

L_n, L_x curves

ALQ Pos. 1

T_n, T_x curves



help("Analyse_SAR OSLdata")

unknown measurement

Cutheat – TL curves



IRSLT

IRSL/BOSL = 0.88%



IRSL curve (10 s)







Fig. 4 – Bos & Wallinga (2012)





`help("CW2pLM")`



Fig. 4 – Bos & Wallinga (2012)





Fig. 4 – Bos & Wallinga (2012)



TL (UVVIS)



OSL (UVVIS)





Histogram



Histogram



No L_x curves detected

No T_x curves detected

help("ExampleData.Fading")

Signal Fading

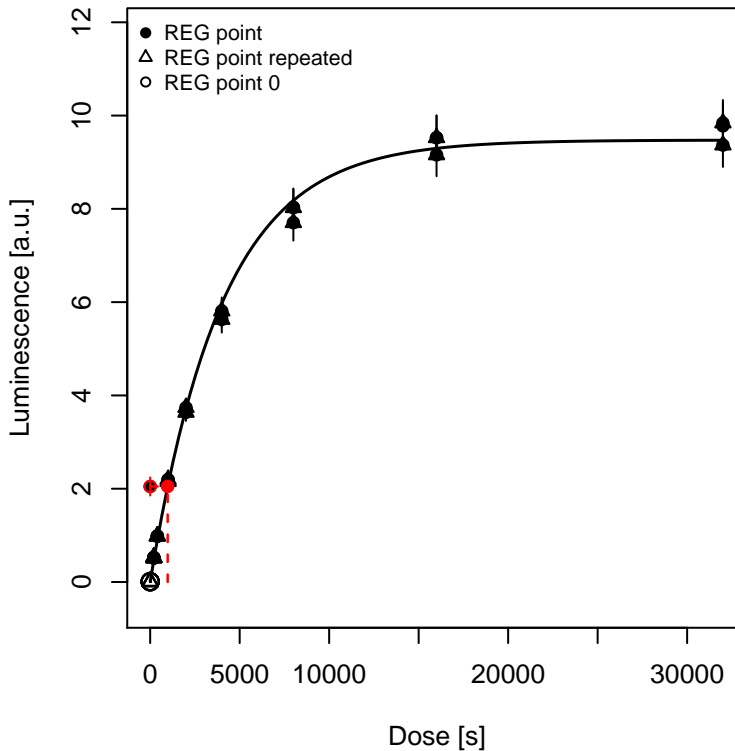


Density: g-values (%/decade)



Growth curve

$D_e = 977.38 \pm 105.65$ | fit: EXP



D_e from MC simulation

$D_{eMC} = 984.66 \pm 105.65$ | quality = 99.3 %



Test dose response





`help("ExampleData.FittingLM")`



`help("ExampleData.LxTxData")`



help("ExampleData.LxTxOSLData")



`help("ExampleData.LxTxOSLData")`

RF

#1



RF

#2



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

RLum.Data.Image





`help("ExampleData.SurfaceExposure")`



help("ExampleData.SurfaceExposure")





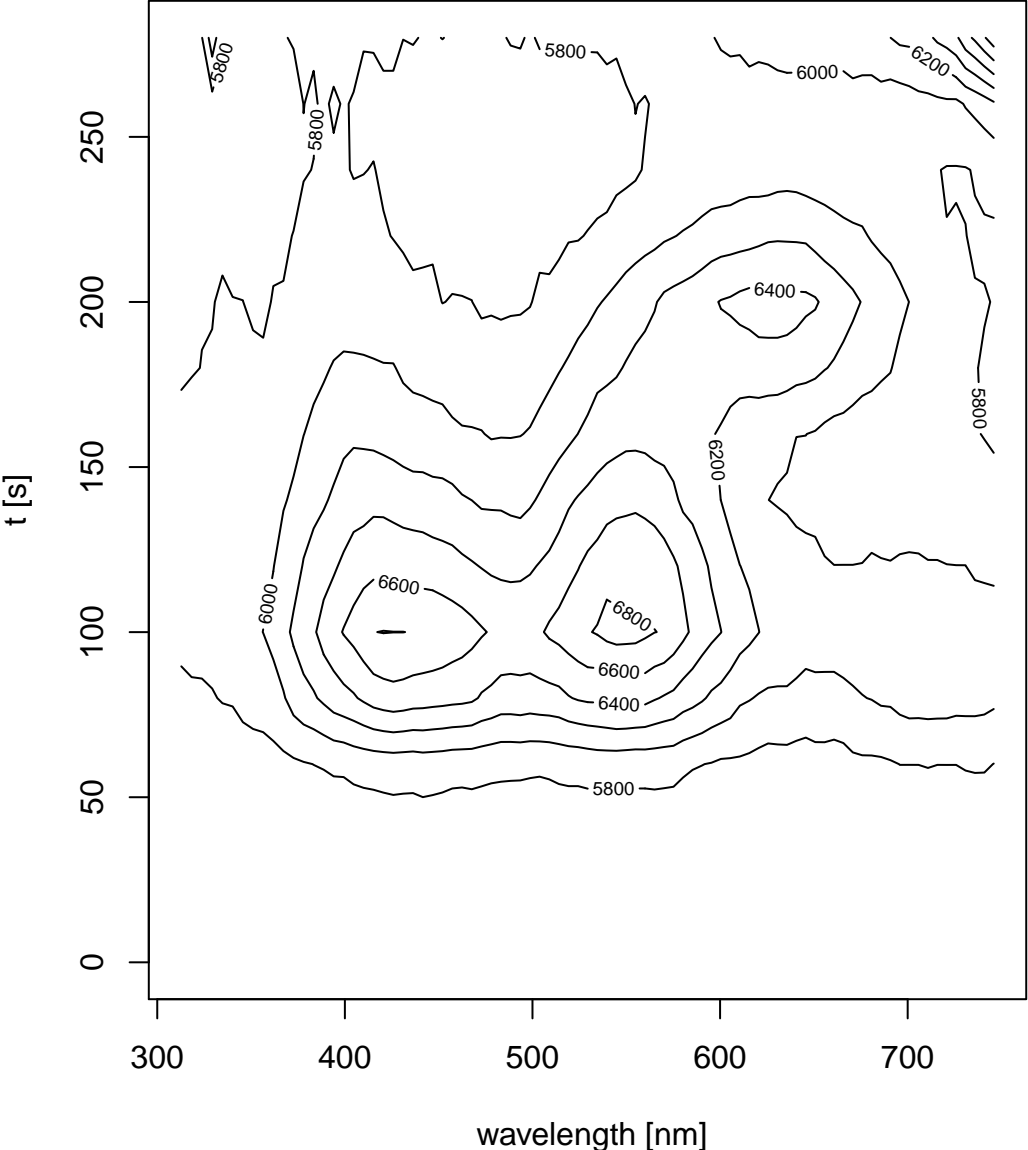
help("ExampleData.SurfaceExposure")

OSL (UVVIS)



help("ExampleData.XSYG")

RLum.Data.Spectrum



[help\("ExampleData.XSYG"\)](#)

USER

Record: 1



IRSL

Record: 1



help("ExampleData.portableOSL")

Record: 1

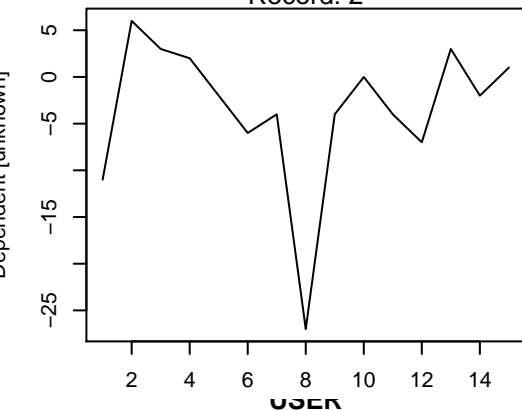


Record: 1



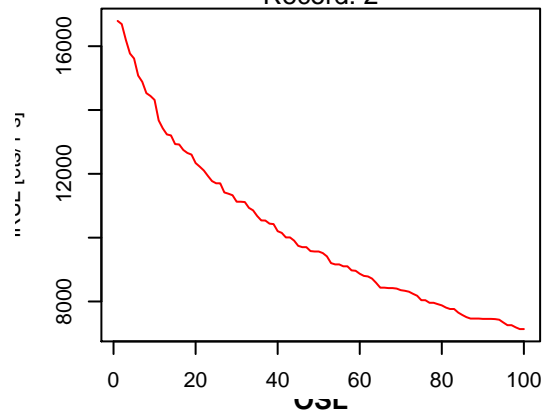
USER

Record: 2



IRSL

Record: 2



help("ExampleData.portableOSL")

Record: 2



Record: 2





USER

Record: 4



IRSL

Record: 4



help("ExampleData.portableOSL")

Record: 4



Record: 4





USER

Record: 6



IRSL

Record: 6



help("ExampleData.portableOSL")

Record: 6



Record: 6



Record: 6



USER

Record: 7



IRSL

Record: 7



help("ExampleData.portableOSL")

Record: 7



Record: 7







USER

Record: 10



IRSL

Record: 10



help("ExampleData.portableOSL")

Record: 10



Record: 10





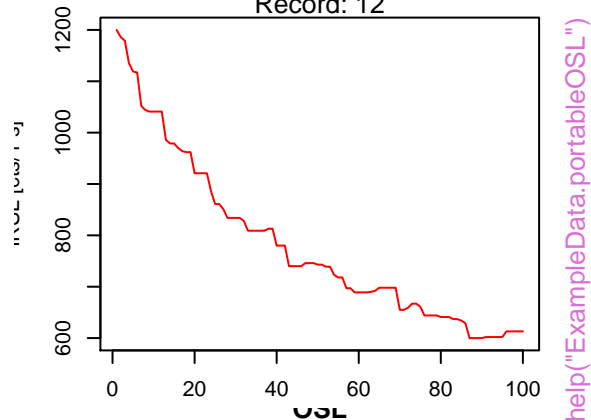
USER

Record: 12



IRSL

Record: 12

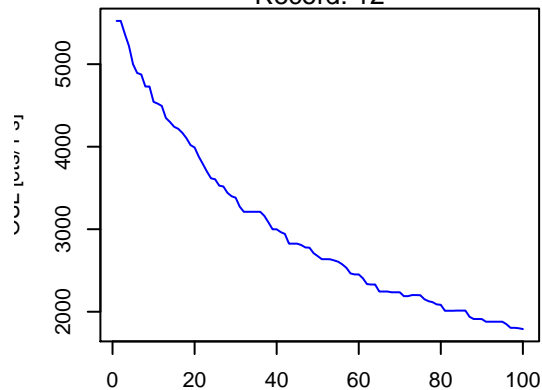


help("ExampleData.portableOSL")

Record: 12



Record: 12

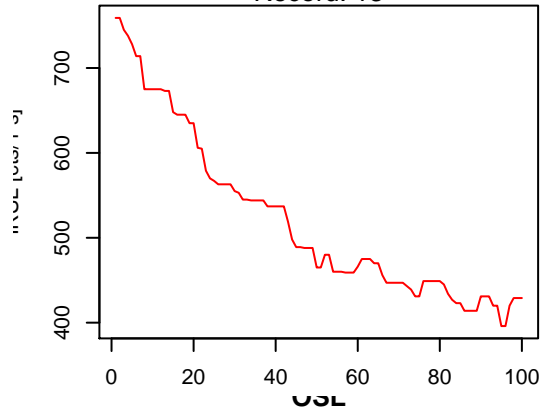


USER

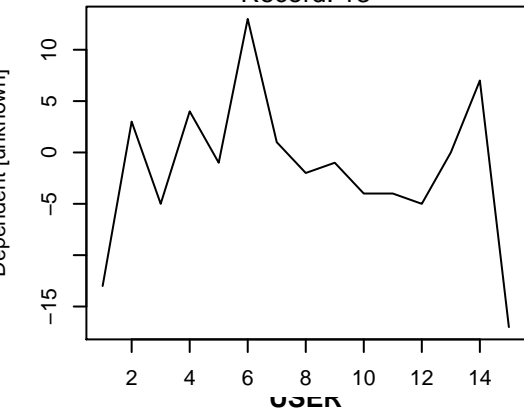
Record: 13



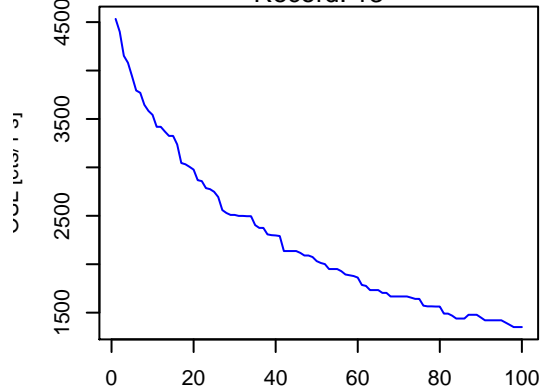
Record: 13



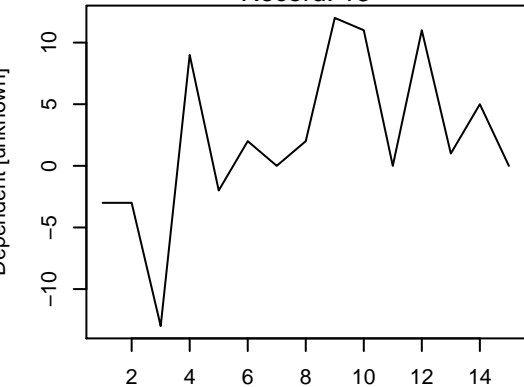
Record: 13



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



USER

Record: 2



IRSL

Record: 2



help("PSL2Riseo.BinfileData")

Record: 2



Record: 2





USER

Record: 4



Record: 4

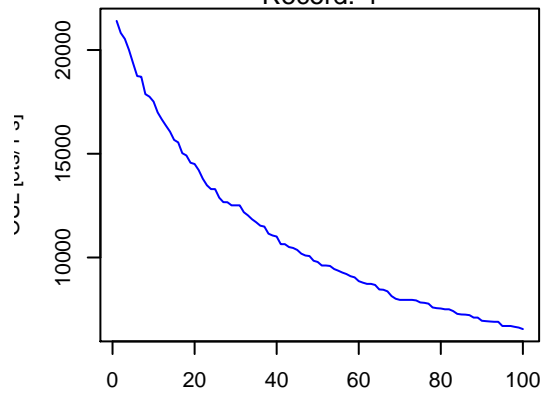


help("PSL2Risee.BINfileData")

Record: 4



Record: 4







USER

Record: 7



IRSL

Record: 7



help("PSL2Riseo.BINfileData")

Record: 7

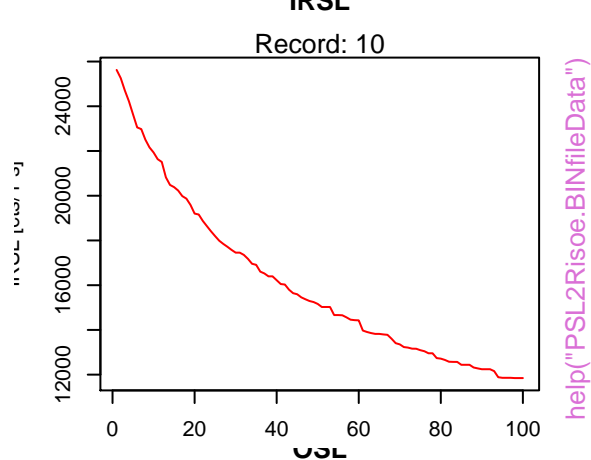


Record: 7









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

Record: 13



Record: 13



help("PSL2Riseo.BinfileData")

Record: 13



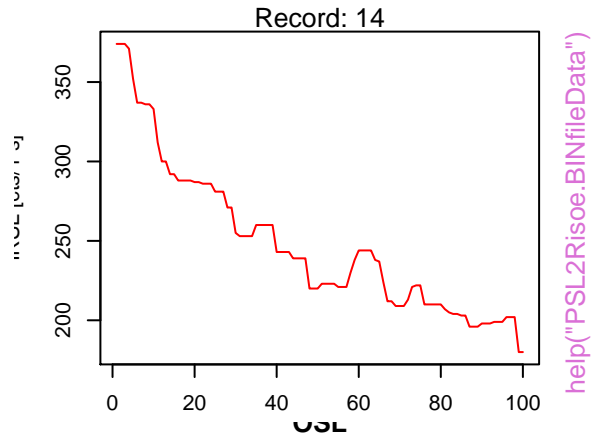
Record: 13



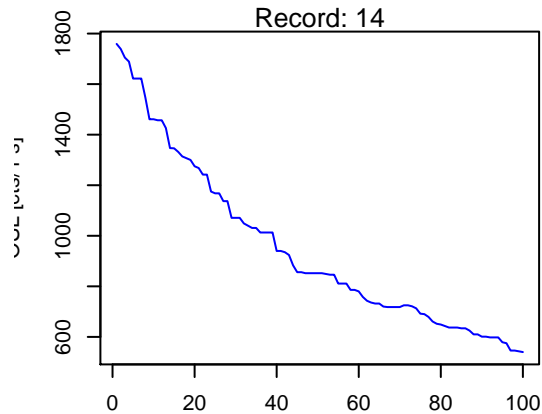
USER



IRSL



help("PSL2Riseo.BINfileData")



Sample Carousel Crosstalk



Irradiation Time Correction



help("analyse_Al2O3C_ITC")

ALQ POS: 1 | OSL



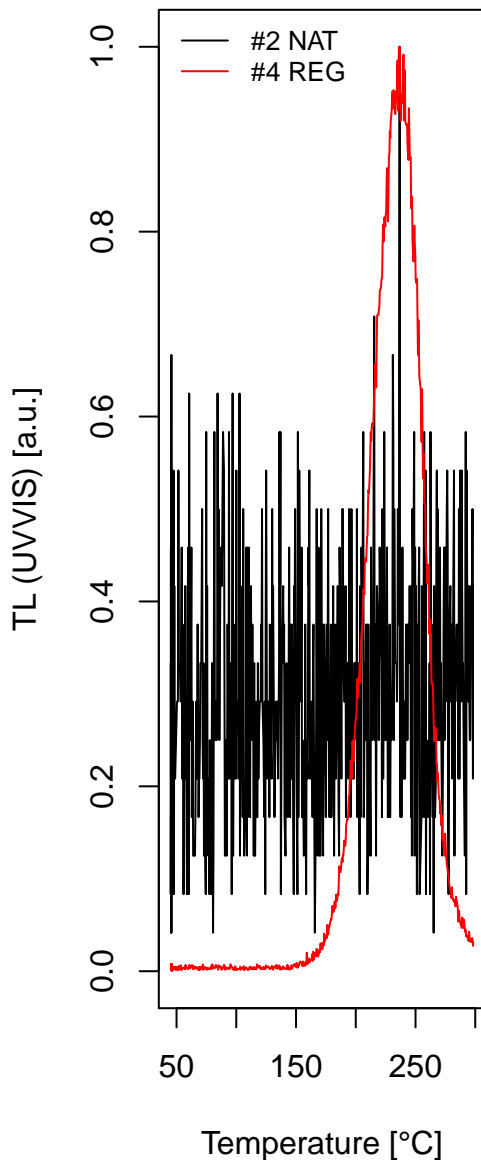
ALQ POS: 1 | T#1



ALQ POS: 2 | OSL



ALQ POS: 2 | T#2



help("analyse_Al2O3C_Measurement")

No L_x curves detected

No T_x curves detected

help("analyse_FadingMeasurement")

Signal Fading



Density: g-values (%/decade)



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 curvesTL previous T_n, T_x curves L_n, L_x curves T_n, T_x curves

●
Natural
(0)

●
R1
(450)

●
R2
(1050)

●
R3
(2000)

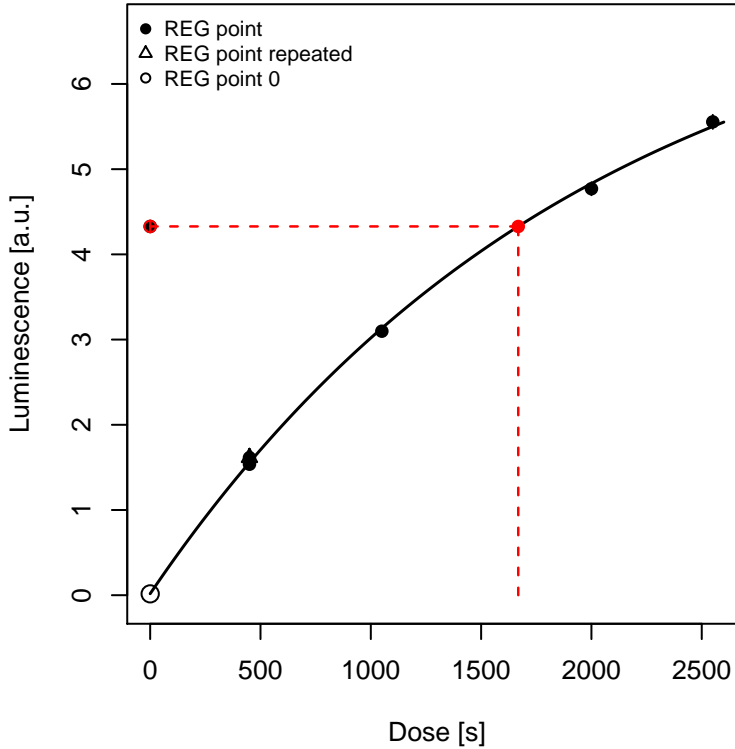
●
R4
(2550)

●
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

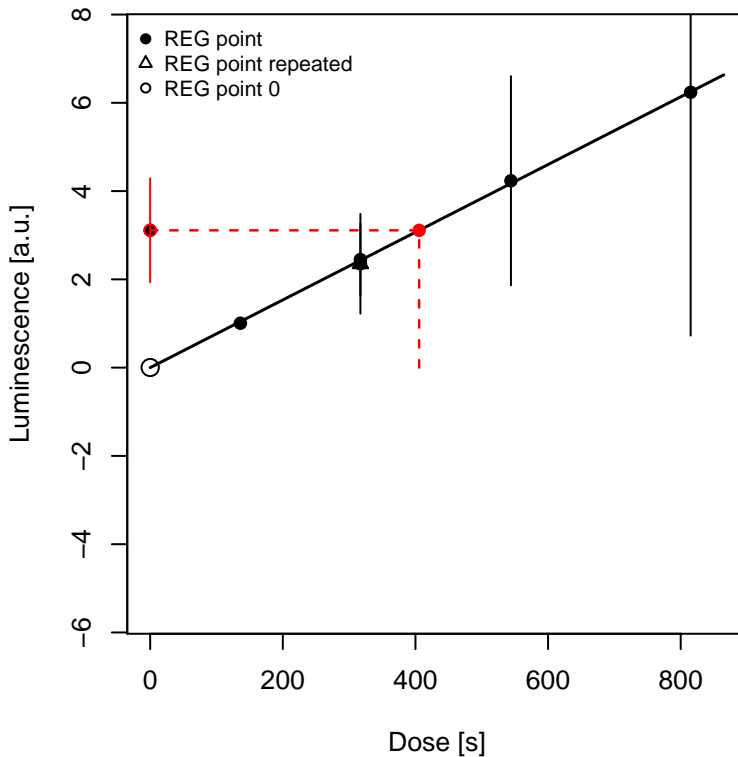


plateau Test T_n, T_x curves



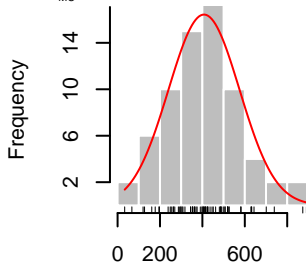
Growth curve

$D_e = 405.58 \pm 167.51$ | fit: EXP



D_e from MC simulation

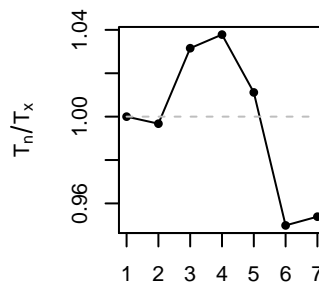
$D_{eMC} = 407.59 \pm 167.51$ | quality = 99.5 %



Dose [s]

n = 100, valid fits = 60

Test dose response



SAR cycle

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

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



Observed: Equivalent dose

n = 56



Bootstrapping: Average Dose

n = 500



Bootstrapping: Sigma_d

n = 500



help("calc_AverageDose")

D_e distribution

n = 56 | in 2 sigma = 53.6 %



Profile log likelihood for σ_{OD}



Fast Ratio

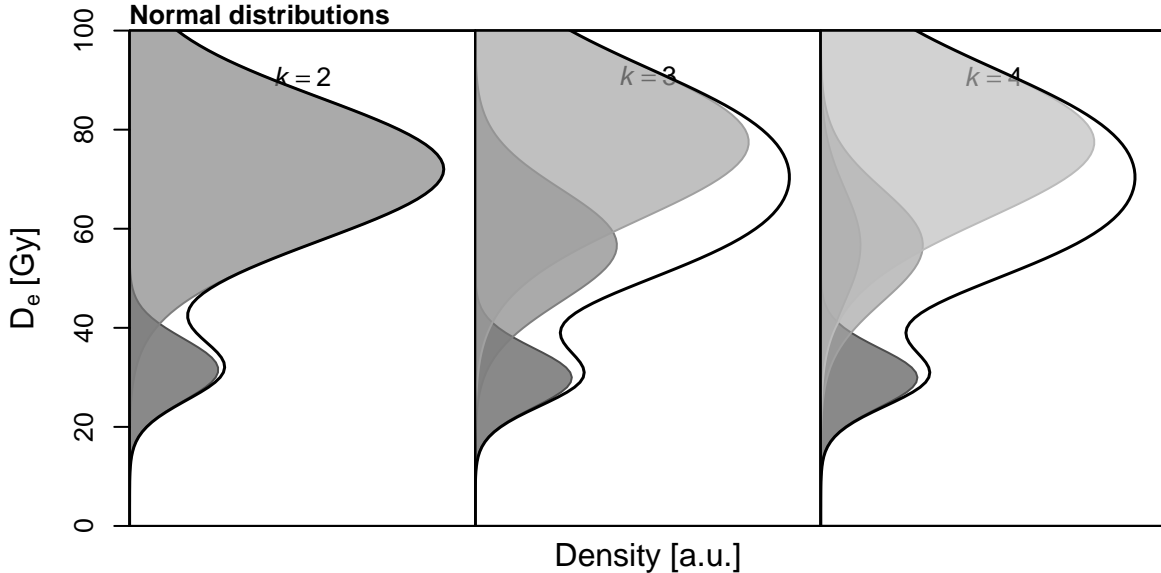


help("calc_FastRatio")

Finite Mixture Model

$\sigma_b = 0.2 \mid n = 62$

Normal distributions



Proportion of components



Statistical criteria



help("calc_FiniteMixture")

Fuchs & Lang (2001)



No L_x curves detected

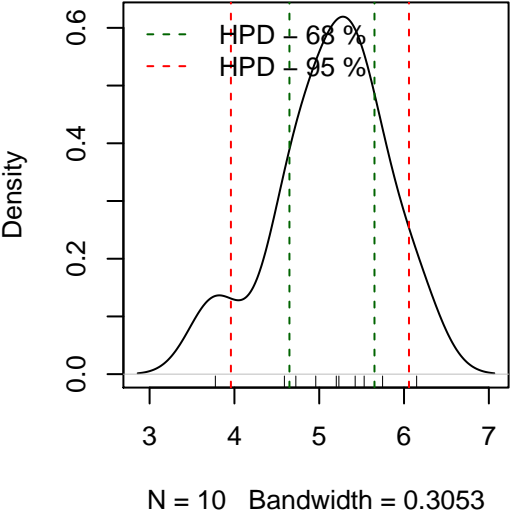
No T_x curves detected

help("calc_Huntley2006")

Signal Fading



Density: g-values (%/decade)



Measured dose response curve

$D_e = 130.97 \pm 17.12$ | fit: EXP



D_e from MC simulation

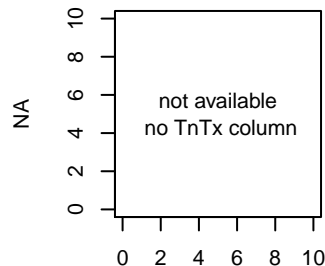
$D_{eMC} = 132.17 \pm 17.12$ | quality = 99.1 %



Dose (Gy)

n = 100, valid fits = 100

Test dose response



NA

Simulated dose response curve

$D_e = 282.67 \pm 38.63$ | fit: EXP



D_e from MC simulation

$D_{eMC} = 289.46 \pm 38.63$ | quality = 97.6 %



Test dose response



Dose response curves







help("calc_I EU")

No L_x curves detected

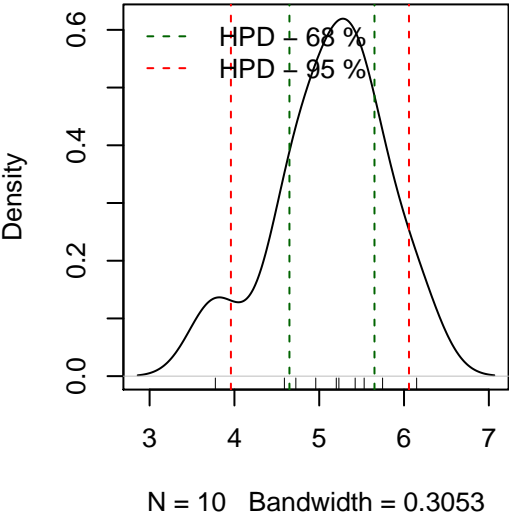
No T_x curves detected

help("calc_Kars2008")

Signal Fading



Density: g-values (%/decade)



Measured dose response curve

$D_e = 130.97 \pm 17.12$ | fit: EXP



D_e from MC simulation

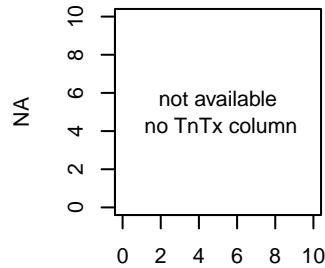
$D_{eMC} = 132.17 \pm 17.12$ | quality = 99.1 %



Dose (Gy)

n = 100, valid fits = 100

Test dose response



NA

Simulated dose response curve

$D_e = 282.67 \pm 38.63$ | fit: EXP



D_e from MC simulation

$D_{eMC} = 289.46 \pm 38.63$ | quality = 97.6 %



Test dose response



Dose response curves



Corrected Dose Response Curve

$D_e = 471.3 \pm 21.74$ | fit: EXP



help("calc_Lamothe2003")

Likelihood profile: gamma



Likelihood profile: sigma



help("calc_MaxDose")

Likelihood profile: p0



Likelihood profile: gamma



Likelihood profile: sigma



help("calc_MinDose")

Likelihood profile: p0



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



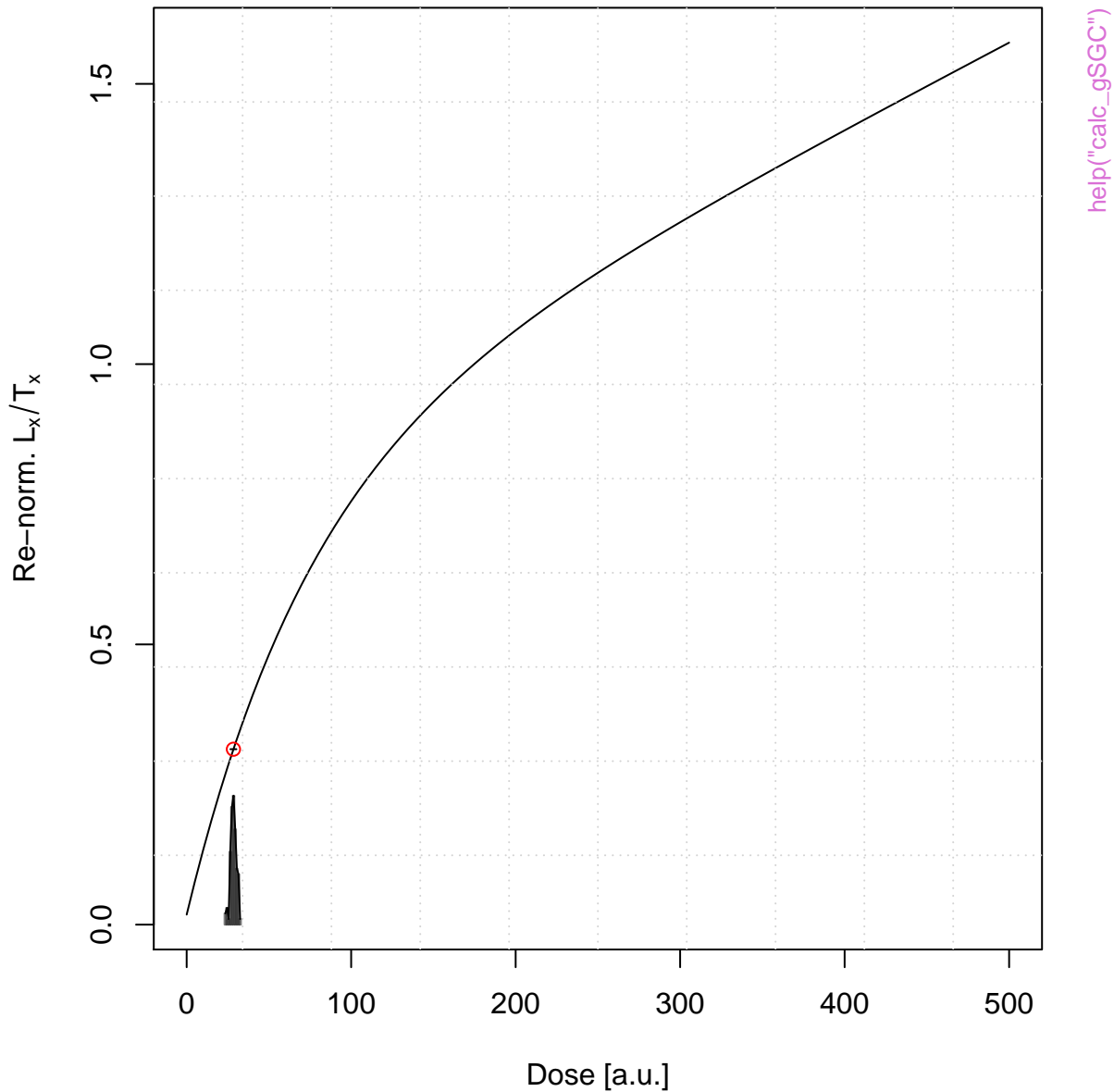
`help("calc_ThermalLifetime")`

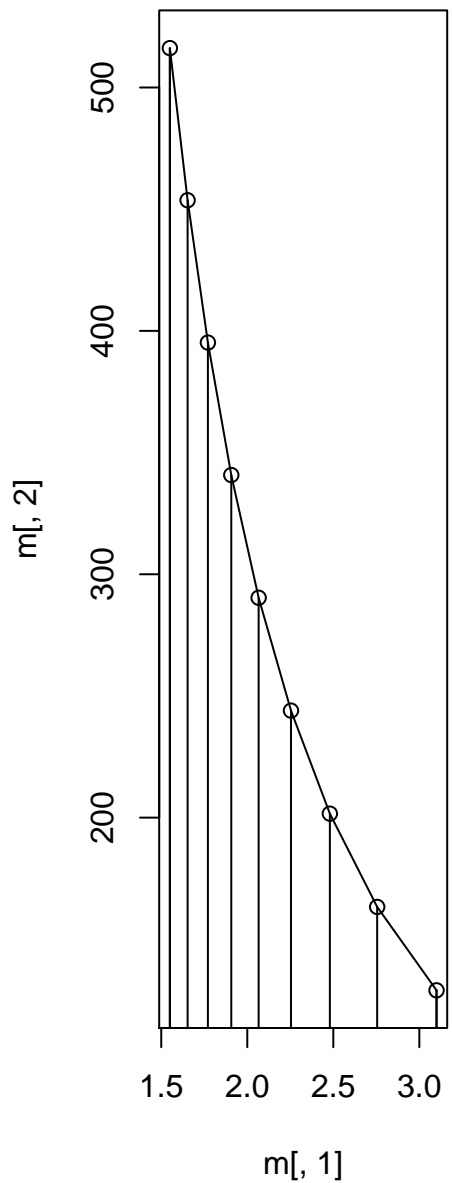
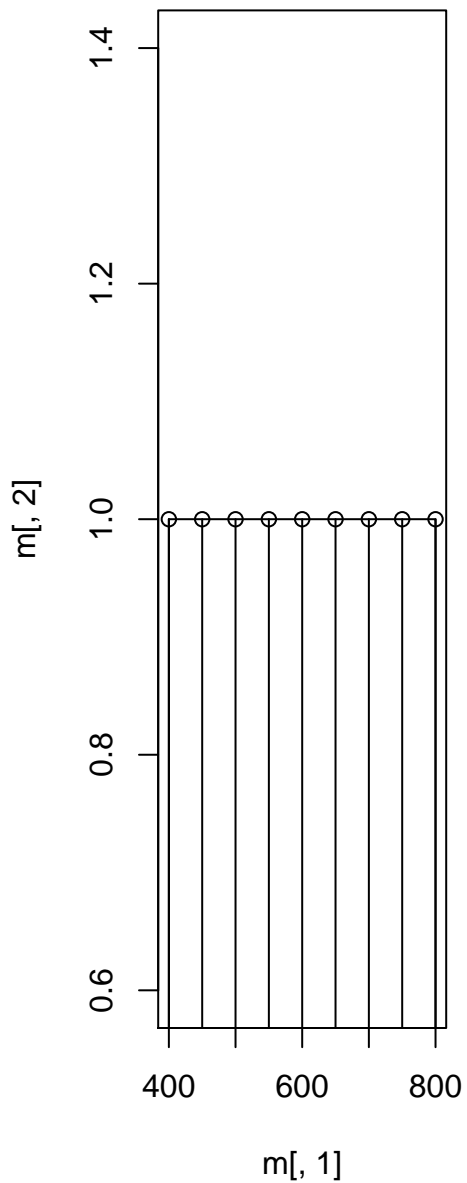
D_e applying Woda and Fuchs (2008)



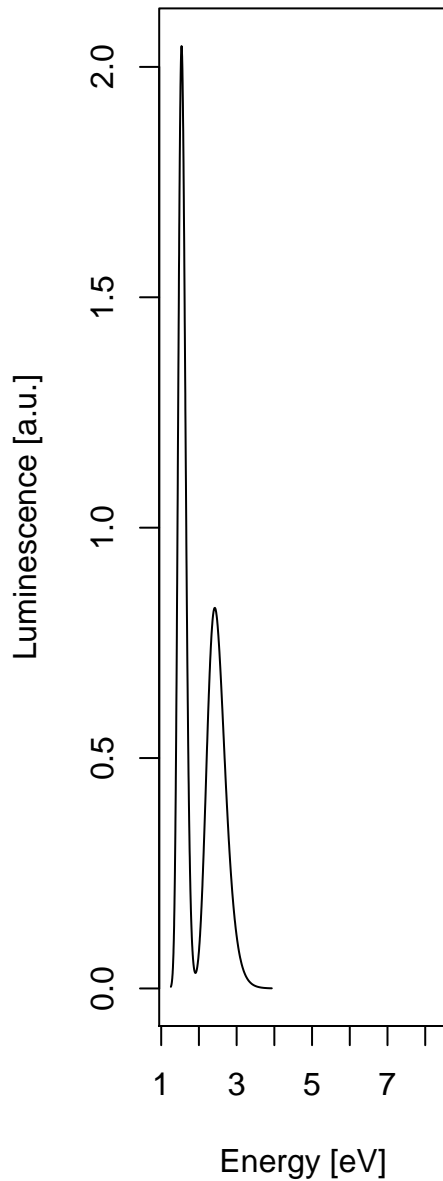
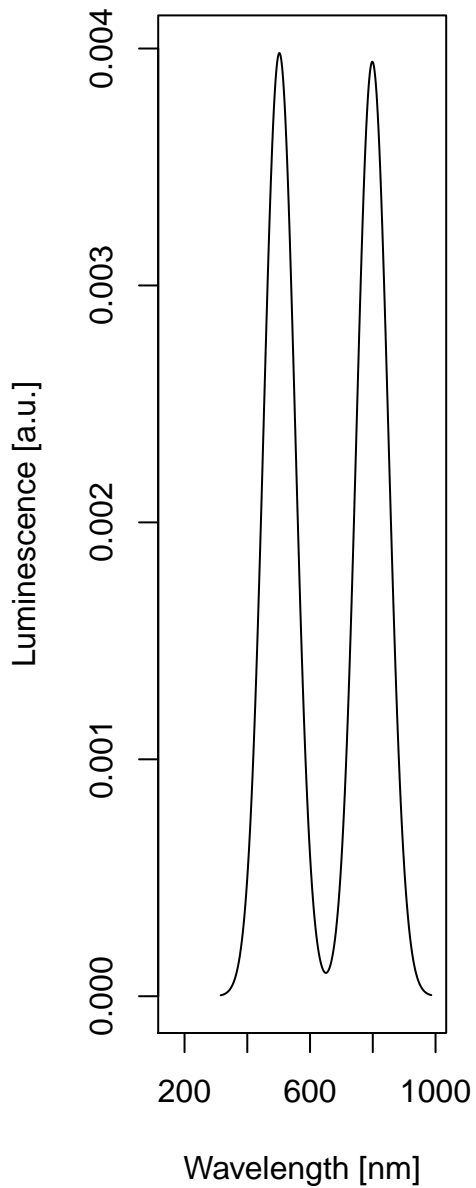
help("calc_WodaFuchs2008")

gSGC and resulting De





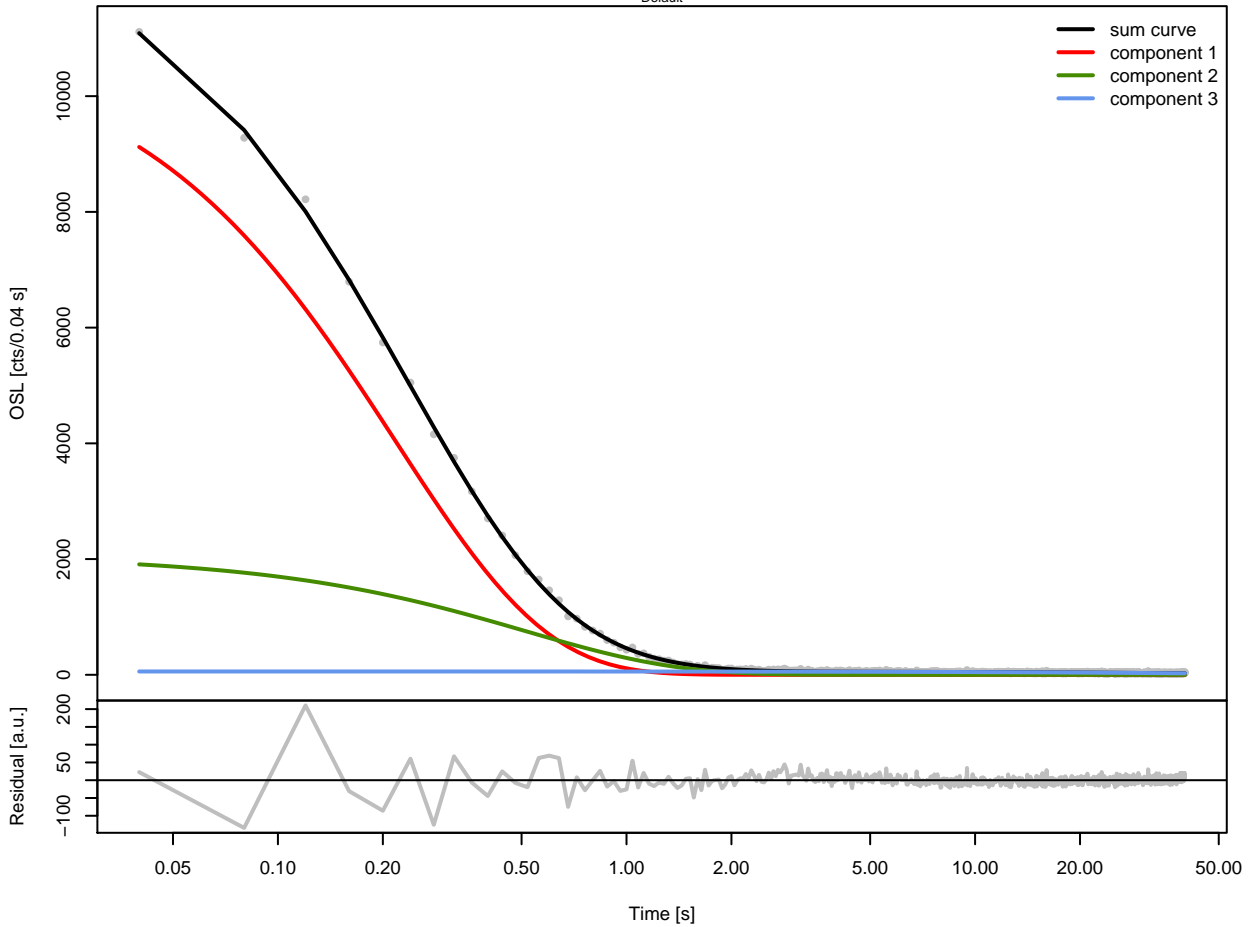
help("convert_Wavelength2Energy")



[help\("convert_Wavelength2Energy"\)](#)

CW Curve Fit

Default



Component contribution to sum curve



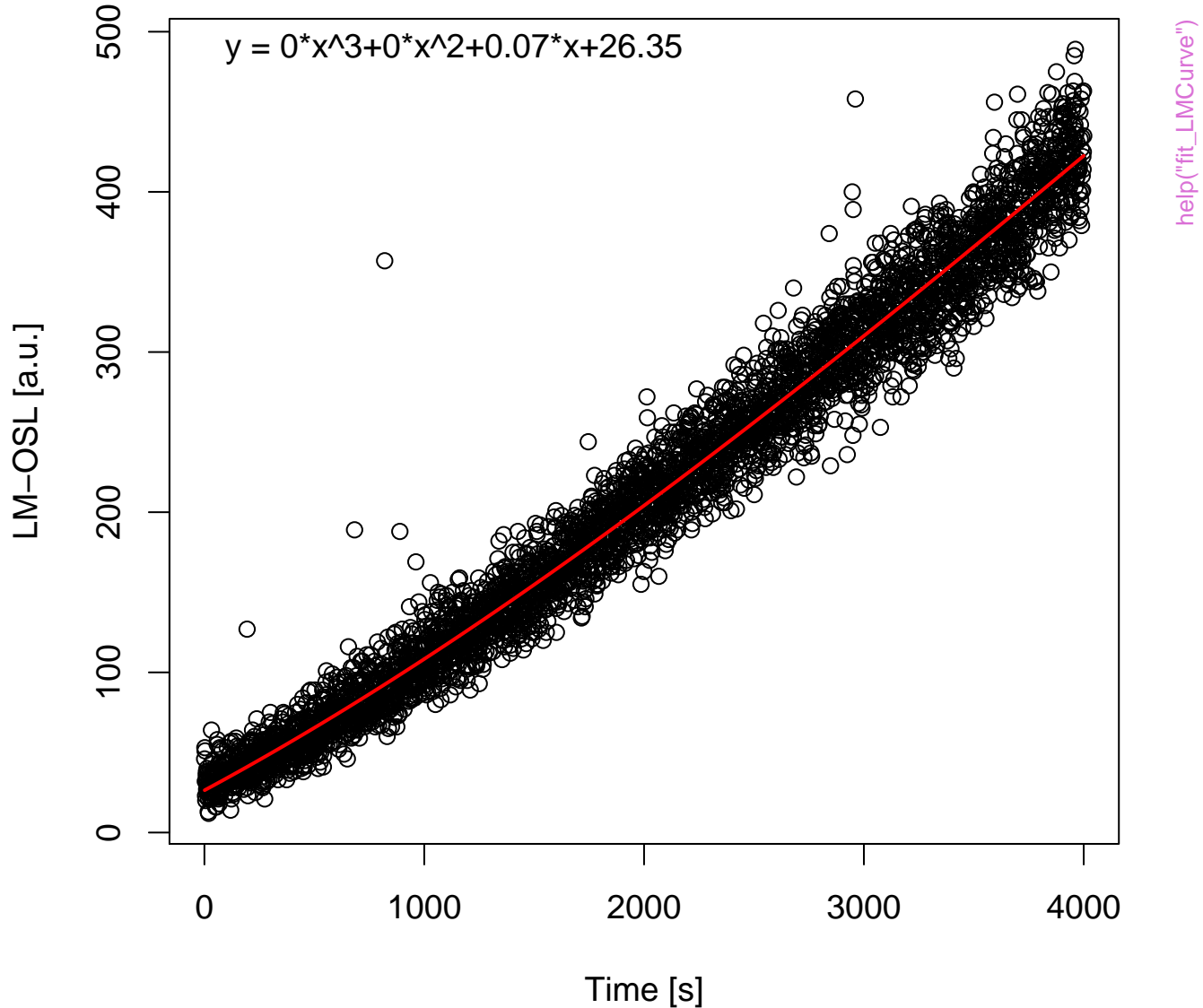
Default



Component contribution to sum curve



Background



Default



Component contribution to sum curve

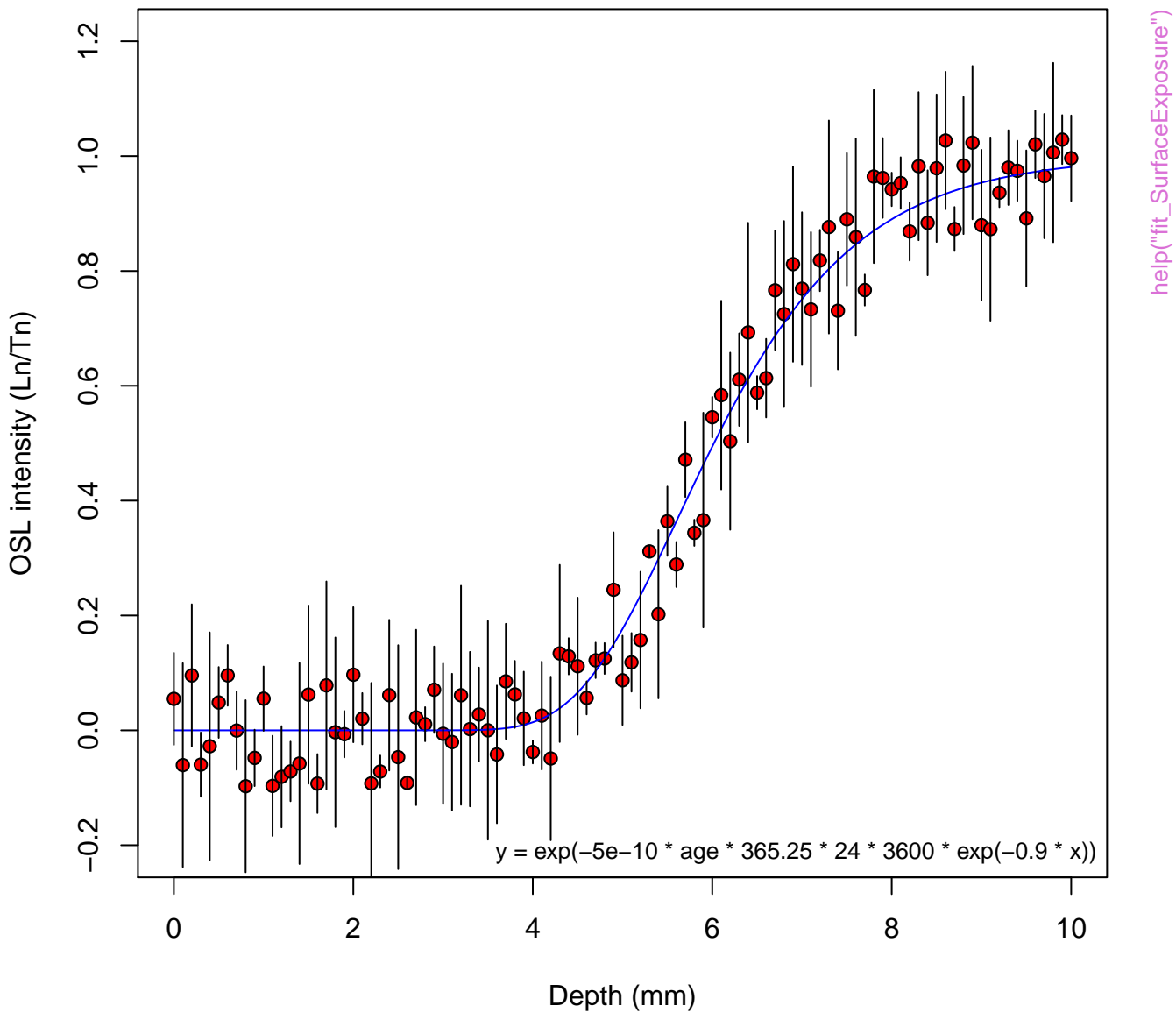


Default

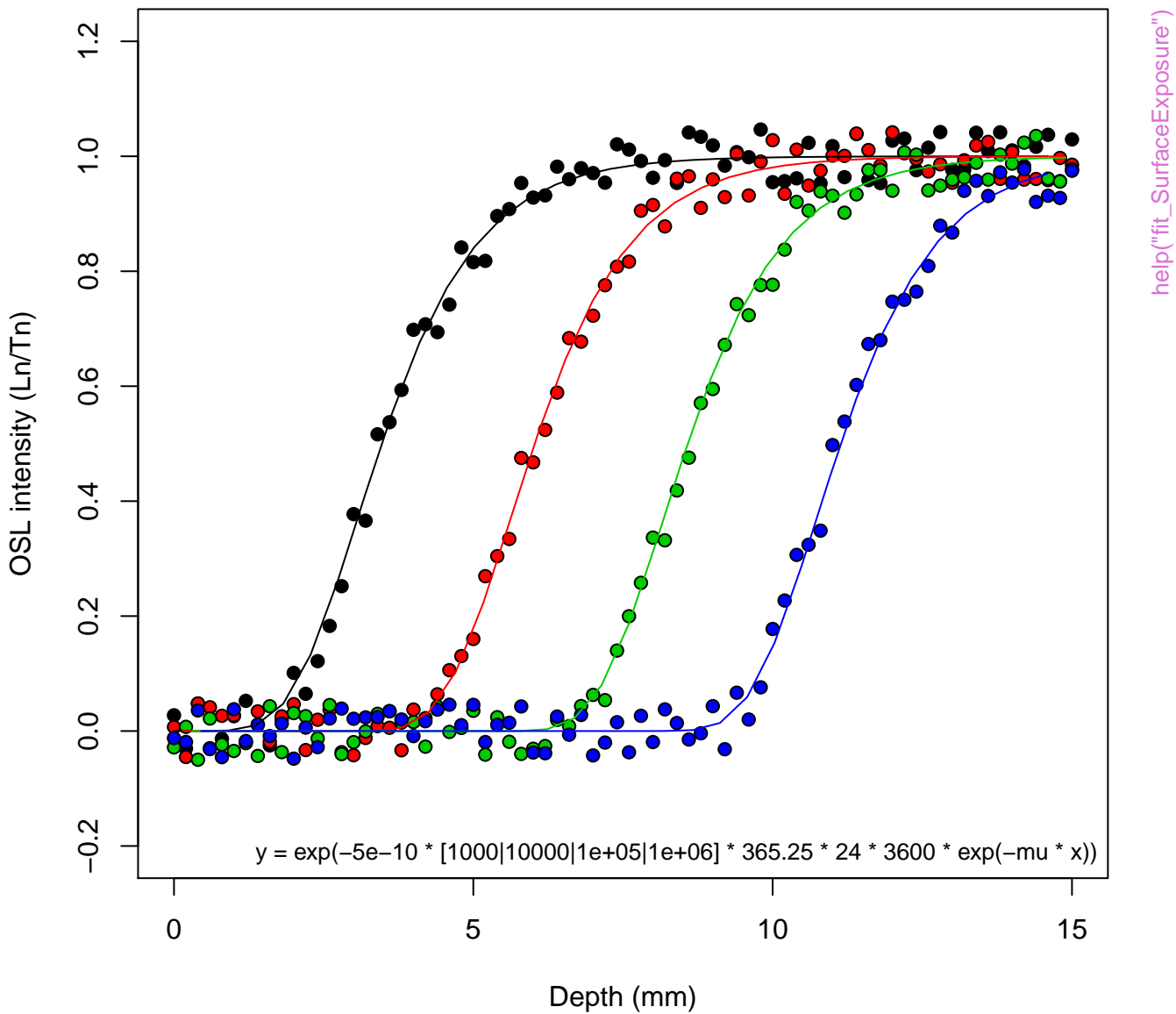


Component contribution to sum curve











Thermal quenching

n.MC = 0

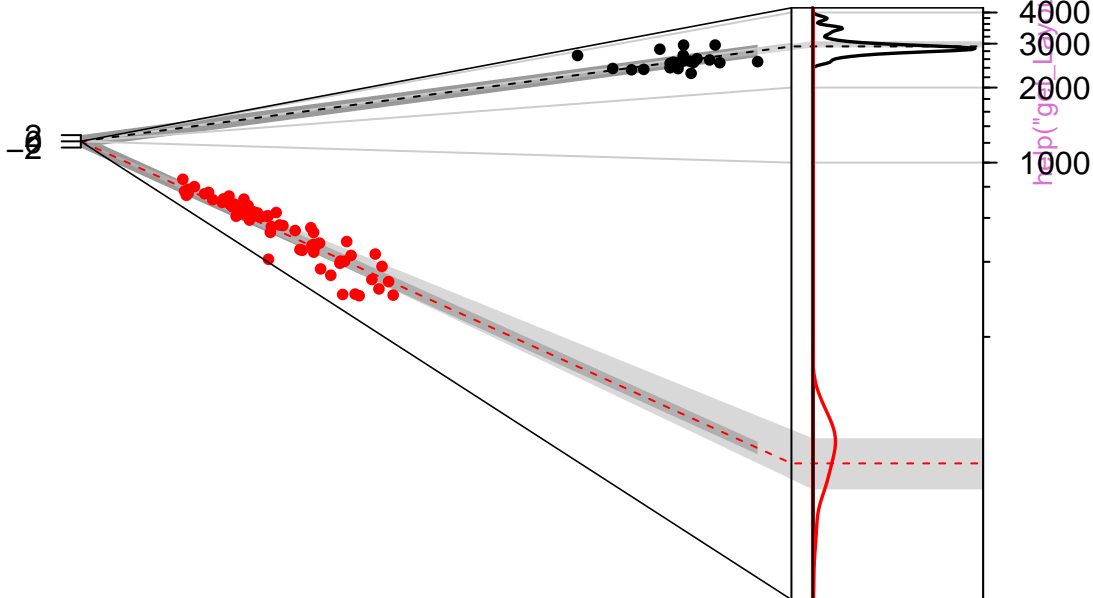


D_e distribution

n = 25 | in 2 sigma = 68 %

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

10

5

3.3

0

10

20

30

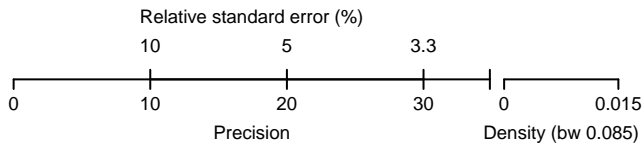
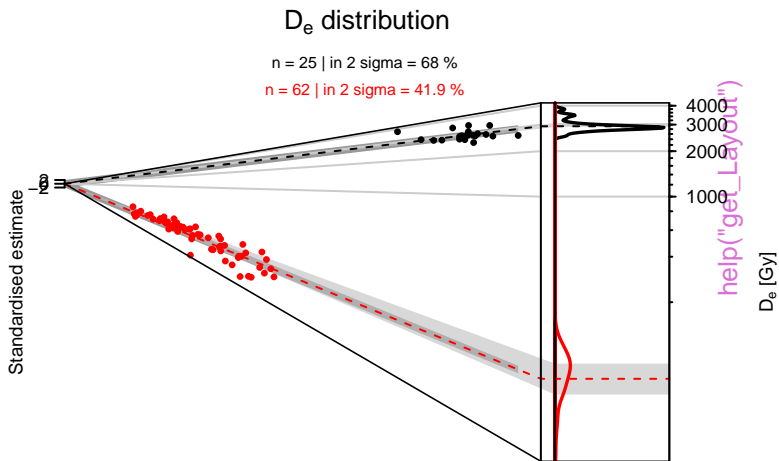
0.015

Precision

Density (bw 0.085)

D_e [Gy]

help("get_Layout")



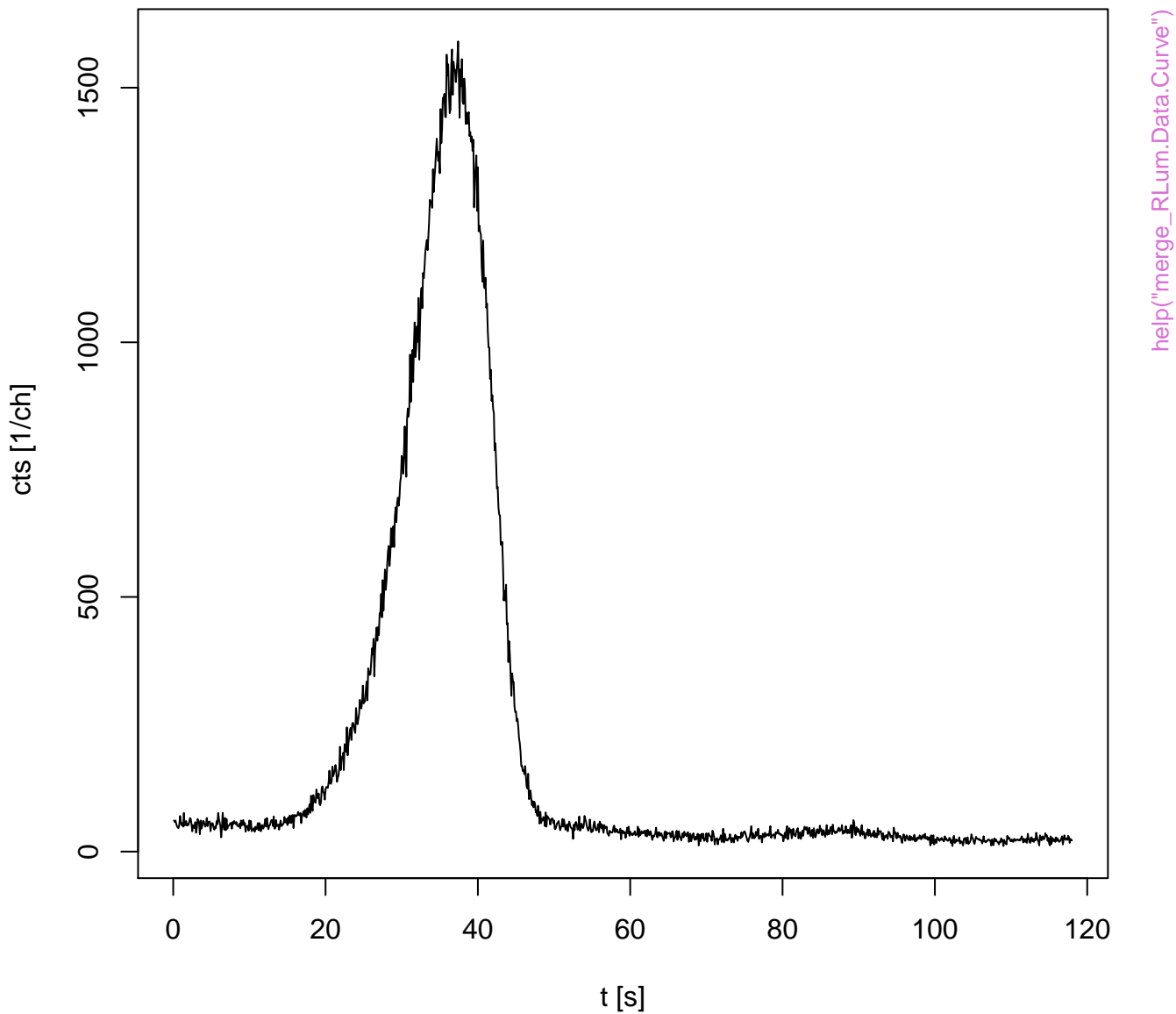
Profile log likelihood for σ_{OD}



TL (UUVIS)



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

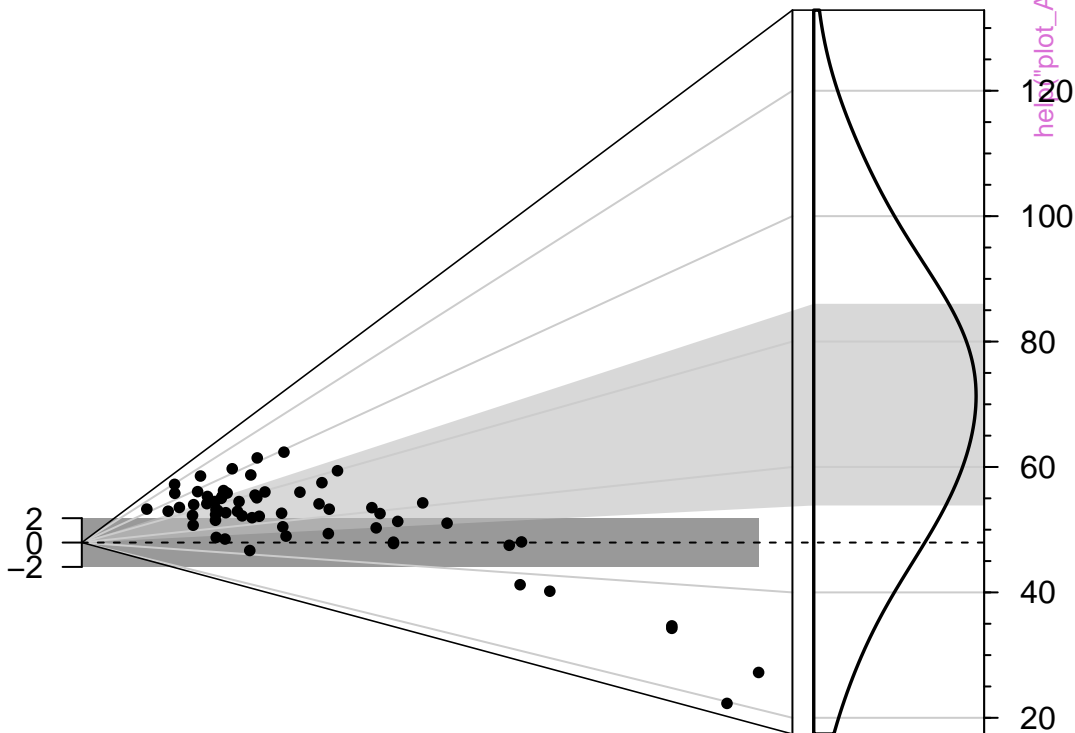
Density (bw 0.15)

help("plot_AbanicoPlot")

D_e distribution

n = 62 | in 2 sigma = 24.2 %

Standardised estimate



Standard error

10

5

3.3

2.5

2

0.0

0.1

0.2

0.3

0.4

0.5

0.016

Precision

Density (bw 11.795)

D_e [Gy]

help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

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)

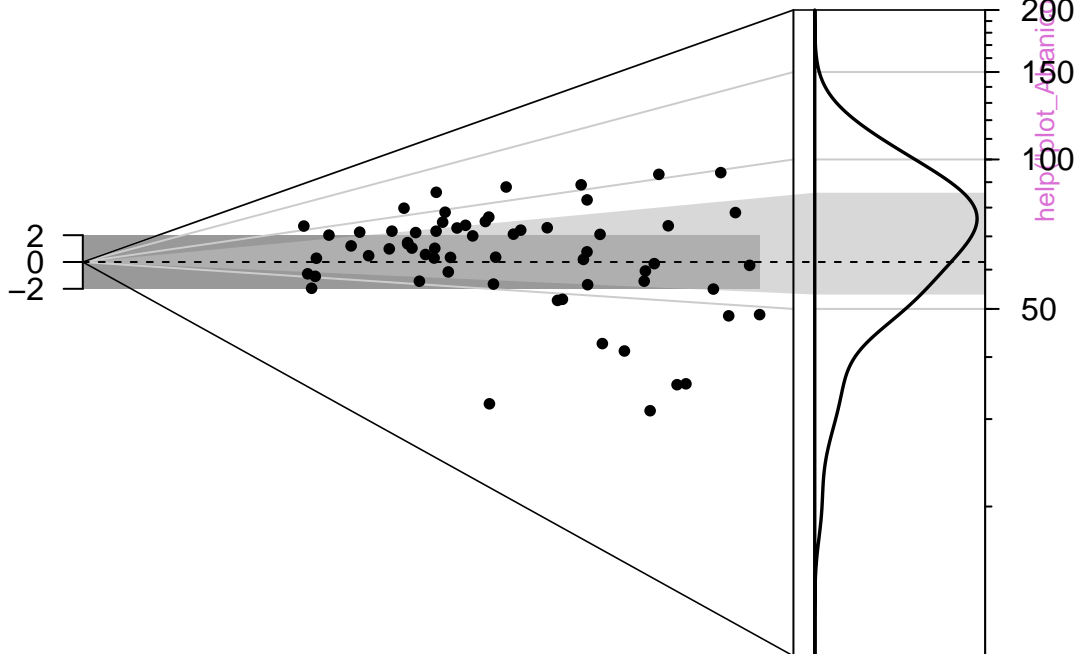
help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

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

0.016

Precision

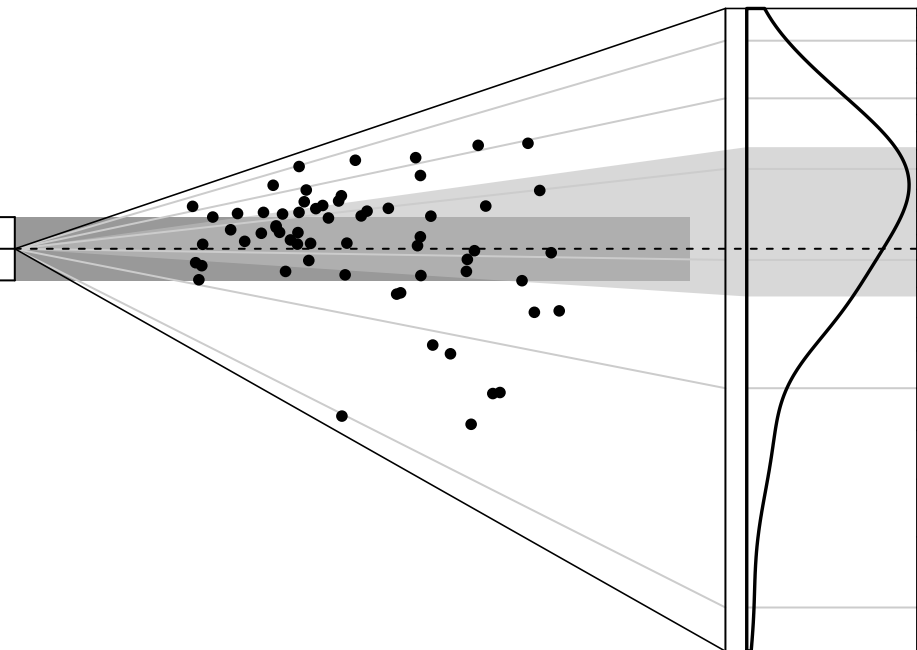
Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate

2
0
-2



help("plot_AbanicoPlot")

D_e [Gy]

help("plot_AbanicoPlot")

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)

help("plot_AbanicoPlot")

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D_e [Gy]

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

n

15

0

5

10

15

Precision

D_e [Gy]

120

100

80

60

40

20

0

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

380

400

420

440

460

480

500

520

540

560

580

600

620

640

660

680

700

720

740

760

780

800

820

840

860

880

900

920

940

960

980

1000

1020

1040

1060

1080

1100

1120

1140

1160

1180

1200

1220

1240

1260

1280

1300

1320

1340

1360

1380

1400

1420

1440

1460

1480

1500

1520

1540

1560

1580

1600

1620

1640

1660

1680

1700

1720

1740

1760

1780

1800

1820

1840

1860

1880

1900

1920

1940

1960

1980

2000

2020

2040

2060

2080

2100

2120

2140

2160

2180

2200

2220

2240

2260

2280

2300

2320

2340

2360

2380

2400

2420

2440

2460

2480

2500

2520

2540

2560

2580

2600

2620

2640

2660

2680

2700

2720

2740

2760

2780

2800

2820

2840

2860

2880

2900

2920

2940

2960

2980

3000

3020

3040

3060

3080

3100

3120

3140

3160

3180

3200

3220

3240

3260

3280

3300

3320

3340

3360

3380

3400

3420

3440

3460

3480

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3700

3720

3740

3760

3780

3800

3820

3840

3860

3880

3900

3920

3940

3960

3980

4000

4020

4040

4060

4080

4100

4120

4140

4160

4180

4200

4220

4240

4260

4280

4300

4320

4340

4360

4380

4400

4420

4440

4460

4480

4500

4520

4540

4560

4580

4600

4620

4640

4660

4680

4700

4720

4740

4760

4780

4800

4820

4840

4860

4880

4900

4920

4940

4960

4980

5000

5020

5040

5060

5080

5100

5120

5140

5160

5180

5200

5220

5240

5260

5280

5300

5320

5340

5360

5380

5400

5420

5440

5460

5480

5500

5520

5540

5560

5580

5600

5620

5640

5660

5680

5700

5720

5740

5760

5780

5800

5820

D_e distribution

n = 62 | in 2 sigma = 41.9 %

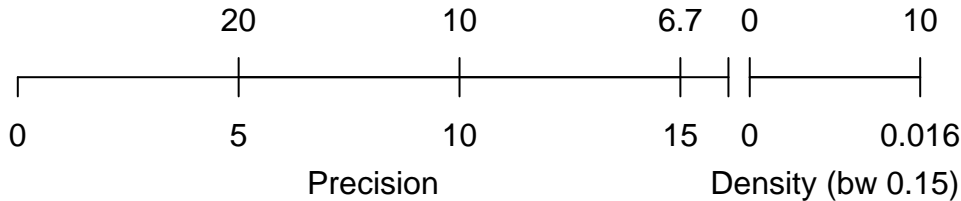
Standardised estimate



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)

help("plot_AbanicoPlot")

D_e distribution

n = 62 | in 2 sigma = 41.9 %



D_e distribution

n = 62 | in 2 sigma = 53.2 %

Standardised estimate



D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

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)

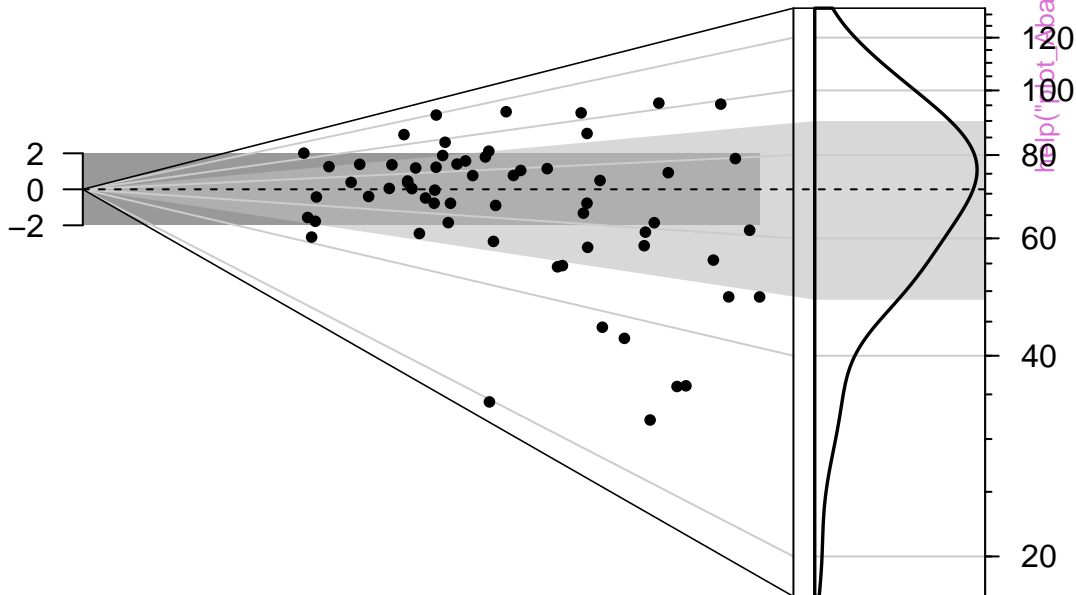
plot_2

help("plot_AbanicoPlot")

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

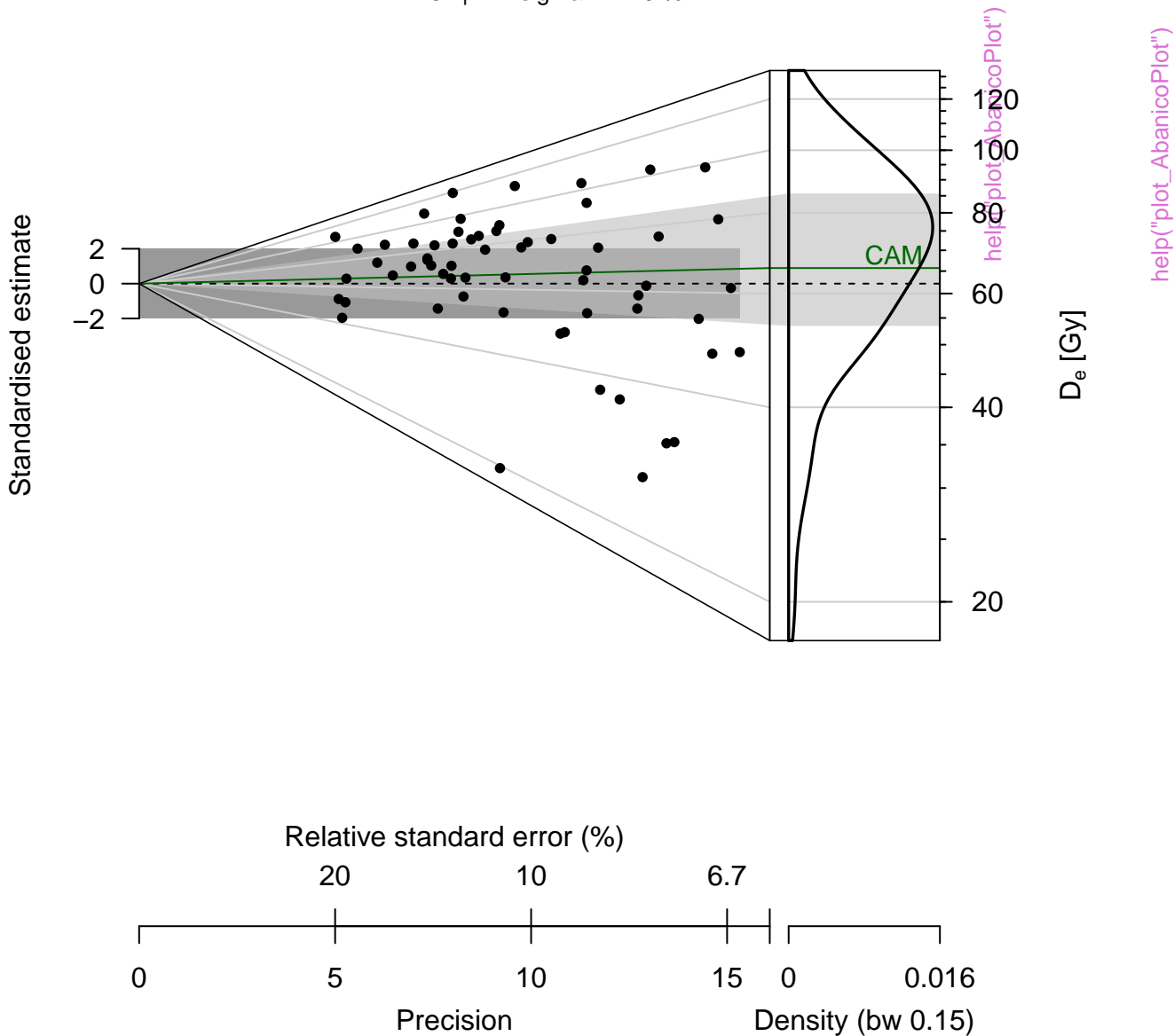
Density (bw 0.15)

D_e [Gy]

help("plot_AbanicoPlot")

D_e distribution

n = 62 | in 2 sigma = 41.9 %

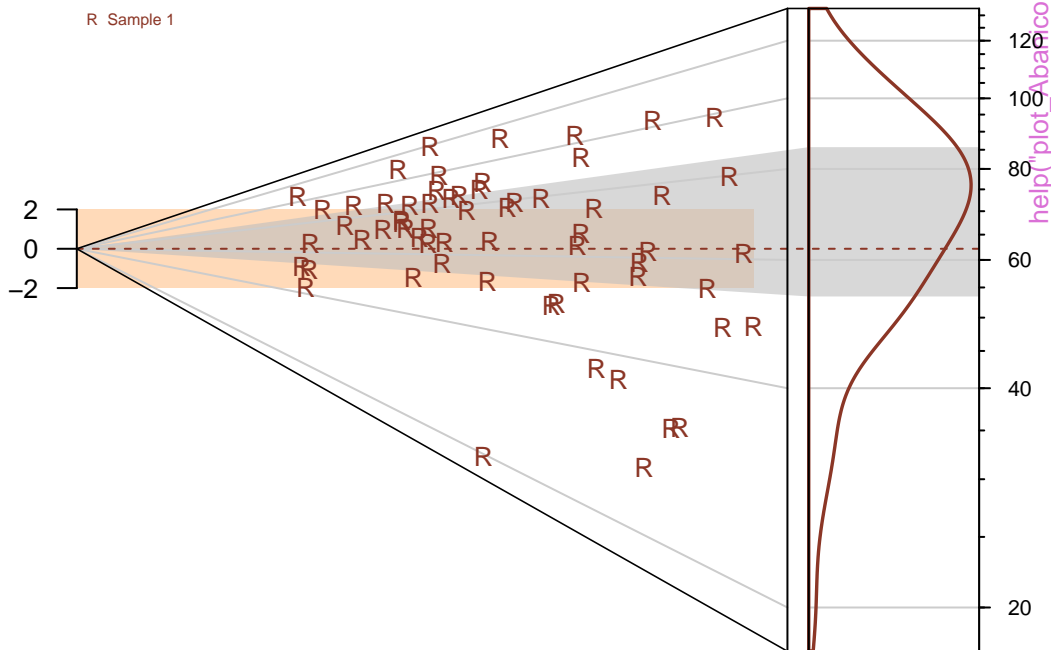


D_e distribution

n = 62 | in 2 sigma = 41.9 %

R Sample 1

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

0

D_e [Gy]

20 40 60 80 100 120

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

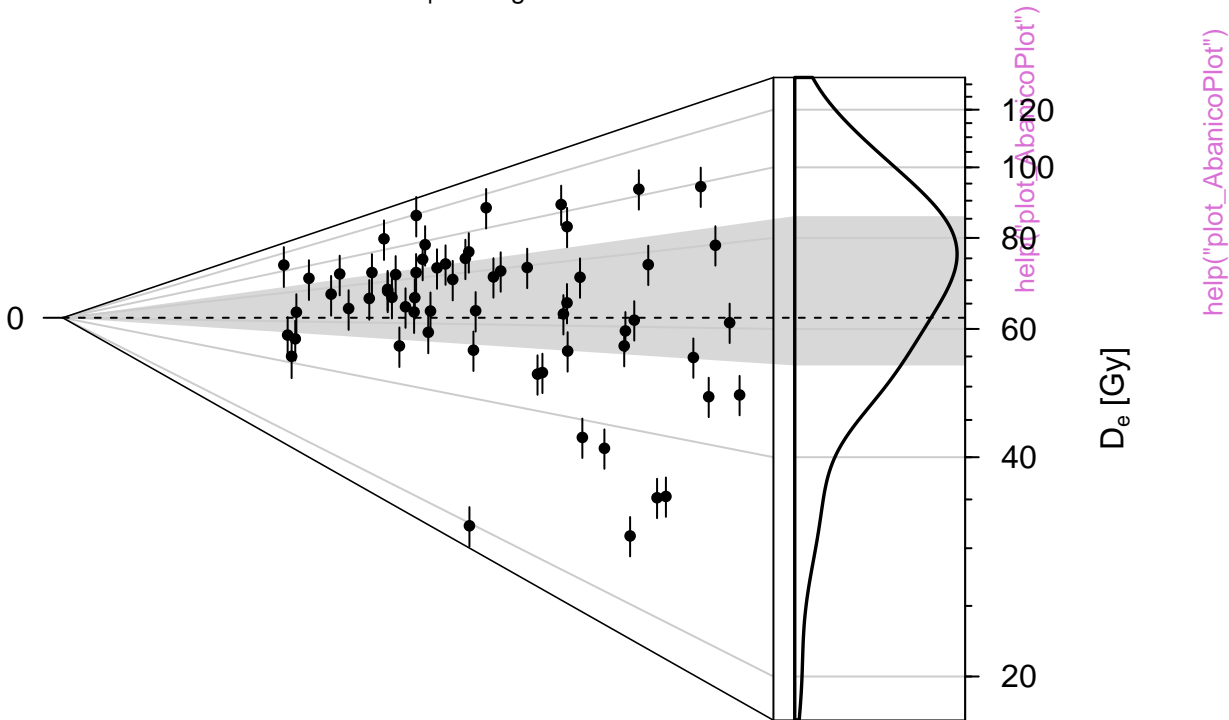
help("plot_AbanicoPlot")

help("plot_AbanicoPlot")



D_e distribution

n = 62 | in 2 sigma = 41.9 %

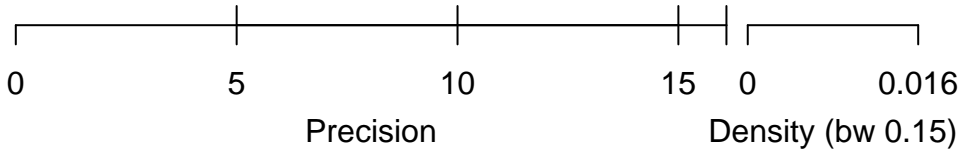


Relative standard error (%)

20

10

6.7

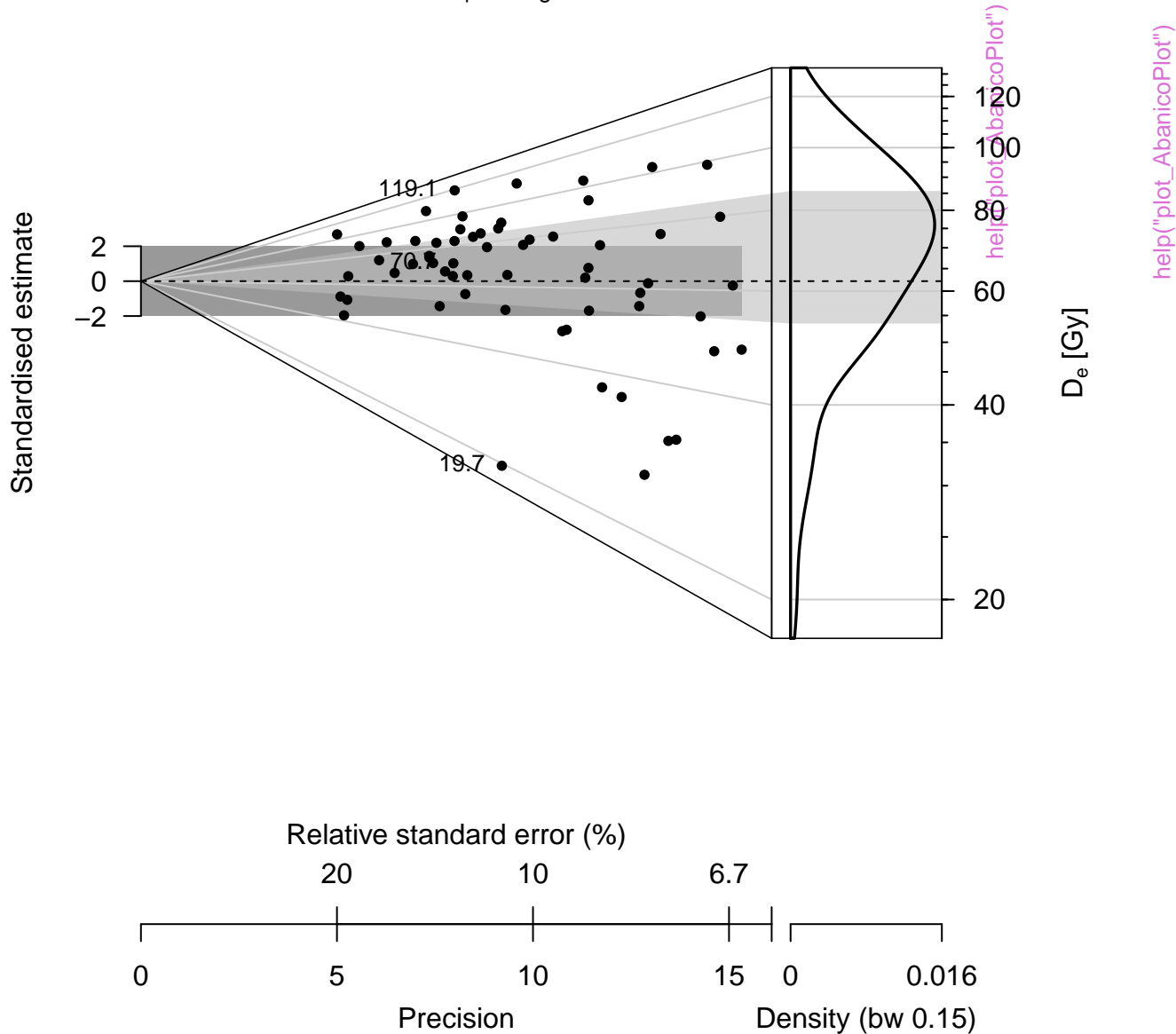


D_e distribution

n = 62 | in 2 sigma = 41.9 %



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)

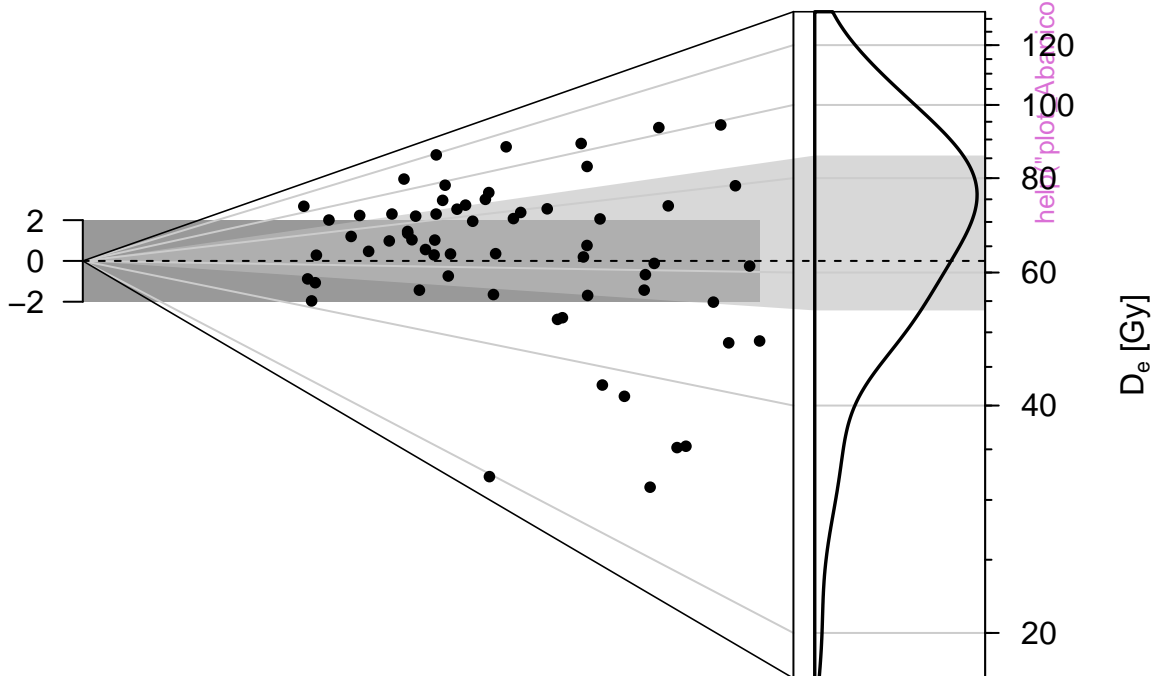
help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

D_e distribution

median = 71.07

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 %

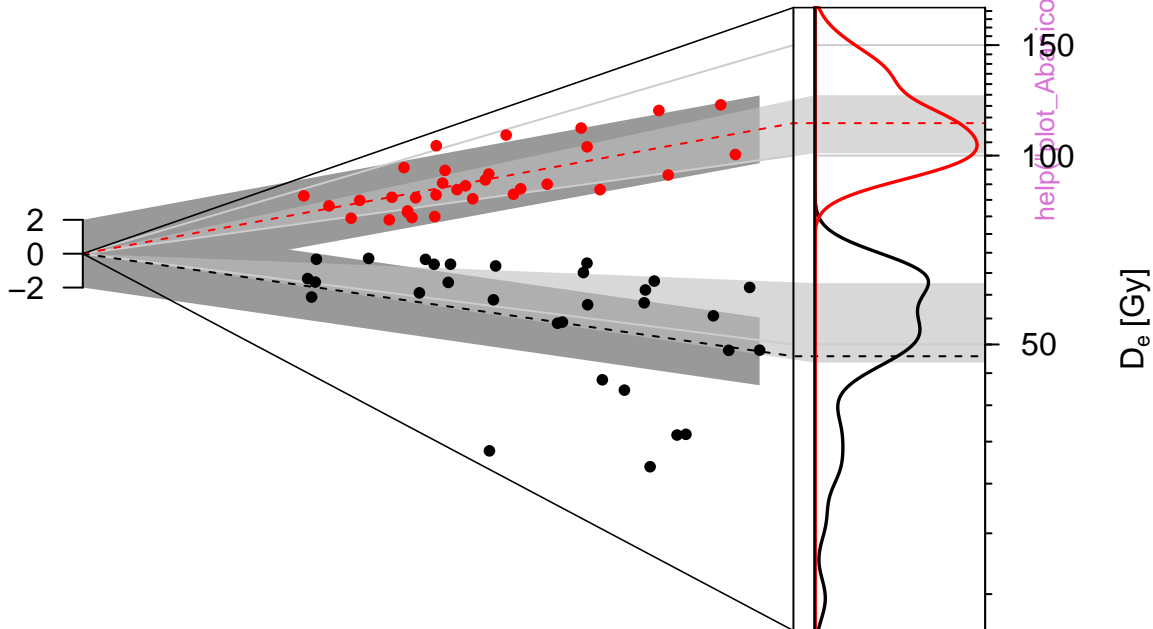


D_e distribution

n = 30 | in 2 sigma = 46.7 %

n = 32 | in 2 sigma = 87.5 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.032

Precision

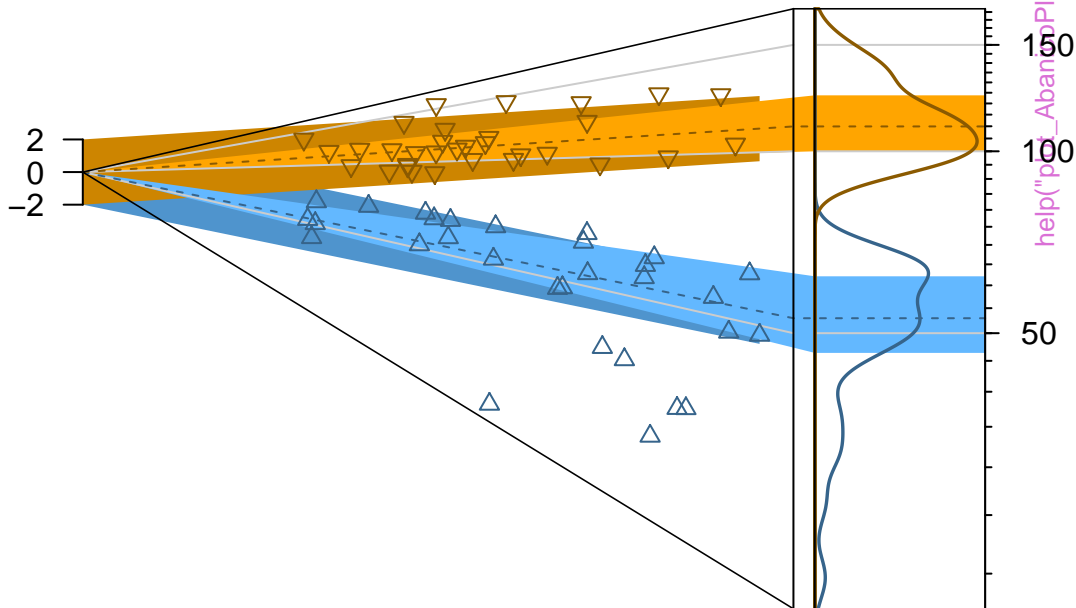
Density (bw 0.074)

D_e distribution

n = 30 | in 2 sigma = 70 % | median = 52.94

n = 32 | in 2 sigma = 84.4 % | median = 109.93

Standardised estimate



D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

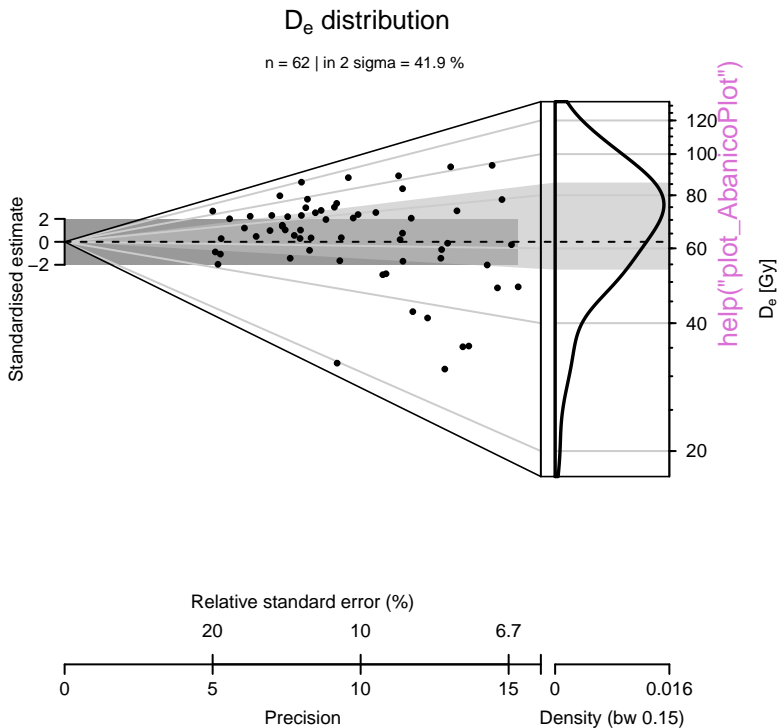
10

15

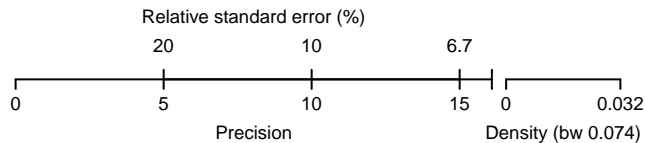
0.032

Precision

Density (bw 0.074)



help("plot_AbanicoPlot")



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

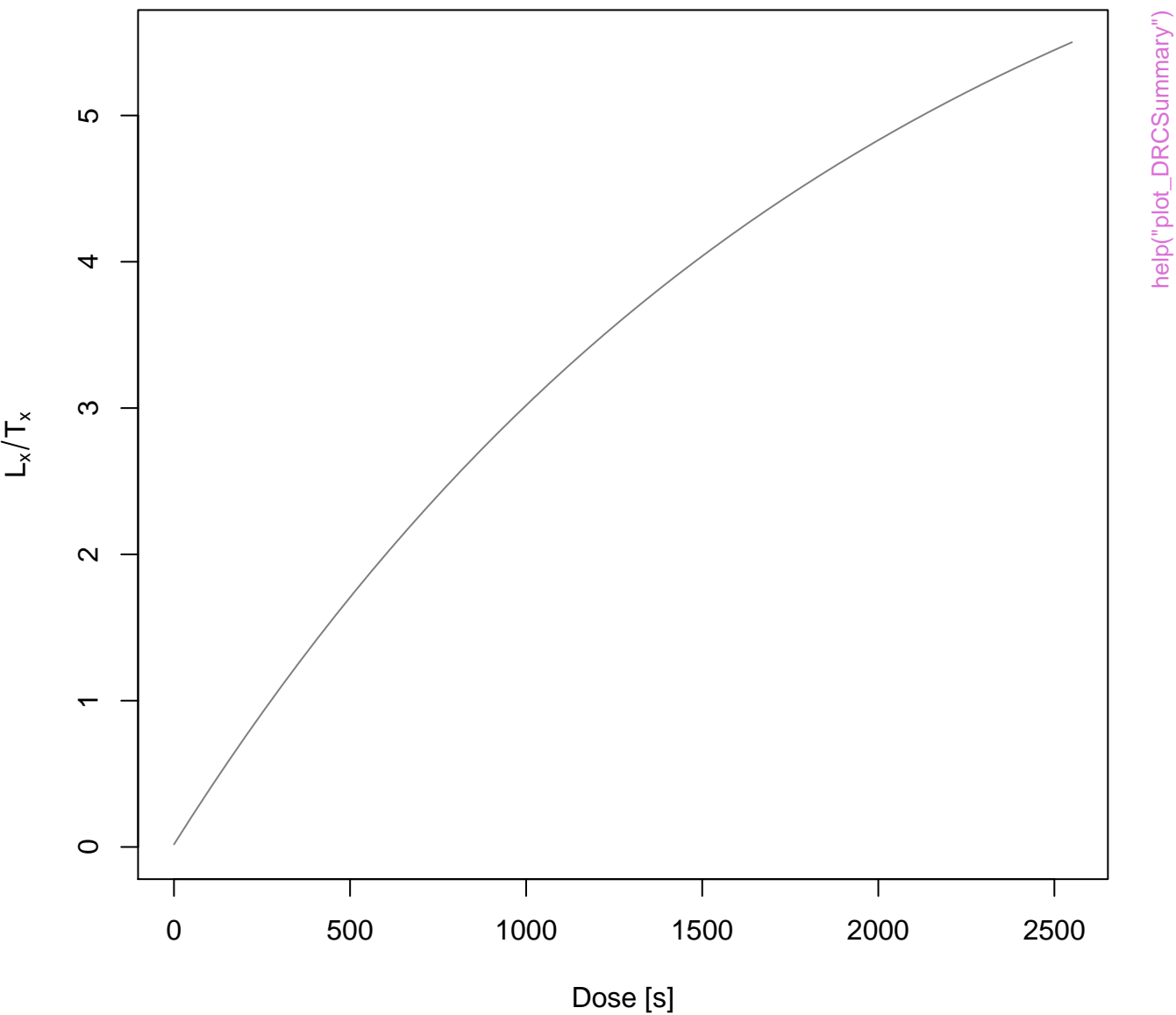
15

0.016

Precision

Density (bw 0.15)

DRC Summary



Dose recovery test

Example data



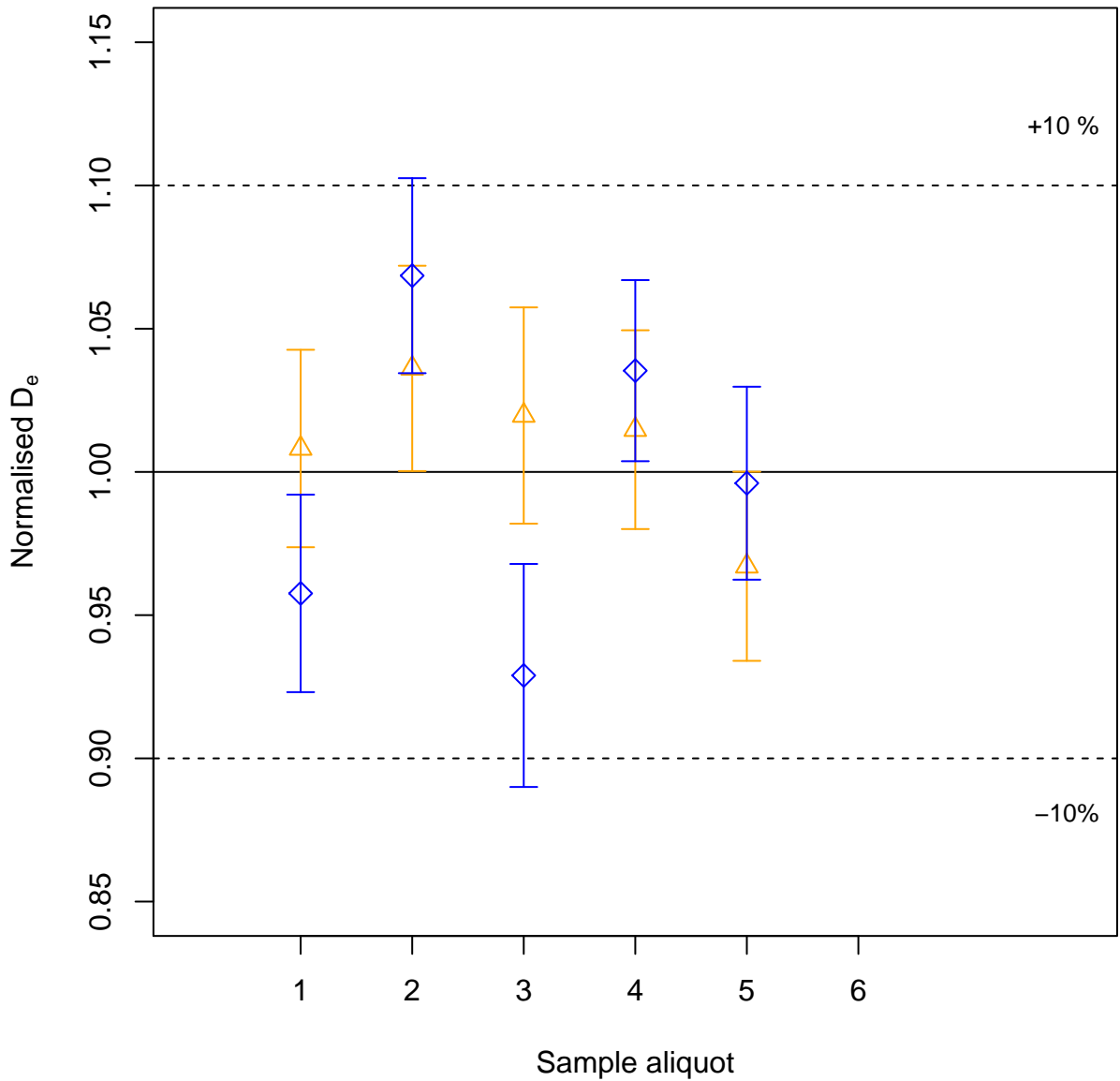
Dose recovery test



Dose recovery test



Dose recovery test



Dose recovery test



Dose recovery test

n = 5

n = 5



Dose recovery test

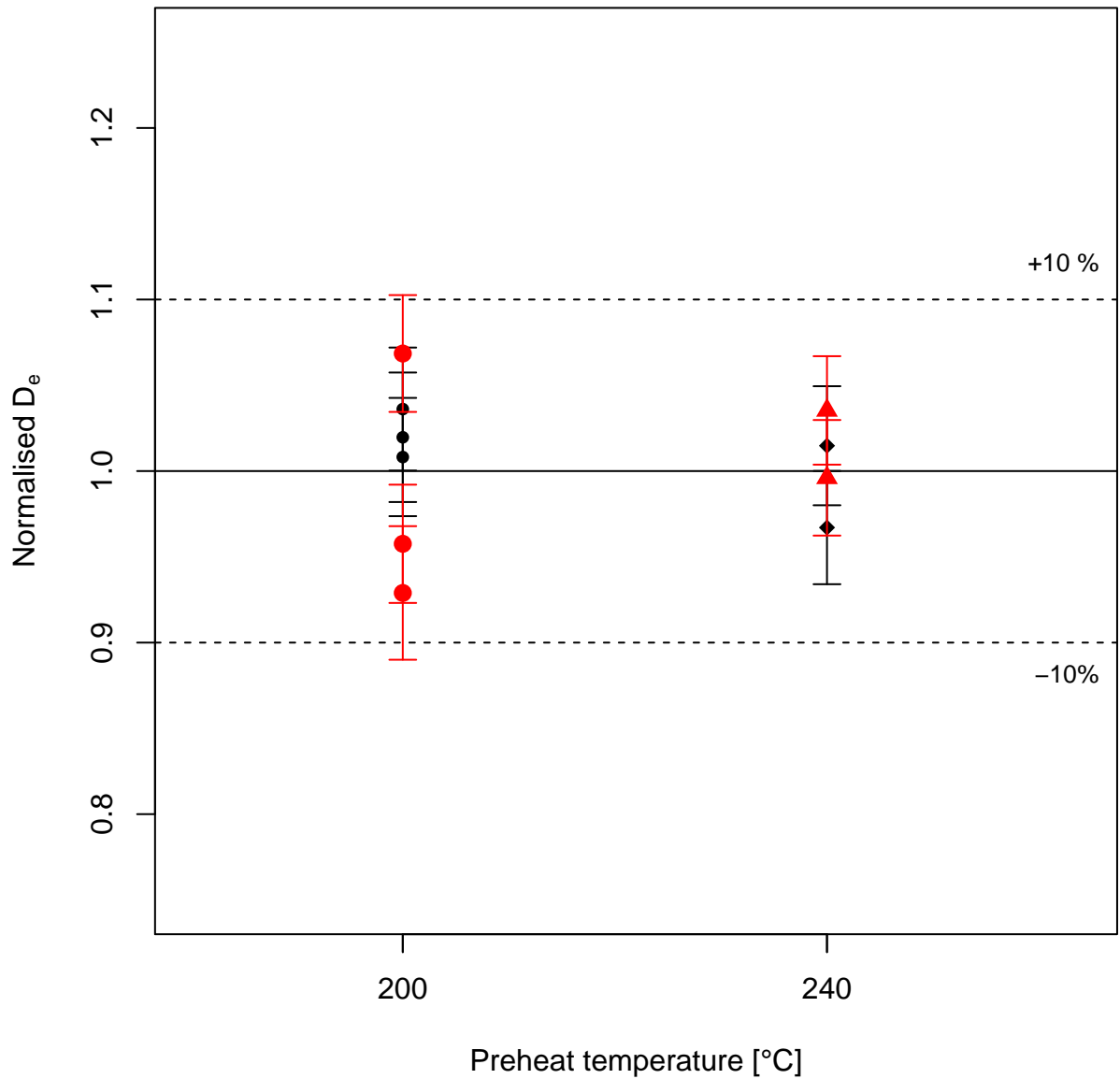


Dose recovery test

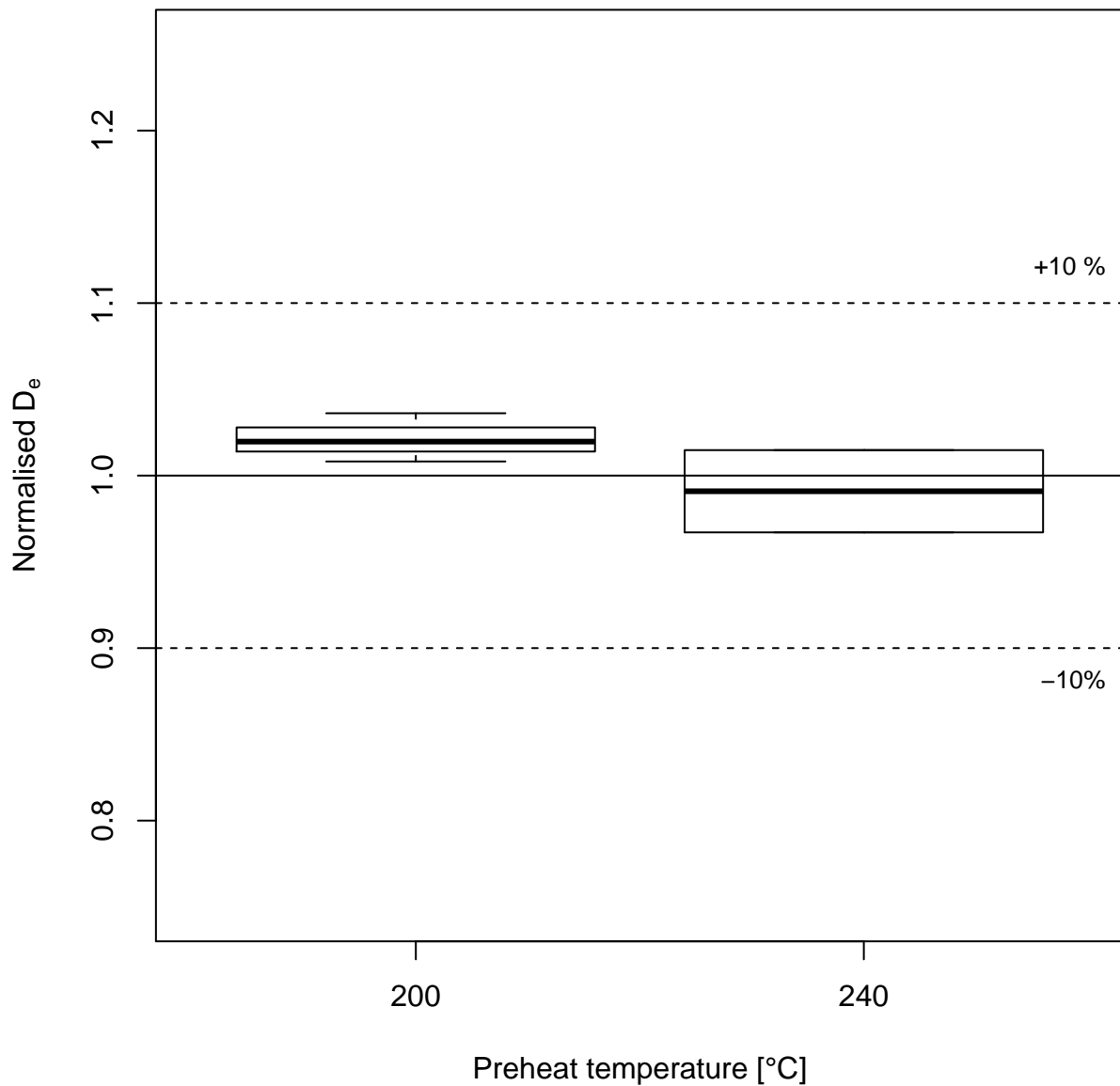
Example data



Dose recovery test



Dose recovery test



Filter Combination



Filter Combination





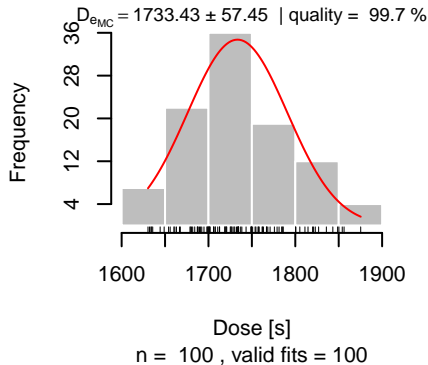
help("plot_FilterCombinations")

Growth curve

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



D_e from MC simulation



Test dose response



Growth curve

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



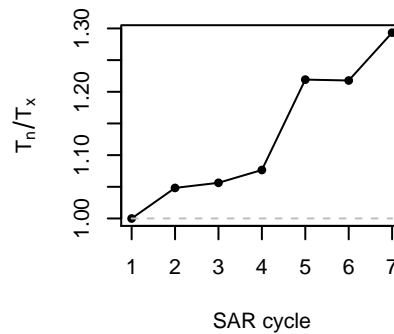
D_e from MC simulation

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



n = 100 , valid fits = 100

Test dose response



Growth curve

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



D_e from MC simulation

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



Test dose response





help("plot_GrowthCurve")

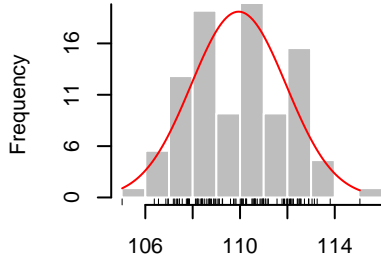
Growth curve

$D_e = 109.74 \pm 2$ | fit: EXP



D_e from MC simulation

$D_{eMC} = 109.94 \pm 2$ | quality = 300.2 %



n = 100 , valid fits = 100

Test dose response



Growth curve



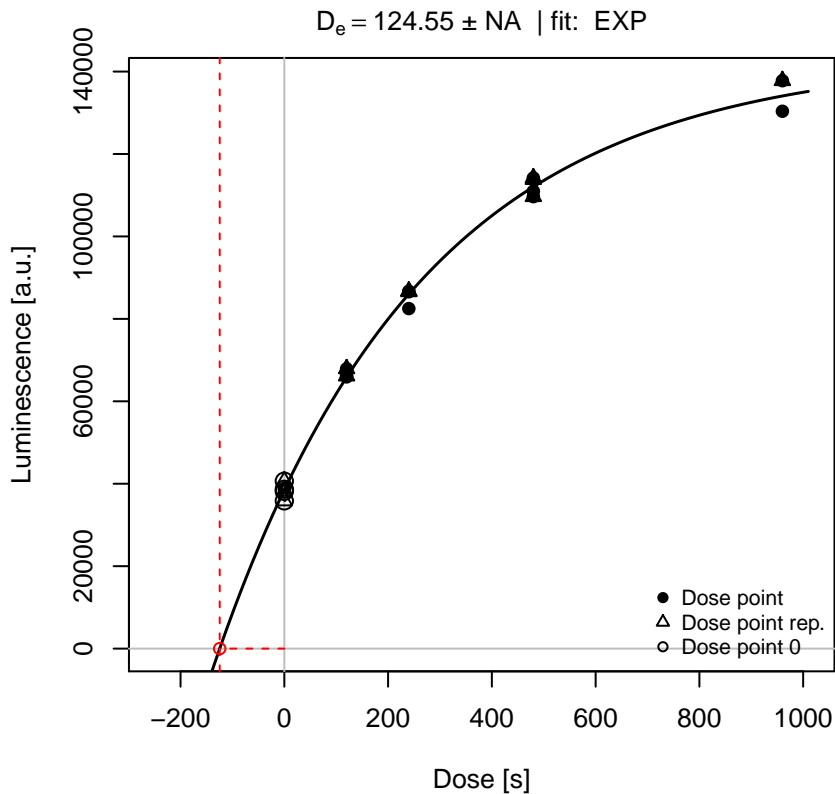
D_e from Monte Carlo simulation



Test dose response



Growth curve



D_e from Monte Carlo simulation



Test dose response



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 = 126.34 | skewness = 1.34 | in 2 sigma = 96 %



D_e distribution



D_e distribution



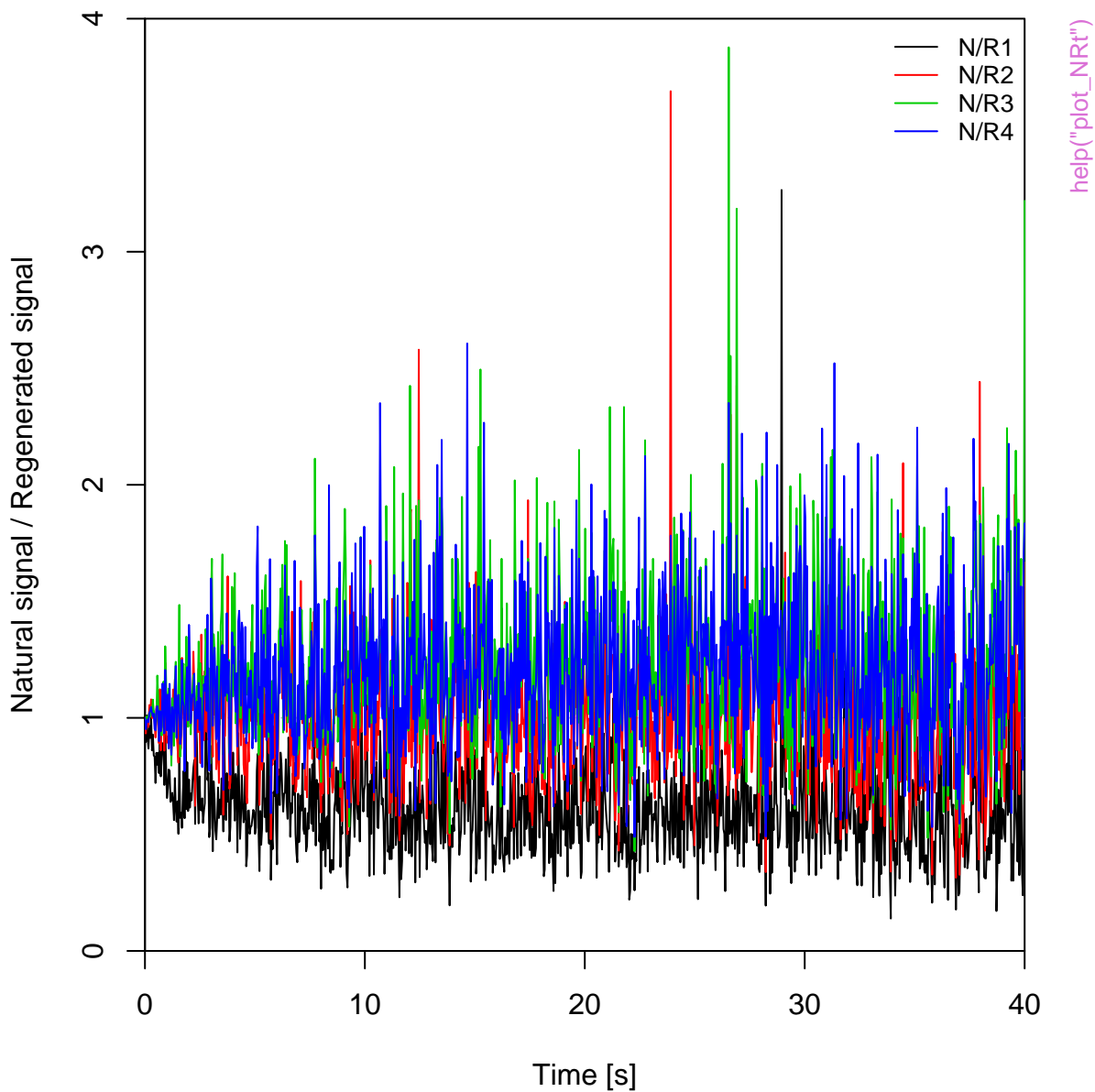
D_e distribution



D_e distribution



NR(t) Plot

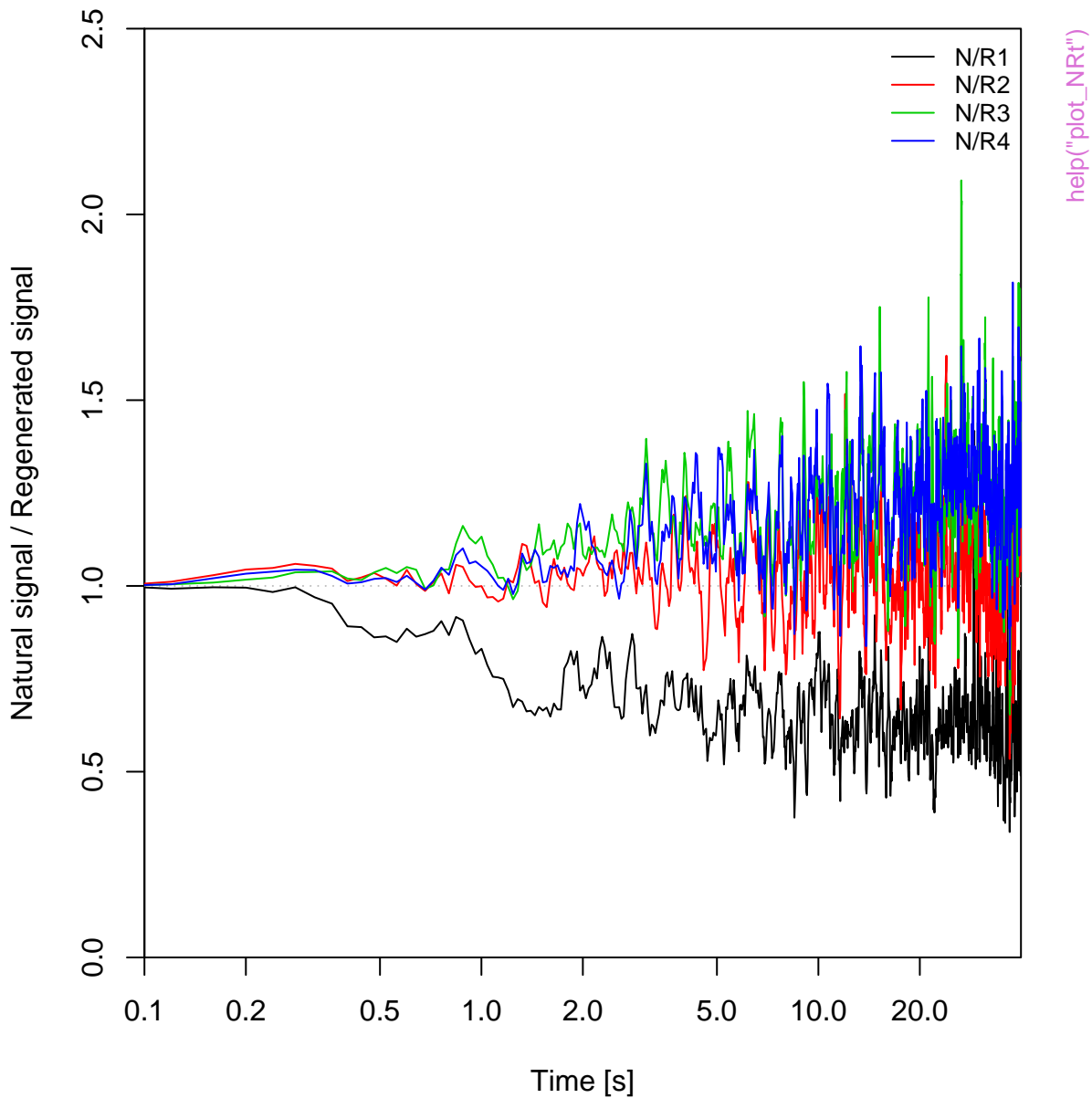


NR(t) Plot



help("plot_NRt")

NR(t) Plot



NR(t) Plot

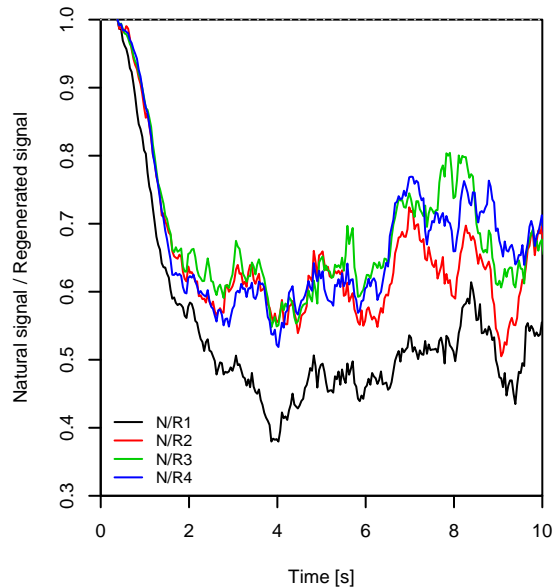


NR(t) Plot

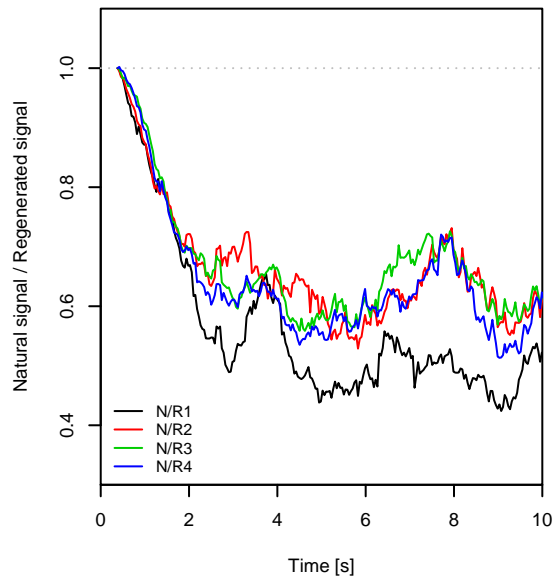


TnTx(t) Plot



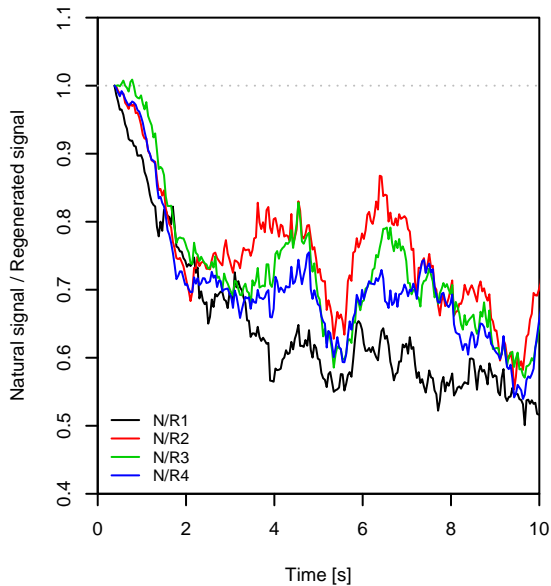
Aliquot #1**Aliquot #2**

help("plot_NRt")

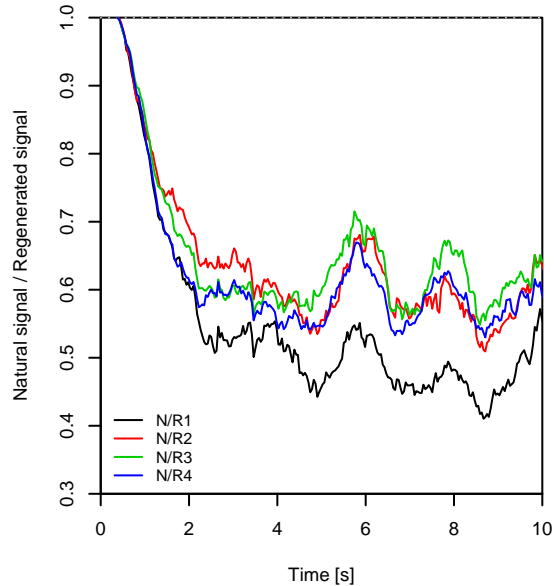
Aliquot #3**Aliquot #4**

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

Aliquot #9



Aliquot #10



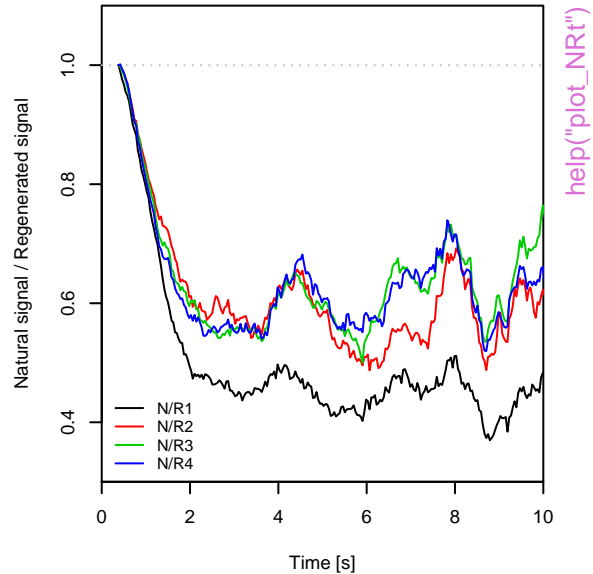
help("plot_NRt")

Aliquot #11



Aliquot #12

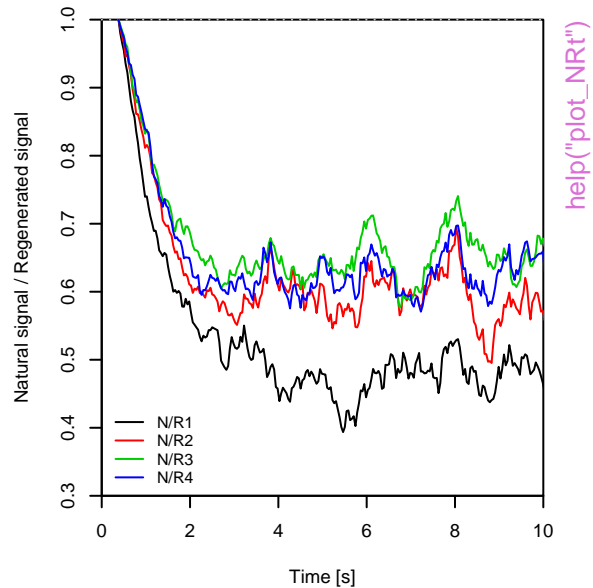


Aliquot #13**Aliquot #14****Aliquot #15****Aliquot #16**

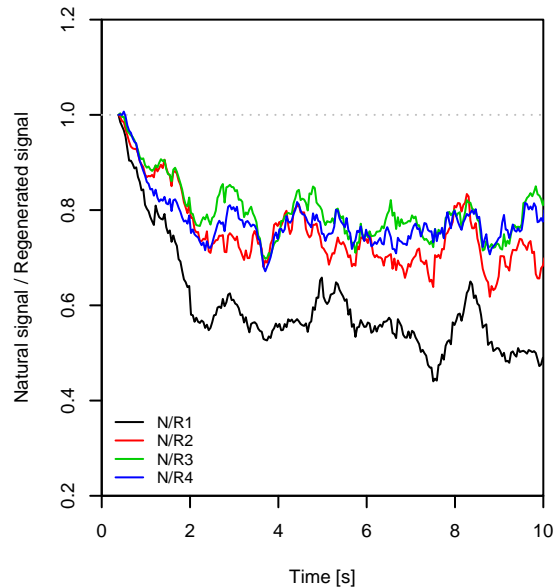
Aliquot #17**Aliquot #18**

help("plot_NRt")

Aliquot #19**Aliquot #20**

Aliquot #21**Aliquot #22**

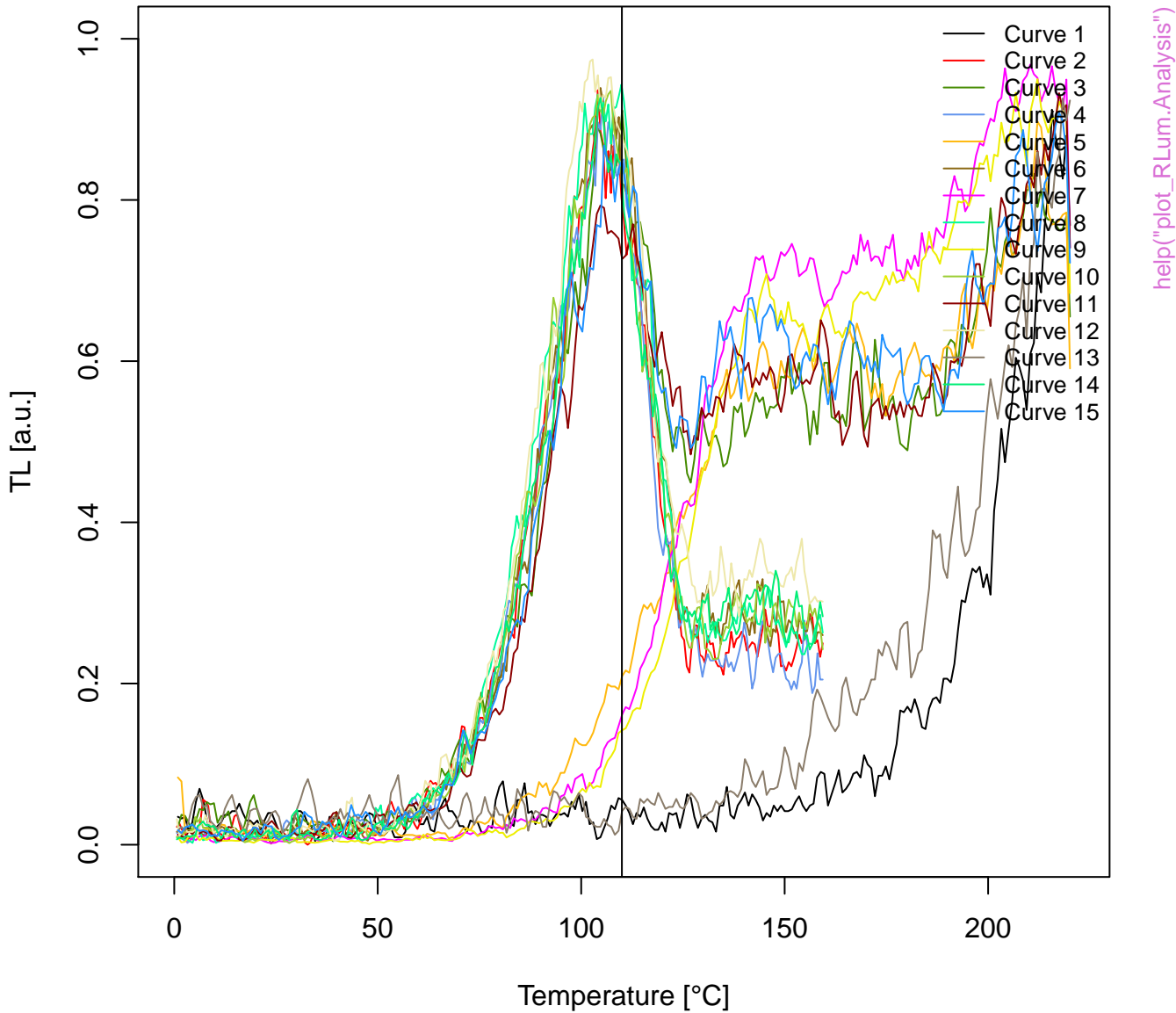
help("plot_NRt")

Aliquot #23**Aliquot #24**

TL combined



TL combined



unkown curve type



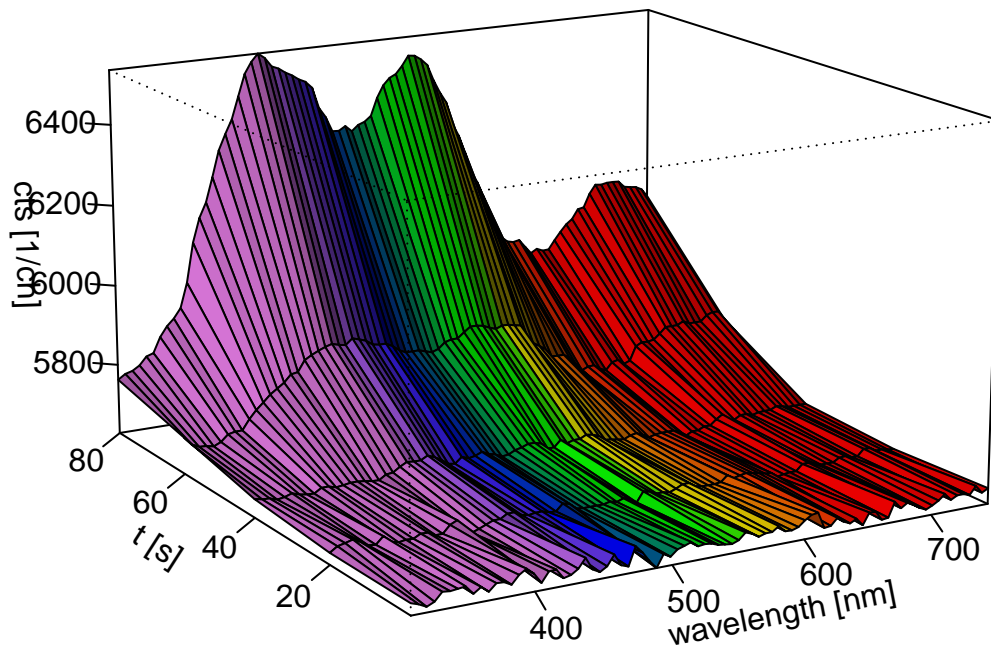
RLum.Data.Image



RLum.Data.Spectrum



RLum.Data.Spectrum



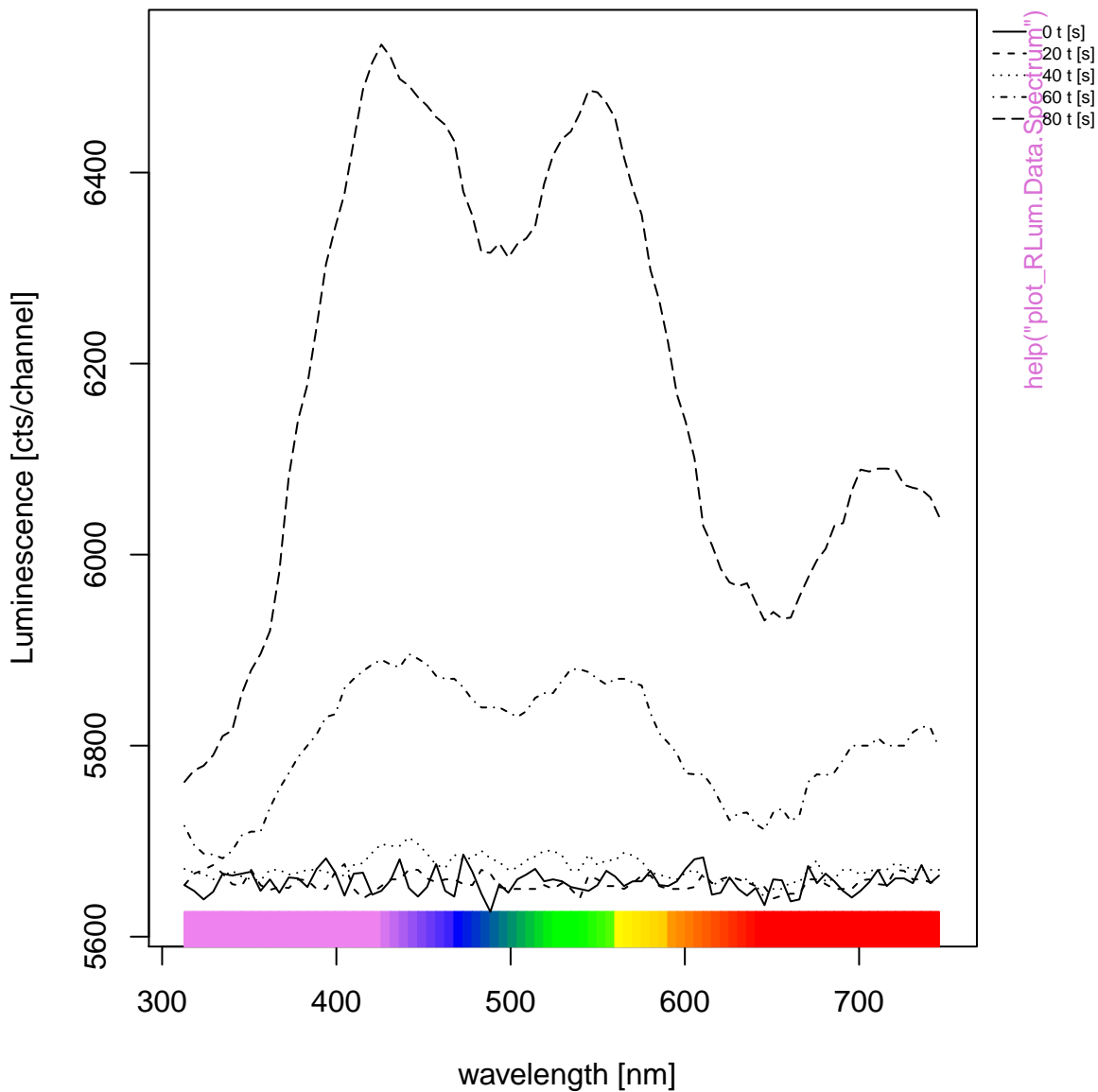
`help("plot_RLum.Data.Spectrum")`

RLum.Data.Spectrum



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

RLum.Data.Spectrum



unkown curve type



Likelihood profile: gamma



Likelihood profile: sigma

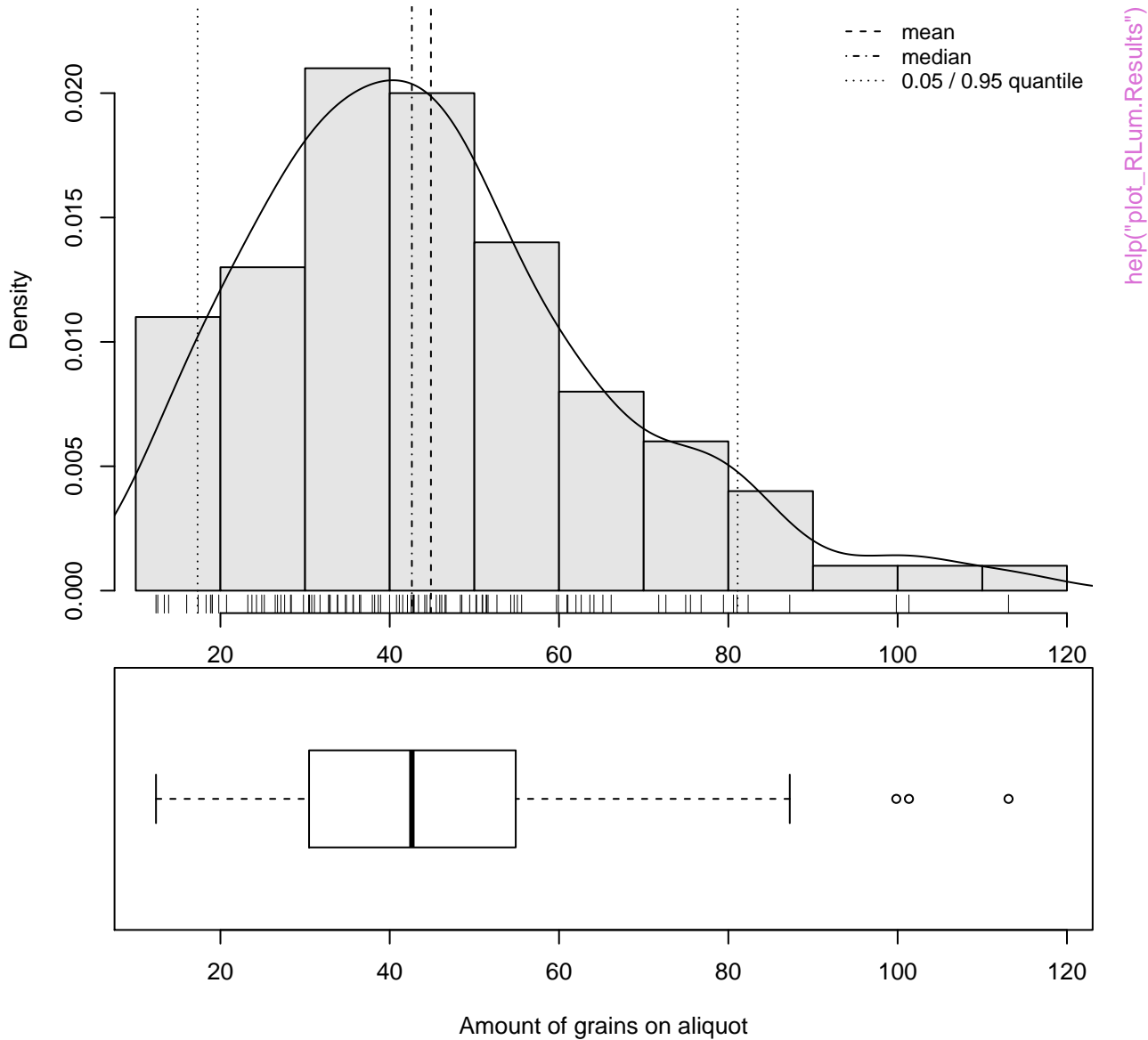


Likelihood profile: p0



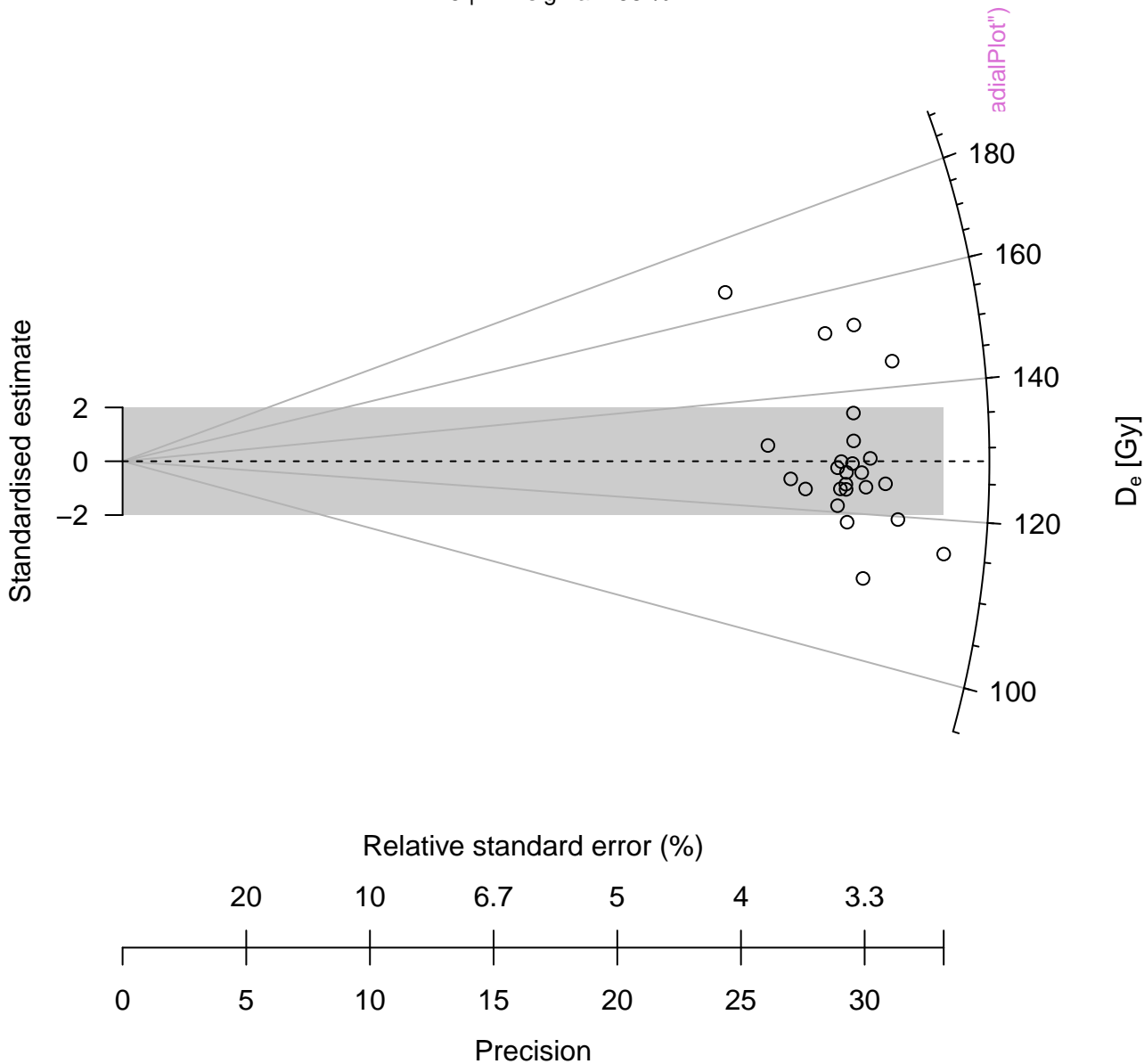
Monte Carlo Simulation

$$n = \left| \hat{\mu} = 45 \mid \hat{\sigma} = 21 \mid \frac{\hat{\sigma}}{\sqrt{n}} = 2 \mid v = 0.84 \right.$$



D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %



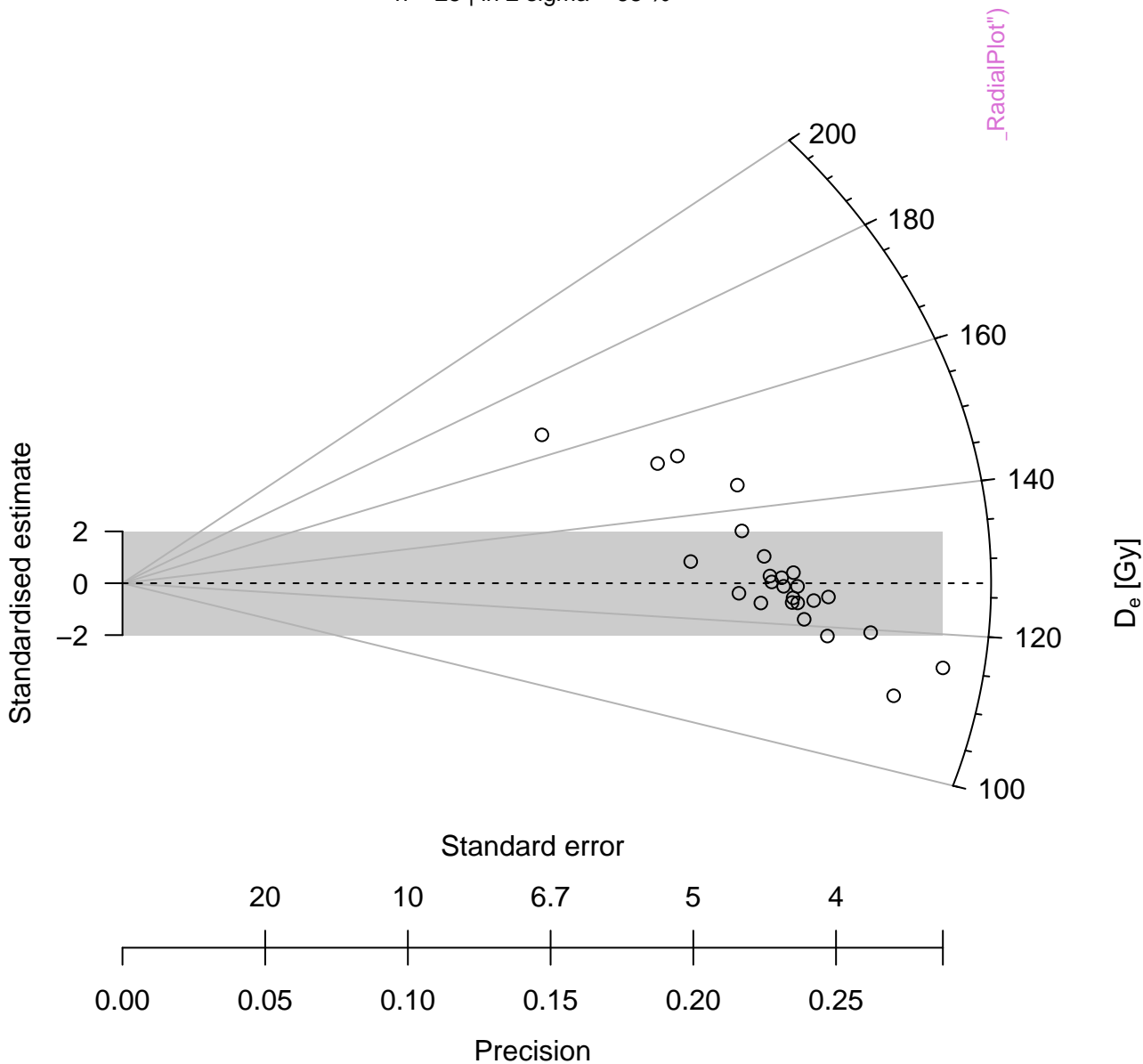
D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %



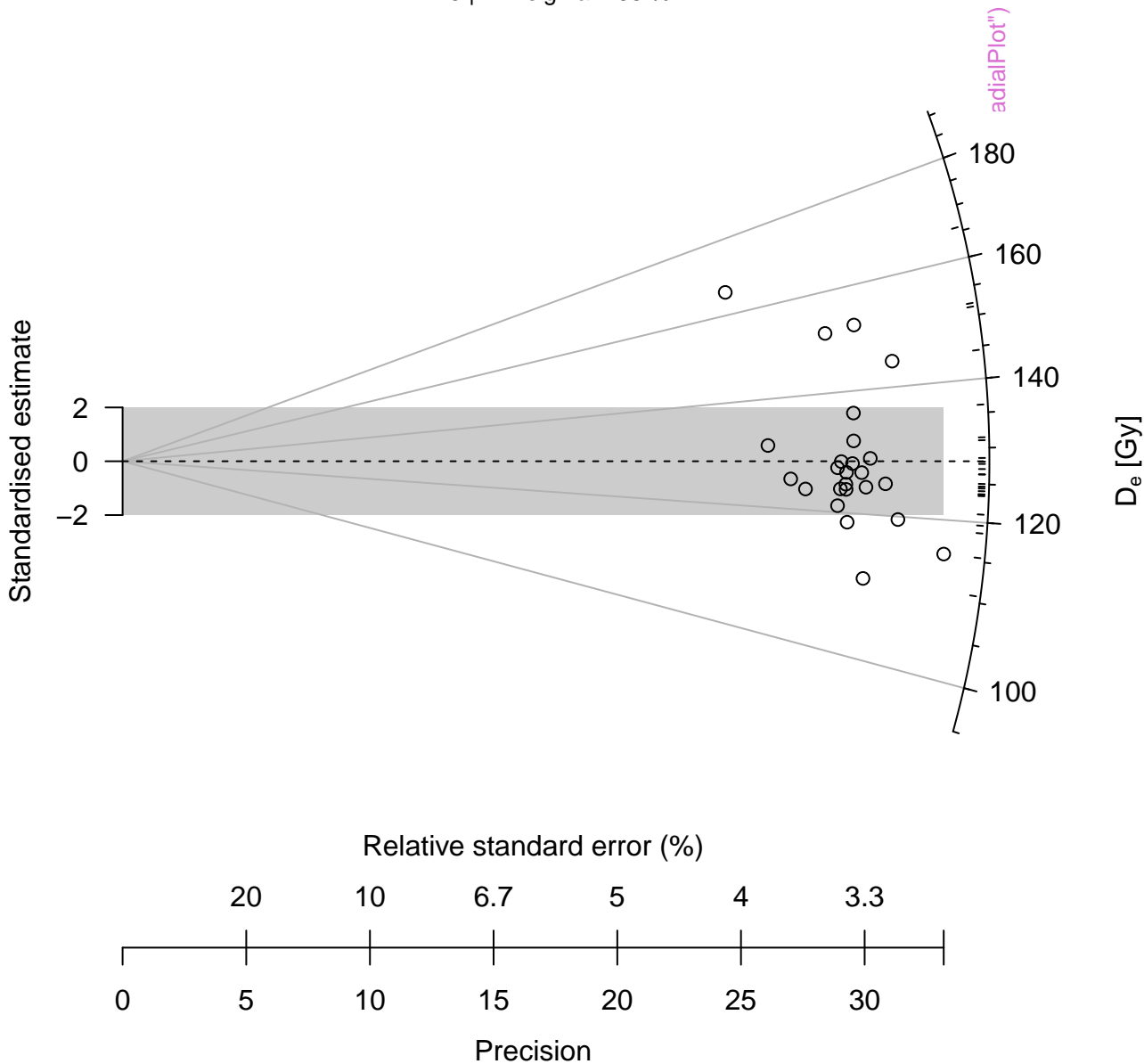
D_e distribution

n = 25 | in 2 sigma = 68 %



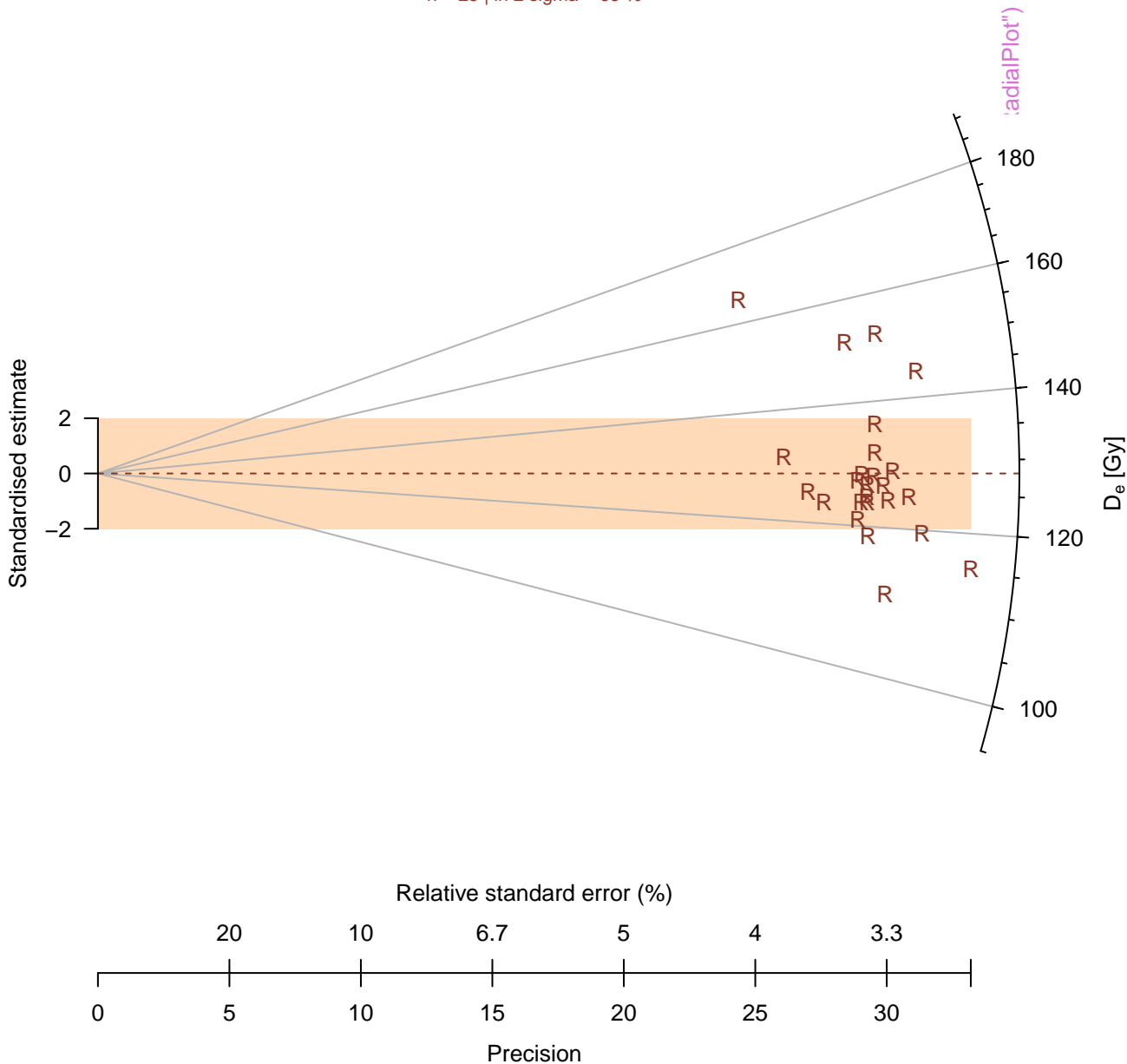
D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %

Standardised estimate

0

0

20

5

10

10

6.7

15

5

20

4

25

3.3

30

Precision

Relative standard error (%)

adialPlot")

180

160

140

120

100

D_e [Gy]

D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %



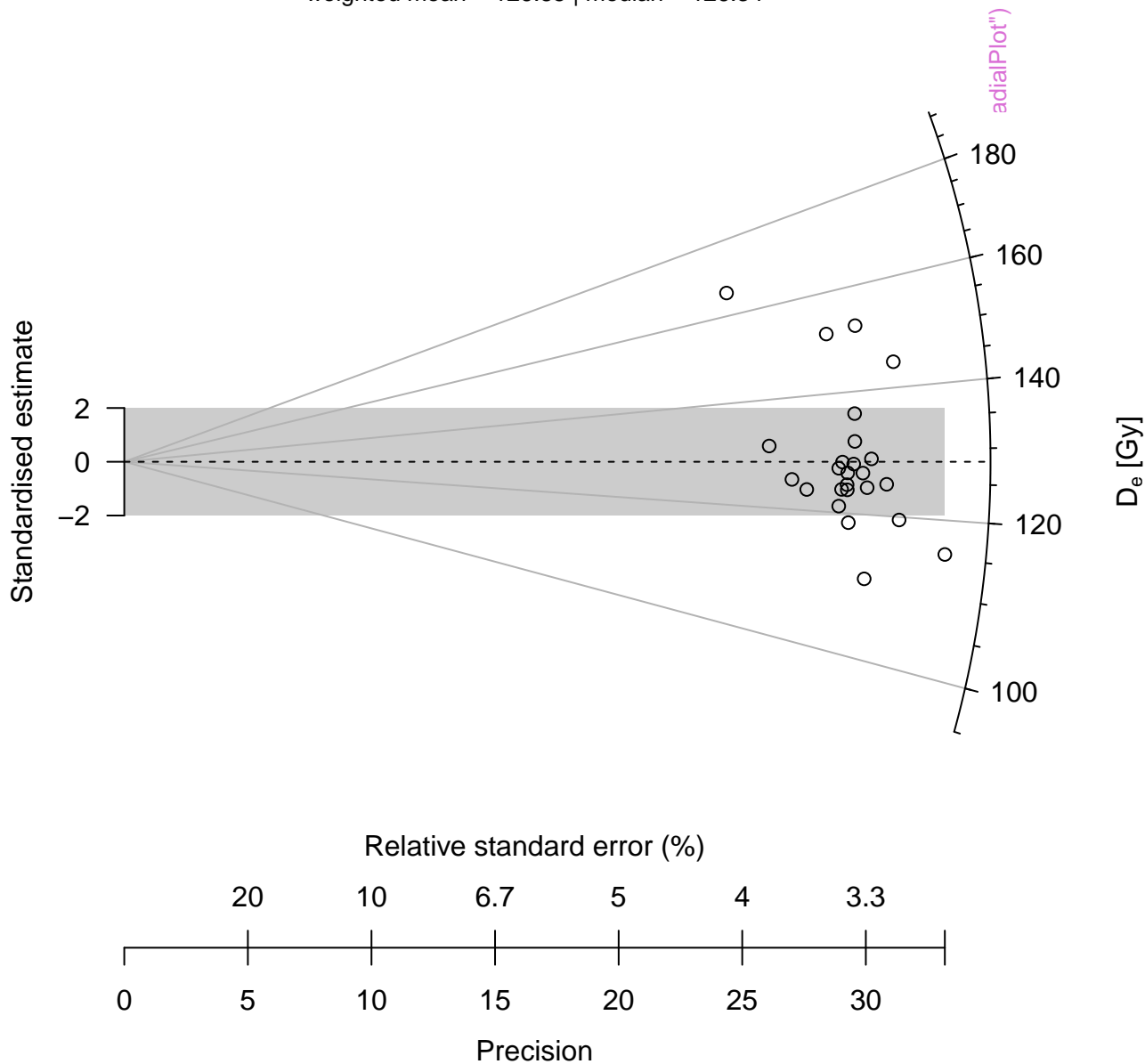
D_e distribution

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

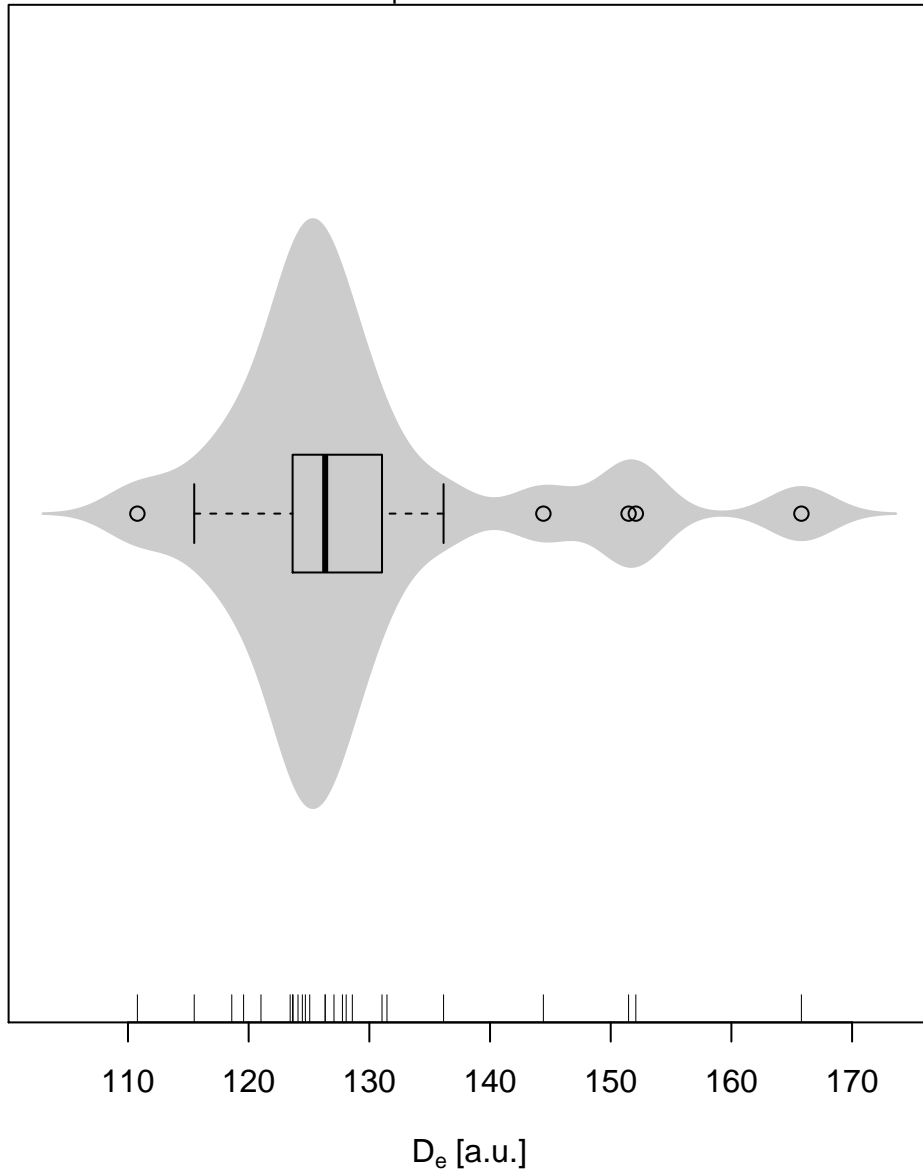
▽ Sample 2



Violin Plot

n = 25 | median = 126.34

Density



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

USER combined



IRSL combined



`help("read_PSL2R")`

OSL combined

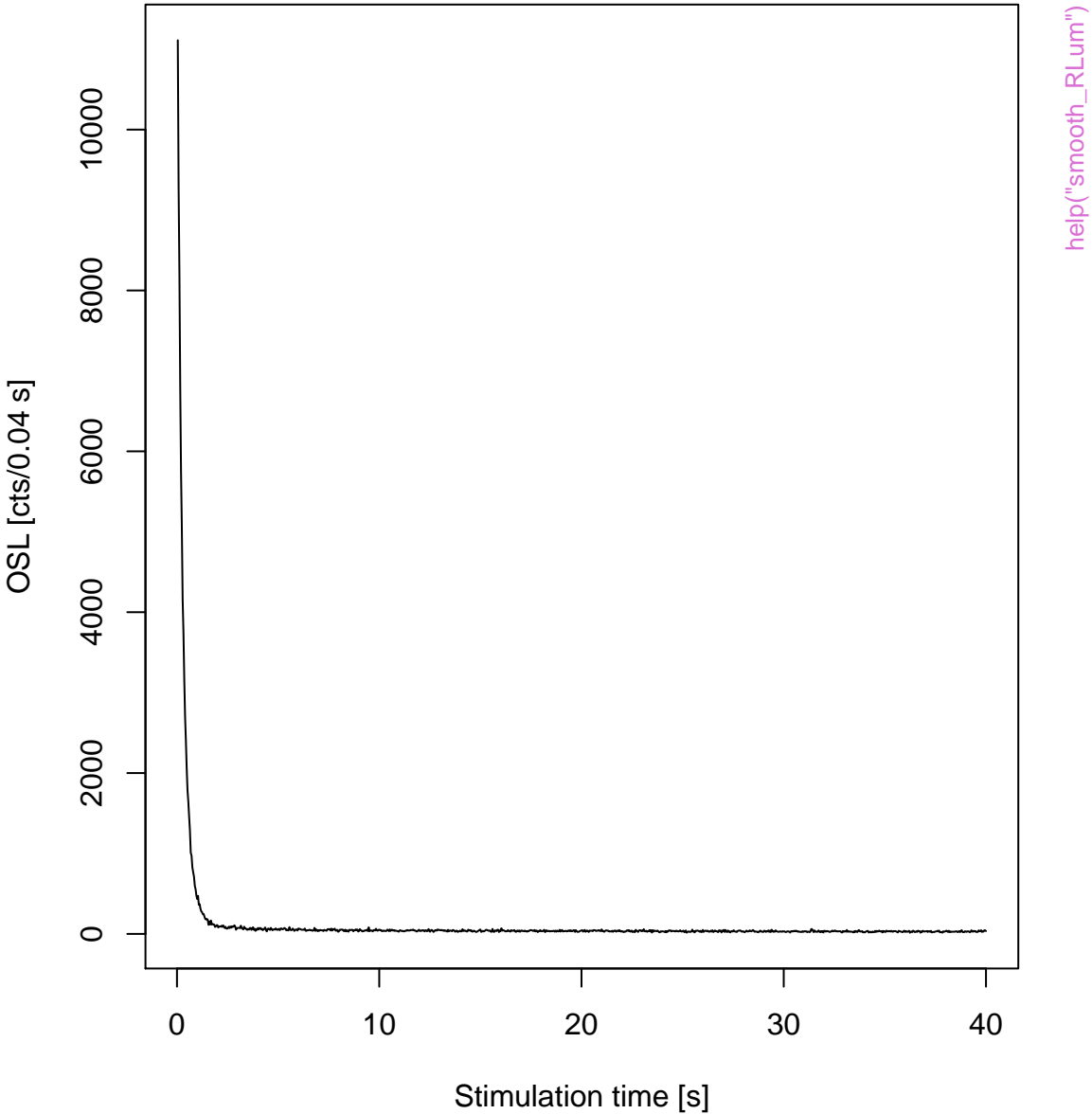




OSL



OSL



OSL



D_e distribution

n = 62 | mean = 66.01



D_e distribution

n = 62 | mean = 66.01

