

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")

unkown 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\("ExampleData.XSYG"\)](#)

IR-RF

$D_e = 623.25$ [600.63 ; 635.8]



TL previous L_n, L_x curves



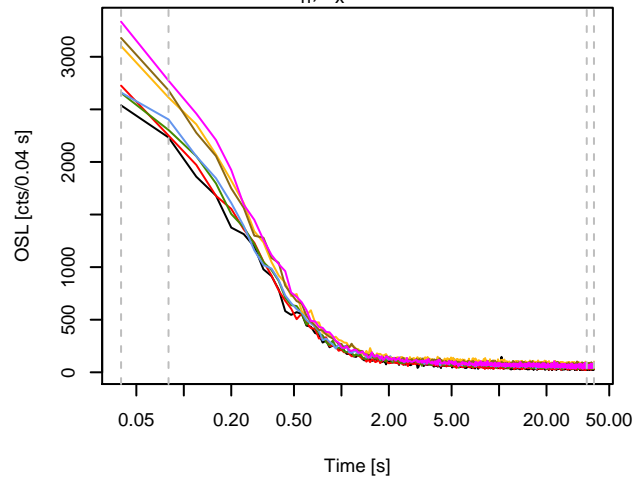
TL previous T_n, T_x curves



L_n, L_x curves



T_n, T_x curves



●
Natural
(0)

●
R1
(450)

●
R2
(1050)

●
R3
(2000)

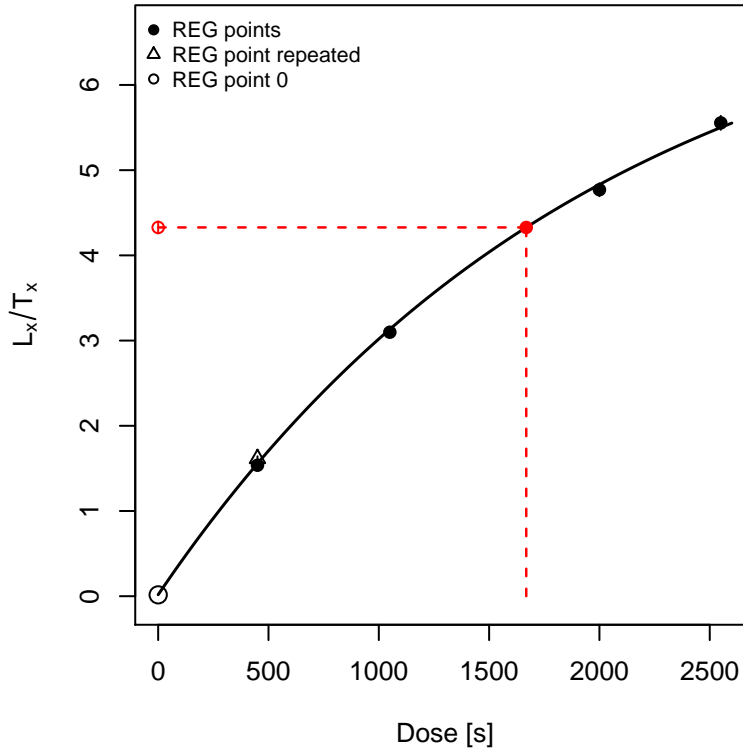
●
R4
(2550)

●
R5
(450)

●
R0
(0)

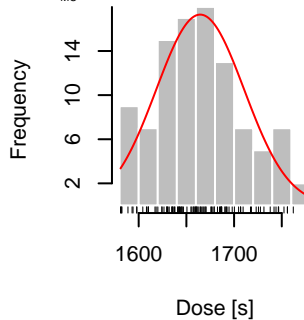
Growth curve

$D_e = 1668.25 \pm 46.11$ | fit: EXP



D_e from MC simulation

$D_{eMC} = 1664.49 \pm 46.11$ | quality = 99.8 %



Test dose response



Rejection criteria

Recycling ratio



Recuperation rate



Palaeodose error



- 0.2 + 0.2

IRSL



`help("analyse_SAR.CWOSL")`

L_n, L_x curves T_n, T_x curvesPlateau test L_n, L_x curvesplateau Test T_n, T_x curves

■ Natural
(0)

■ R1
(136)

■ R2
(317)

■ R3
(544)

■ R4
(815)

■ R0
(0)

■ R6
(317)

Growth curve

$D_e = 406.85 \pm 42.81$ | fit: LIN



D_e from MC simulation

$D_{eMC} = 402.95 \pm 42.81$ | quality = 99 %



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

TL previous L_n, L_x curves



Pseudo pIRIR data set based on quartz OSL



Pseudo pIRIR data set based on quartz OSL

TL previous T_n, T_x curves



help("analyse_pIRIRSequence")

Pseudo pIRIR data set based on quartz OSL



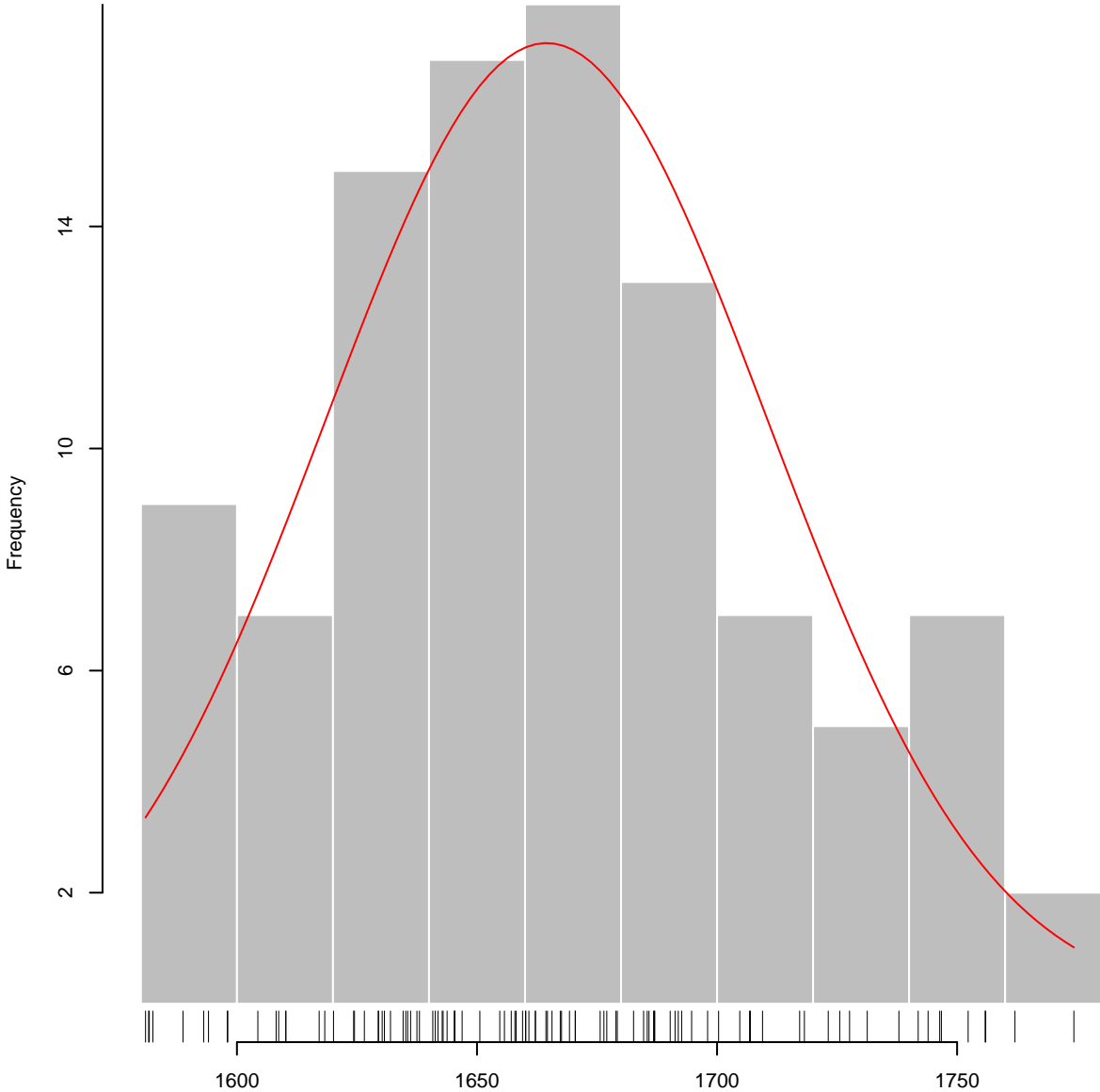
Pseudo pIRIR data set based on quartz OSL

$D_e = 1668.25 \pm 46.11$ | fit: EXP



D_e from MC simulation

D_{MC} = 1664.49 ± 46.11 | quality = 99.8 %



help("analyse_pIRIRSequence")

n = 100, valid fits = 100

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

$D_e = 1668.25 \pm 48.13$ | fit: EXP



D_e from MC simulation

D_{e,MC} = 1663.13 ± 48.13 | quality = 99.7 %



n = 100 , valid fits = 100

help("analyse_pIRSequence")

Test dose response



Summarised growth curves



Sensitivity change



Rejection criteria



Monte Carlo Simulation

$n = 10000 \mid \hat{\mu} = 42 \mid \hat{\sigma} = 20 \mid \frac{\hat{\sigma}}{\sqrt{n}} = 0 \mid v = 0.89$



Profile log likelihood for σ_{OD}



Finite Mixture Model

$\sigma_b = 0.2 \mid n = 62$

Normal distributions



Proportion of components



Statistical criteria



help("calc_FiniteMixture")

used values = 22













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



Relative standard error (%)

n

20

10

6.7

0

15

0

5

Precision

10

15

Density (bw 0.1)

0.106

source type: Sr-90 | half-life: 28.9 a
Source Dose Rate Prediction

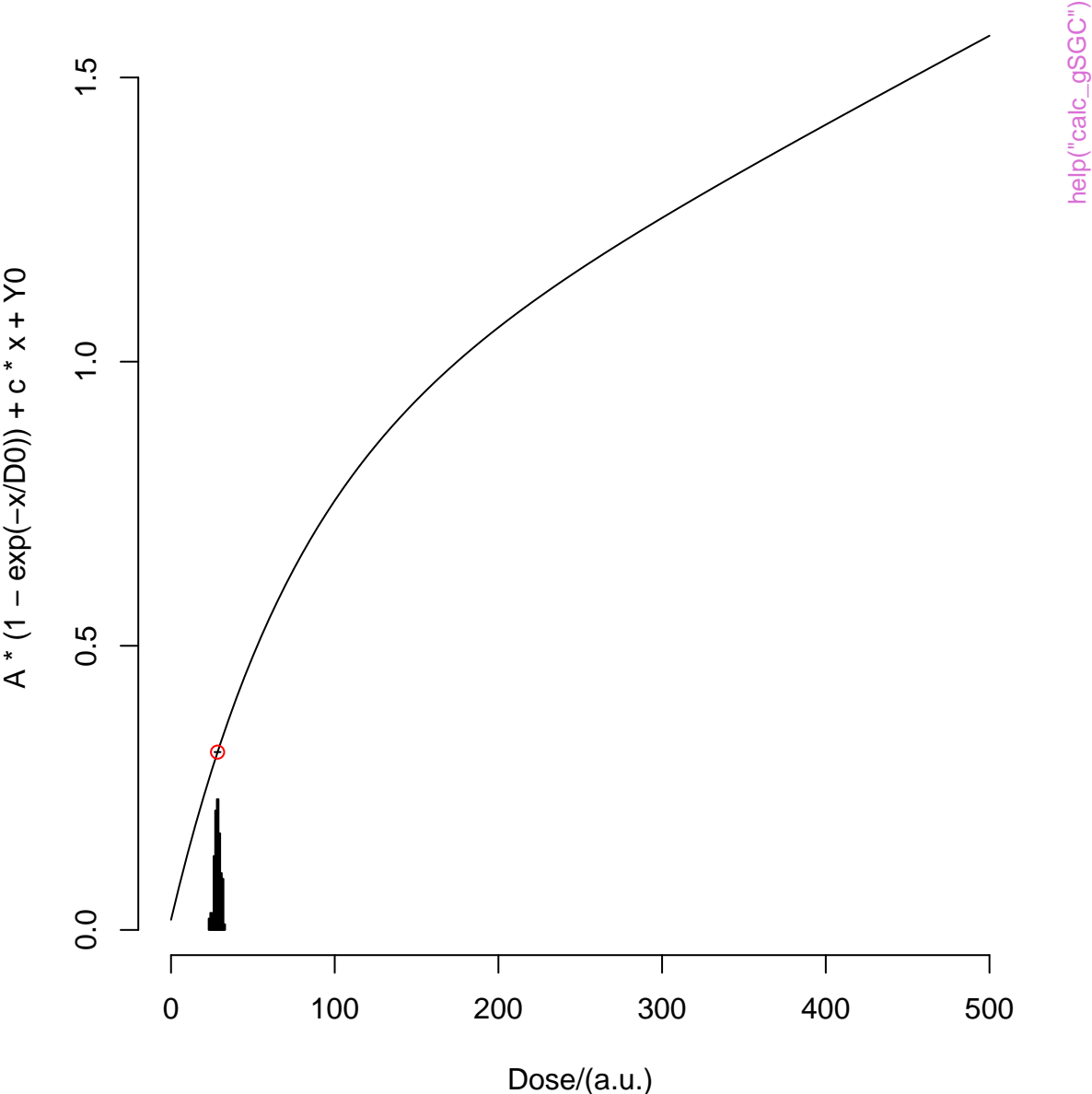


help("calc_SourceDoseRate")

D_e distribution



gSGC and resulting De

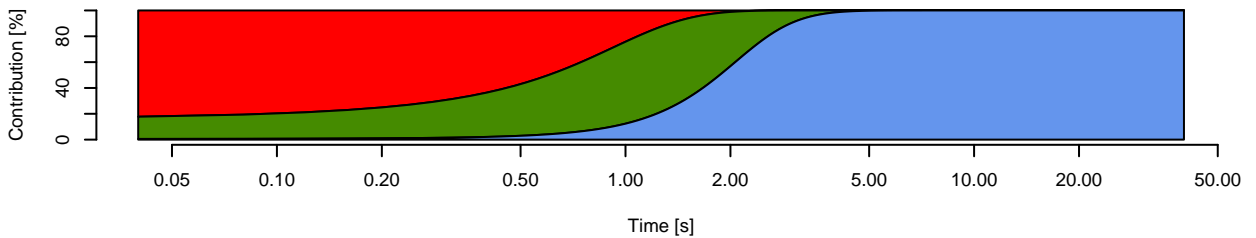


CW Curve Fit

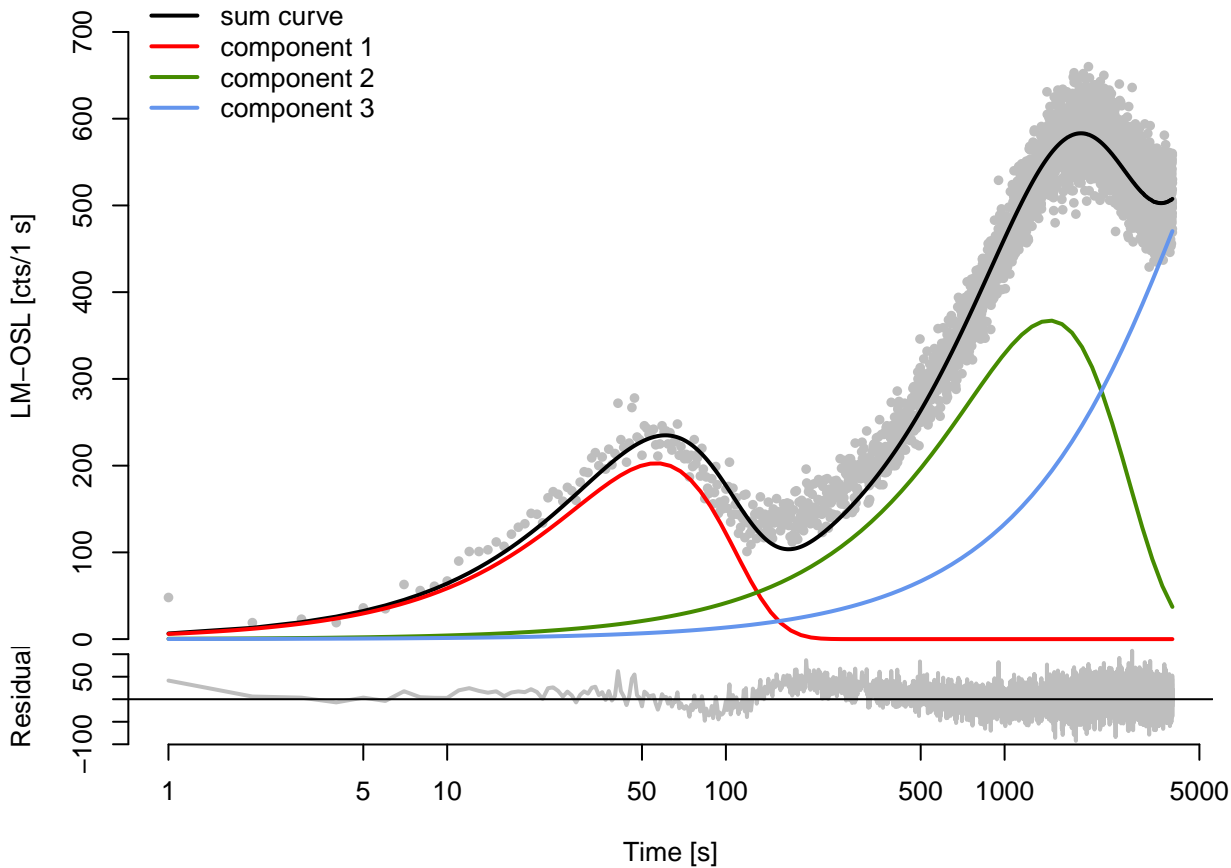
Default



Component contribution to sum curve



Default



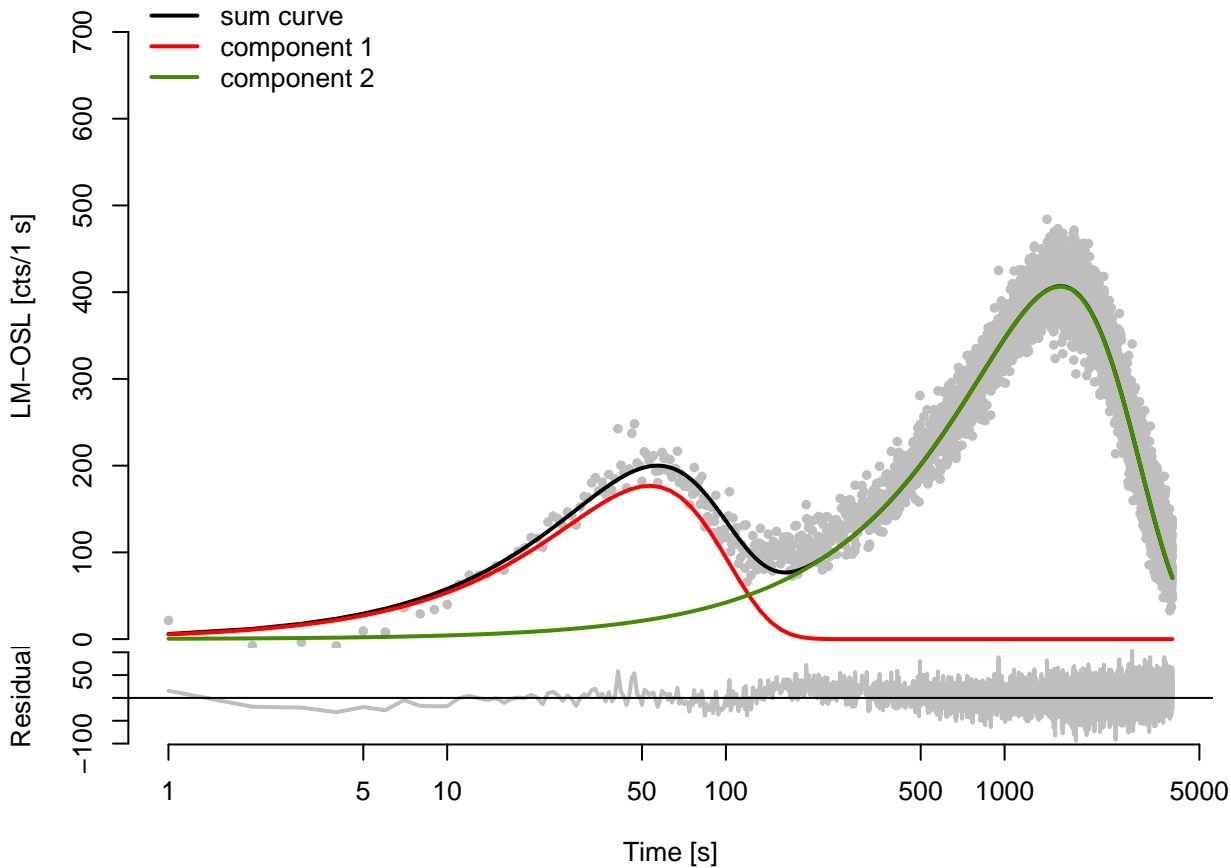
Component contribution to sum curve



Background



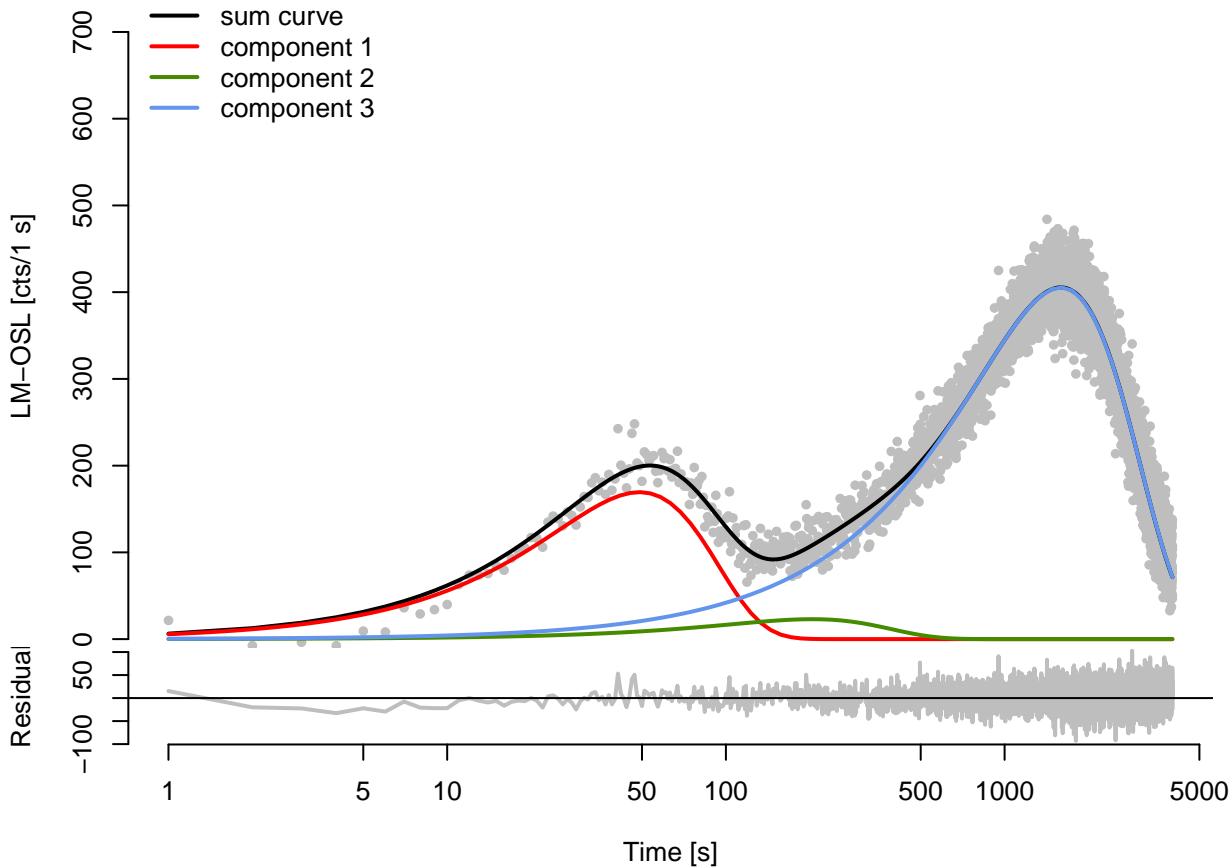
Default



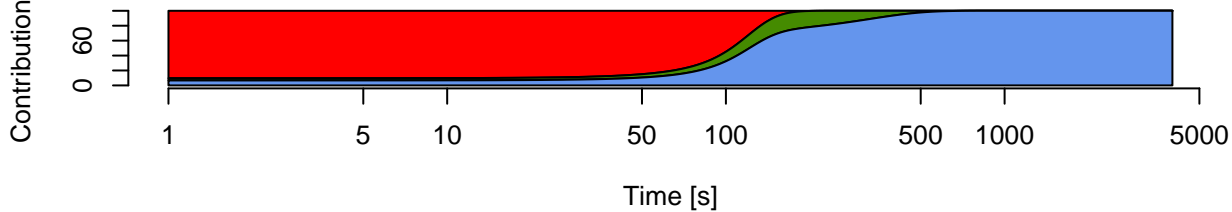
Component contribution to sum curve



Default



Component contribution to sum curve



D_e distribution

n = 25

n = 62

Standardised estimate



Relative standard error (%)

10

5

3.3

0

10

20

30

0

0.015

Precision

Density (bw 0.085)

D_e (Gy)

help("get_Layout")

D_e distribution

n = 25

n = 62



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)

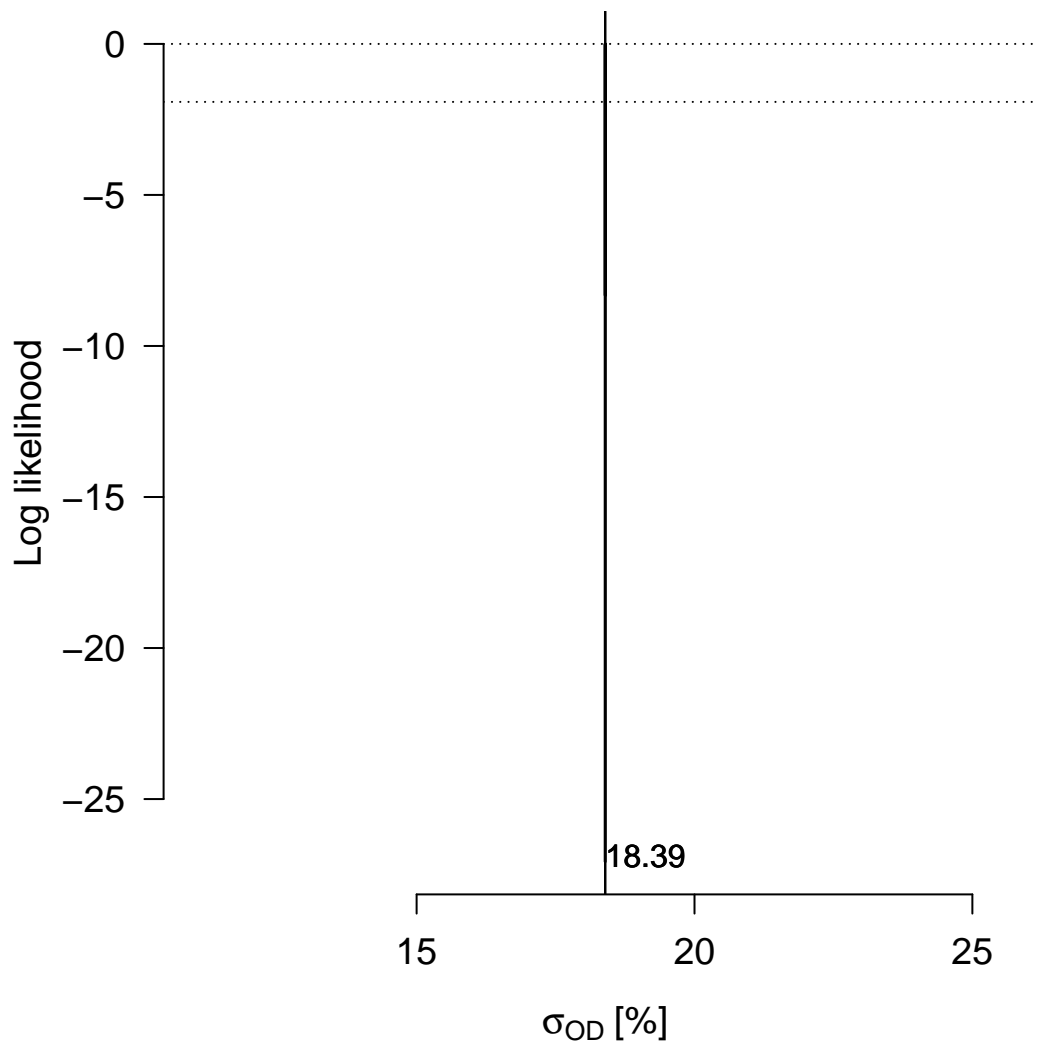


help("merge_RLum.Data.Curve")

Profile log likelihood for σ_{OD}



Profile log likelihood for σ_{OD}



D_e distribution

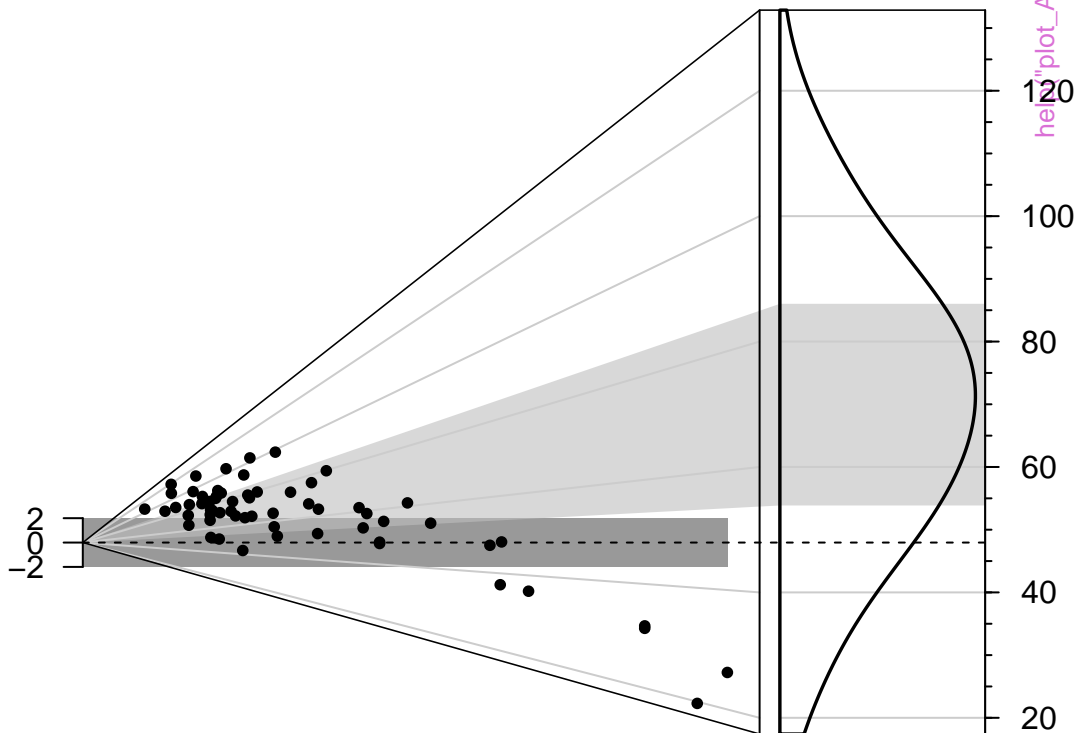
n = 62



D_e distribution

n = 62

Standardised estimate



D_e (Gy)

help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

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 distribution

n = 62

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

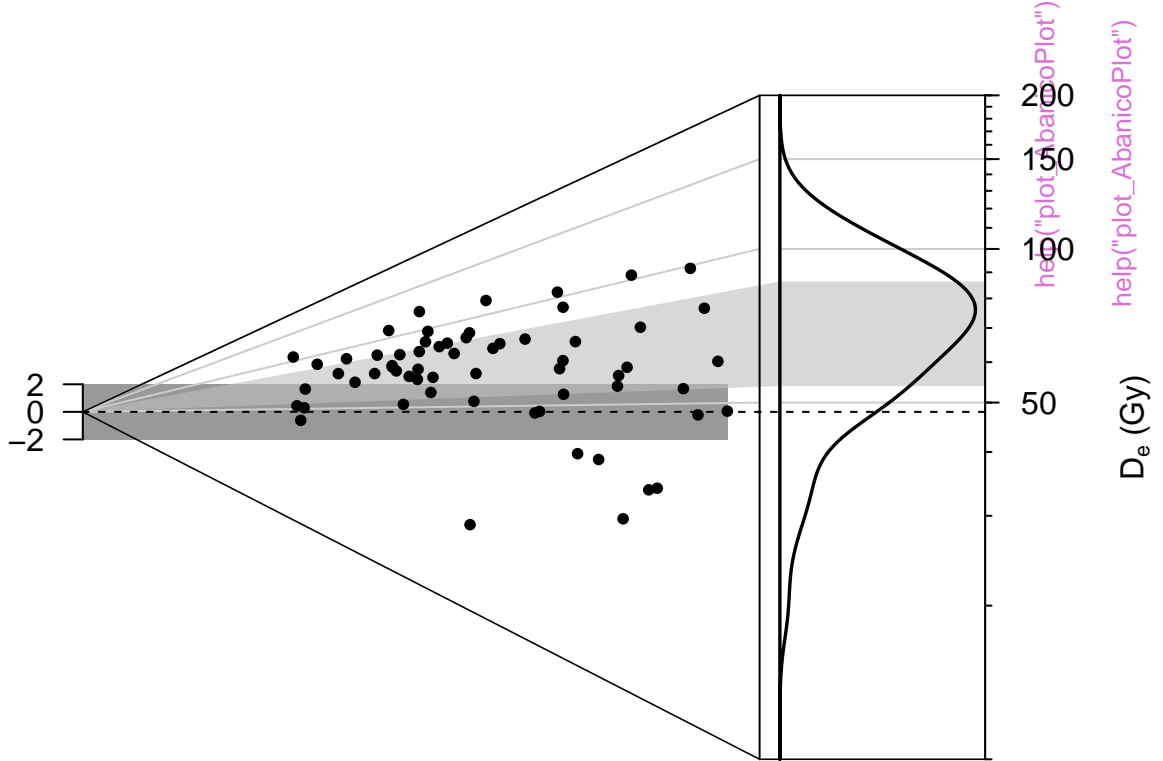
Precision

Density (bw 0.15)

D_e distribution

n = 62

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

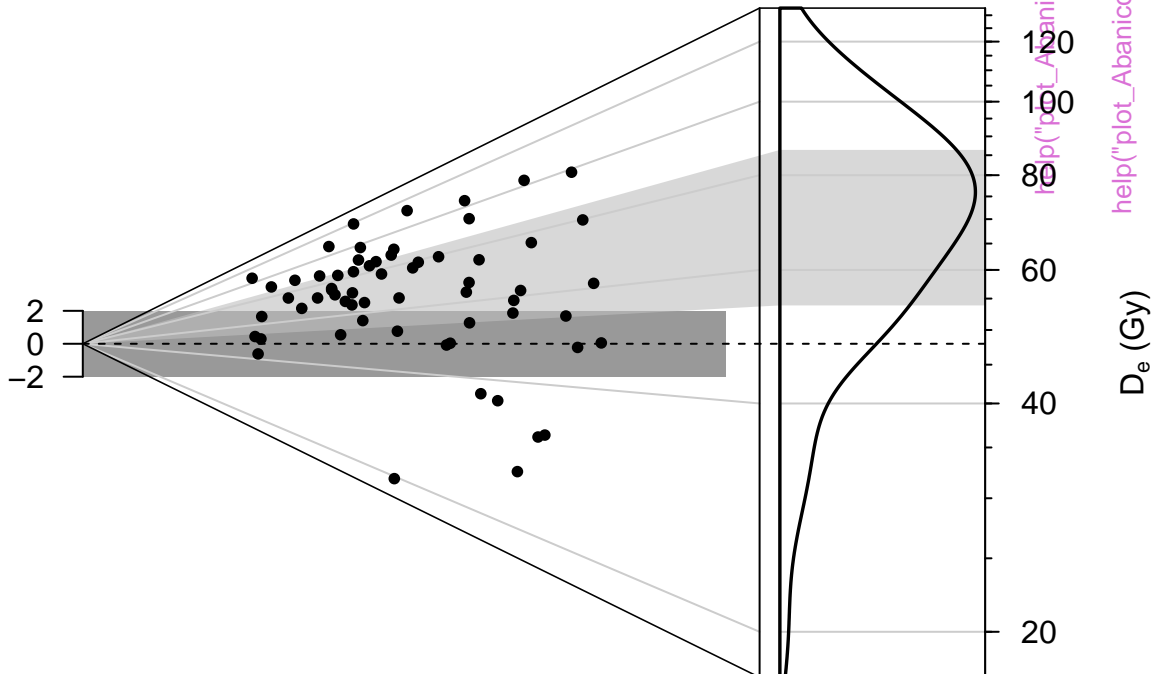
Precision

Density (bw 0.15)

D_e distribution

n = 62

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

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

Precision

10

15

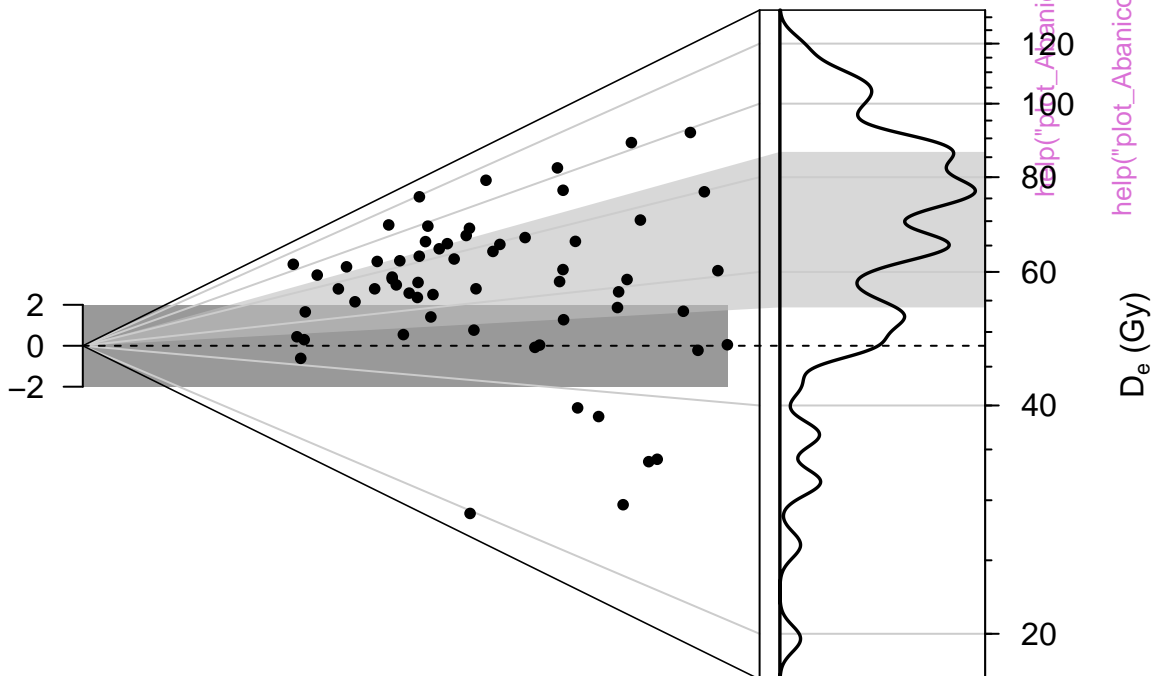
Density (bw 0.15)

0.016

D_e distribution

n = 62

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.264

Precision

Density (bw 0.04)

D_e distribution

n = 62



D_e distribution

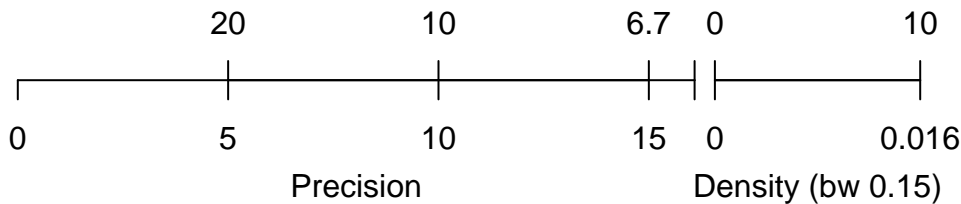
n = 62

Standardised estimate



Relative standard error (%)

n



D_e distribution

n = 62

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

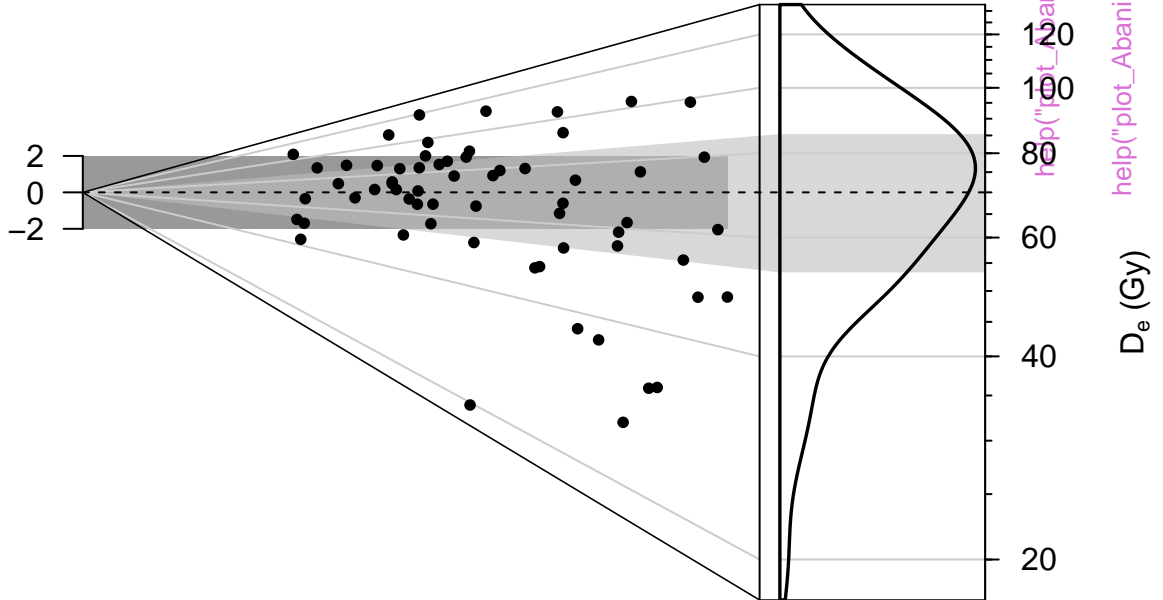


Density (bw 0.15)

D_e distribution

n = 62

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

Precision

10

15

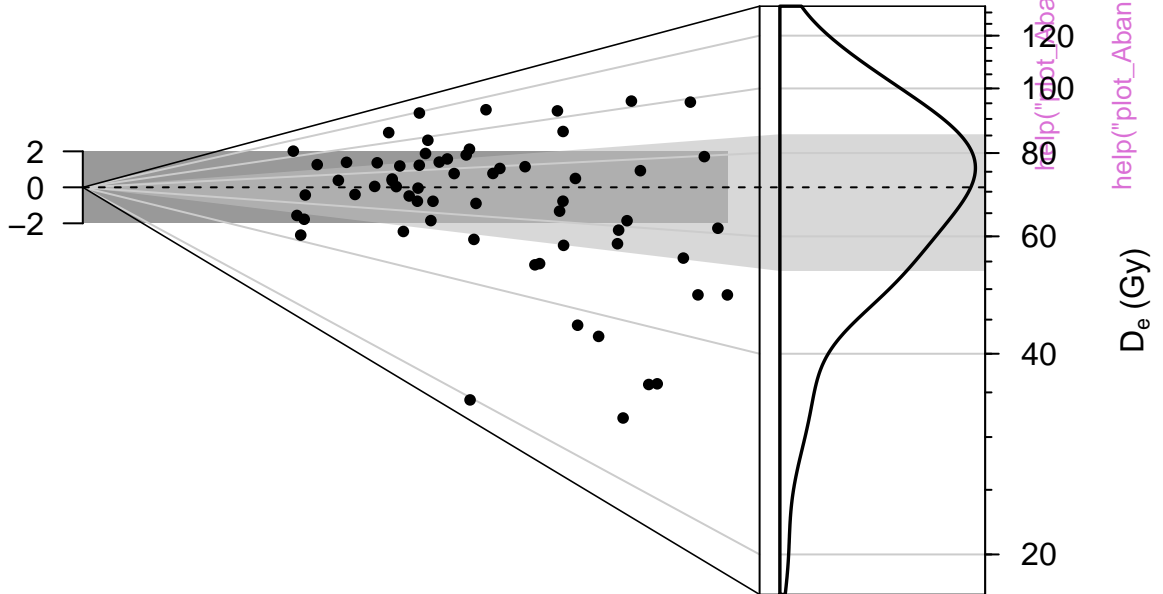
Density (bw 0.15)

0.016

D_e distribution

n = 62

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

Standardised estimate



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

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

R Sample 1

Standardised estimate



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

120
100
80
60
40
20

help("plot_AbanicoPlot")
D_e (Gy)

Relative standard error (%)

20

10

6.7

0

5

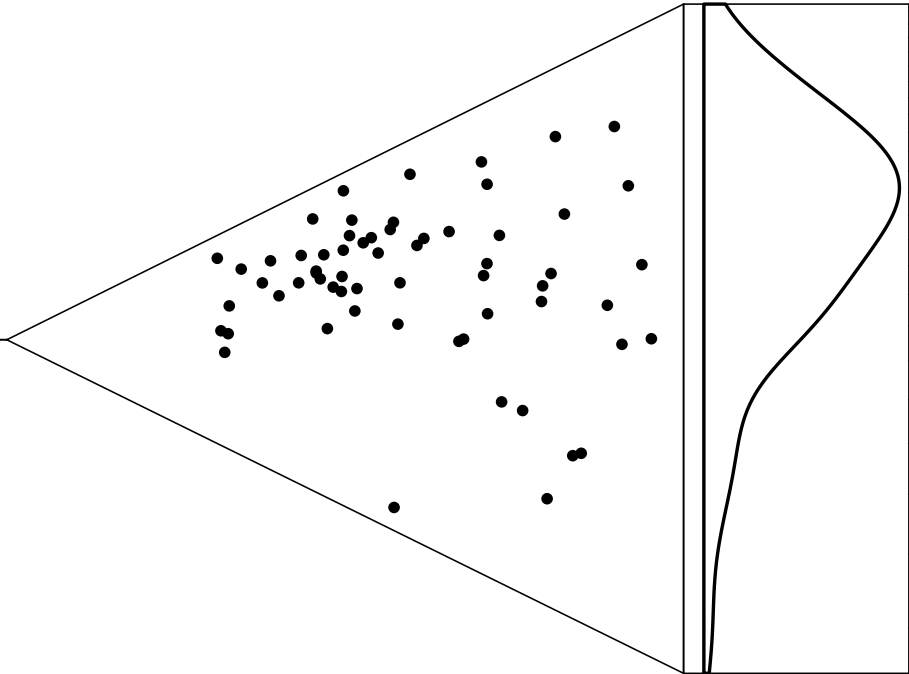
Precision

10

15

Density (bw 0.15)

0.016



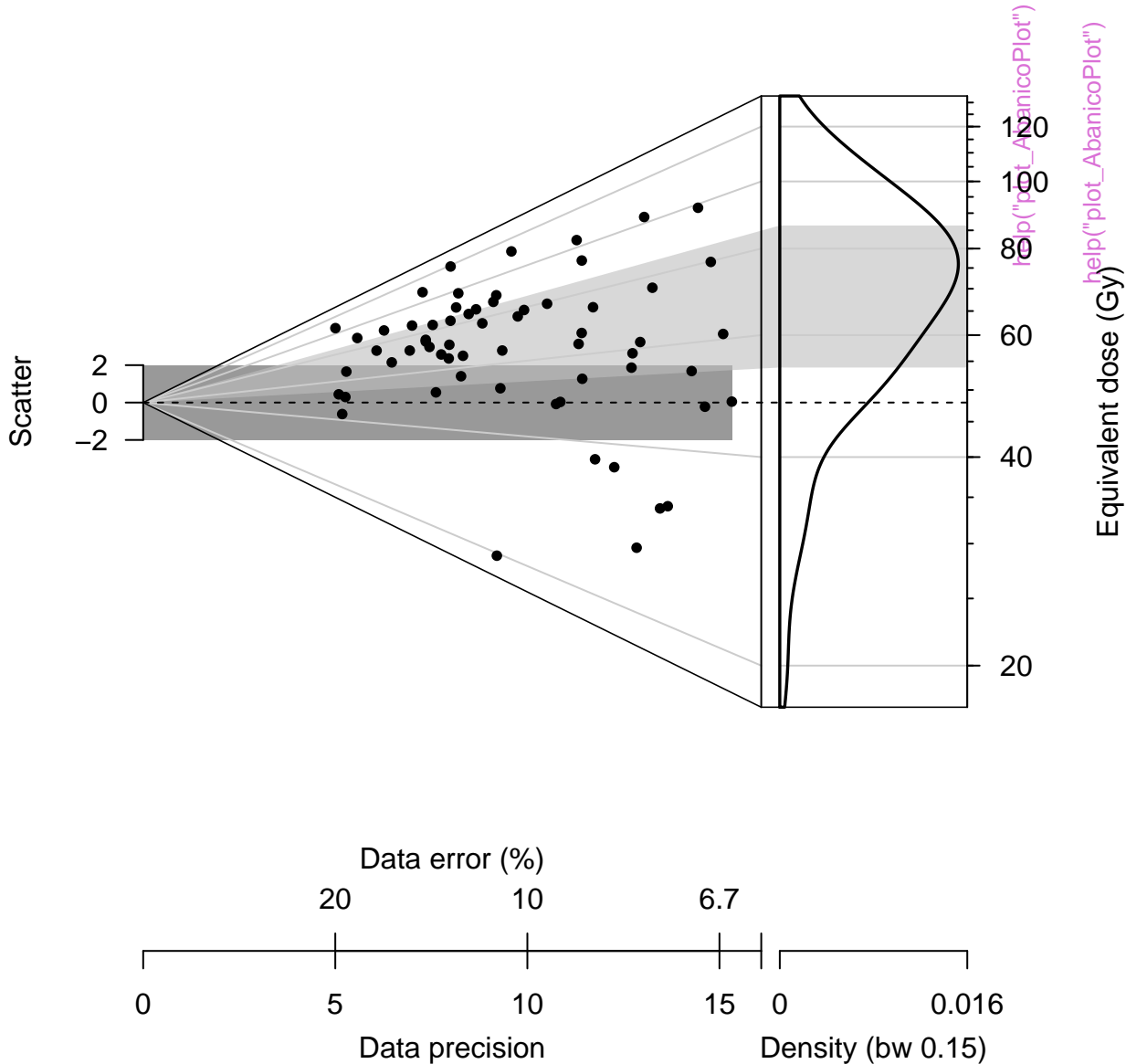
D_e distribution

n = 62



D_e distribution

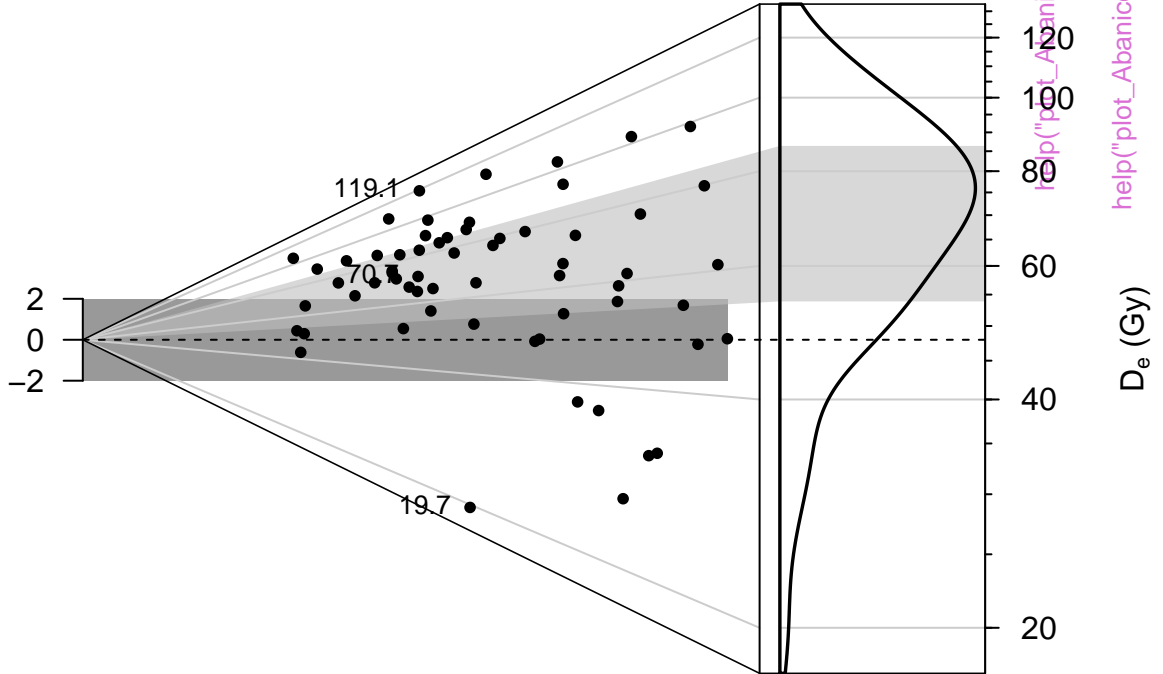
n = 62



D_e distribution

n = 62

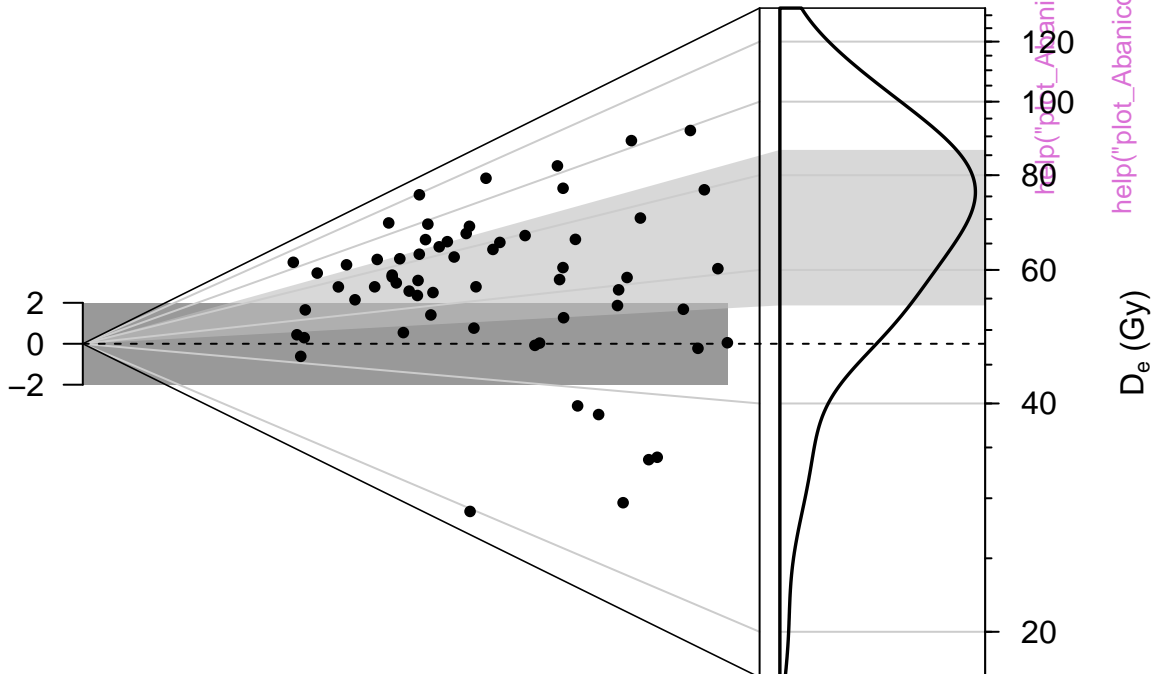
Standardised estimate



D_e distribution

n = 62 | in 2 sigma = 22.6 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

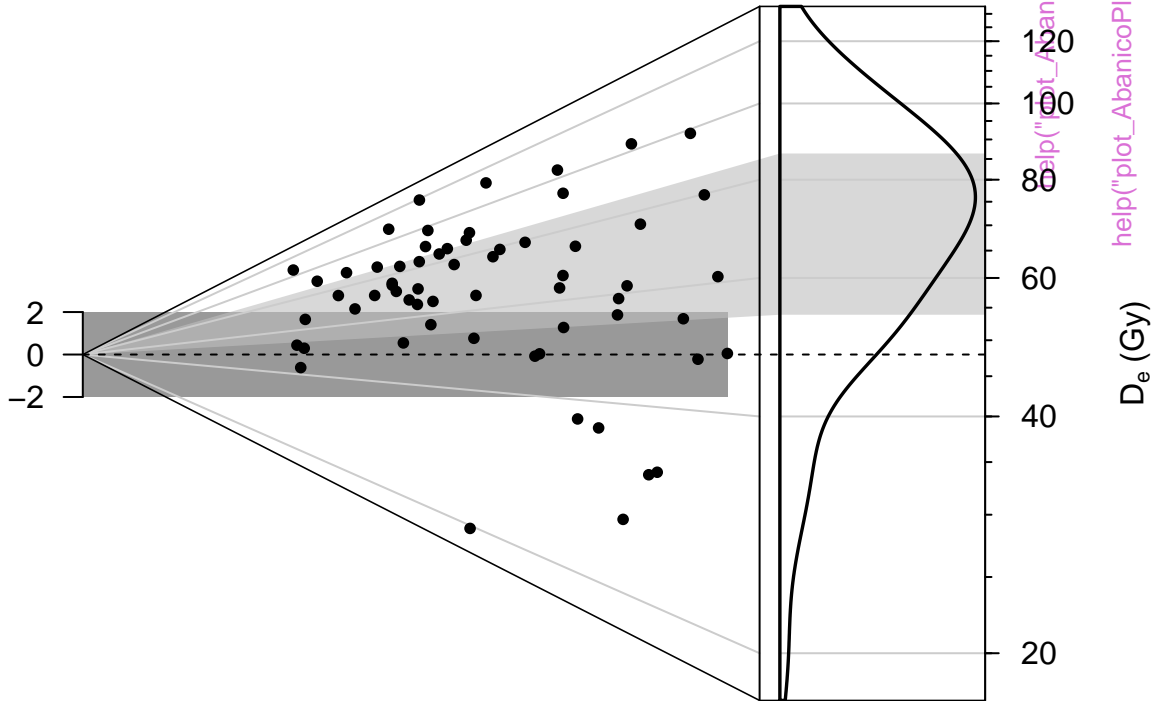
Precision

Density (bw 0.15)

D_e distribution

weighted mean = 47.95
median = 71.07

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

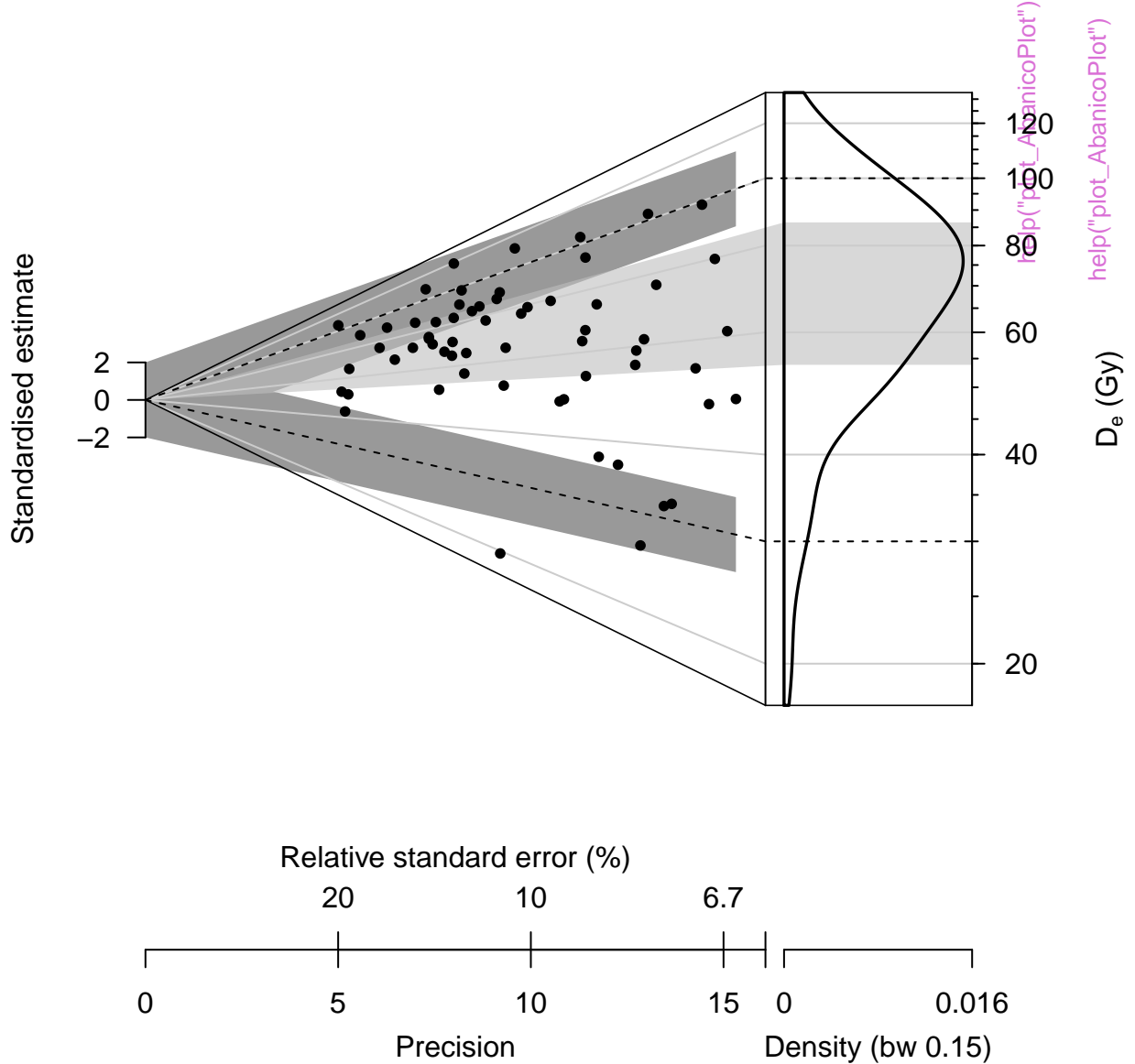
0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62



D_e distribution

n = 30

n = 32

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



help("plot_AbanicoPlot")

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



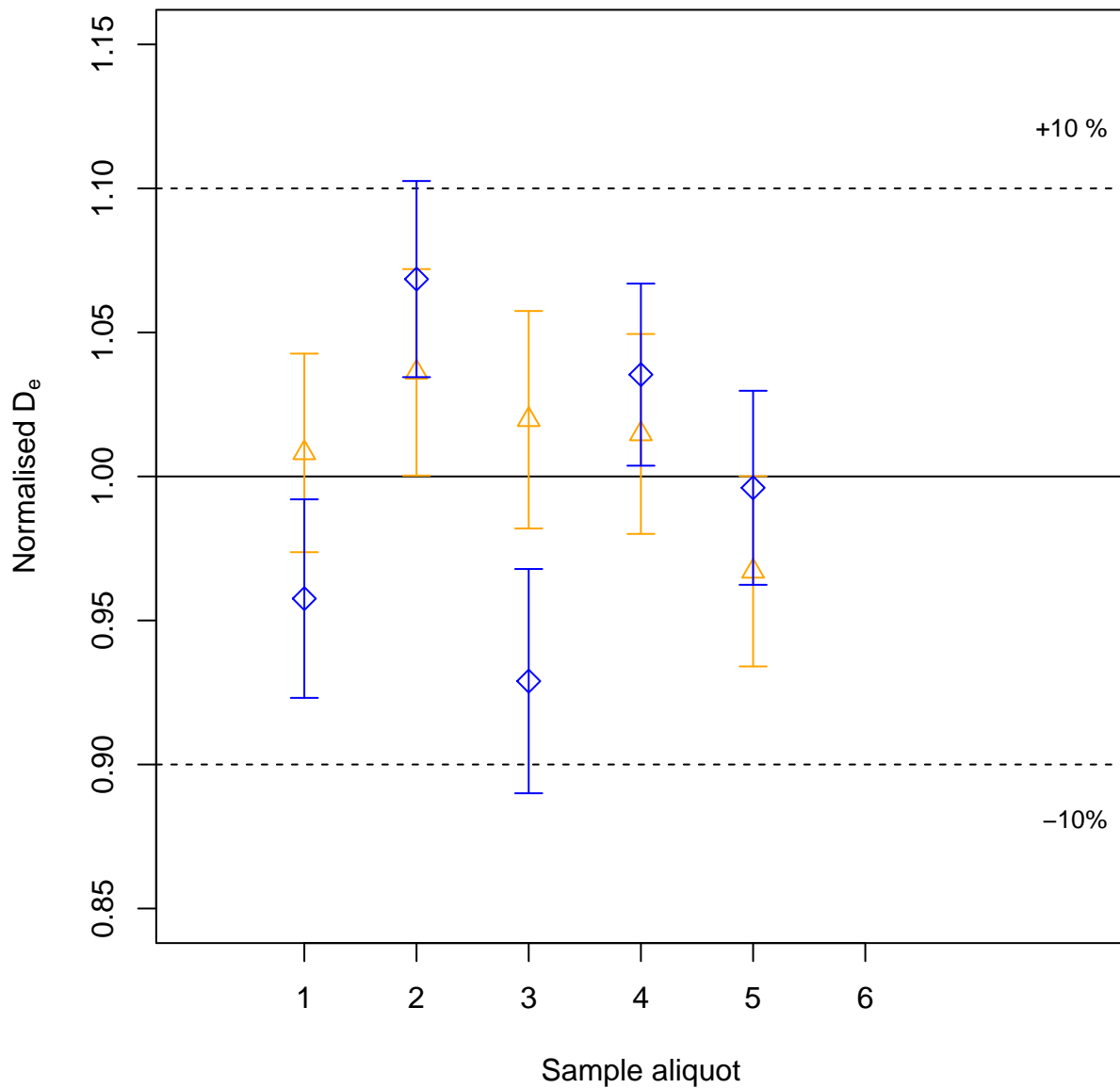
Dose recovery test



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

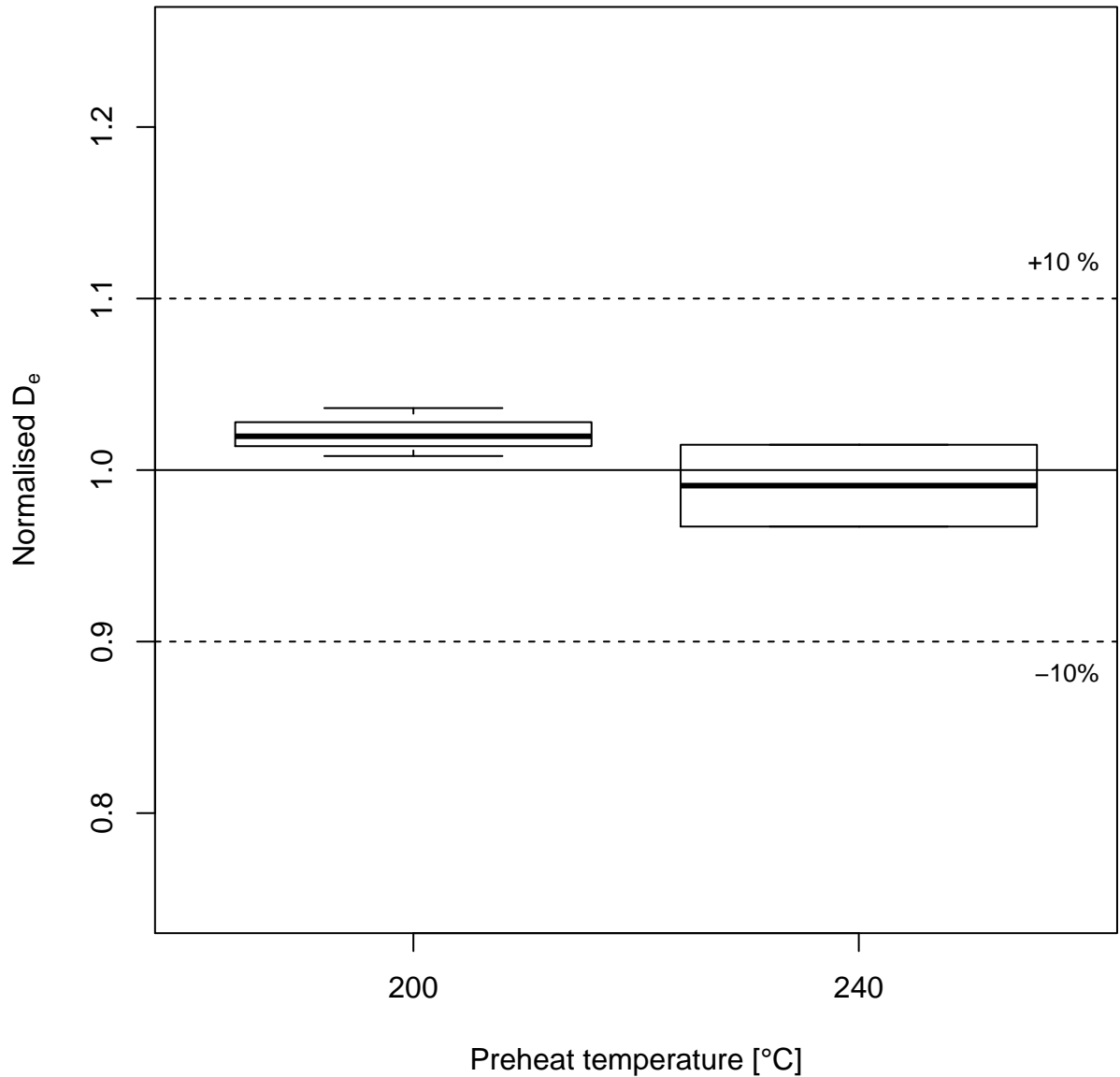
Example data



Dose recovery test



Dose recovery test



Growth curve

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



D_e from MC simulation



Test dose response



Growth curve

$D_e = 1737.88 \pm 59.97$ | fit: EXP



D_e from MC simulation

$D_{eMC} = 1732.18 \pm 59.97$ | quality = 99.7 %



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

Test dose response



Growth curve

$D_e = 1737.88 \pm 61.2$ | fit: EXP



D_e from MC simulation

D_{MC} = 1743.04 ± 61.2 | quality = 99.7 %



Test dose response



Histogram



Histogram of De-values

Example data set



D_e distribution



D_e distribution



Dose distribution



D_e distribution

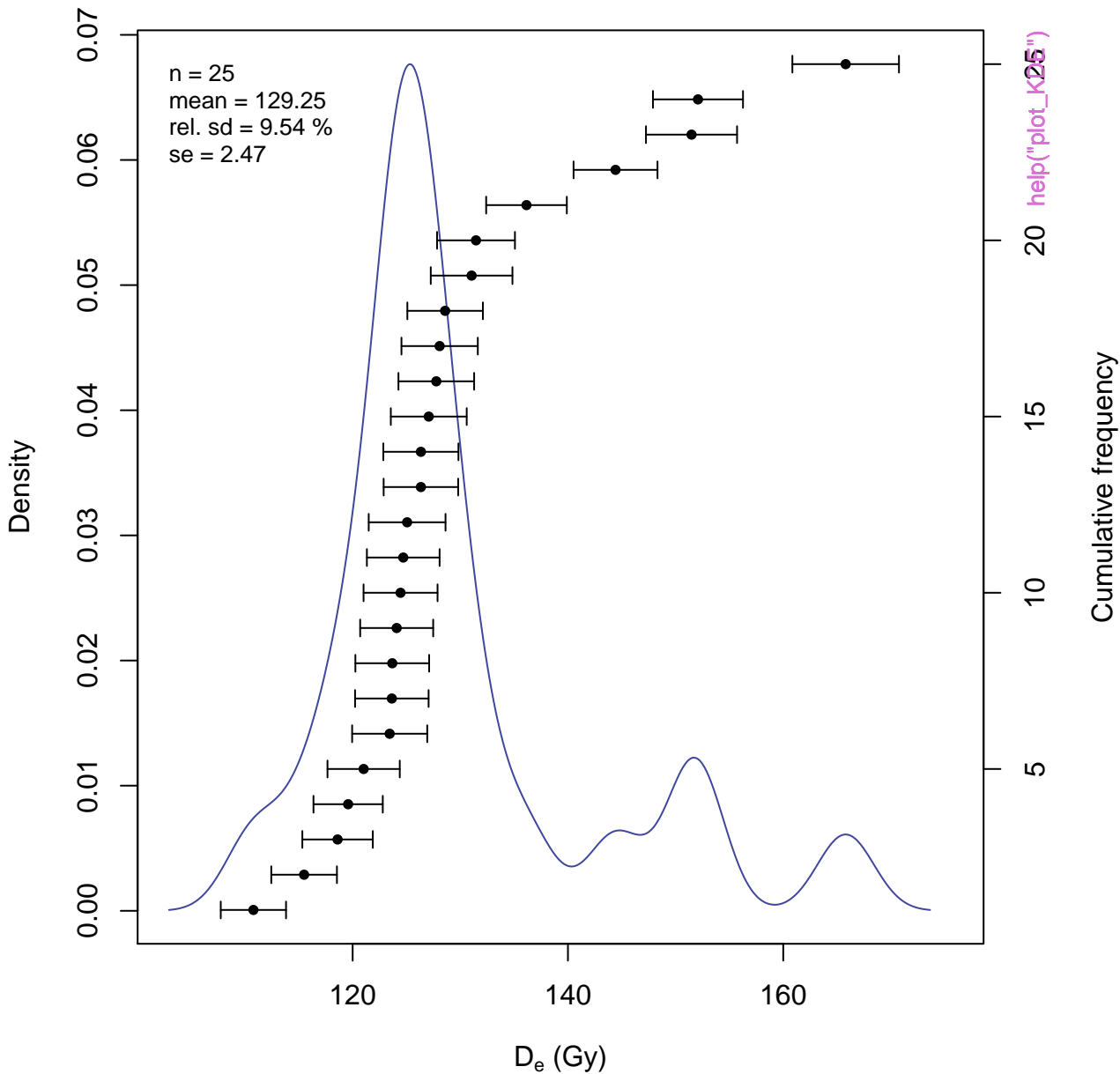


D_e distribution

n = 25 | median = 126.34 | skewness = 1.34



D_e distribution



D_e distribution



D_e distribution



D_e distribution



NR(t) Plot

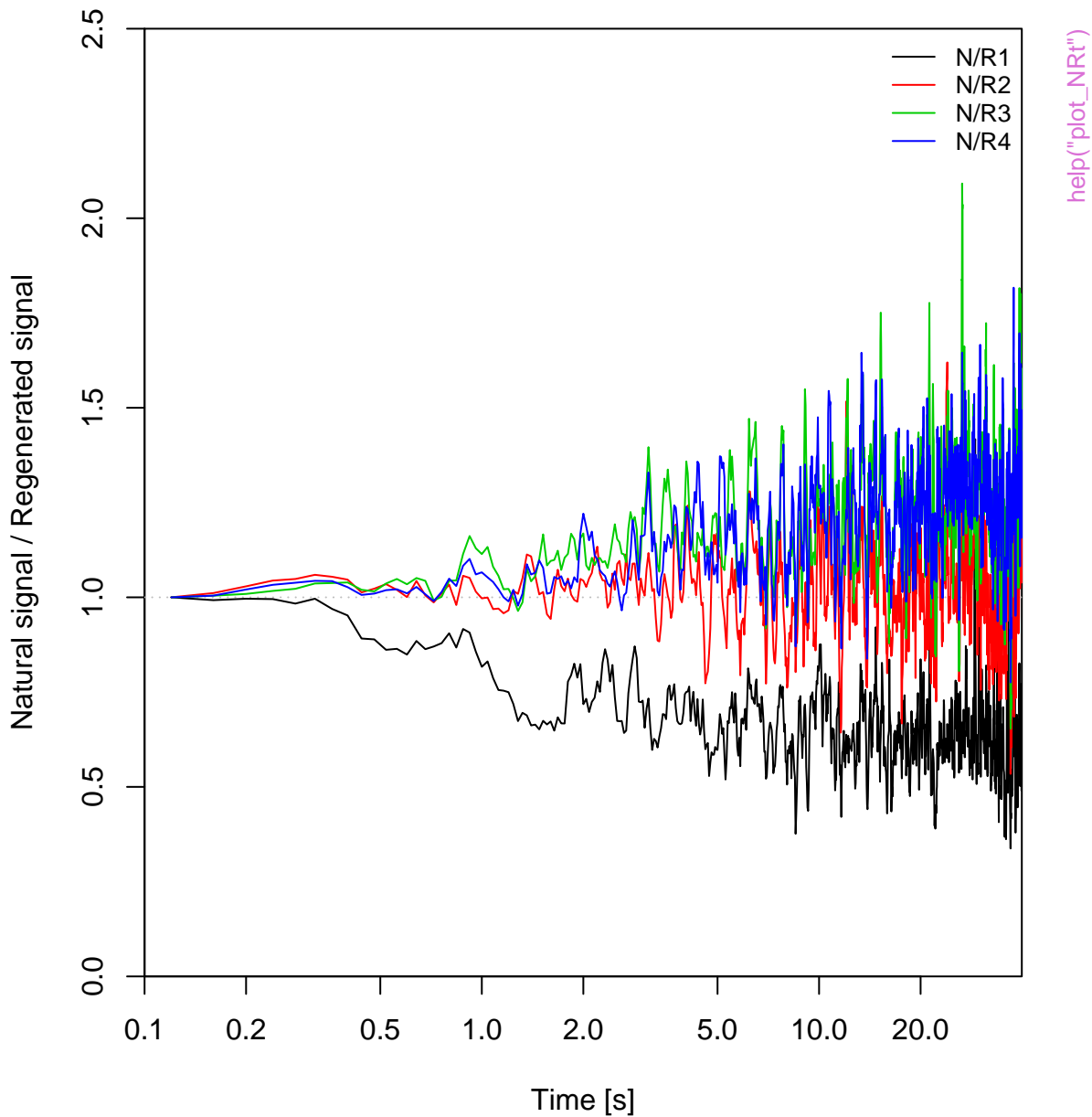


NR(t) Plot



help("plot_NRt")

NR(t) Plot



NR(t) Plot



NR(t) Plot



TnTx(t) Plot



Aliquot #1**Aliquot #2**

help("plot_NRt")

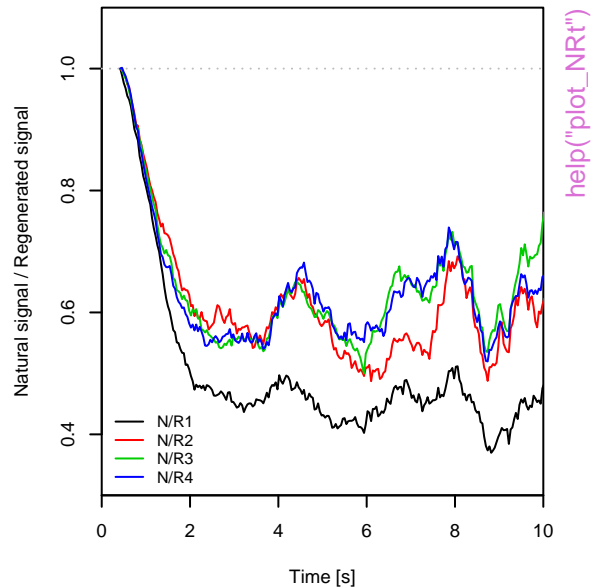
Aliquot #3**Aliquot #4**

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

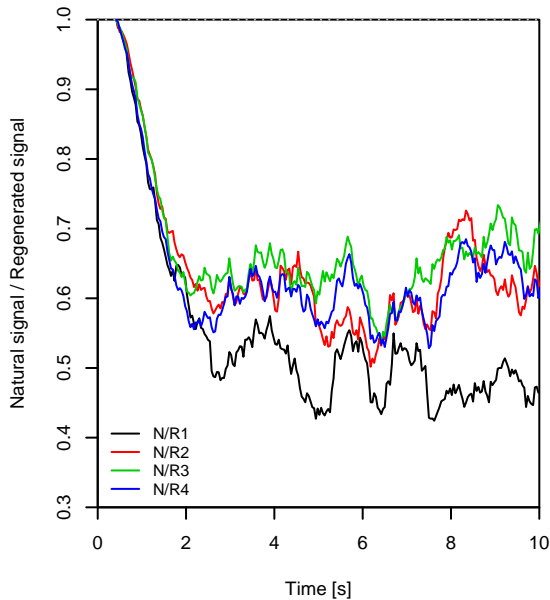
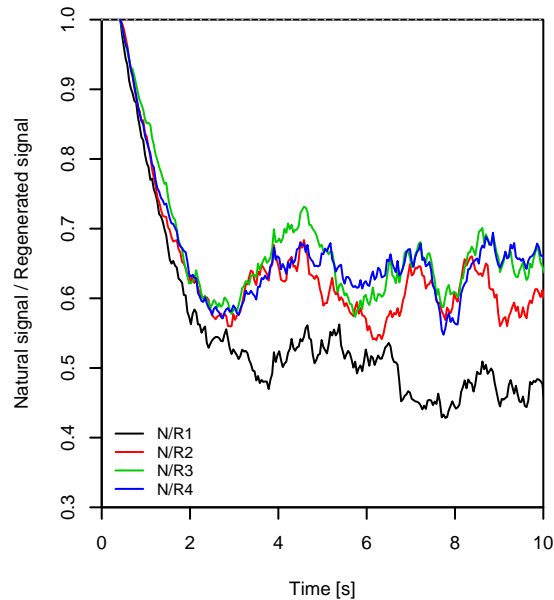
Aliquot #9**Aliquot #10**

help("plot_NRt")

Aliquot #11**Aliquot #12**

Aliquot #13**Aliquot #14**

help("plot_NRt")

Aliquot #15**Aliquot #16**

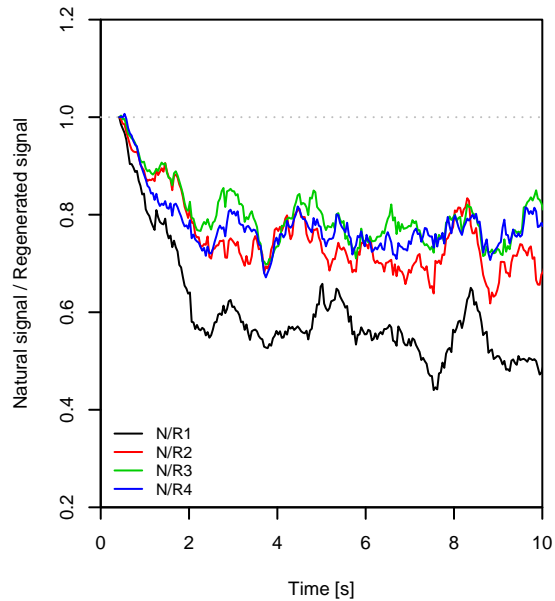
Aliquot #17**Aliquot #18**

help("plot_NRt")

Aliquot #19**Aliquot #20**

Aliquot #21**Aliquot #22**

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

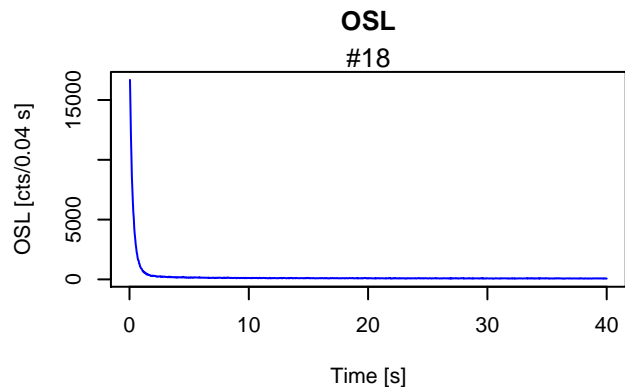
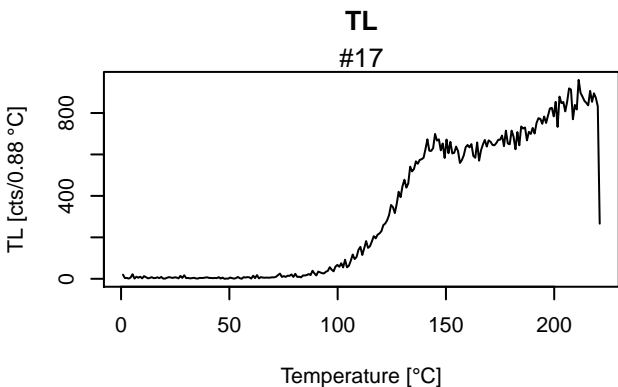
Aliquot #23**Aliquot #24**



help("plot_RLumAnalysis")



help("plot_RLumAnalysis")



help("plot_RLumAnalysis")





TL combined



unkown curve type



RLum.Data.Image



RLum.Data.Spectrum



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

RLum.Data.Spectrum



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

unkown curve type



Likelihood profile: gamma



Likelihood profile: sigma



help("plot_RLum.Results")

Likelihood profile: p0



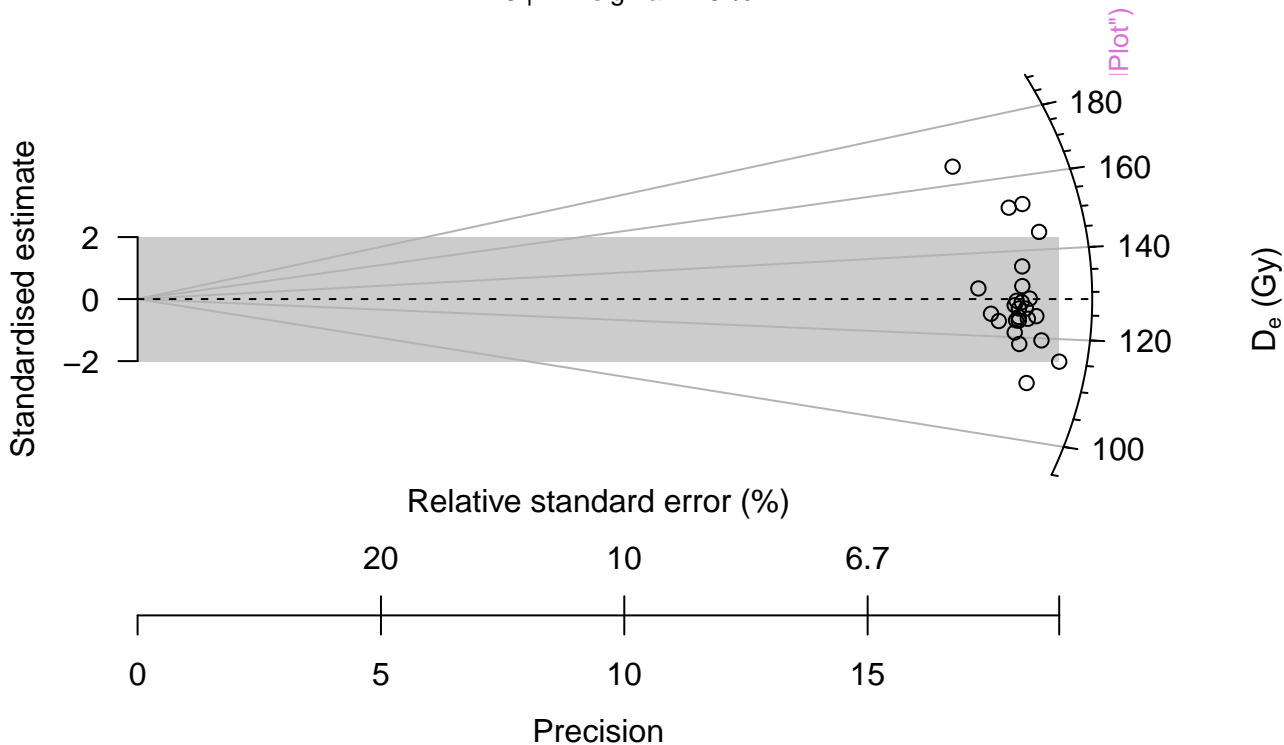
Monte Carlo Simulation

$n = 10000 \mid \hat{\mu} = 43 \mid \hat{\sigma} = 20 \mid \frac{\hat{\sigma}}{\sqrt{n}} = 0 \mid v = 0.85$



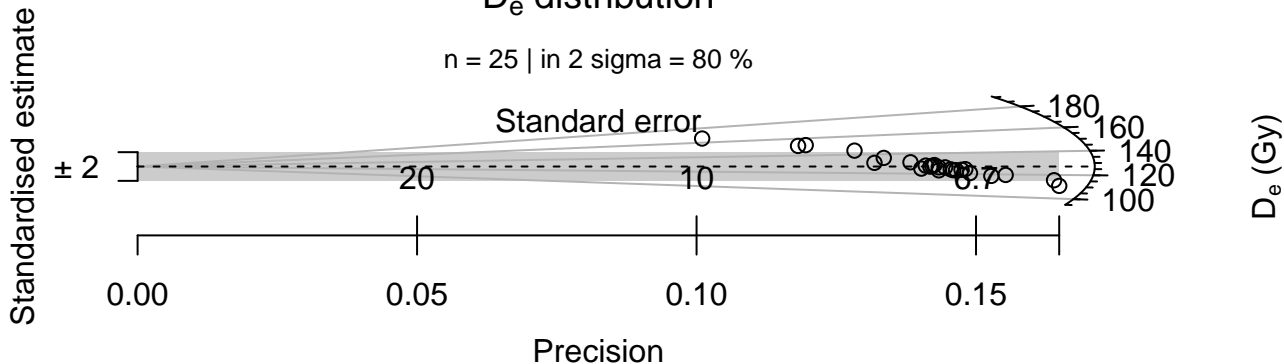
D_e distribution

n = 25 | in 2 sigma = 76 %



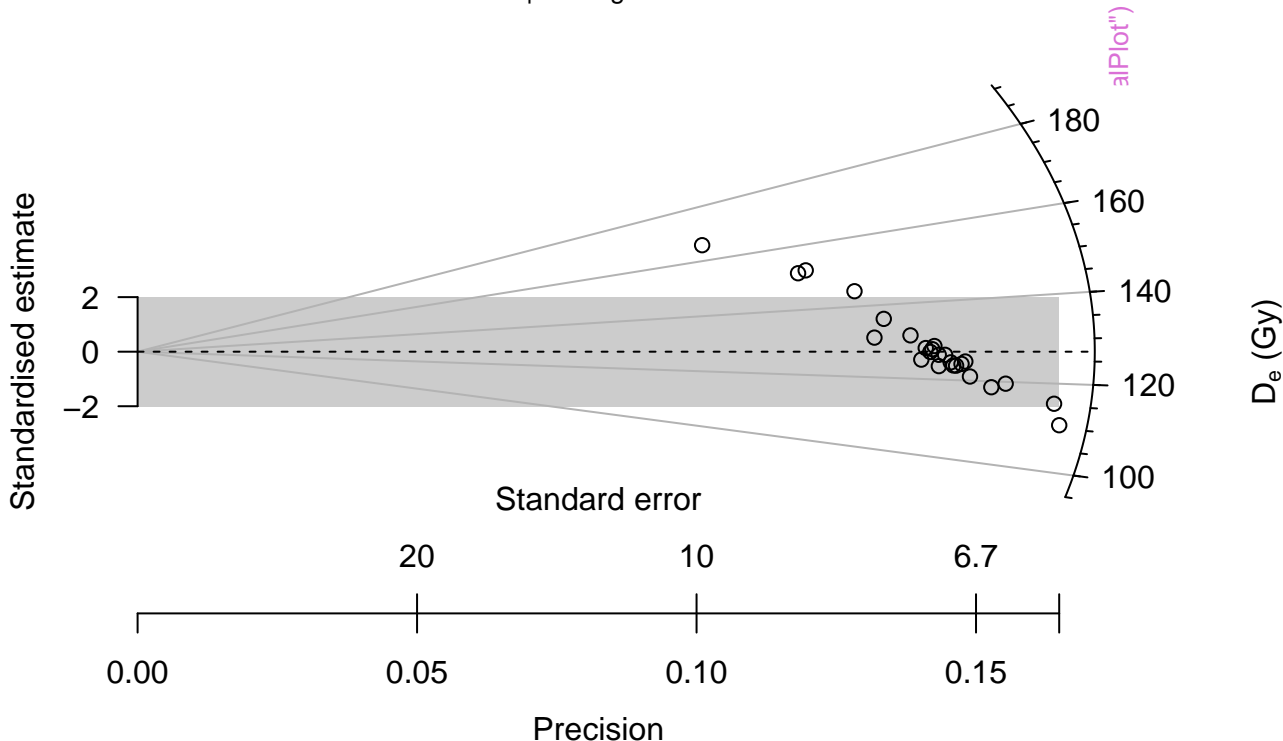
D_e distribution

n = 25 | in 2 sigma = 80 %



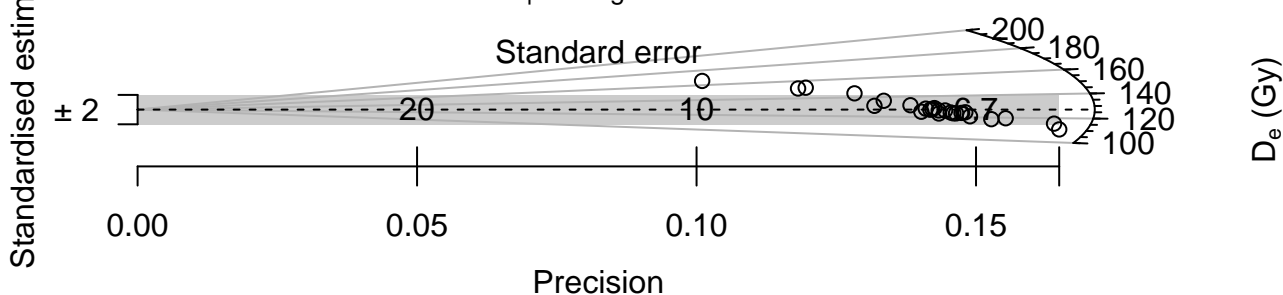
D_e distribution

n = 25 | in 2 sigma = 80 %



D_e distribution

n = 25 | in 2 sigma = 80 %



D_e distribution

n = 25 | in 2 sigma = 76 %

Standardised estimate



Relative standard error (%)

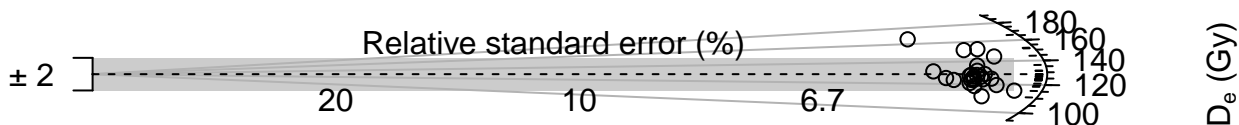


Precision

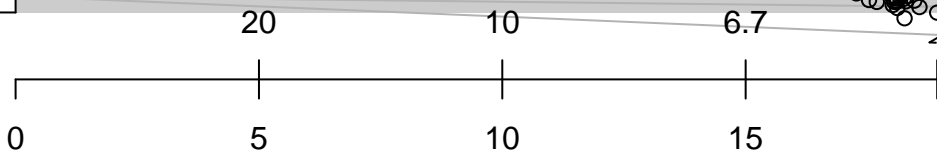
D_e distribution

n = 25 | in 2 sigma = 76 %

Standardised estimate



Relative standard error (%)

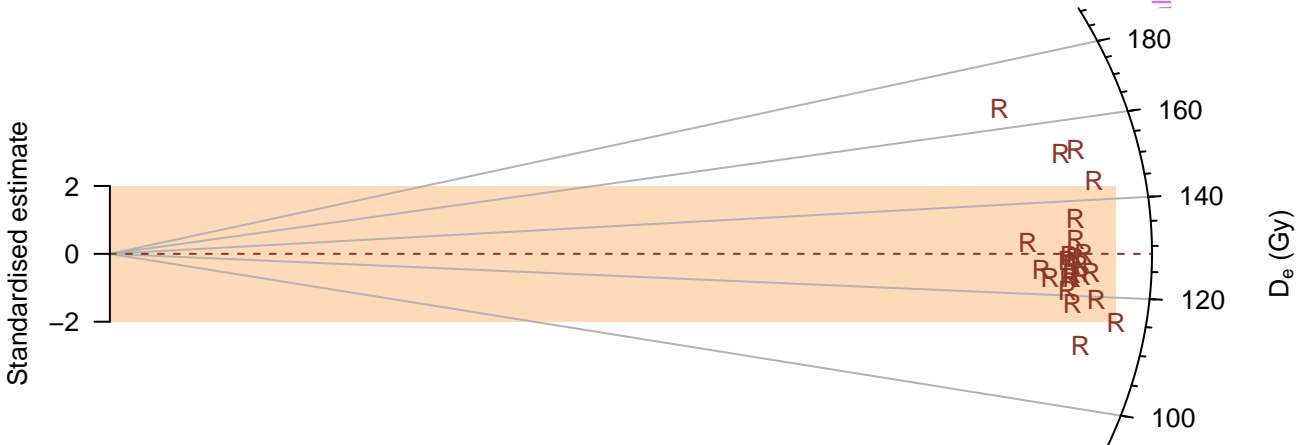


Precision

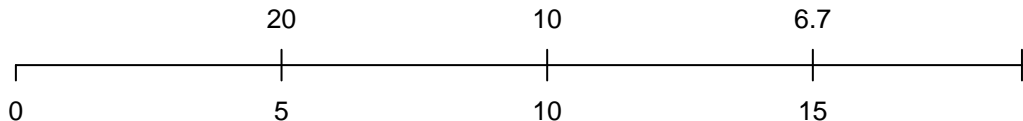
D_e distribution

n = 25 | in 2 sigma = 76 %

Plot

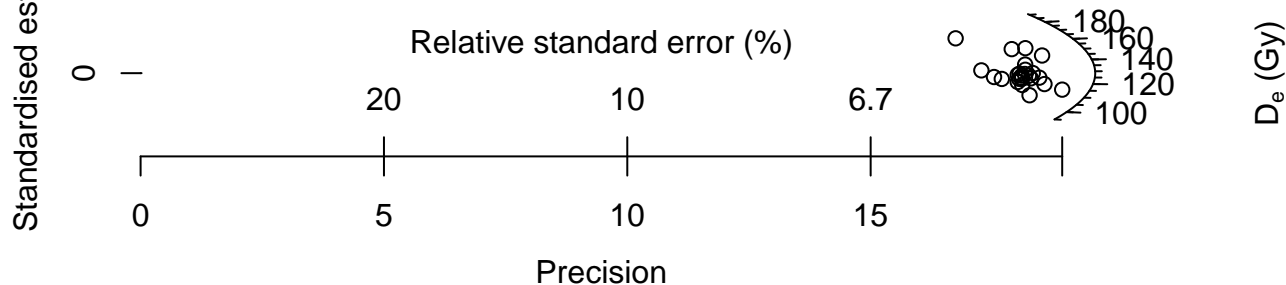


Relative standard error (%)



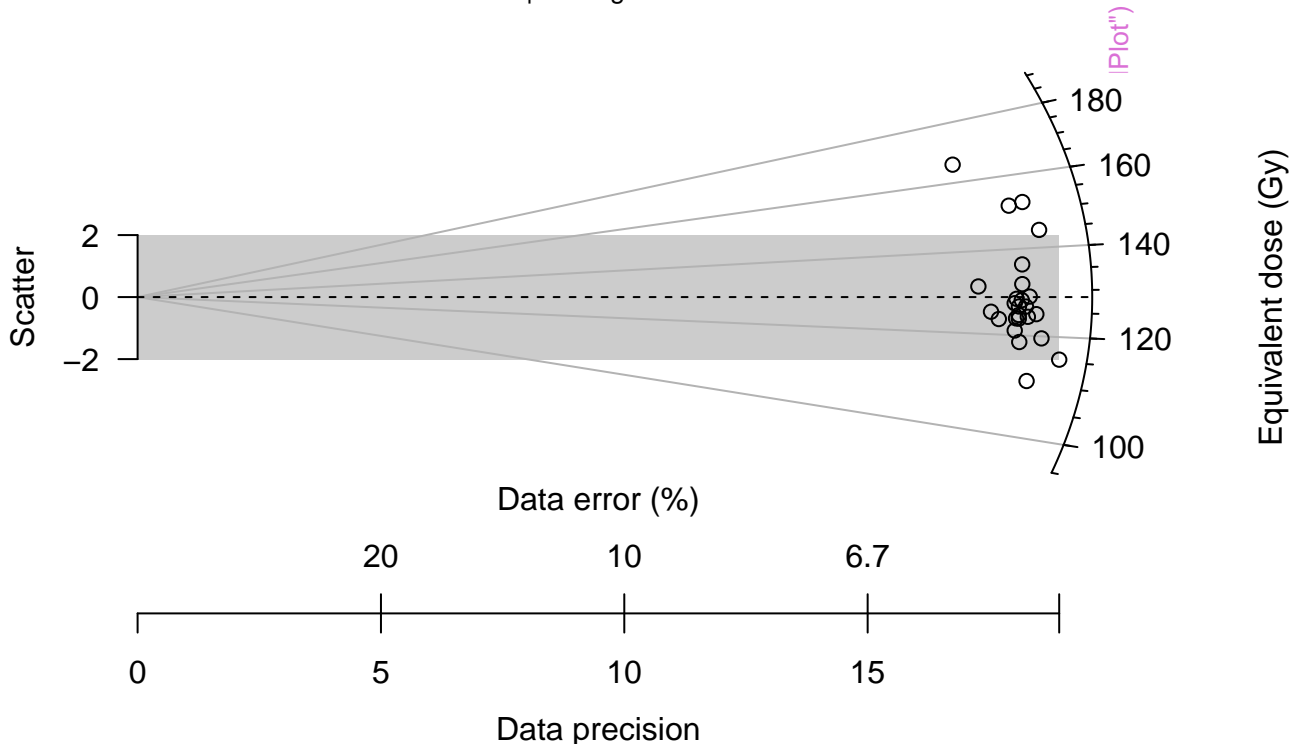
D_e distribution

n = 25 | in 2 sigma = 76 %



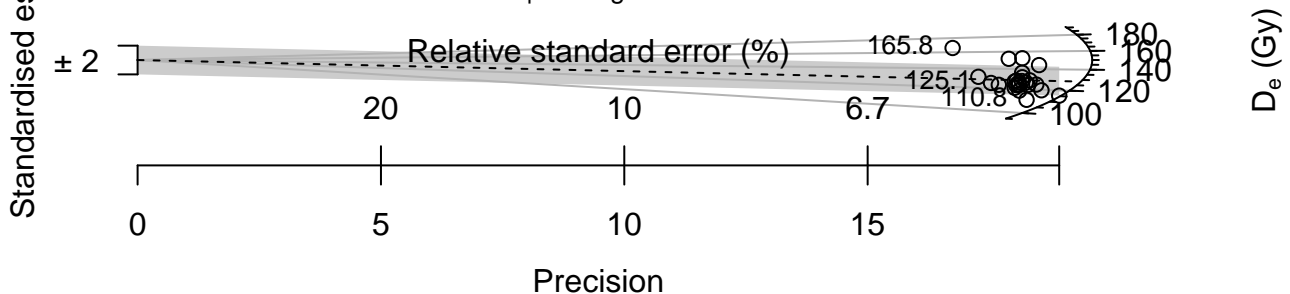
D_e distribution

n = 25 | in 2 sigma = 76 %



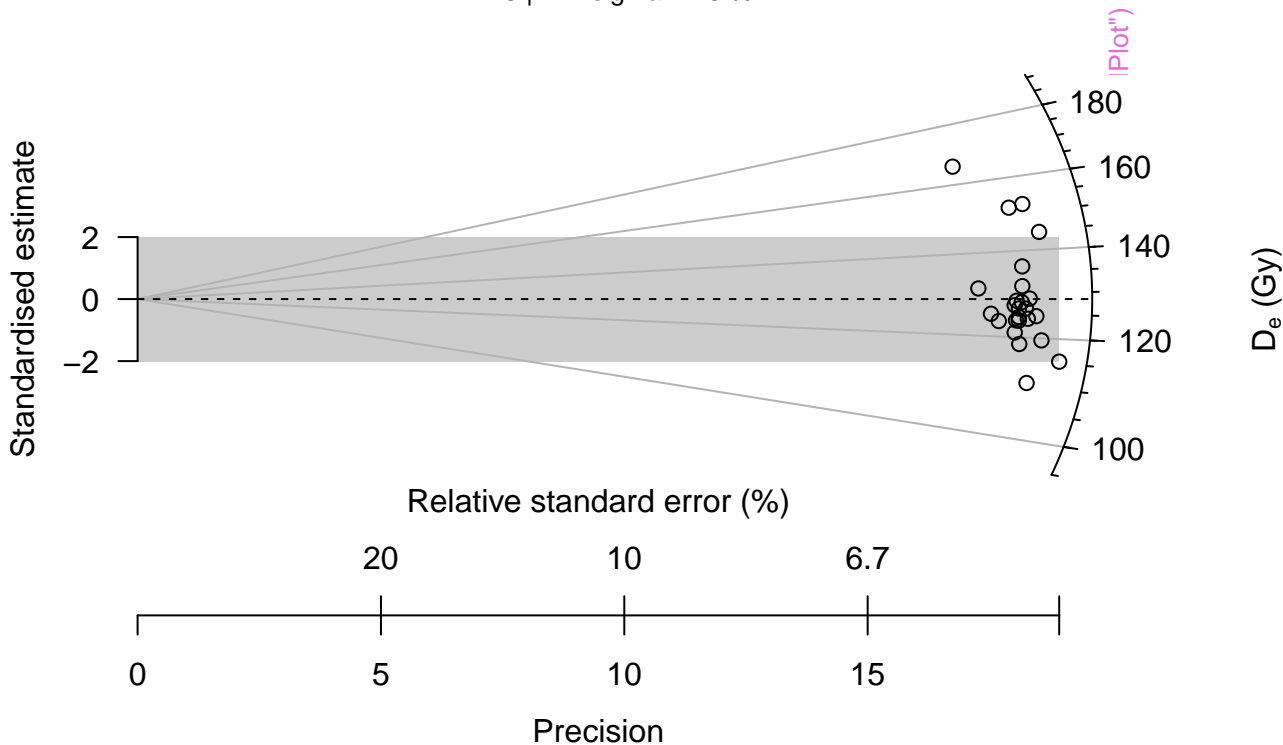
D_e distribution

n = 25 | in 2 sigma = 76 %



D_e distribution

n = 25 | in 2 sigma = 76 %



D_e distribution

weighted mean = 127.13 | median = 126.34



D_e distribution

n = 15 | in 2 sigma = 73.3 %

n = 10 | in 2 sigma = 100 %



D_e distribution

n = 15 | in 2 sigma = 73.3 %

n = 10 | in 2 sigma = 100 %

