

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

USER

Record: 1



IRSL

Record: 1



help("ExampleData.portableOSL")

Record: 1



Record: 1



USER

Record: 2



IRSL

Record: 2

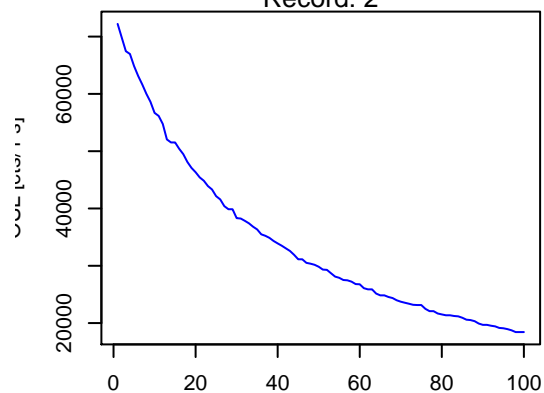


help("ExampleData.portableOSL")

Record: 2



Record: 2





USER

Record: 4



IRSL

Record: 4



help("ExampleData.portableOSL")

Record: 4



Record: 4





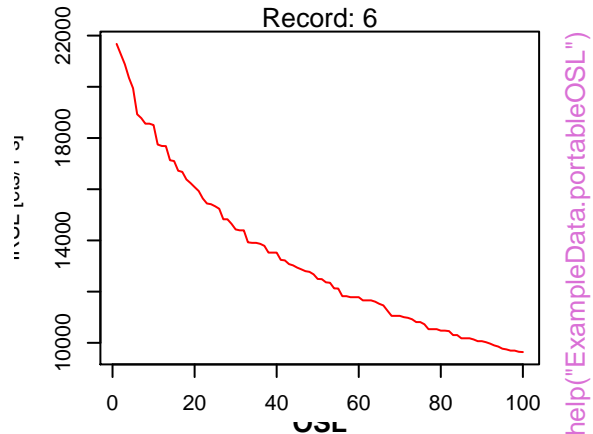
USER

Record: 6



IRSL

Record: 6

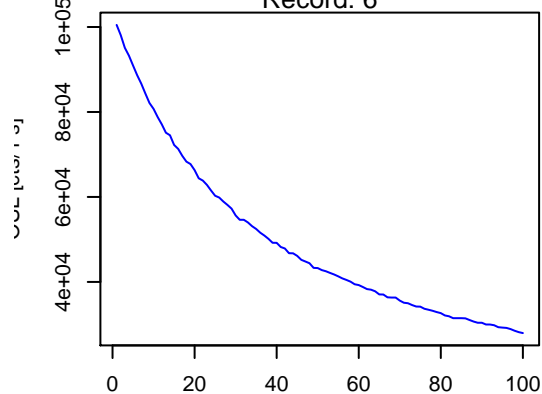


help("ExampleData.portableOSL")

Record: 6



Record: 6



Record: 6



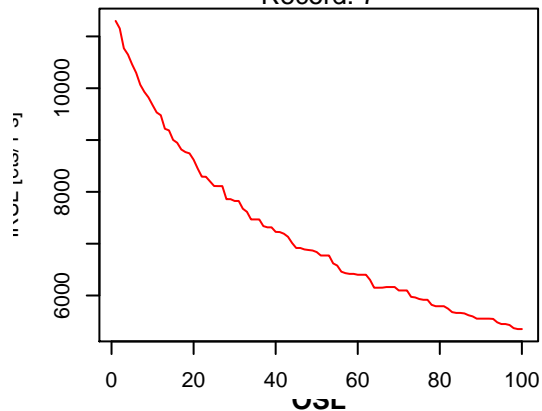
USER

Record: 7



IRSL

Record: 7

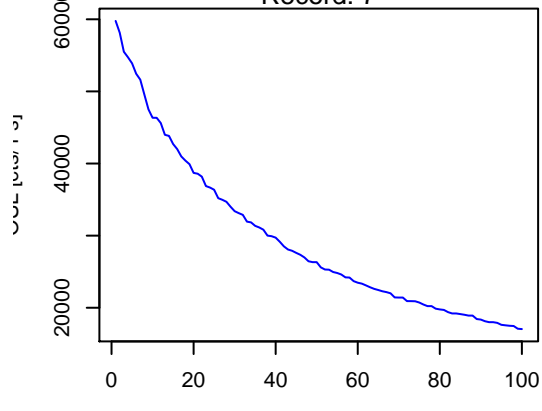


help("ExampleData.portableOSL")

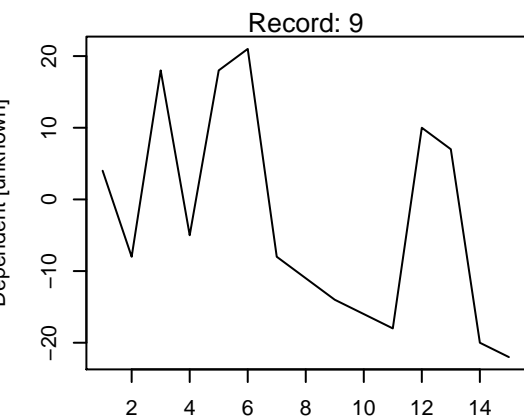
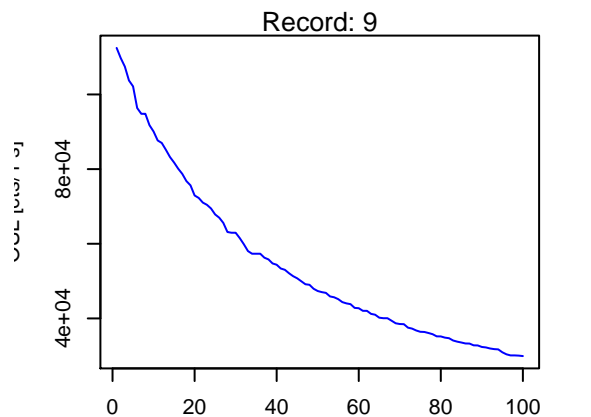
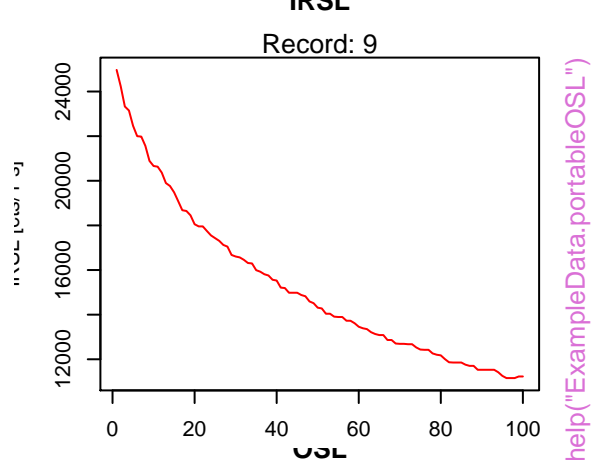
Record: 7



Record: 7







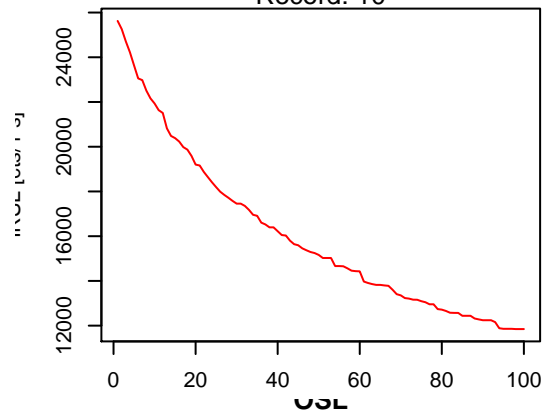
USER

Record: 10



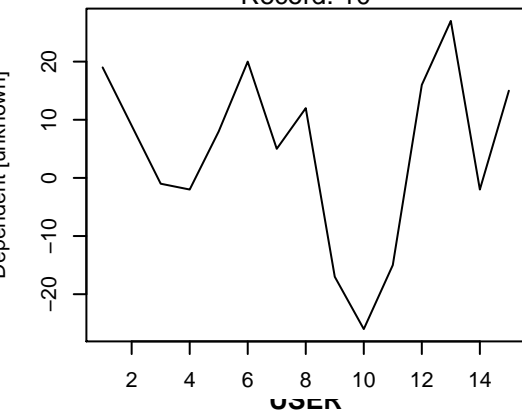
IRSL

Record: 10

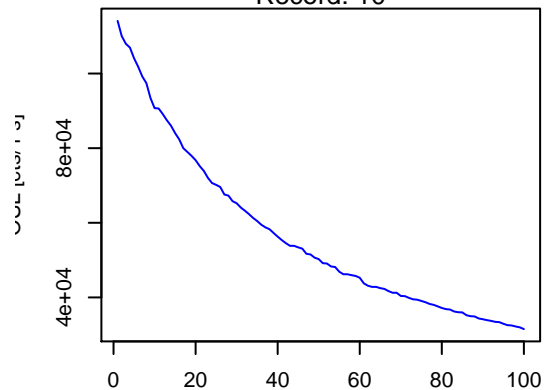


help("ExampleData.portableOSL")

Record: 10



Record: 10





USER

Record: 12



IRSL

Record: 12



help("ExampleData.portableOSL")

Record: 12



Record: 12



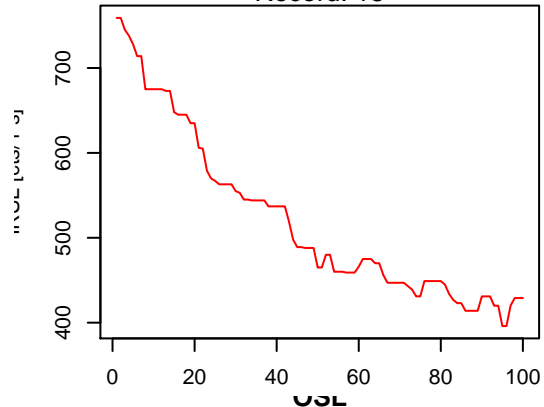
USER

Record: 13



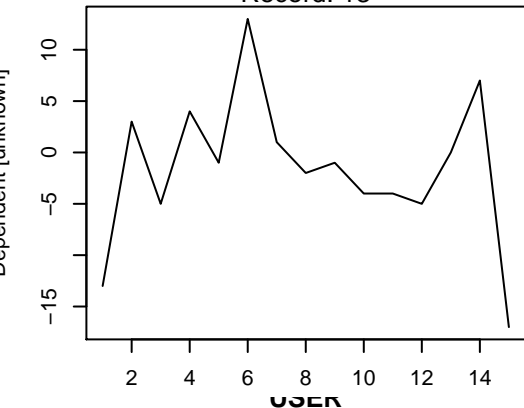
IRSL

Record: 13

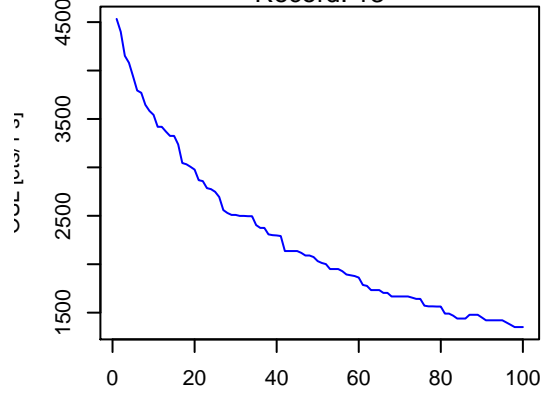


help("ExampleData.portableOSL")

Record: 13



Record: 13



USER

Record: 14



IRSL

Record: 14



help("ExampleData.portableOSL")

Record: 14



Record: 14



USER

Record: 1



IRSL

Record: 1



help("PSL2Riseo.BINfileData")

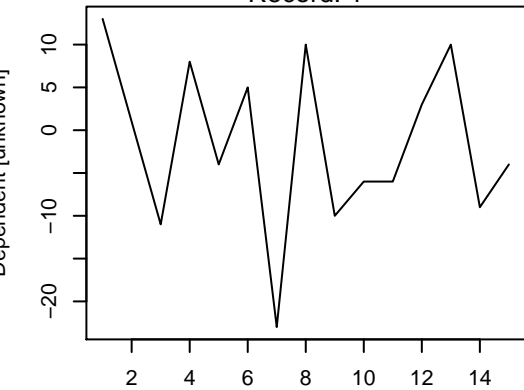
Record: 1



Record: 1



Record: 1



USER

Record: 2



IRSL

Record: 2



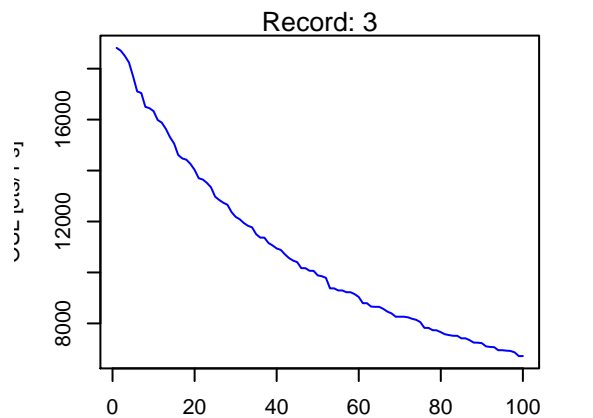
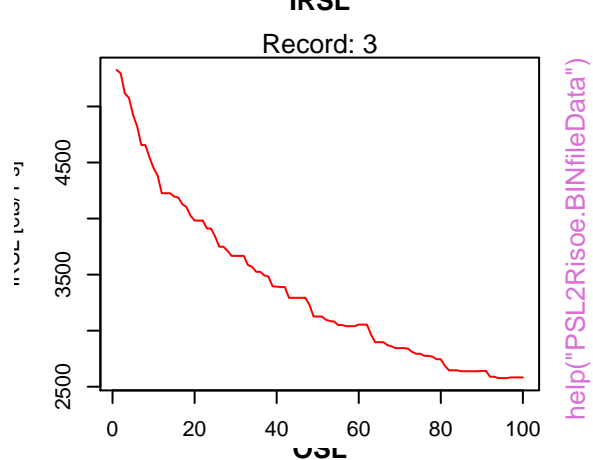
help("PSL2Riseo.BinfileData")

Record: 2



Record: 2



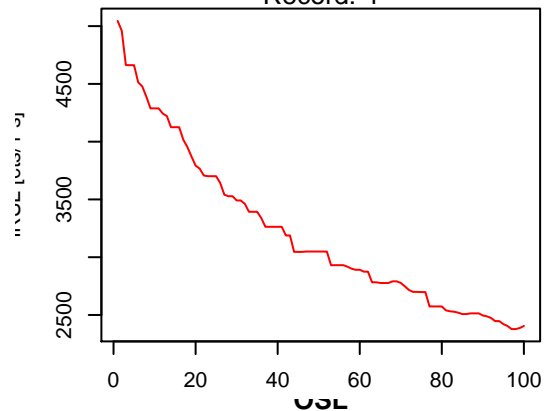


USER

Record: 4

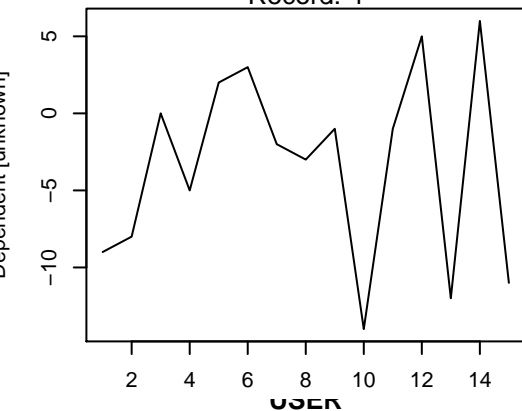


Record: 4

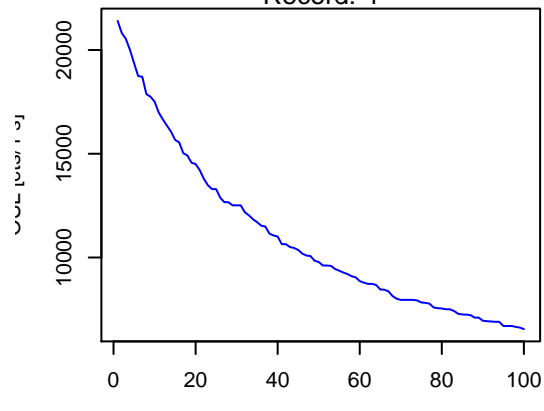


help("PSL2Riseo.BINfileData")

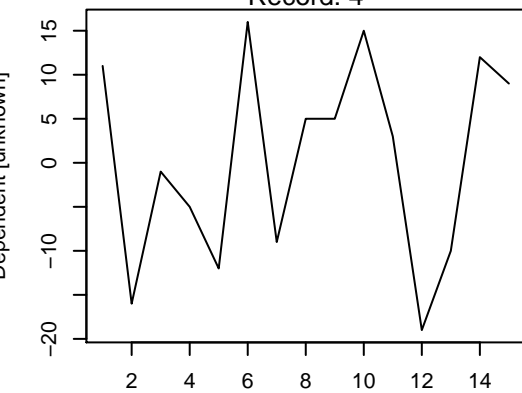
Record: 4



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



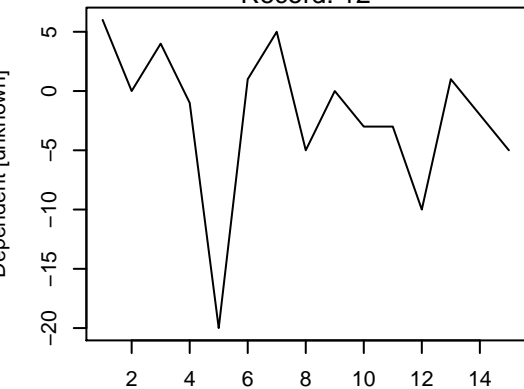
Record: 12



Record: 12



Record: 12



USER

Record: 13

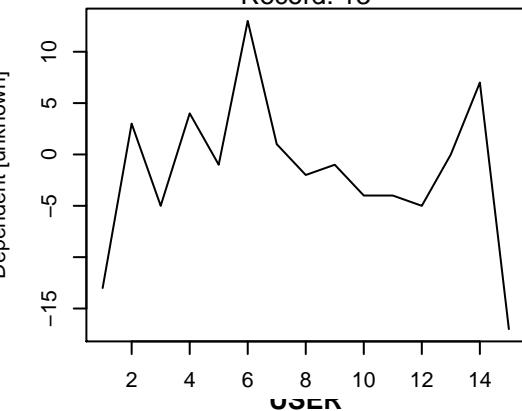


Record: 13

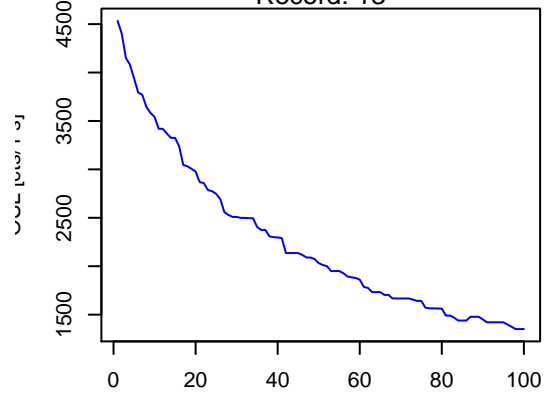


help("PSL2Riseo.BinfileData")

Record: 13



Record: 13



USER



IRSL



help("PSL2Riseo.BINfileData")



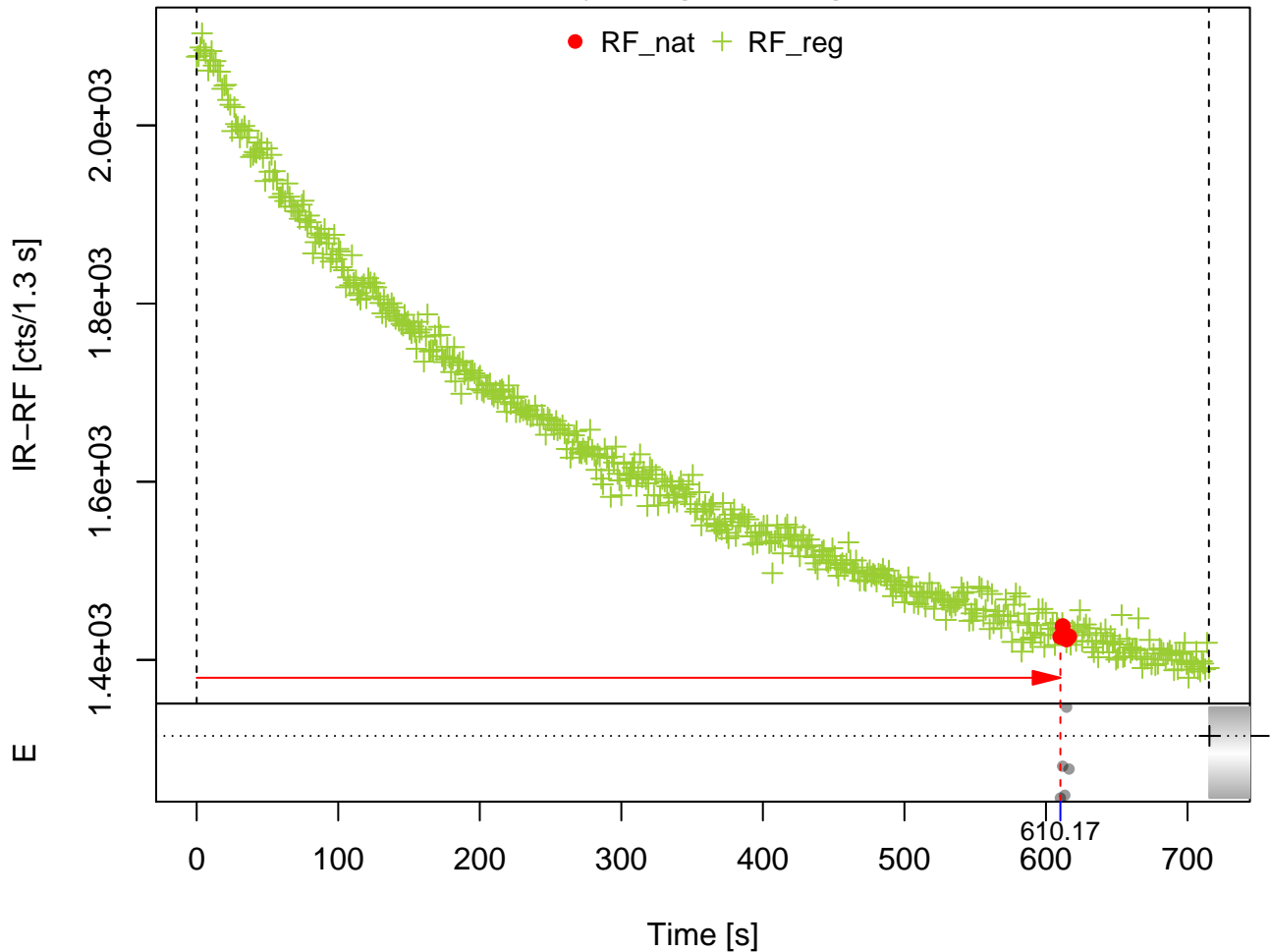
IR-RF

$D_e = 623.25$ [600.63 ; 635.8]



IR-RF

$D_e = 610.17$ [567.19 ; 653.15]



TL previous L_n, L_x 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)

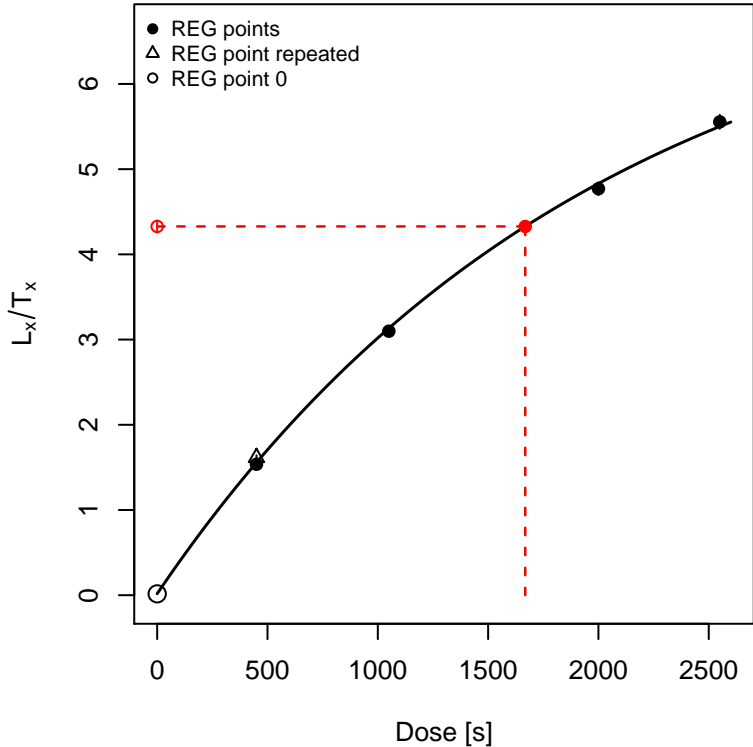
●
R4
(2550)

●
R5
(450)

●
R0
(0)

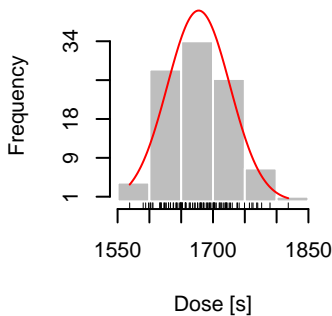
Growth curve

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

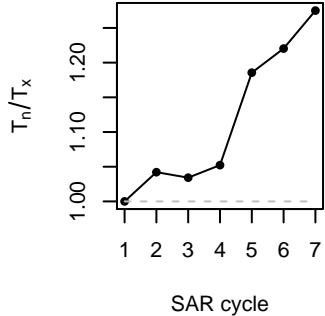


D_e from MC simulation

$D_{eMC} = 1677.48 \pm 49.22$ | 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



Natural
(0)

Natural
(136)

Natural
(317)

Natural
(544)

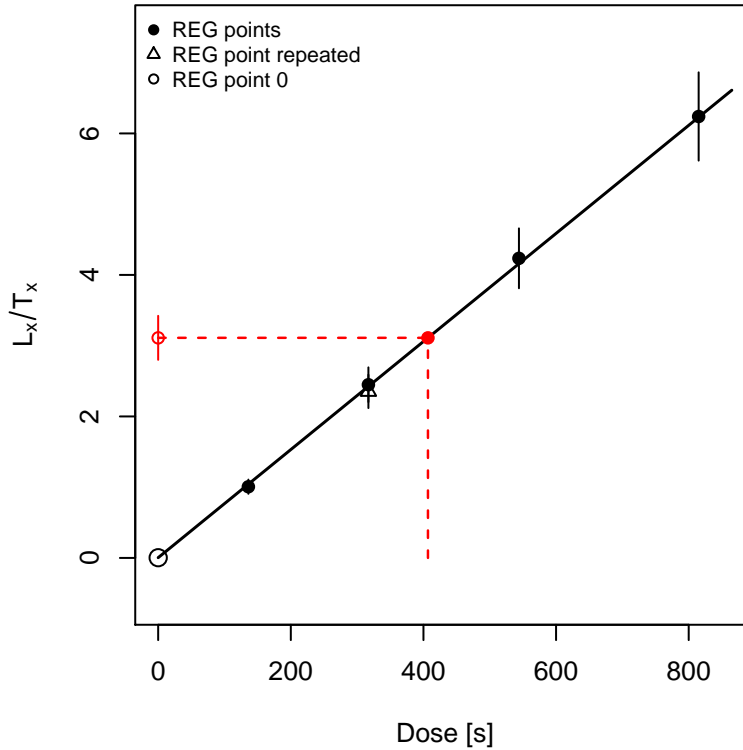
Natural
(815)

Natural
(0)

Natural
(317)

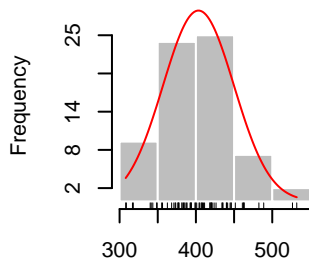
Growth curve

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



D_e from MC simulation

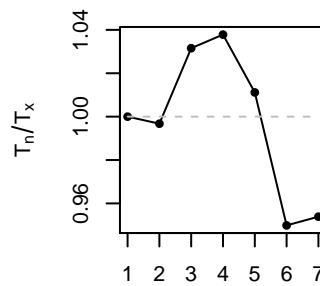
$D_{eMC} = 403.34 \pm 46.54$ | quality = 99.1 %



Dose [s]

n = 100, valid fits = 67

Test dose response



SAR cycle

Pseudo pIRIR data set based on quartz OSL

TL
pseudolRSL1
pseudolRSL2

help("analyse_pIRIRSequence")

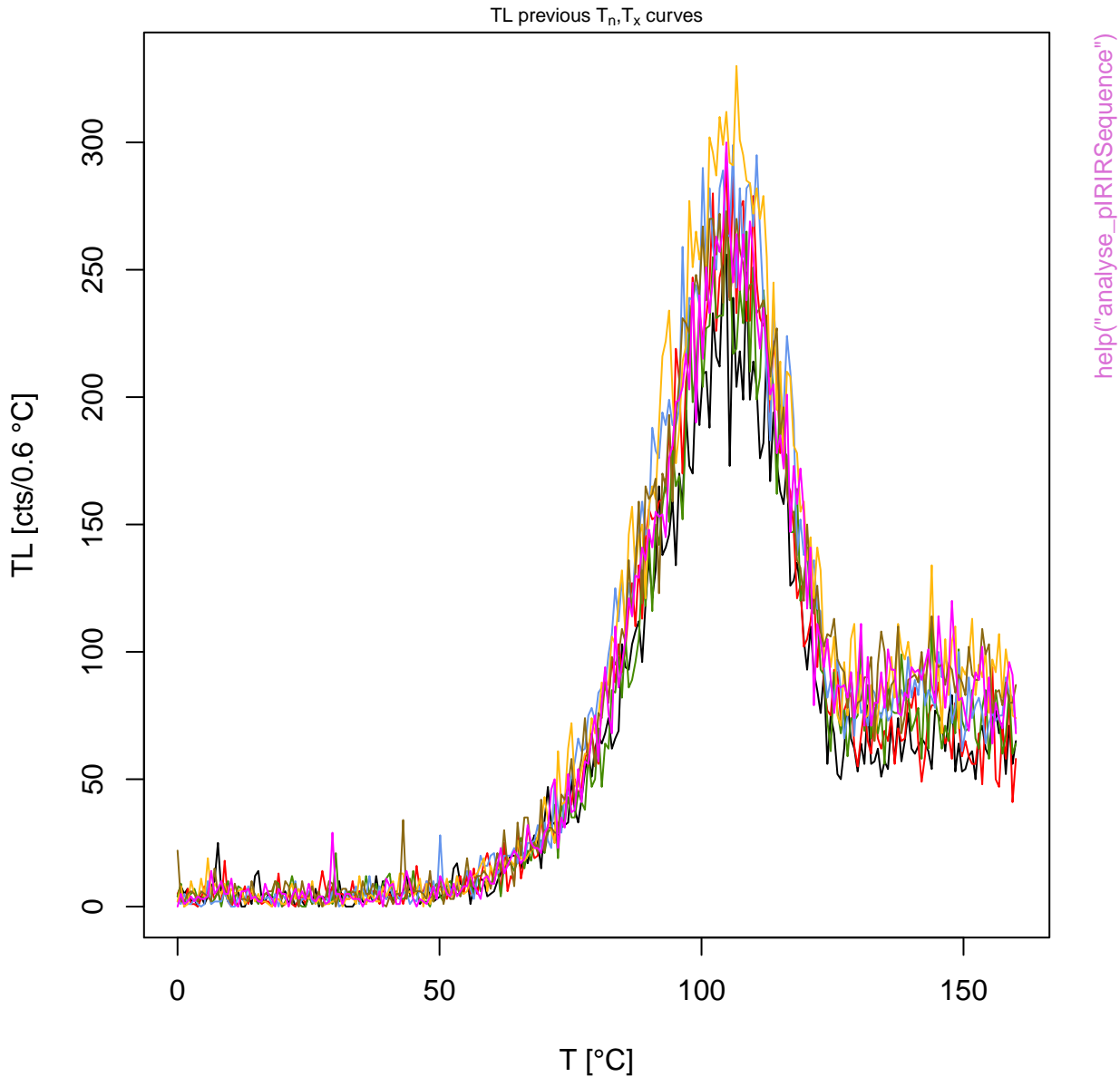
Pseudo pIRIR data set based on quartz OSL



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]

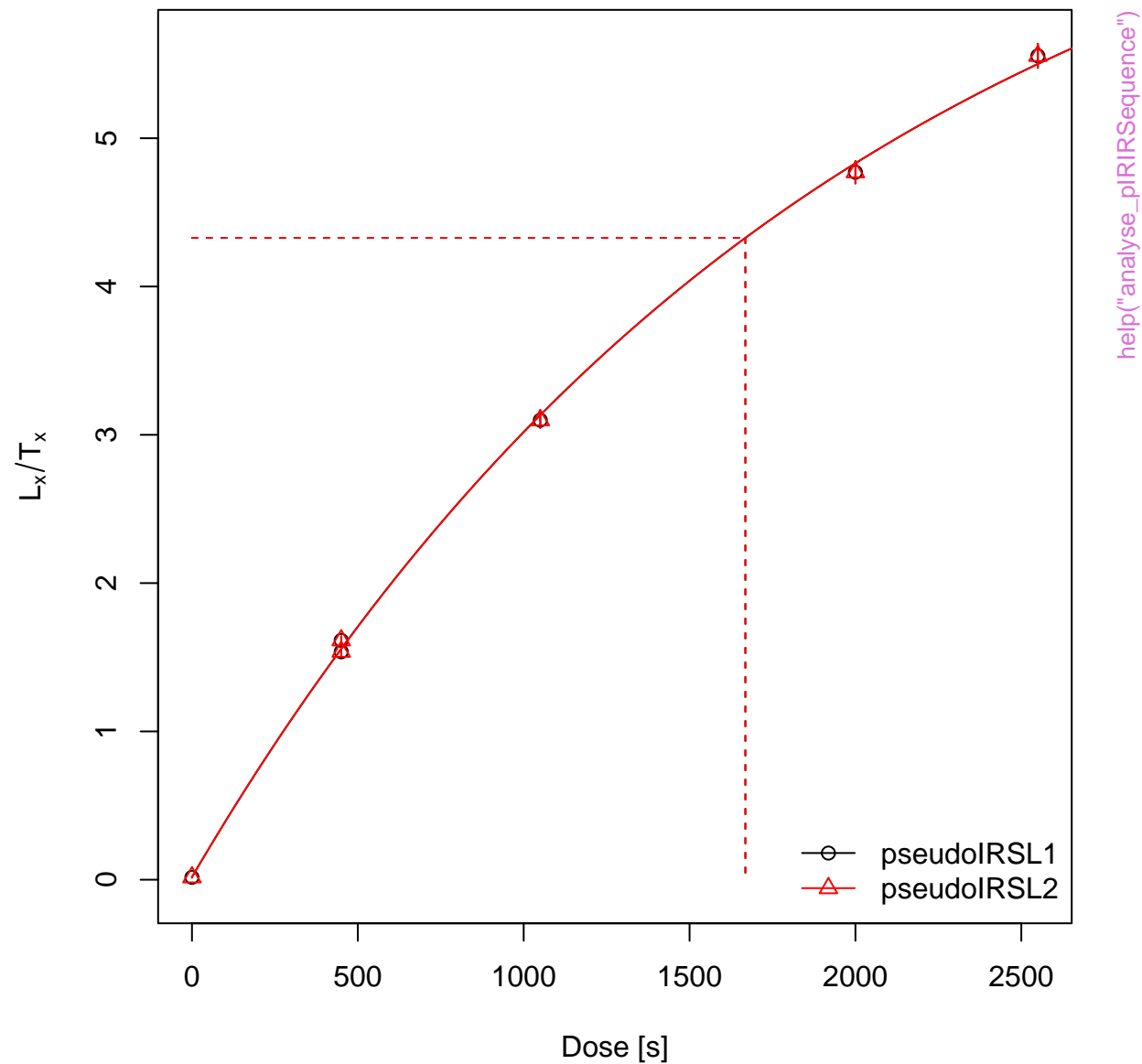
n = 100 , valid fits = 100

help("analyse_pIRSequence")

Test dose response



Summarised Dose Response Curves



Sensitivity change



Rejection criteria



USER combined



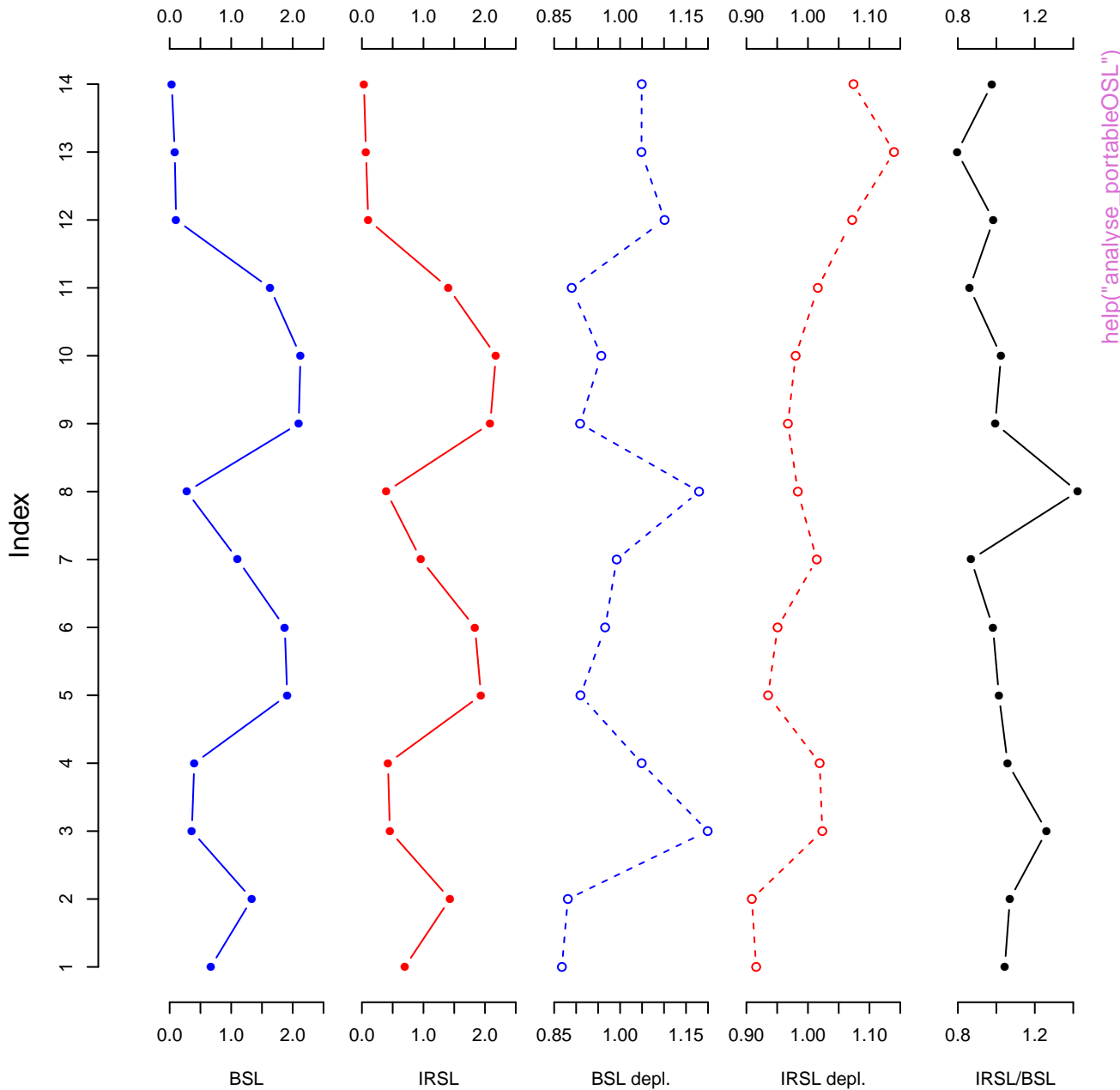
IRSL combined



help("analyse_portableOSL")

OSL combined





OSL



`help("bin_RLum.Data")`

OSL



help("bin_RLum.Data")

OSL



`help("bin_RLum.Data")`

Monte Carlo Simulation

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



Profile log likelihood for σ_{OD}



Fast Ratio



help("calc_FastRatio")

Finite Mixture Model

$\sigma_b = 0.2 \mid n = 62$

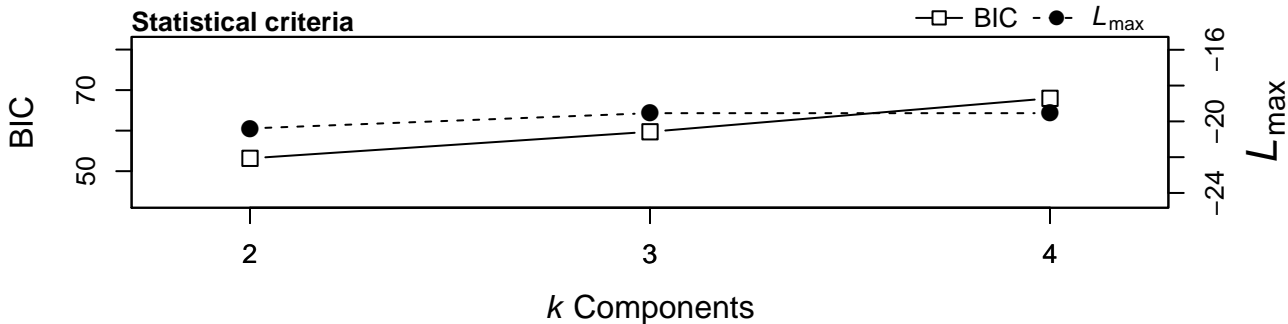
Normal distributions



Proportion of components



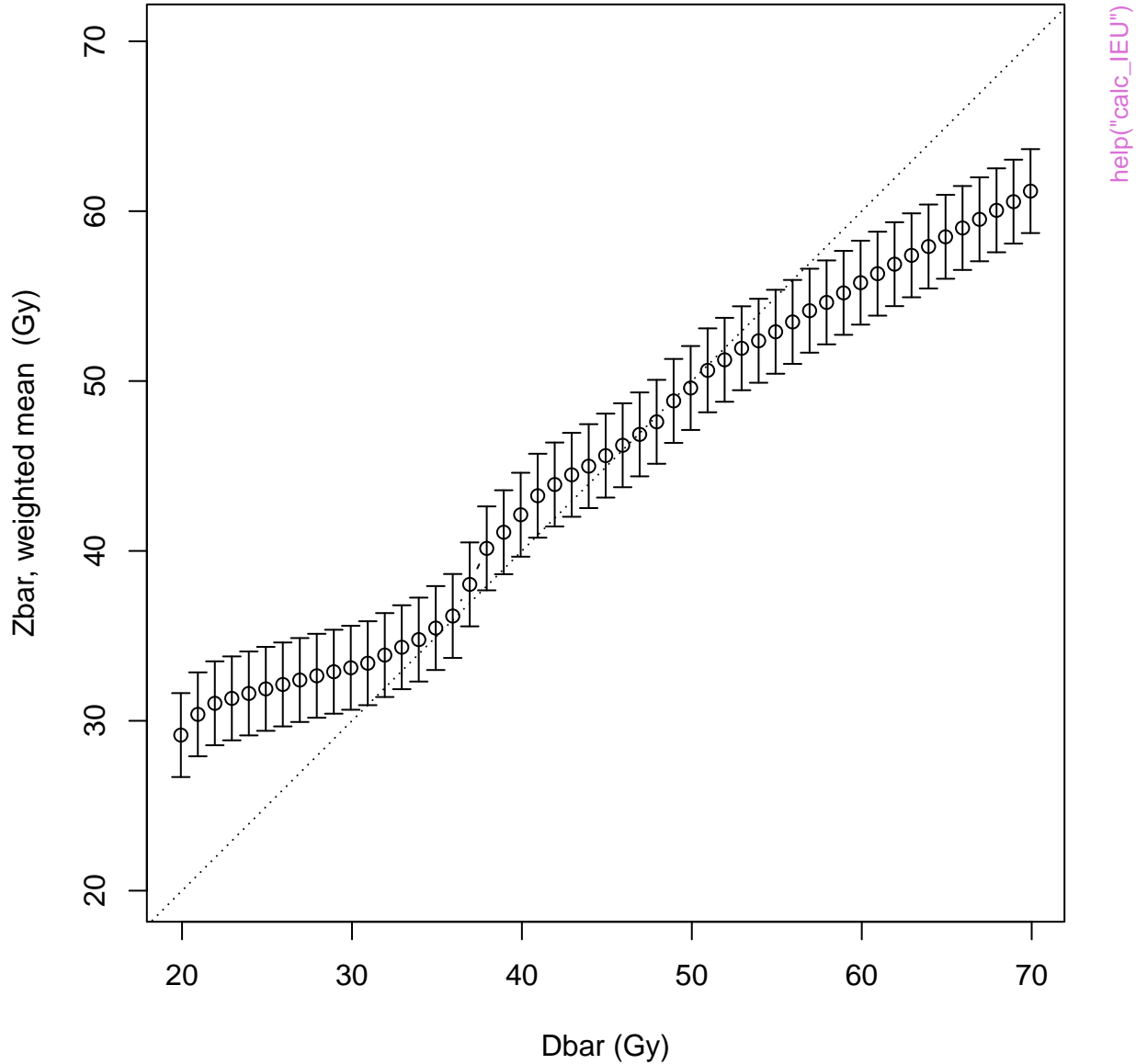
Statistical criteria



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")

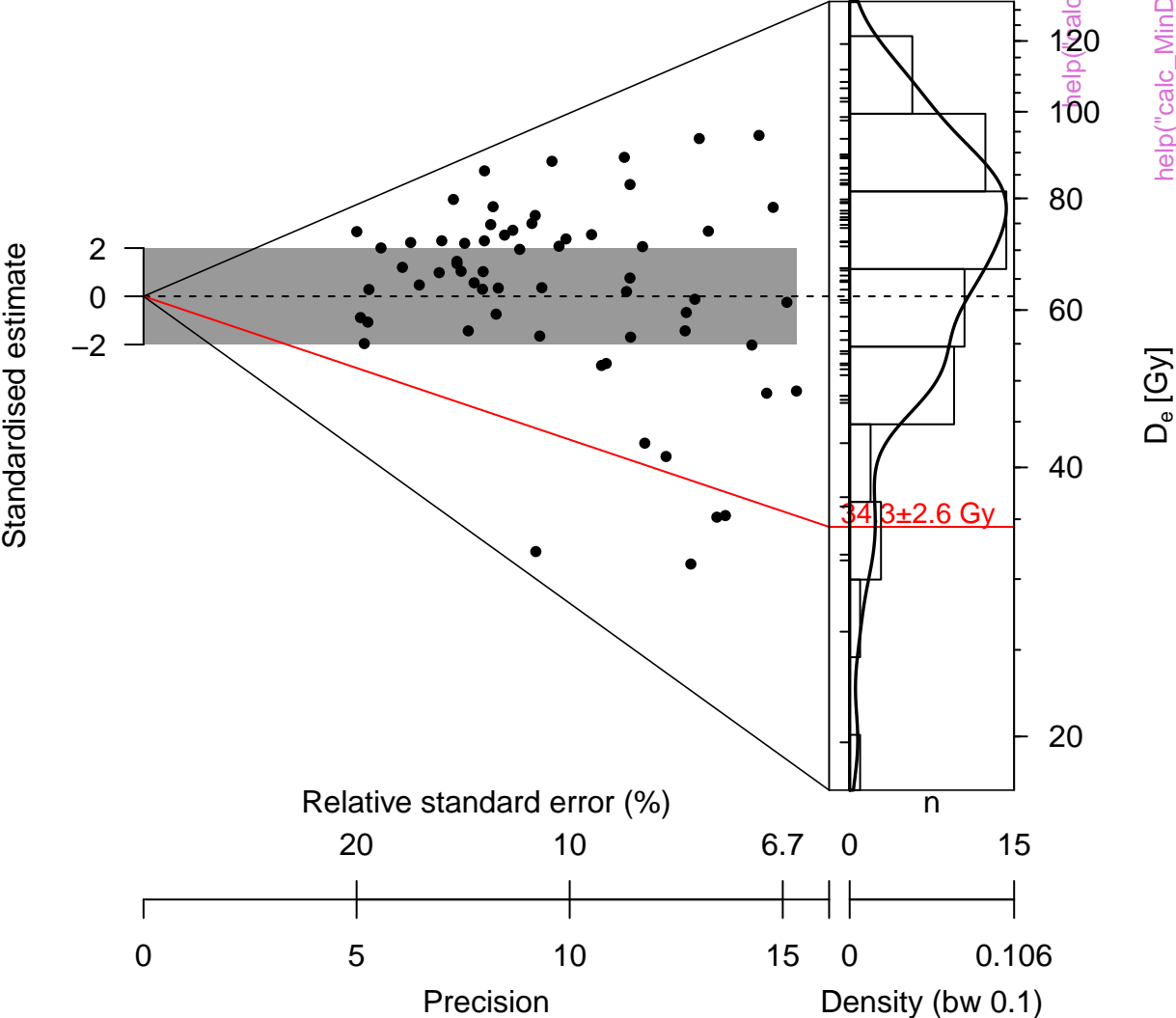
Likelihood profile: p0



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



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



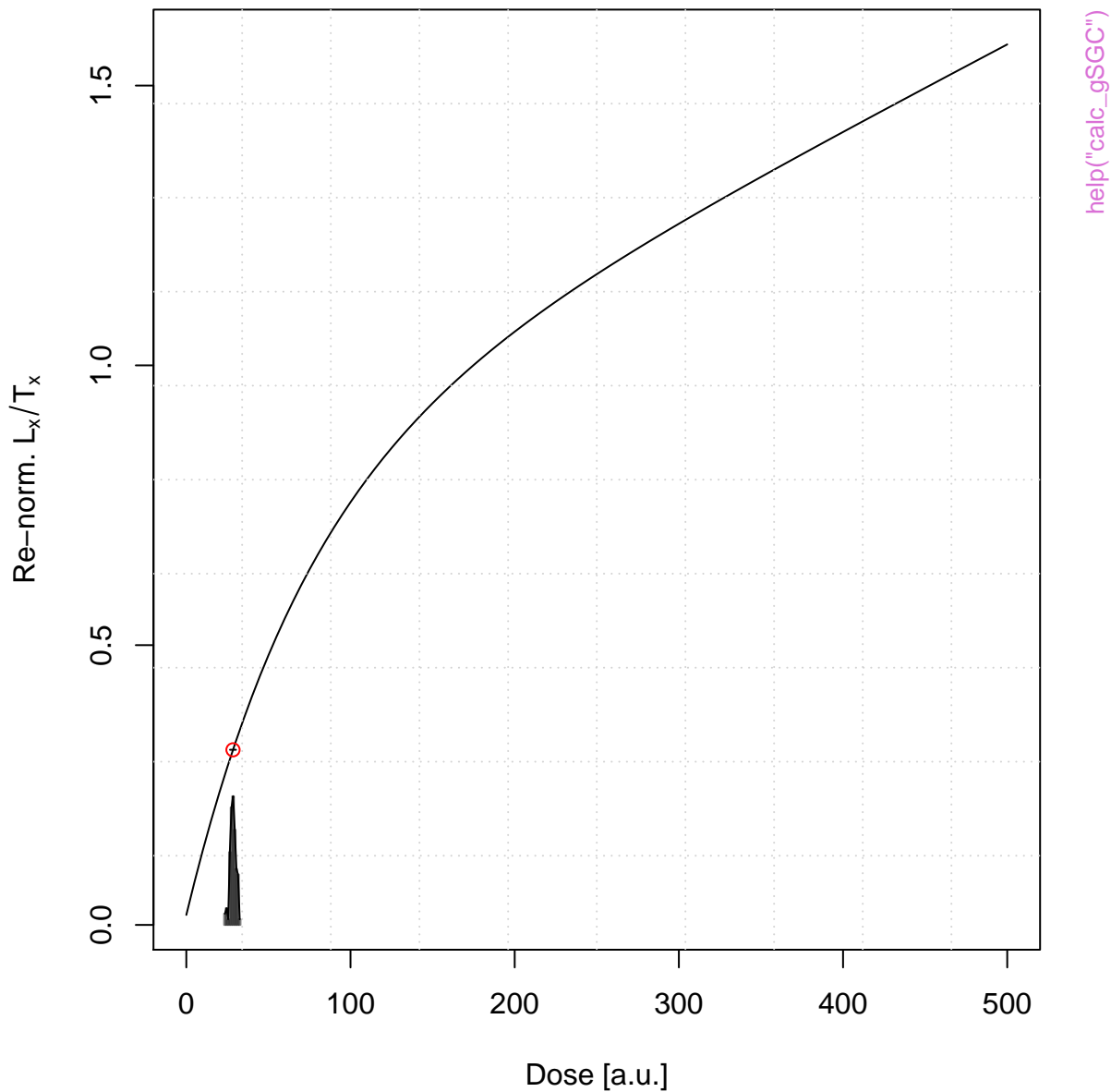
`help("calc_ThermalLifetime")`

D_e estimation applying Woda and Fuchs (2008)



help("calc_WodaFuchs2008")

gSGC and resulting De



CW Curve Fit

Default



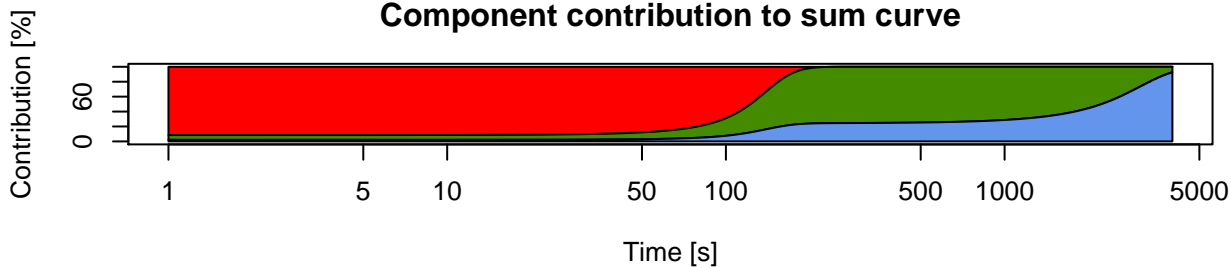
Component contribution to sum curve



Default



Component contribution to sum curve



Background



Default



Component contribution to sum curve



Default



Component contribution to sum curve

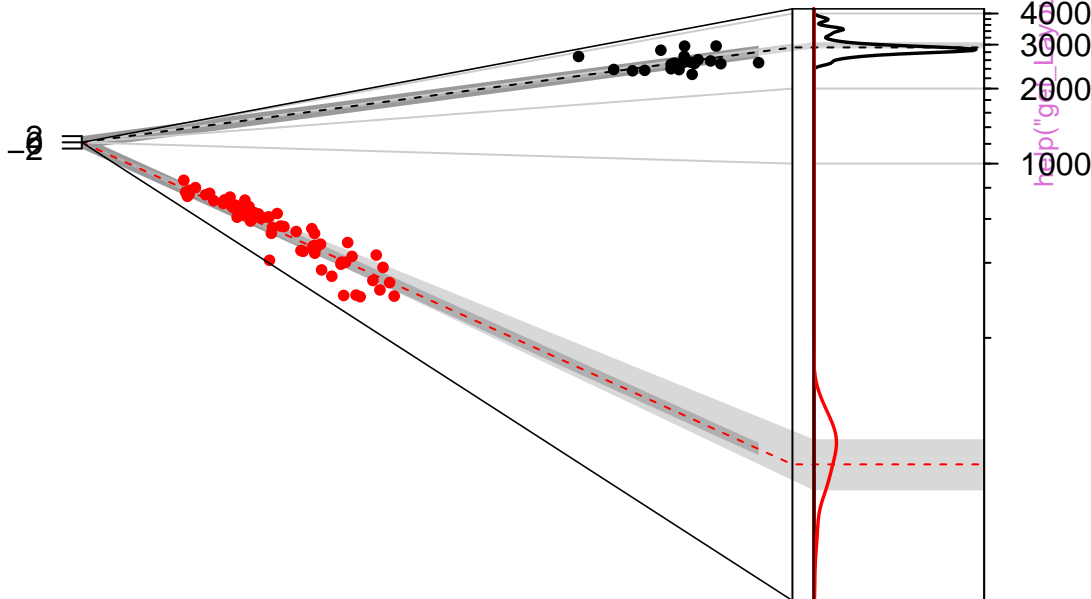


D_e distribution

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

0.015

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}



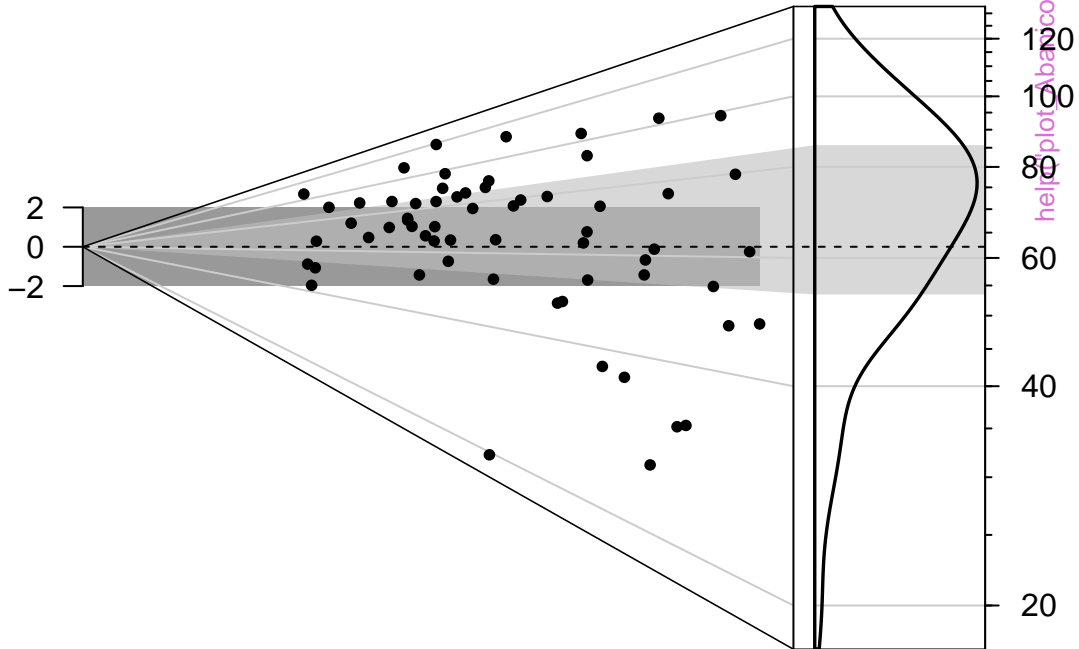
Profile log likelihood for σ_{OD}



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 [Gy]

Standard error

10

5

3.3

2.5

2

0.0

0.1

0.2

0.3

0.4

0.5

0

0.016

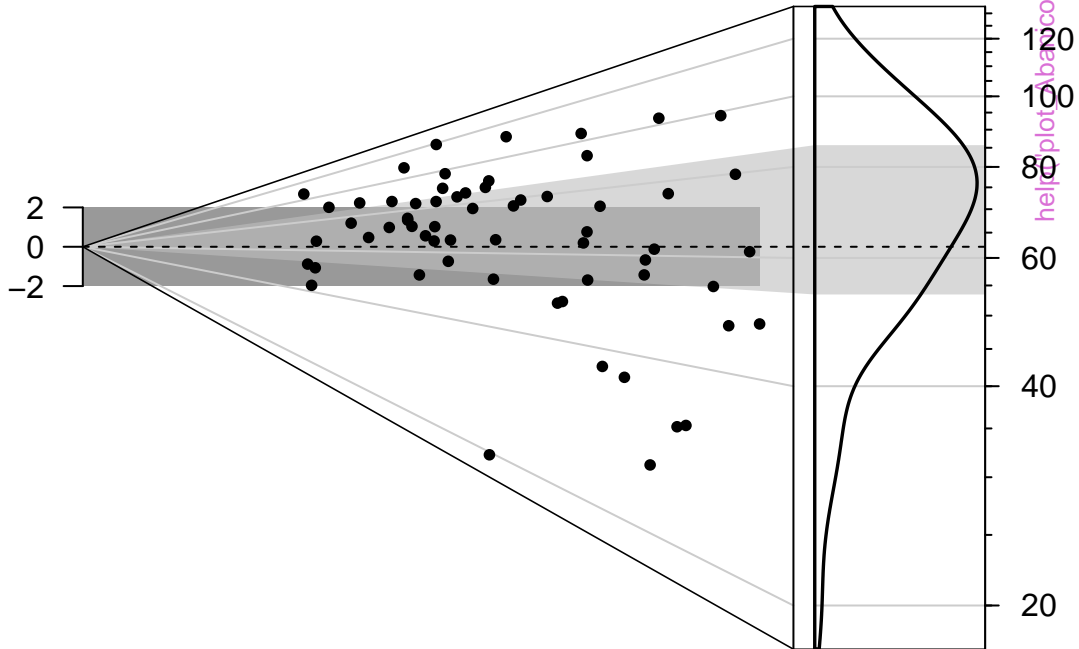
Precision

Density (bw 11.795)

D_e distribution

n = 62 | 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



D_e [Gy]

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



D_e [Gy]

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



Relative standard error (%)

20

10

6.7

0

n

15

0

5

10

15

Precision

D_e distribution

n = 62 | in 2 sigma = 41.9 %

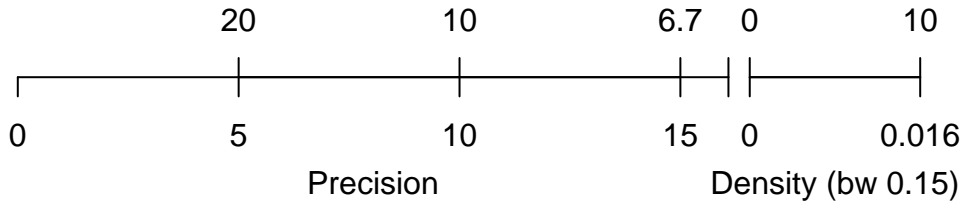
Standardised estimate



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

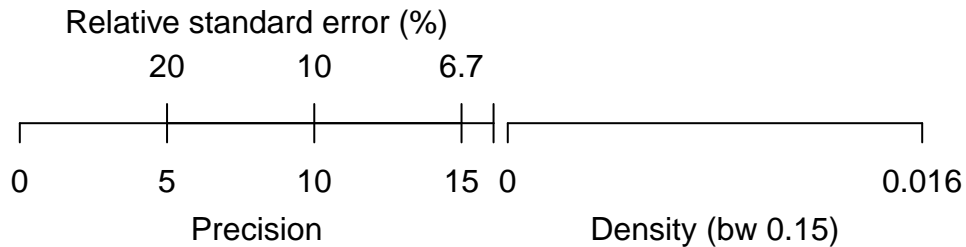
0.016

Precision

Density (bw 0.15)

D_e distribution

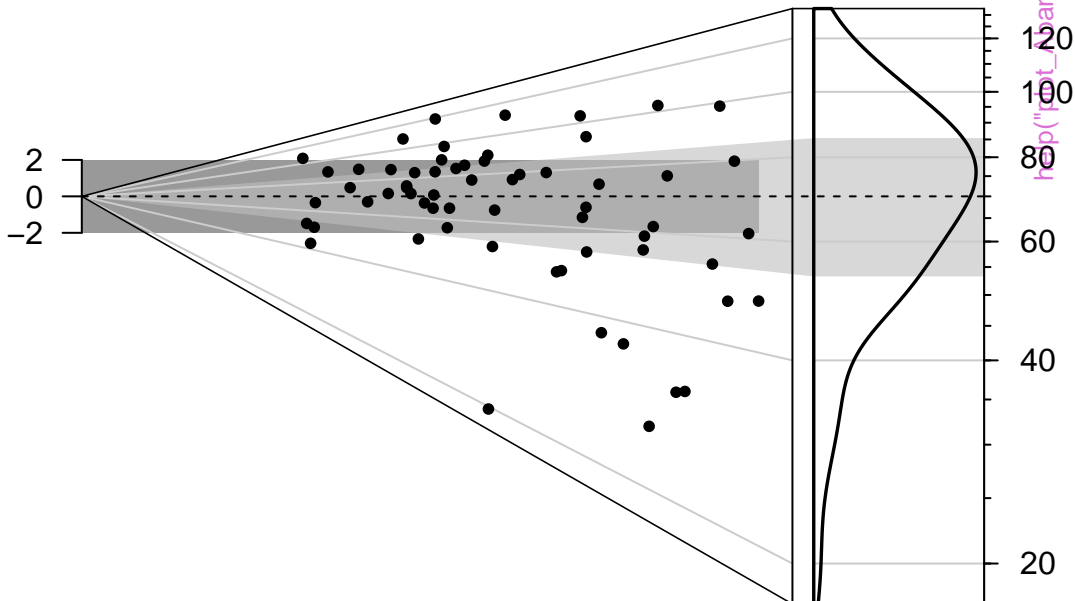
n = 62 | in 2 sigma = 41.9 %



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

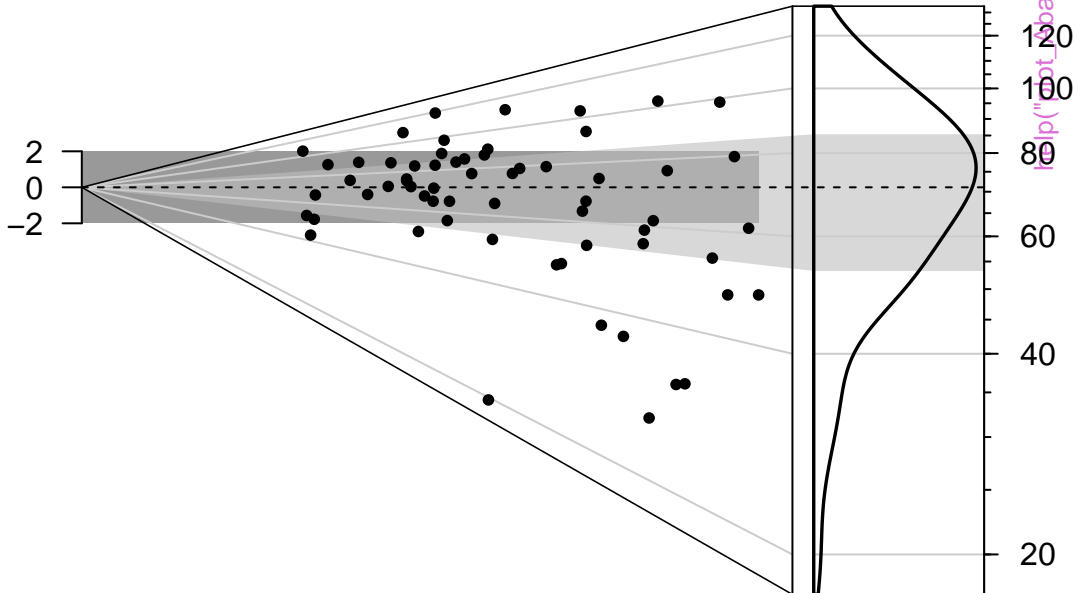
Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 54.8 %

Standardised estimate



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 = 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 = 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

120
100
80
60
40
20

D_e [Gy]

help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)



D_e distribution

n = 62 | in 2 sigma = 41.9 %



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 %



D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

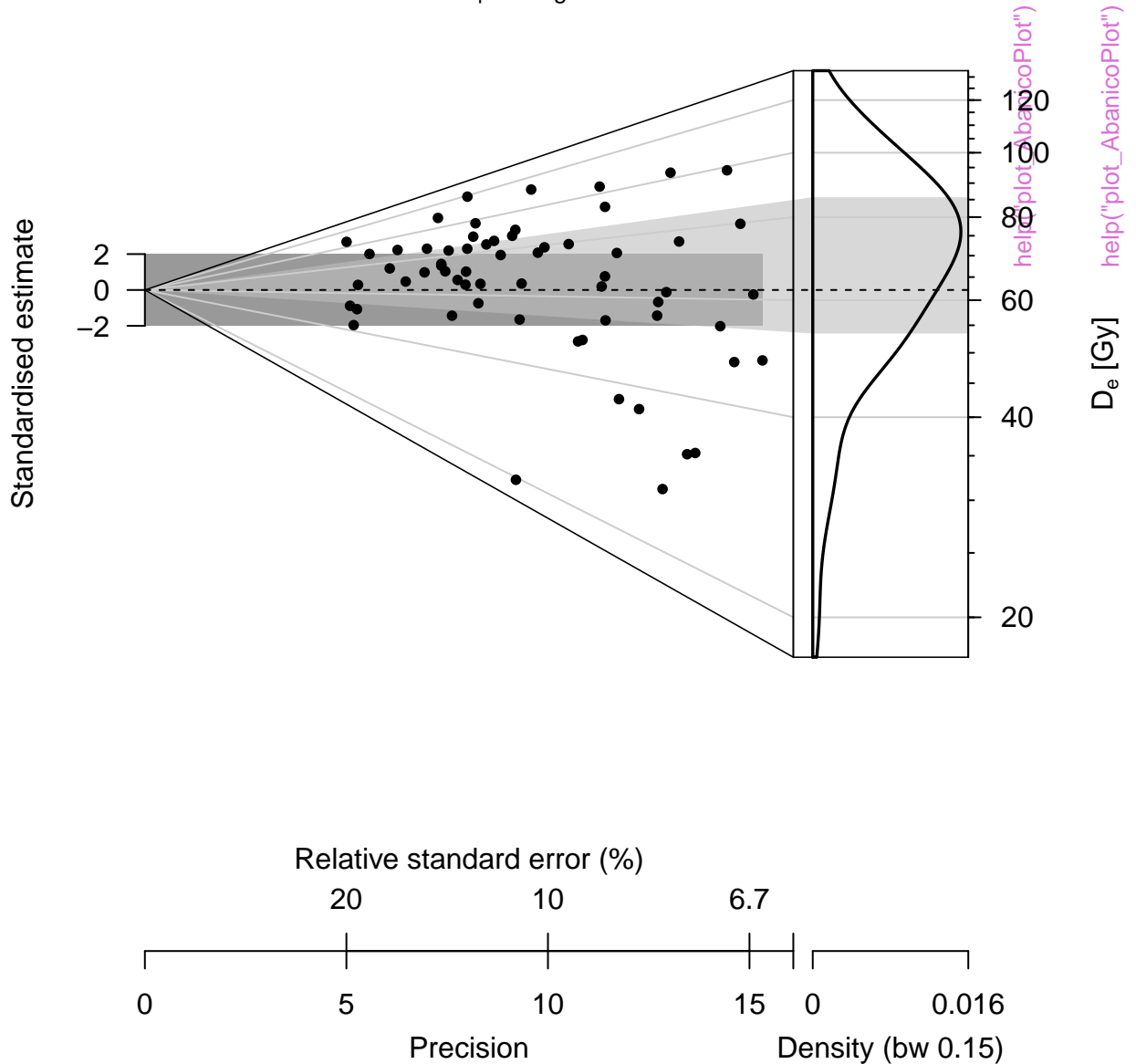
15

0.016

Precision

Density (bw 0.15)

n = 62 | in 2 sigma = 41.9 %



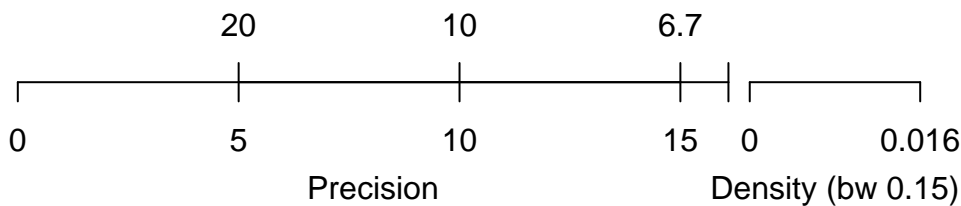
D_e distribution

median = 69.75

Standardised estimate



Relative standard error (%)

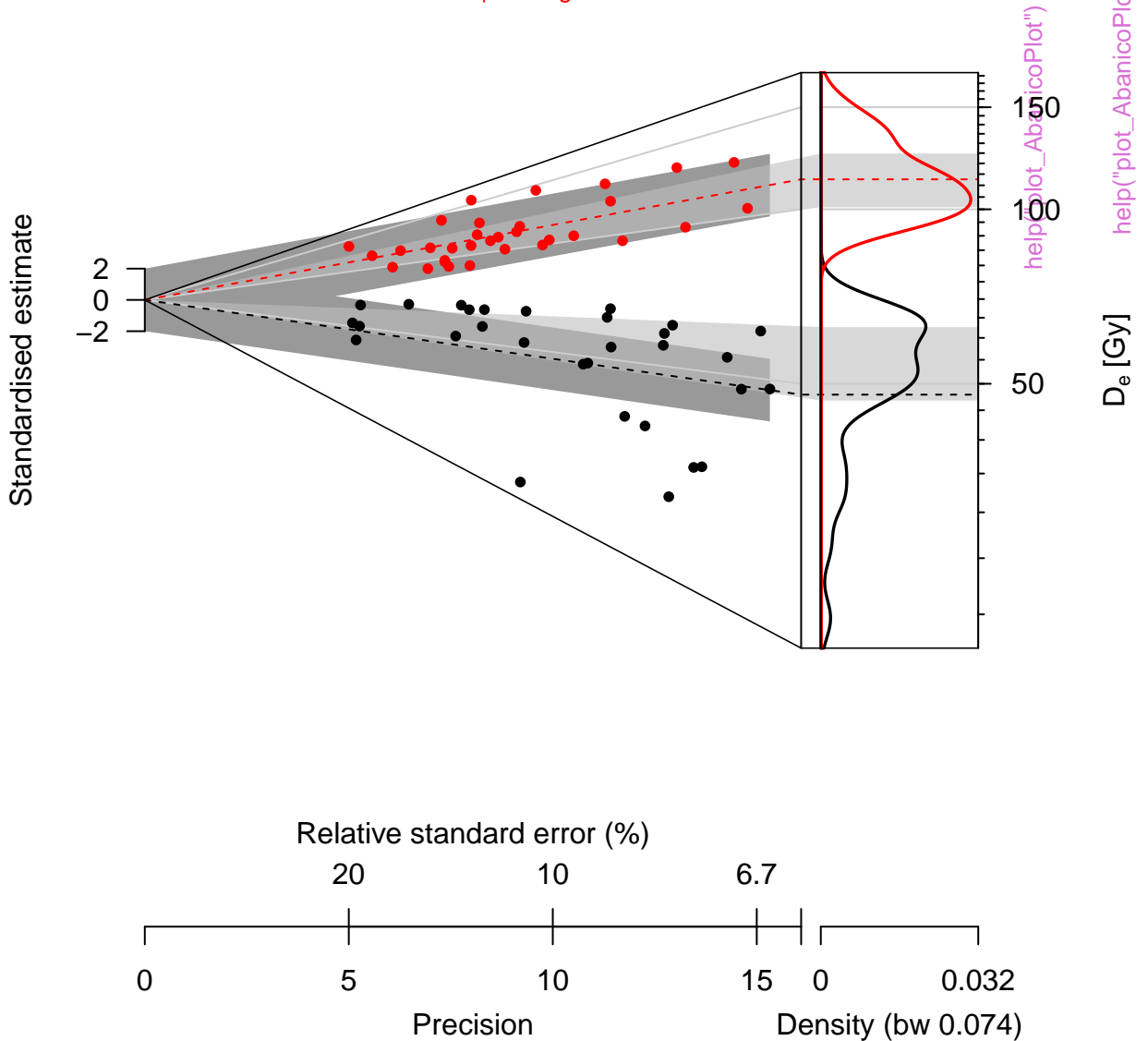


D_e distribution

n = 62 | in 2 sigma = 41.9 %



n = 32 | in 2 sigma = 87.5 %

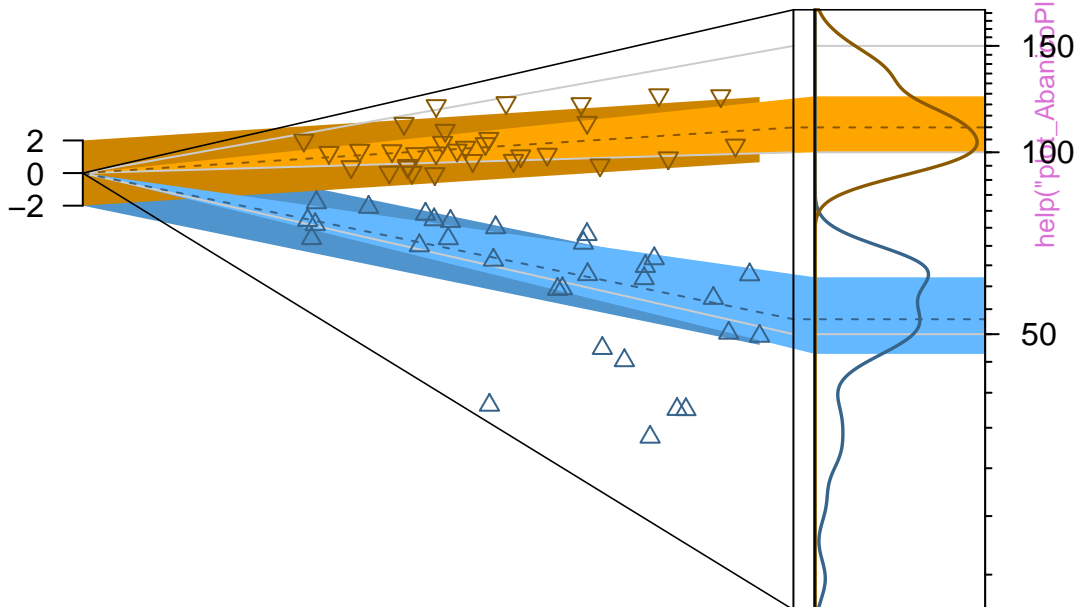


D_e distribution

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

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

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")



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)

Dose recovery test

Example data



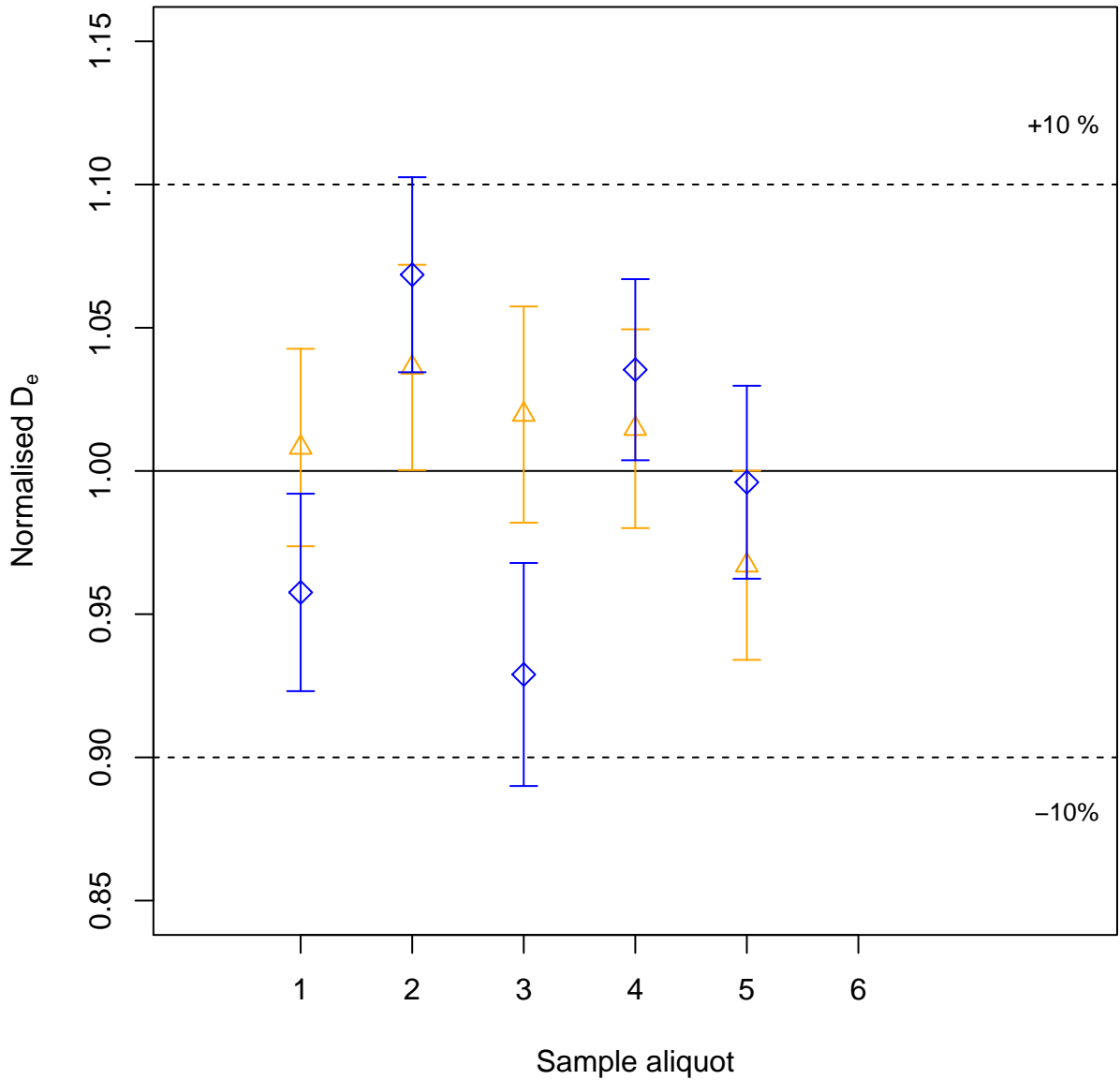
Dose recovery test



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

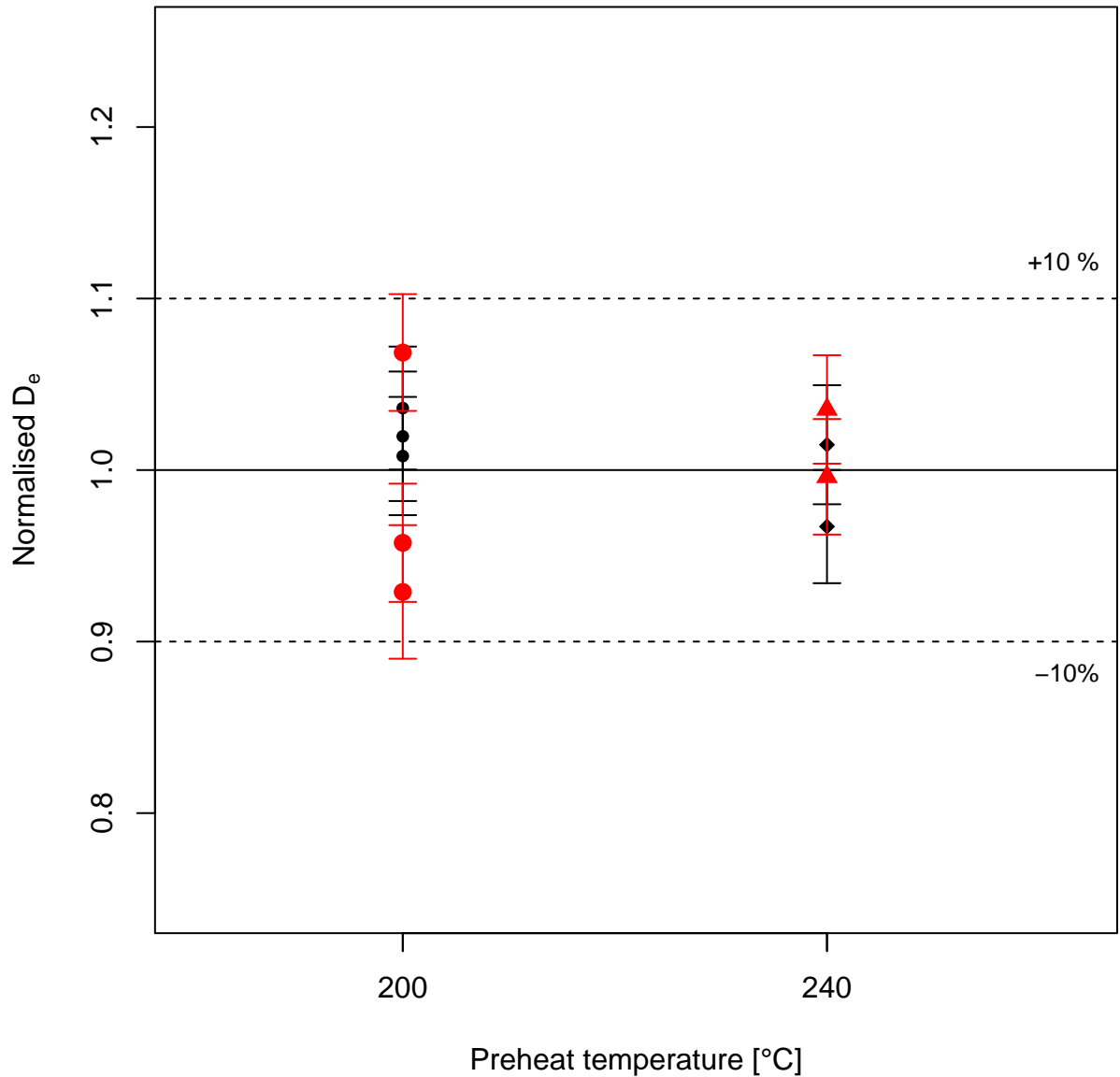


Dose recovery test

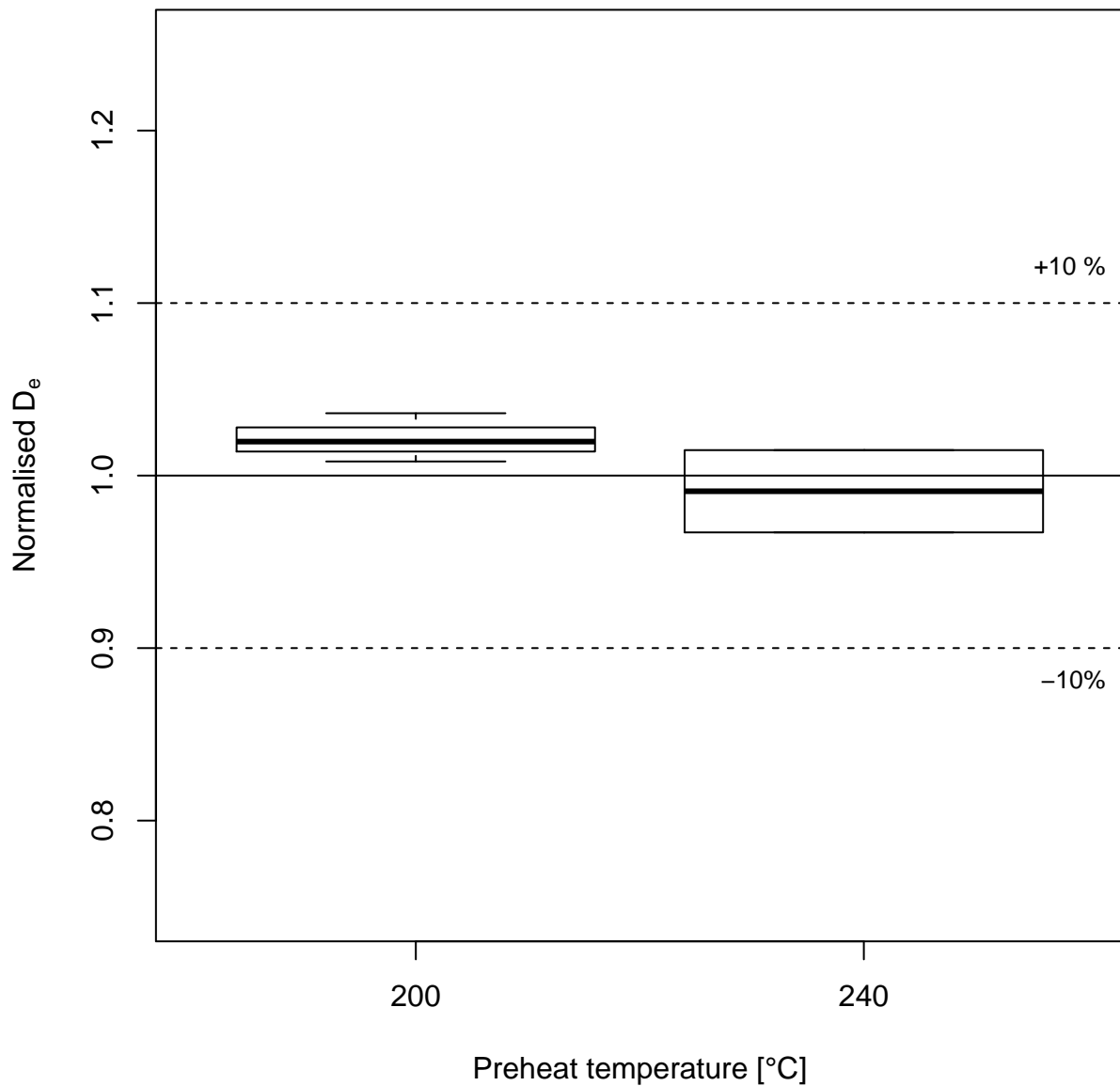
Example data



Dose recovery test



Dose recovery test



Filter Combination



Filter Combination

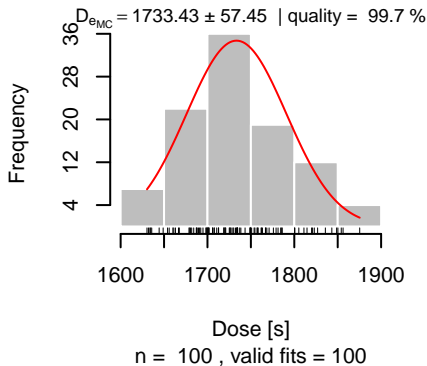


Growth curve

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



D_e from MC simulation

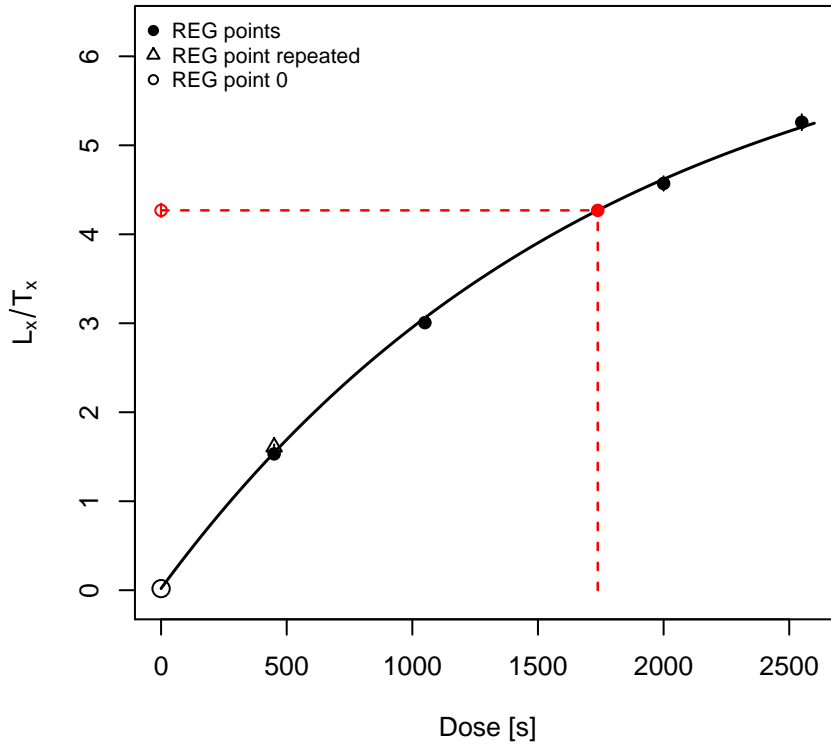


Test dose response



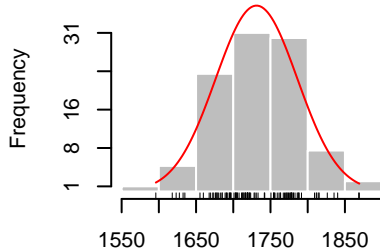
Growth curve

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



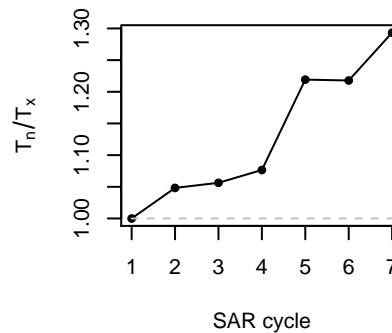
D_e from MC simulation

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



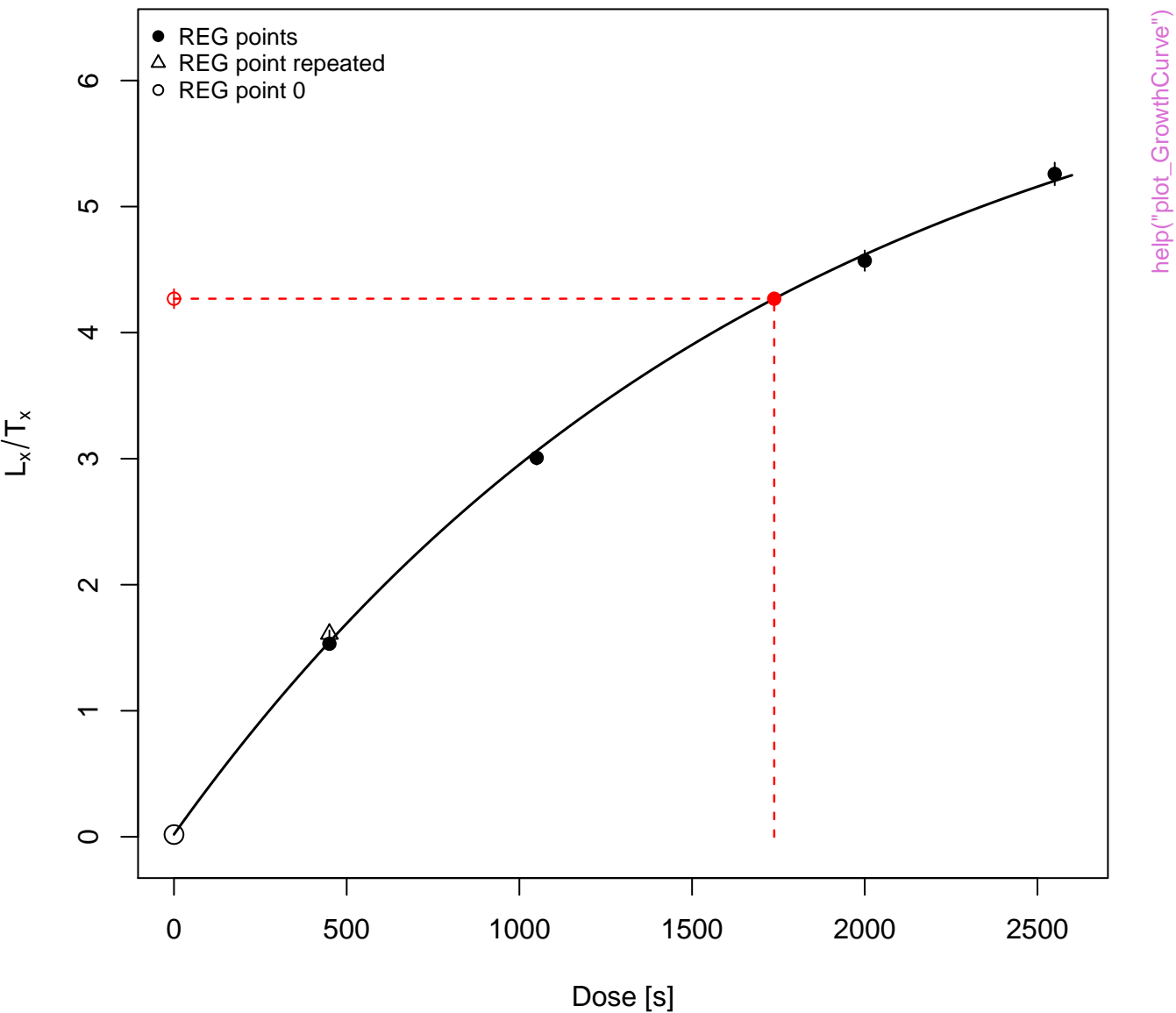
Dose [s]
n = 100 , valid fits = 100

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")

Histogram



Histogram of De-values

Example data set



D_e distribution



D_e distribution



Dose distribution

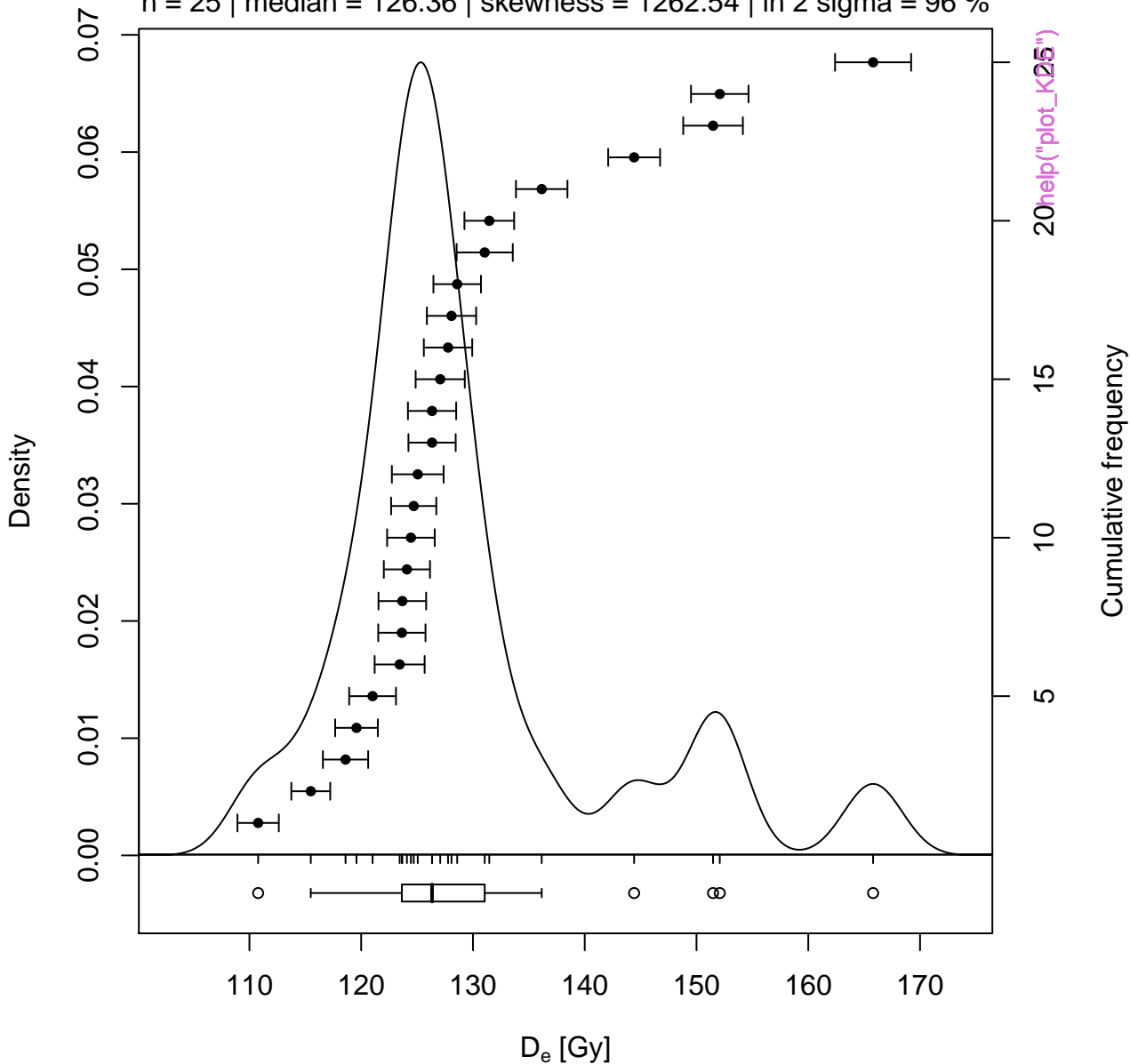


D_e distribution

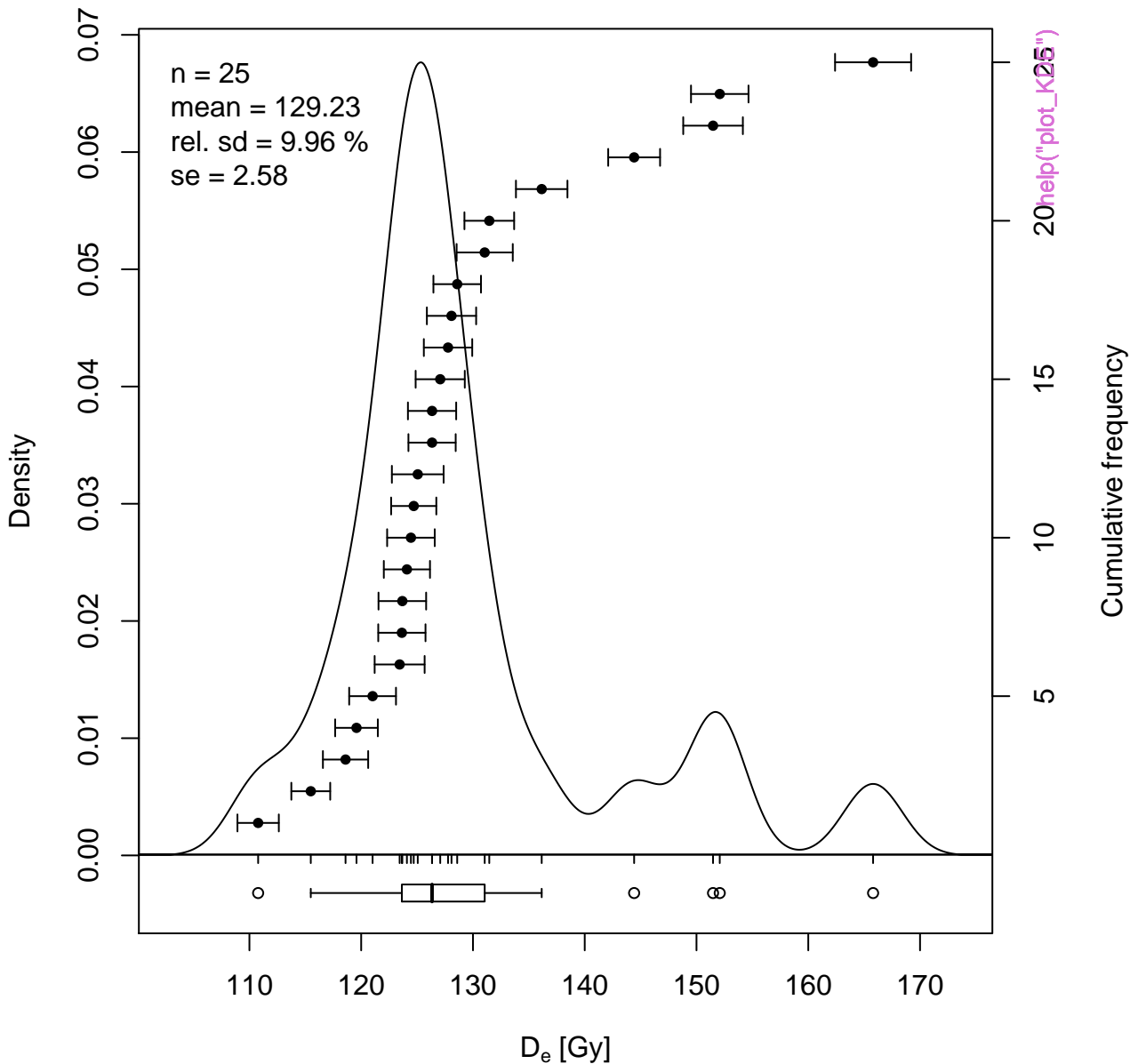


D_e distribution

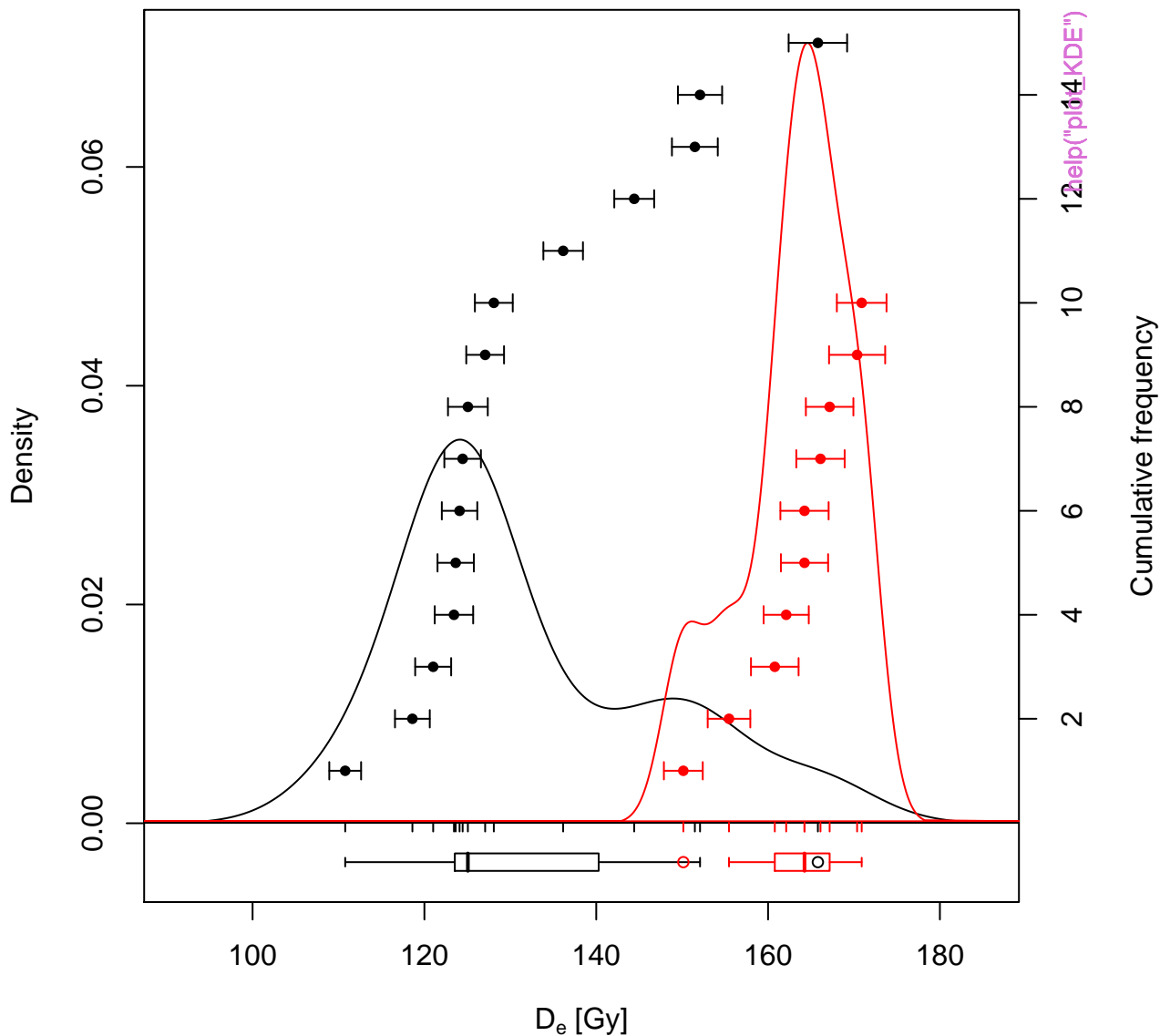
n = 25 | median = 126.36 | skewness = 1262.54 | in 2 sigma = 96 %



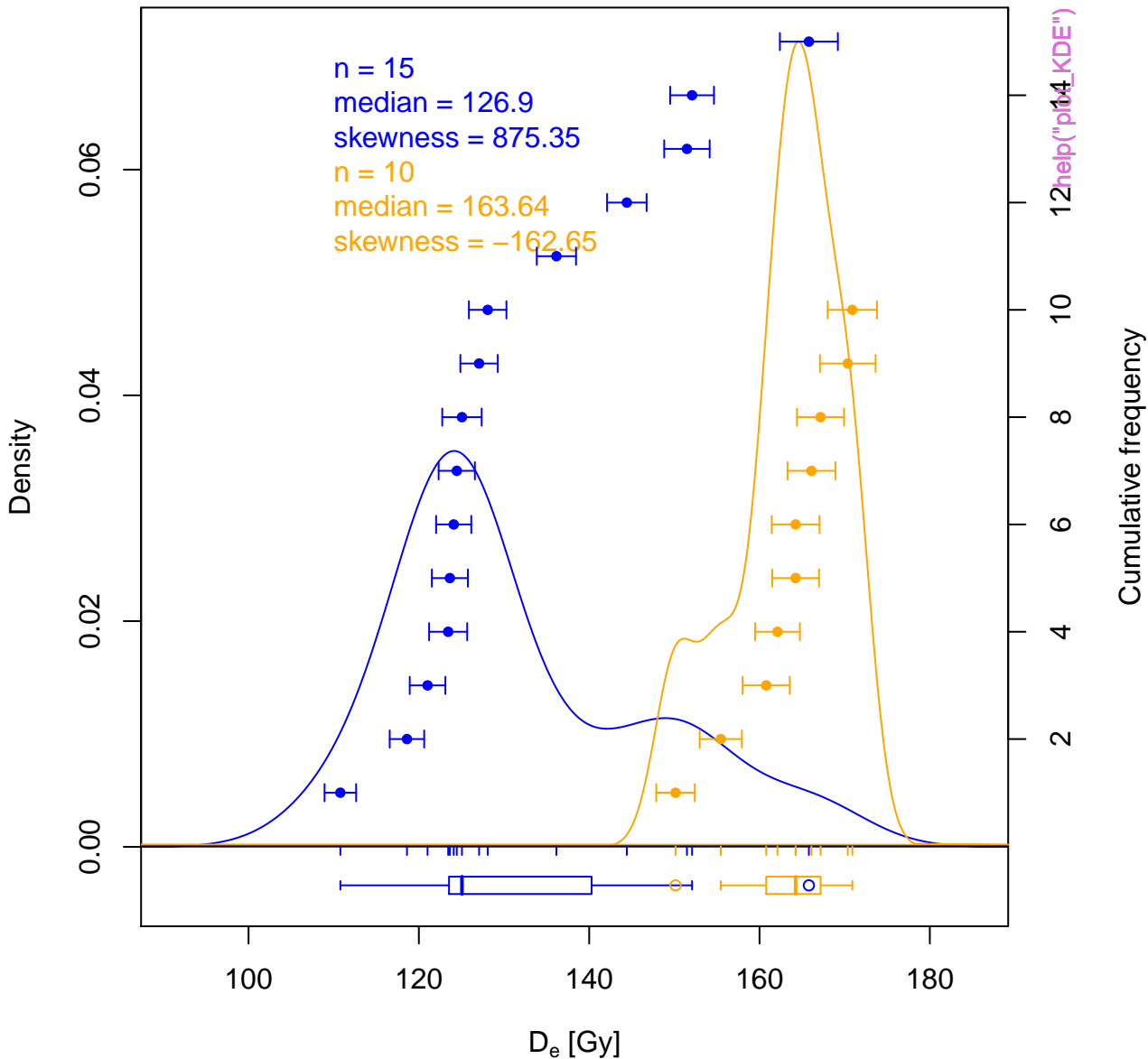
D_e distribution



D_e distribution



D_e distribution



D_e distribution



NR(t) Plot

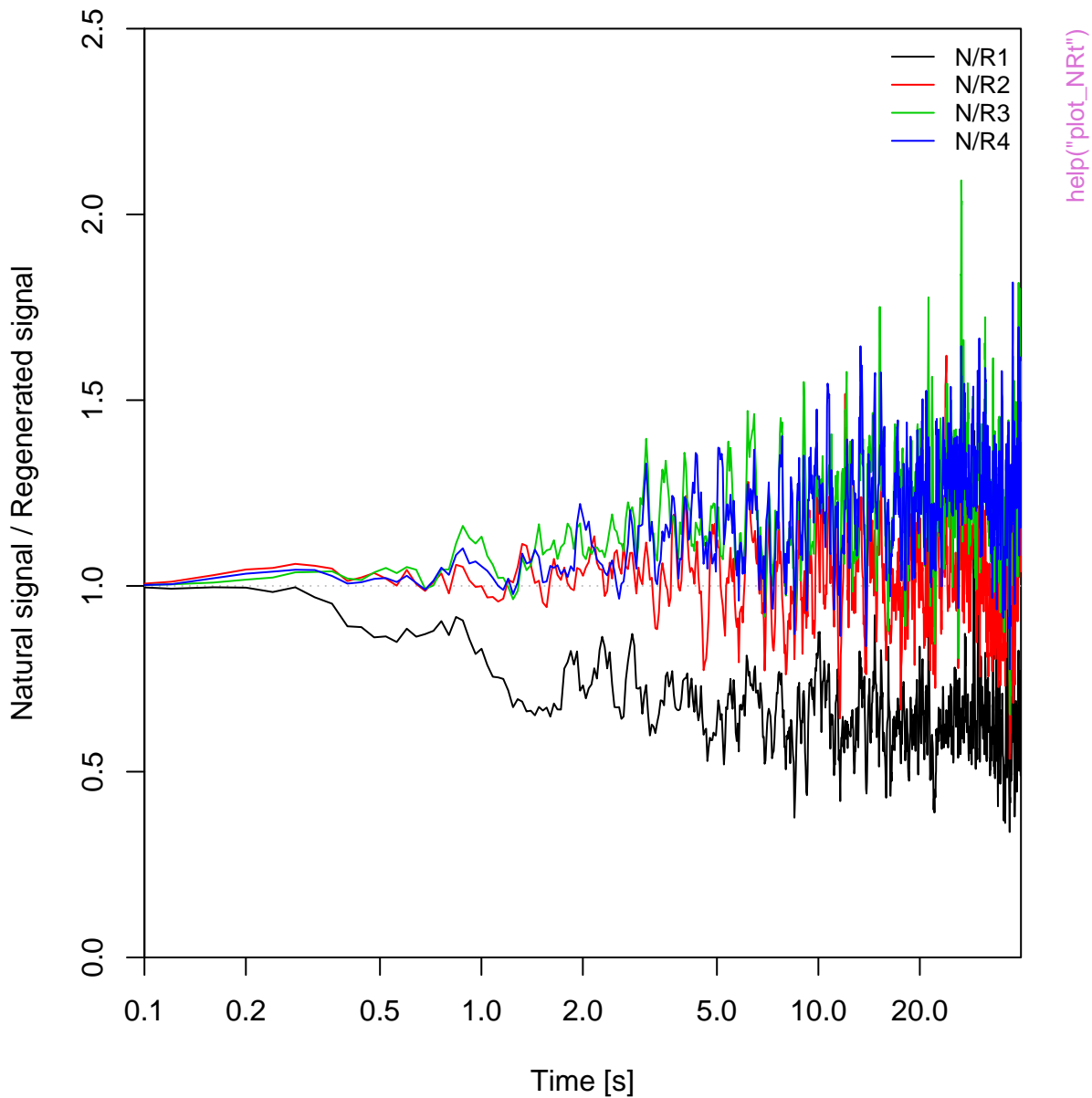


NR(t) Plot



help("plot_NRt")

NR(t) Plot



NR(t) Plot



NR(t) Plot



TnTx(t) Plot

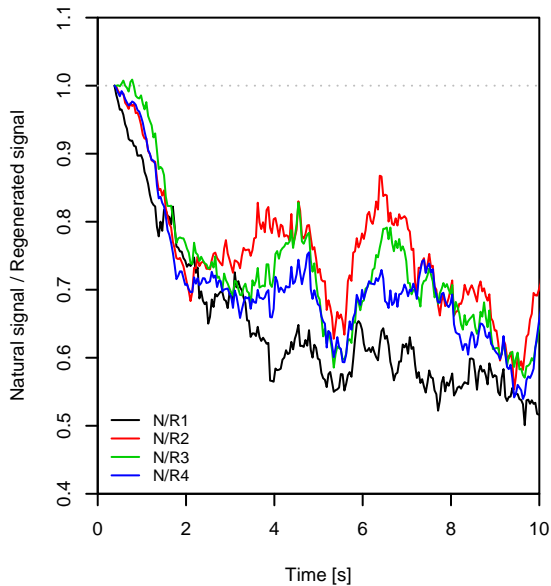
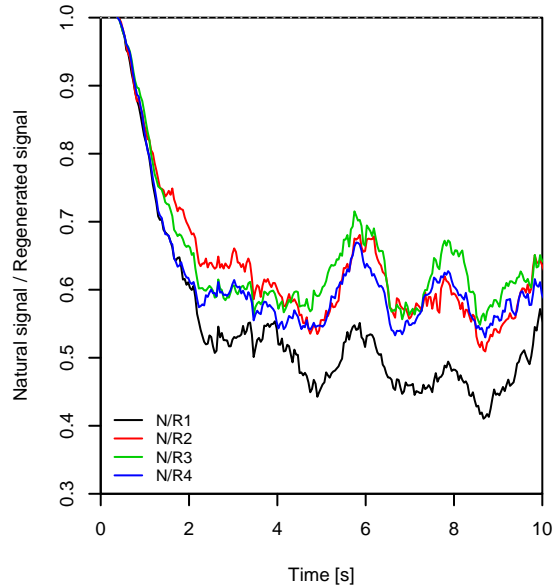


Aliquot #1**Aliquot #2**

help("plot_NRt")

Aliquot #3**Aliquot #4**

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

Aliquot #9**Aliquot #10**

help("plot_NRt")

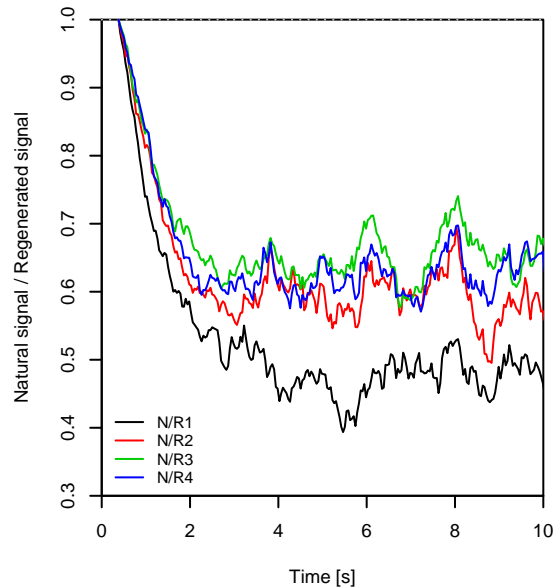
Aliquot #11**Aliquot #12**

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

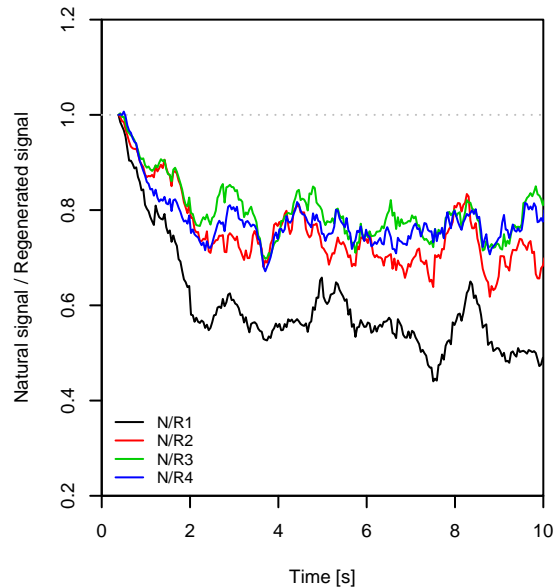
Aliquot #17**Aliquot #18**

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")`

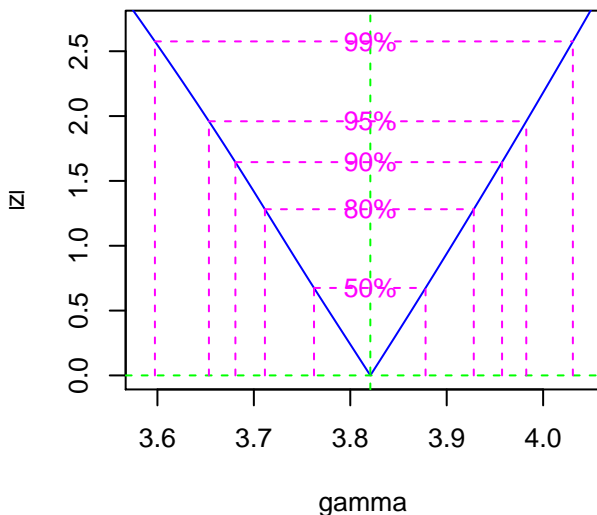
RLum.Data.Spectrum



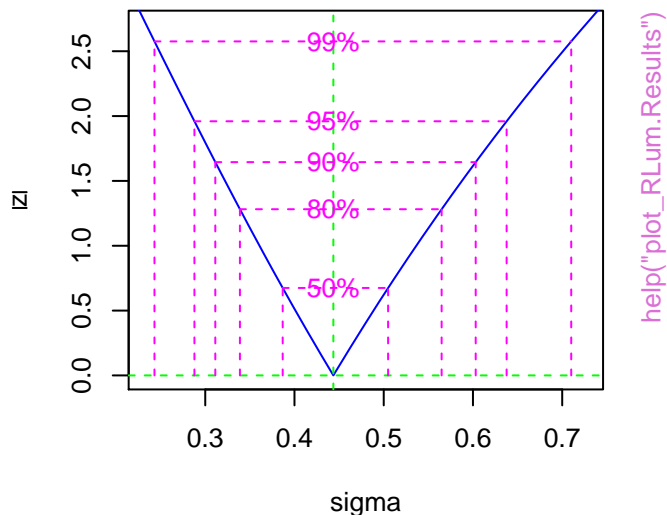
unkown curve type



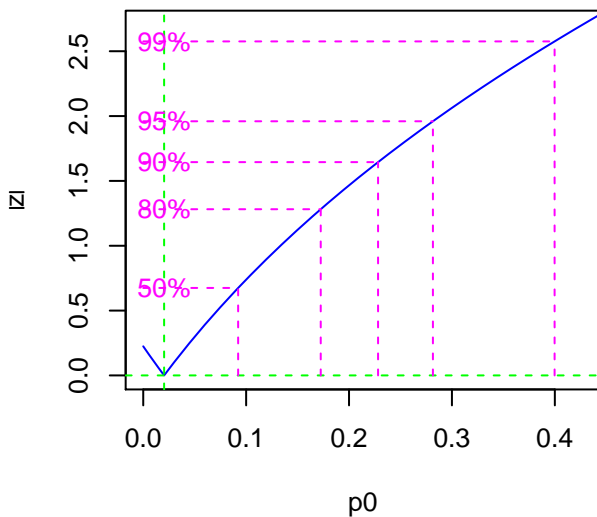
Likelihood profile: gamma



Likelihood profile: sigma



Likelihood profile: p0



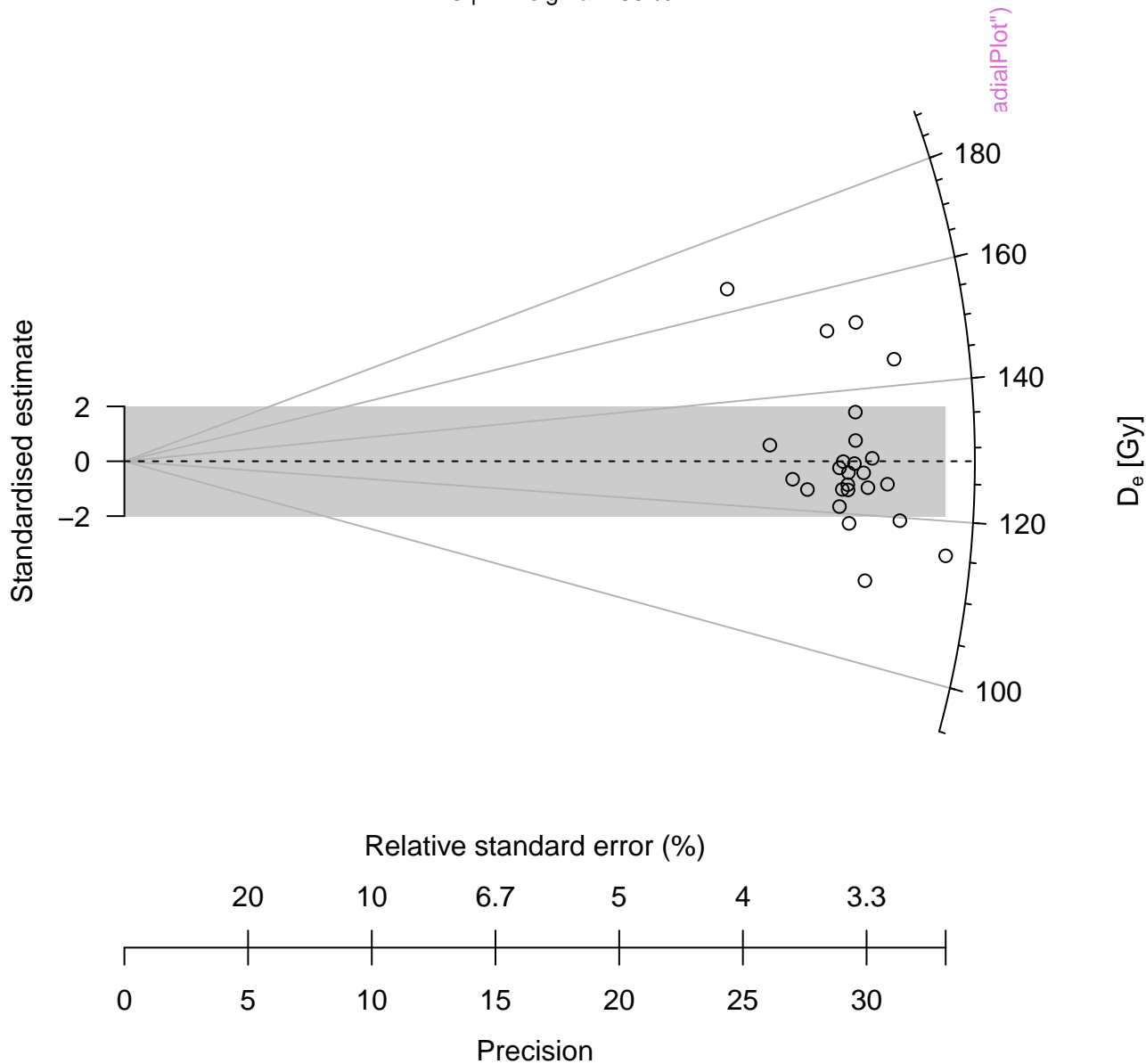
Monte Carlo Simulation

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



D_e distribution

n = 25 | in 2 sigma = 68 %



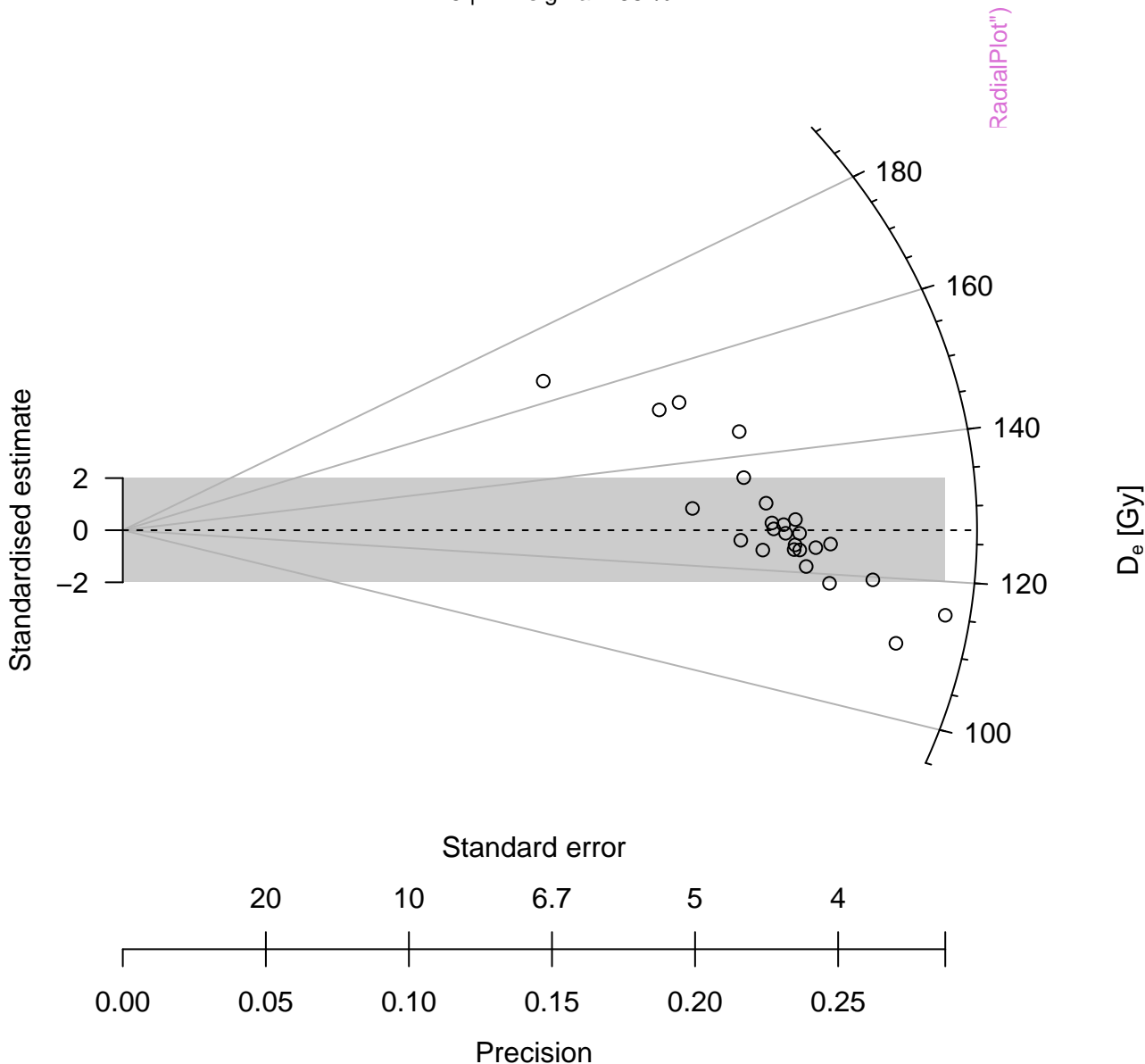
D_e distribution

n = 25 | in 2 sigma = 68 %



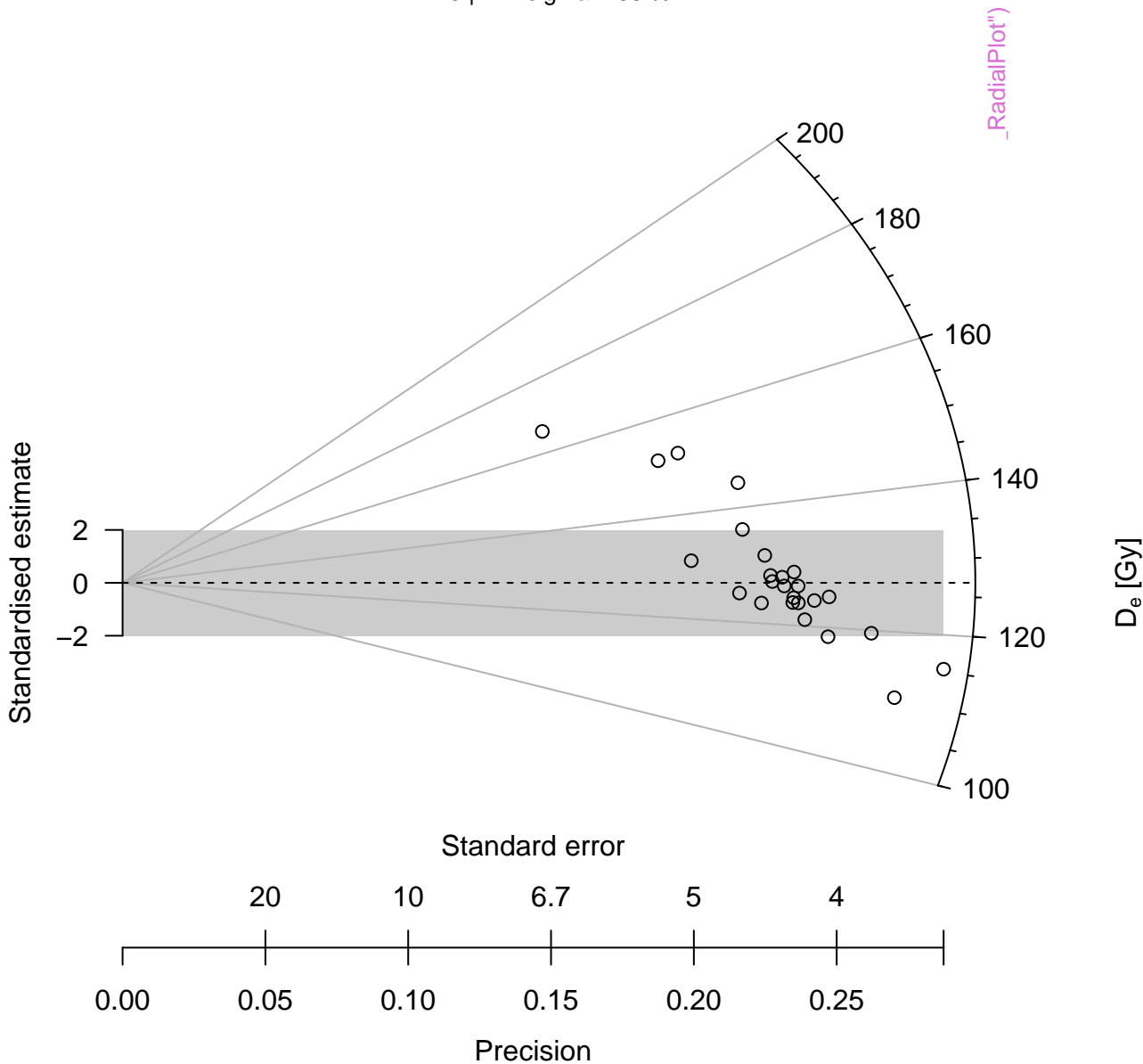
D_e distribution

n = 25 | in 2 sigma = 68 %



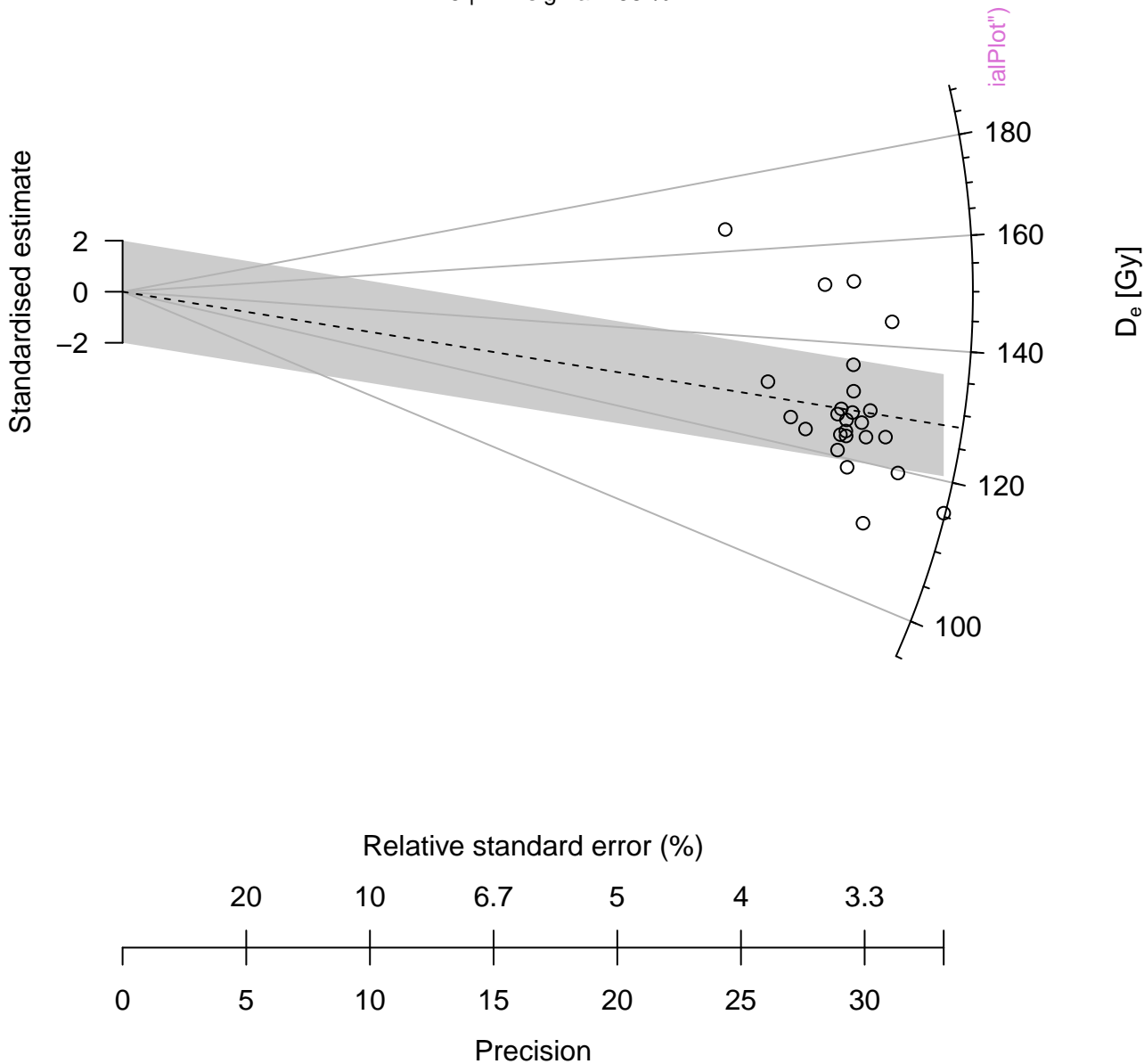
D_e distribution

n = 25 | in 2 sigma = 68 %



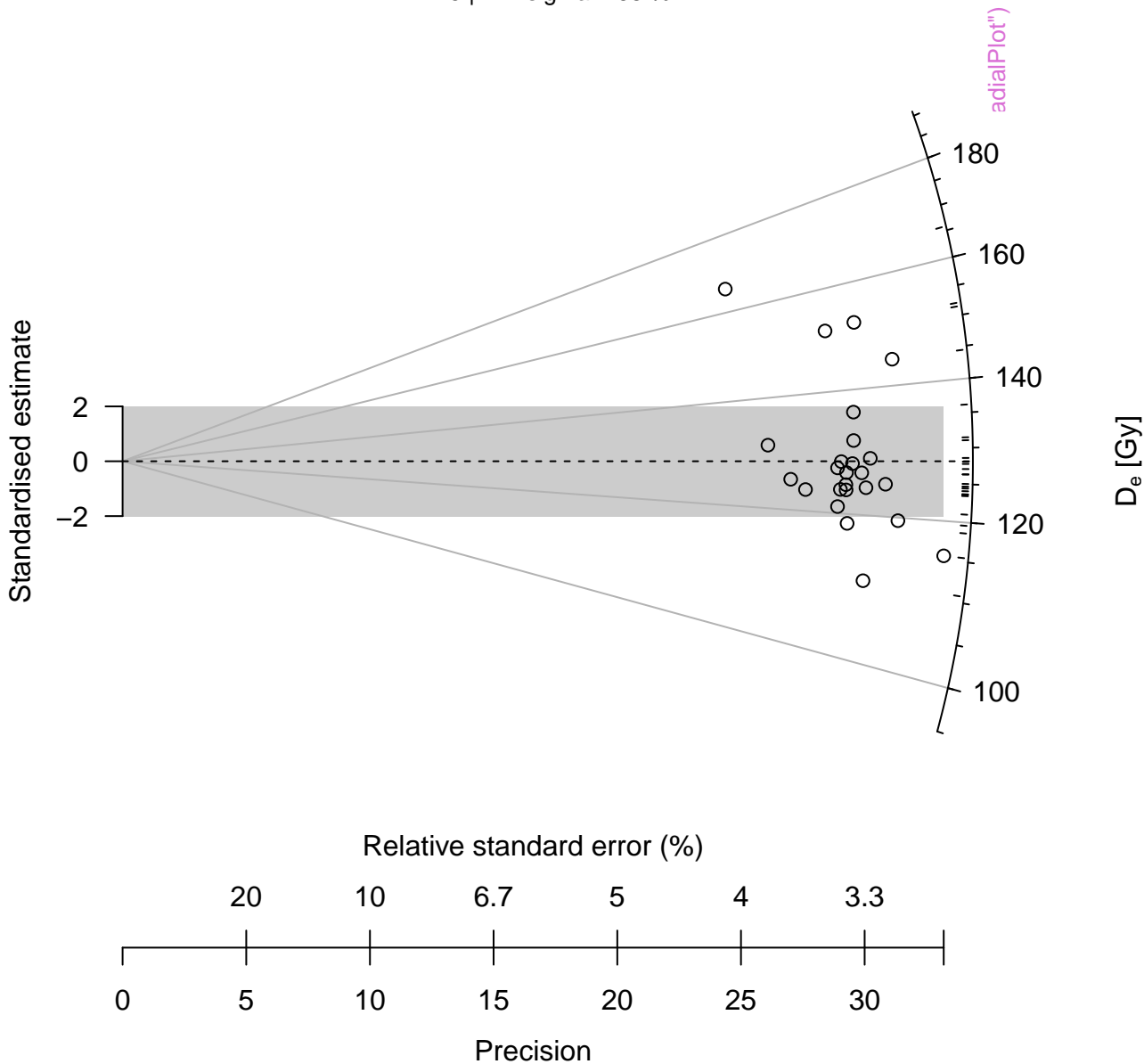
D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

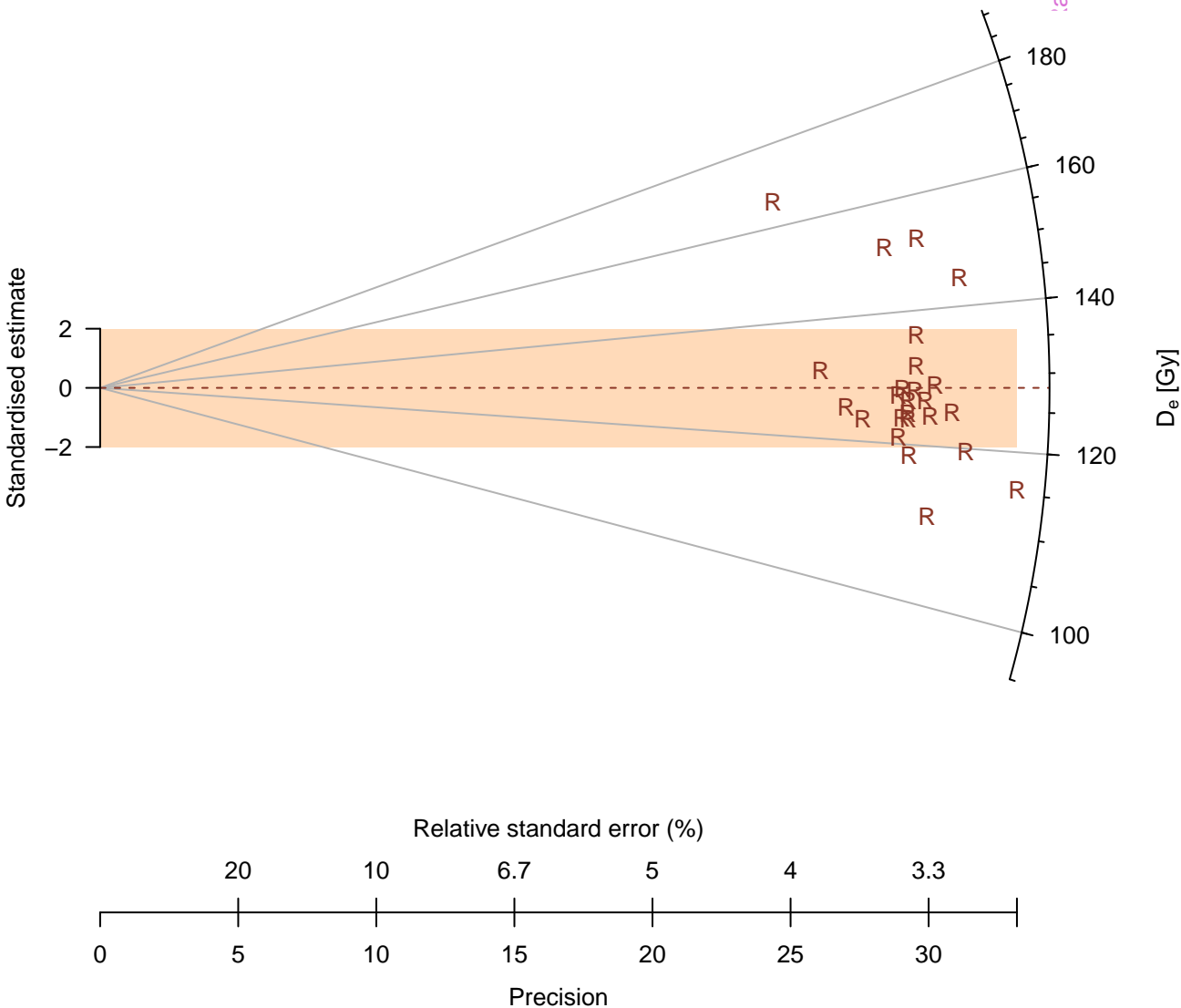
n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %

radialPlot()



D_e distribution

n = 25 | in 2 sigma = 68 %

Standardised estimate

0

0

20

5

10

10

Relative standard error (%)

6.7

15

5

20

4

25

3.3

30

Precision

adialPlot")

180

160

140

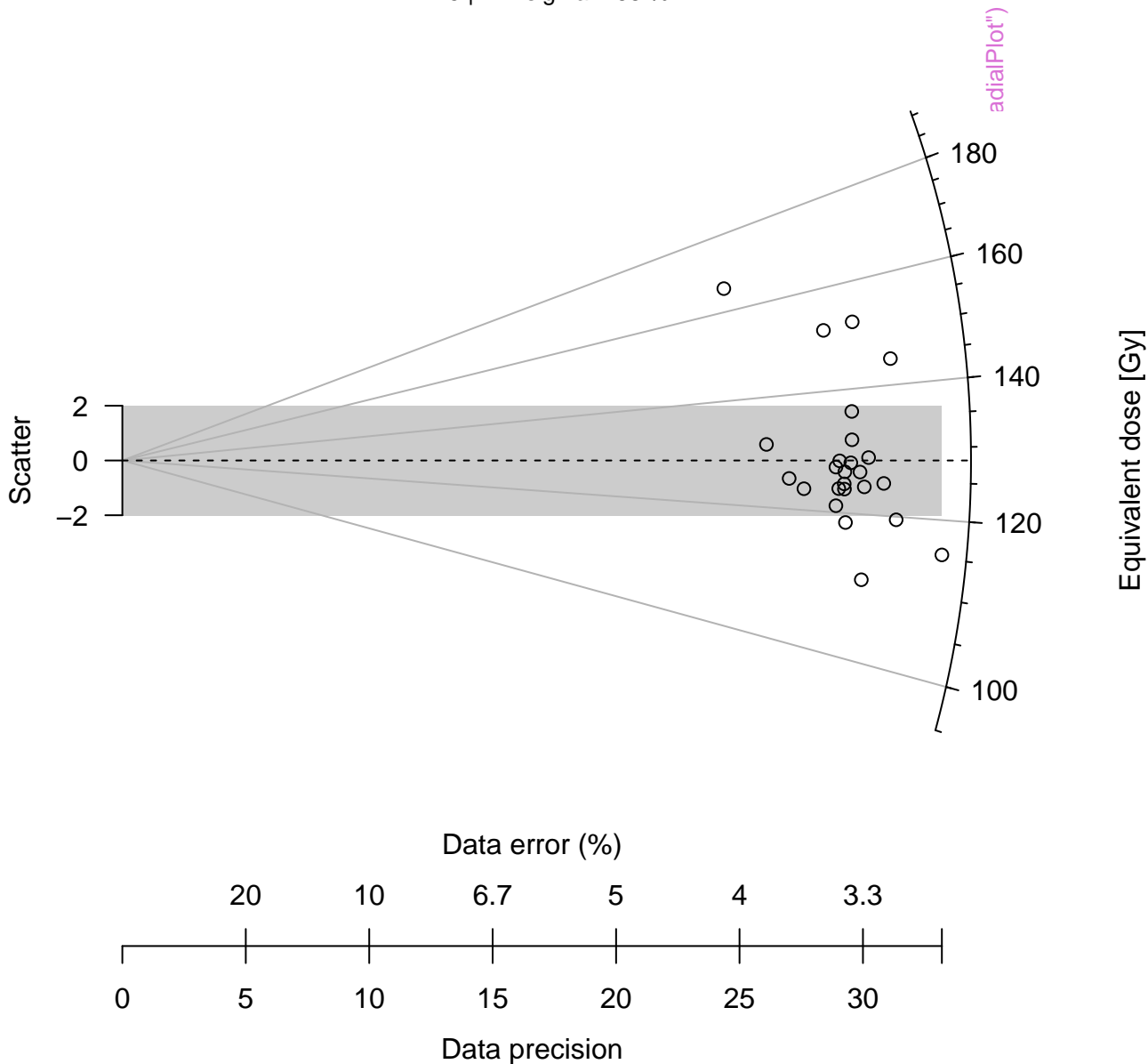
D_e [Gy]

120

100

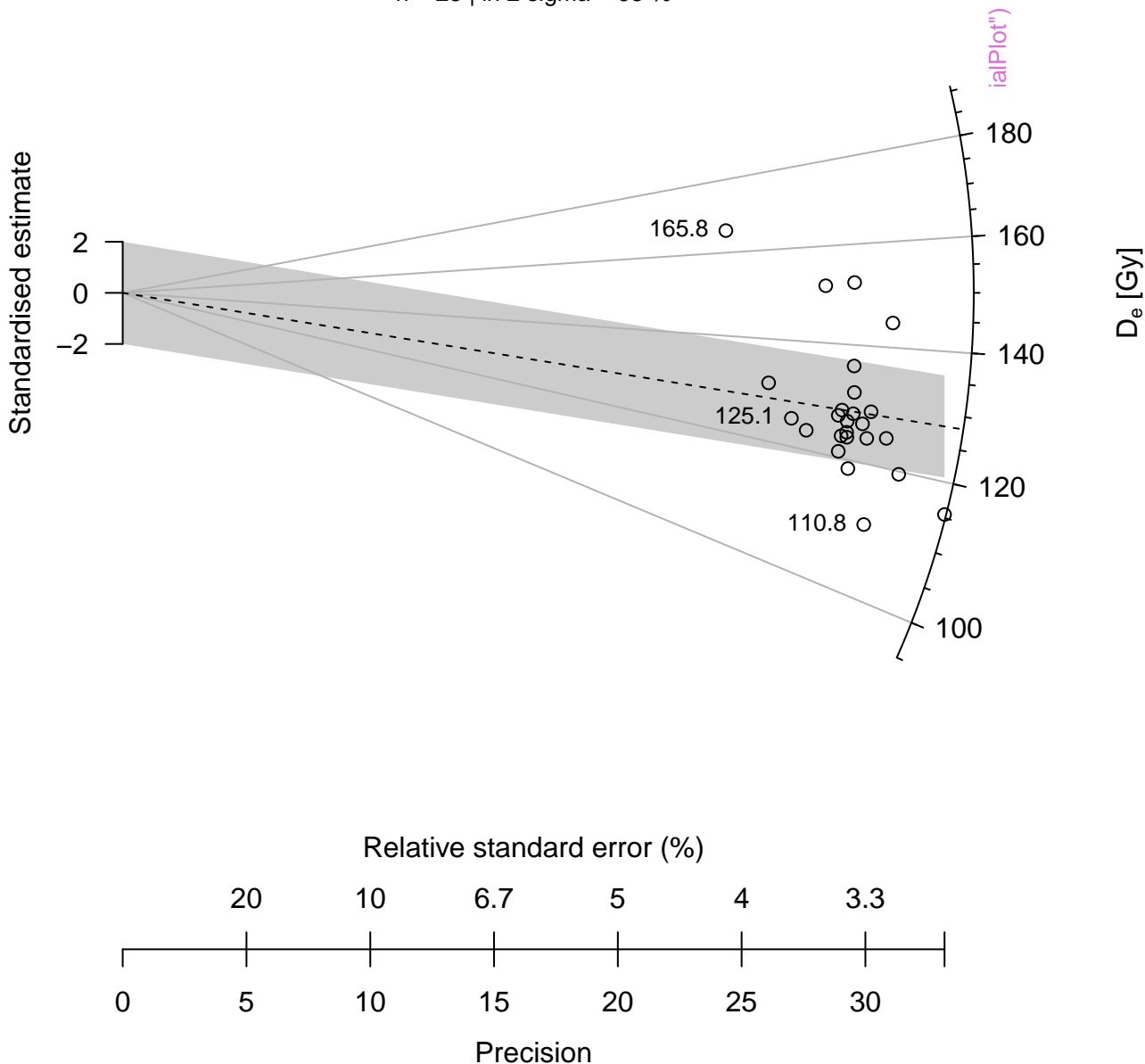
D_e distribution

n = 25 | in 2 sigma = 68 %



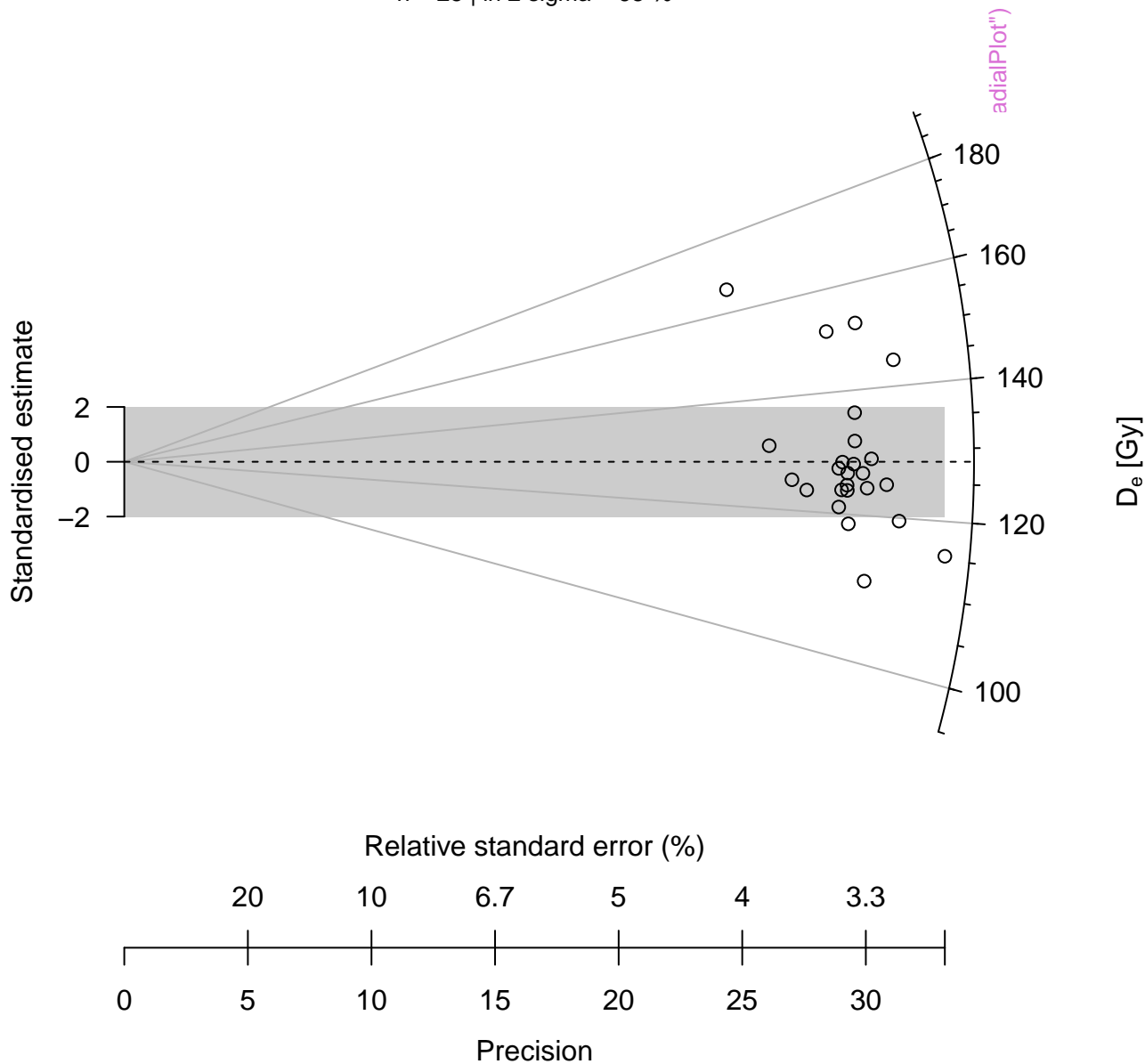
D_e distribution

n = 25 | in 2 sigma = 68 %



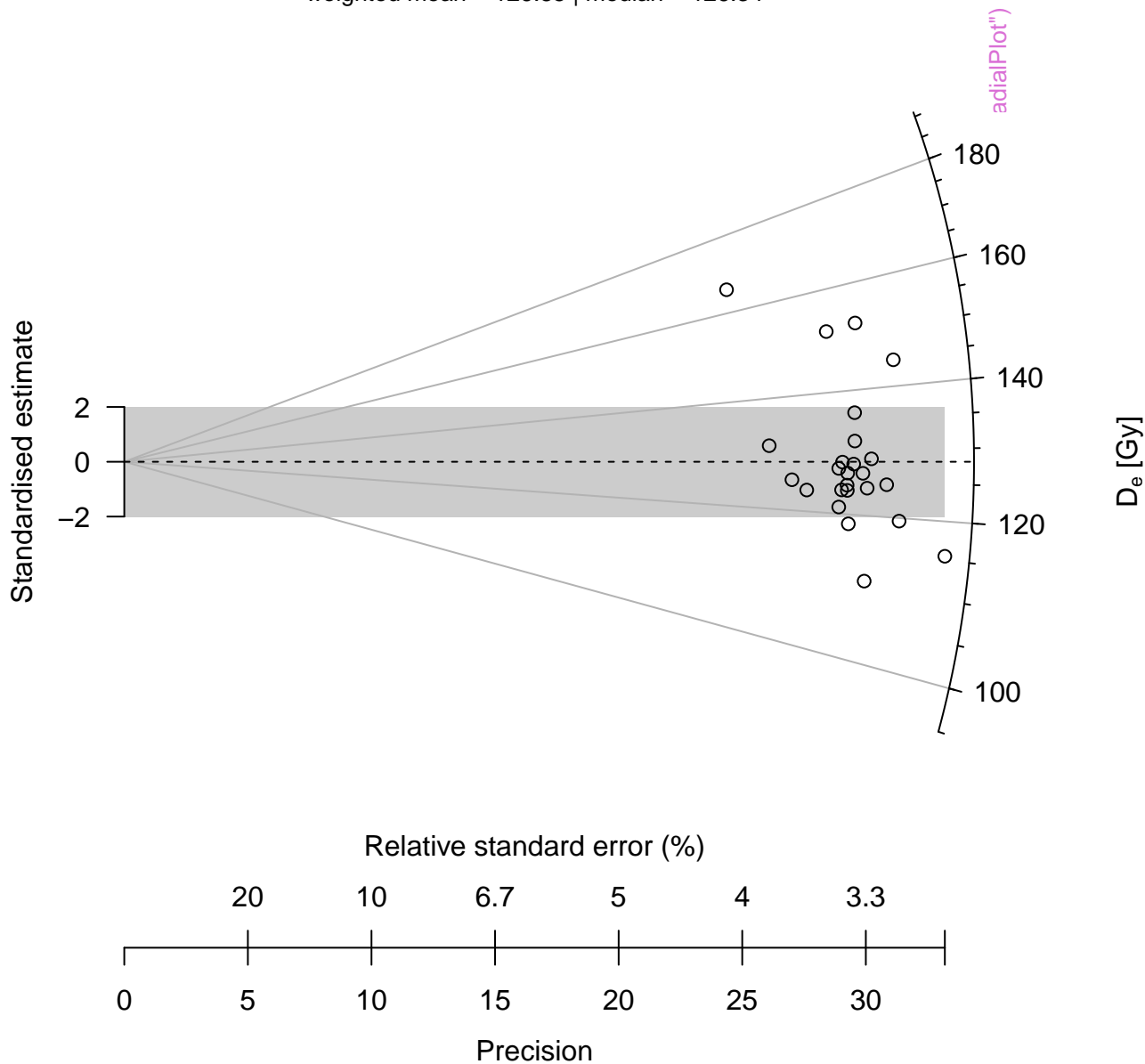
D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

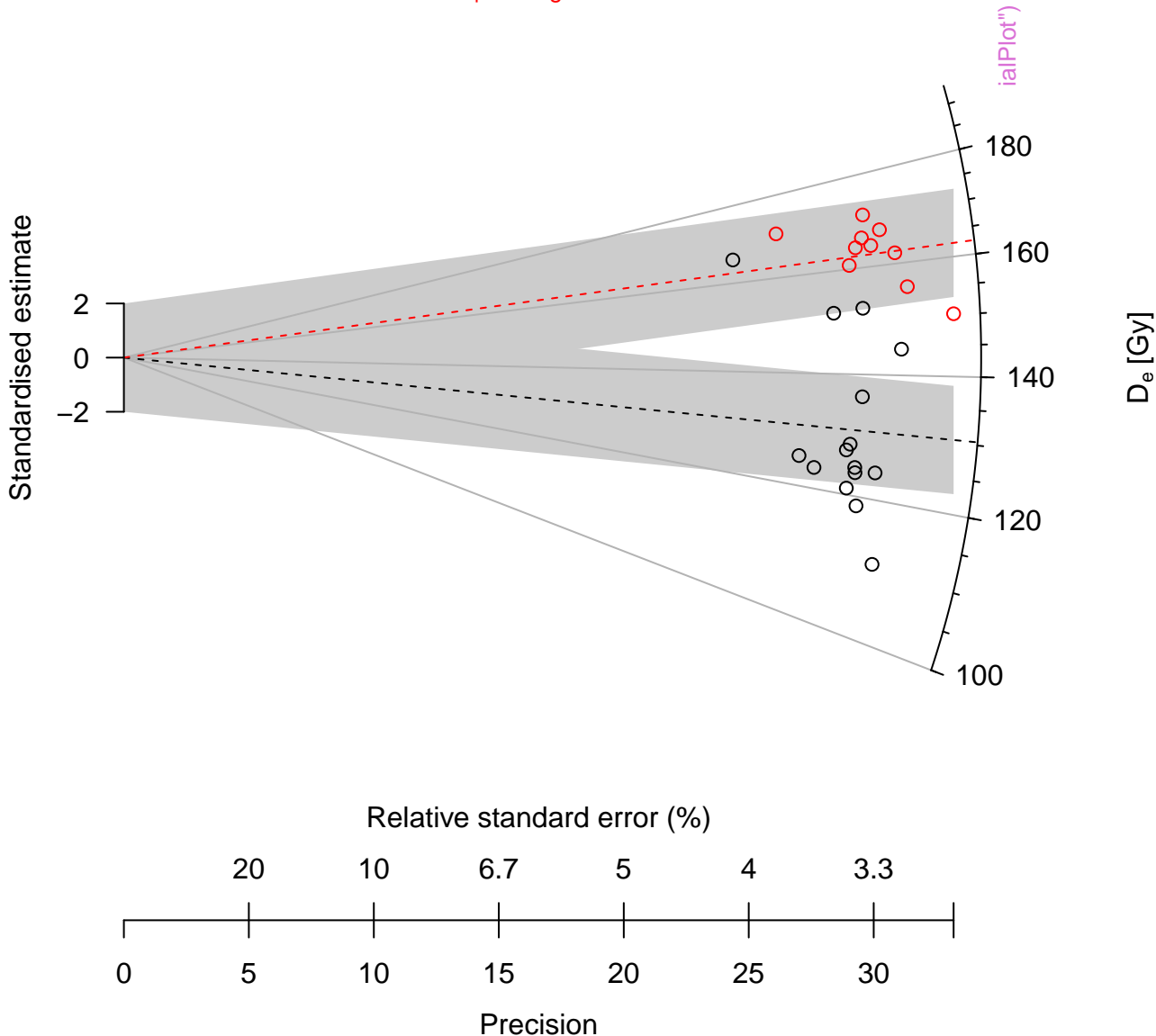
weighted mean = 126.85 | median = 126.34



D_e distribution

n = 15 | in 2 sigma = 53.3 %

n = 10 | in 2 sigma = 90 %



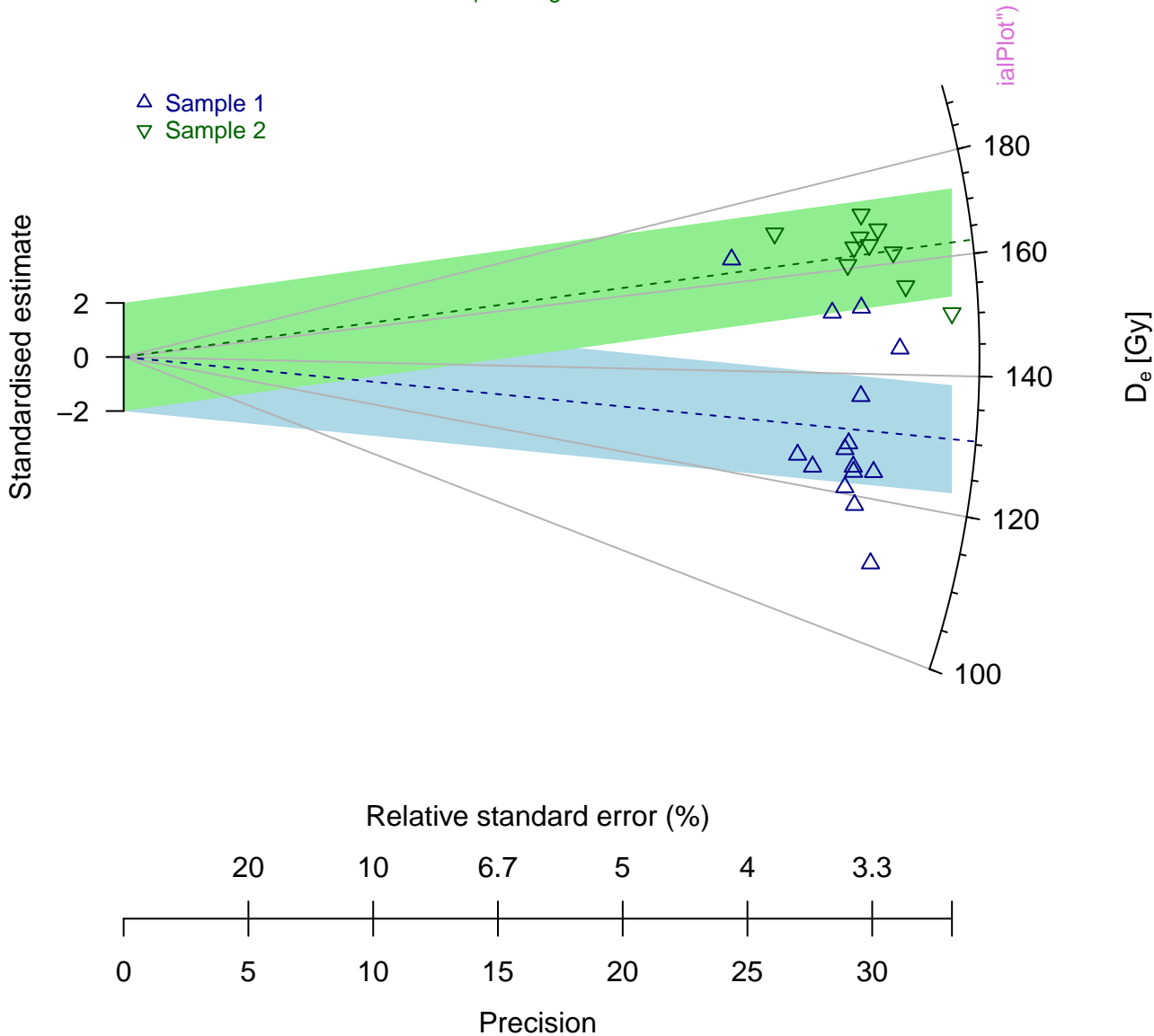
D_e distribution

n = 15 | in 2 sigma = 53.3 %

n = 10 | in 2 sigma = 90 %

△ Sample 1

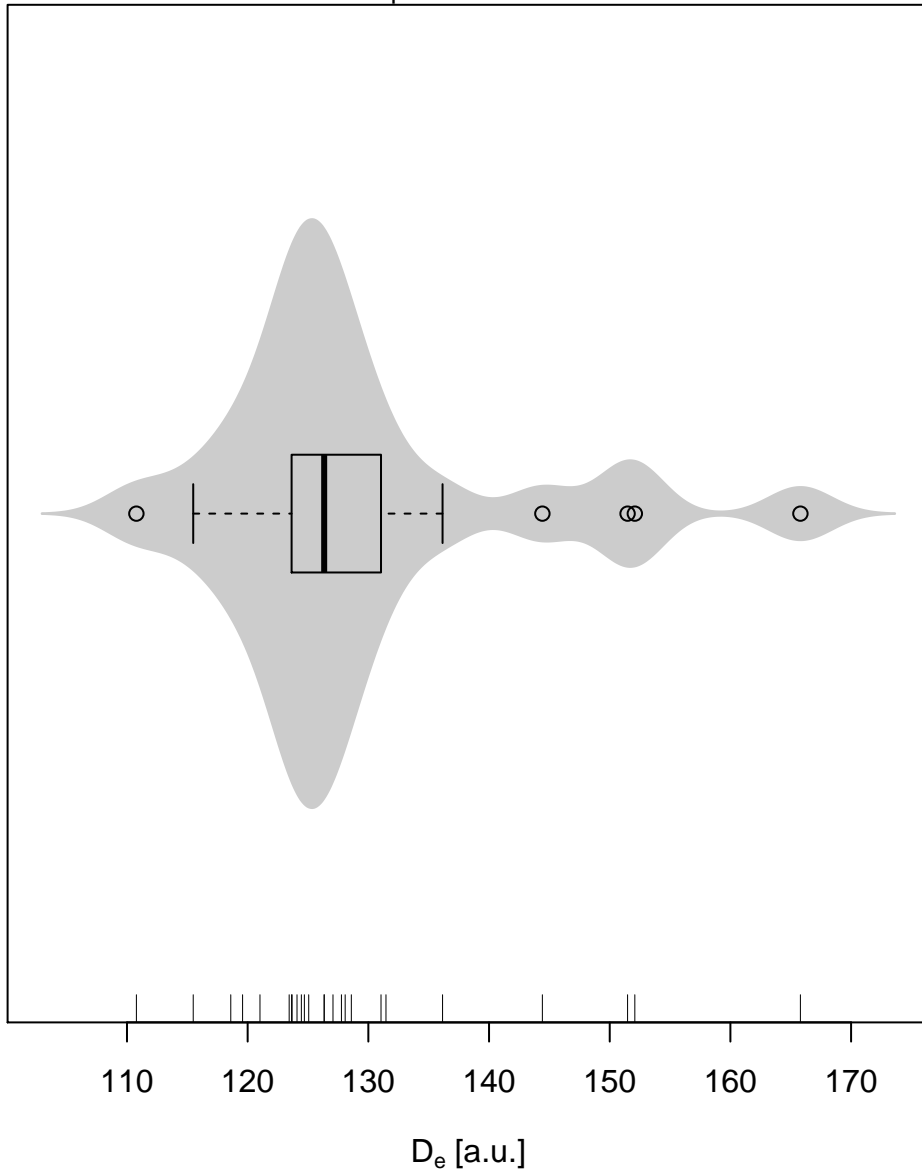
▽ Sample 2



Violin Plot

n = 25 | median = 126.34

Density



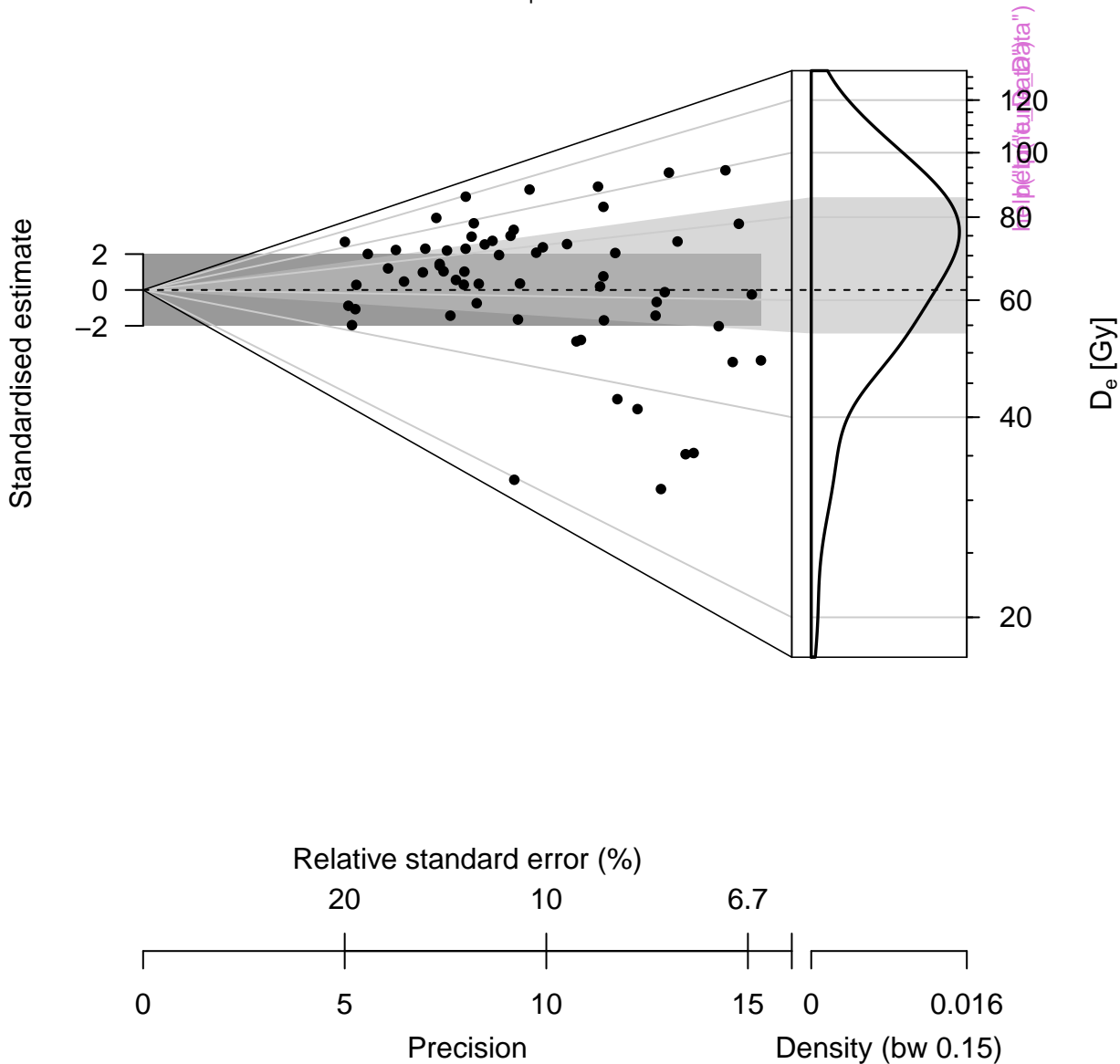
[help\("plot_ViolinPlot"\)](#)

OSL



D_e distribution

n = 62 | mean = 66



D_e distribution

n = 62 | mean = 66

