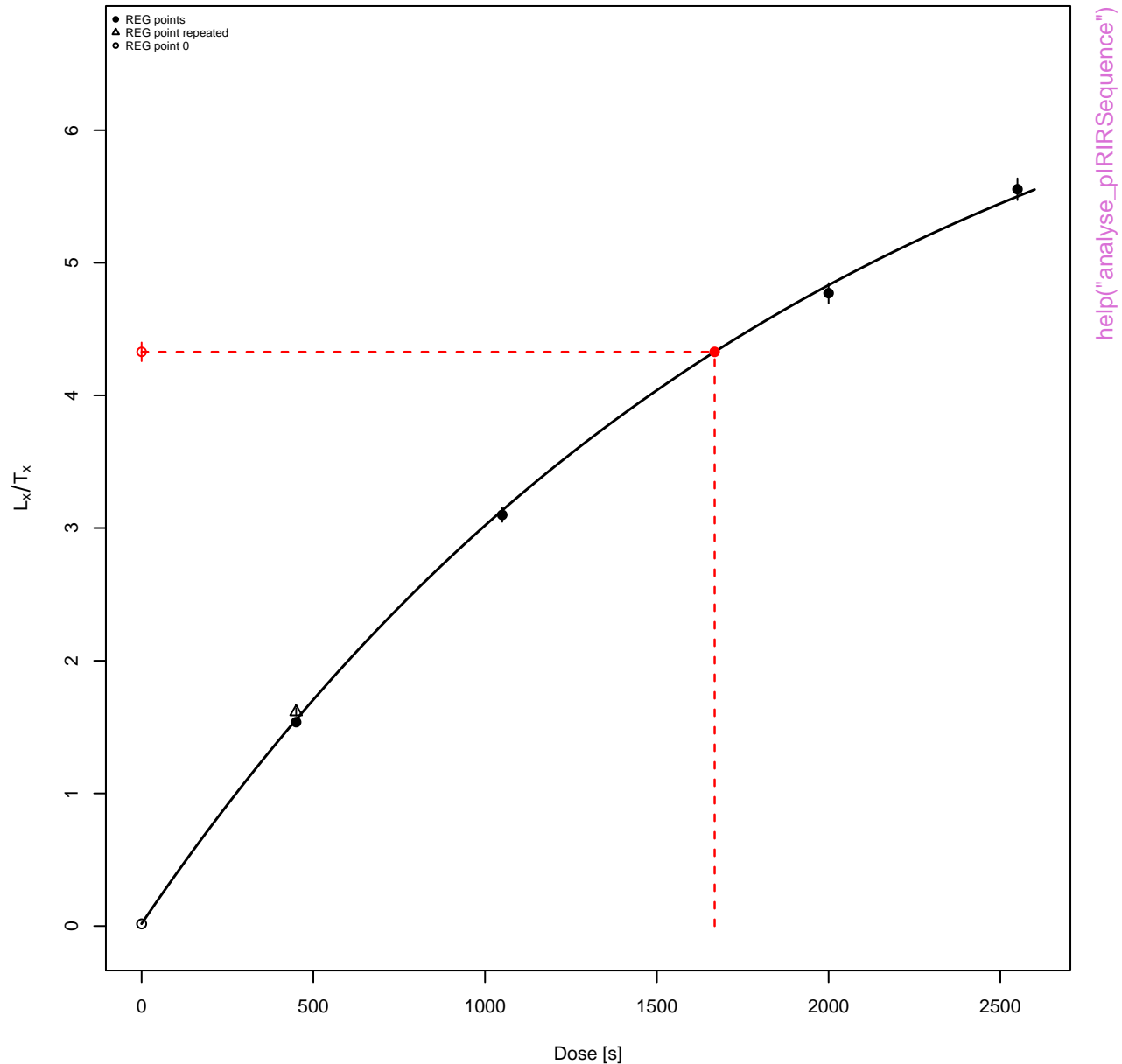


Pseudo pIRIR data set based on quartz OSL



Pseudo pIRIR data set based on quartz OSL

$D_e = 1668.25 \pm 41.38$ | fit: EXP



D_e from MC simulation

D_{eMC} = 1666.57 ± 41.38 | quality = 99.9 %



help("analyse_pIRIRSequence")

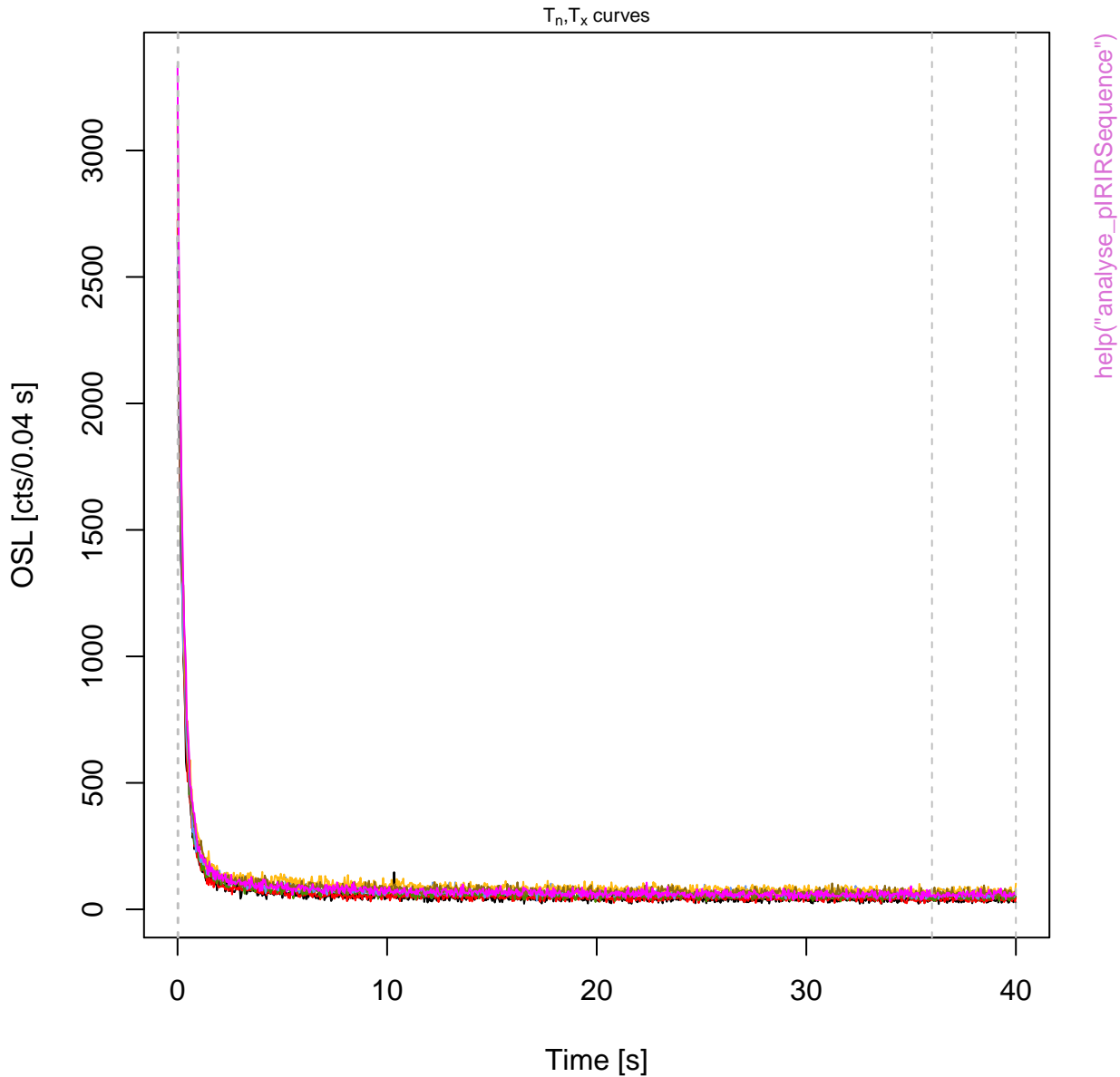
Test dose response



Pseudo pIRIR data set based on quartz OSL



Pseudo pIRIR data set based on quartz OSL





Pseudo pIRIR data set based on quartz OSL

$D_e = 1668.25 \pm 47.59$ | fit: EXP



help("analyse_pIRIRSequence")

D_e from MC simulation

D_{e,MC} = 1669.37 ± 47.59 | quality = 99.9 %



Dose [s]

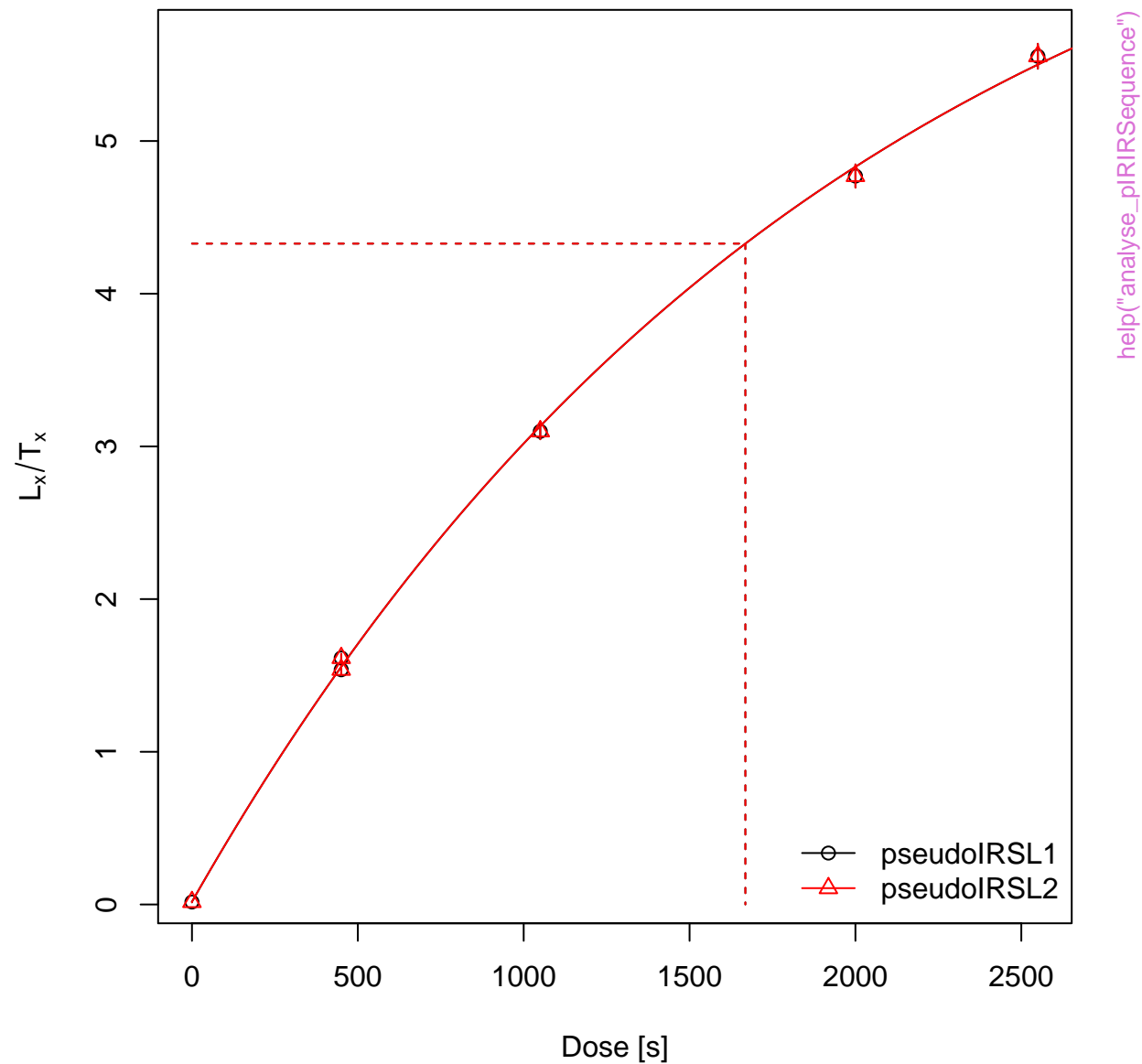
n = 100 , valid fits = 100

help("analyse_pIRSequence")

Test dose response



Summarised Dose Response Curves



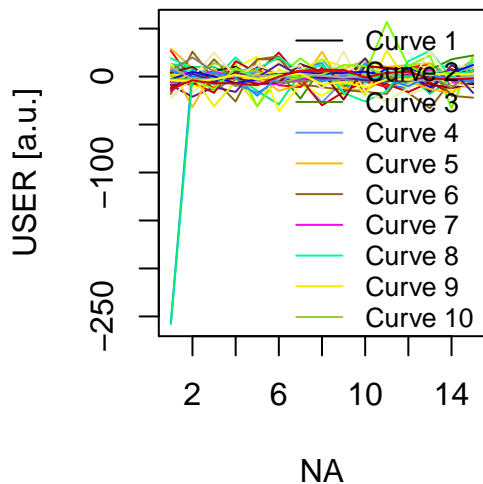
Sensitivity change



Rejection criteria



USER combined

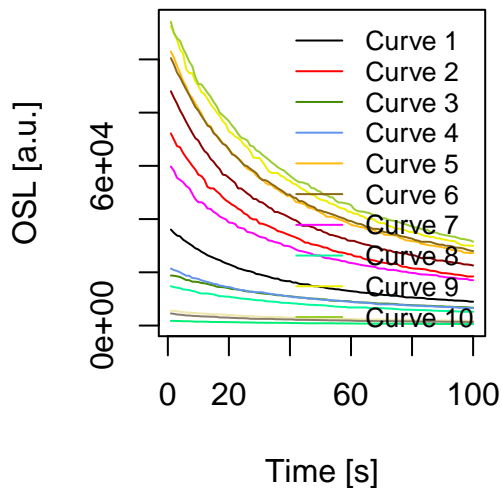


IRSL combined



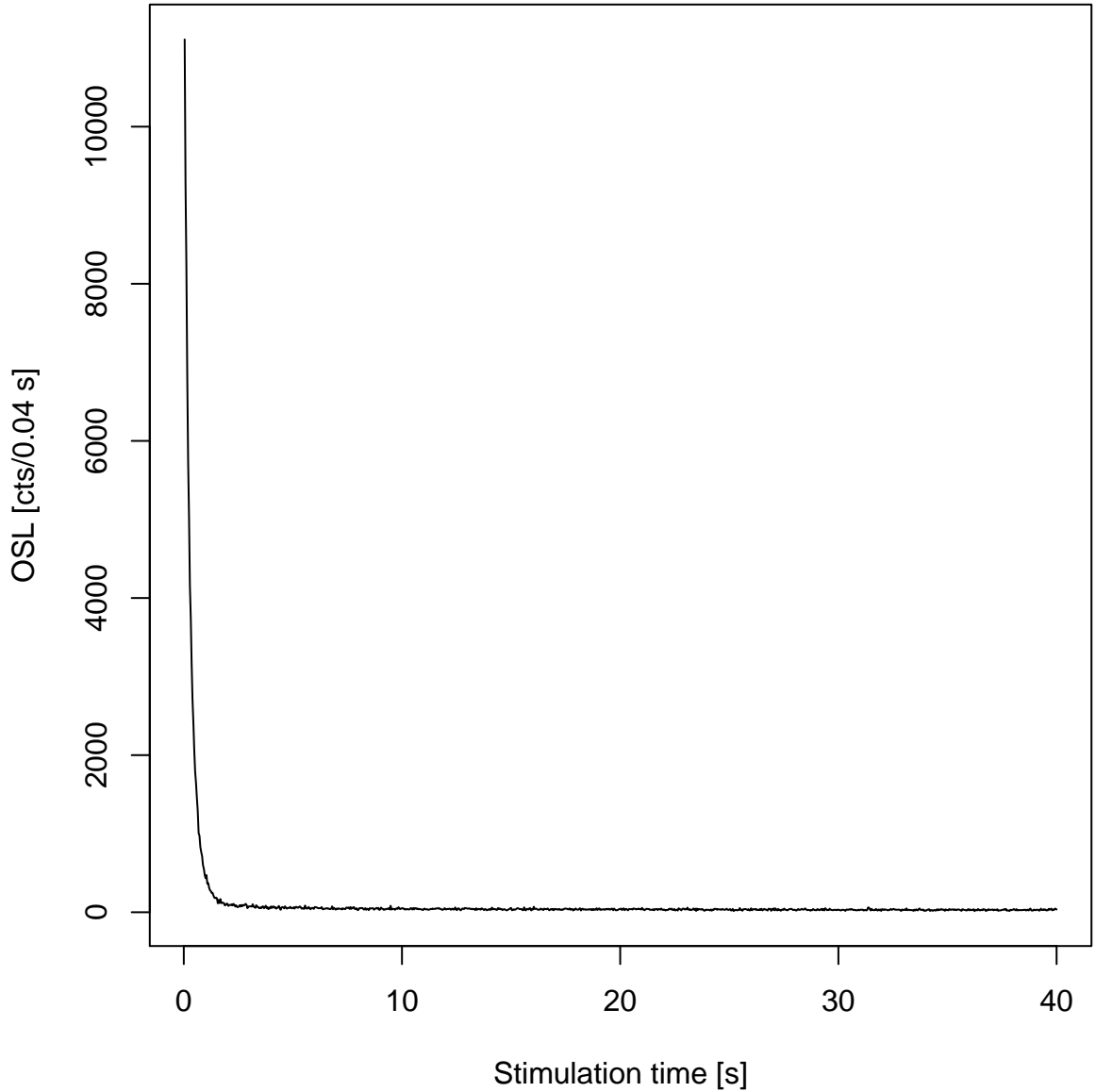
help("analyse_portableOSL")

OSL combined



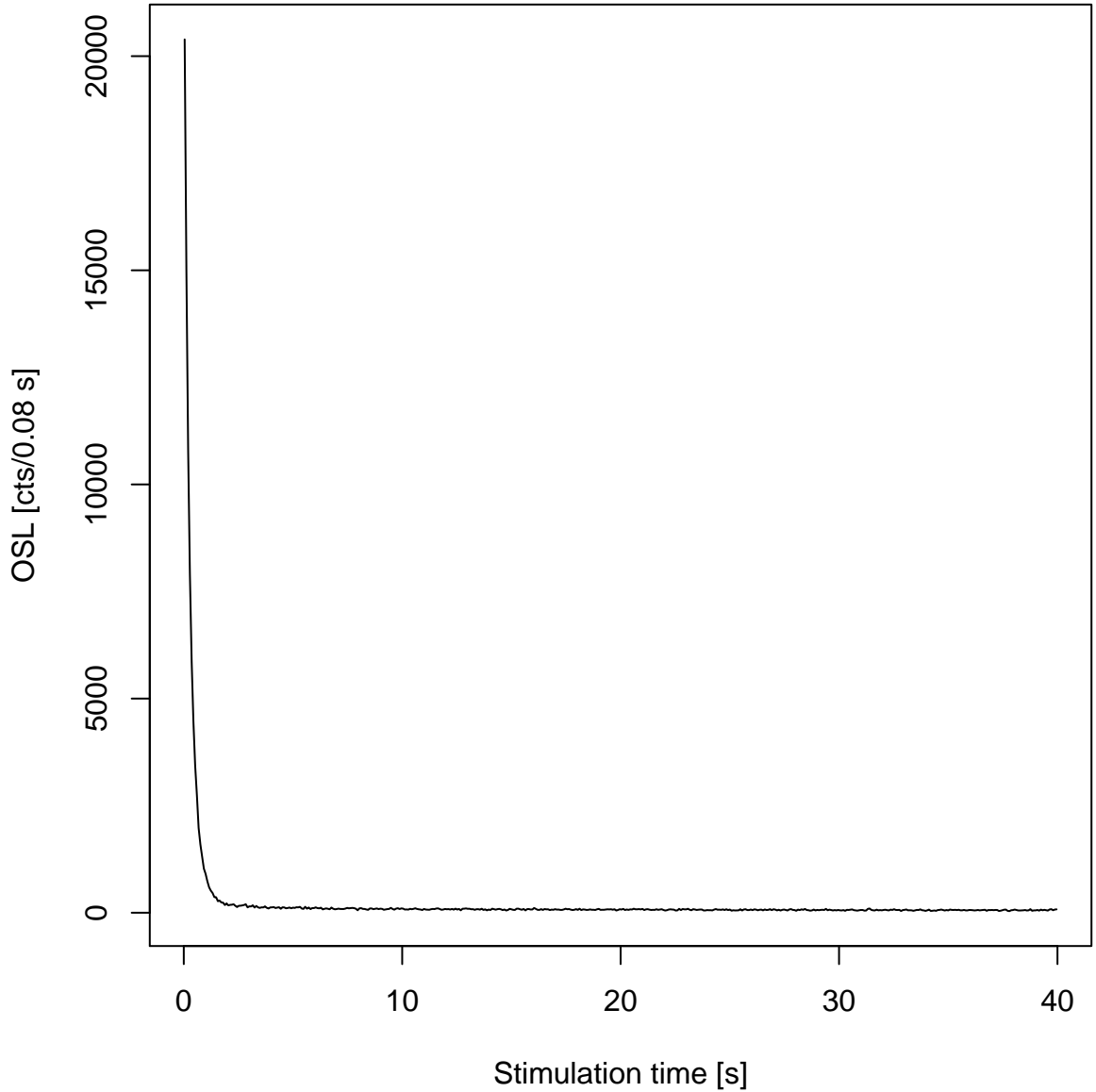


OSL



`help("bin_RLum.Data")`

OSL



help("bin_RLum.Data")

OSL



help("bin_RLum.Data")

Monte Carlo Simulation

$$n = 100 \mid \hat{\mu} = 43 \mid \hat{\sigma} = 20 \mid \frac{\hat{\sigma}}{\sqrt{n}} = 2 \mid v = 0.73$$



Profile log likelihood for σ_{OD}



Fast Ratio



help("calc_FastRatio")

Finite Mixture Model

$\sigma_b = 0.2 \mid n = 62$

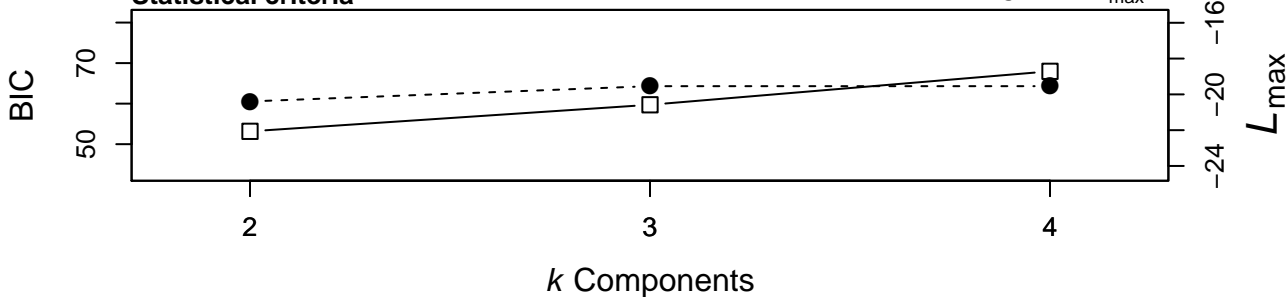
Normal distributions



Proportion of components



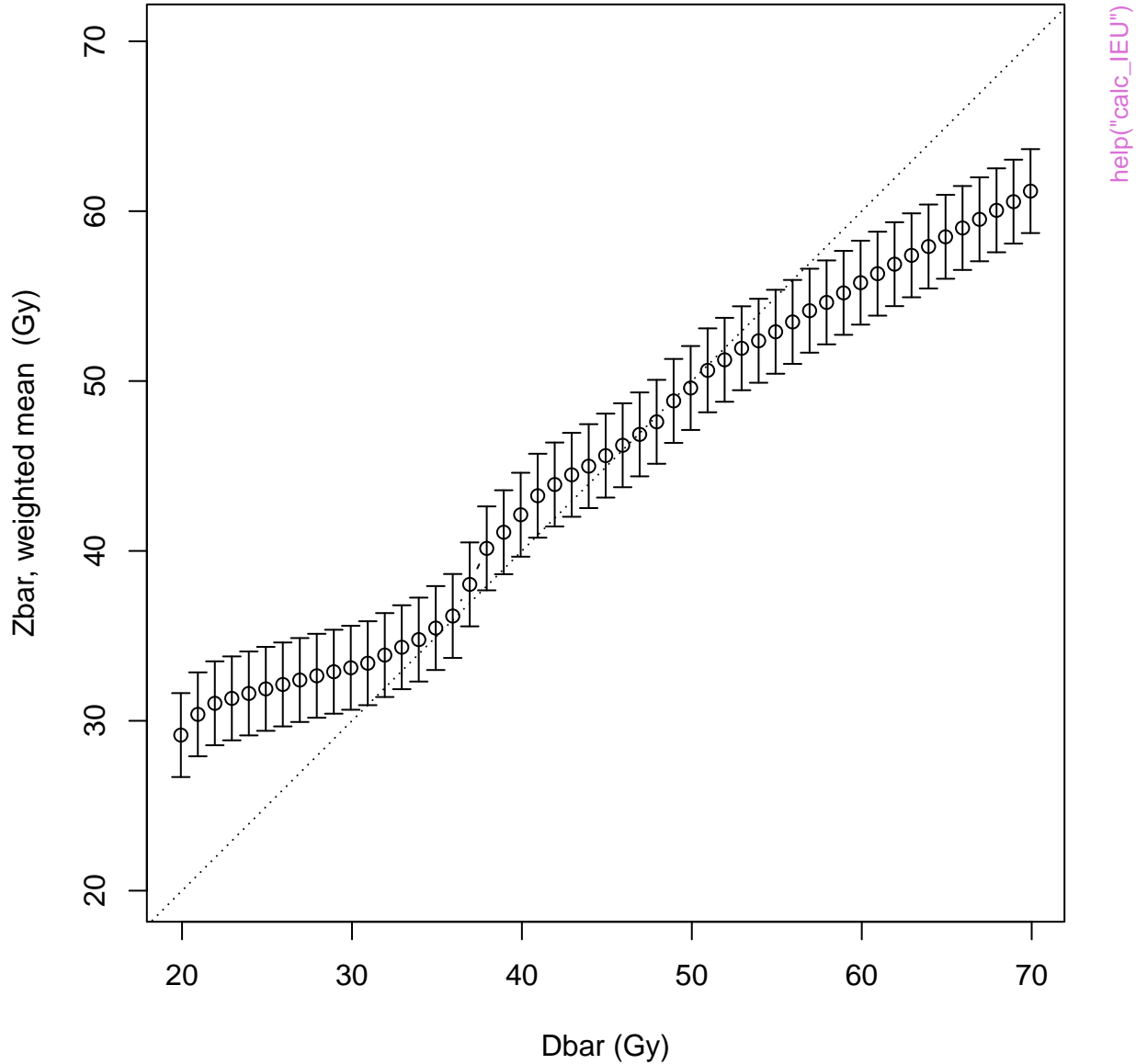
Statistical criteria



help("calc_FiniteMixture")

Fuchs & Lang (2001)







help("calc_I EU")

Likelihood profile: gamma



Likelihood profile: sigma



help("calc_MaxDose")

Likelihood profile: p0



Likelihood profile: gamma

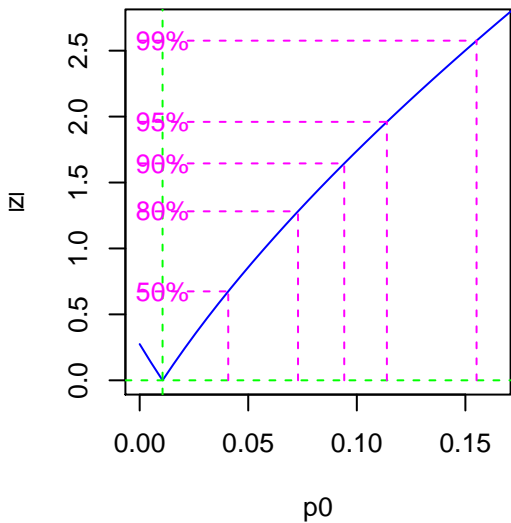


Likelihood profile: sigma



help("calc_MinDose")

Likelihood profile: p0



Likelihood profile: gamma



Likelihood profile: sigma



help("calc_MinDose")

Likelihood profile: p0



3-parameter Minimum Age Model

Parameters: $\sigma_b = 0.1$, $\gamma = 3.5$, $\sigma = 0.7$, $\rho = 0.01$

n = 62

mean = 65.99

median = 69.64

Standardised estimate



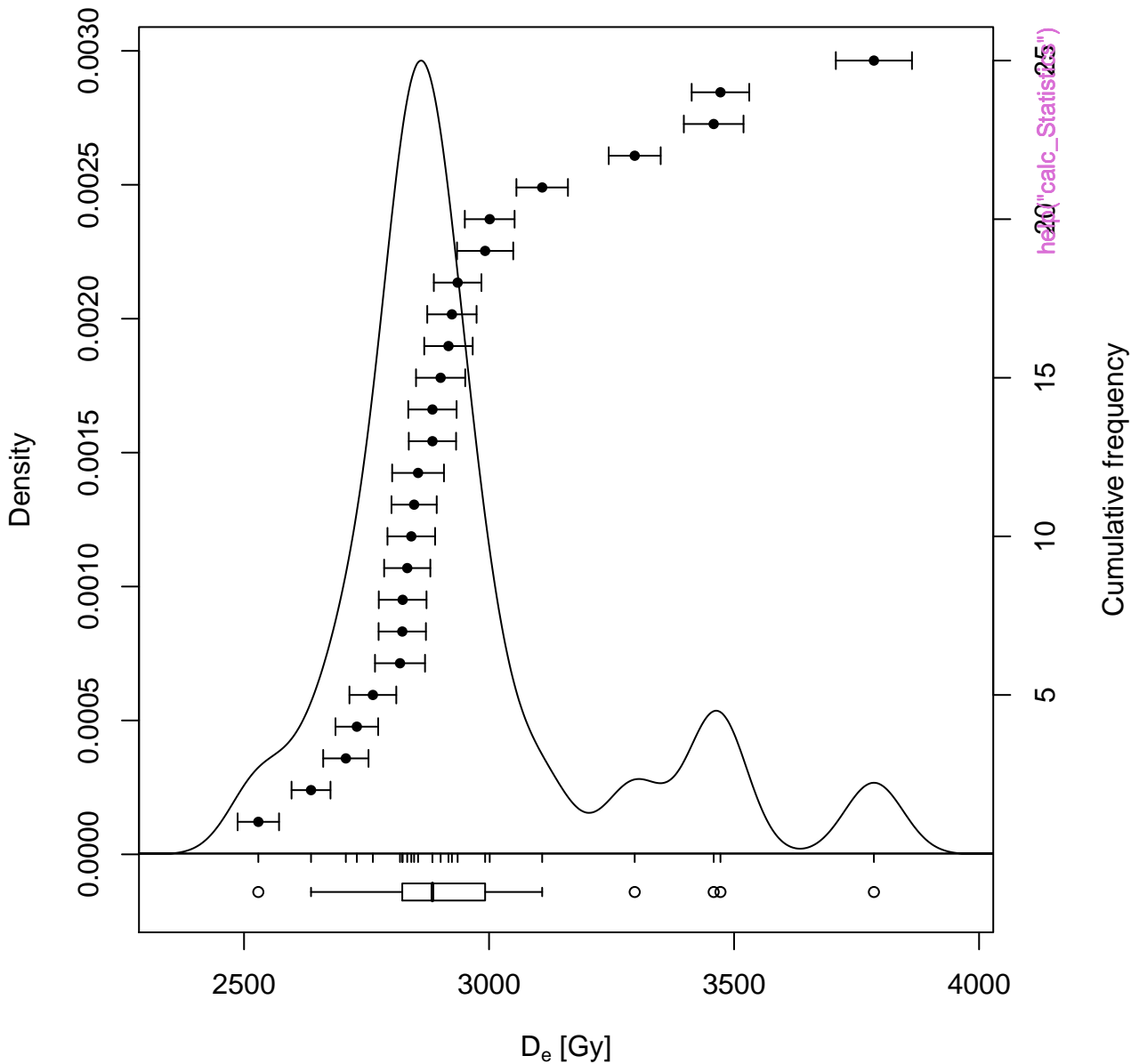
Source Dose Rate Prediction

source type: Sr-90 | half-life: 28.9 a



help("calc_SourceDoseRate")

D_e distribution



Thermal Lifetime Contour Plot

(values quoted in Ma)



help("calc_ThermalLifetime")

Thermal Lifetime Density Plot



`help("calc_ThermalLifetime")`

gSGC and resulting De



CW Curve Fit

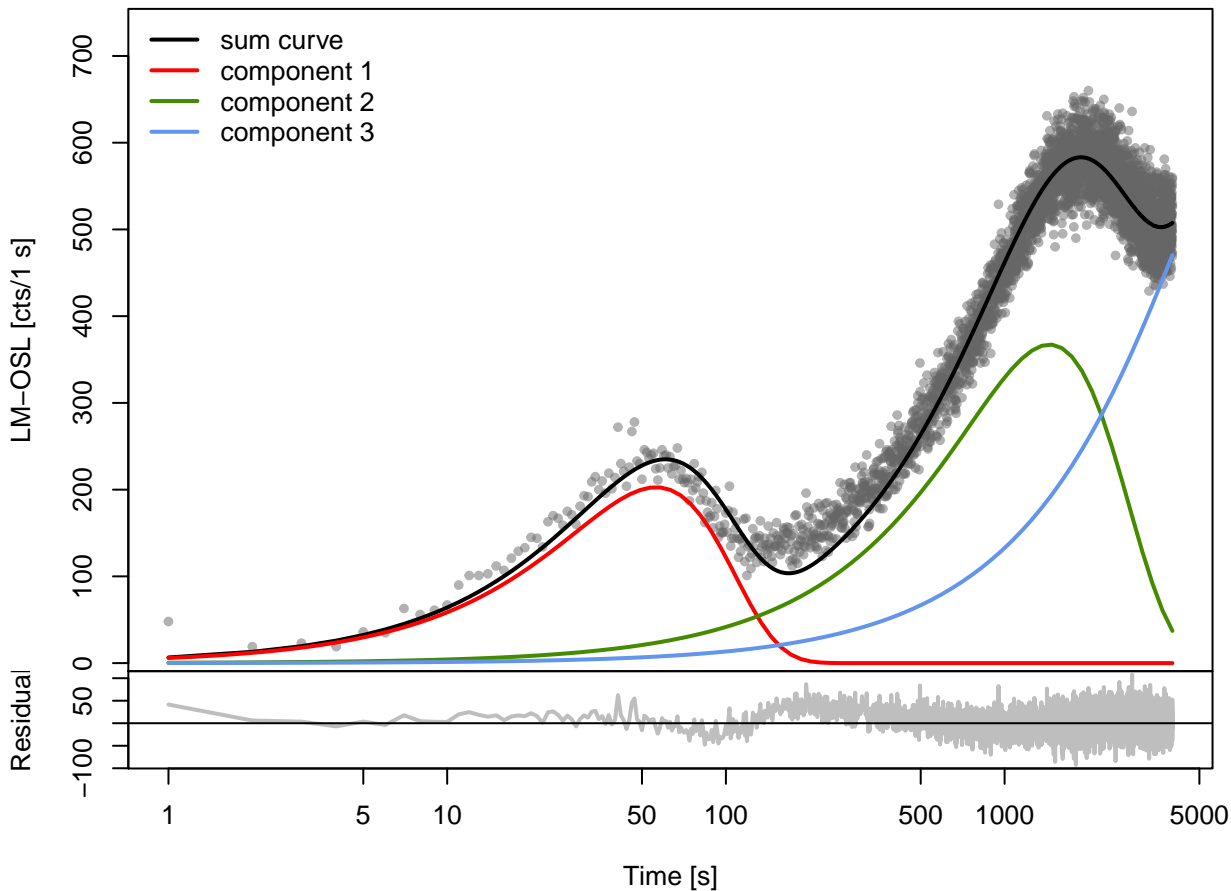
Default



Component contribution to sum curve



Default



Component contribution to sum curve



Background



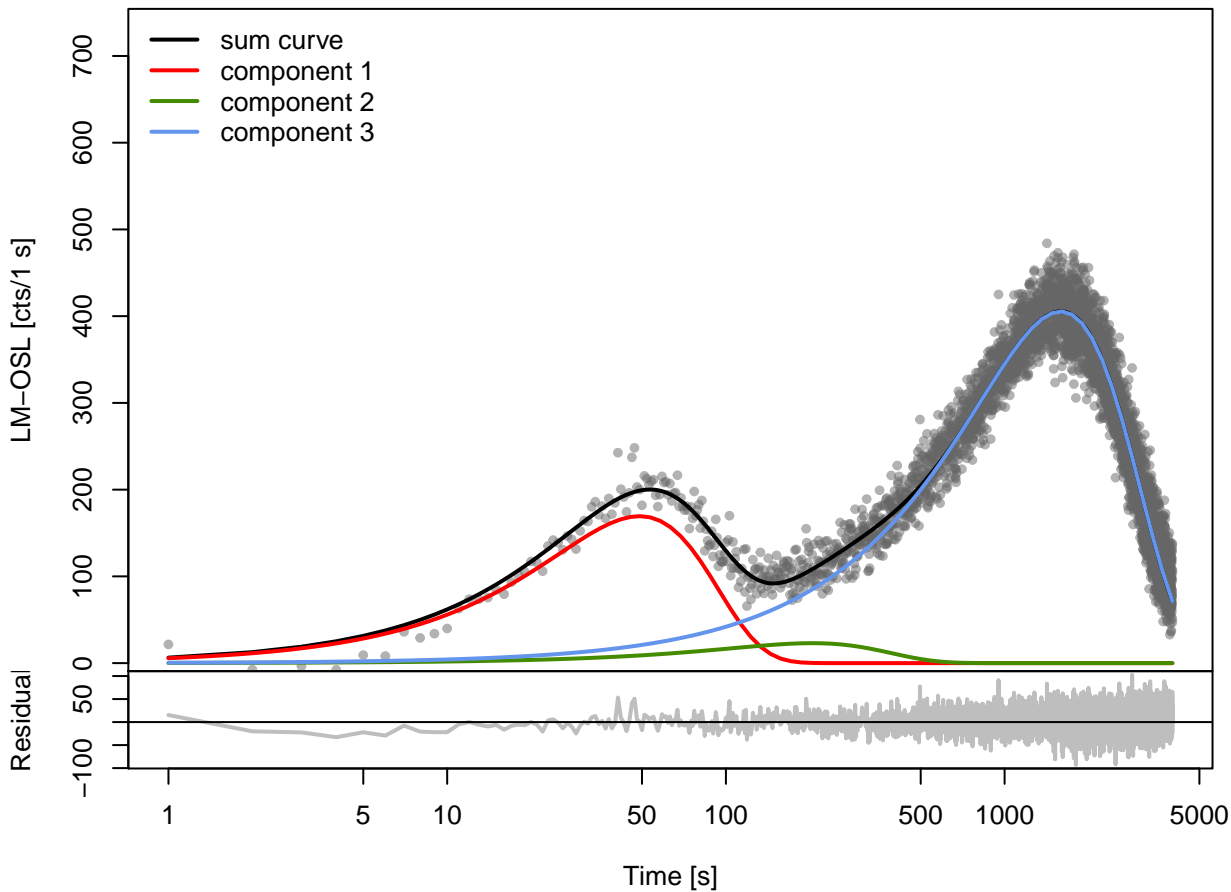
Default



Component contribution to sum curve



Default



Component contribution to sum curve



D_e distribution

n = 25 | in 2 sigma = 68 %

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D_e [Gy]

help("get_Layout")

Relative standard error (%)

10

5

3.3

0

10

20

30

0 0.015

Precision

Density (bw 0.085)

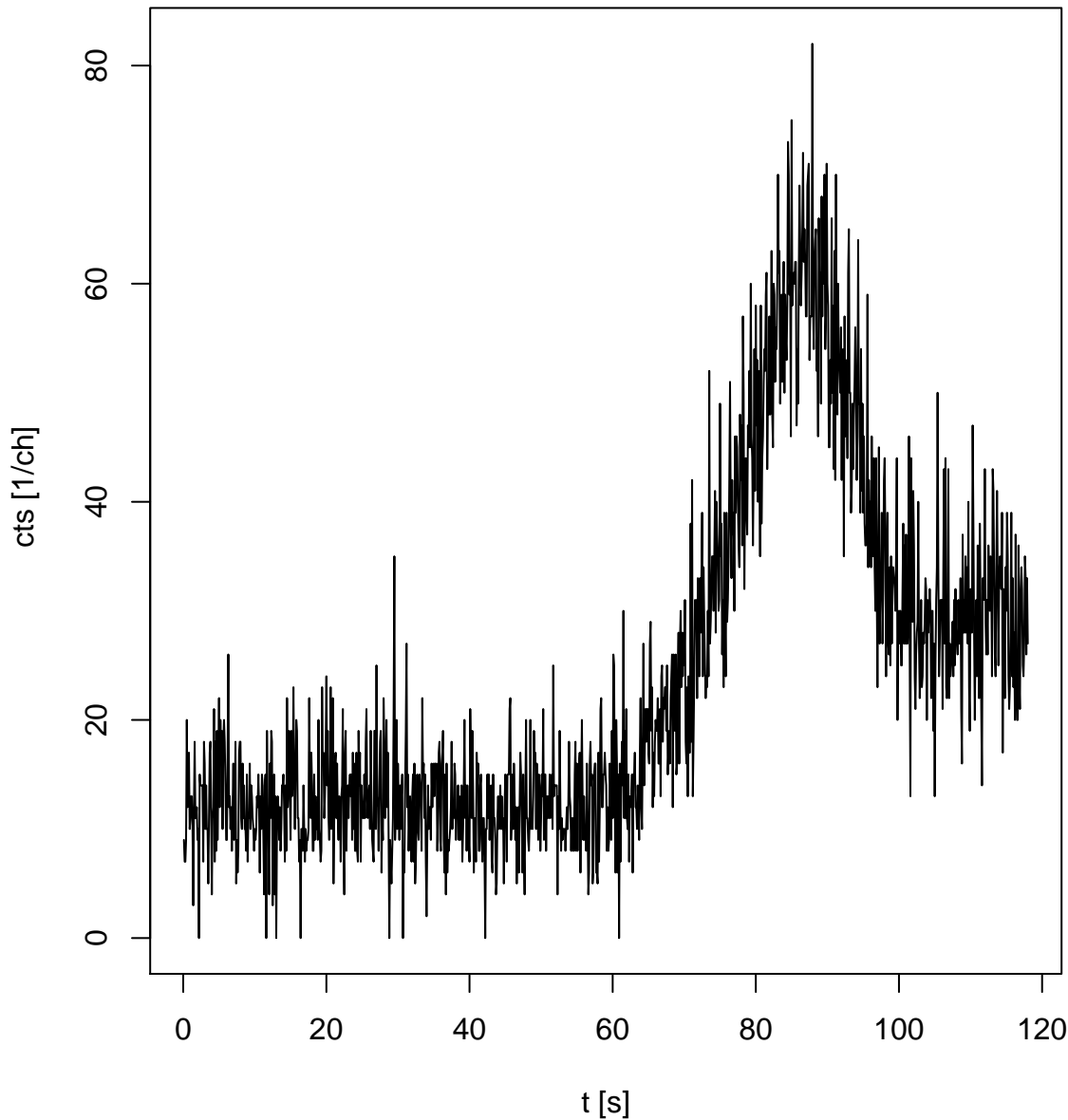


help("get_Layout")

Profile log likelihood for σ_{OD}



TL (UVVIS)



help("merge_RLum.Data.Curve")

TL (UVVIS)



help("merge_RLum.Data.Curve")

TL (UVVIS)

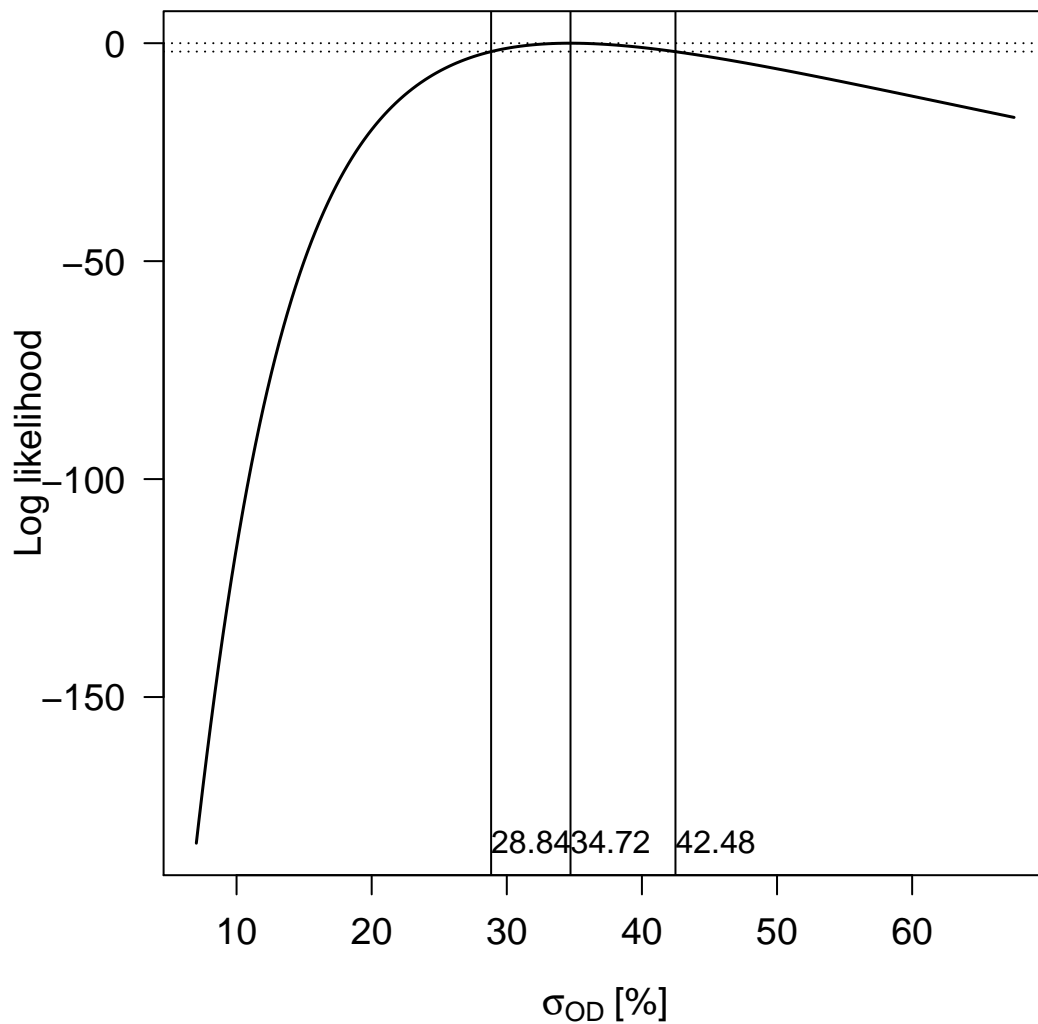


help("merge_RLum.Data.Curve")

Profile log likelihood for σ_{OD}



Profile log likelihood for σ_{OD}



D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 24.2 %

Standardised estimate



help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

5

0

5

10

15

200

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0

0.264

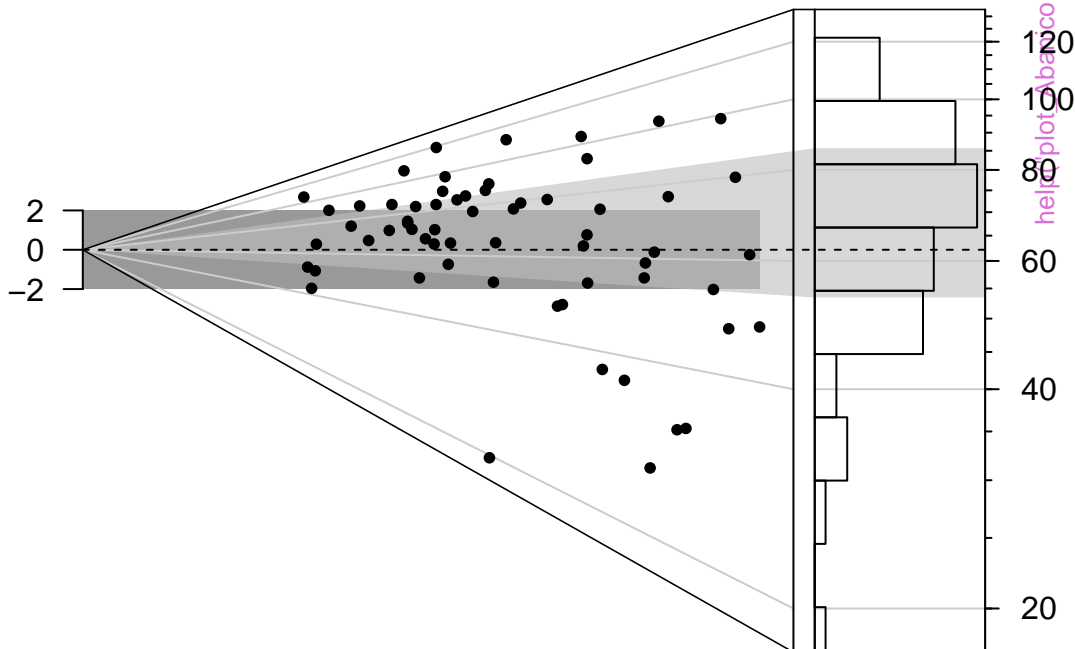
Precision

Density (bw 0.04)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D_e distribution

n = 62 | in 2 sigma = 41.9 %

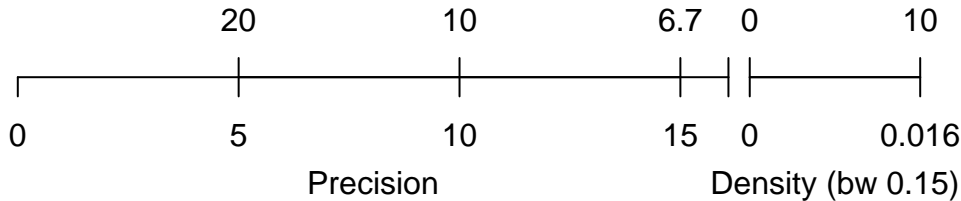
Standardised estimate



D_e [Gy]

Relative standard error (%)

n



D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

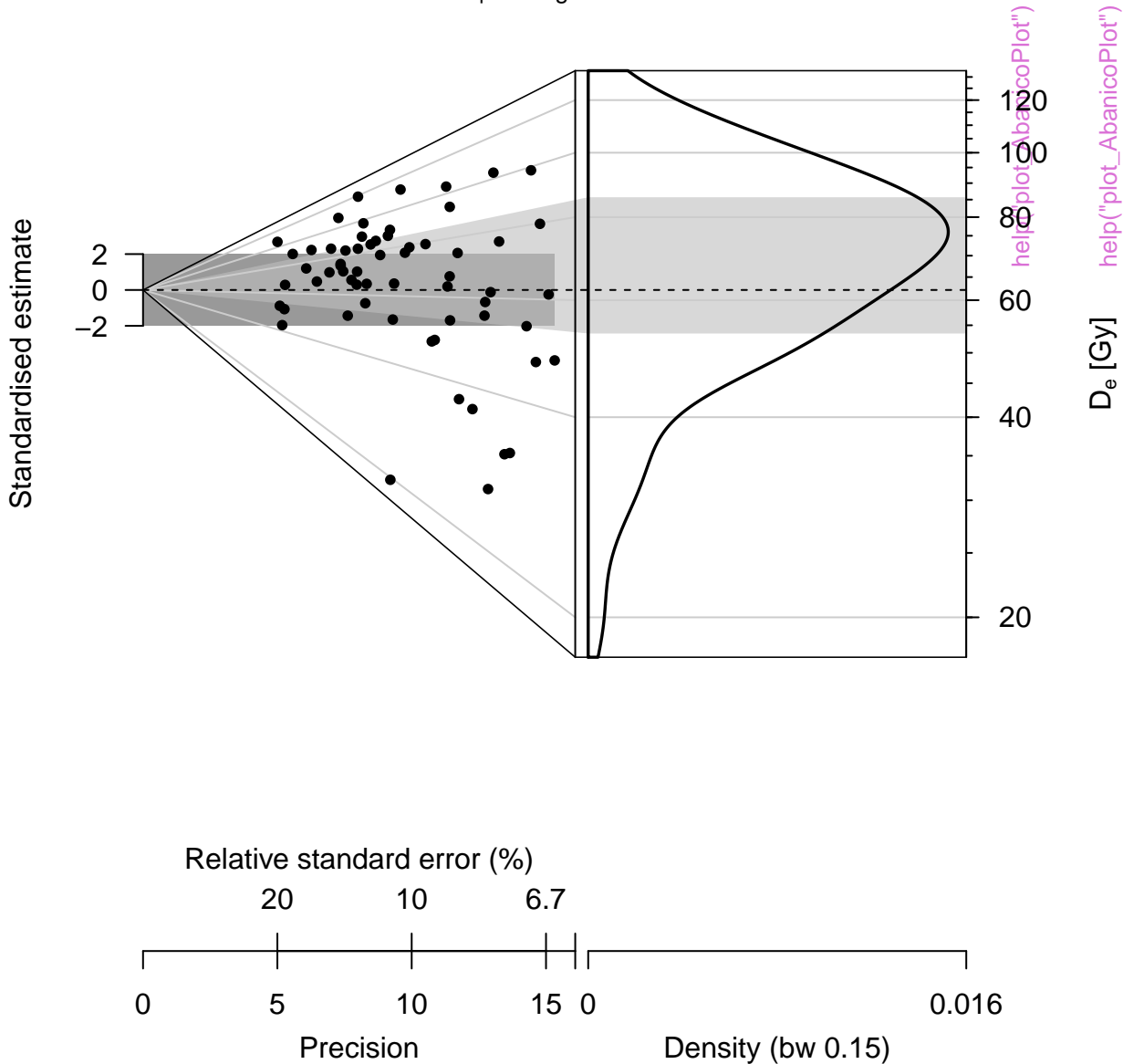
0.016

Precision

Density (bw 0.15)

D_e distribution

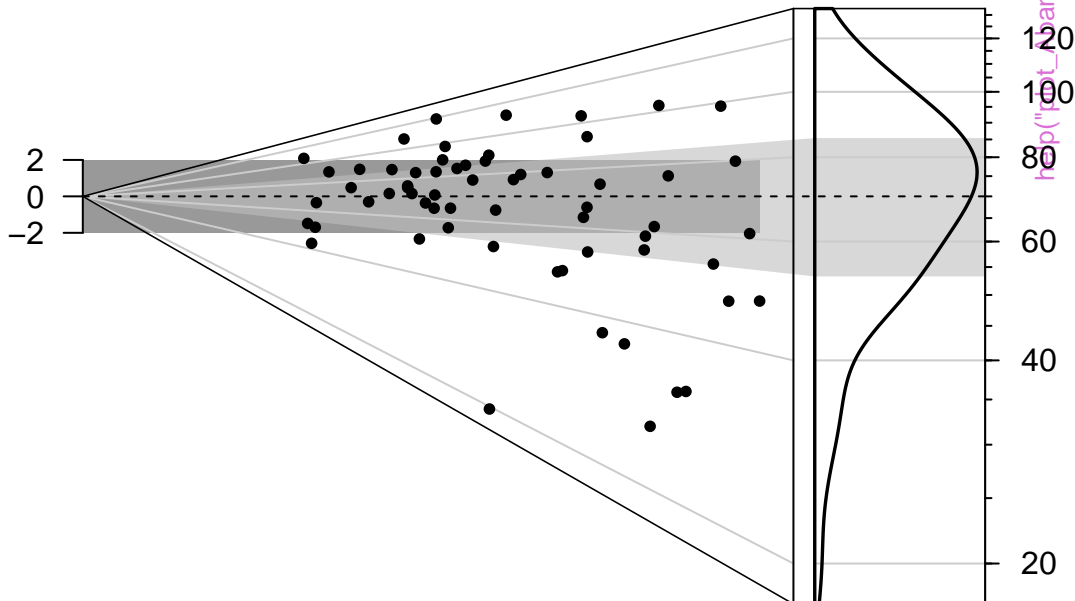
n = 62 | in 2 sigma = 41.9 %



D_e distribution

n = 62 | in 2 sigma = 53.2 %

Standardised estimate



help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 54.8 %

Standardised estimate



D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 54.8 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

R Sample 1

Standardised estimate



help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate

0

help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

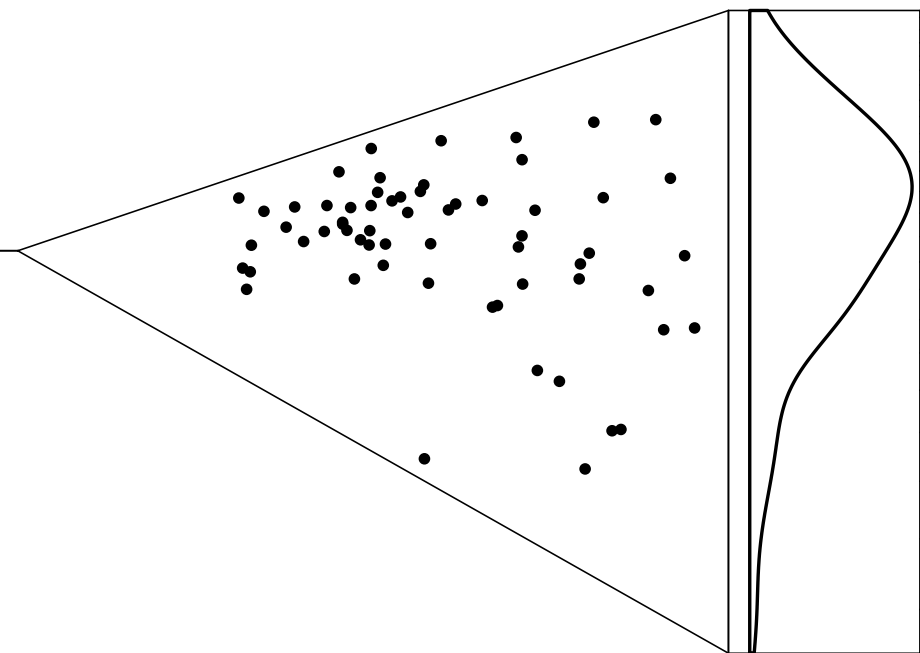
10

15

0.016

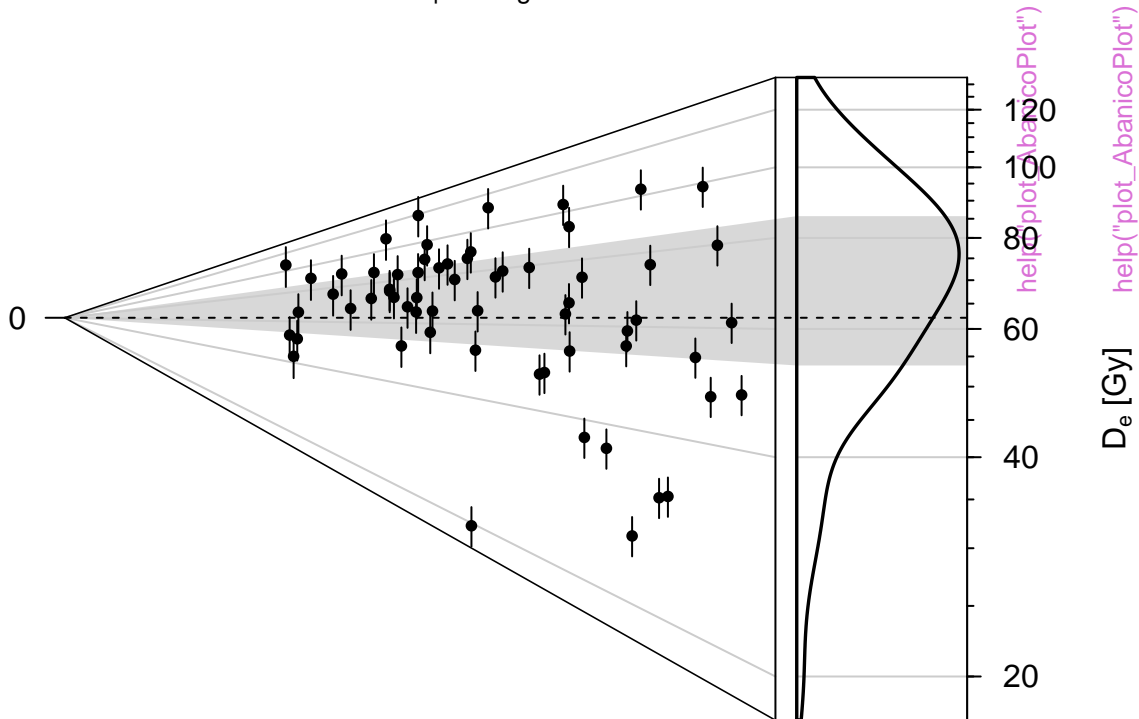
Precision

Density (bw 0.15)



D_e distribution

n = 62 | in 2 sigma = 41.9 %



D_e distribution

n = 62 | in 2 sigma = 41.9 %



D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

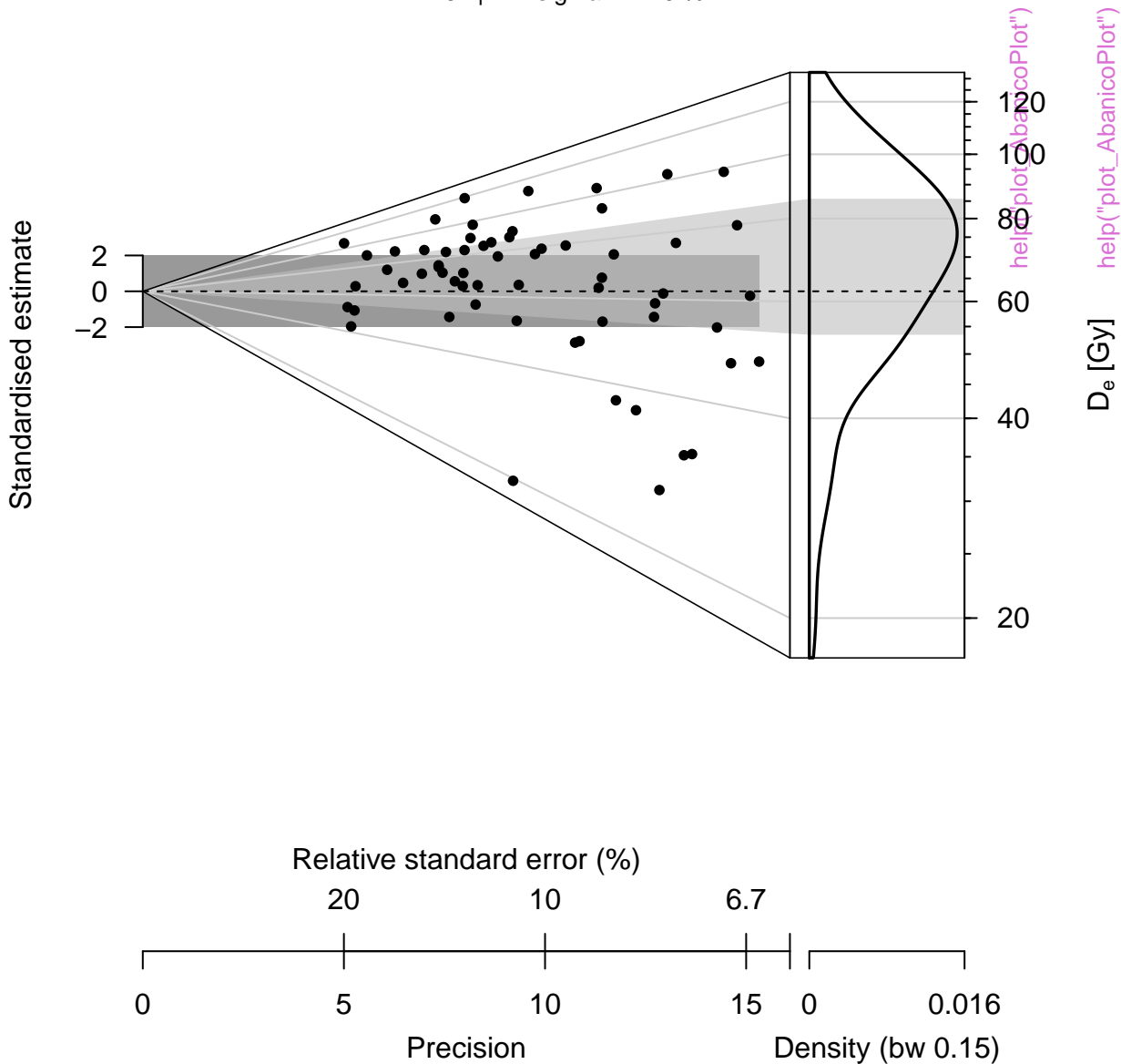
0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %



D_e distribution

median = 69.75

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %



D_e distribution

n = 30 | in 2 sigma = 46.7 %

n = 32 | in 2 sigma = 87.5 %

Standardised estimate



D_e [Gy]

help(plot_AbanicoPlot")

help("plot_AbanicoPlot")

Relative standard error (%)

20

10

6.7

0

5

10

15

0.032

Precision

Density (bw 0.074)

D_e distribution

n = 30 | in 2 sigma = 70 % median = 53.39

n = 32 | in 2 sigma = 84.4 % median = 110.51

Standardised estimate



help("plot_AbanicoPlot")

D_e [Gy] help("plot_AbanicoPlot")

Relative standard error (%)

20

10

6.7

0

5

10

15

0.032

Precision

Density (bw 0.074)



help("plot_AbanicoPlot")



help("plot_AbanicoPlot")

Dose recovery test

Example data



Dose recovery test



Dose recovery test



Dose recovery test



Dose recovery test



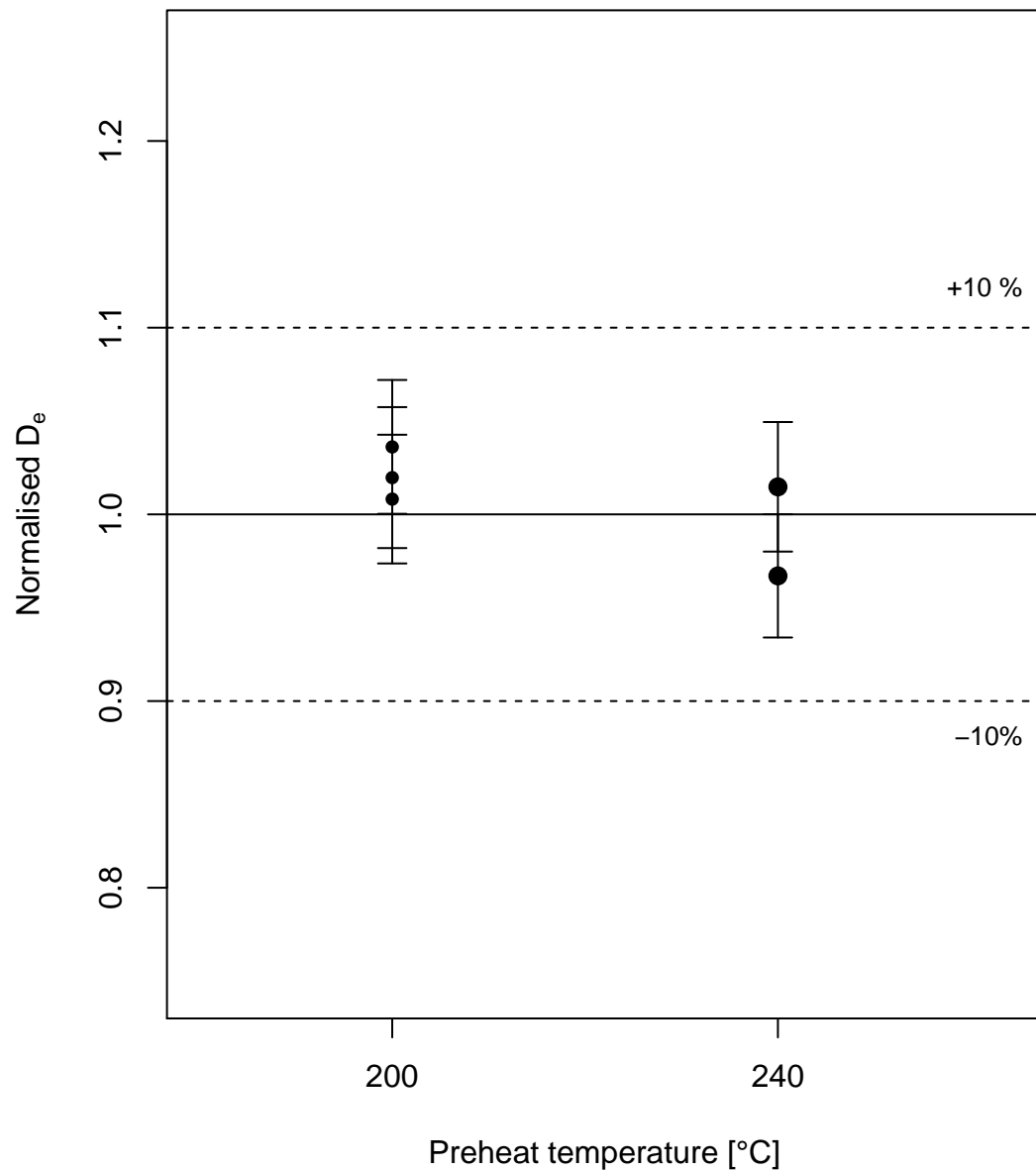
Dose recovery test

| n = 5 | weighted mean = 1.01 |

| n = 5 | weighted mean = 1 |



Dose recovery test



Dose recovery test

Example data



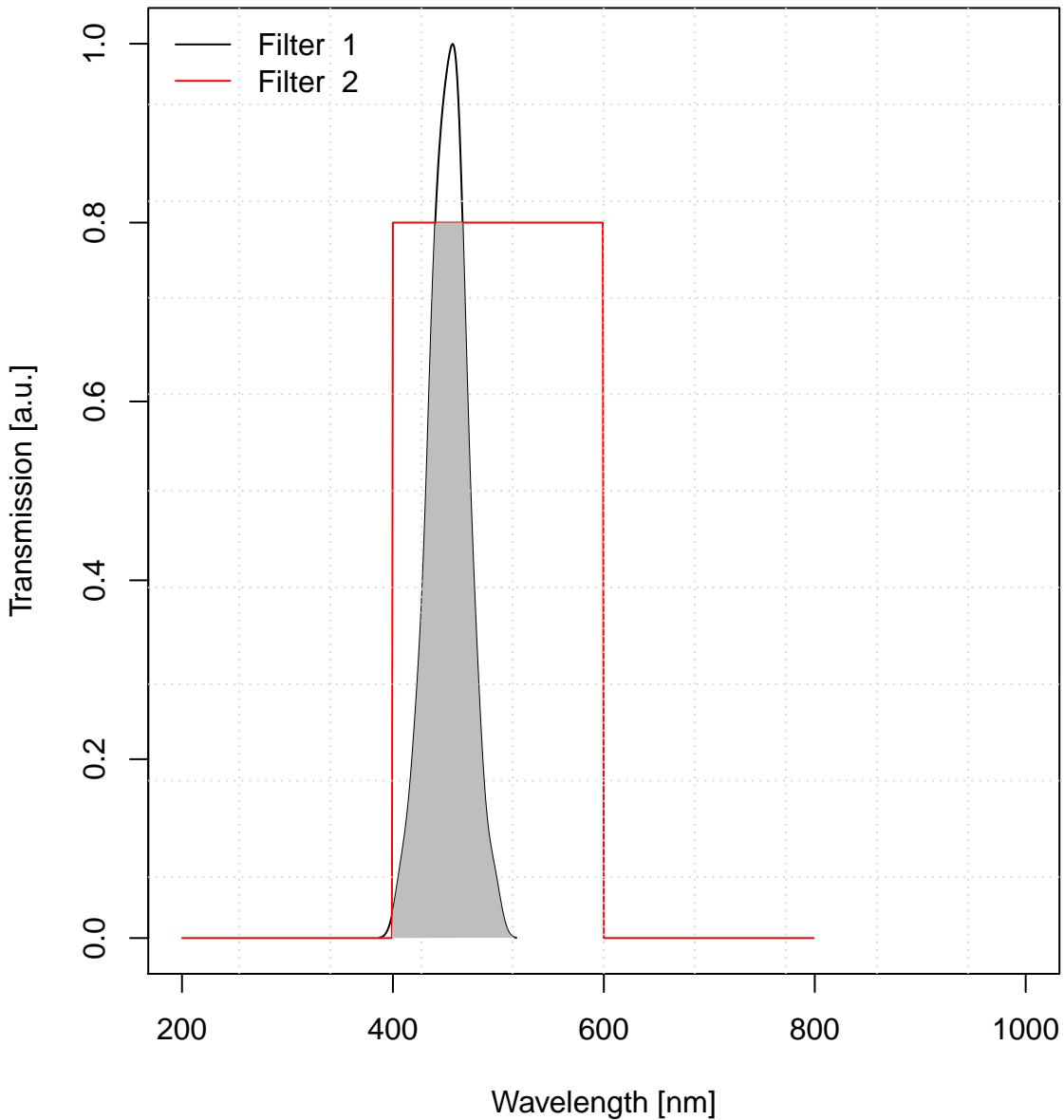
Dose recovery test



Dose recovery test



Filter Combination



[help\("plot_FilterCombinations"\)](#)

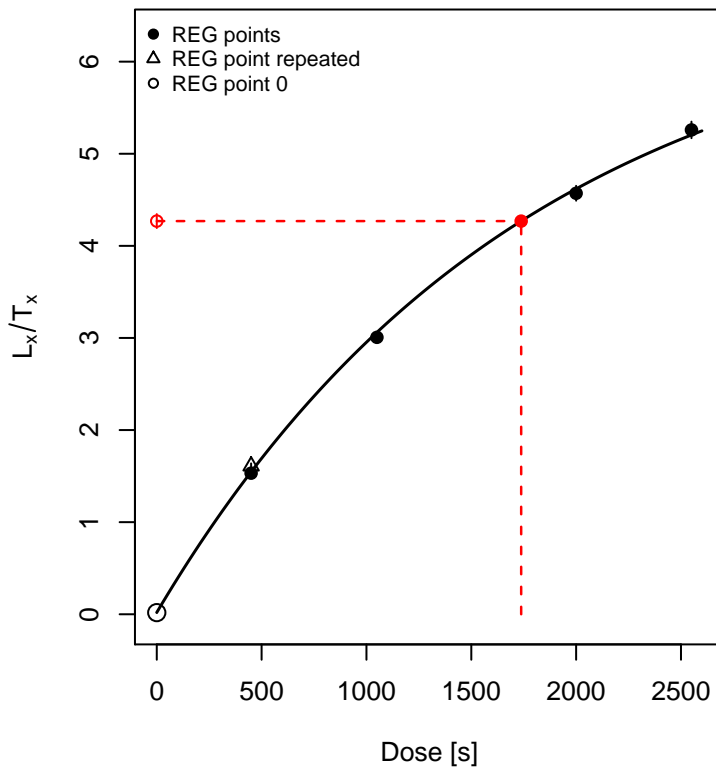
Filter Combination



`help("plot_FilterCombinations")`

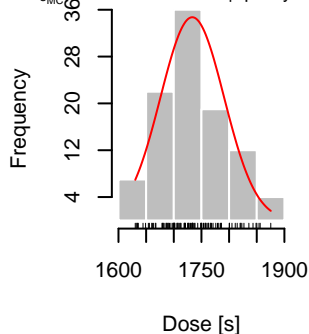
Growth curve

$D_e = 1737.88 \pm 57.45$ | fit: EXP



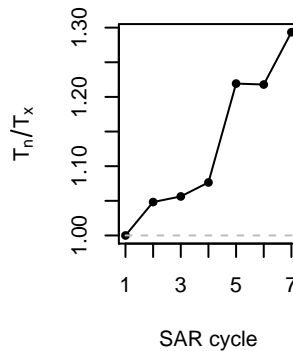
D_e from MC simulation

$D_{EMC} = 1733.43 \pm 57.45$ | quality = 99.7 %



n = 100 , valid fits = 100

Test dose response



Growth curve

$D_e = 1737.88 \pm 54.9$ | fit: EXP



D_e from MC simulation

$D_{eMC} = 1731.23 \pm 54.9$ | quality = 99.6 %



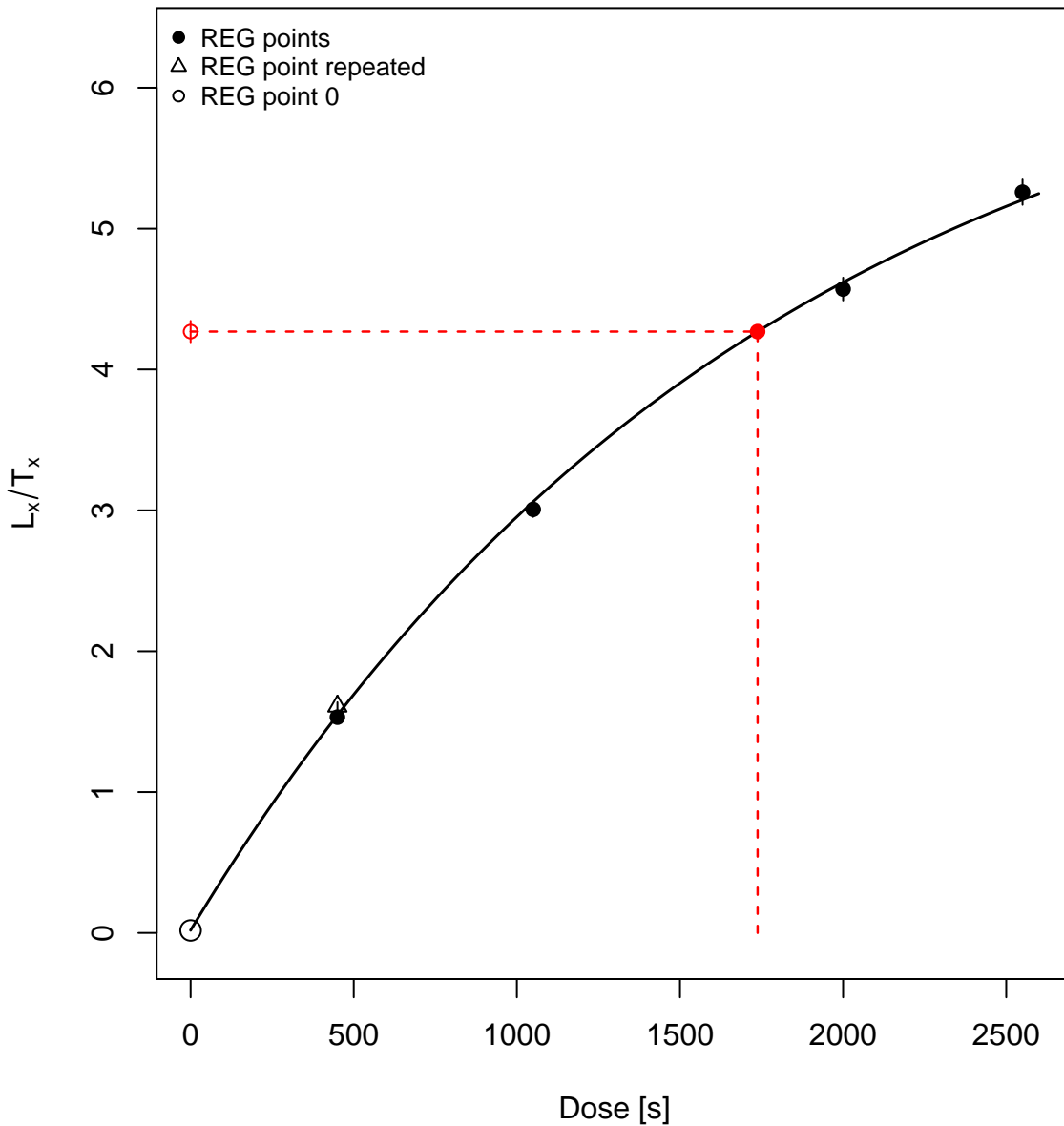
Dose [s]
n = 100 , valid fits = 100

Test dose response



Growth curve

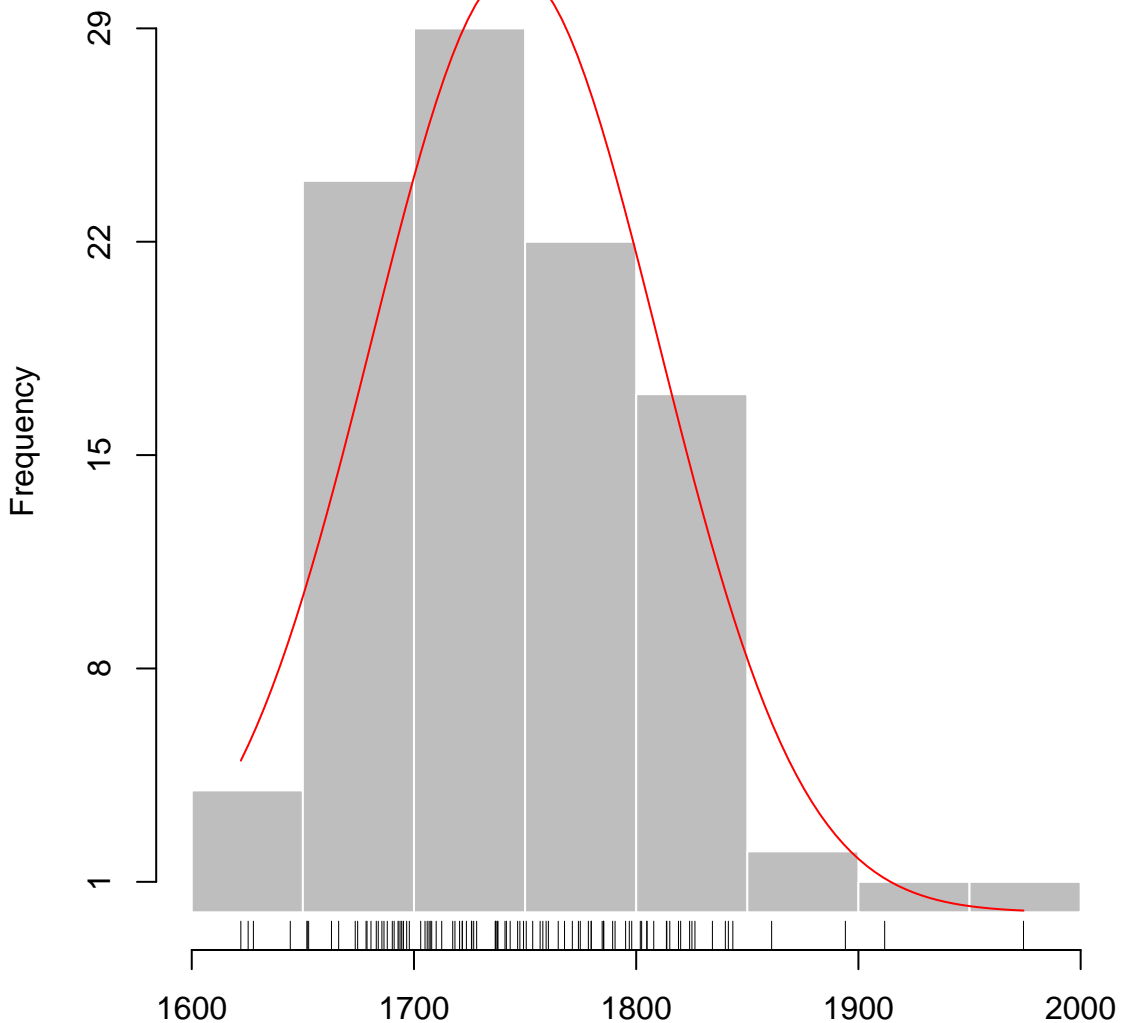
$D_e = 1737.88 \pm 64.53$ | fit: EXP



[help\("plot_GrowthCurve"\)](#)

D_e from MC simulation

D_{eMC} = 1745.42 ± 64.53 | quality = 99.6 %

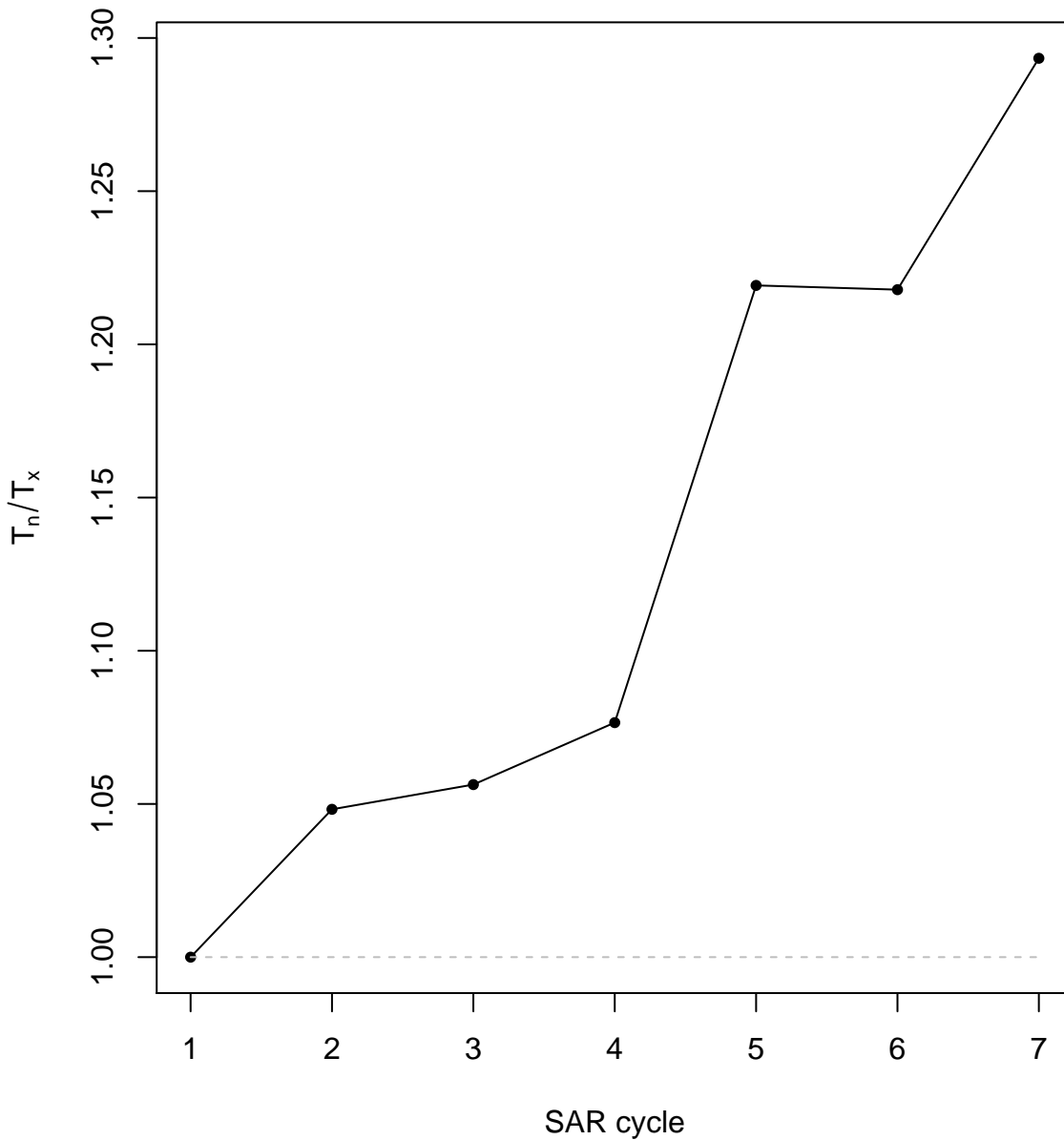


Dose [s]

n = 100 , valid fits = 100

help("plot_GrowthCurve")

Test dose response



help("plot_GrowthCurve")



[help\("plot_GrowthCurve"\)](#)

Histogram



Histogram of De-values

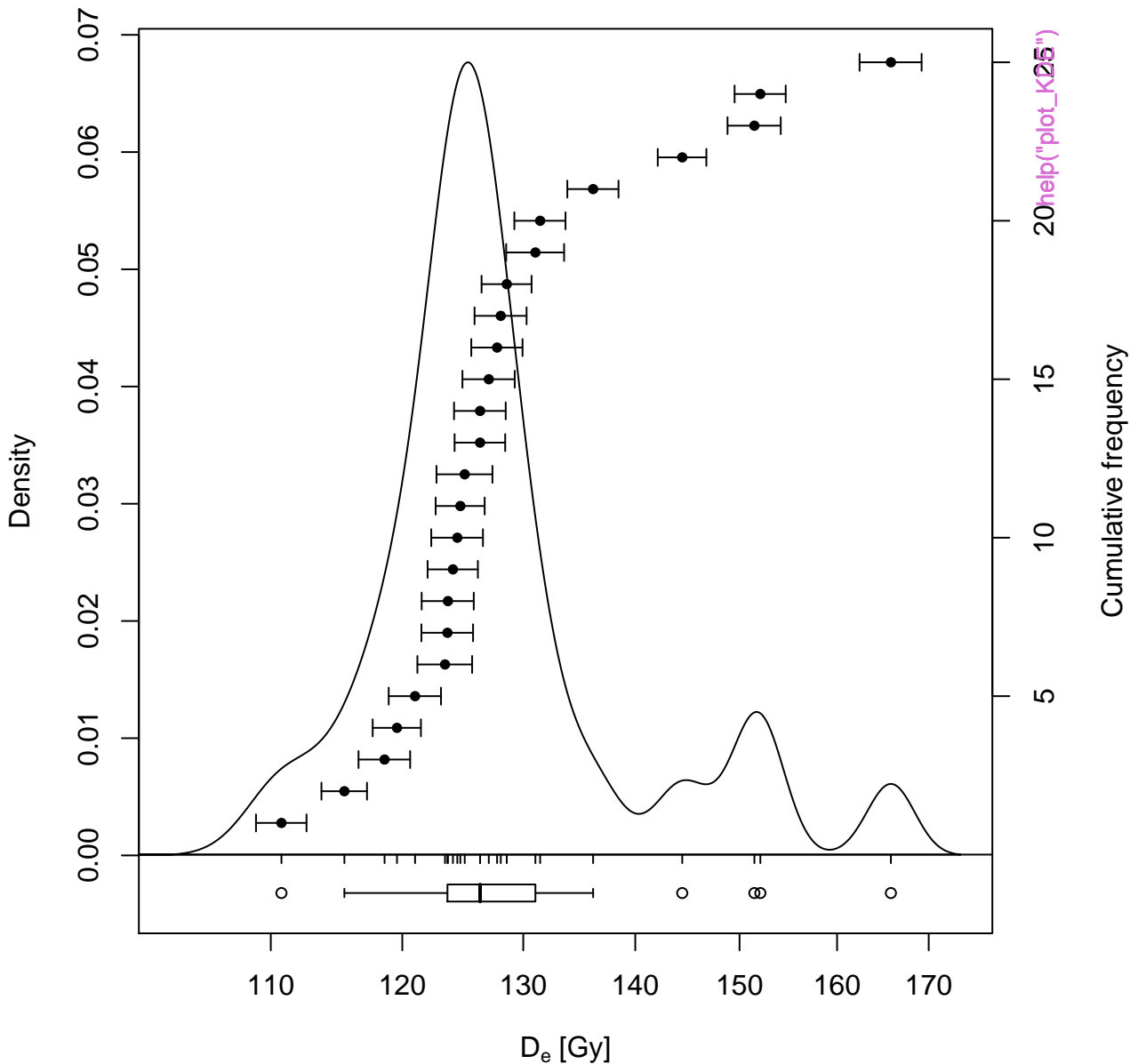
Example data set



D_e distribution



D_e distribution



Dose distribution



D_e distribution



D_e distribution

n = 25 | median = 126.36 | skewness = 1262.54 | in 2 sigma = 96 %



D_e distribution



D_e distribution



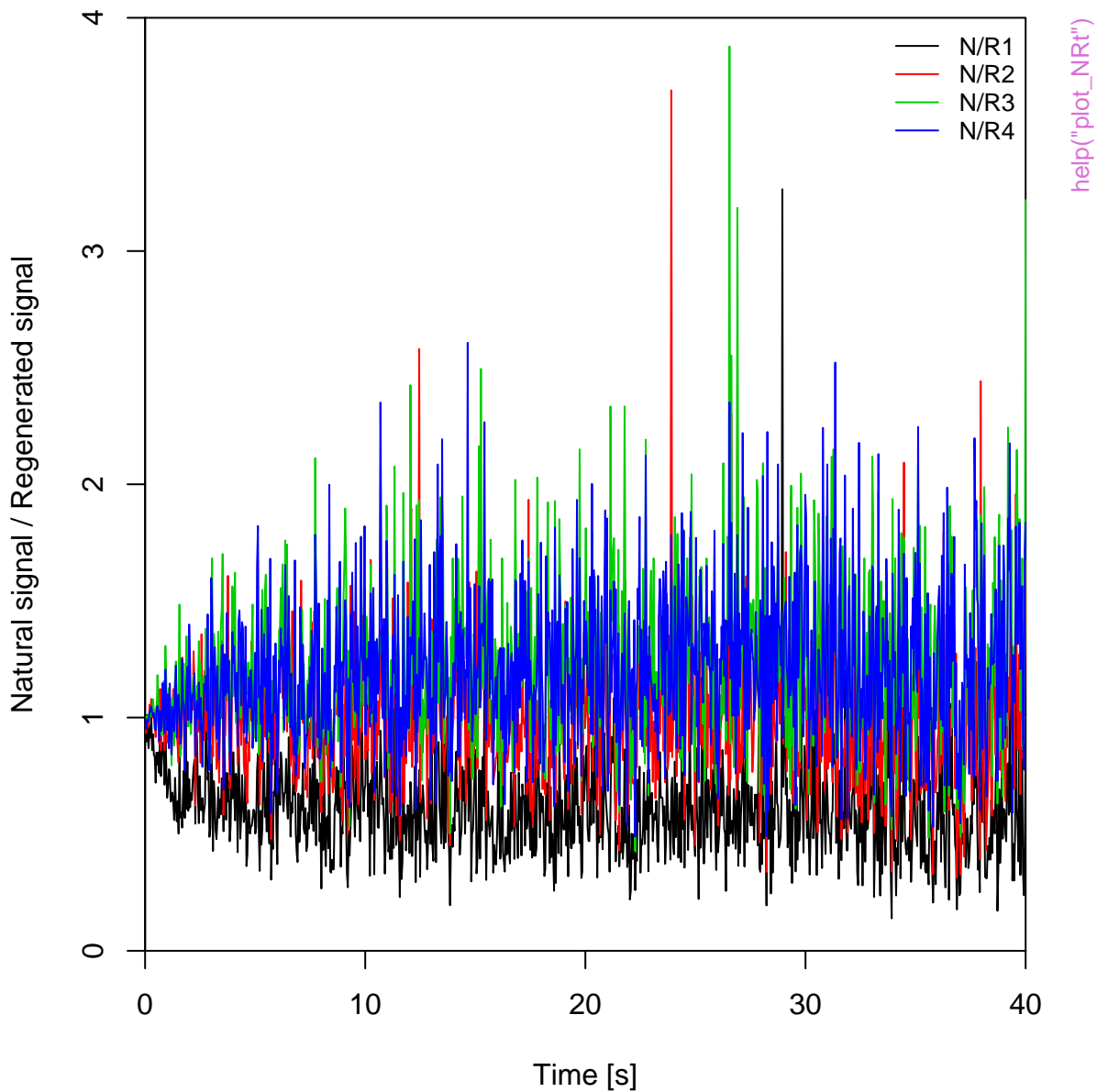
D_e distribution



D_e distribution



NR(t) Plot



NR(t) Plot



help("plot_NRt")

NR(t) Plot



NR(t) Plot



NR(t) Plot



TnTx(t) Plot

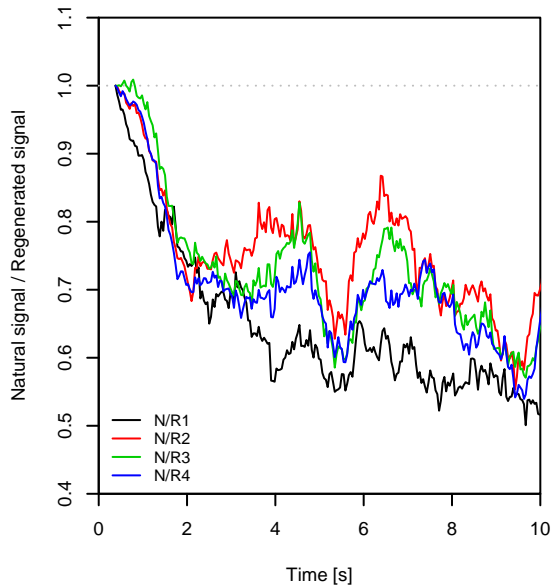


Aliquot #1**Aliquot #2**

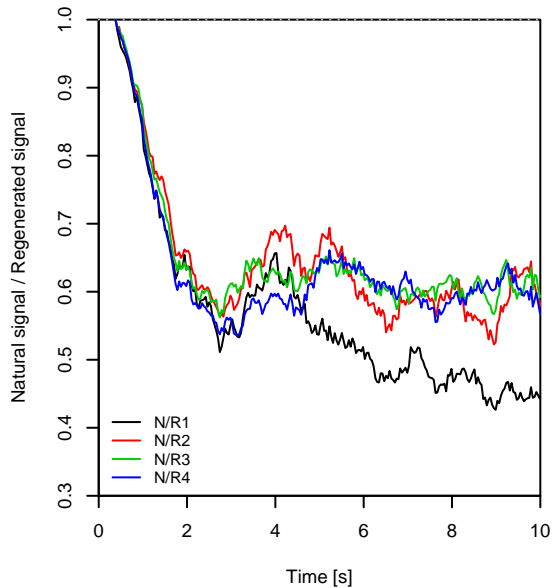
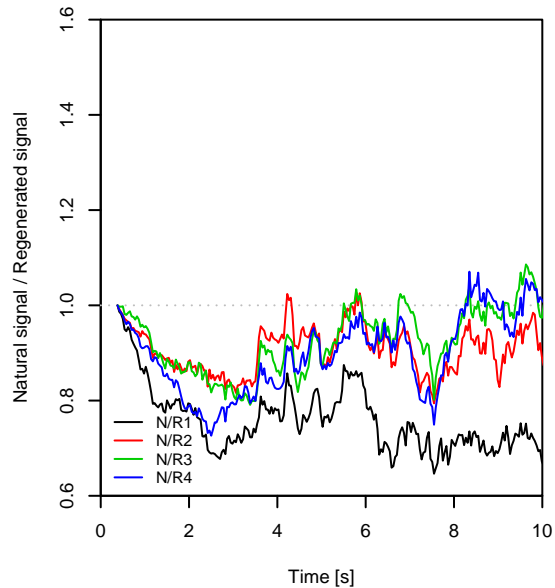
help("plot_NRt")

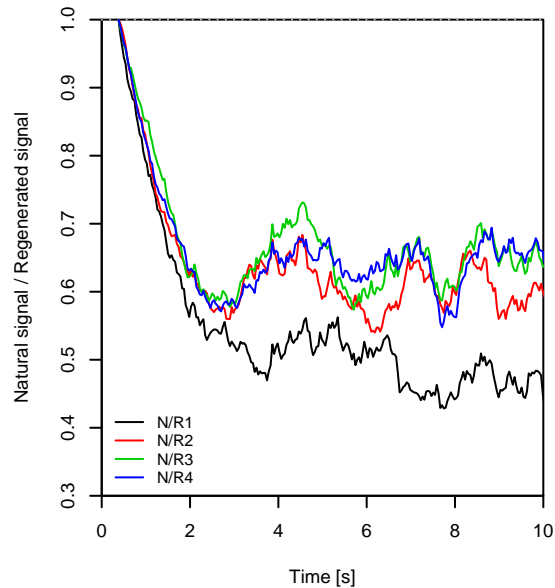
Aliquot #3**Aliquot #4**

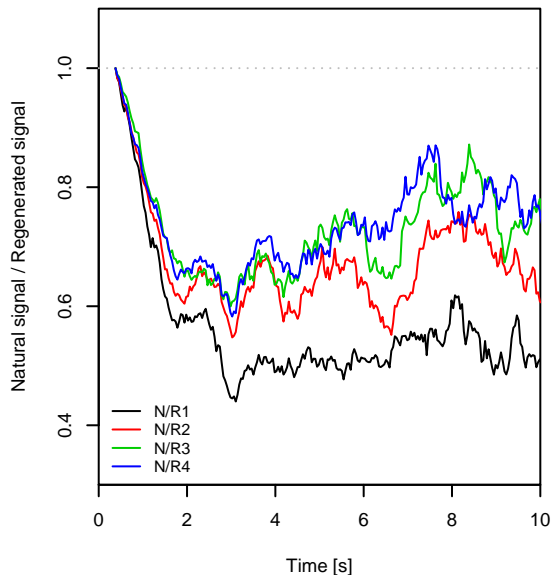
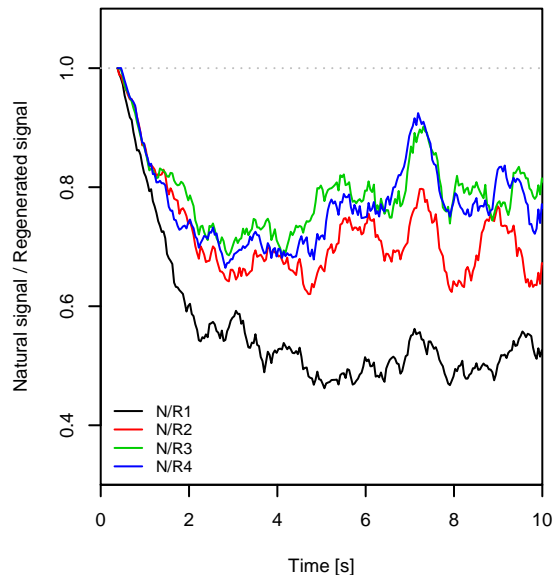
Aliquot #5**Aliquot #6****Aliquot #7****Aliquot #8**

Aliquot #9**Aliquot #10**

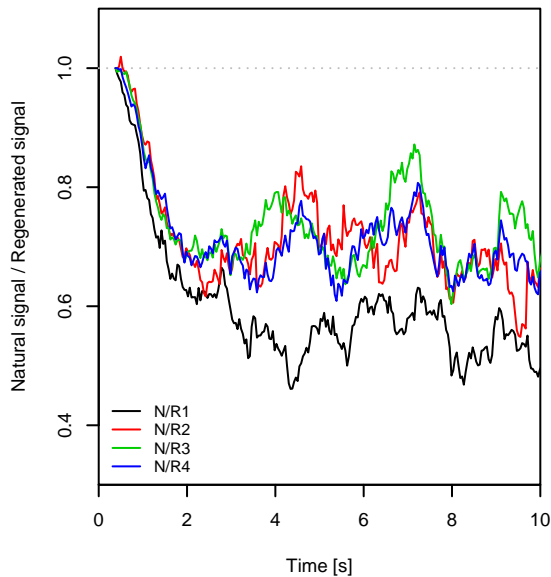
help("plot_NRt")

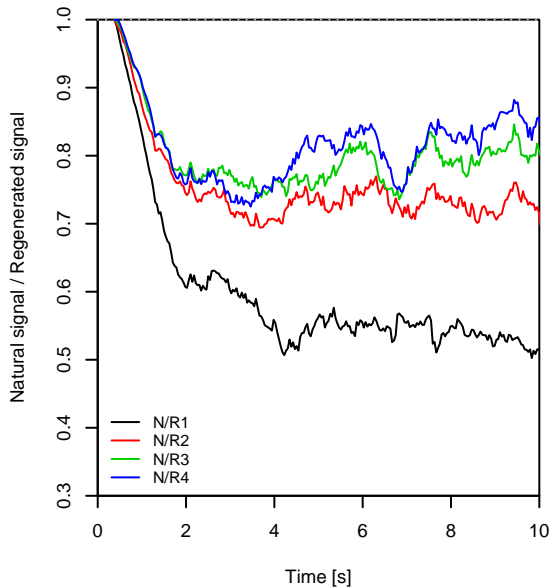
Aliquot #11**Aliquot #12**

Aliquot #13**Aliquot #14****Aliquot #15****Aliquot #16**

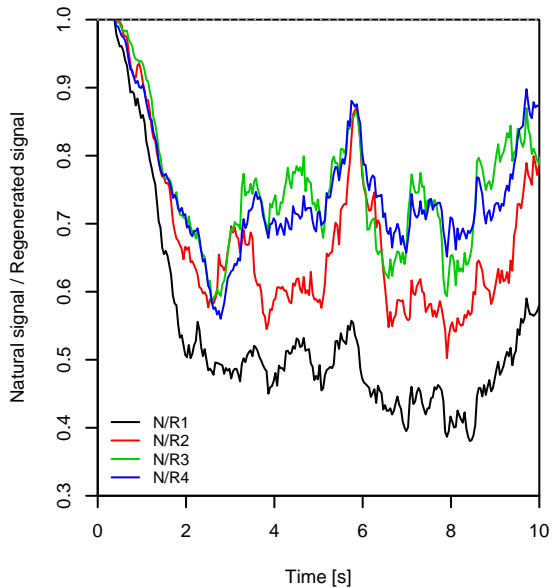
Aliquot #17**Aliquot #18**

help("plot_NRt")

Aliquot #19**Aliquot #20**

Aliquot #21**Aliquot #22**

help("plot_NRt")

Aliquot #23**Aliquot #24**

TL combined



unkown curve type



RLum.Data.Image

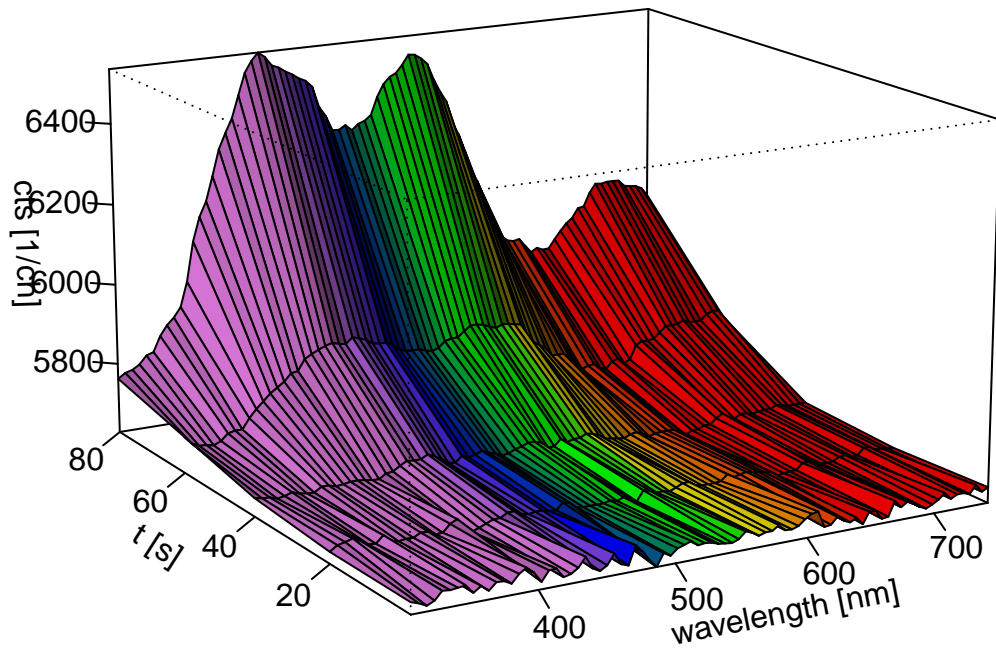


RLum.Data.Spectrum



[help\("plot_RLum.Data.Spectrum"\)](#)

RLum.Data.Spectrum

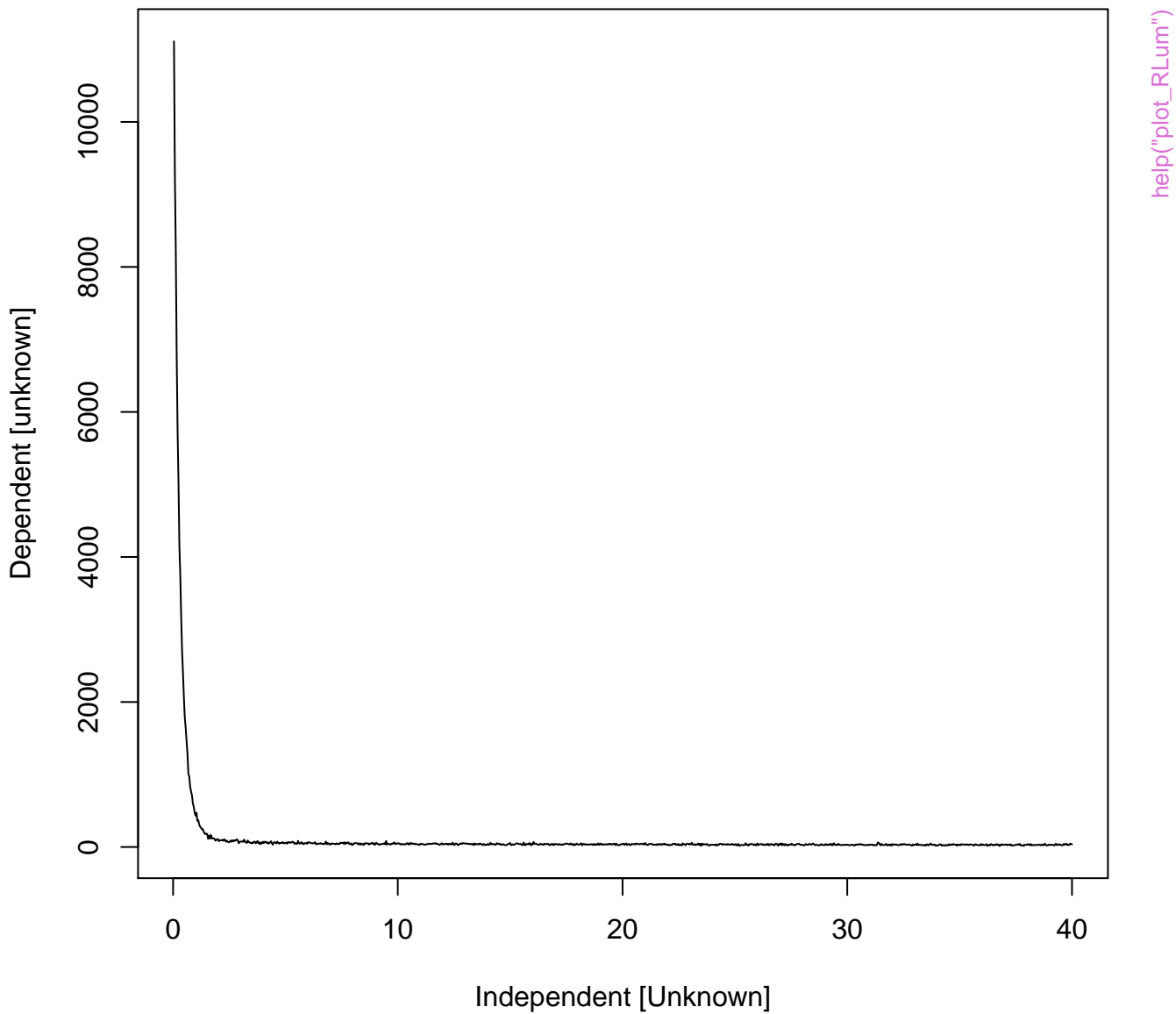


`help("plot_RLum.Data.Spectrum")`

RLum.Data.Spectrum



unkown curve type



Likelihood profile: gamma



Likelihood profile: sigma



Likelihood profile: p0



help("plot_RLum.Results")

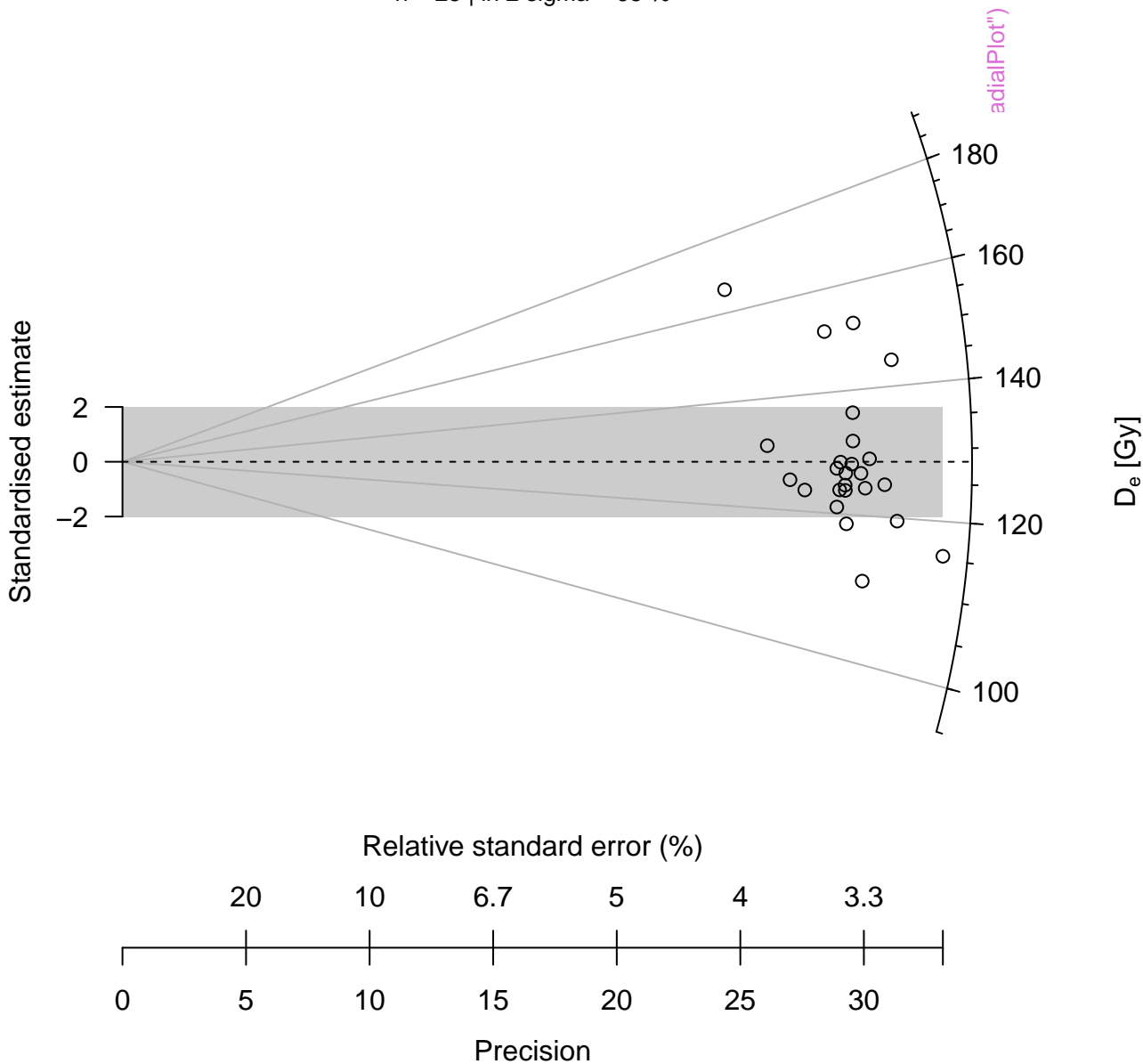
Monte Carlo Simulation

$$n = 100 \mid \hat{\mu} = 45 \mid \hat{\sigma} = 21 \mid \frac{\hat{\sigma}}{\sqrt{n}} = 2 \mid v = 0.84$$



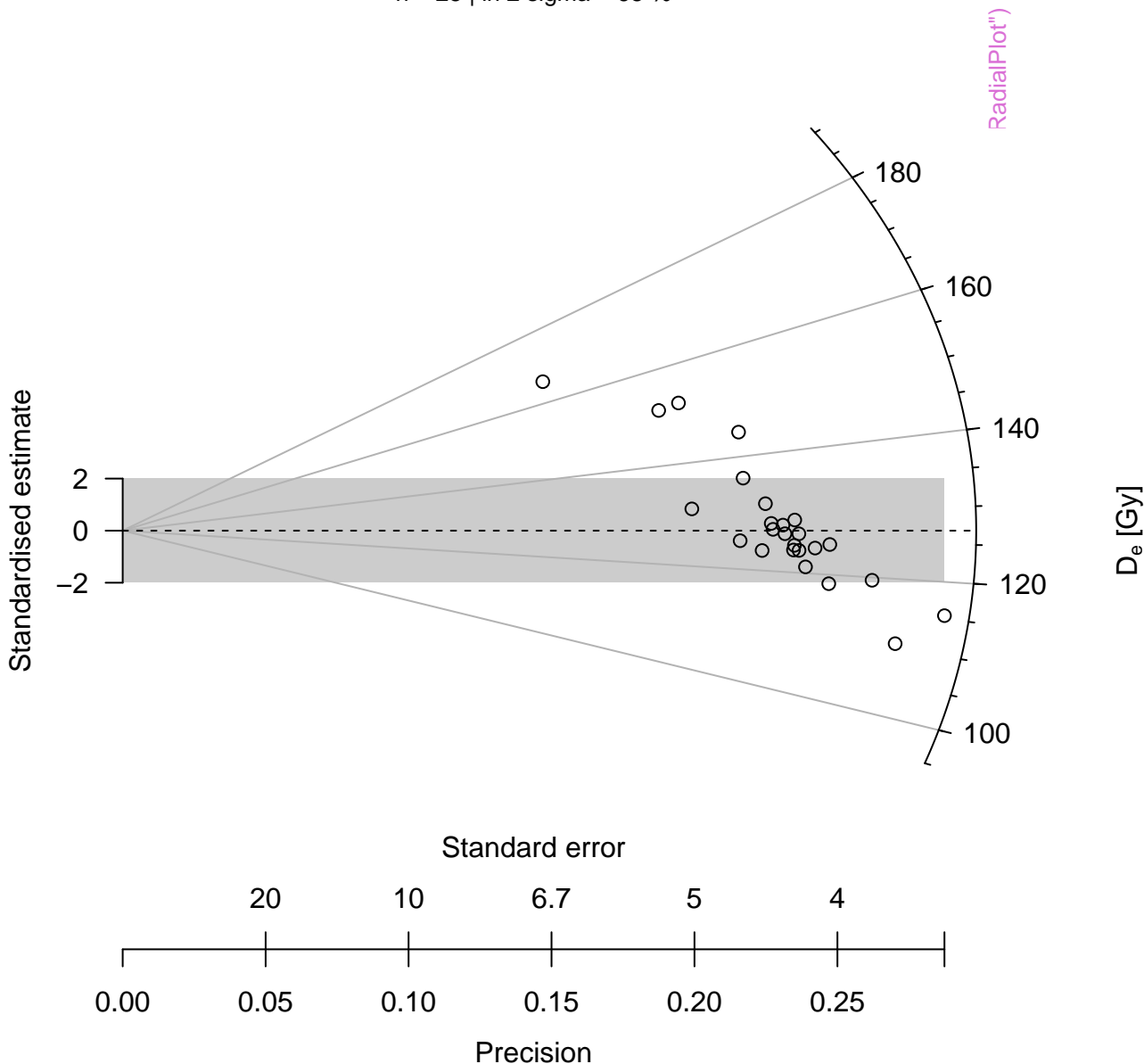
D_e distribution

n = 25 | in 2 sigma = 68 %



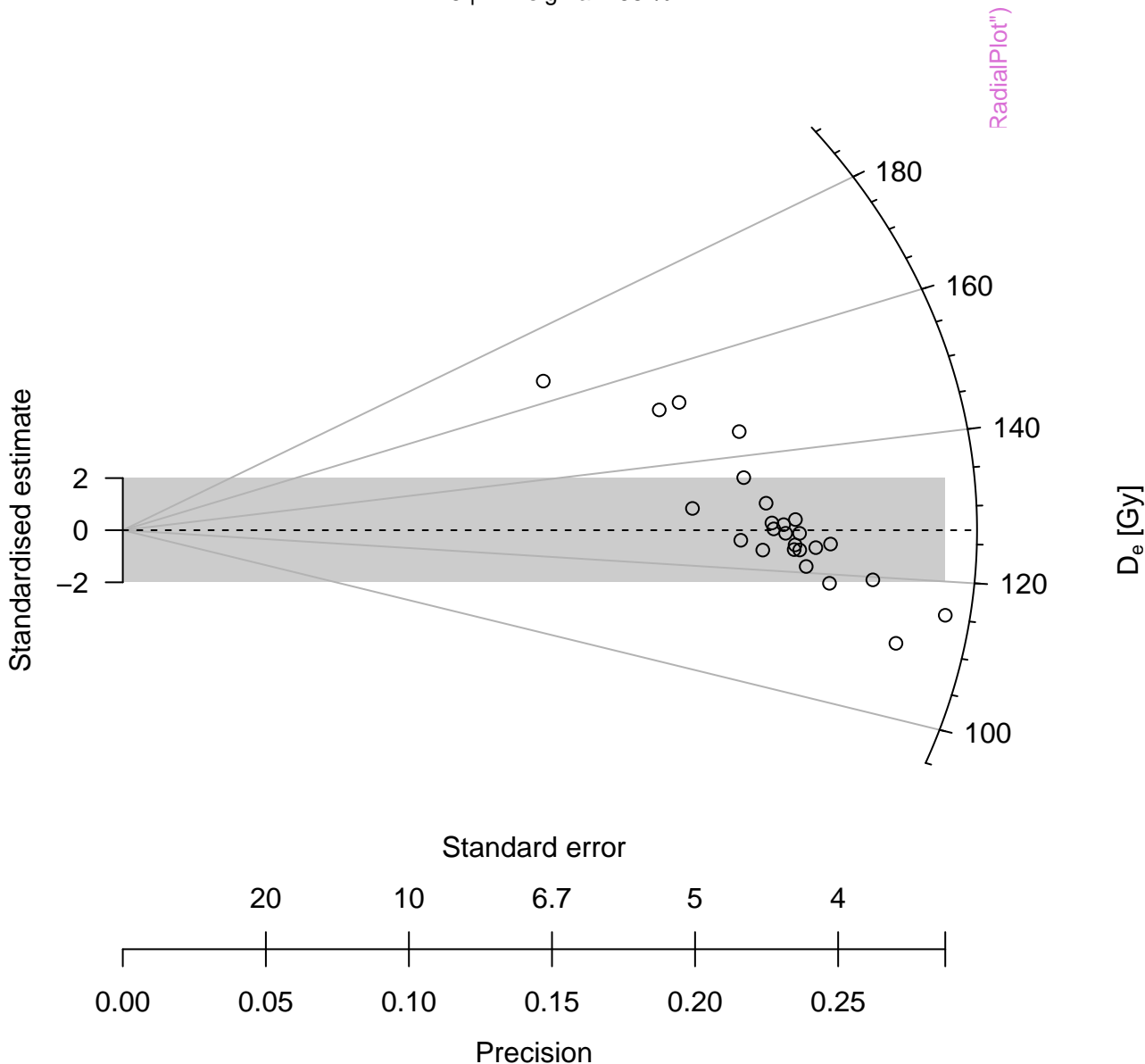
D_e distribution

n = 25 | in 2 sigma = 68 %



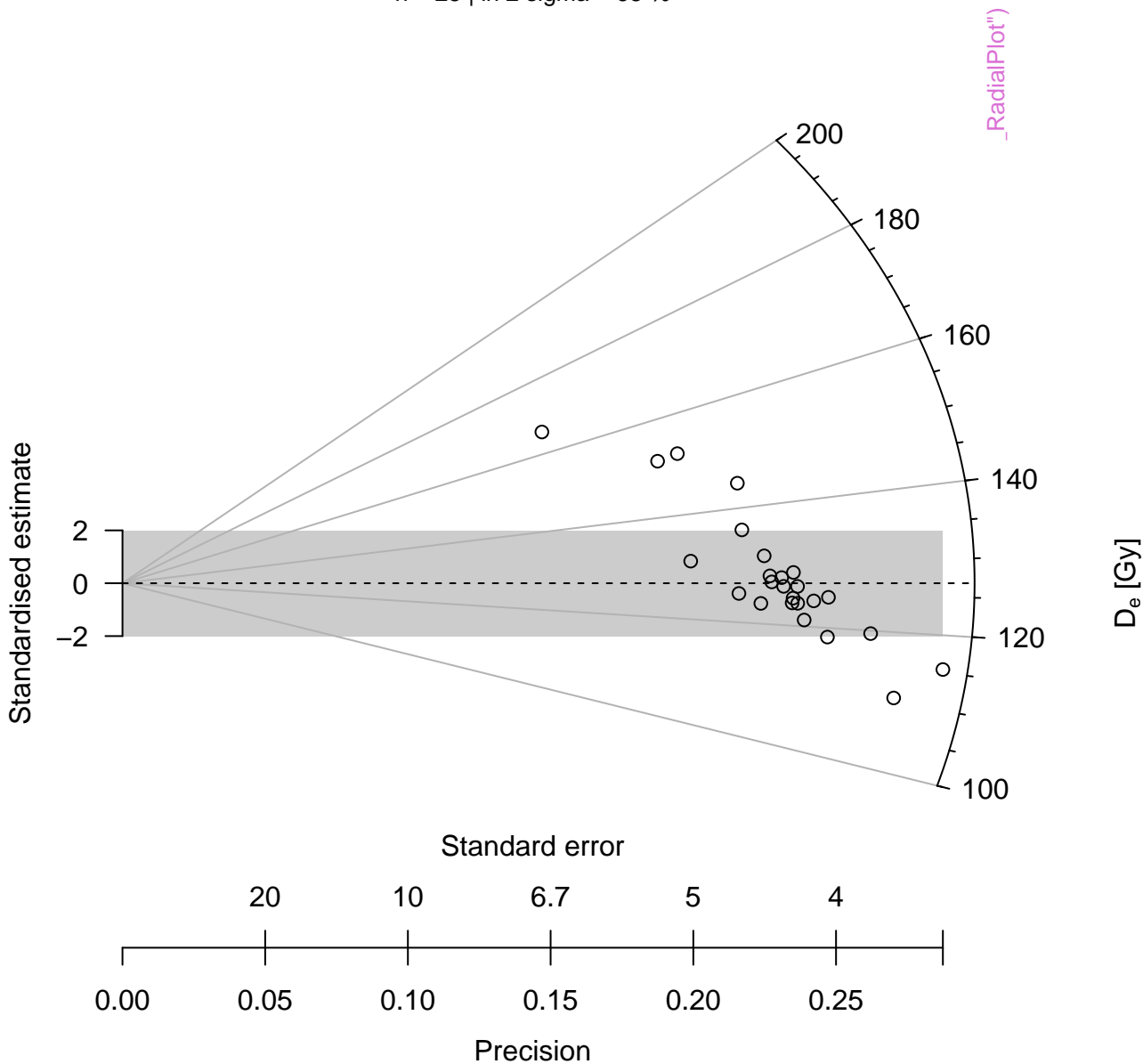
D_e distribution

n = 25 | in 2 sigma = 68 %



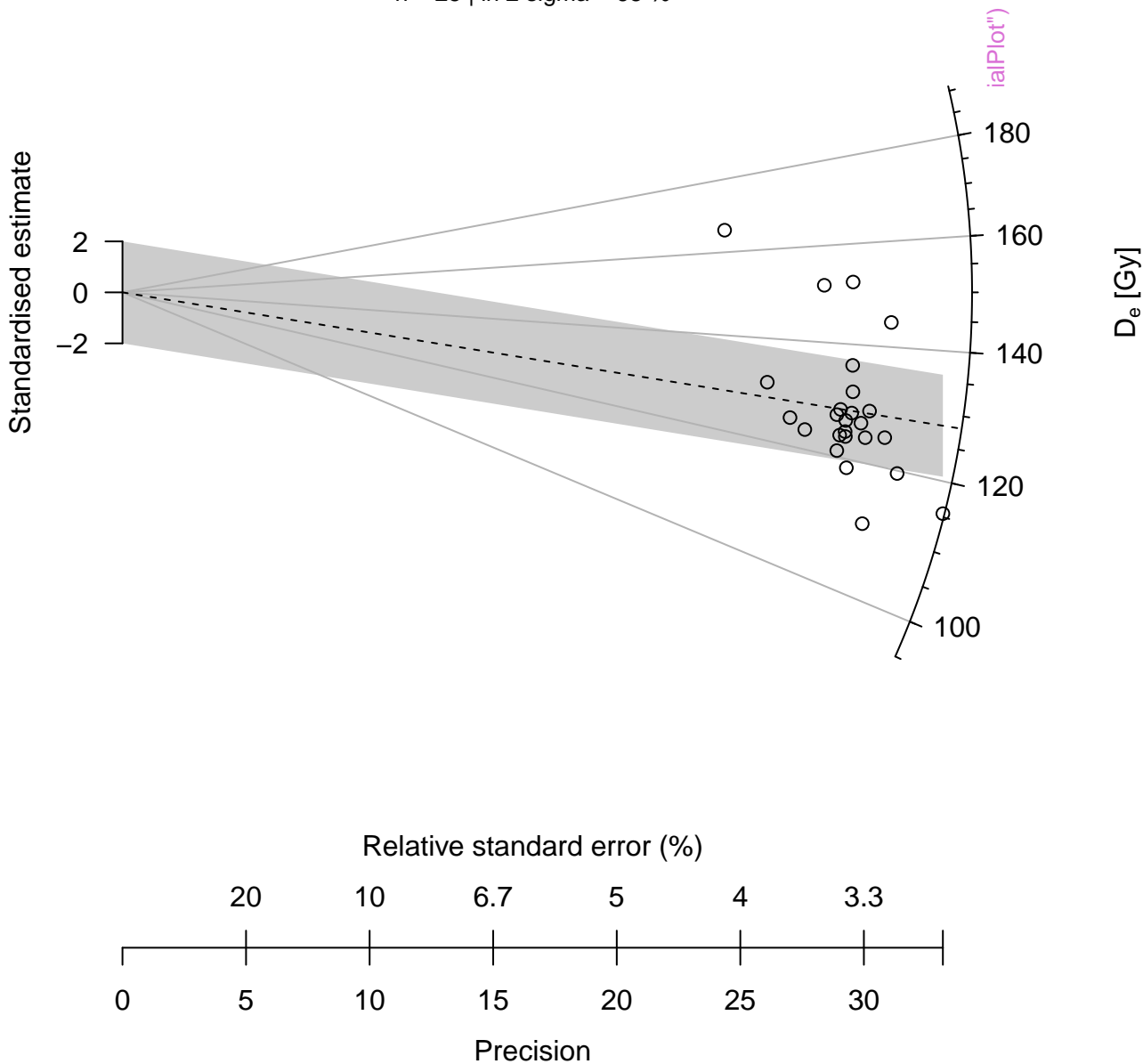
D_e distribution

n = 25 | in 2 sigma = 68 %



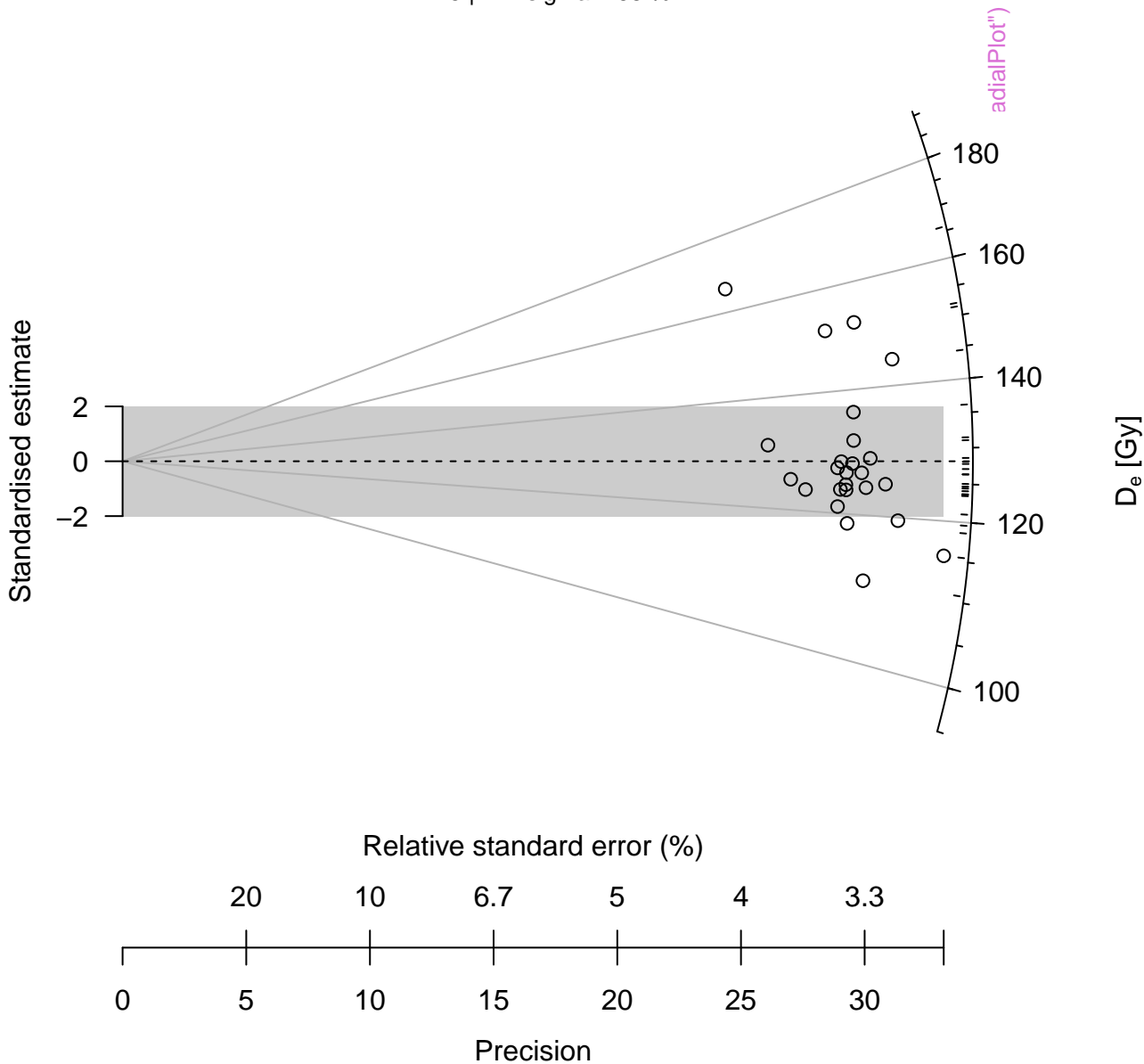
D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %

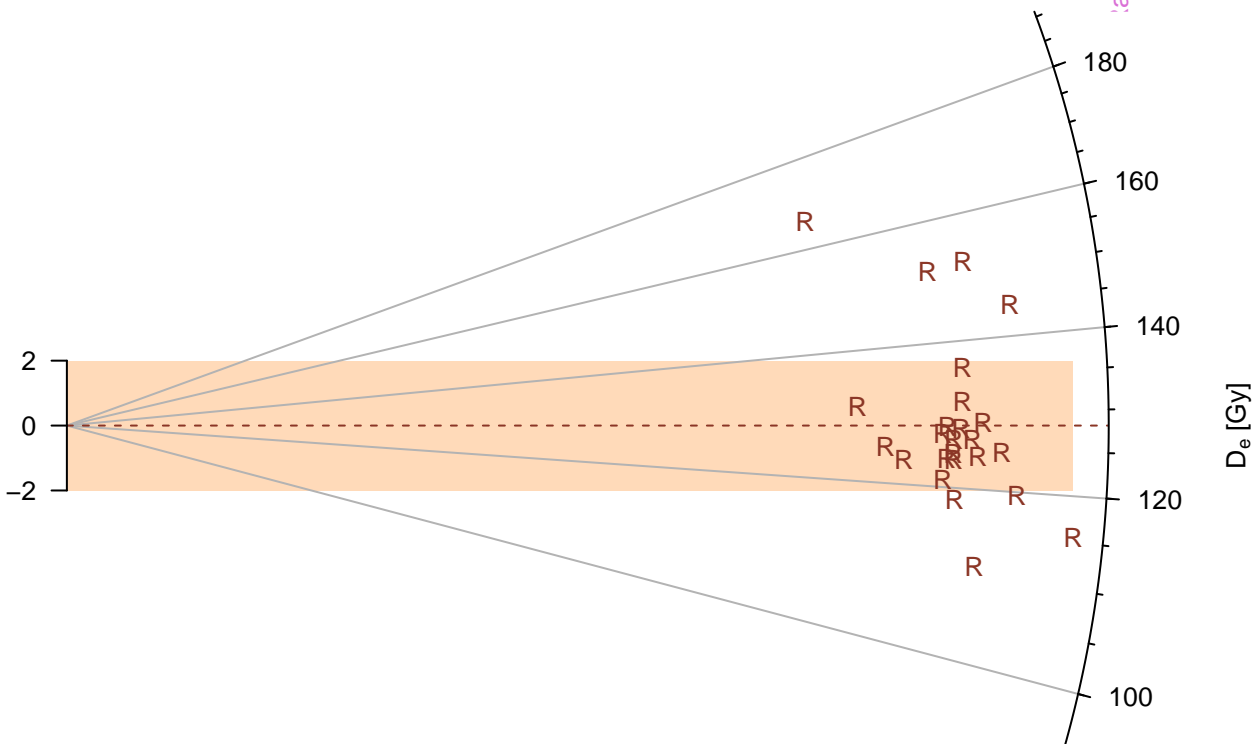


D_e distribution

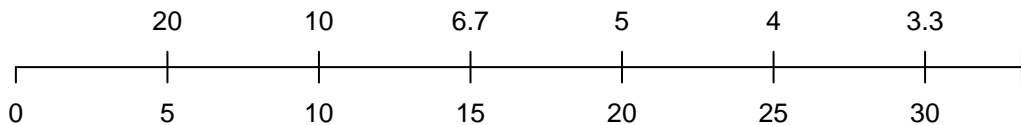
n = 25 | in 2 sigma = 68 %

radialPlot()

Standardised estimate



Relative standard error (%)



Precision

D_e distribution

n = 25 | in 2 sigma = 68 %

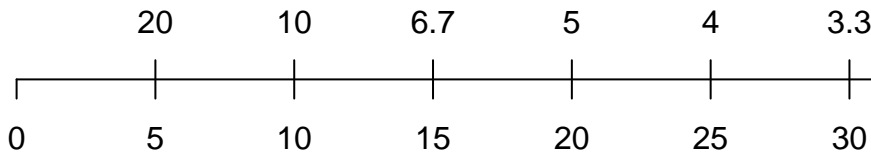
Standardised estimate

0

D_e [Gy]

adialPlot()

Relative standard error (%)



Precision

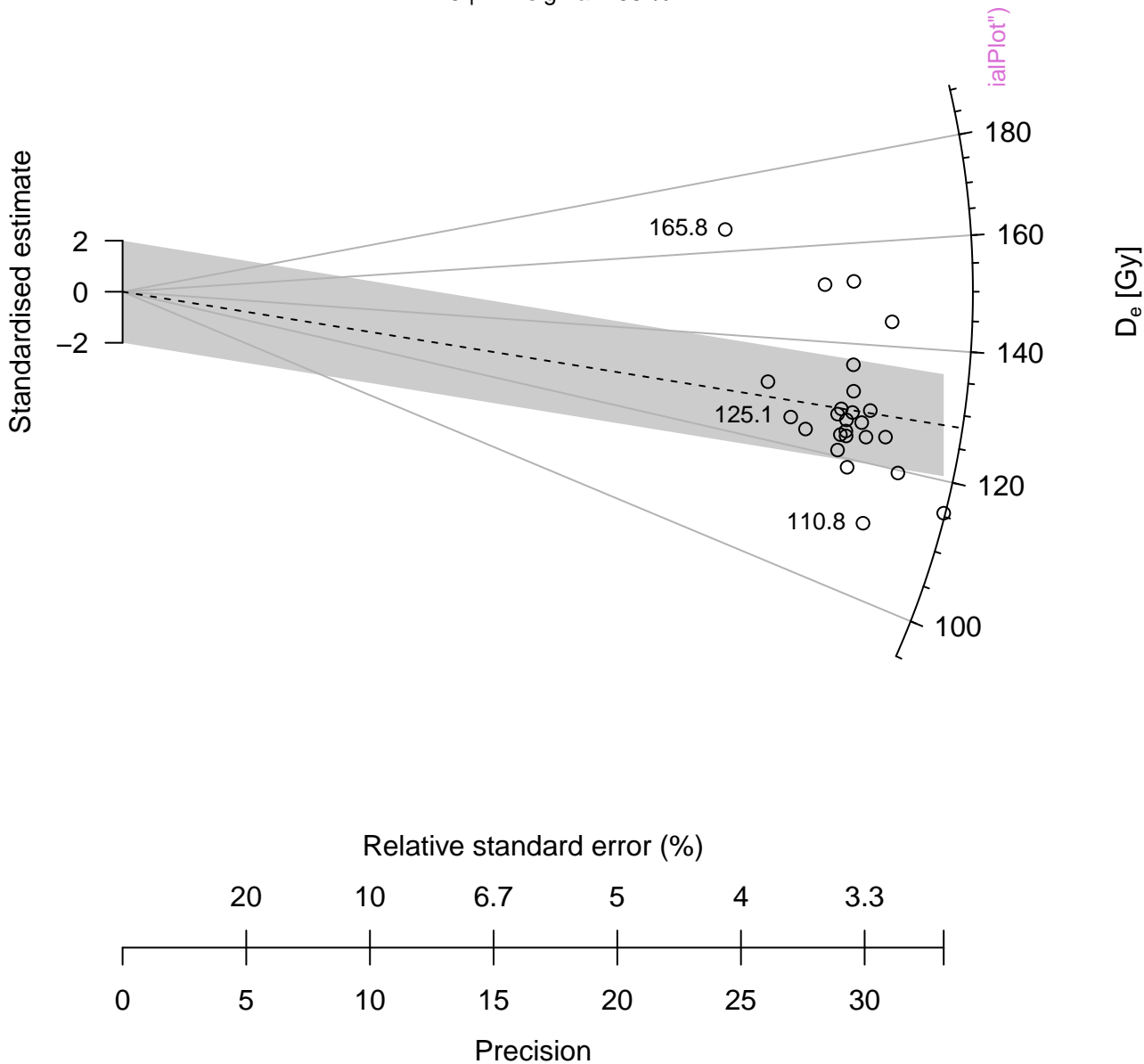
D_e distribution

n = 25 | in 2 sigma = 68 %



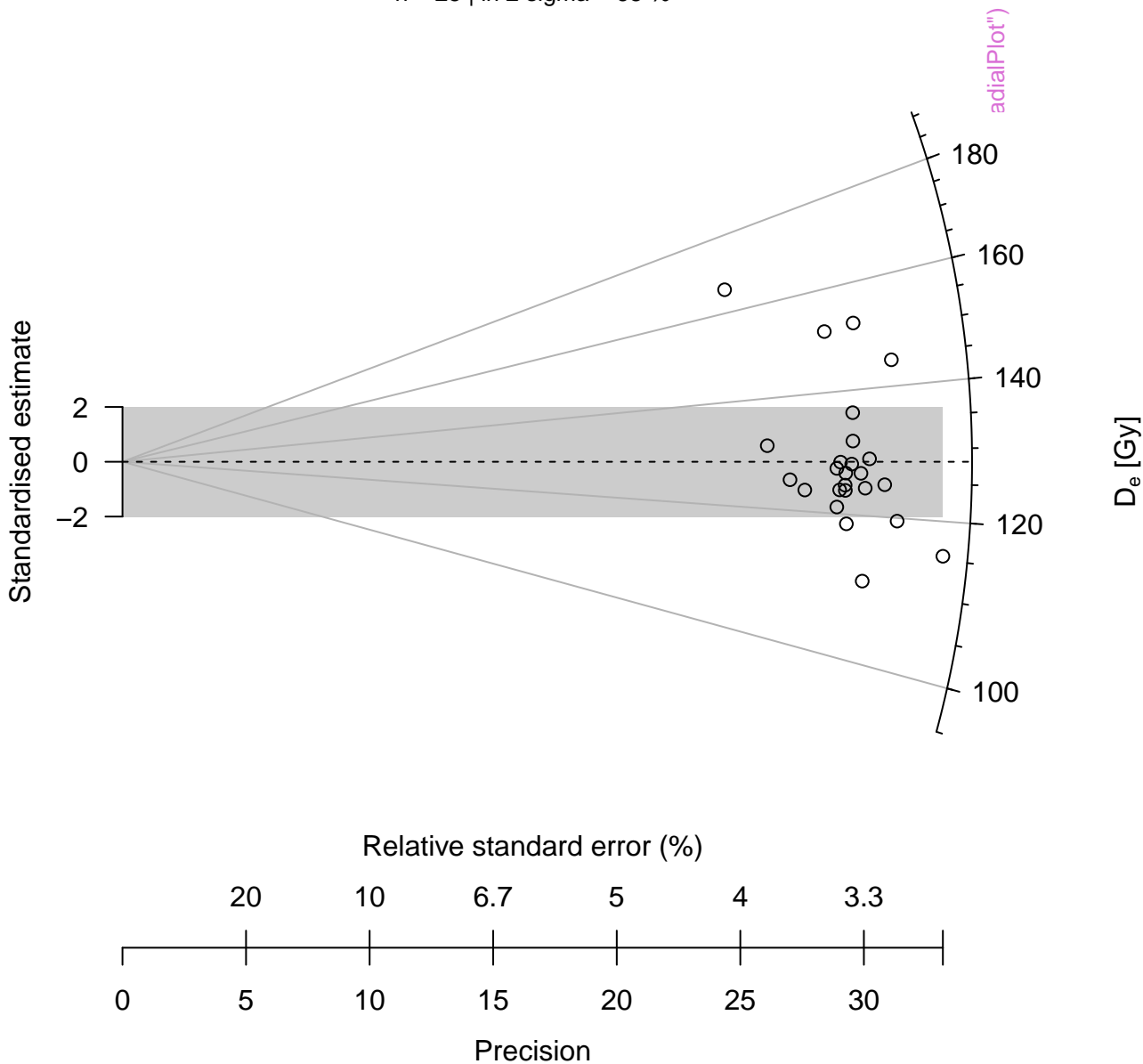
D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

weighted mean = 126.85 | median = 126.34



D_e distribution

n = 15 | in 2 sigma = 53.3 %

n = 10 | in 2 sigma = 90 %



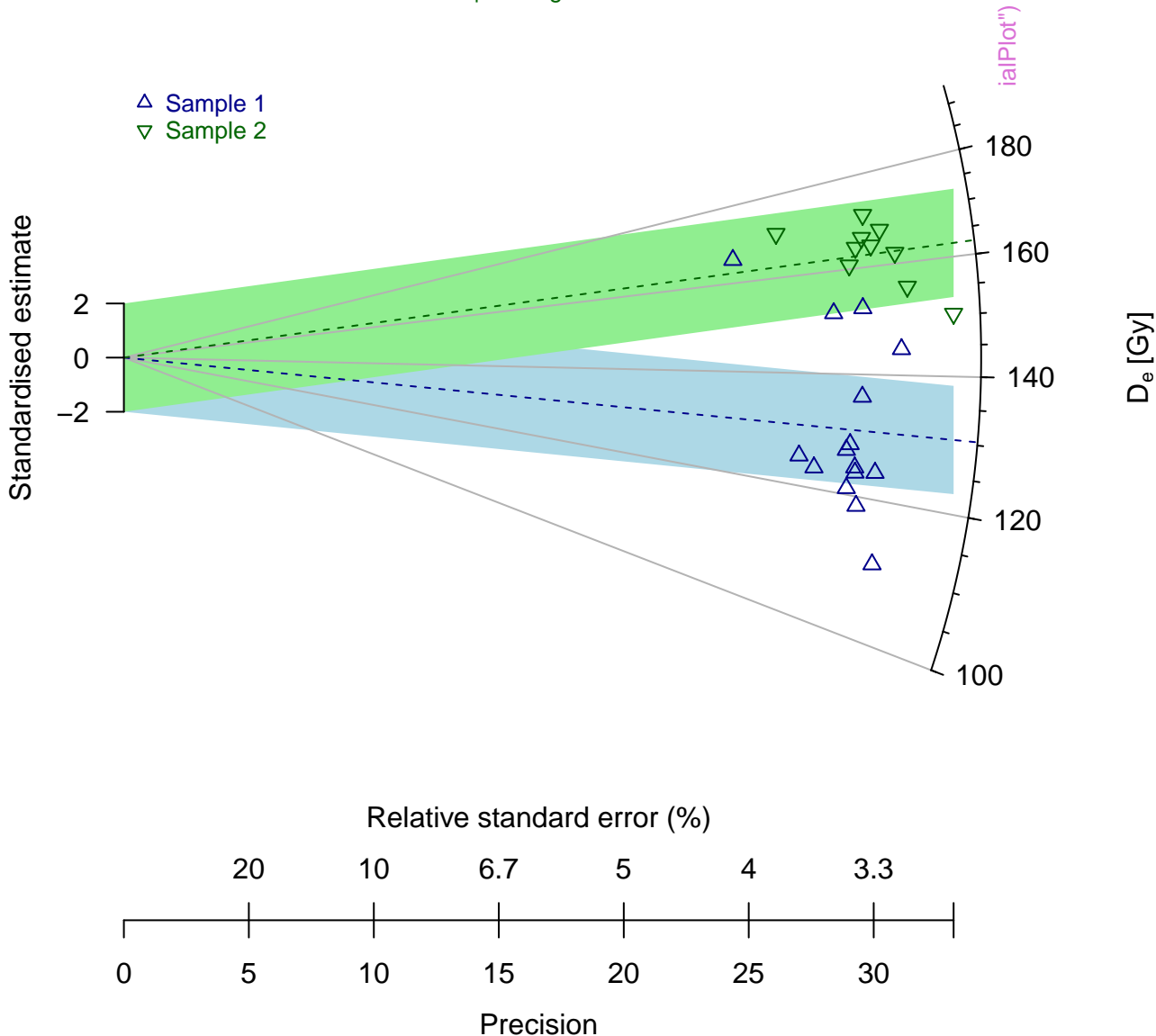
D_e distribution

n = 15 | in 2 sigma = 53.3 %

n = 10 | in 2 sigma = 90 %

△ Sample 1

▽ Sample 2



Violin Plot

n = 25 | median = 126.34

Density



[help\("plot_ViolinPlot"\)](#)

OSL



D_e distribution

n = 62 | mean = 66



D_e distribution

n = 62 | mean = 66

