

$L_n, L_x$  curves

ALQ Pos. 1

$T_n, T_x$  curves



Cutheat – TL curves

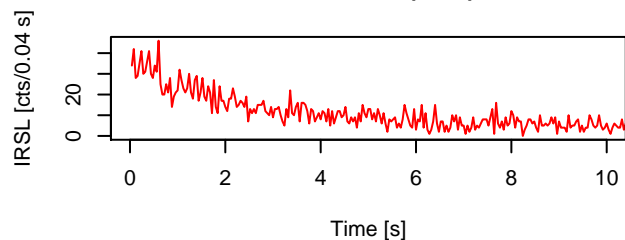


IRSLT

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)**



TL (UVVIS)



OSL (UVVIS)





# Histogram



# Histogram



No L<sub>x</sub> curves detected

No T<sub>x</sub> 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 %



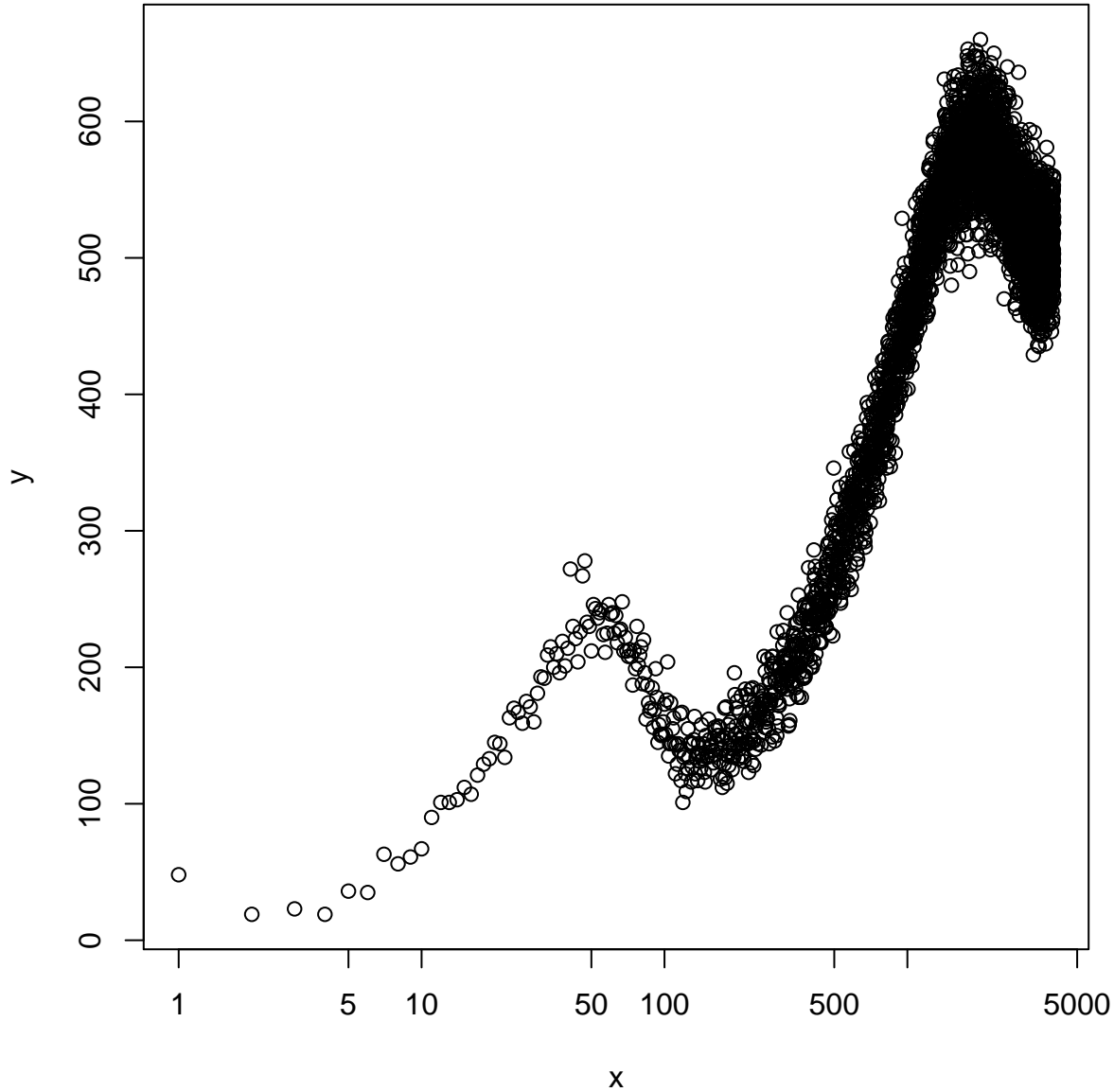
Dose [s]

n = 100, valid fits = 100

## Test dose response



NA



`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")





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

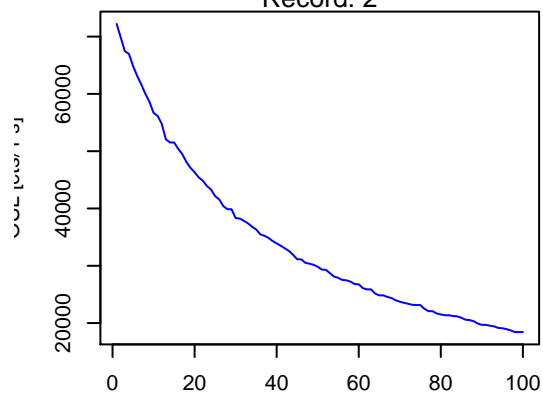


help("ExampleData.portableOSL")

Record: 2



Record: 2

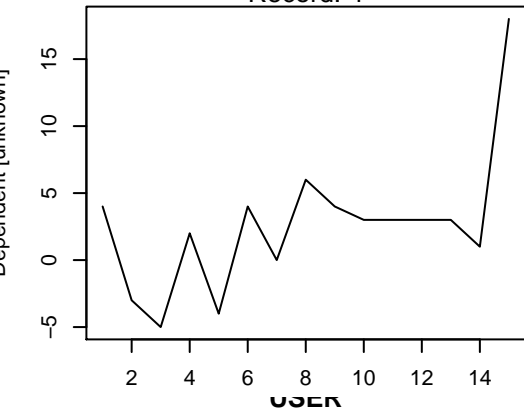




help("ExampleData.portableOSL")

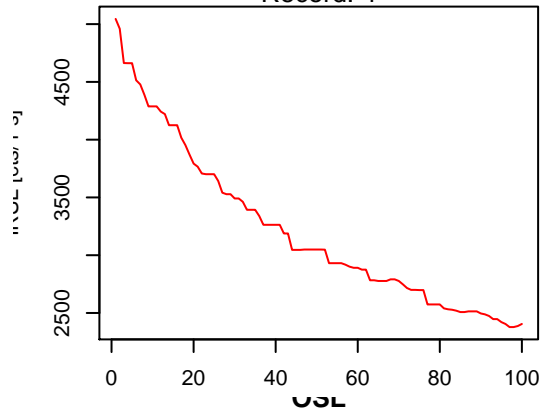
USER

Record: 4



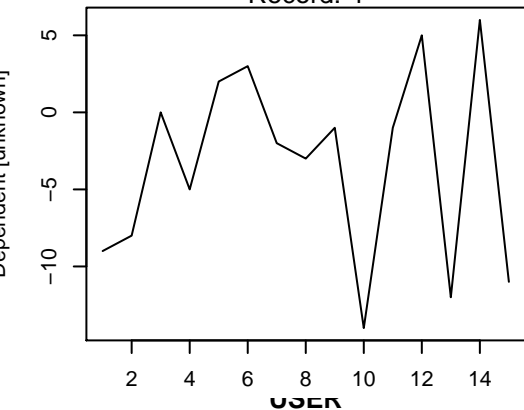
IRSL

Record: 4

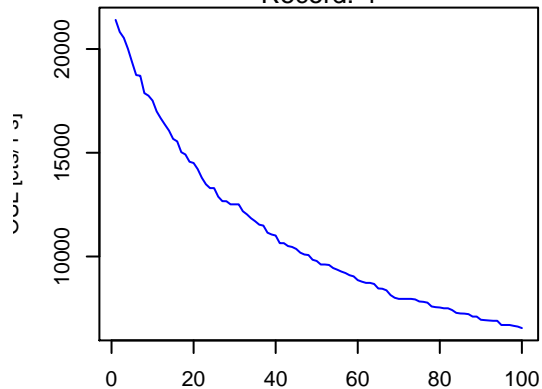


help("ExampleData.portableOSL")

Record: 4



Record: 4

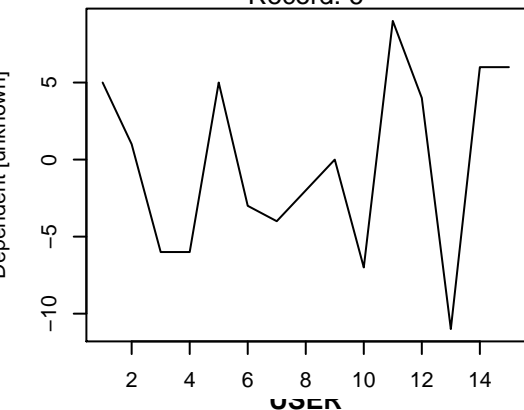






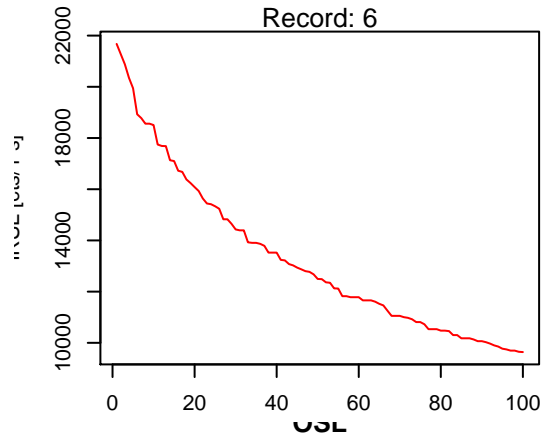
USER

Record: 6



IRSL

Record: 6



help("ExampleData.portableOSL")

Record: 6

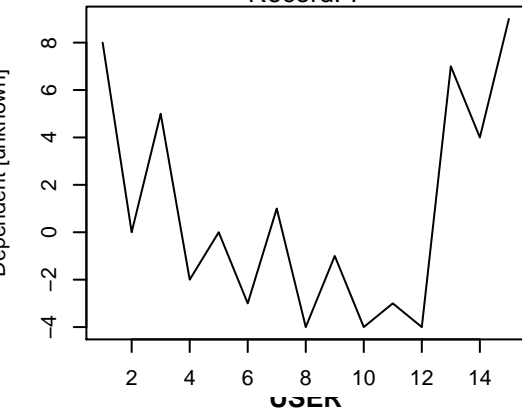


Record: 6



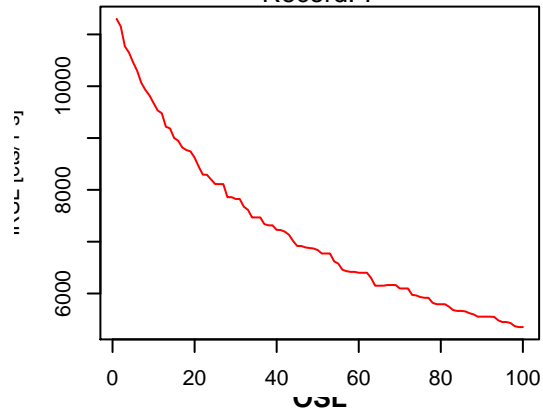
USER

Record: 7



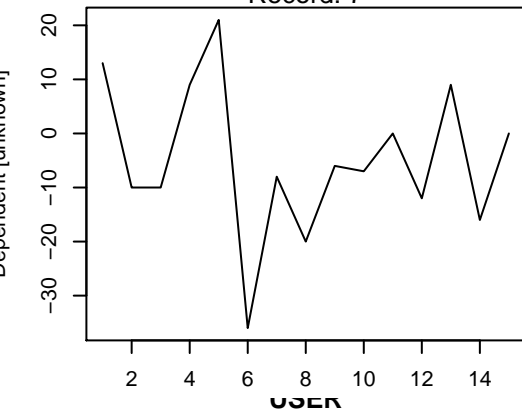
IRSL

Record: 7

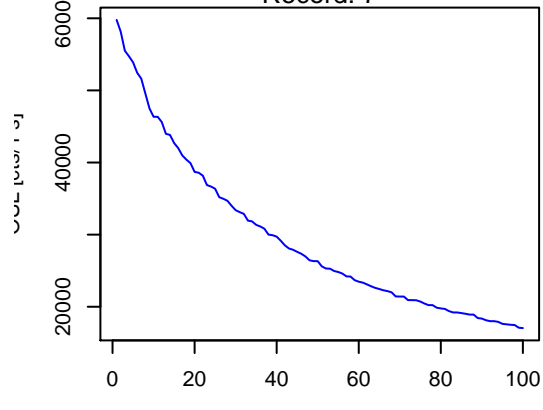


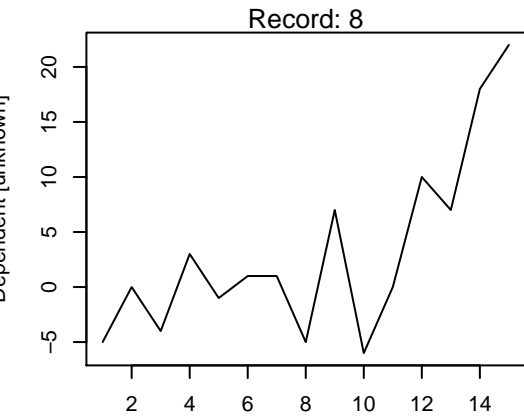
help("ExampleData.portableOSL")

Record: 7

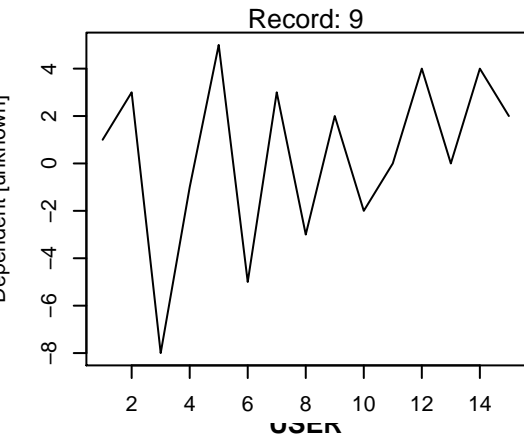


Record: 7

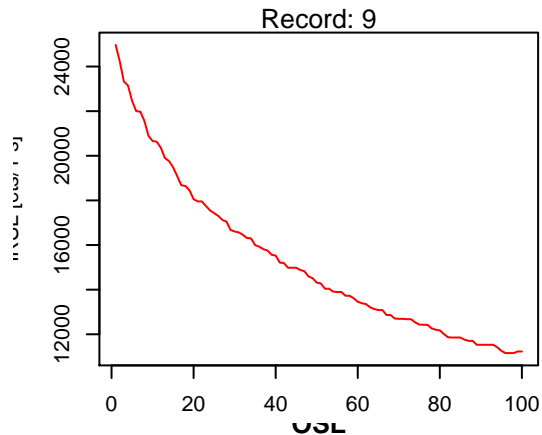




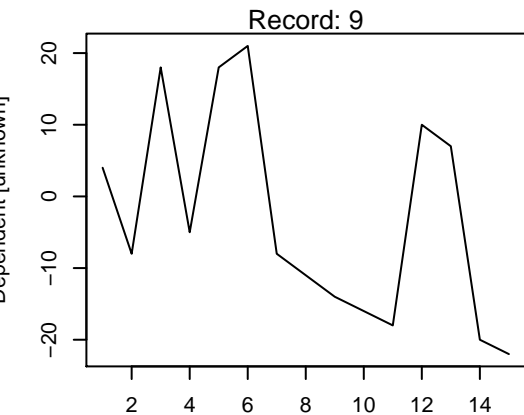
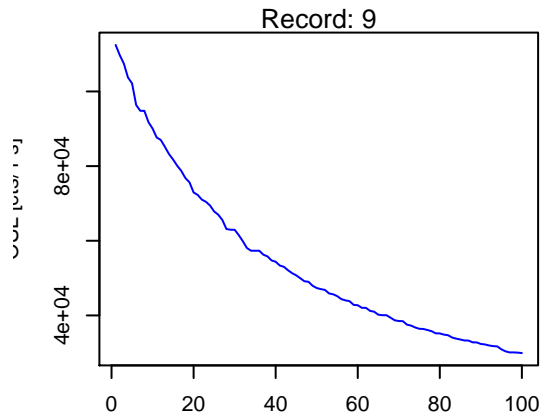
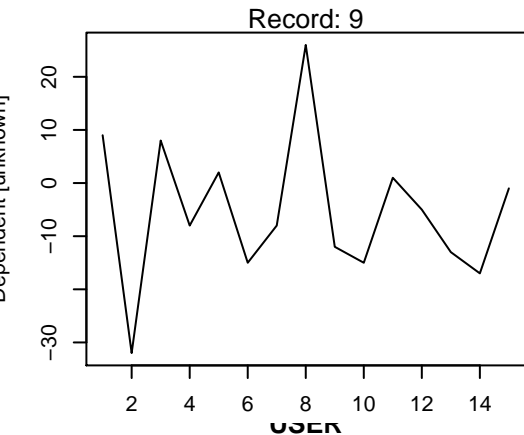
USER



IRSL



help("ExampleData.portableOSL")







USER

Record: 12



IRSL

Record: 12



help("ExampleData.portableOSL")

Record: 12



Record: 12

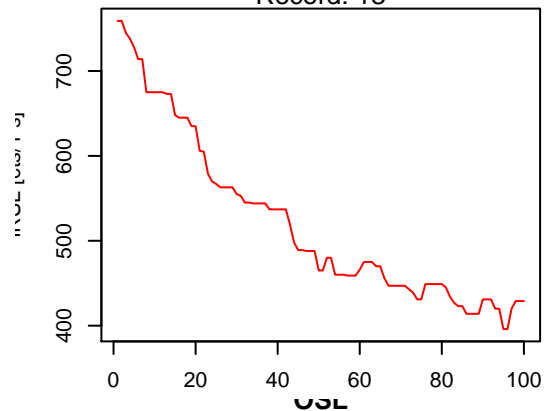


USER

Record: 13



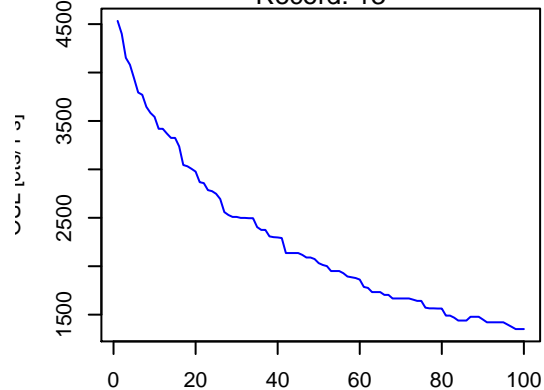
Record: 13



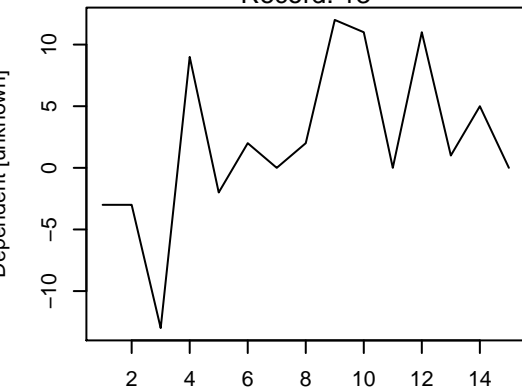
Record: 13



Record: 13



Record: 13



help("ExampleData.portableOSL")



USER

Record: 14



IRSL

Record: 14



help("ExampleData.portableOSL")

Record: 14

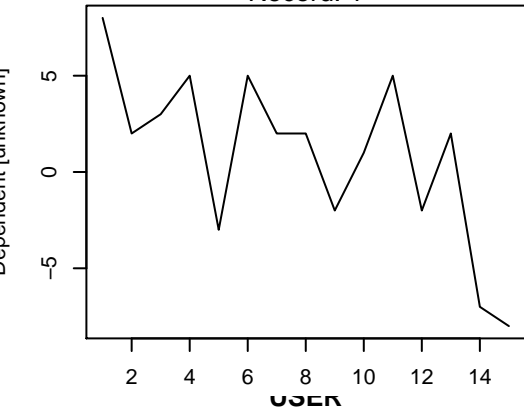


Record: 14



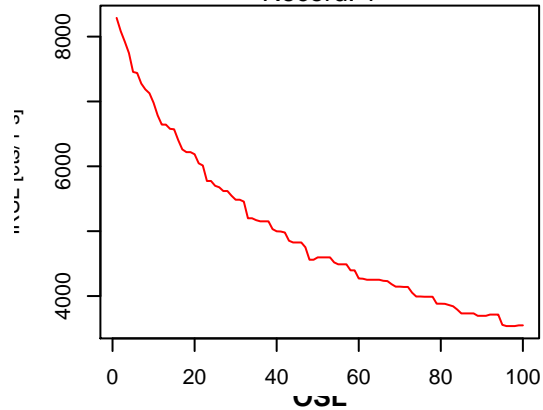
USER

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("PSL2Riseo.BINfileData")

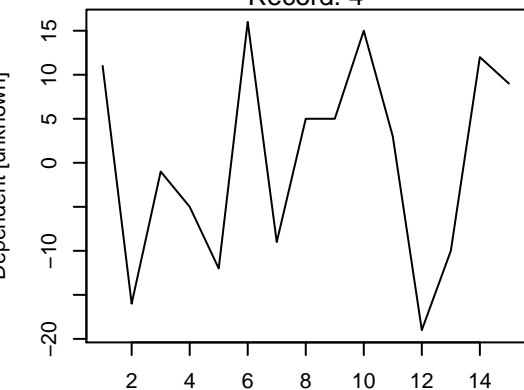
Record: 4



Record: 4

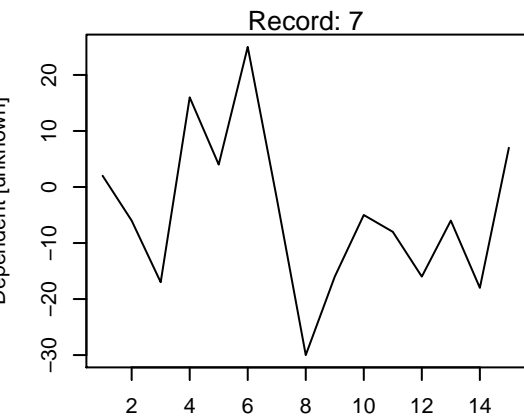
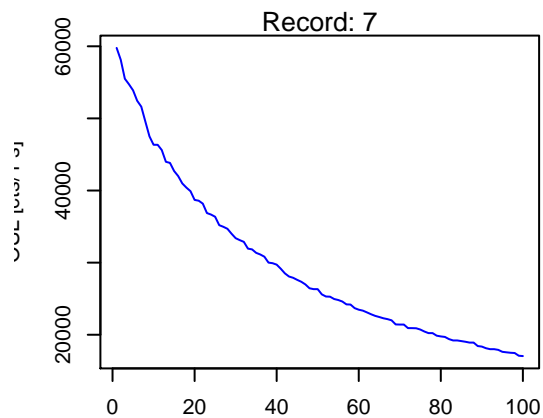
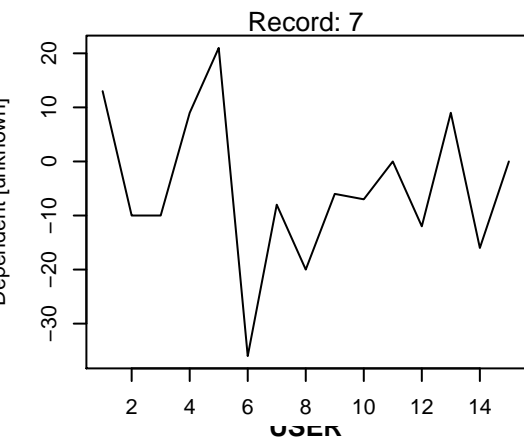
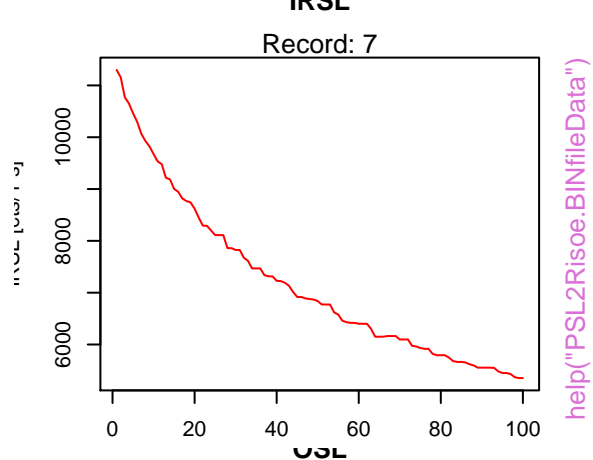
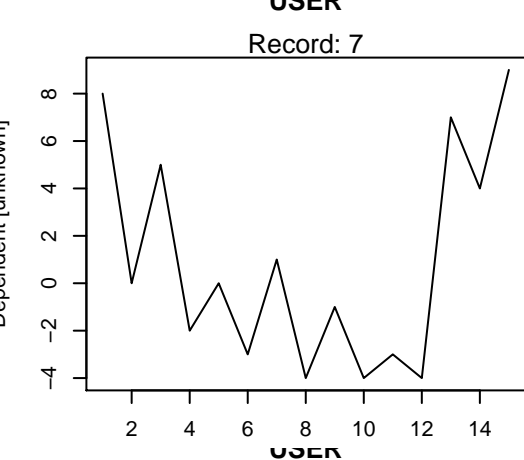


Record: 4





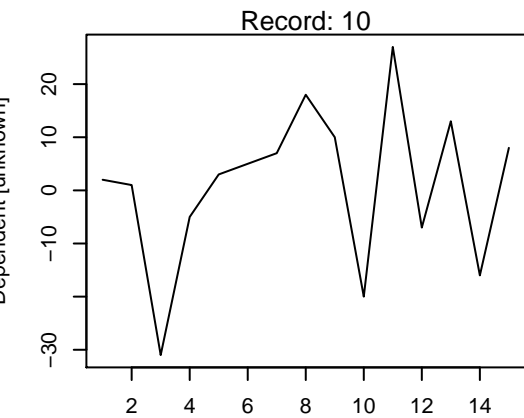
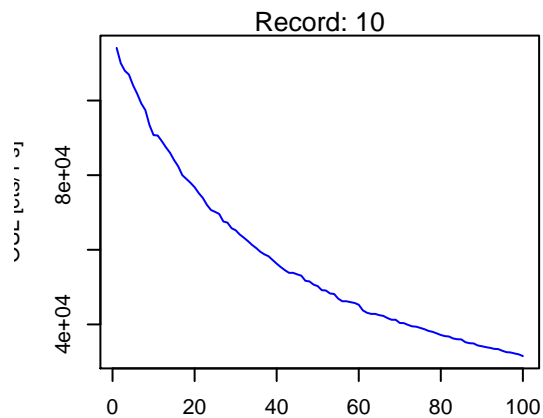
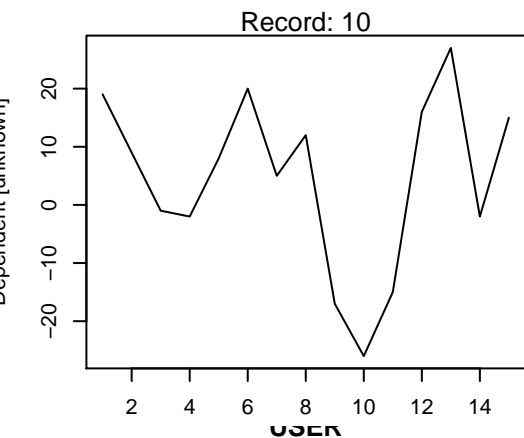












USER

Record: 11



IRSL

Record: 11



help("PSL2Riseo.BINfileData")

Record: 11



Record: 11



USER

Record: 12



IRSL

Record: 12



Record: 12

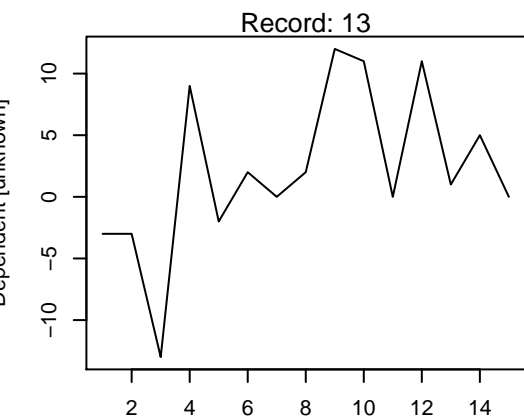


Record: 12

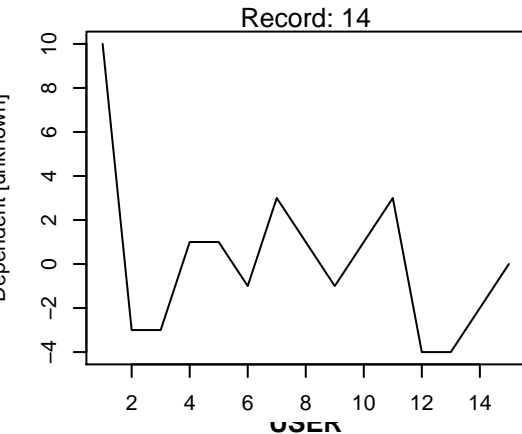


Record: 12

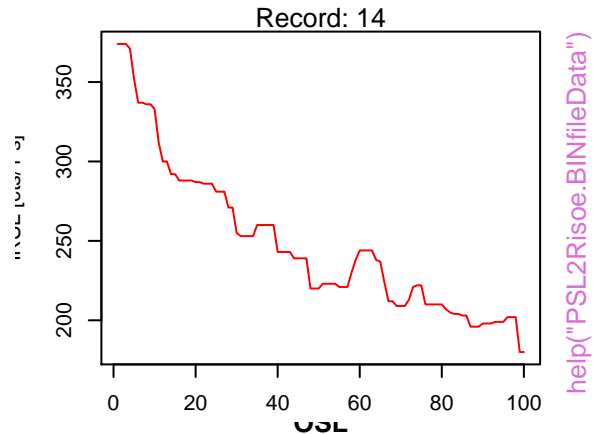




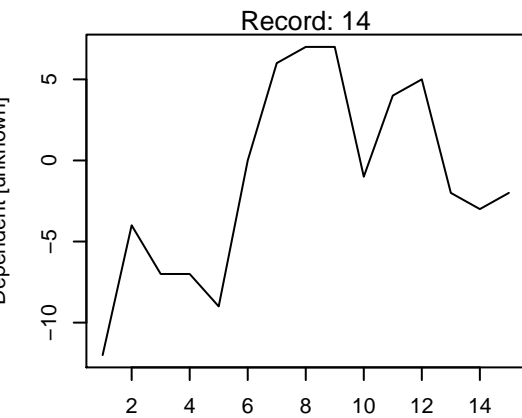
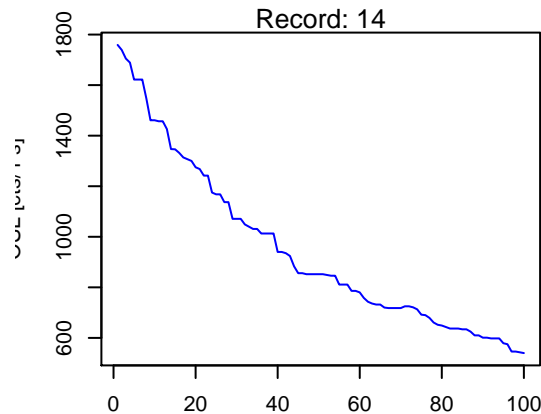
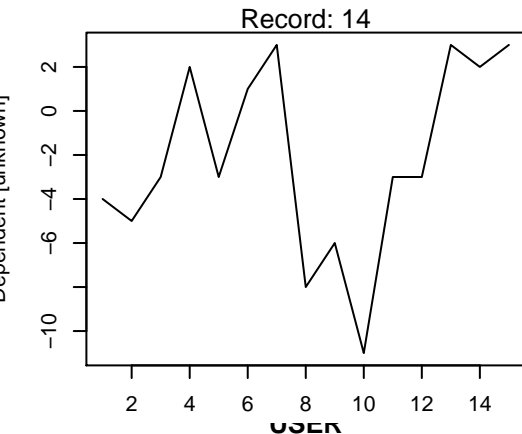
USER



IRSL



help("PSL2Riseo.BINfileData")



# Sample Carousel Crosstalk



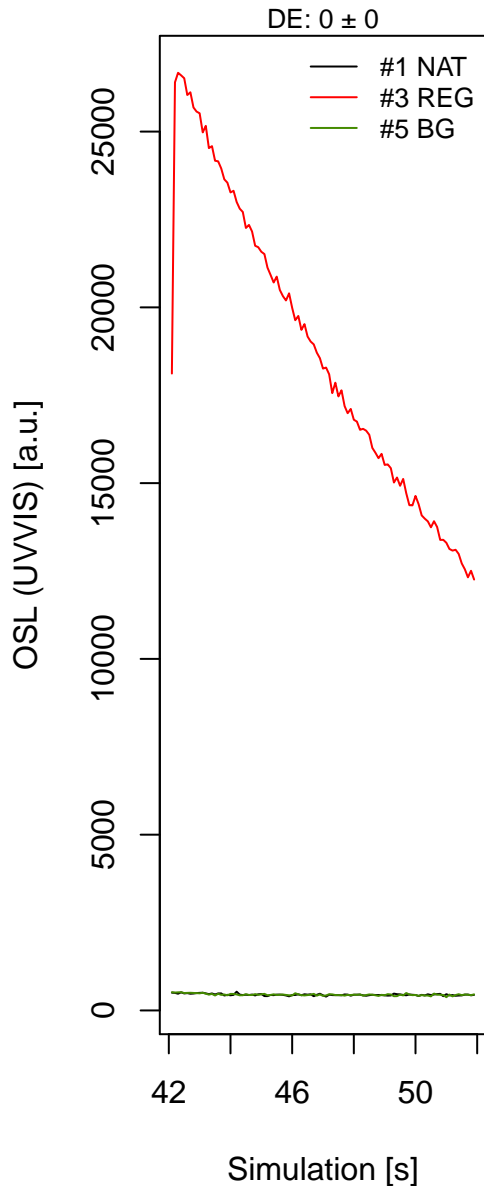


# Irradiation Time Correction



help("analyse\_Al2O3C\_ITC")

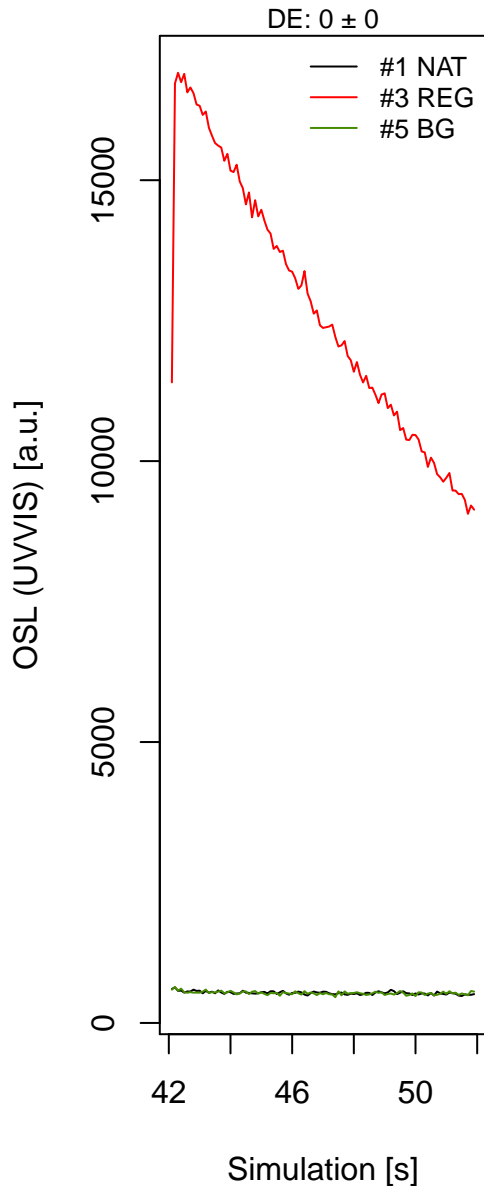
## ALQ POS: 1 | OSL



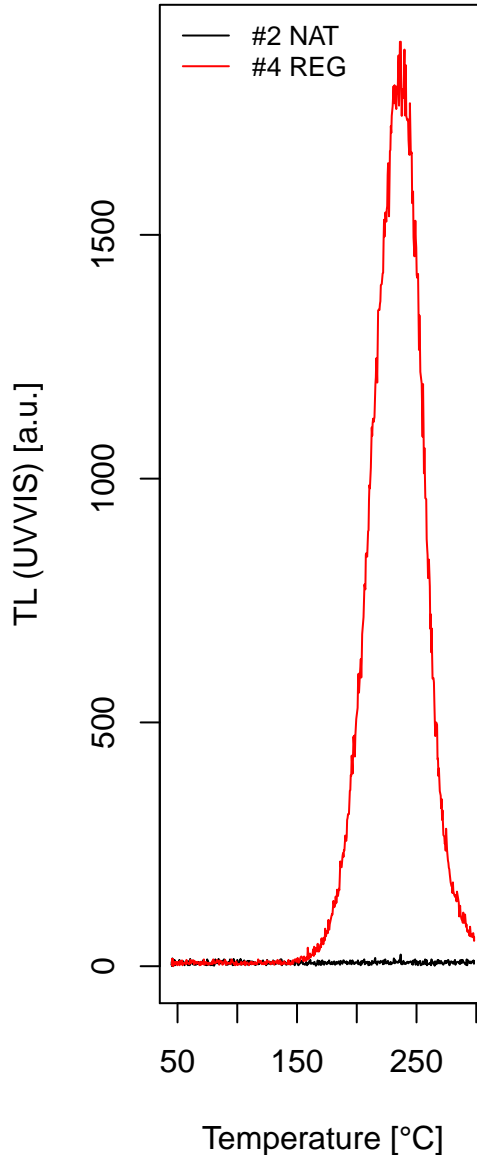
## ALQ POS: 1 | T#1



## ALQ POS: 2 | OSL



## ALQ POS: 2 | T#2



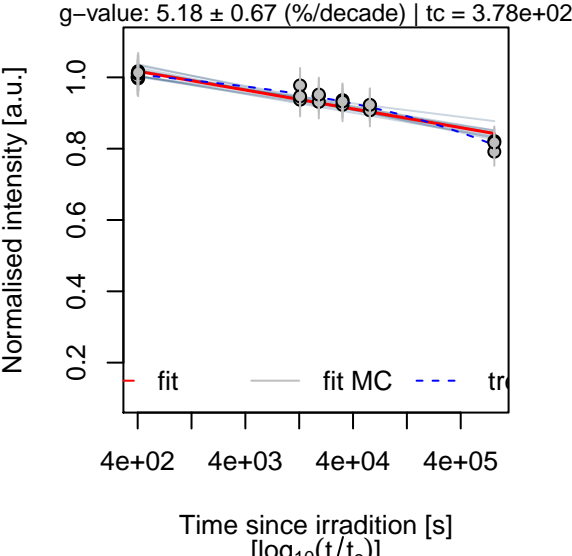
help("analyse\_Al2O3C\_Measurement")

No L<sub>x</sub> curves detected

No T<sub>x</sub> curves detected

help("analyse\_FadingMeasurement")

Signal Fading



Density: g-values (%/decade)



# IR-RF

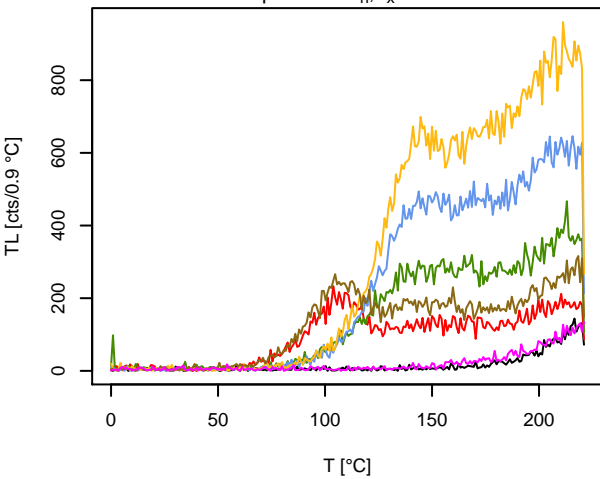
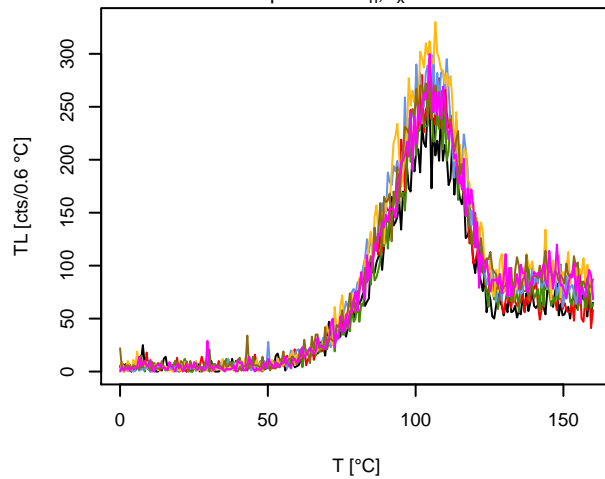
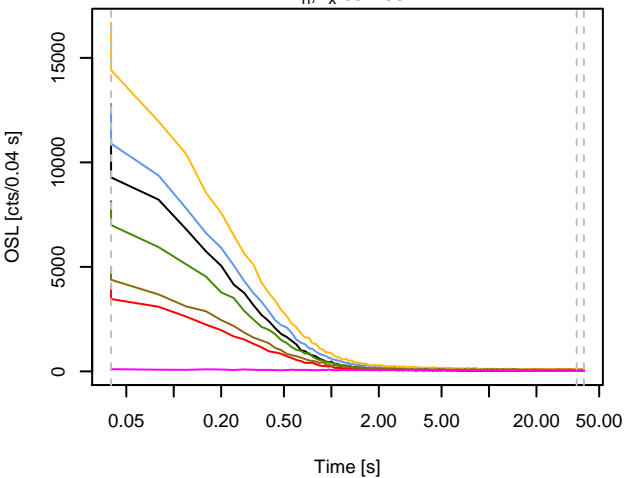
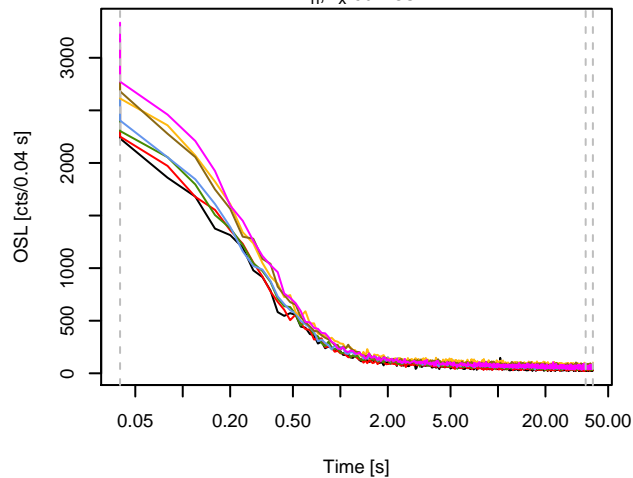
$D_e = 623.25$  [600.63 ; 635.8]



# 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 %

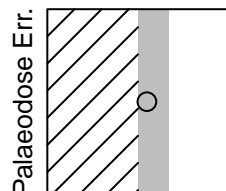


## Test dose response



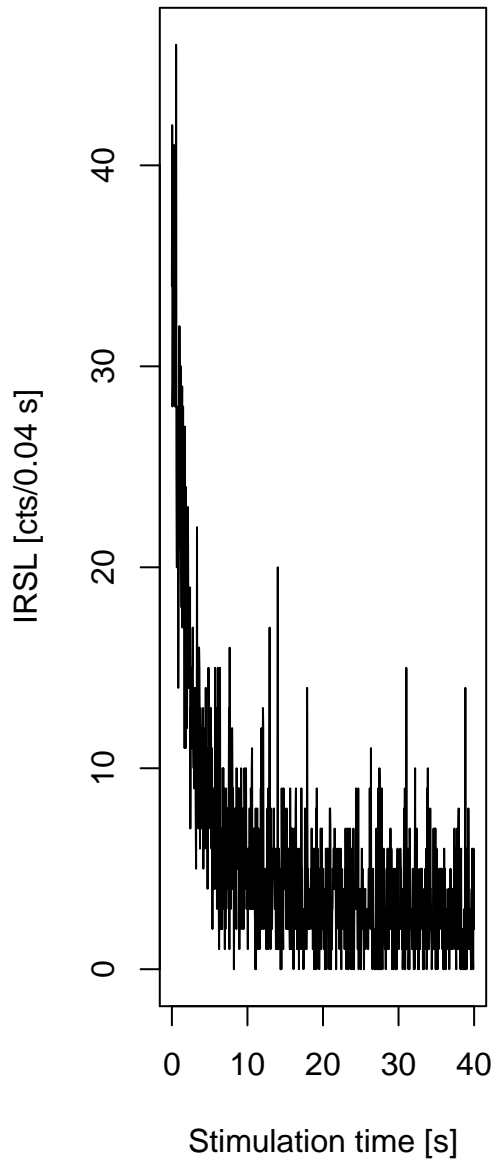


## Rejection criteria



- 0.2      + 0.2

## IRSL



[help\("analyse\\_SAR.CWOSL"\)](#)

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

Natural  
(0)

Natural  
(136)

Natural  
(317)

Natural  
(544)

Natural  
(815)

Natural  
(0)

Natural  
(317)



## 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<sub>e</sub> from MC simulation

D<sub>eMC</sub> = 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<sub>e</sub> from MC simulation

D<sub>e,MC</sub> = 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



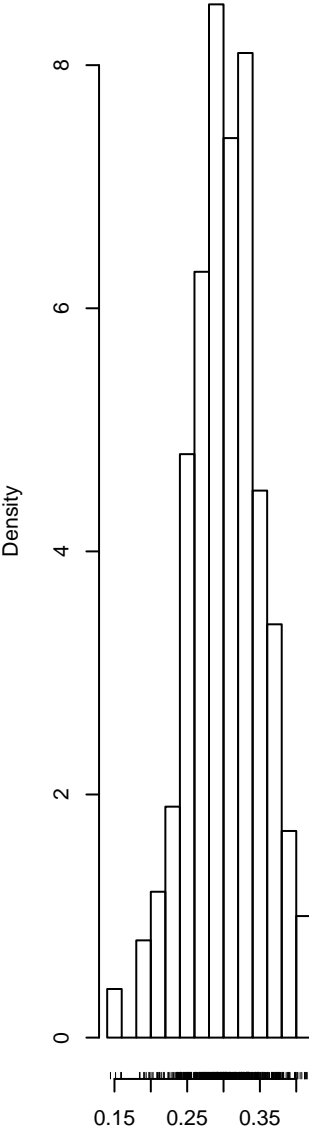
**Bootstrapping: Average Dose**

n = 500



**Bootstrapping: Sigma\_d**

n = 500



help("calc\_AverageDose")

# D<sub>e</sub> distribution

n = 56 | in 2 sigma = 53.6 %

Standardised estimate

2  
0  
-2

D<sub>e</sub> [Gy]

100

40

20

help("calc\_AverageDose")

help("calc\_AverageDose")

Relative standard error (%)

20

10

6.7

0

5

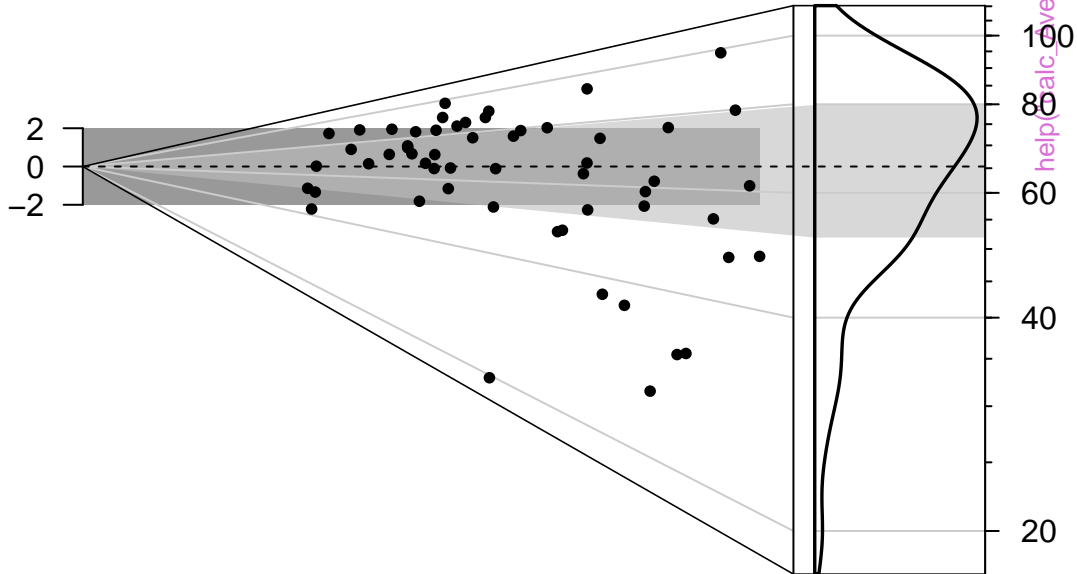
10

15

0.018

Precision

Density (bw 0.117)



Profile log likelihood for  $\sigma_{OD}$



# Fast Ratio

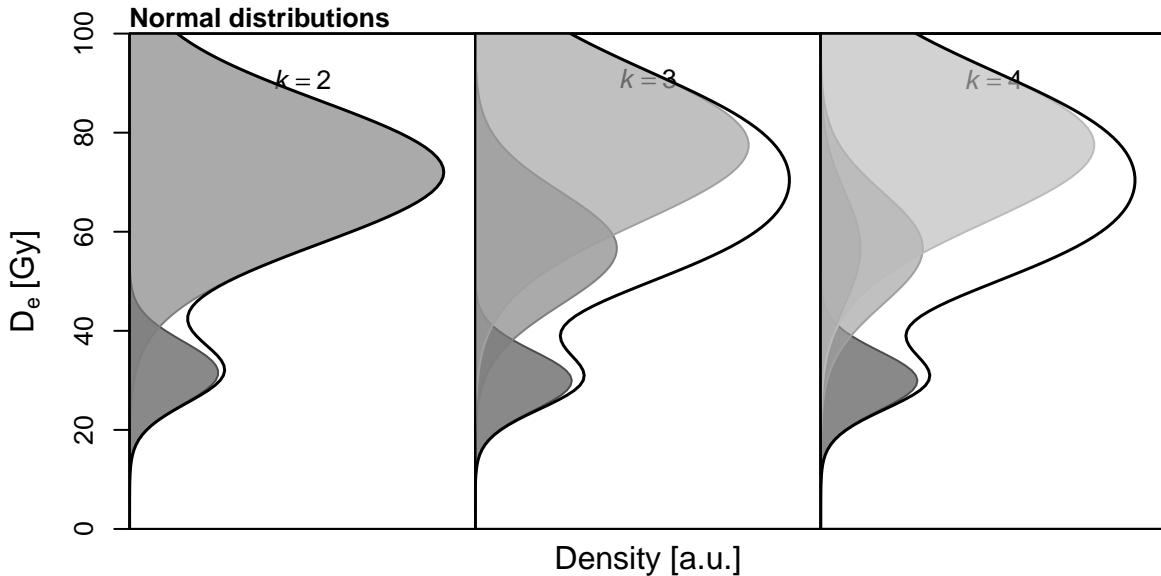


help("calc\_FastRatio")

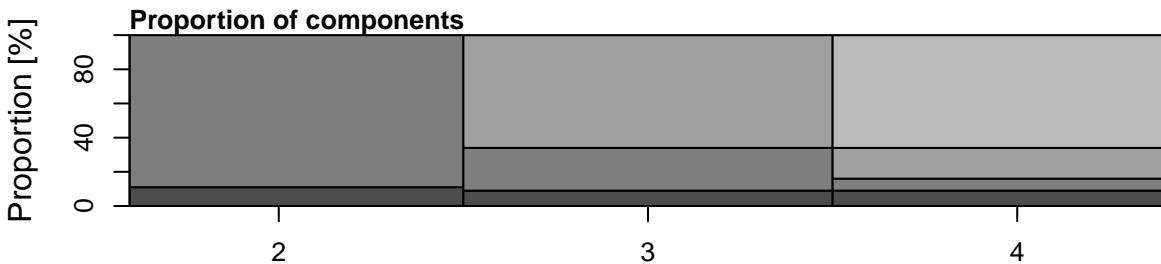
# Finite Mixture Model

$\sigma_b = 0.2 \mid n = 62$

## Normal distributions



## Proportion of components



## Statistical criteria

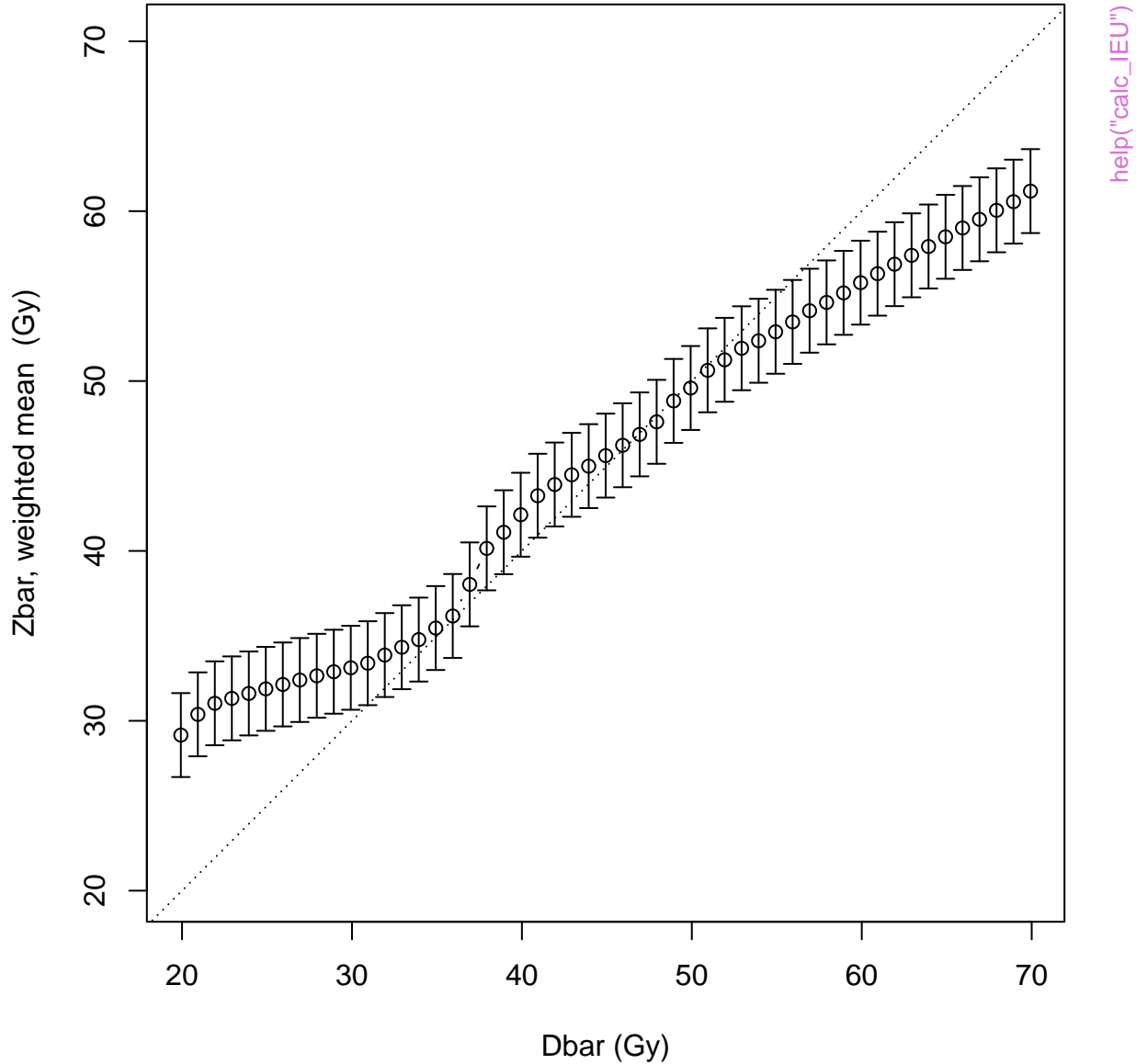


help("calc\_FiniteMixture")

# Fuchs & Lang (2001)









help("calc\_I EU")

No L<sub>x</sub> curves detected

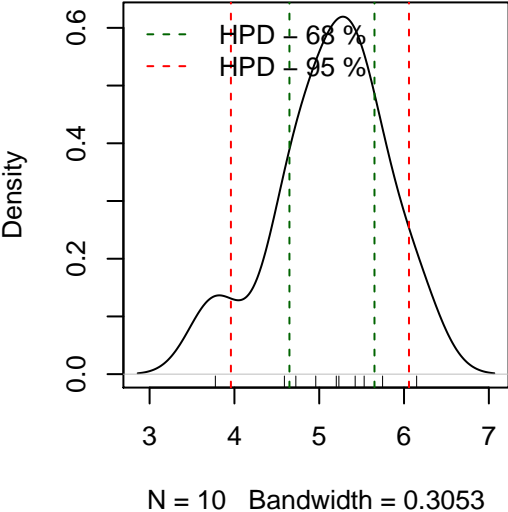
No T<sub>x</sub> curves detected

help("calc\_Kars2008")

Signal Fading

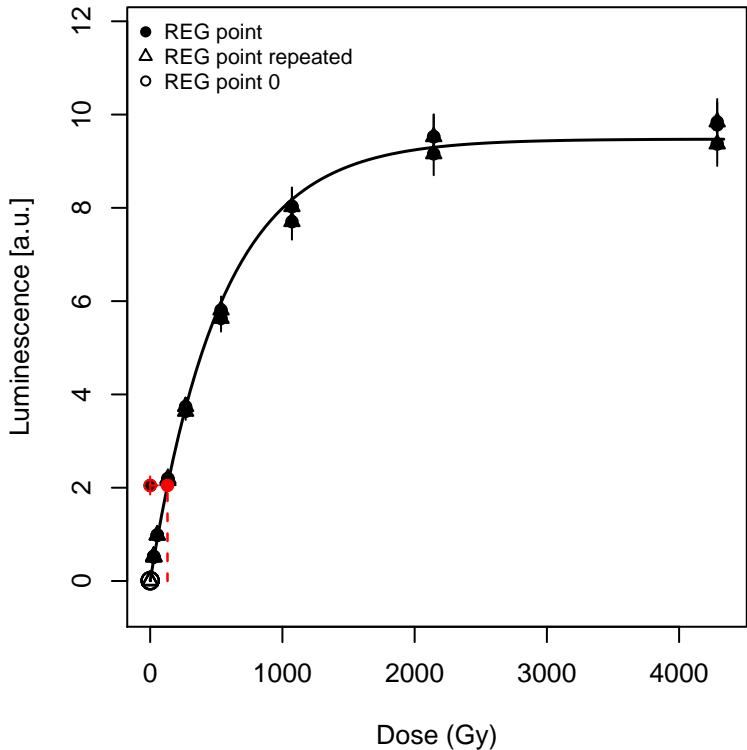


Density: g-values (%/decade)



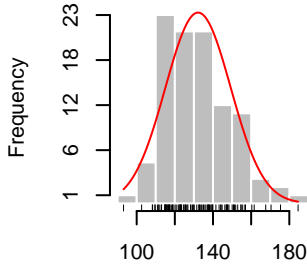
Measured dose response curve

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

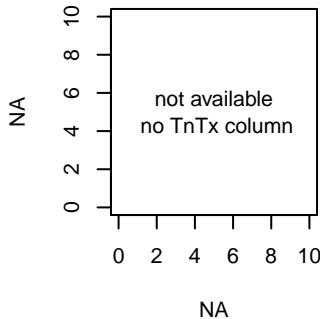


$D_e$  from MC simulation

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

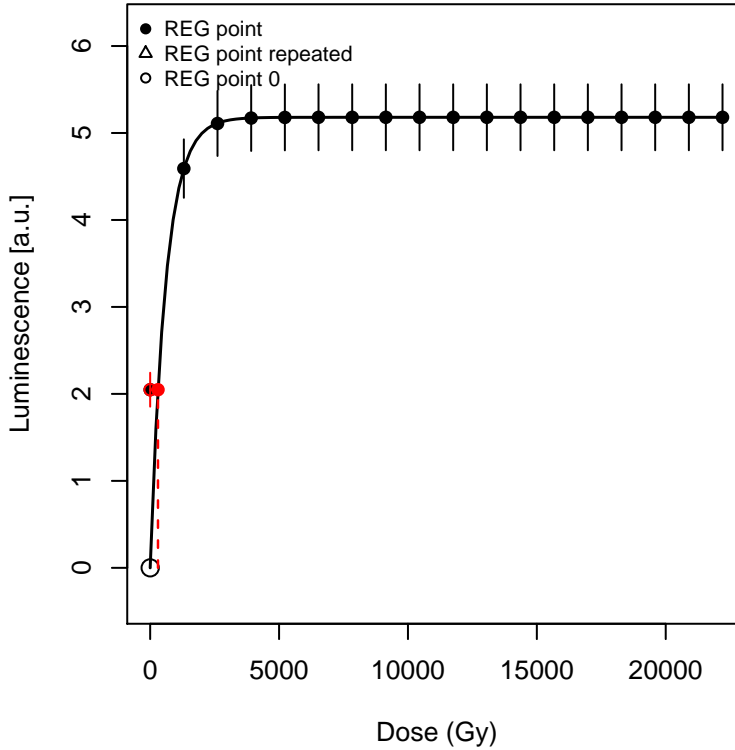


Test dose response



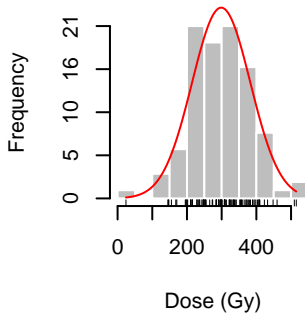
# Simulated dose response curve

$D_e = 302.49 \pm 84.07$  | fit: EXP



## $D_e$ from MC simulation

$D_{eMC} = 298.66 \pm 84.07$  | quality = 98.7 %



## Test dose response



Dose response curves



$$\dot{D} = 7.00 \pm 0.004 \frac{\text{Gy}}{\text{ka}}$$

$$\dot{D}_{\text{Reader}} = 0.13 \pm 0.007 \frac{\text{Gy}}{\text{s}}$$

$$\log_{10}(\rho') = -5.42 \pm 0.09$$

$$\left(\frac{n}{N}\right) = 0.14 \pm 0.02$$

$$\left(\frac{n}{N}\right)_{\text{SS}} = 0.34 \pm 0.06$$

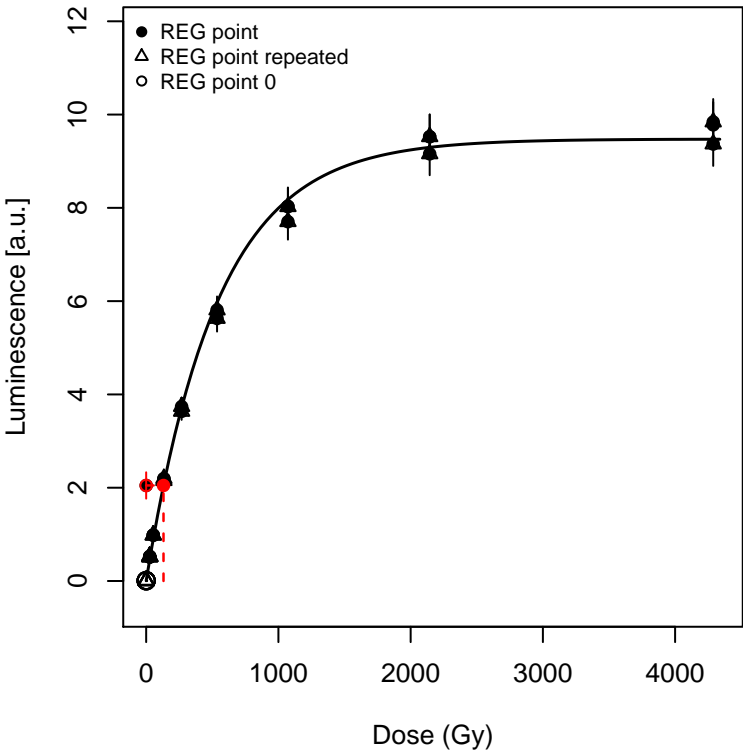
$$D_{\text{E, sim}} = 302 \pm 84 \text{ Gy}$$

$$D_{0, \text{sim}} = 601 \pm 168 \text{ Gy}$$

$$\text{Age}_{\text{sim}} = 43 \pm 12 \text{ ka}$$

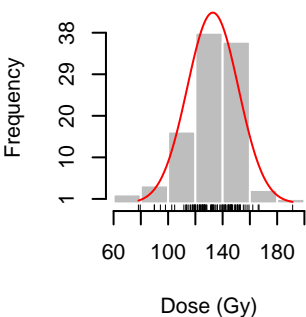
Measured dose response curve

$D_e = 130.97 \pm 18.78$  | fit: EXP

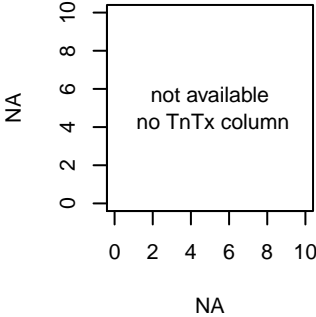


$D_e$  from MC simulation

$D_{EMC} = 132.8 \pm 18.78$  | quality = 98.6 %

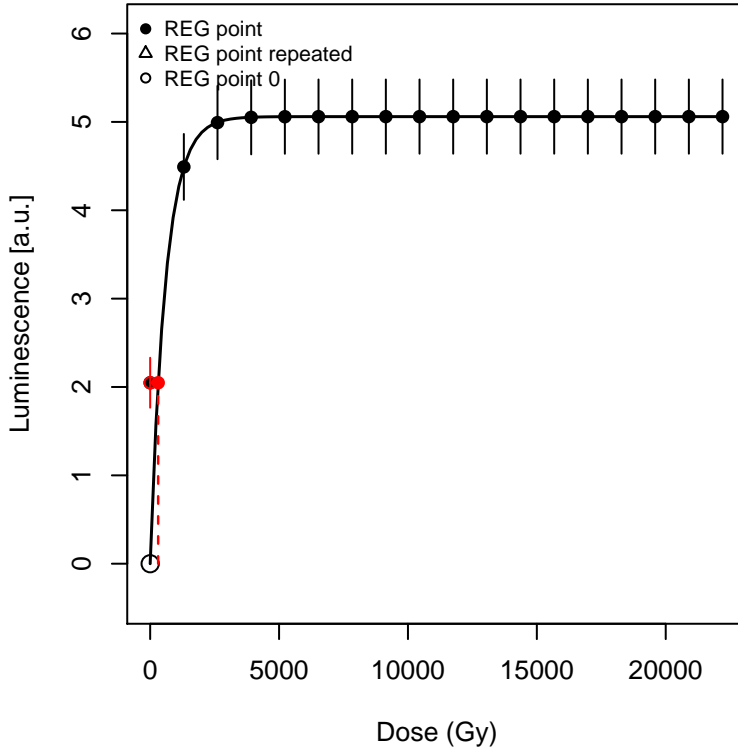


Test dose response



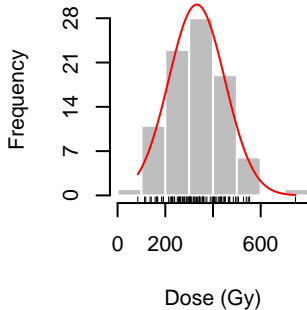
# Simulated dose response curve

$D_e = 310.3 \pm 117.71$  | fit: EXP

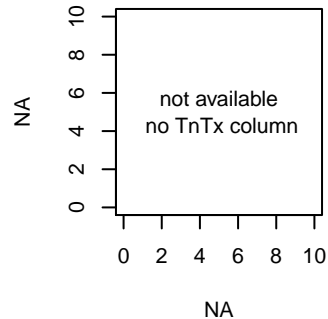


## $D_e$ from MC simulation

$D_{eMC} = 331.99 \pm 117.71$  | quality = 93 %

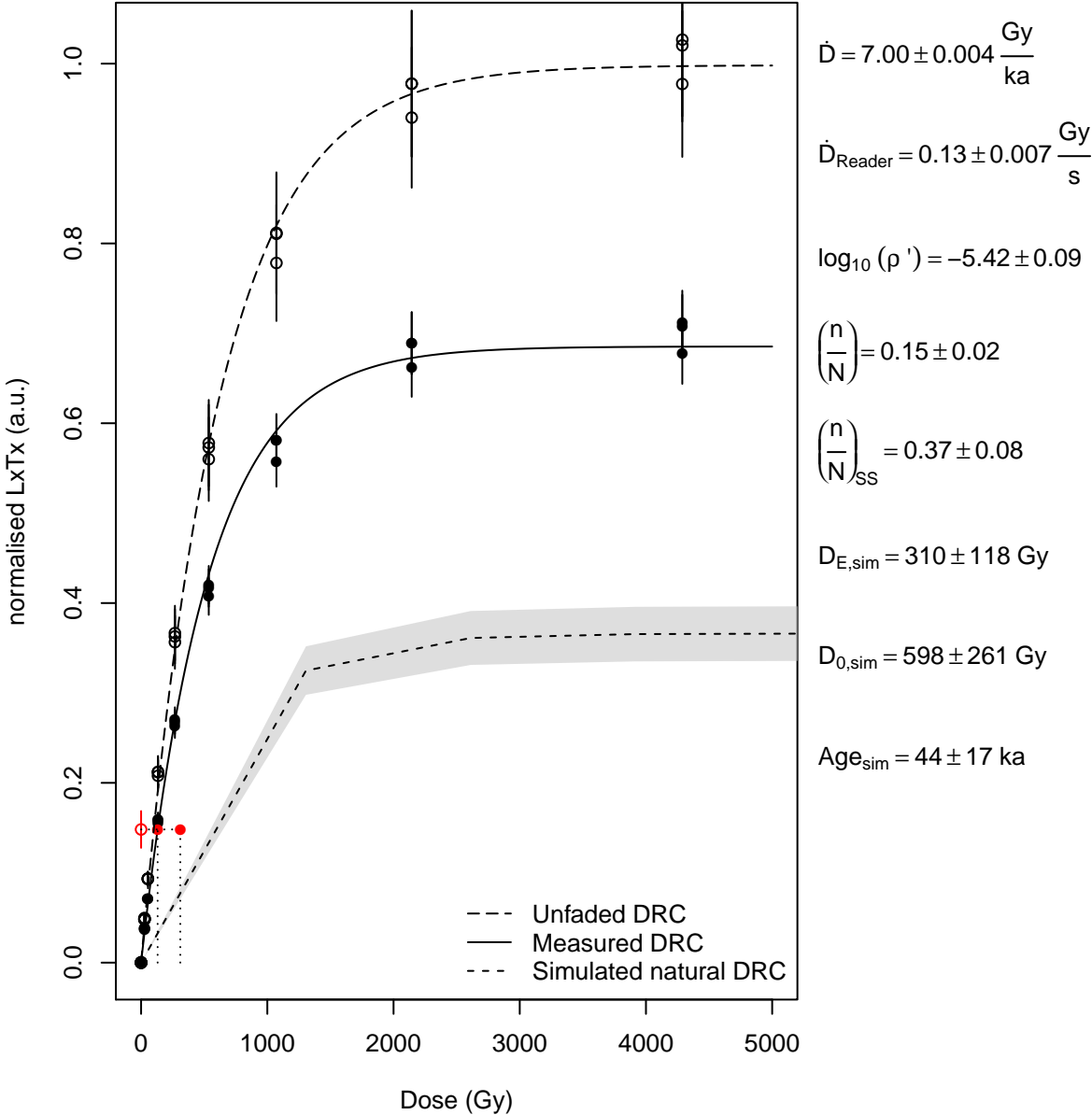


## Test dose response

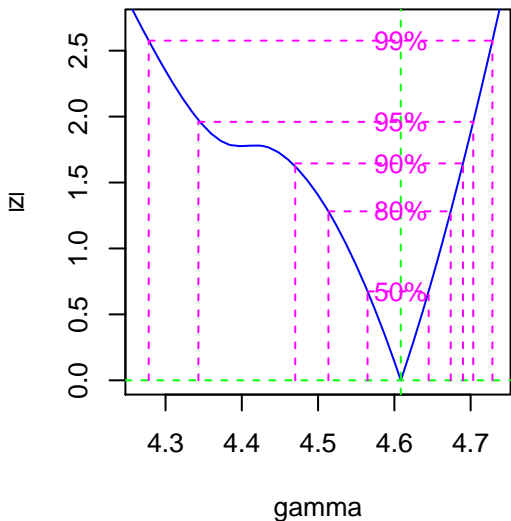




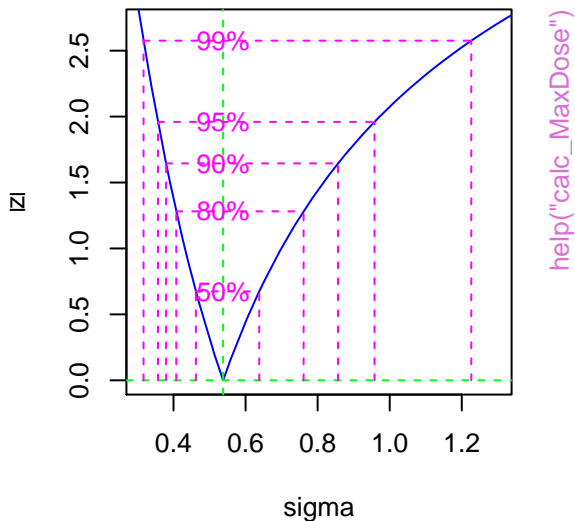
Dose response curves



**Likelihood profile: gamma**

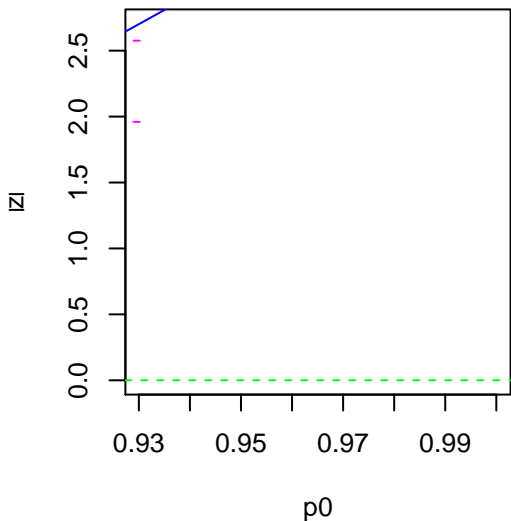


**Likelihood profile: sigma**



help("calc\_MaxDose")

**Likelihood profile: p0**



**Likelihood profile: gamma**

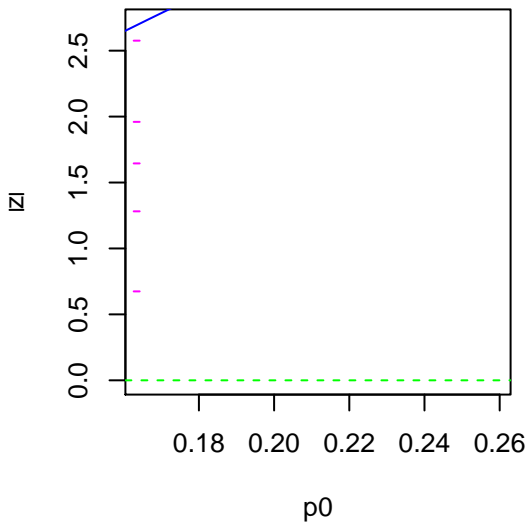


**Likelihood profile: sigma**



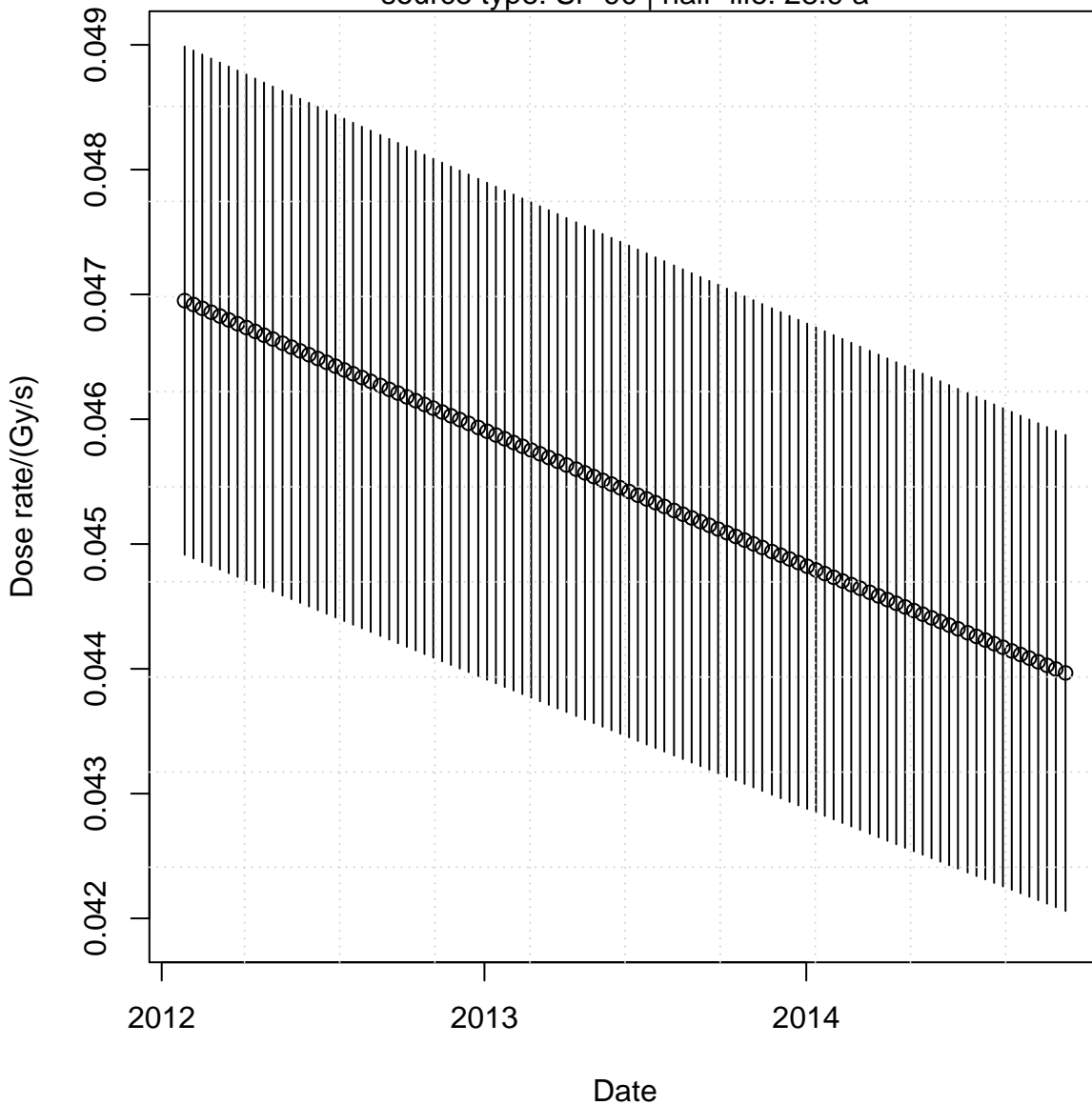
help("calc\_MinDose")

**Likelihood profile: p0**



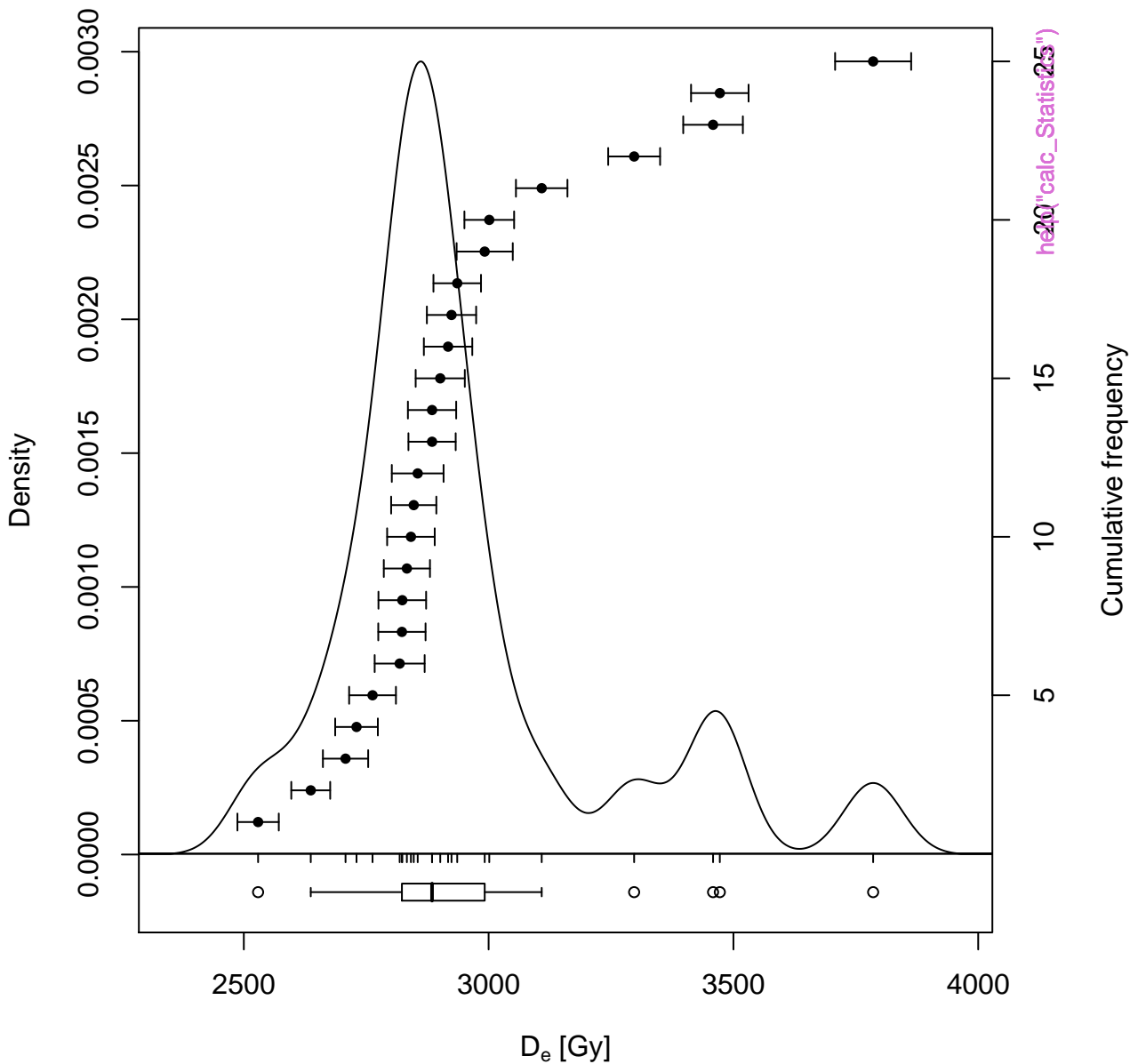
# Source Dose Rate Prediction

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



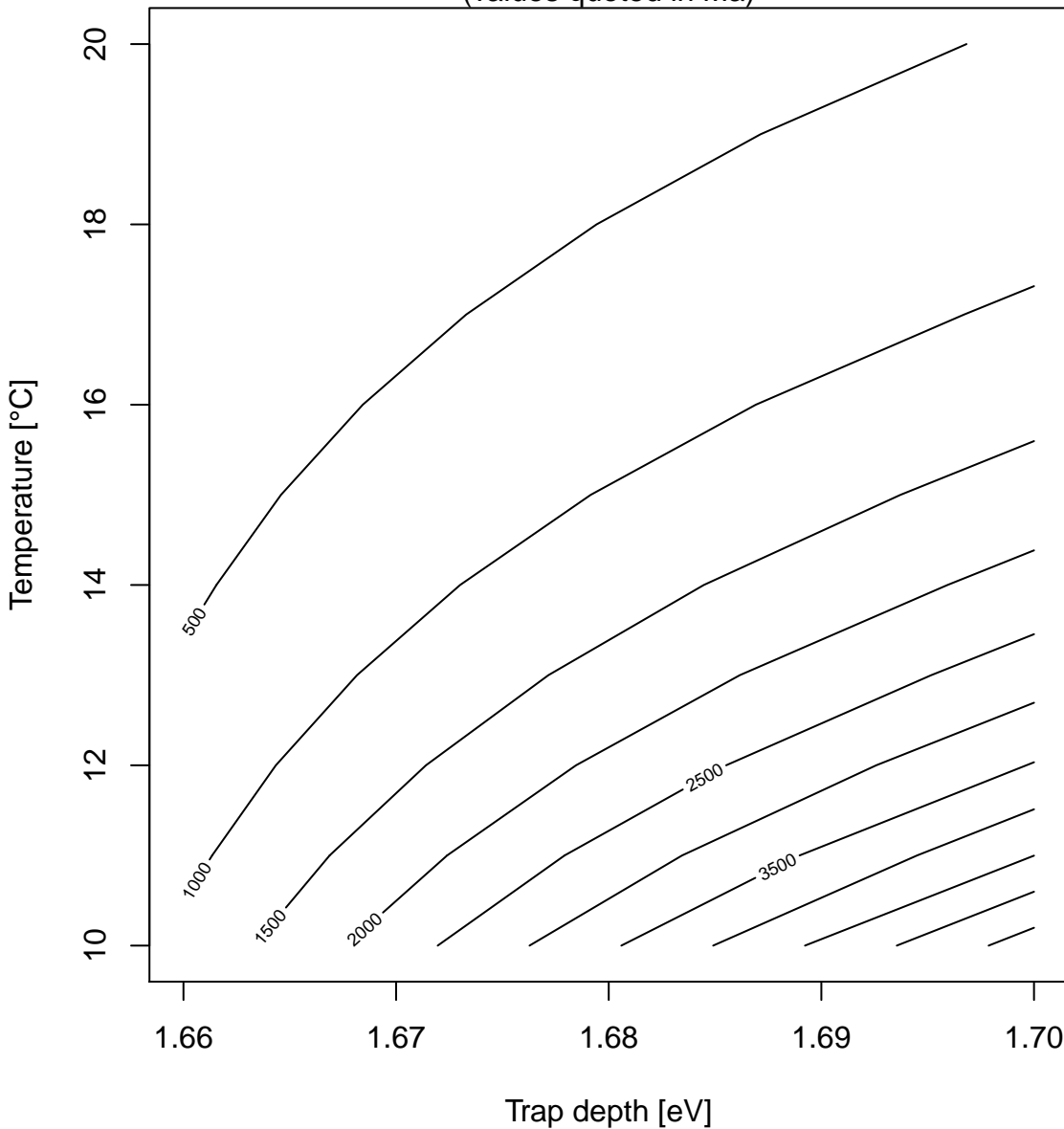
help("calc\_SourceDoseRate")

# D<sub>e</sub> distribution



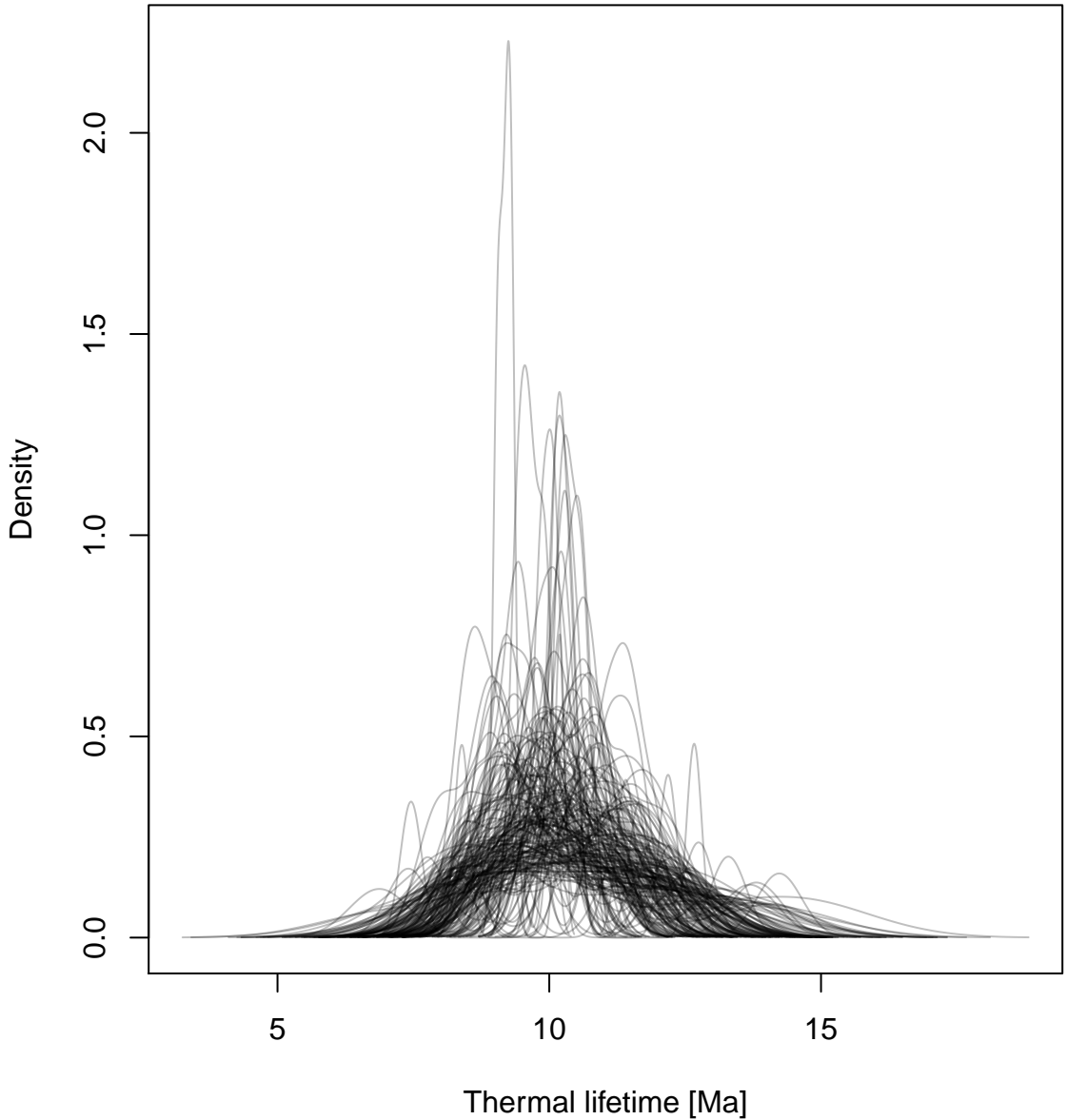
# Thermal Lifetime Contour Plot

(values quoted in Ma)



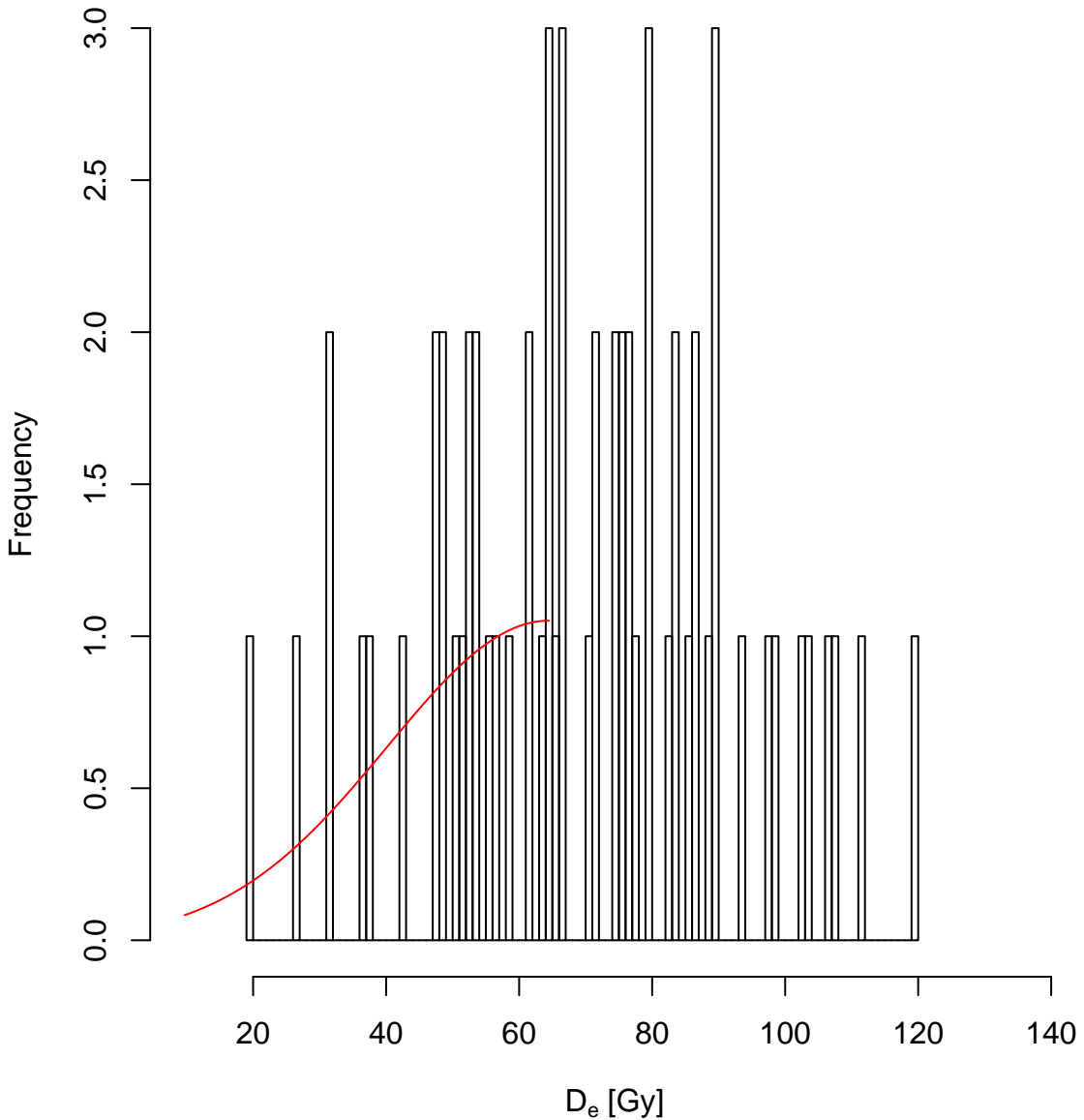
help("calc\_ThermalLifetime")

# Thermal Lifetime Density Plot



`help("calc_ThermalLifetime")`

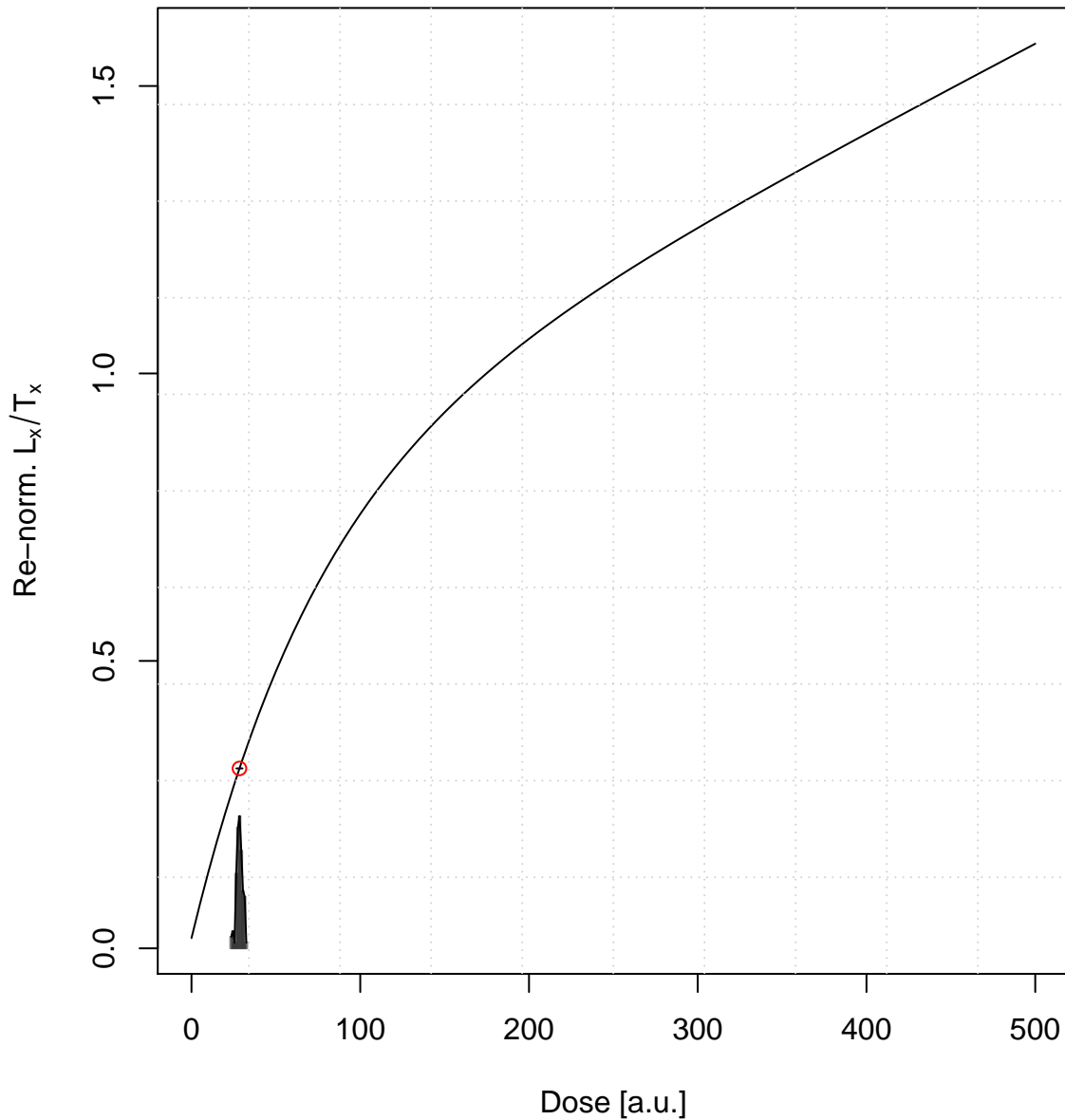
# D<sub>e</sub> estimation applying Woda and Fuchs (2008)



help("calc\_WodaFuchs2008")



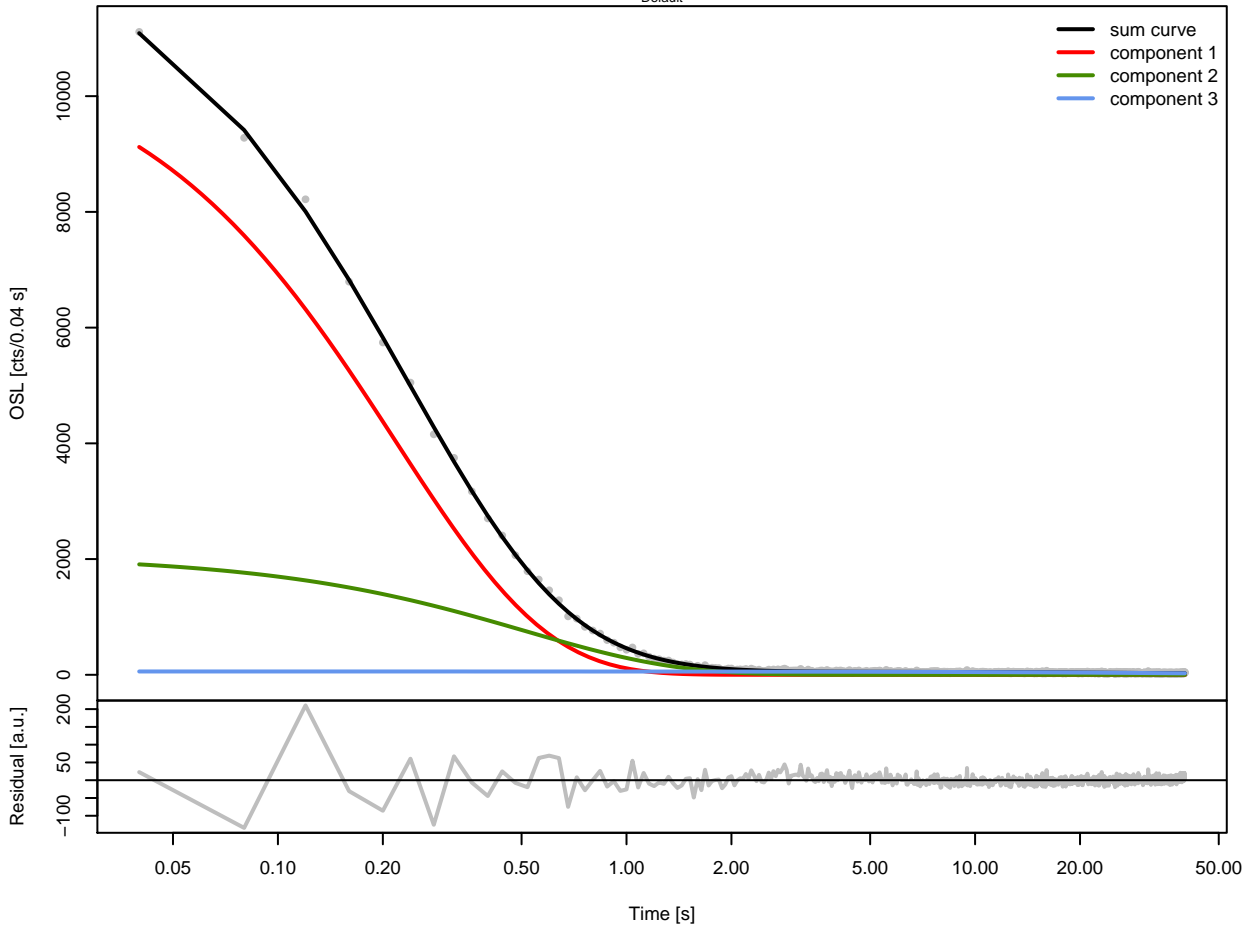
# gSGC and resulting De



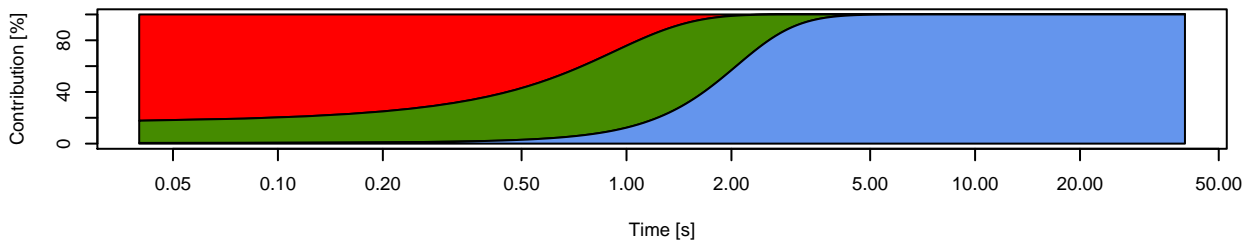
help("calc\_gSGC")

# CW Curve Fit

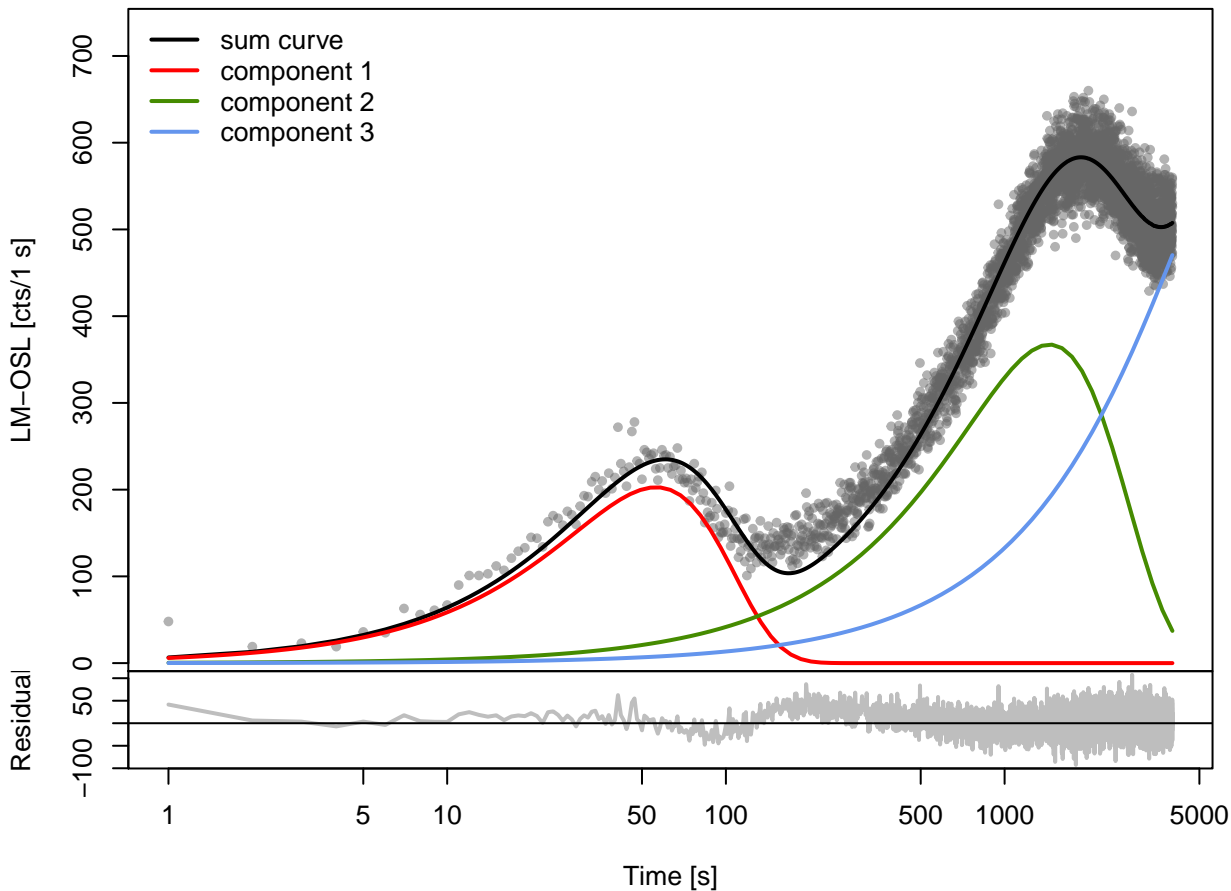
Default



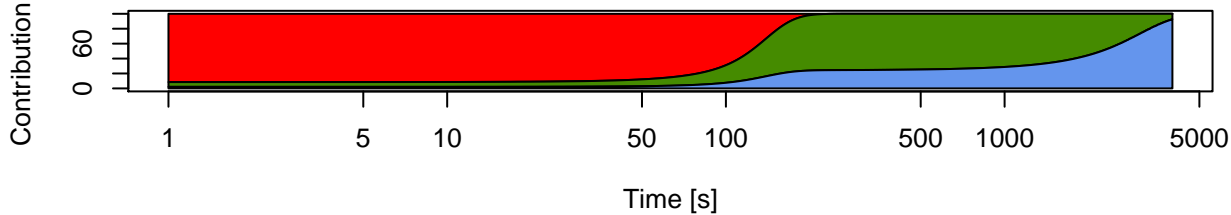
## Component contribution to sum curve



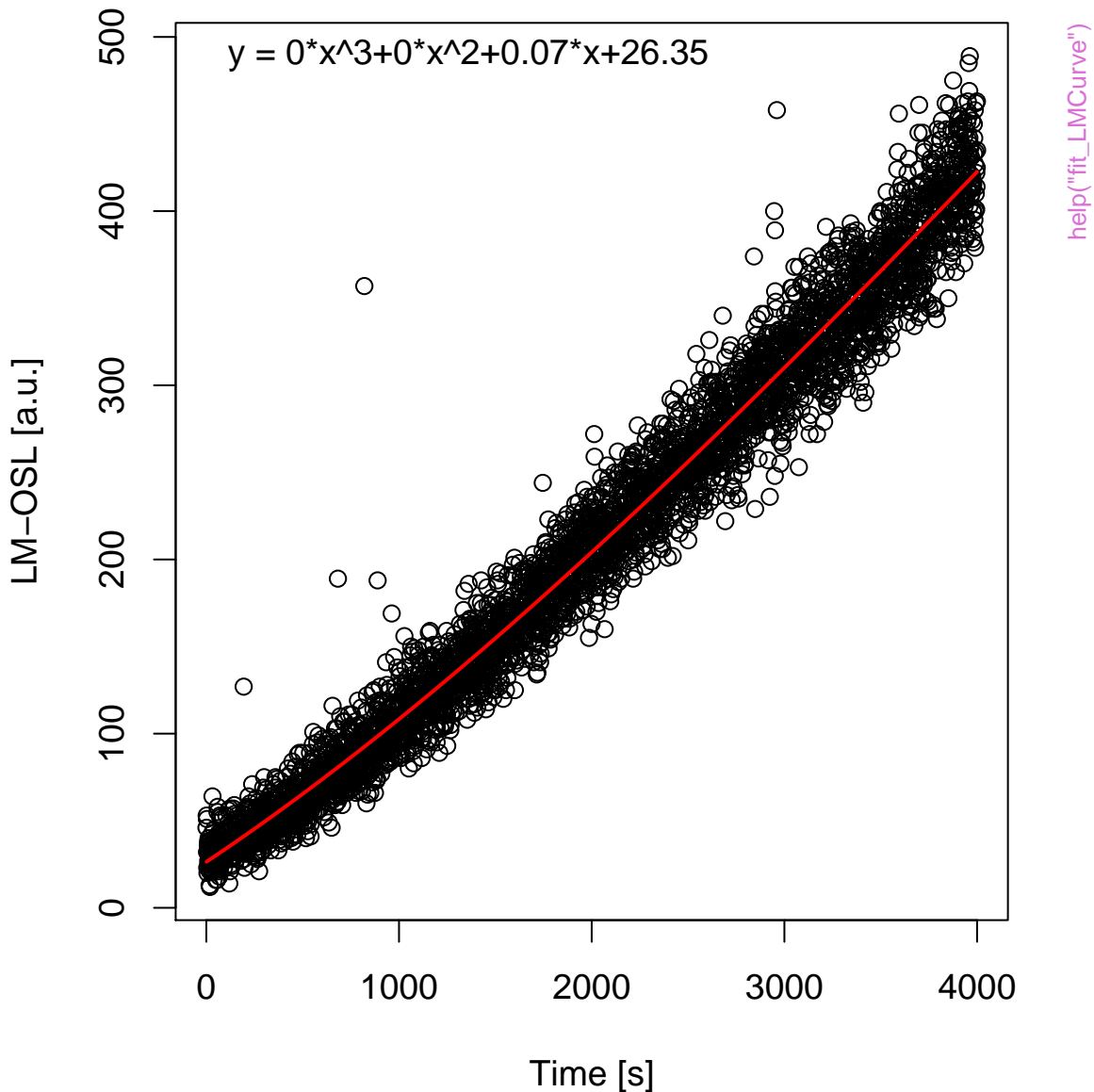
## Default



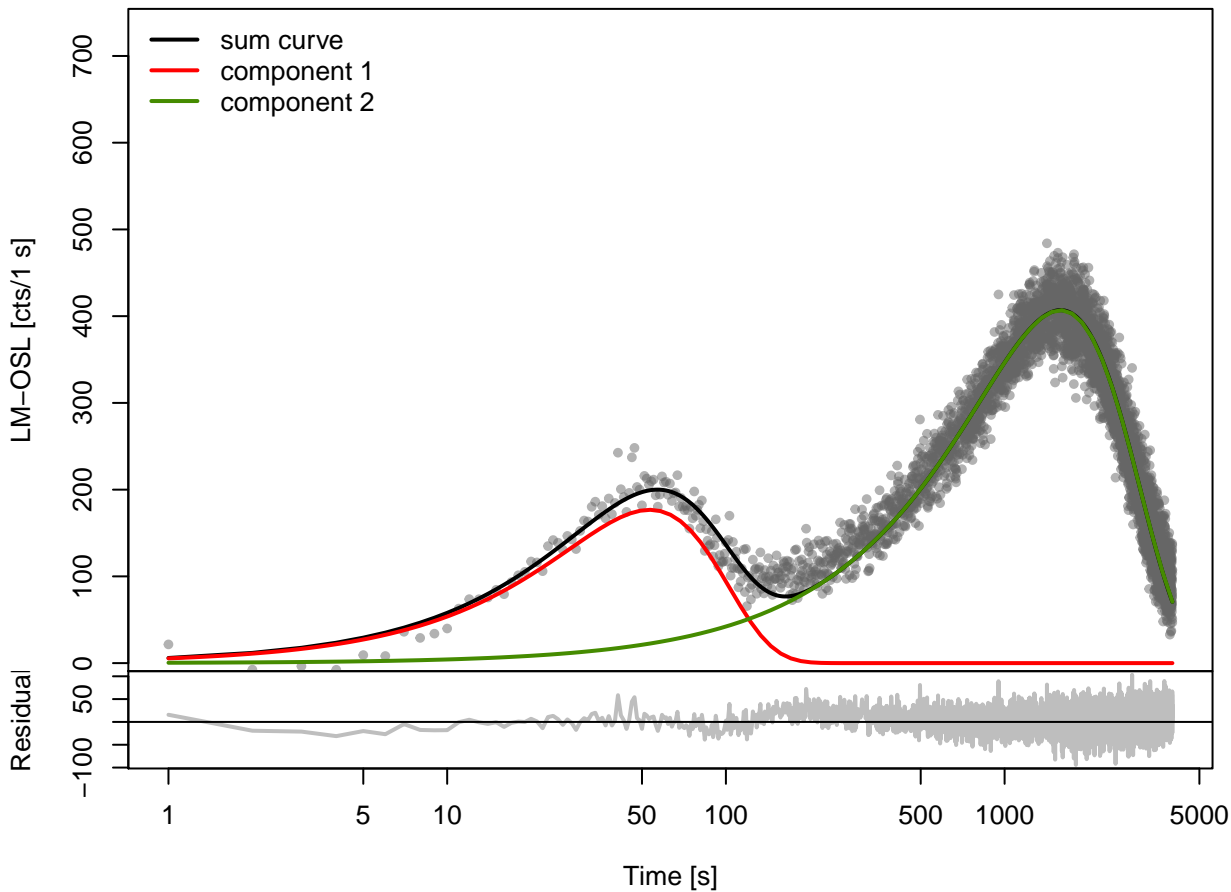
## Component contribution to sum curve



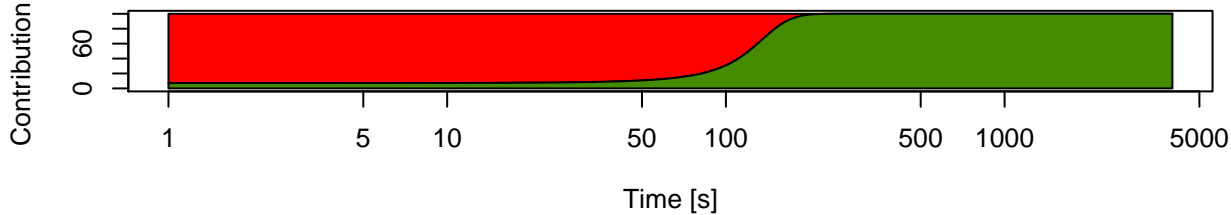
# Background



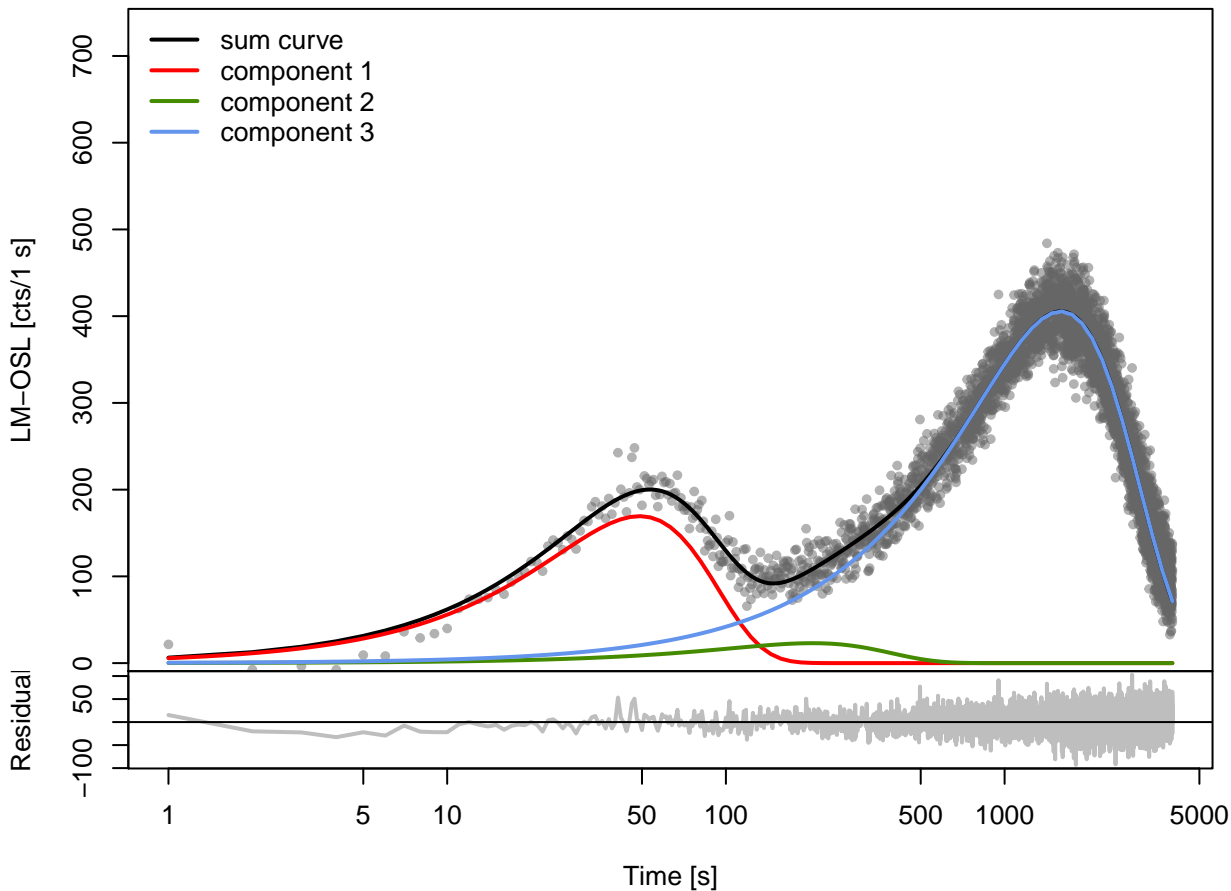
## Default



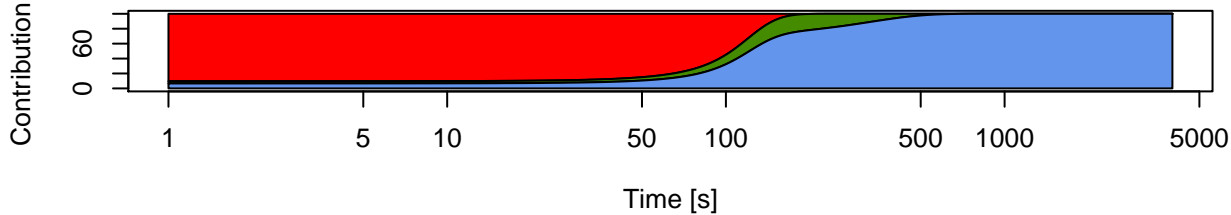
## Component contribution to sum curve

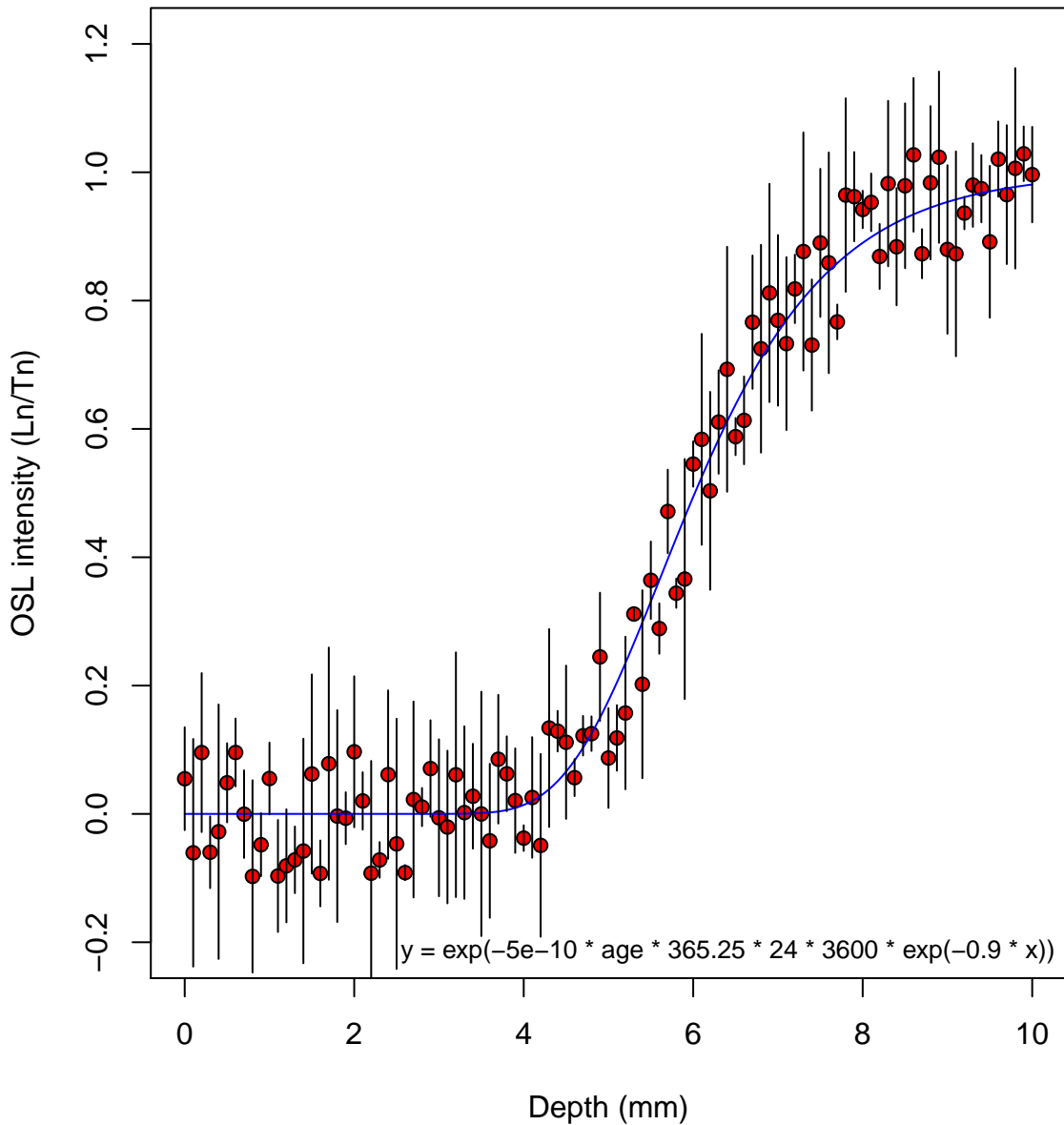


## Default

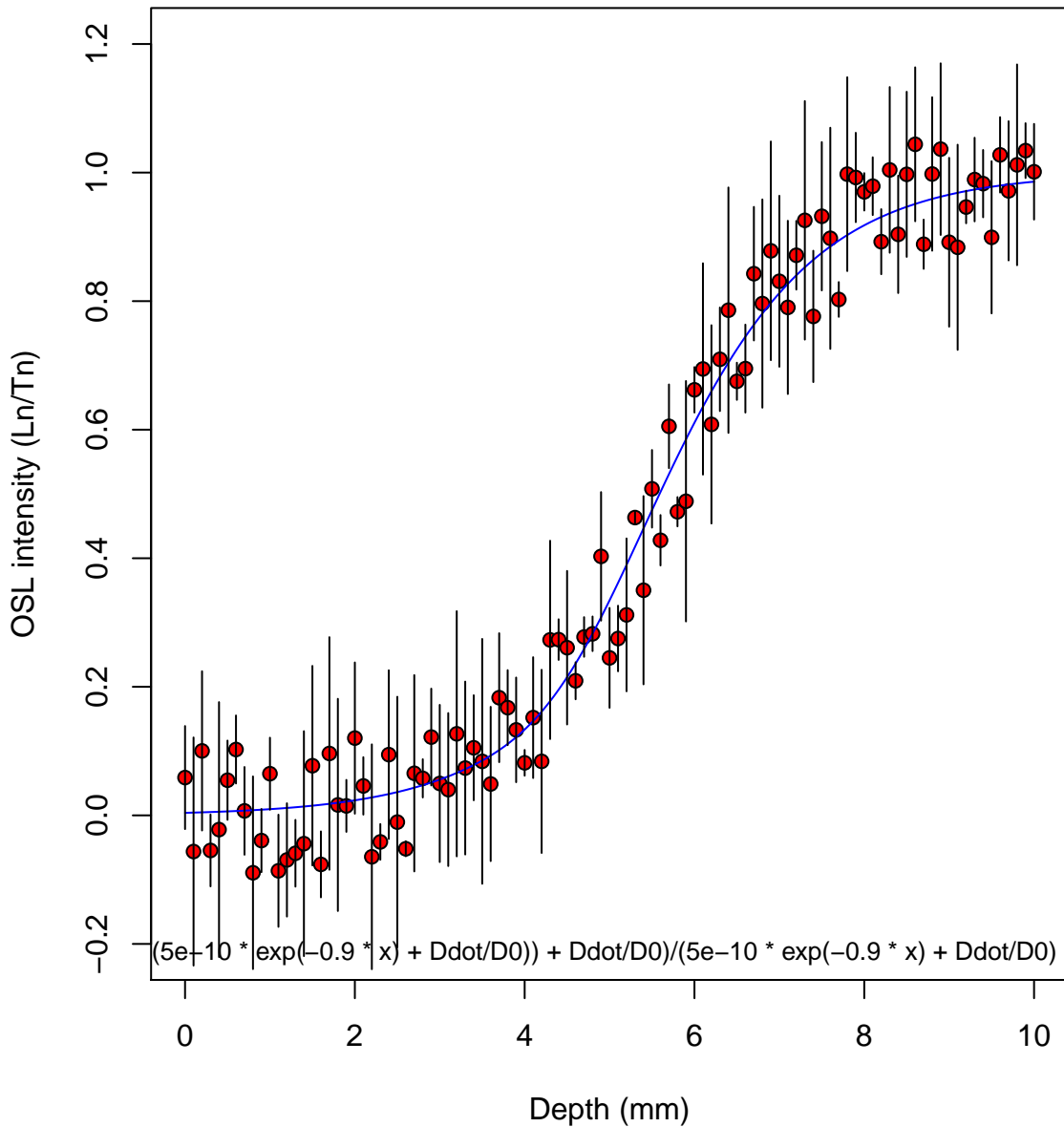


## Component contribution to sum curve



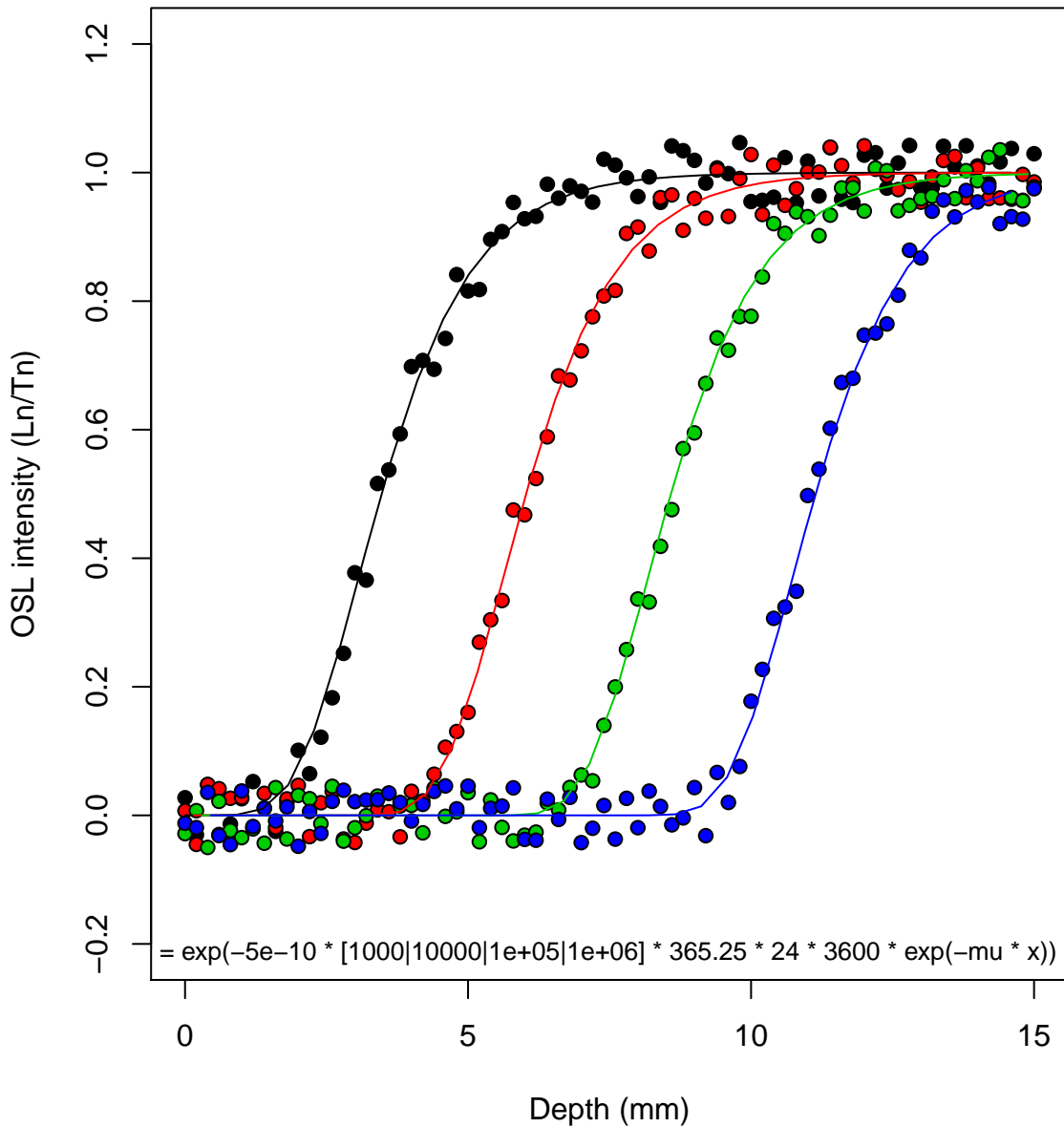


help("fit\_SurfaceExposure")

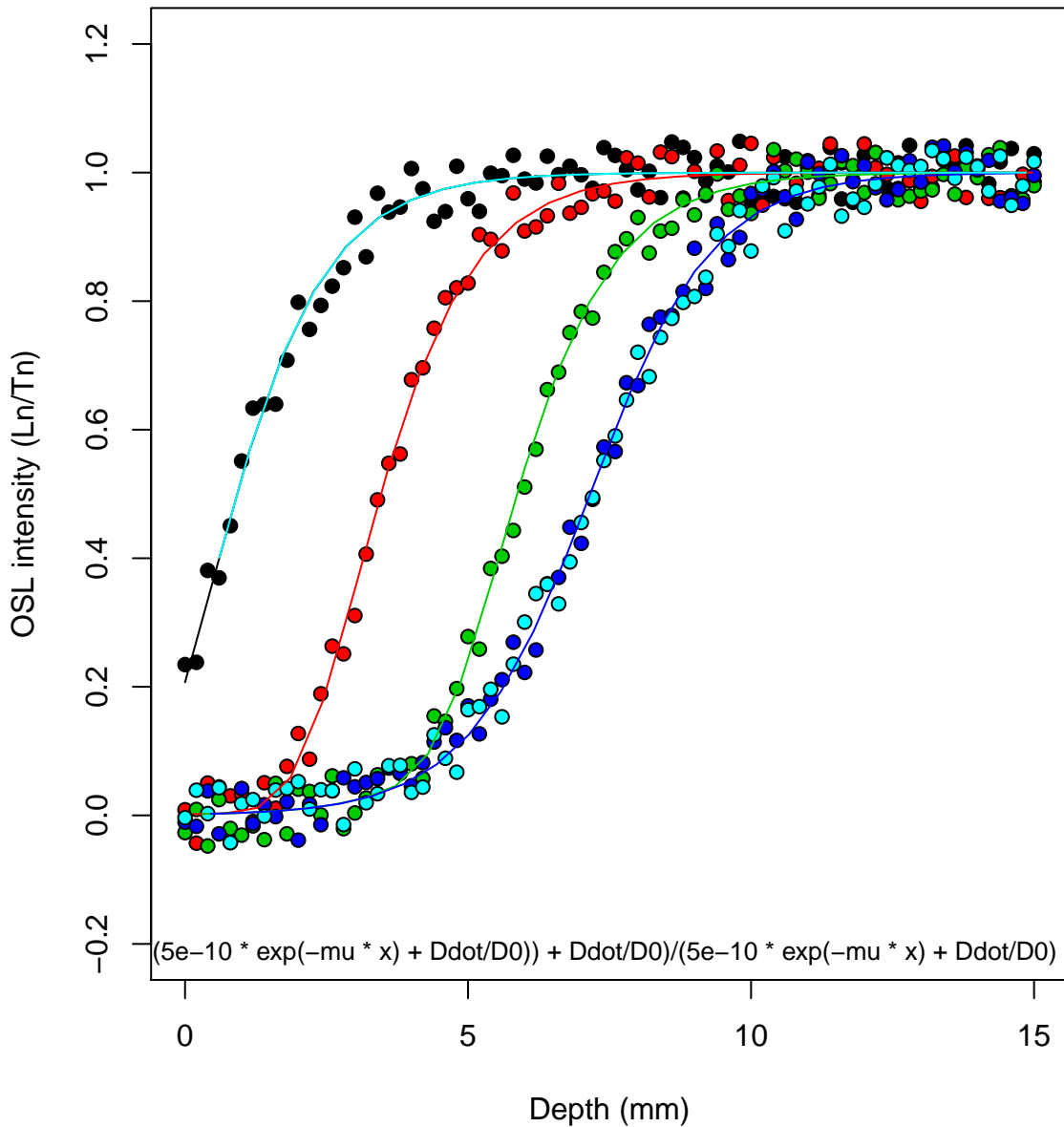


help("fit\_SurfaceExposure")



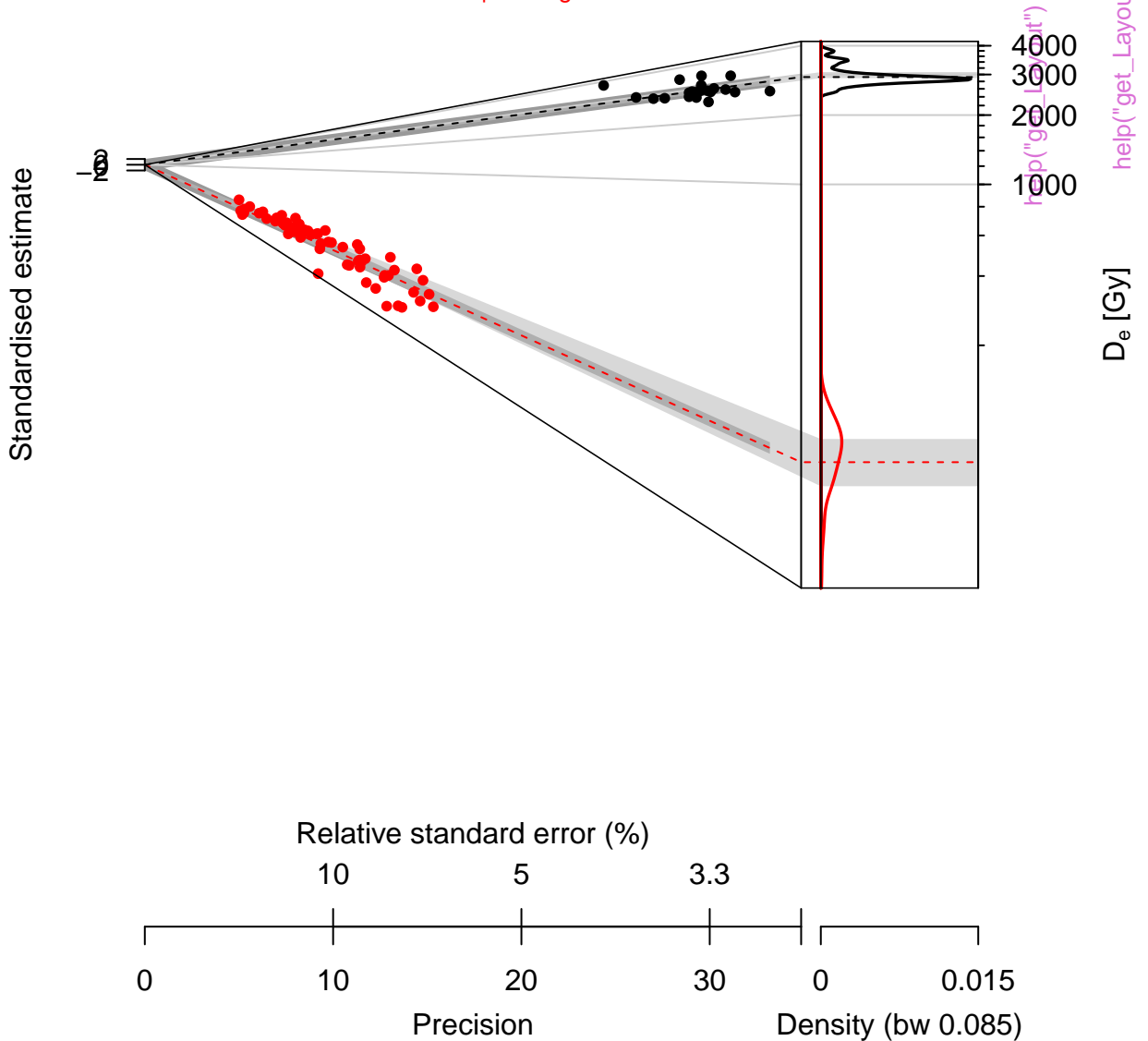


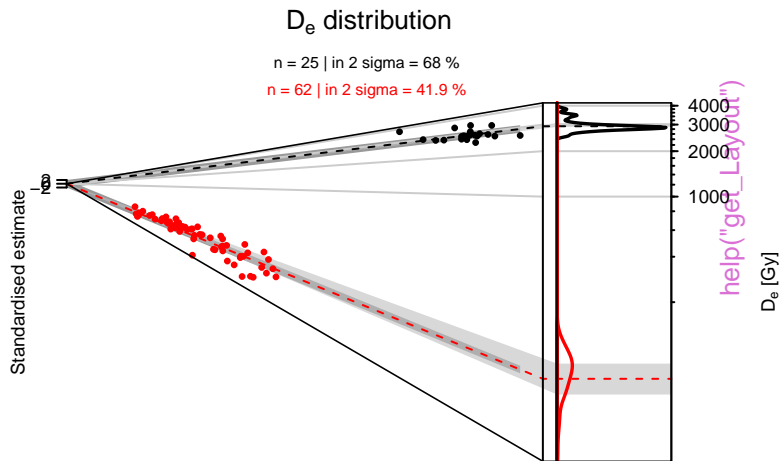
help("fit\_SurfaceExposure")



help("fit\_SurfaceExposure")

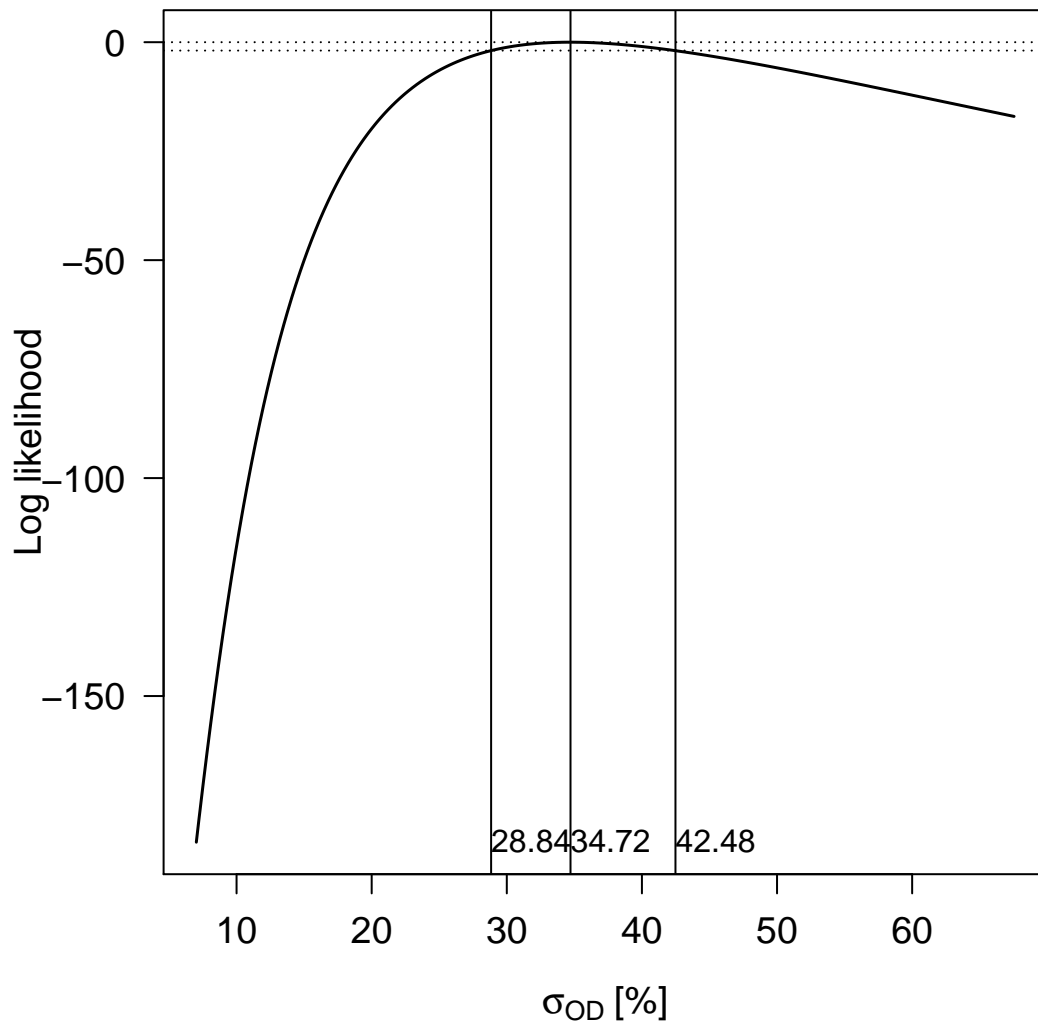
n = 25 | in 2 sigma = 68 %  
n = 62 | in 2 sigma = 41.9 %



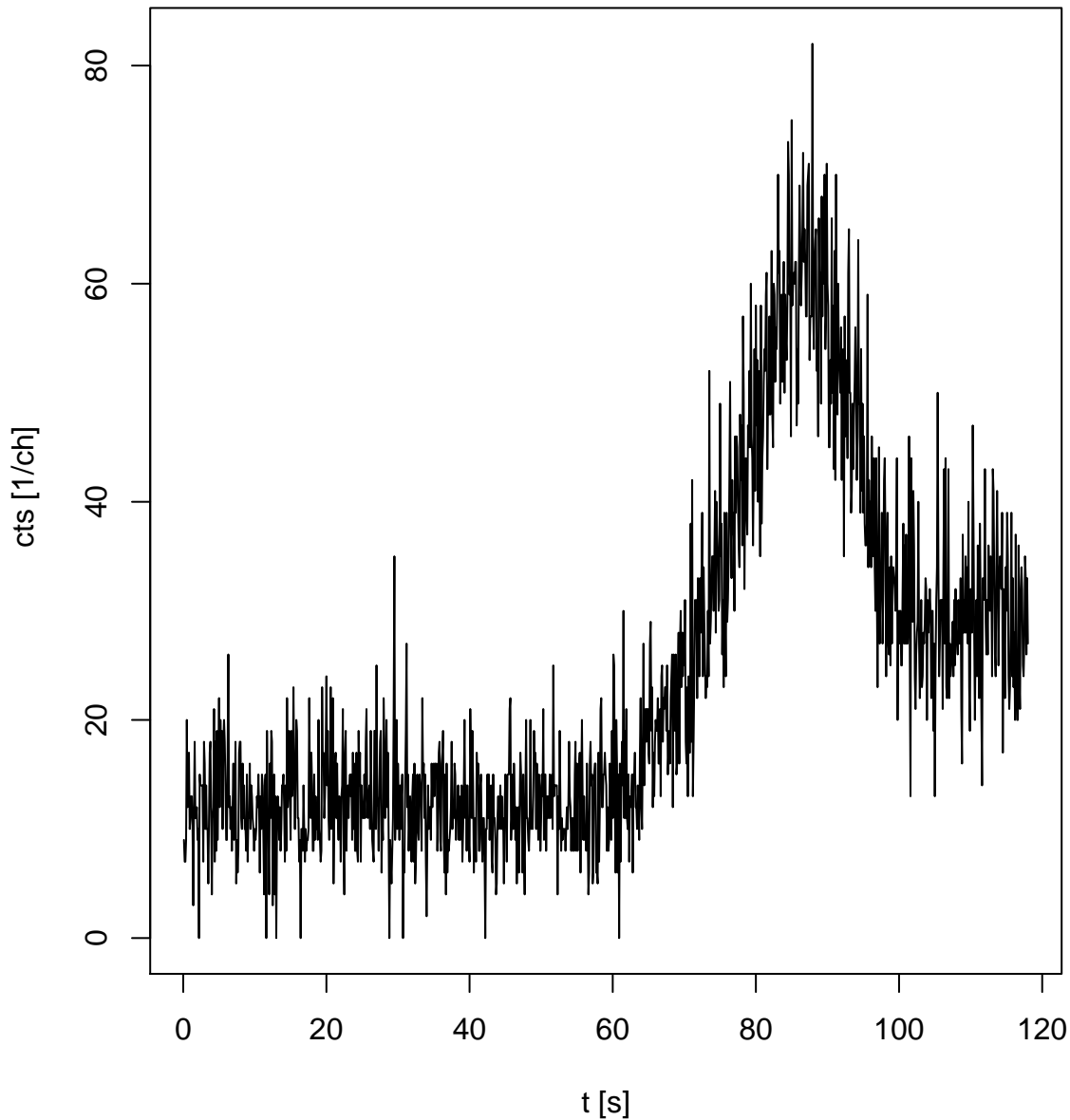


help("get\_Layout")

Profile log likelihood for  $\sigma_{OD}$



# 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  $\sigma_{OD}$



Profile log likelihood for  $\sigma_{OD}$



# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

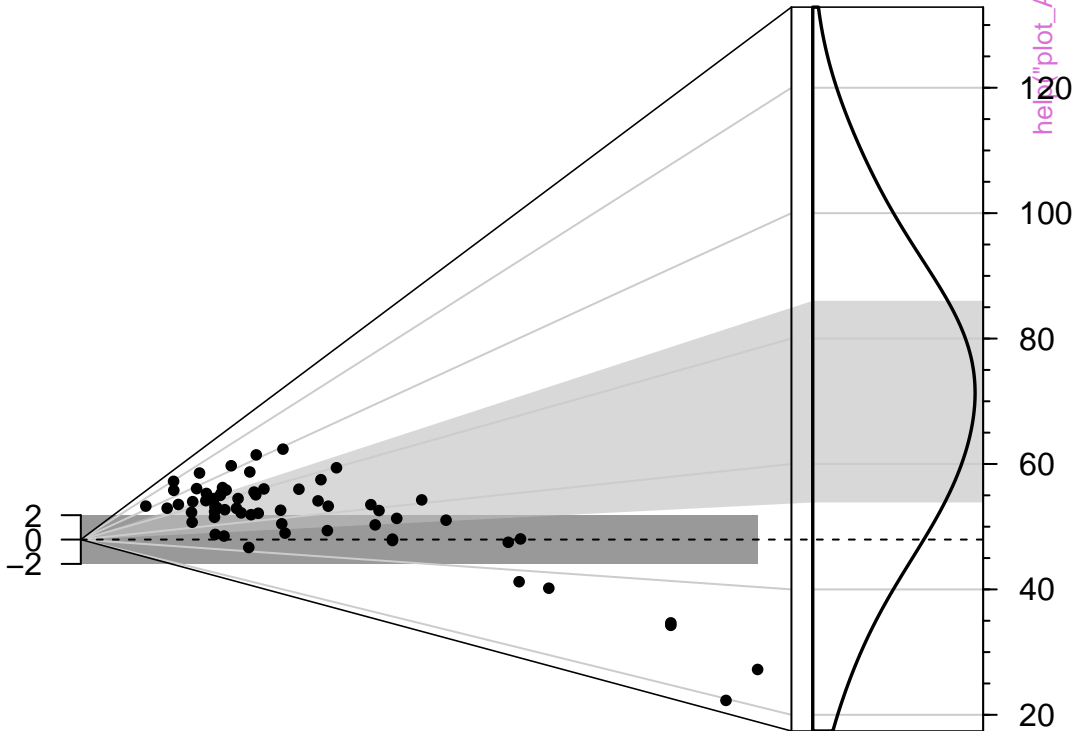
Precision

Density (bw 0.15)

# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 24.2 %

Standardised estimate



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

0.016

Precision

Density (bw 11.795)

# D<sub>e</sub> 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<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D<sub>e</sub> [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D<sub>e</sub> [Gy]

Relative standard error (%)

20

10

6.7

5

0

5

10

15

200

0.016

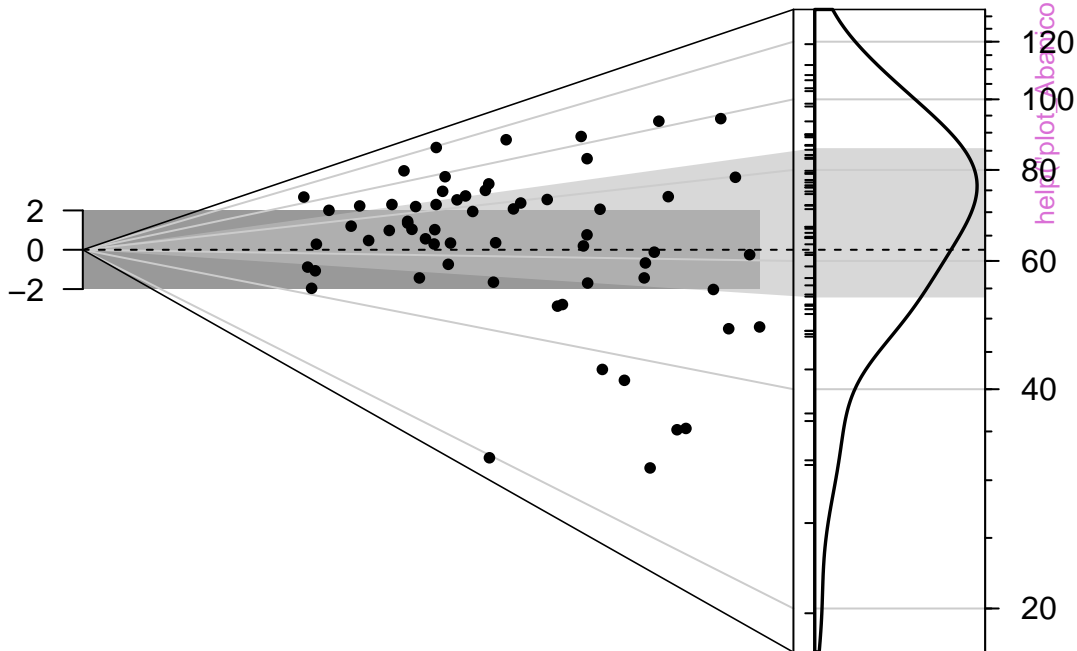
Precision

Density (bw 0.15)

# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D<sub>e</sub> [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)



# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D<sub>e</sub> [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0

0.264

Precision

Density (bw 0.04)

# D<sub>e</sub> 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<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D<sub>e</sub> [Gy]

Relative standard error (%)

n

20

10

6.7

0

10

0

5

10

15

0

0.016

Precision

Density (bw 0.15)

# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

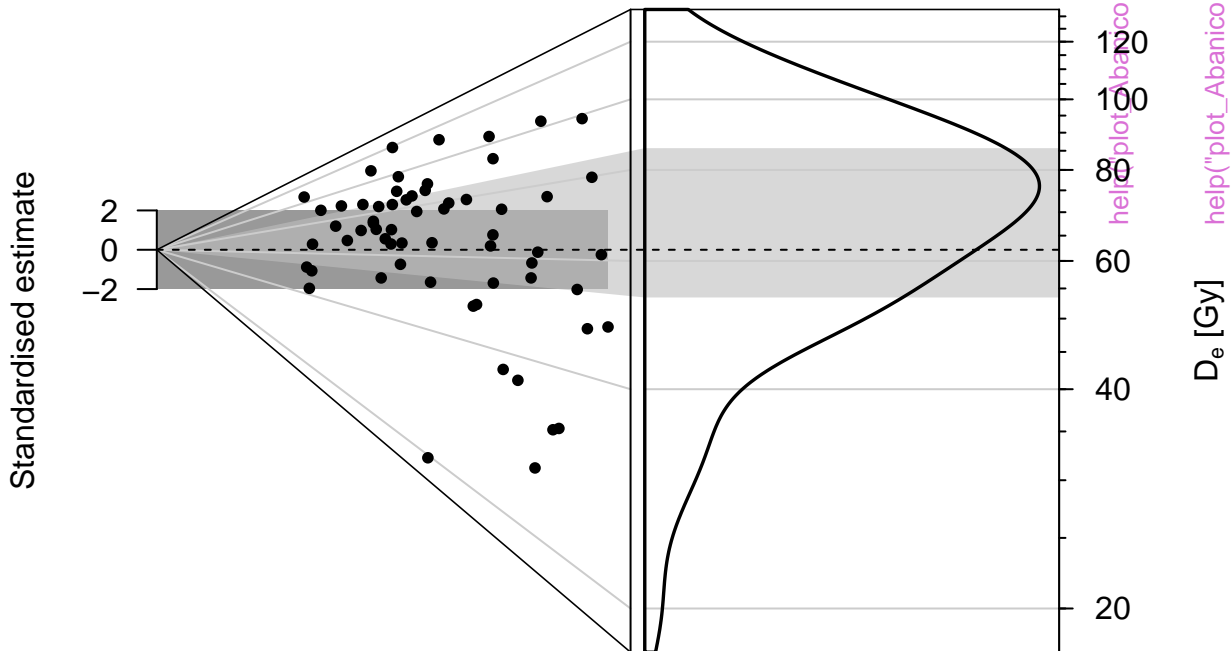
0.016

Precision

Density (bw 0.15)

# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %



Relative standard error (%)

20

10

6.7

0

5

10

15

0

0.016

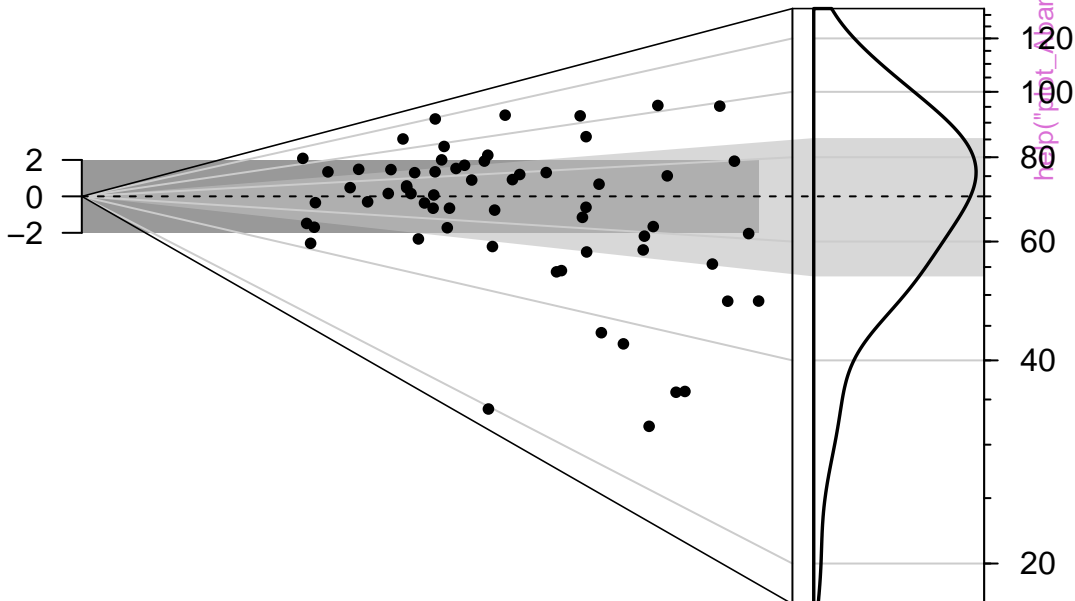
Precision

Density (bw 0.15)

# D<sub>e</sub> 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

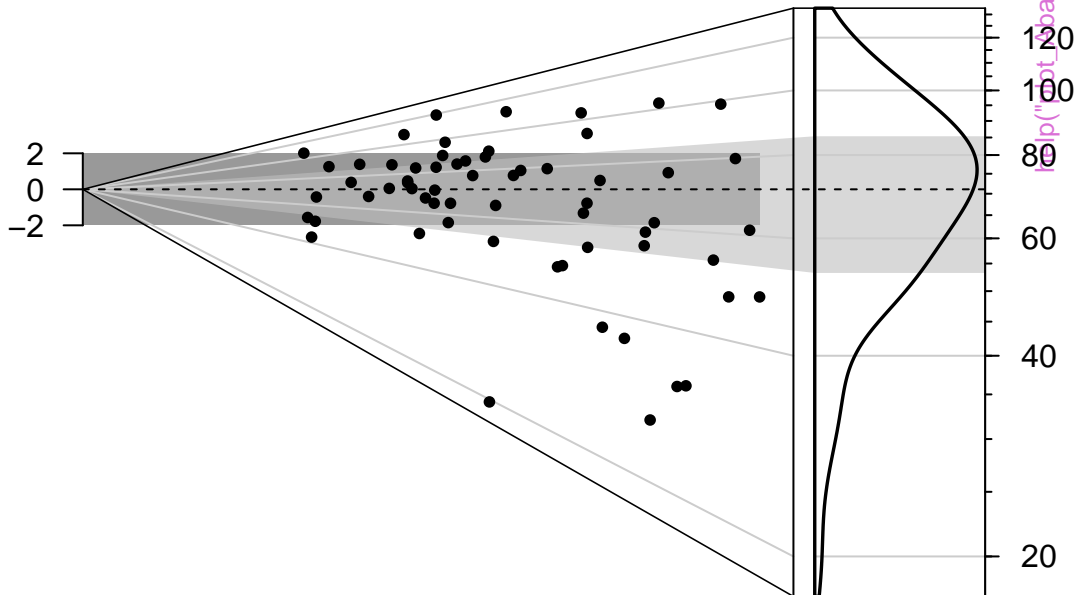
Precision

Density (bw 0.15)

# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 54.8 %

Standardised estimate



D<sub>e</sub> [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 54.8 %

Standardised estimate



D<sub>e</sub> [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)



# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %



# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

R Sample 1

Standardised estimate



help("plot\_AbanicoPlot")

help("plot\_AbanicoPlot")

D<sub>e</sub> [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate

0

120

100

80

60

40

20

D<sub>e</sub> [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

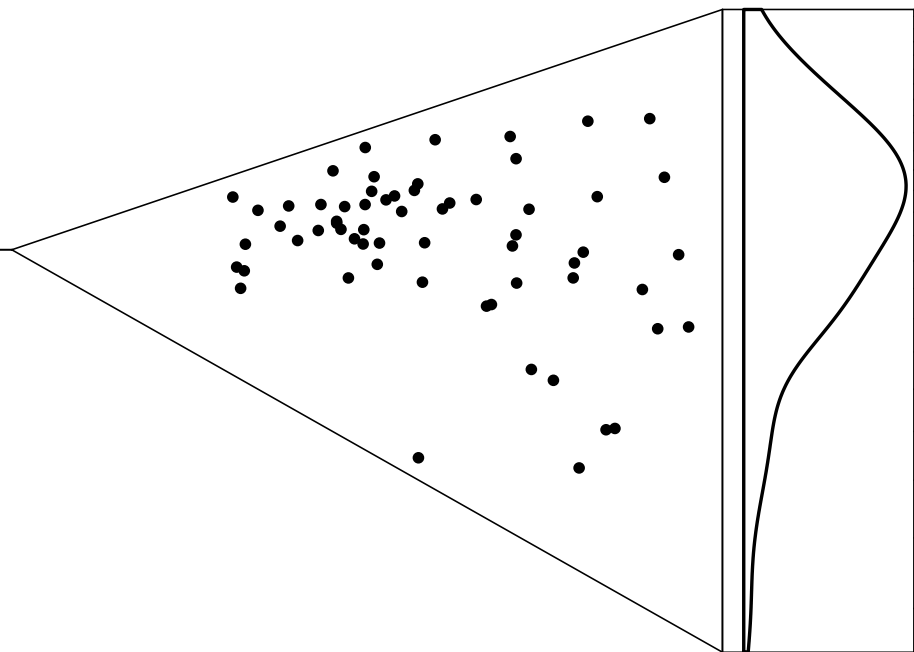
0.016

Precision

Density (bw 0.15)

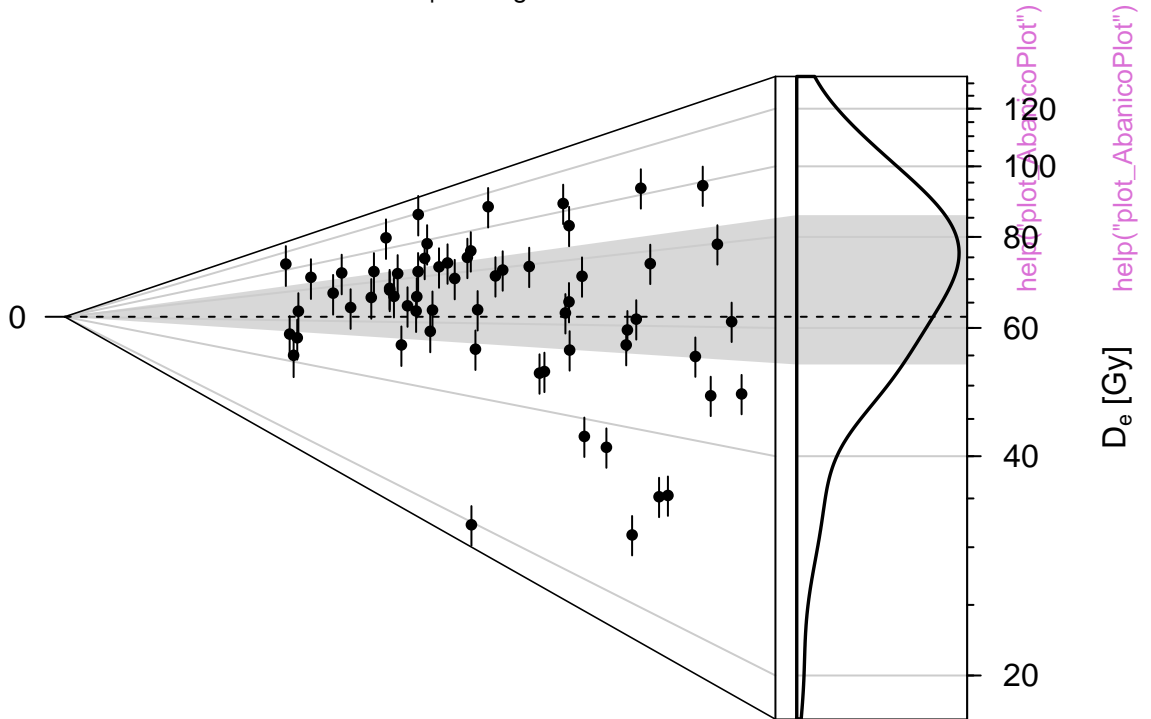
help("plot\_AbanicoPlot")

help("plot\_AbanicoPlot")



# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

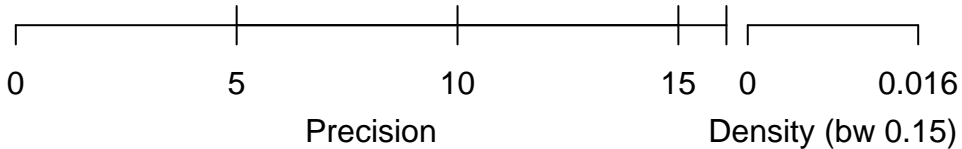


Relative standard error (%)

20

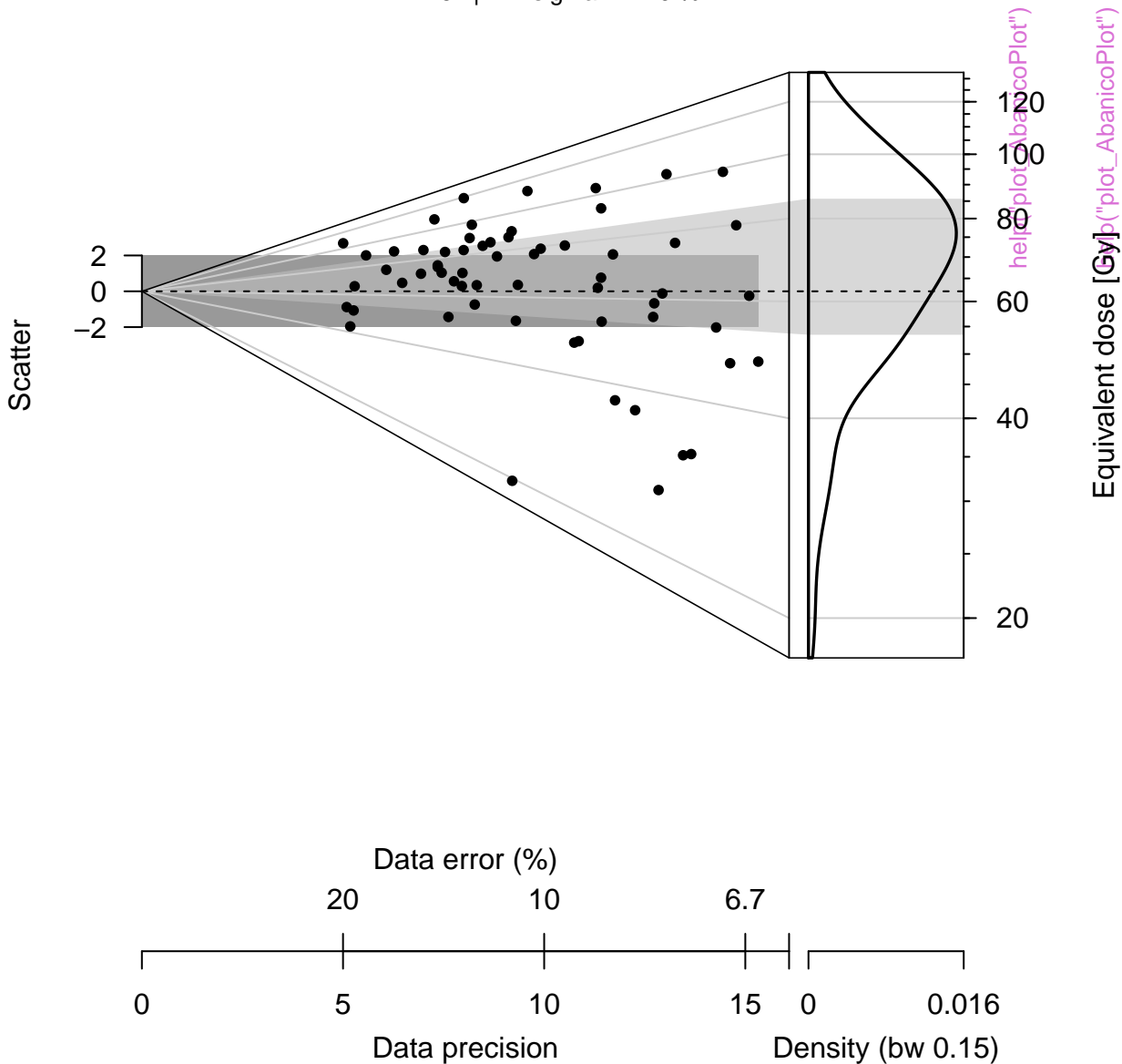
10

6.7



# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %



# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D<sub>e</sub> [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D<sub>e</sub> [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

# D<sub>e</sub> distribution

median = 71.07

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

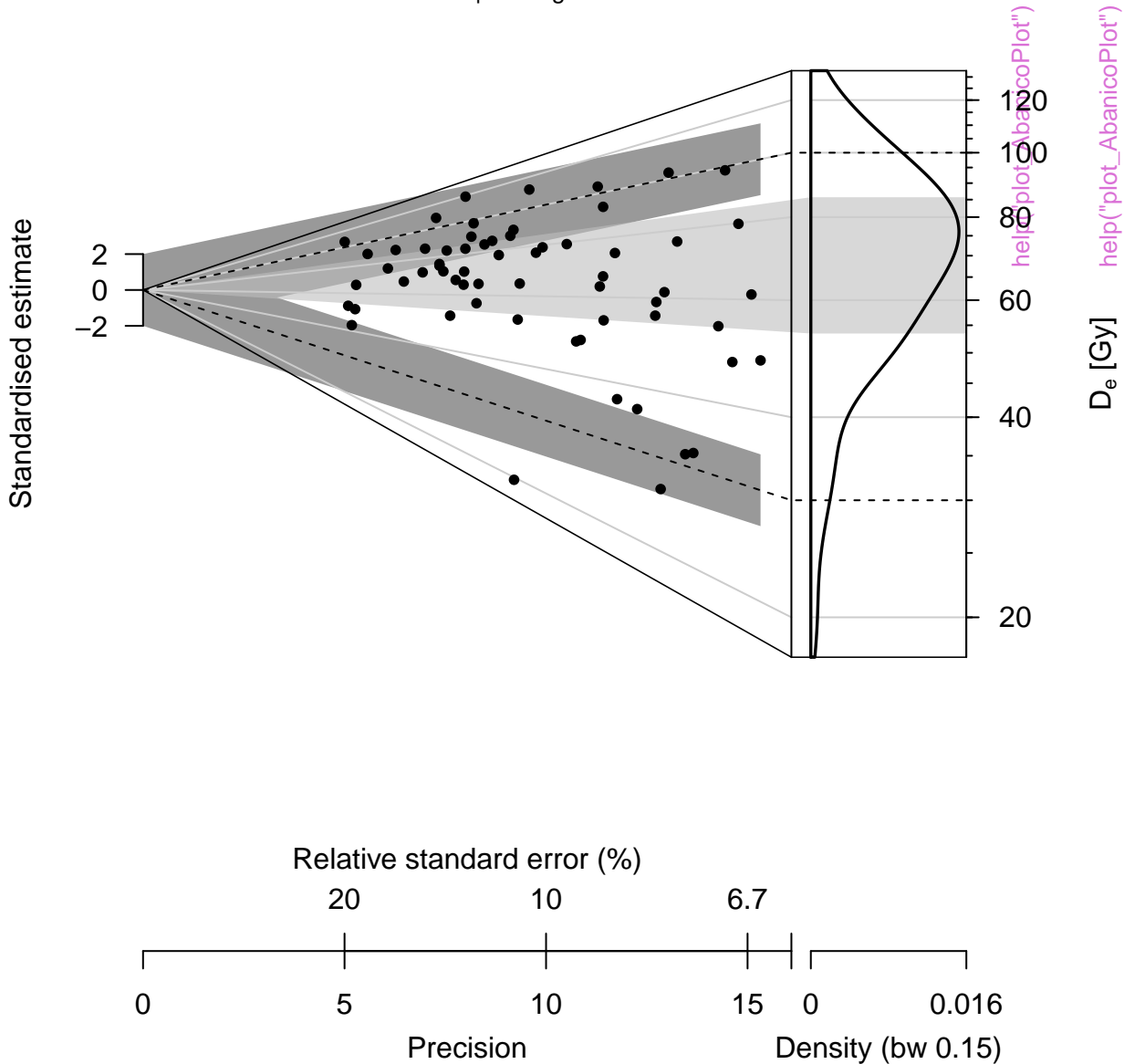
Precision

Density (bw 0.15)



# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

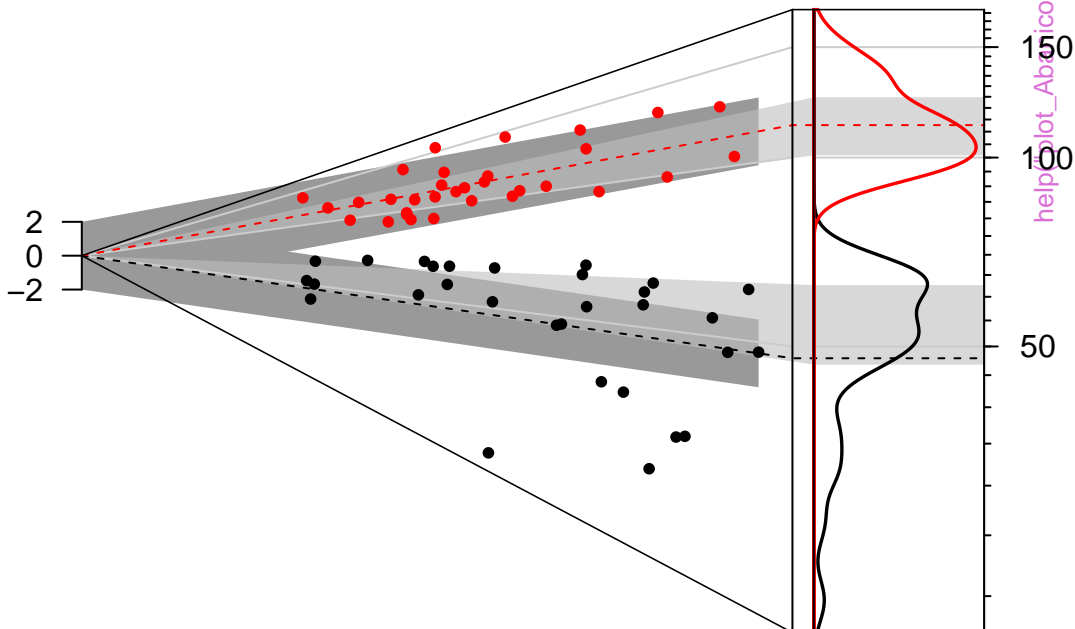


# D<sub>e</sub> distribution

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

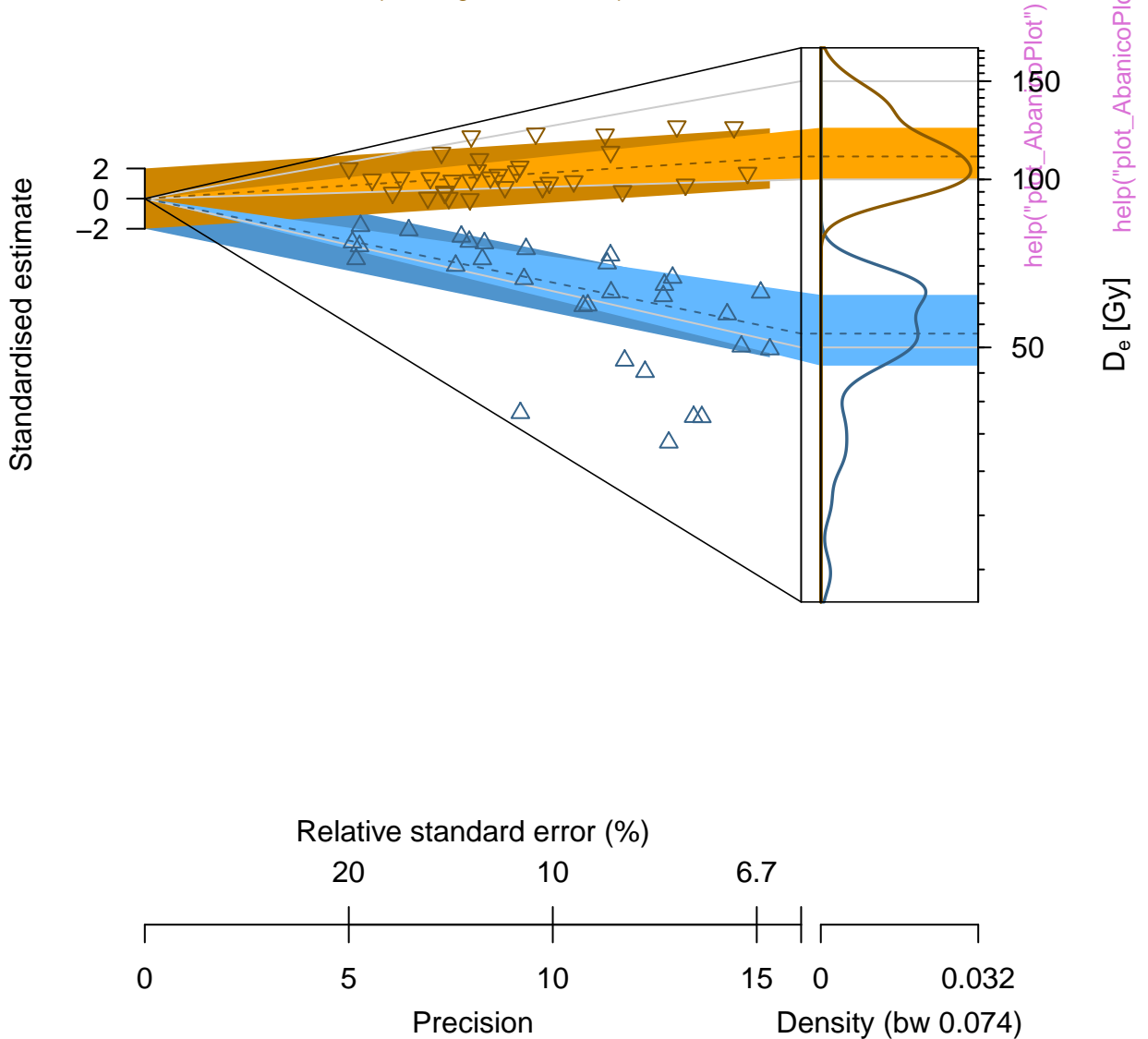
Precision

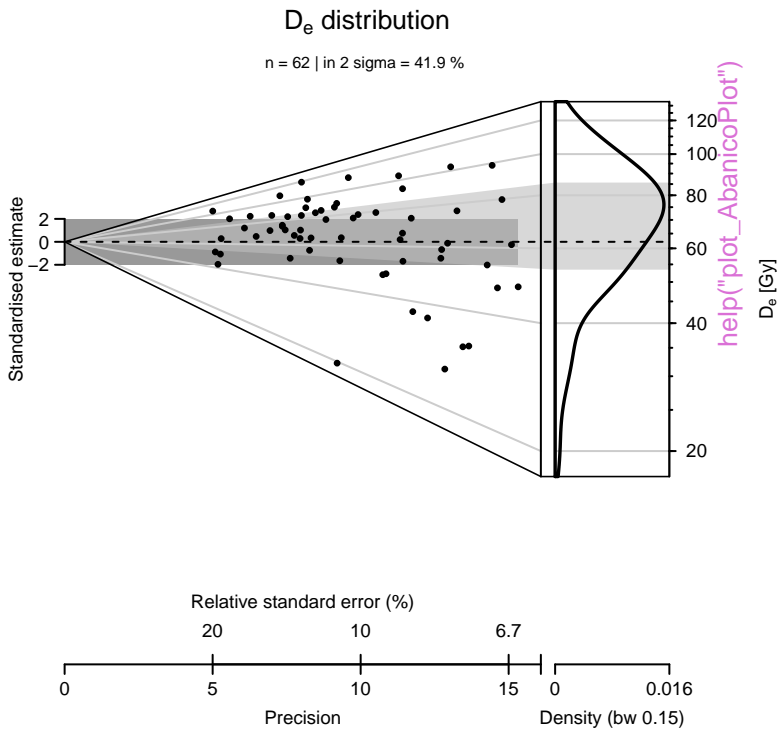
Density (bw 0.074)

# D<sub>e</sub> distribution

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

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





help("plot\_AbanicoPlot")



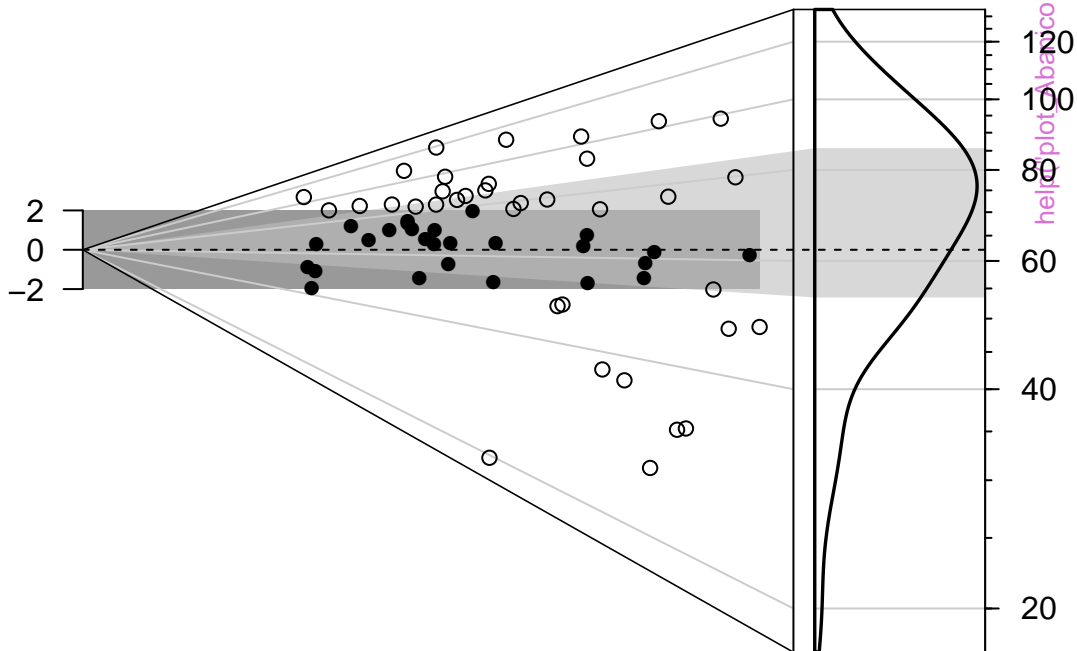
Density (bw 0.074)

help("plot\_AbanicoPlot")

# D<sub>e</sub> distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D<sub>e</sub> [Gy]

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

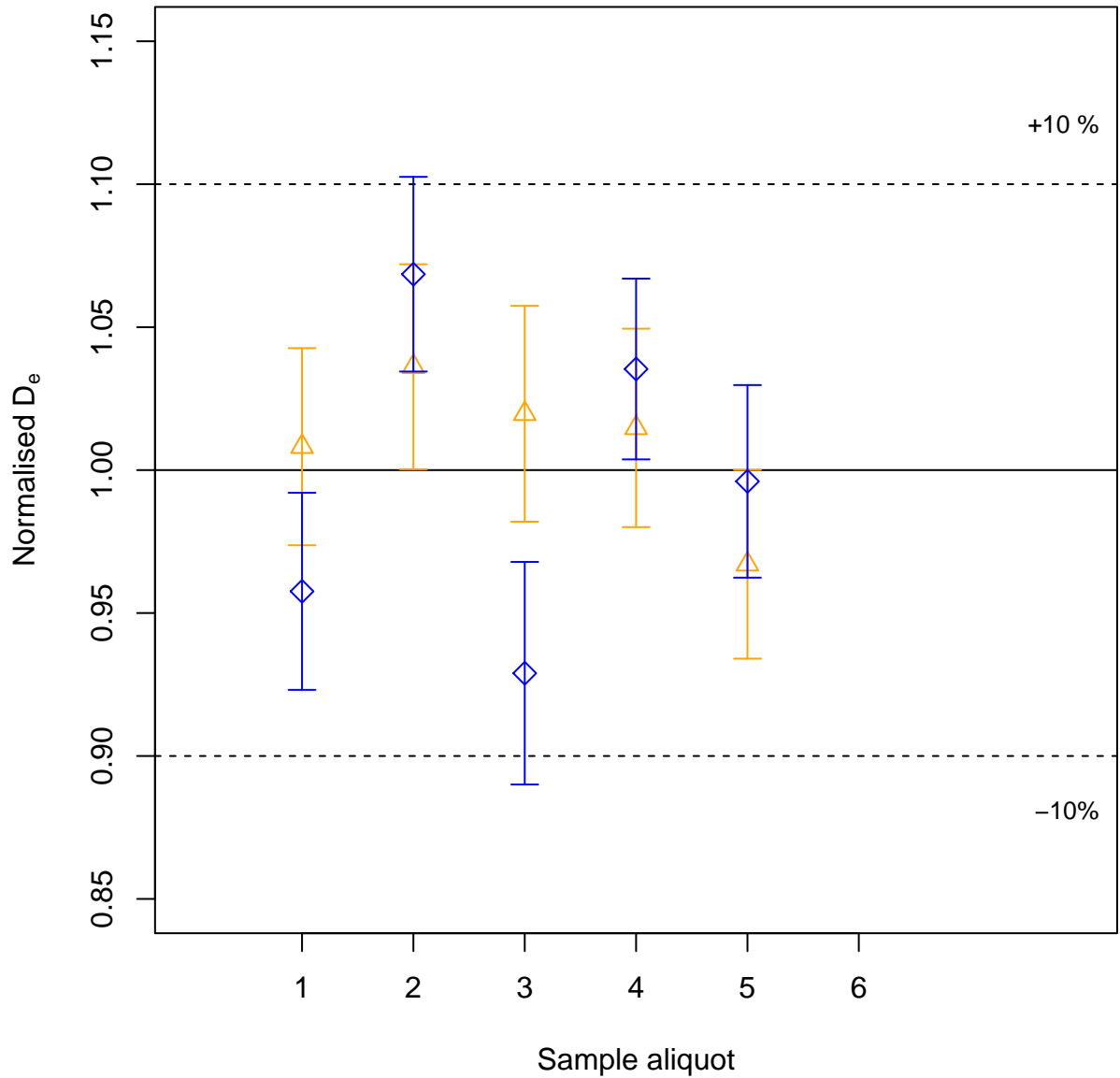




# Dose recovery test



# Dose recovery test



# Dose recovery test



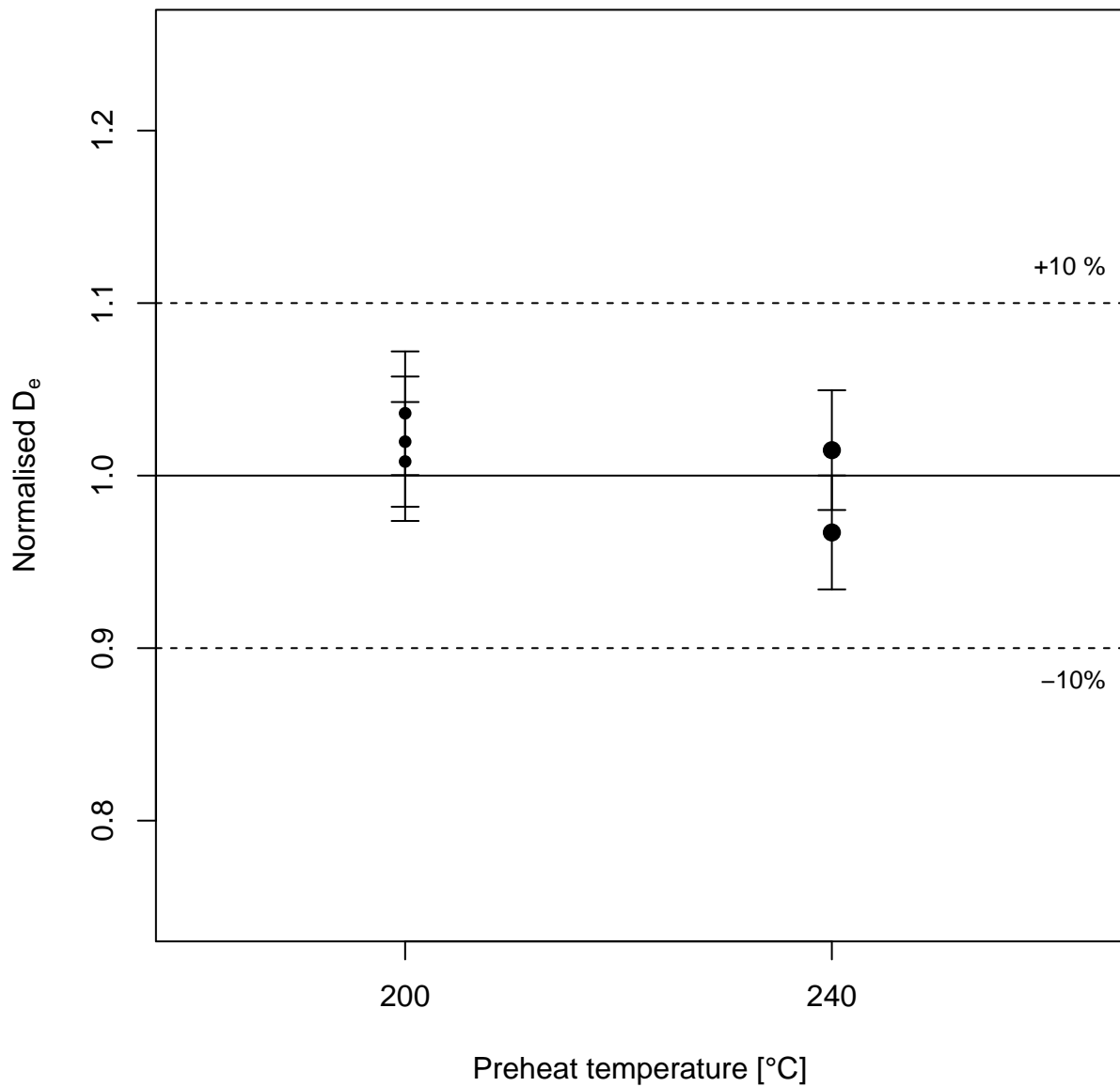
# Dose recovery test

n = 5

n = 5

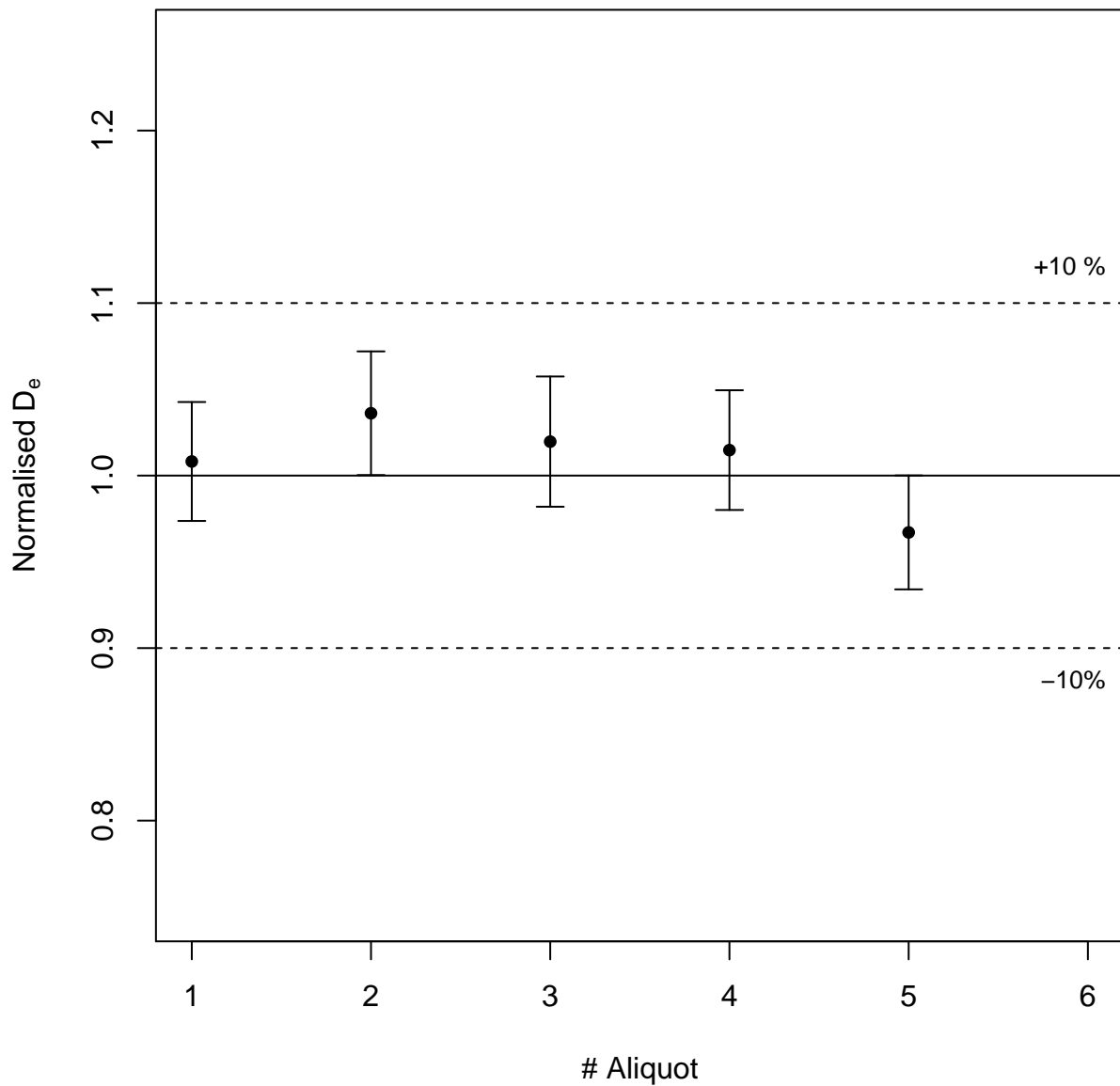


# Dose recovery test



# Dose recovery test

Example data



# Dose recovery test



# Dose recovery test





# Filter Combination



## Filter Combination





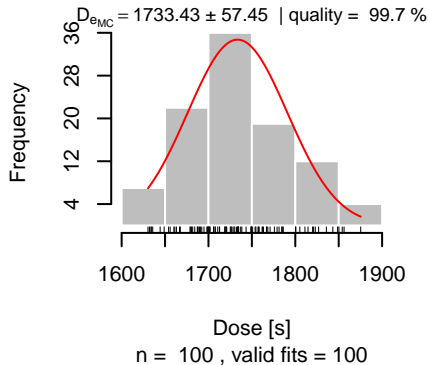
help("plot\_FilterCombinations")

# Growth curve

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



## $D_e$ from MC simulation

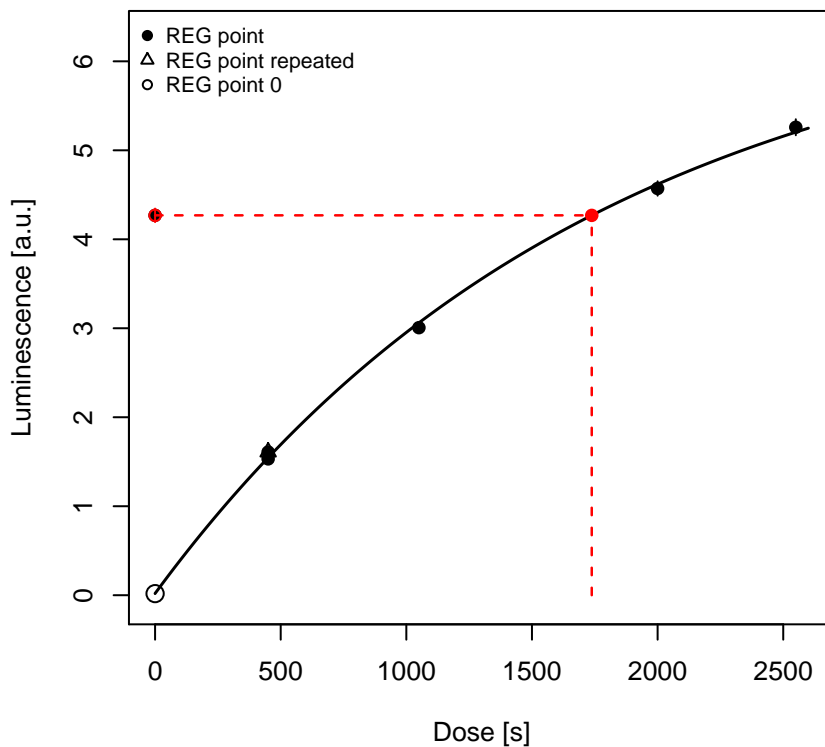


## Test dose response



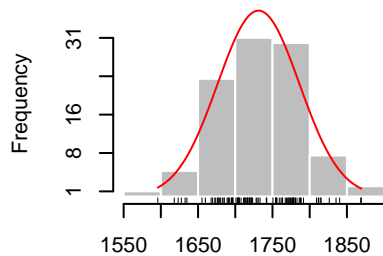
# Growth curve

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



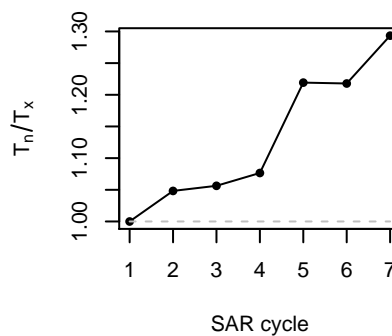
## $D_e$ from MC simulation

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



n = 100 , valid fits = 100

## Test dose response



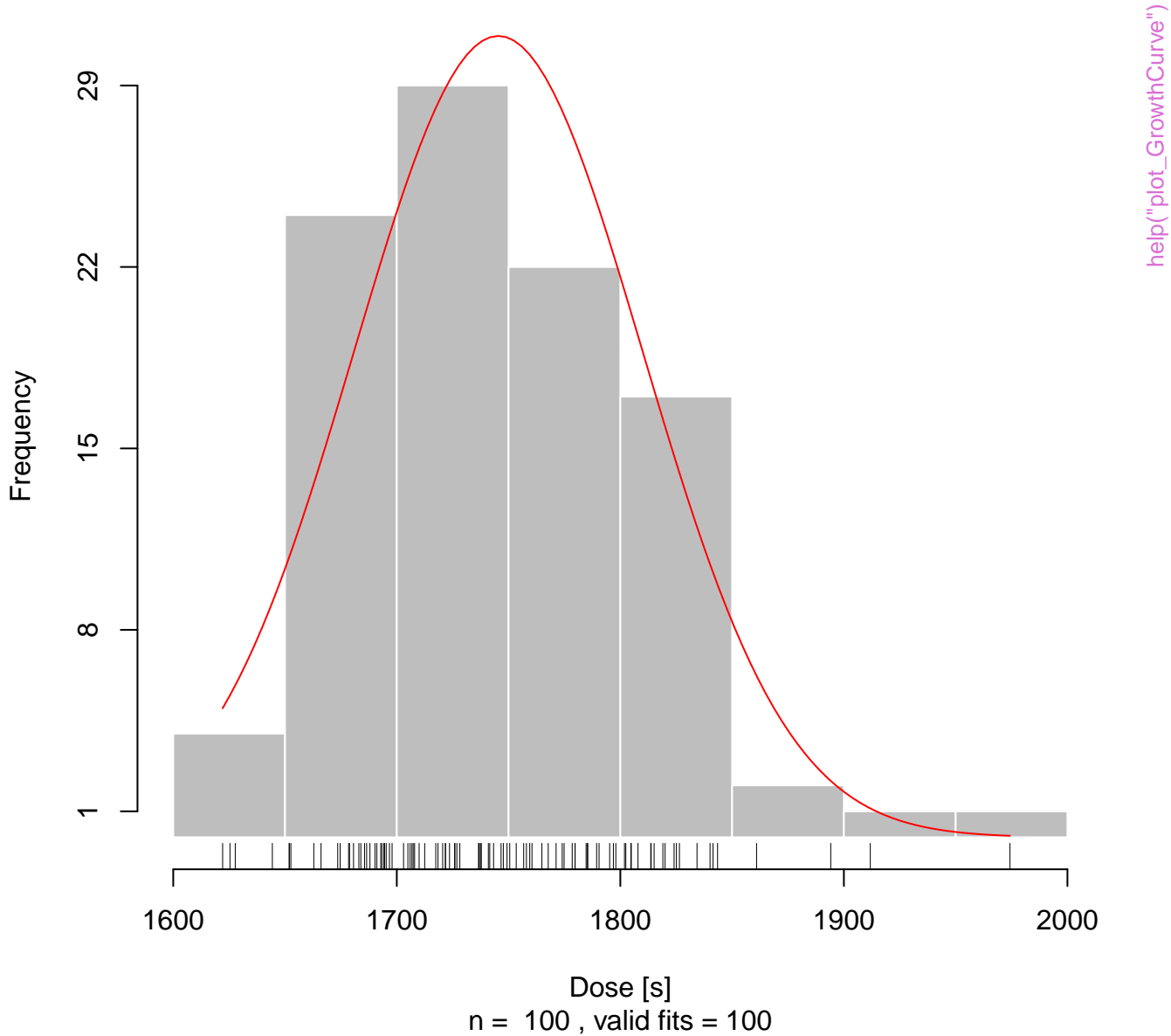
# Growth curve

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



# D<sub>e</sub> from MC simulation

D<sub>eMC</sub> = 1745.42 ± 64.53 | quality = 99.6 %



# Test dose response



help("plot\_GrowthCurve")





help("plot\_GrowthCurve")

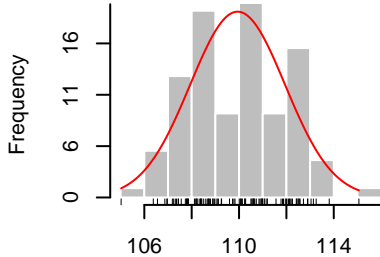
# Growth curve

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



## $D_e$ from MC simulation

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

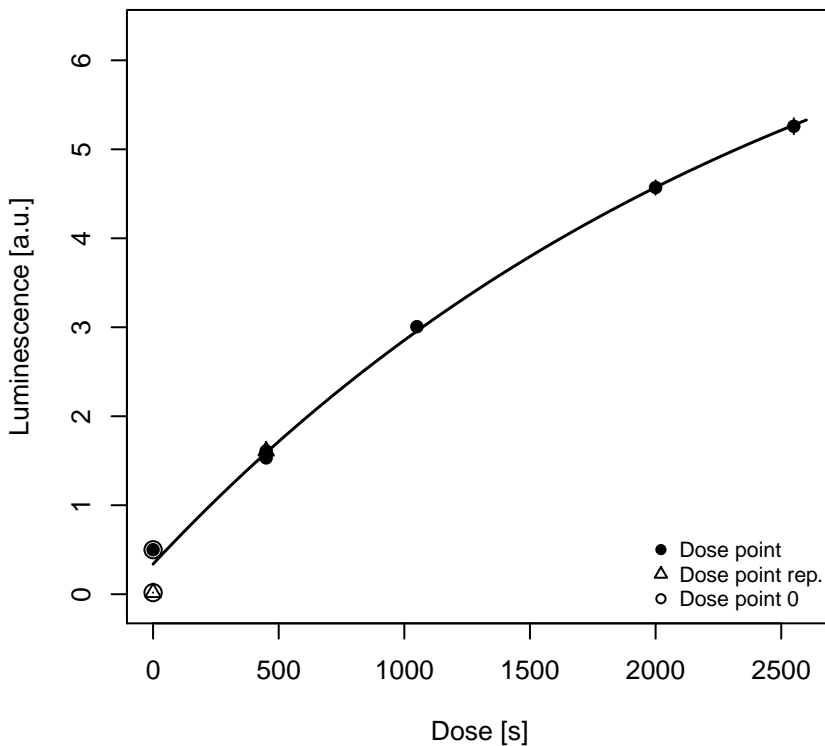


n = 100 , valid fits = 100

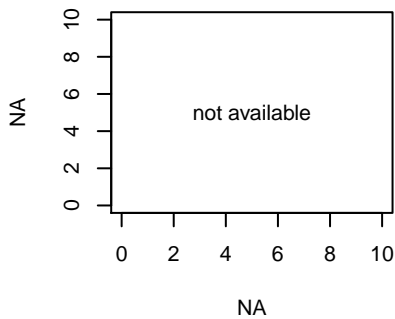
## Test dose response



## 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

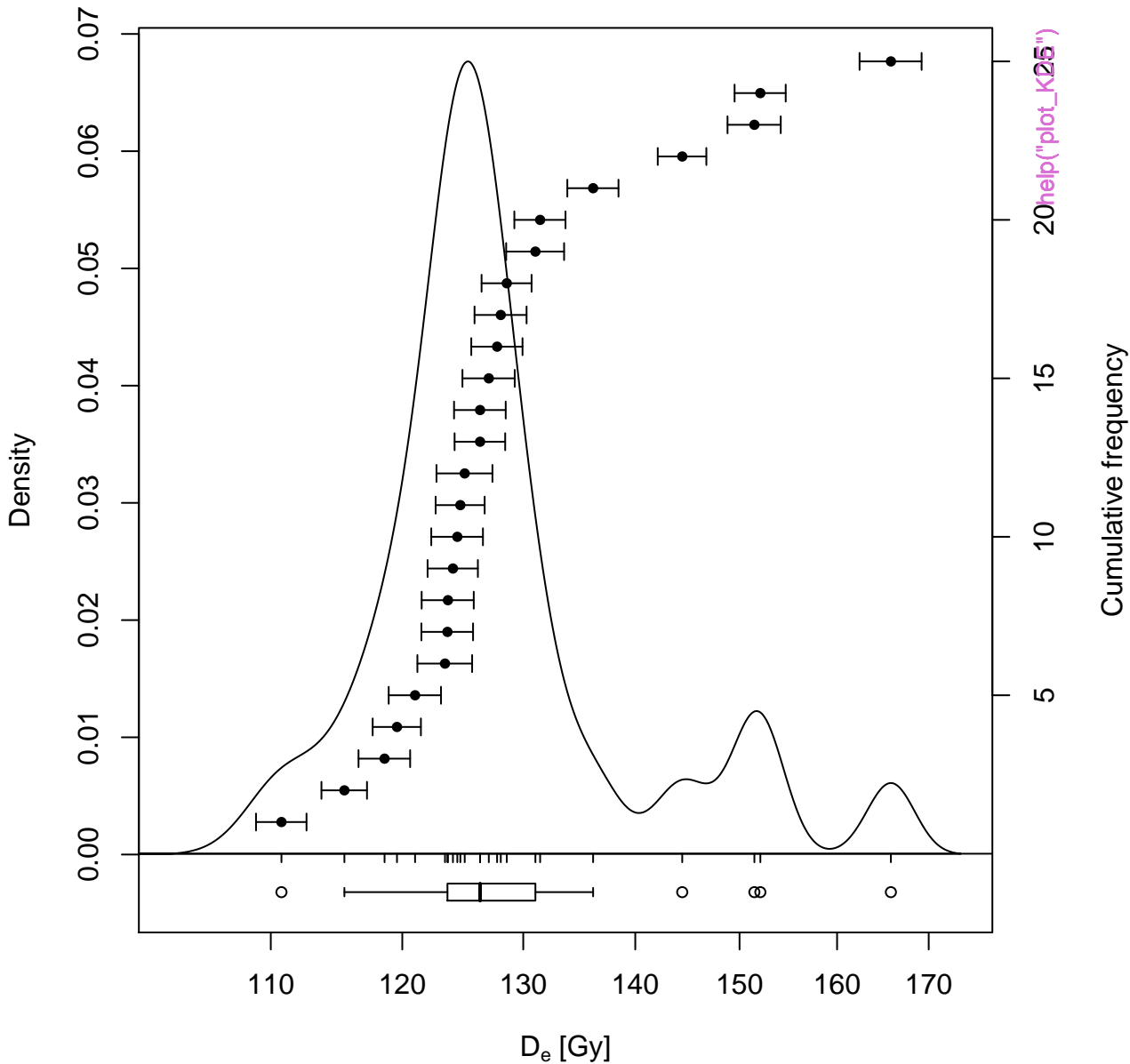
Example data set



# D<sub>e</sub> distribution



# D<sub>e</sub> distribution





# Dose distribution



# D<sub>e</sub> distribution

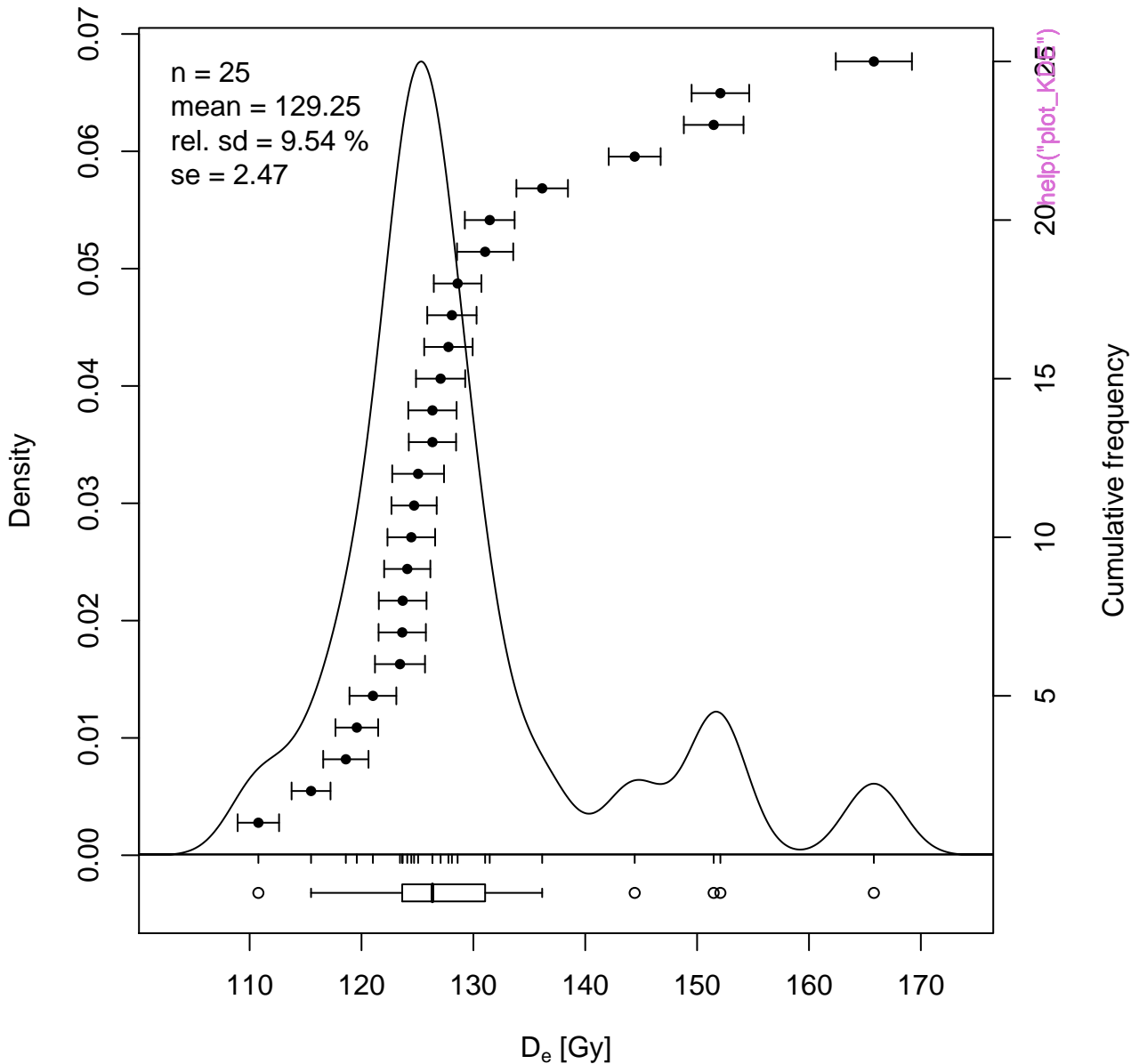


# D<sub>e</sub> distribution

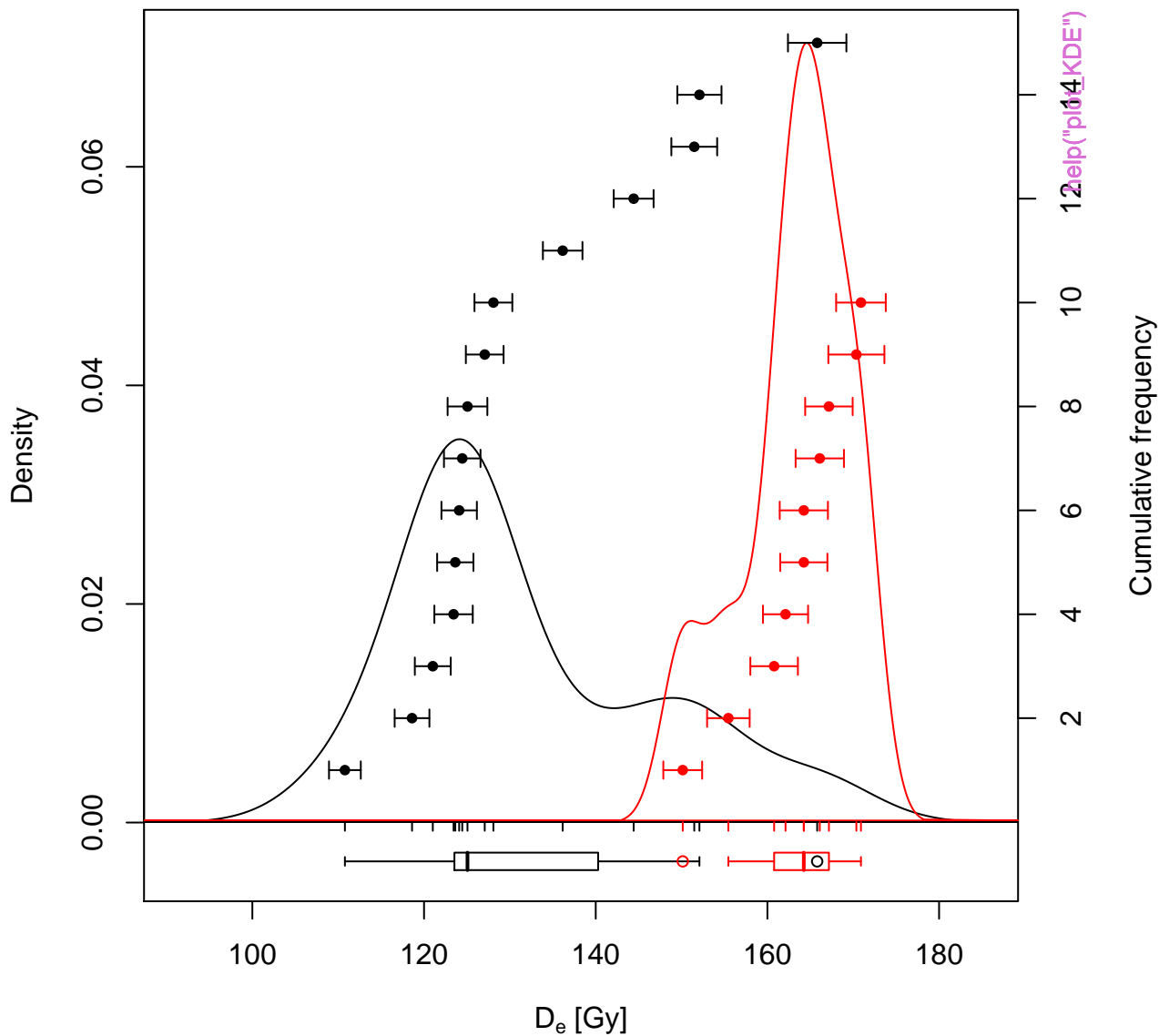
n = 25 | median = 126.34 | skewness = 1.34 | in 2 sigma = 96 %



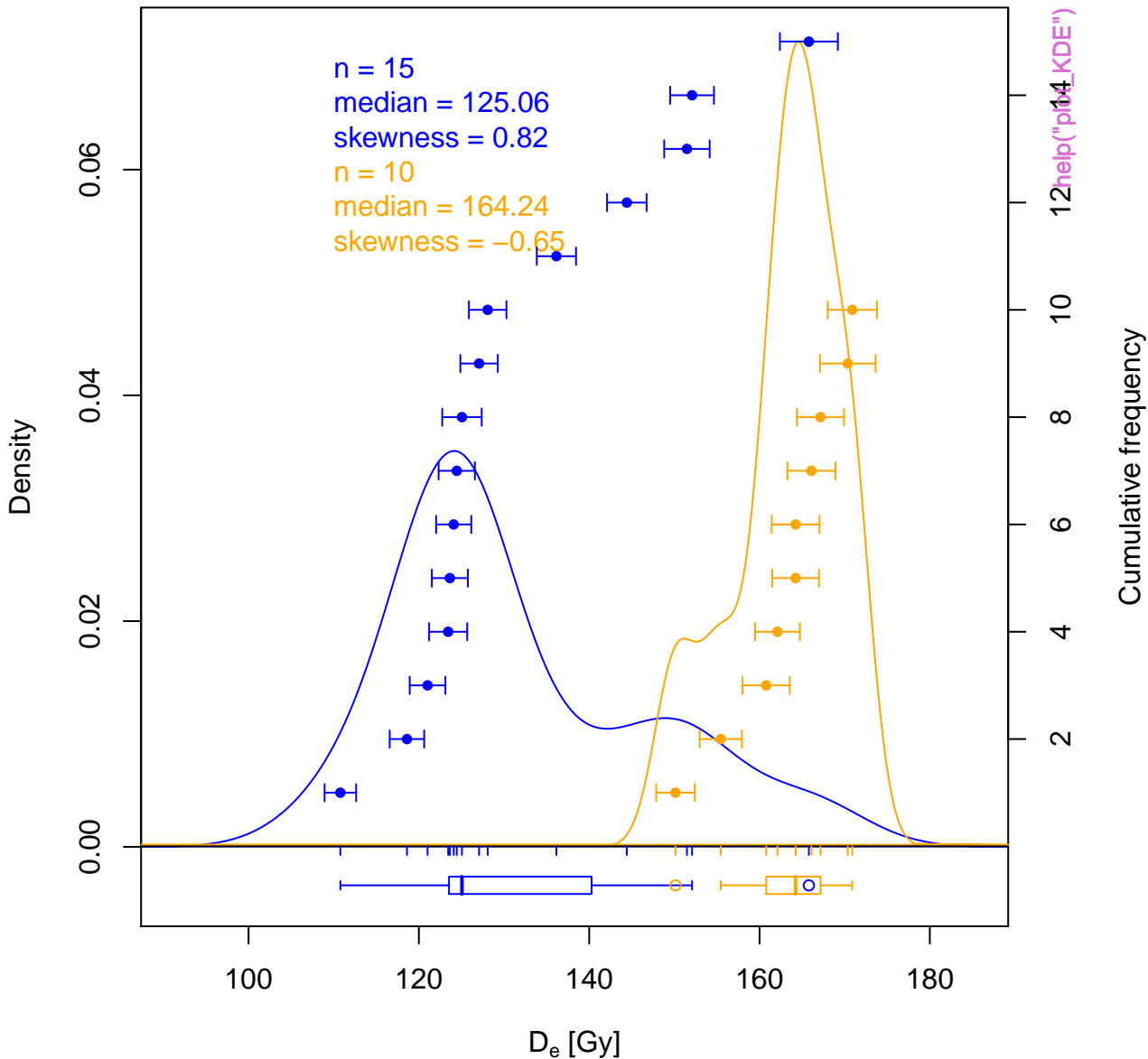
# D<sub>e</sub> distribution



# D<sub>e</sub> distribution



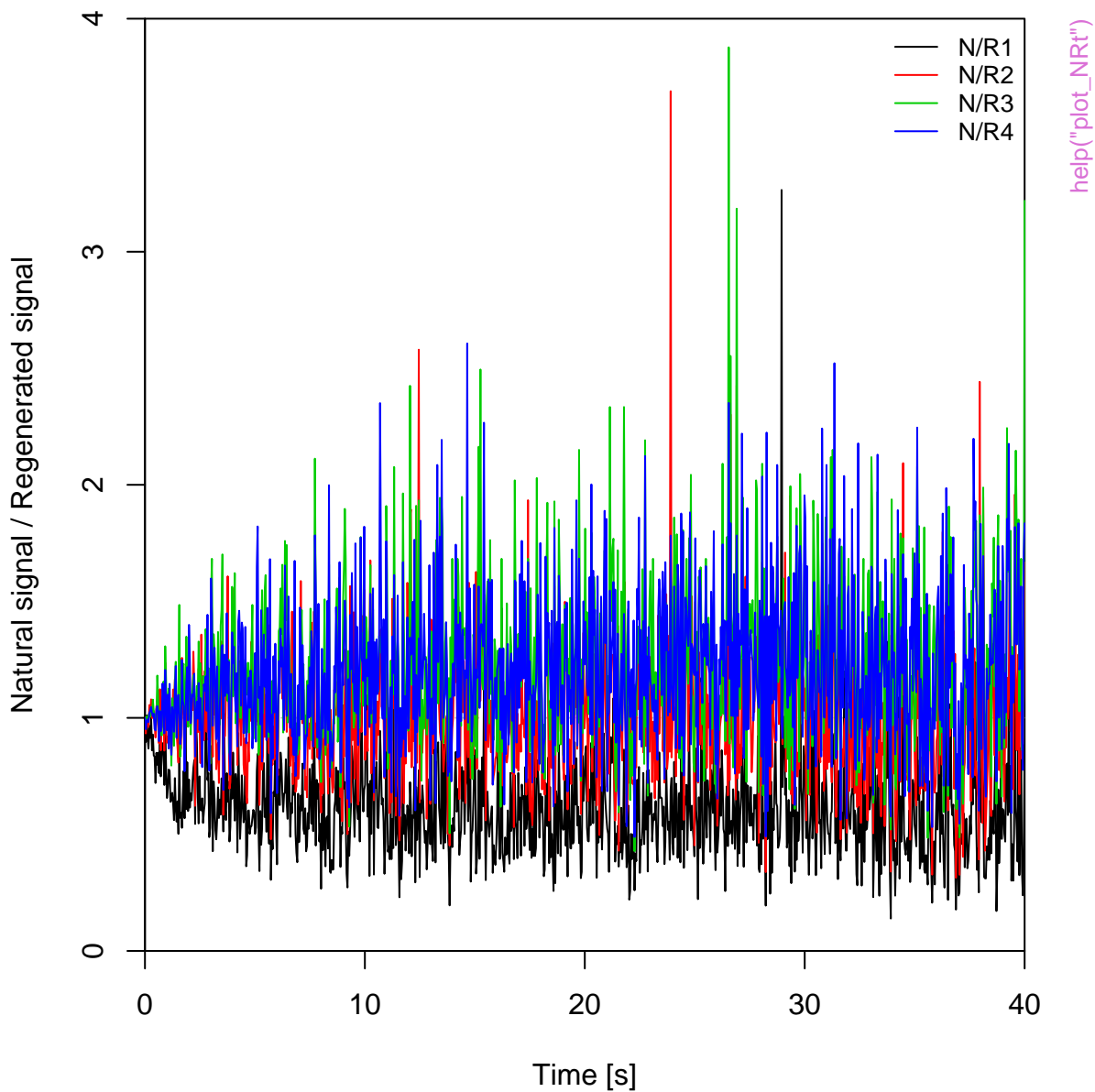
# D<sub>e</sub> distribution



# $D_e$ distribution



NR(t) Plot



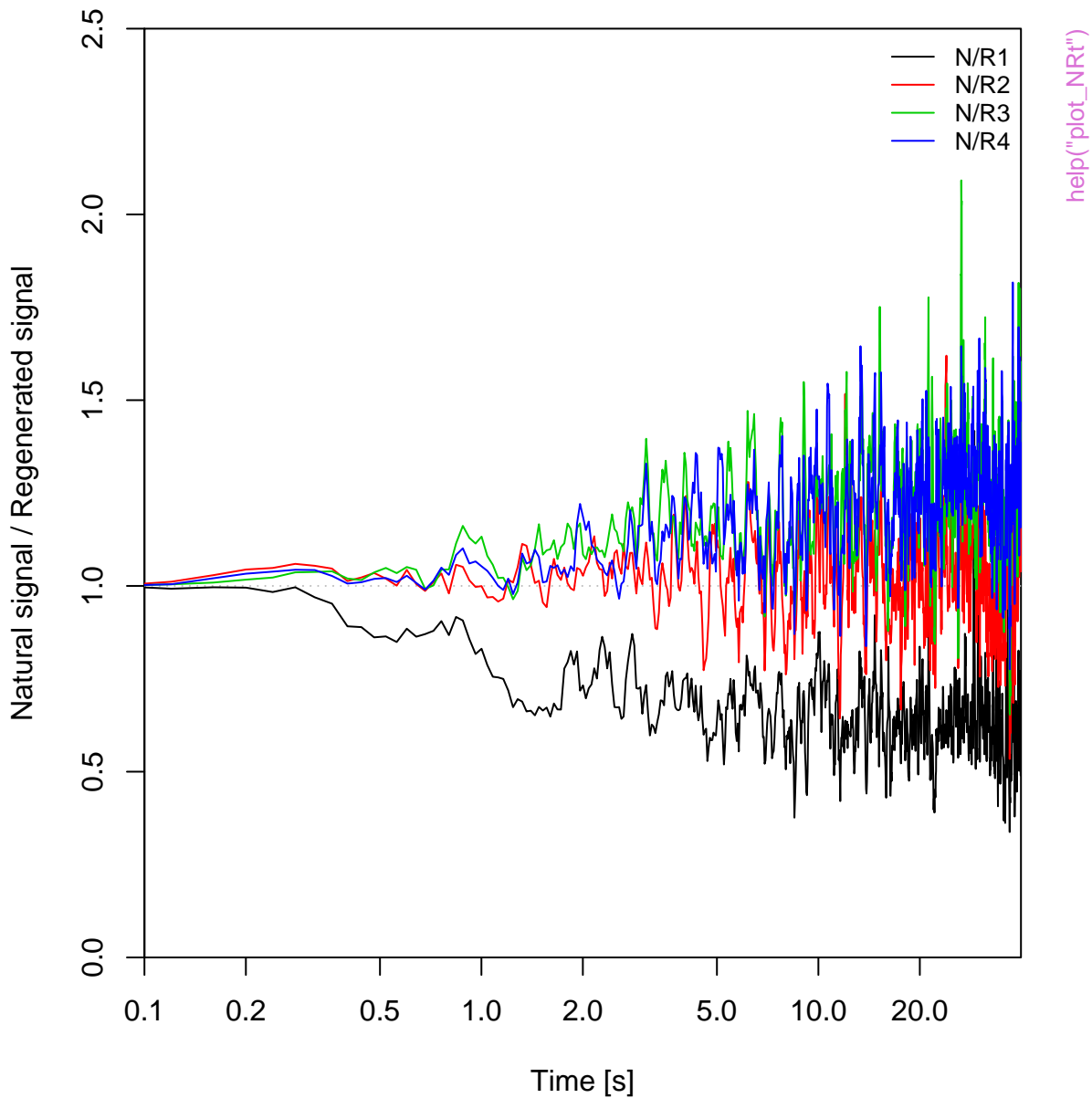


NR(t) Plot



help("plot\_NRt")

NR(t) Plot



NR(t) Plot

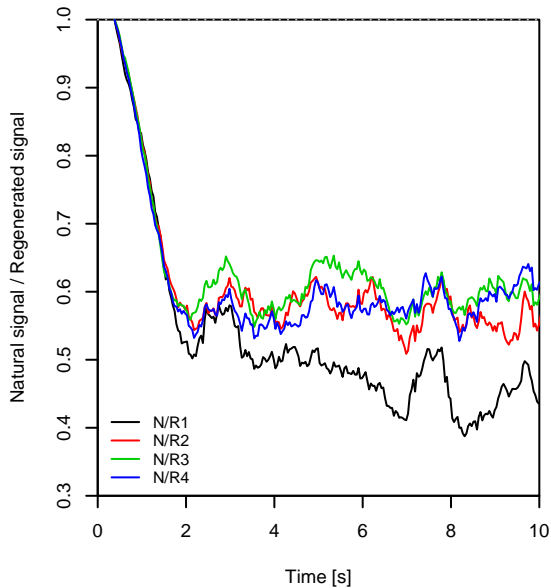


# NR(t) Plot

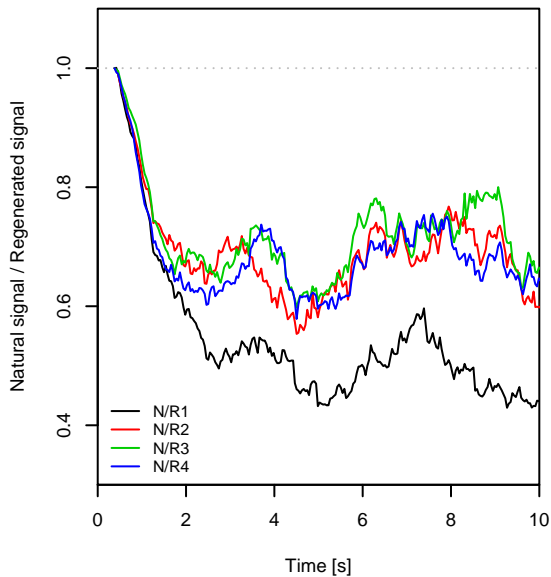


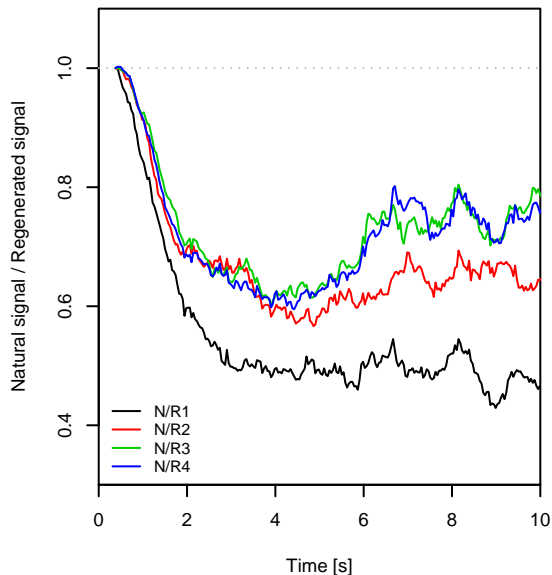
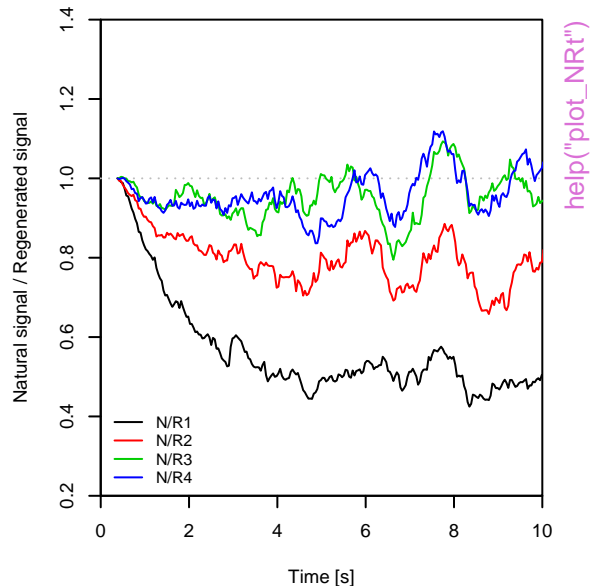
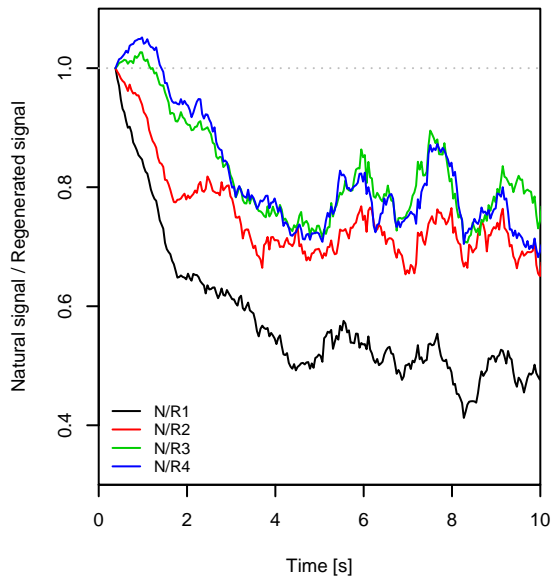
**TnTx(t) Plot**

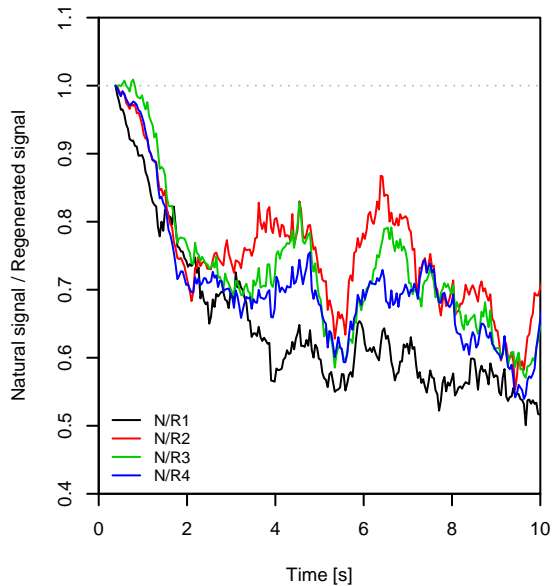
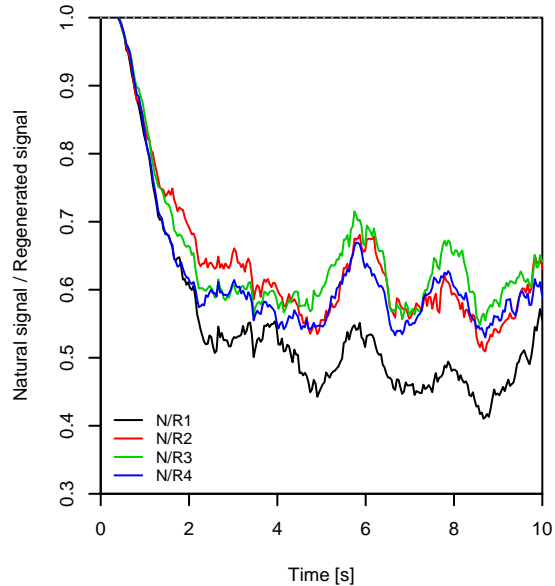


**Aliquot #1****Aliquot #2**

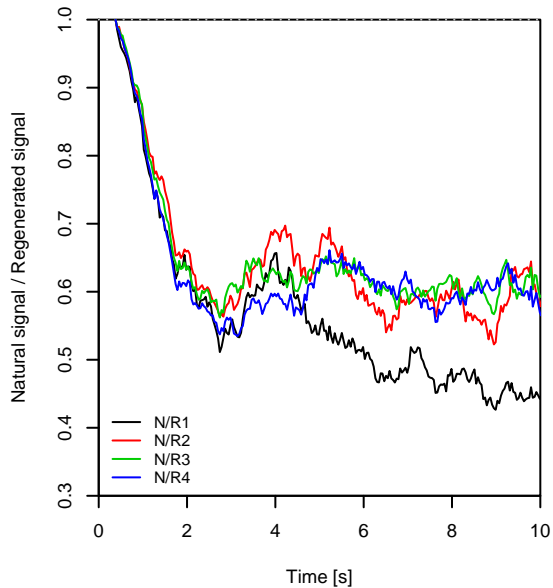
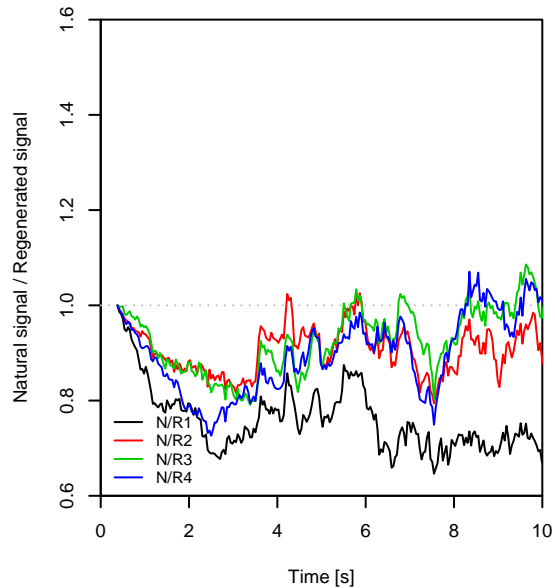
help("plot\_NRt")

**Aliquot #3****Aliquot #4**

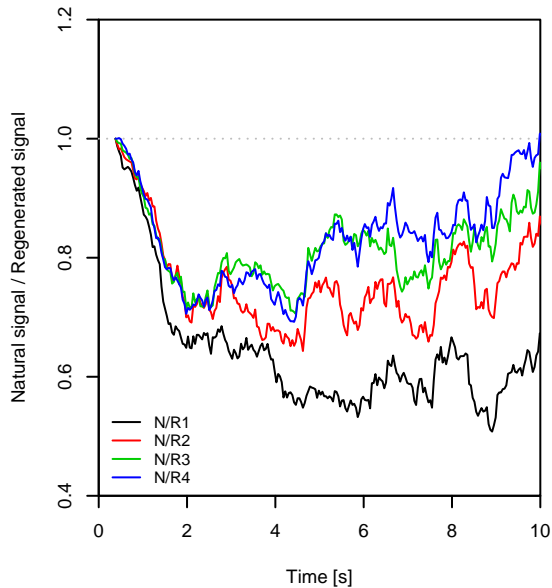
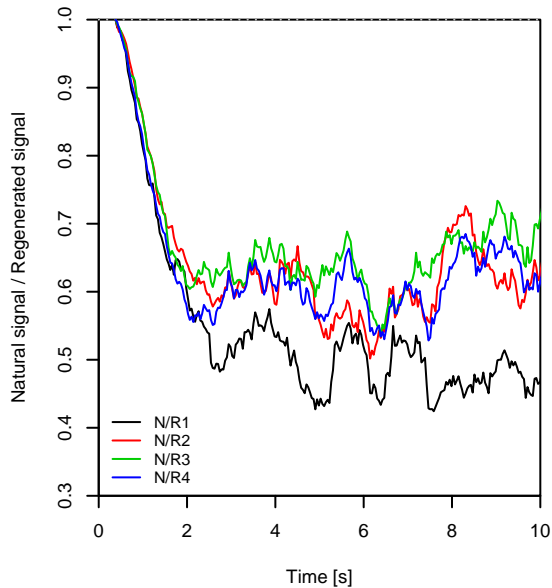
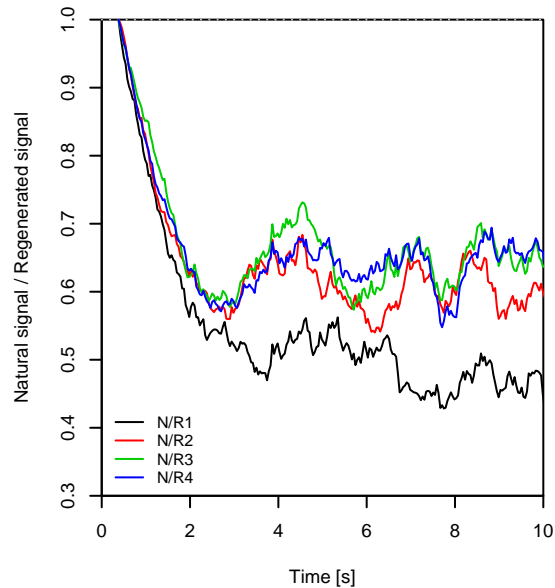
**Aliquot #5****Aliquot #6****Aliquot #7****Aliquot #8**

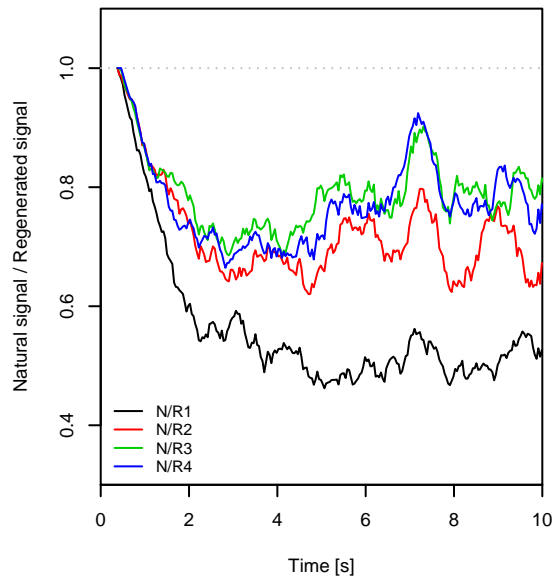
**Aliquot #9****Aliquot #10**

help("plot\_NRt")

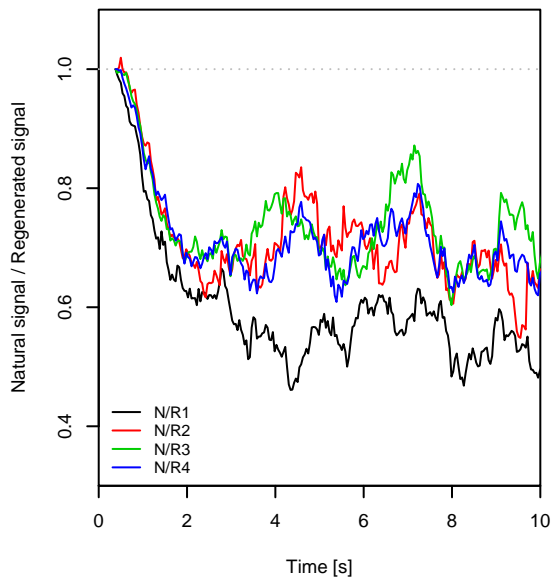
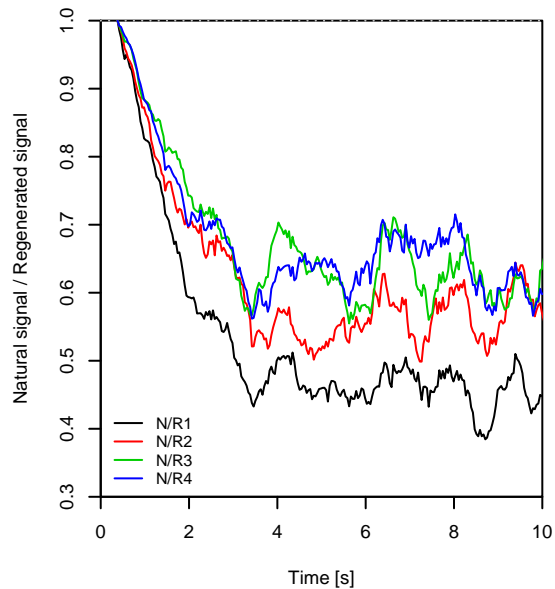
**Aliquot #11****Aliquot #12**

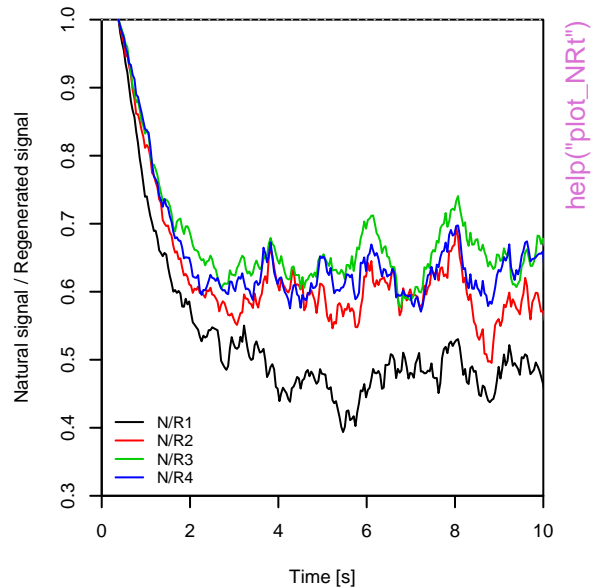


**Aliquot #13****Aliquot #14****Aliquot #15****Aliquot #16**

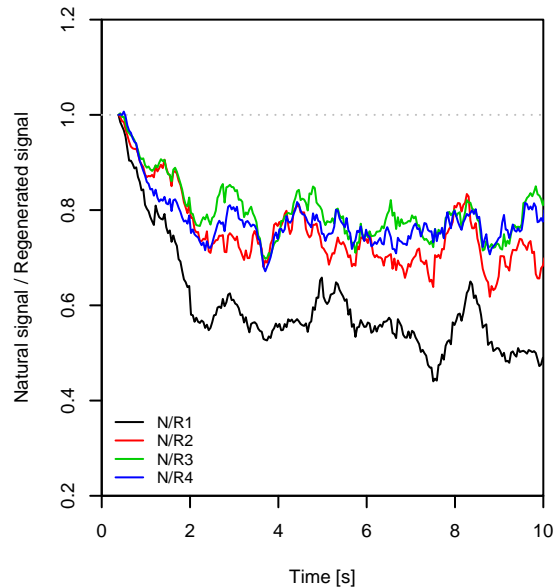
**Aliquot #17****Aliquot #18**

help("plot\_NRt")

**Aliquot #19****Aliquot #20**

**Aliquot #21****Aliquot #22**

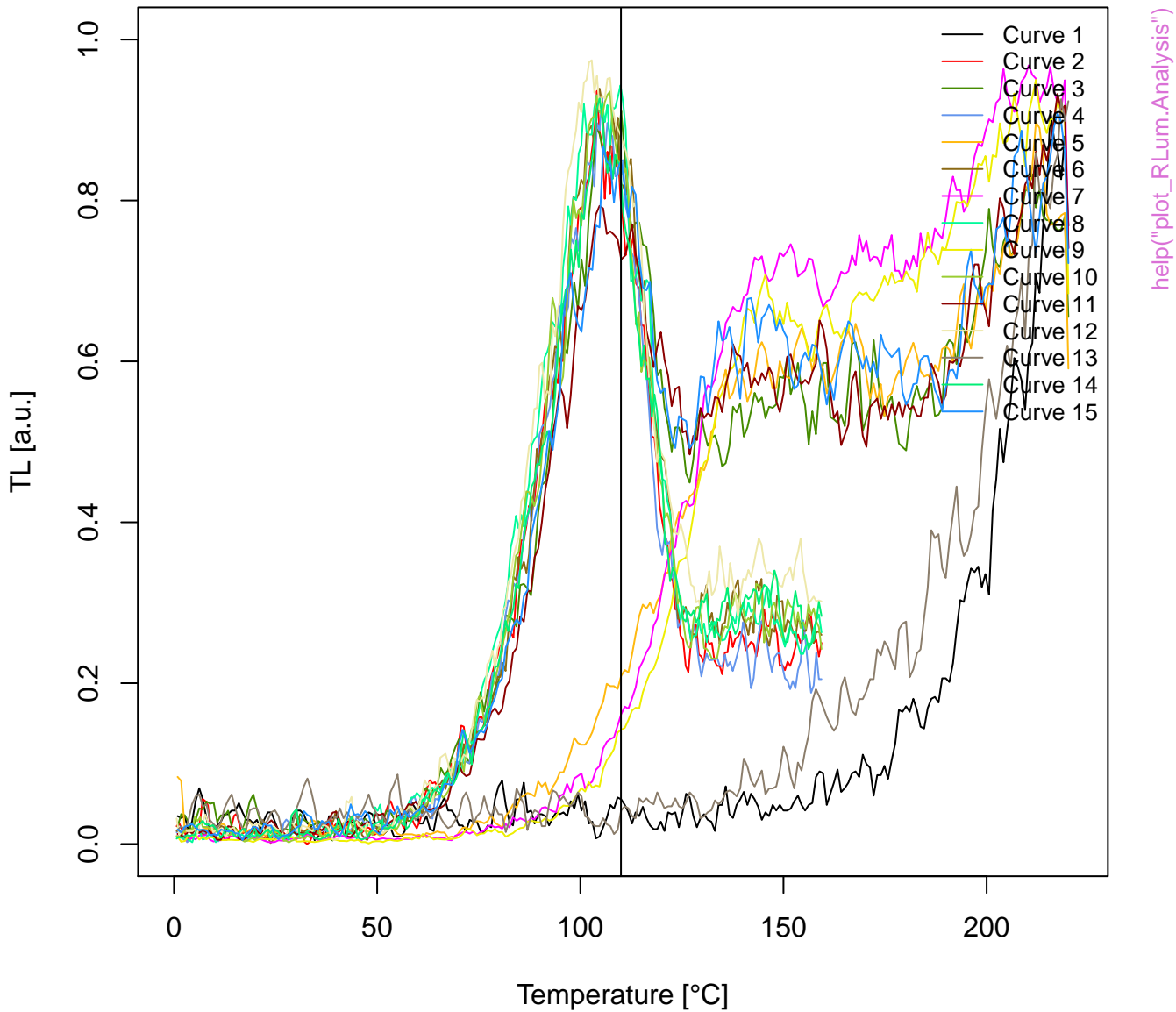
help("plot\_NRt")

**Aliquot #23****Aliquot #24**

# TL combined



# TL combined



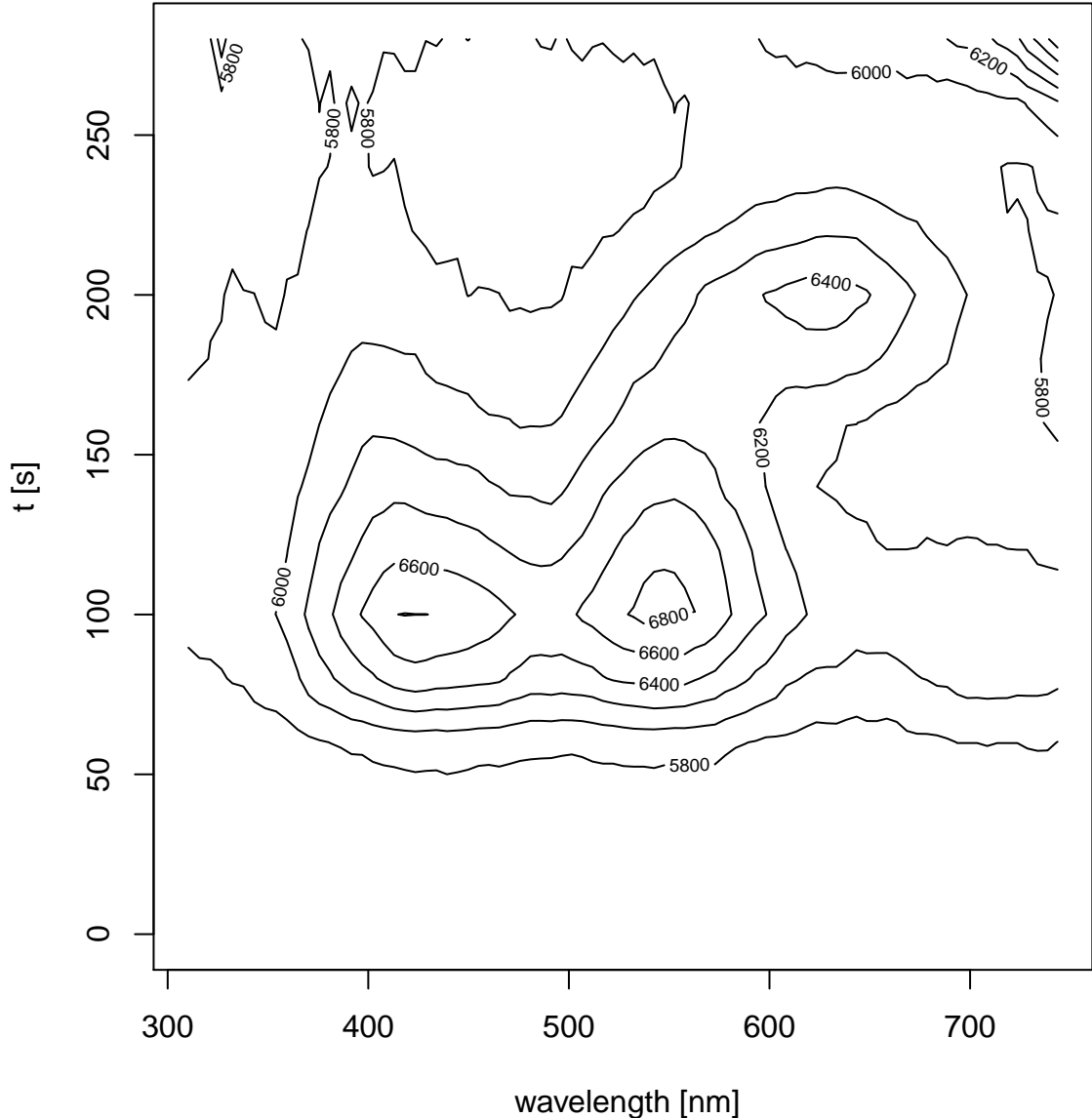
## unkown curve type



# RLum.Data.Image



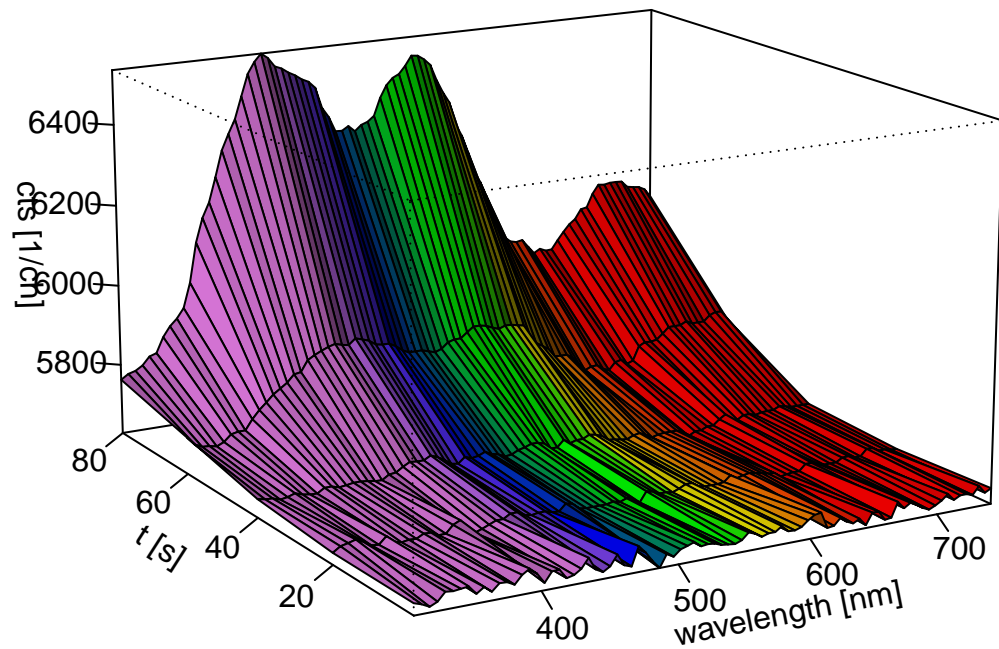
RLum.Data.Spectrum



[help\("plot\\_RLum.Data.Spectrum"\)](#)

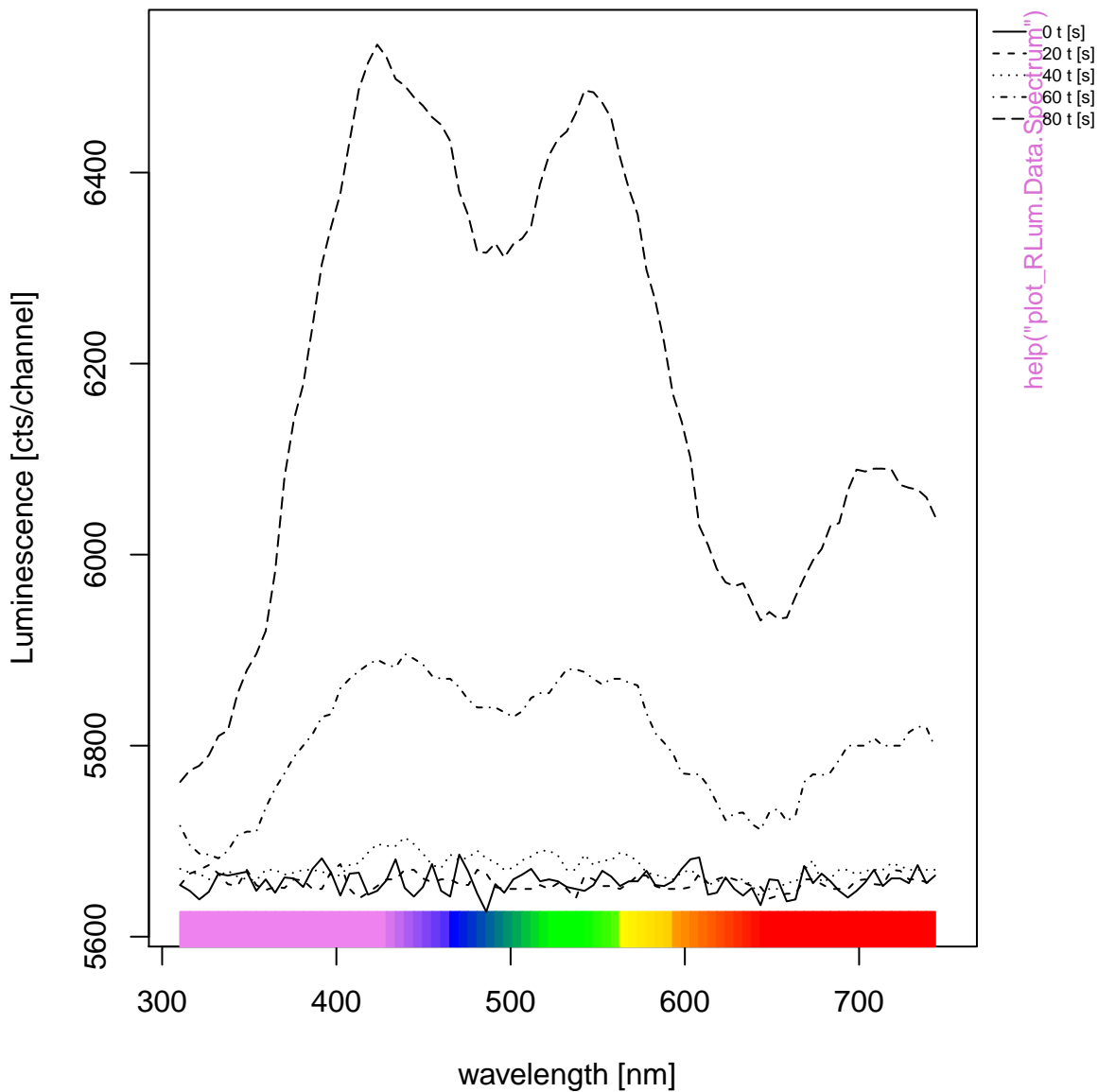


# RLum.Data.Spectrum

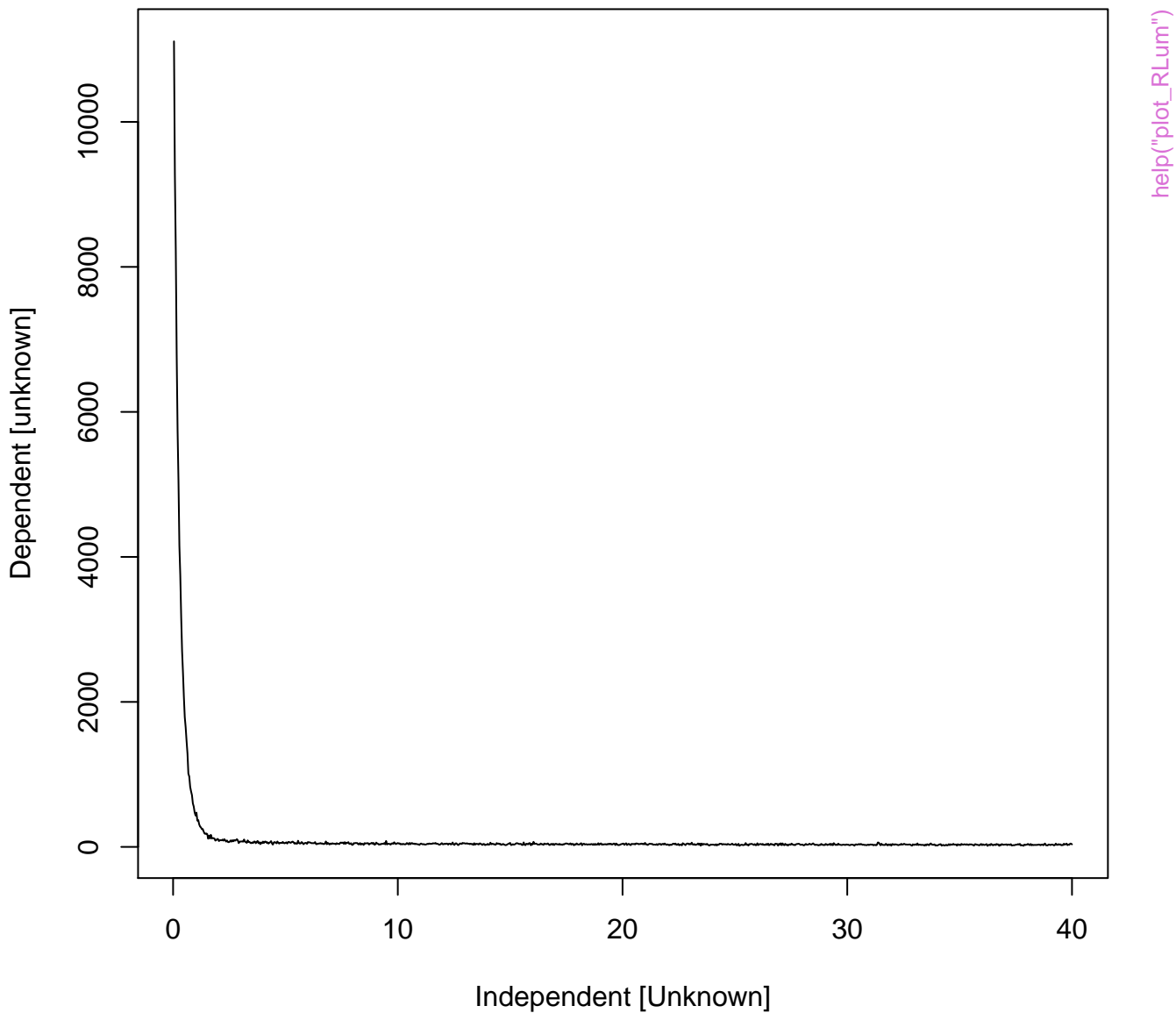


`help("plot_RLum.Data.Spectrum")`

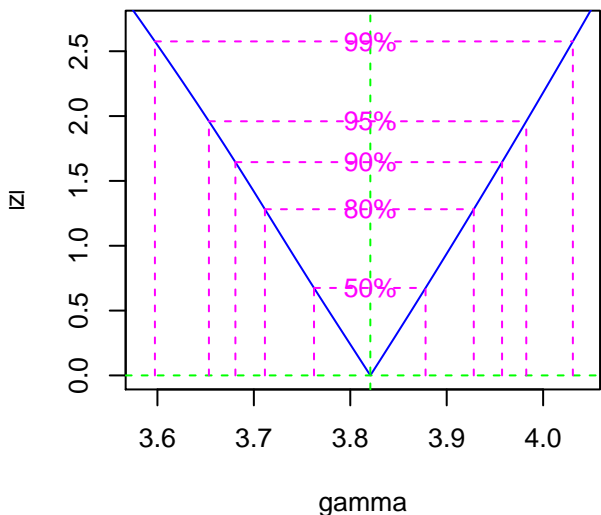
# RLum.Data.Spectrum



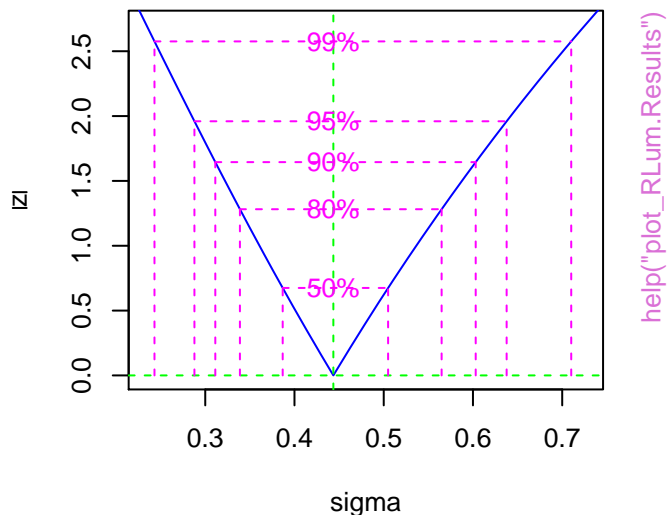
# unkown curve type



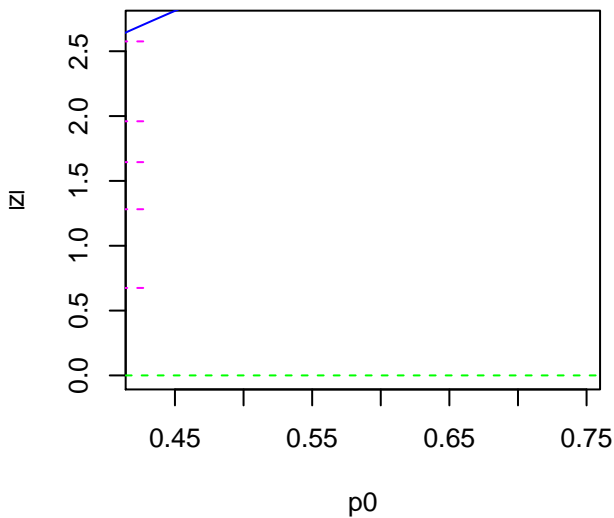
**Likelihood profile: gamma**



**Likelihood profile: sigma**

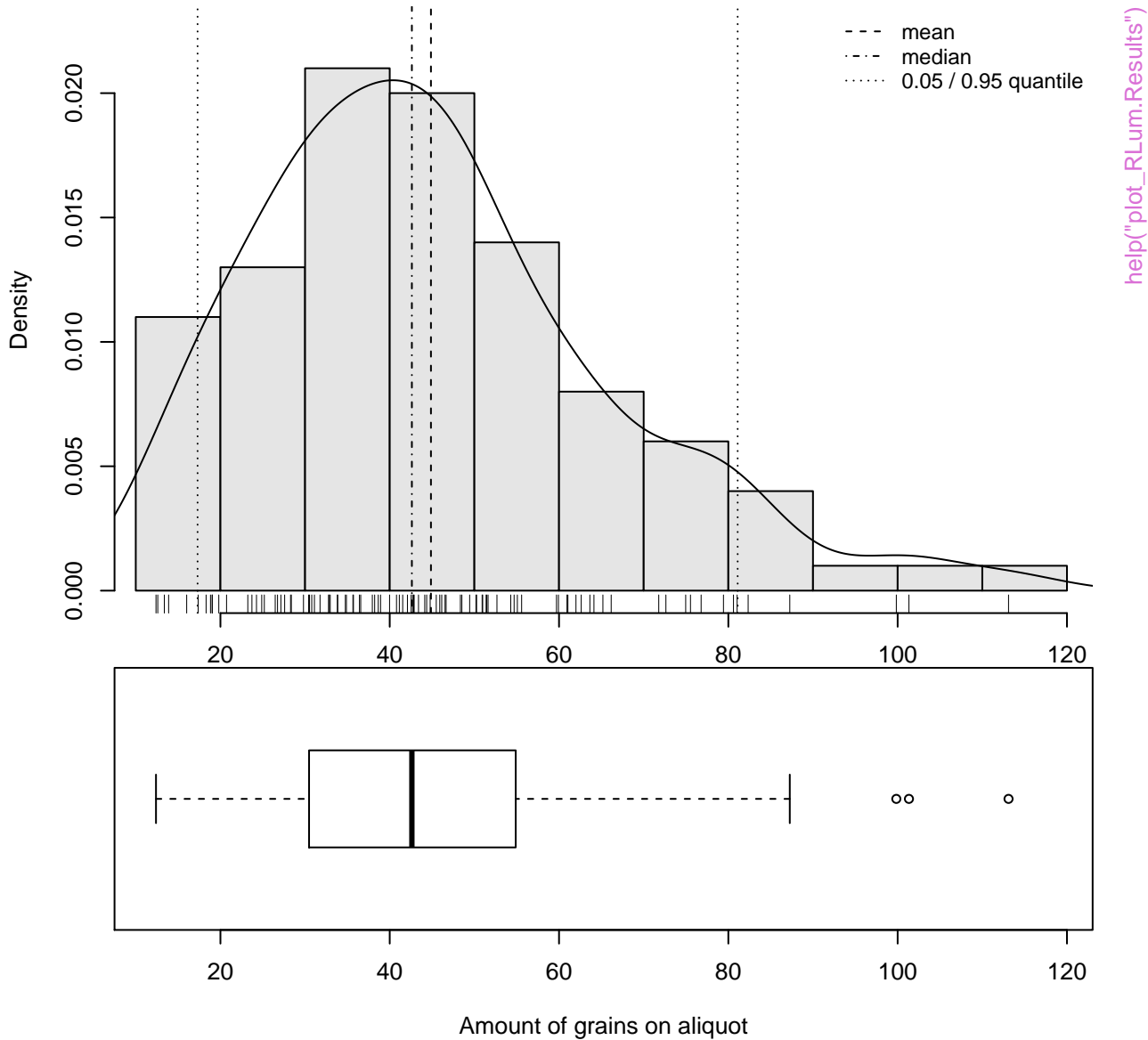


**Likelihood profile: p0**



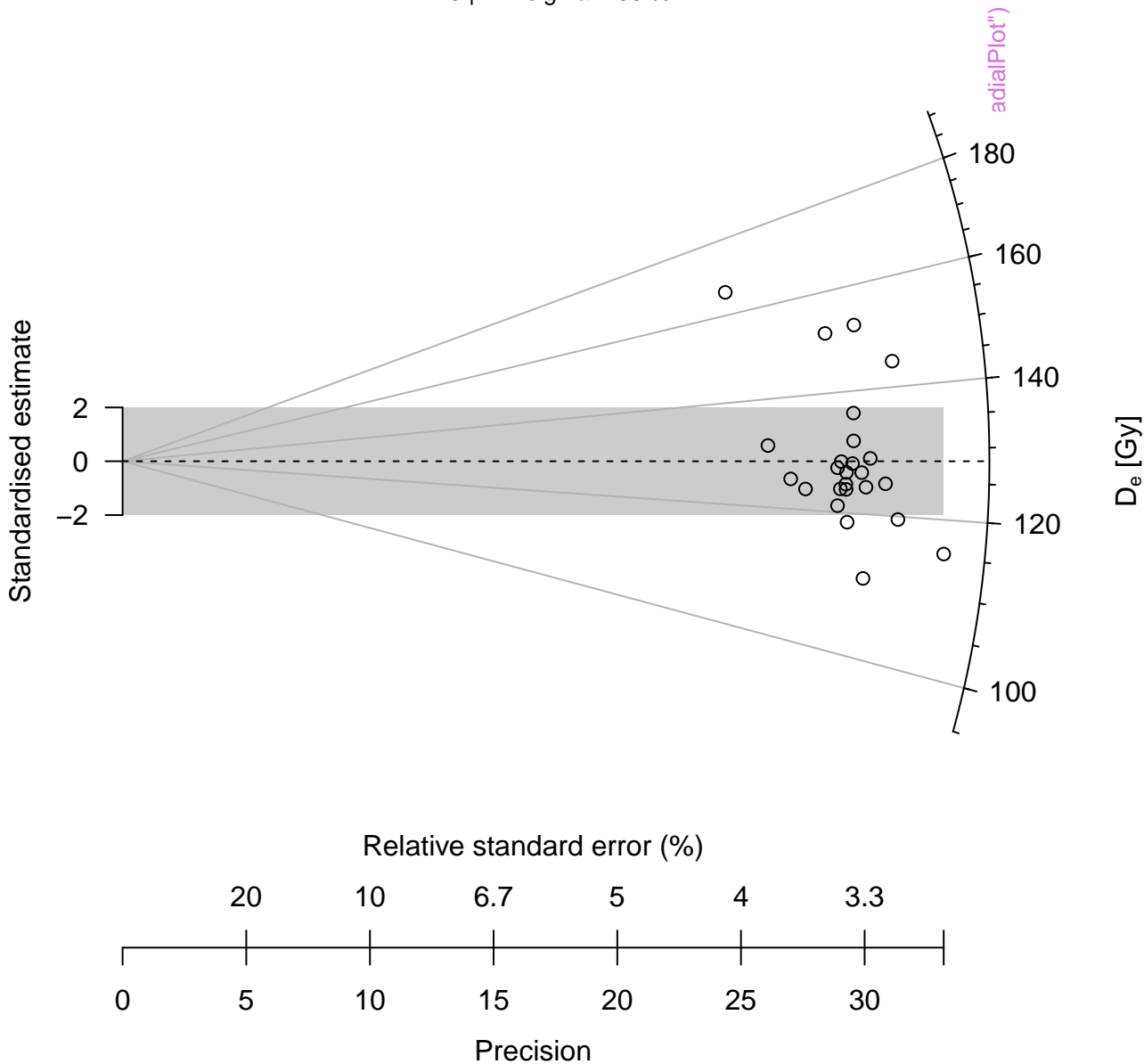
# Monte Carlo Simulation

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



# D<sub>e</sub> distribution

n = 25 | in 2 sigma = 68 %



# D<sub>e</sub> distribution

n = 25 | in 2 sigma = 68 %



# D<sub>e</sub> distribution

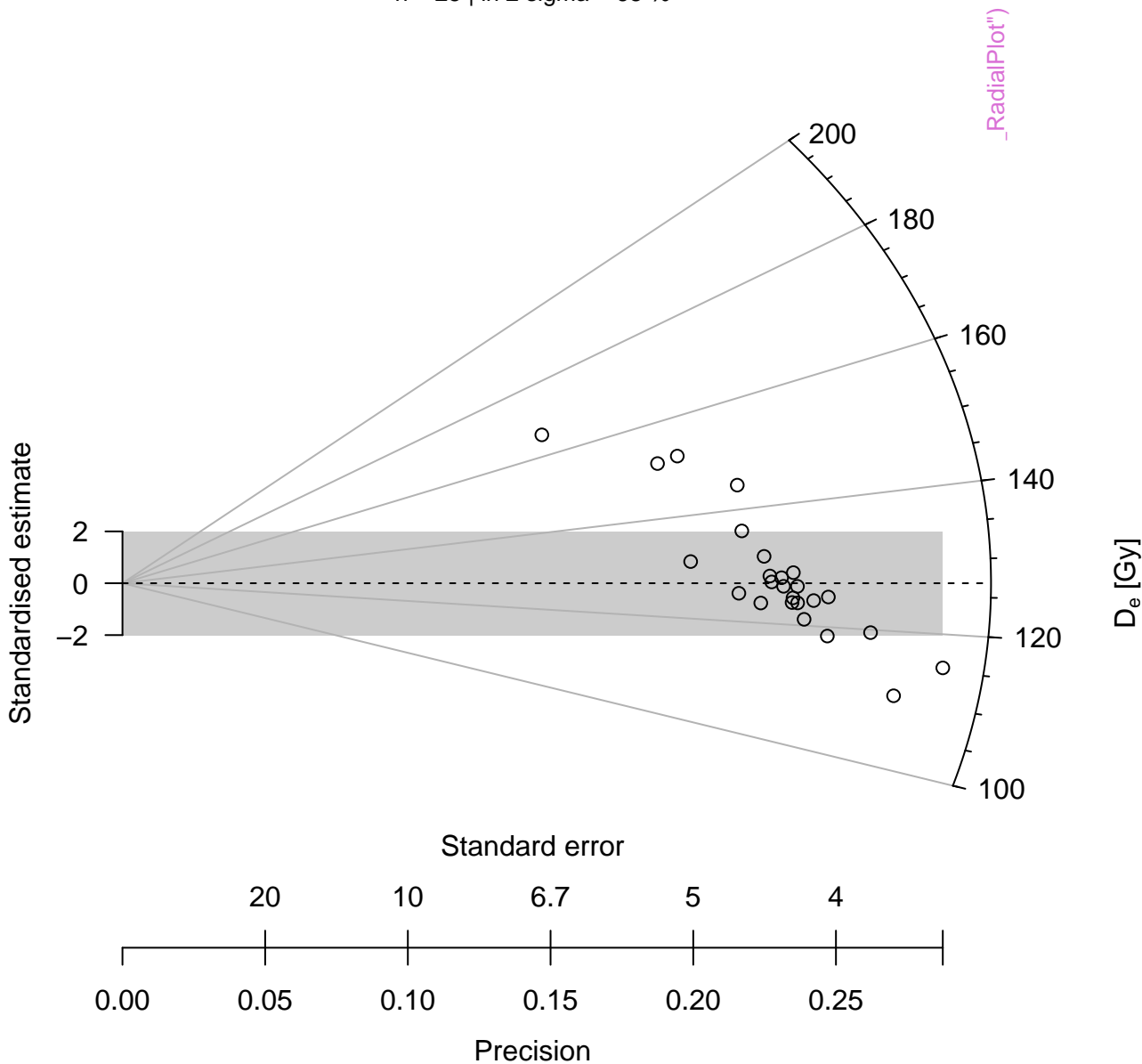
n = 25 | in 2 sigma = 68 %





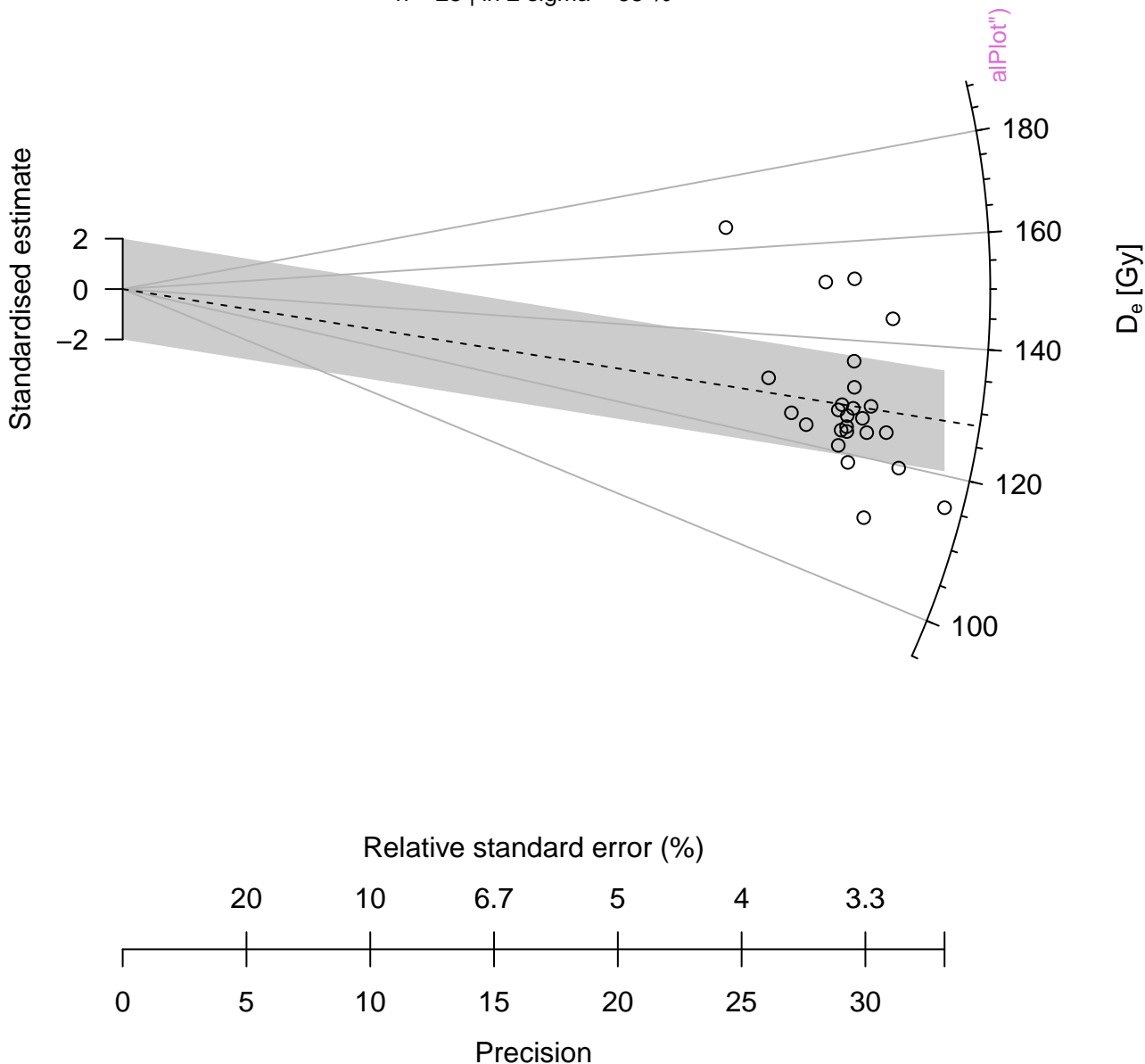
# D<sub>e</sub> distribution

n = 25 | in 2 sigma = 68 %



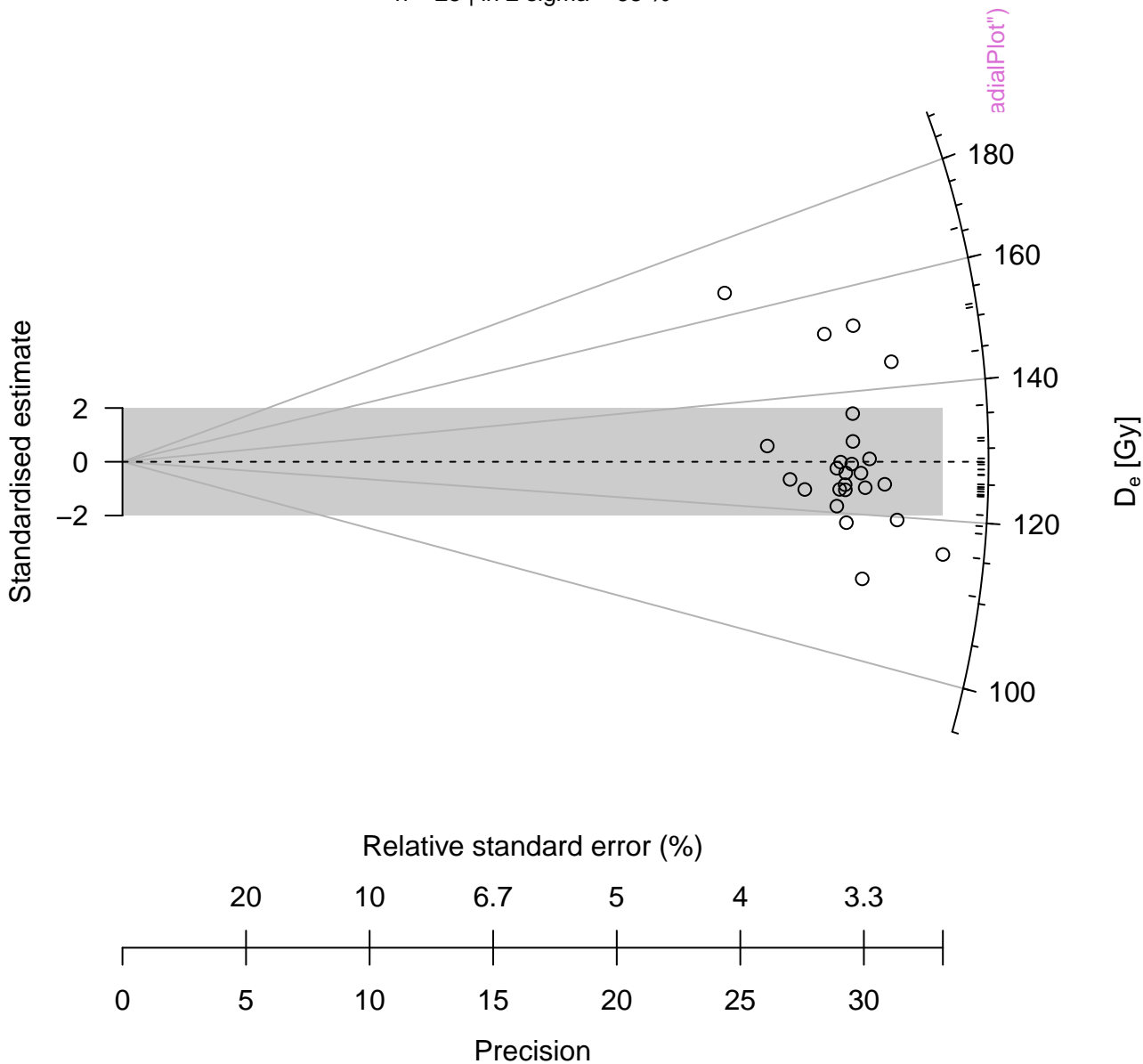
# D<sub>e</sub> distribution

n = 25 | in 2 sigma = 68 %



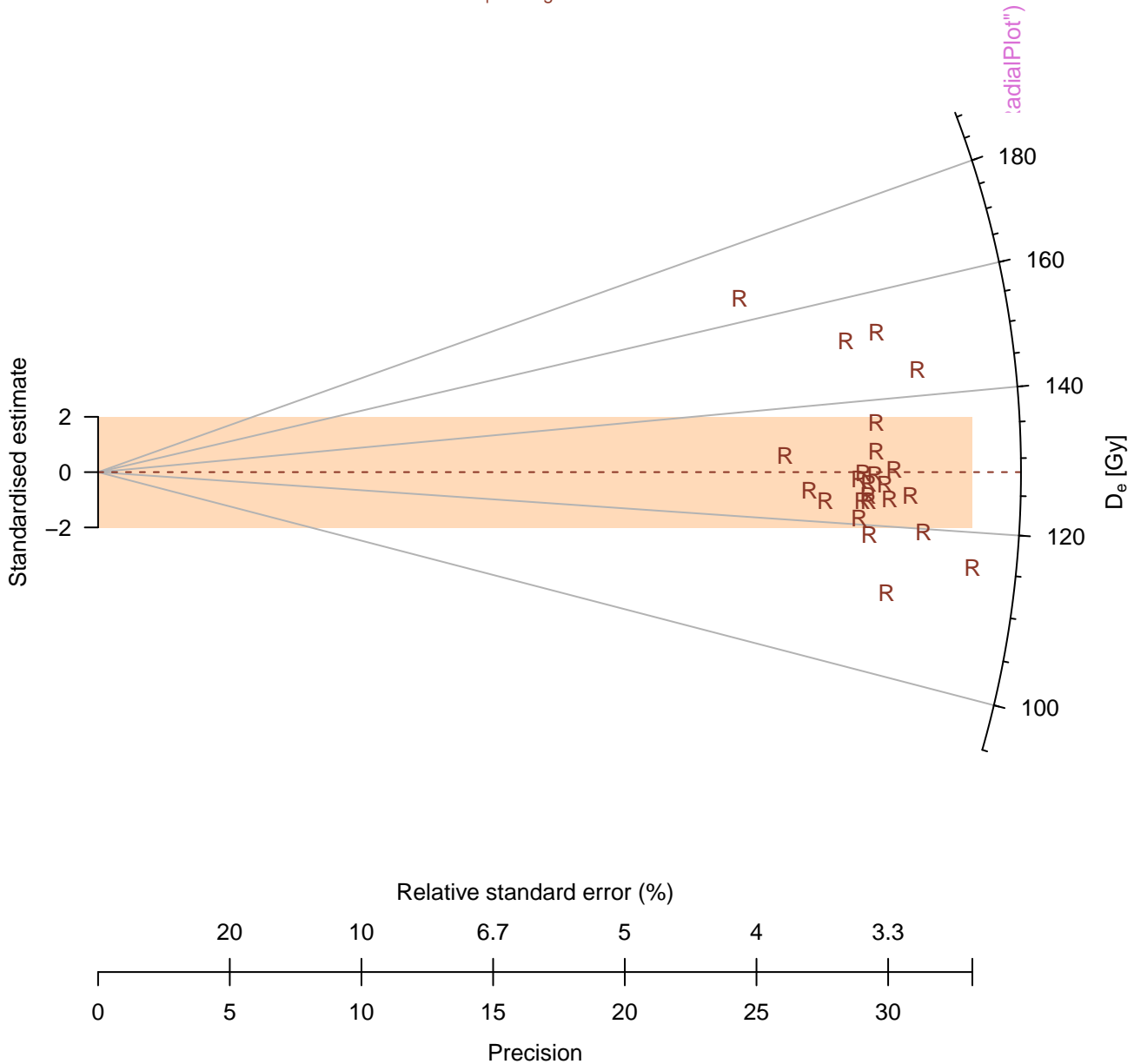
# D<sub>e</sub> distribution

n = 25 | in 2 sigma = 68 %



# D<sub>e</sub> distribution

n = 25 | in 2 sigma = 68 %



# D<sub>e</sub> 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

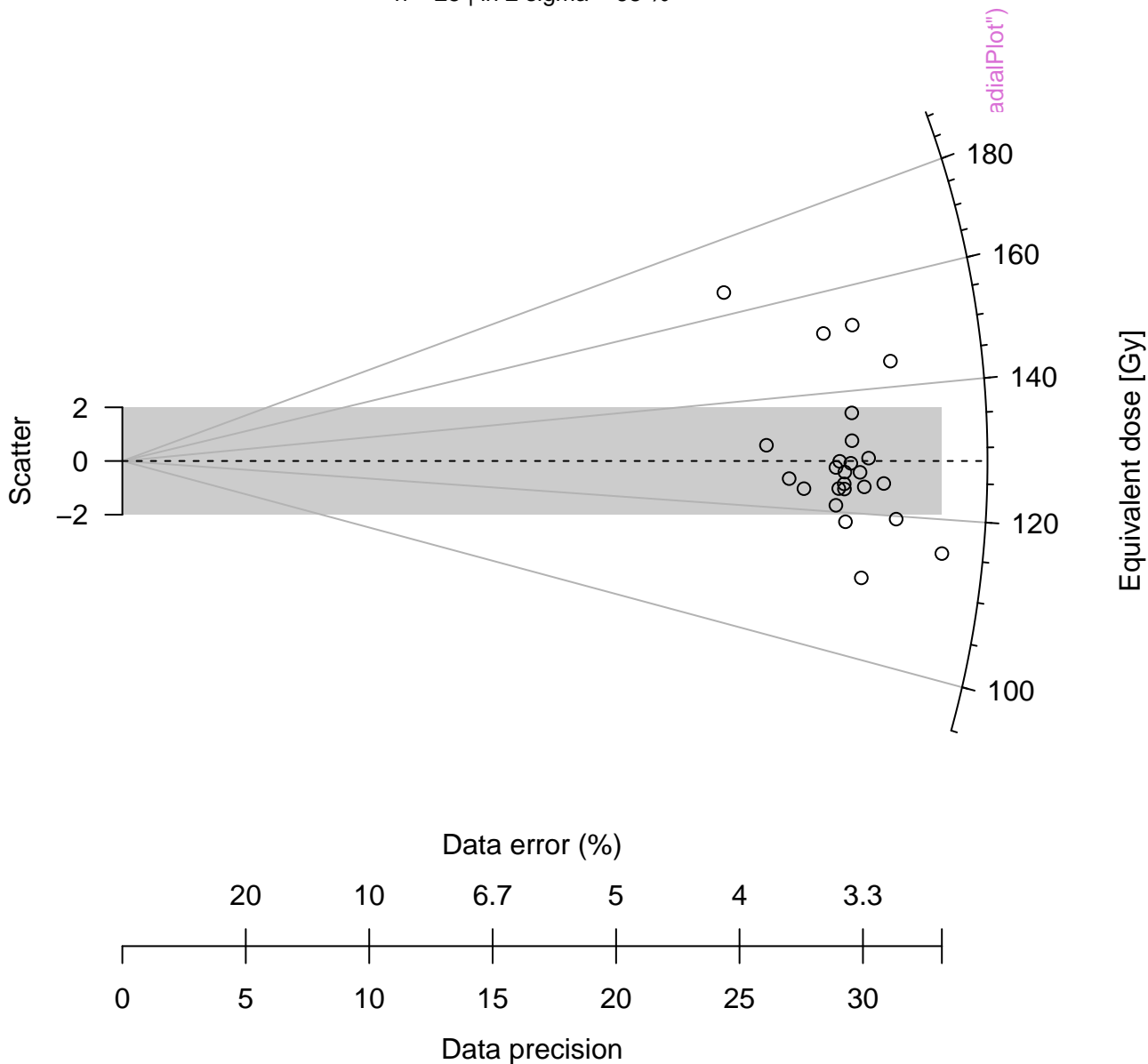
120

100

D<sub>e</sub> [Gy]

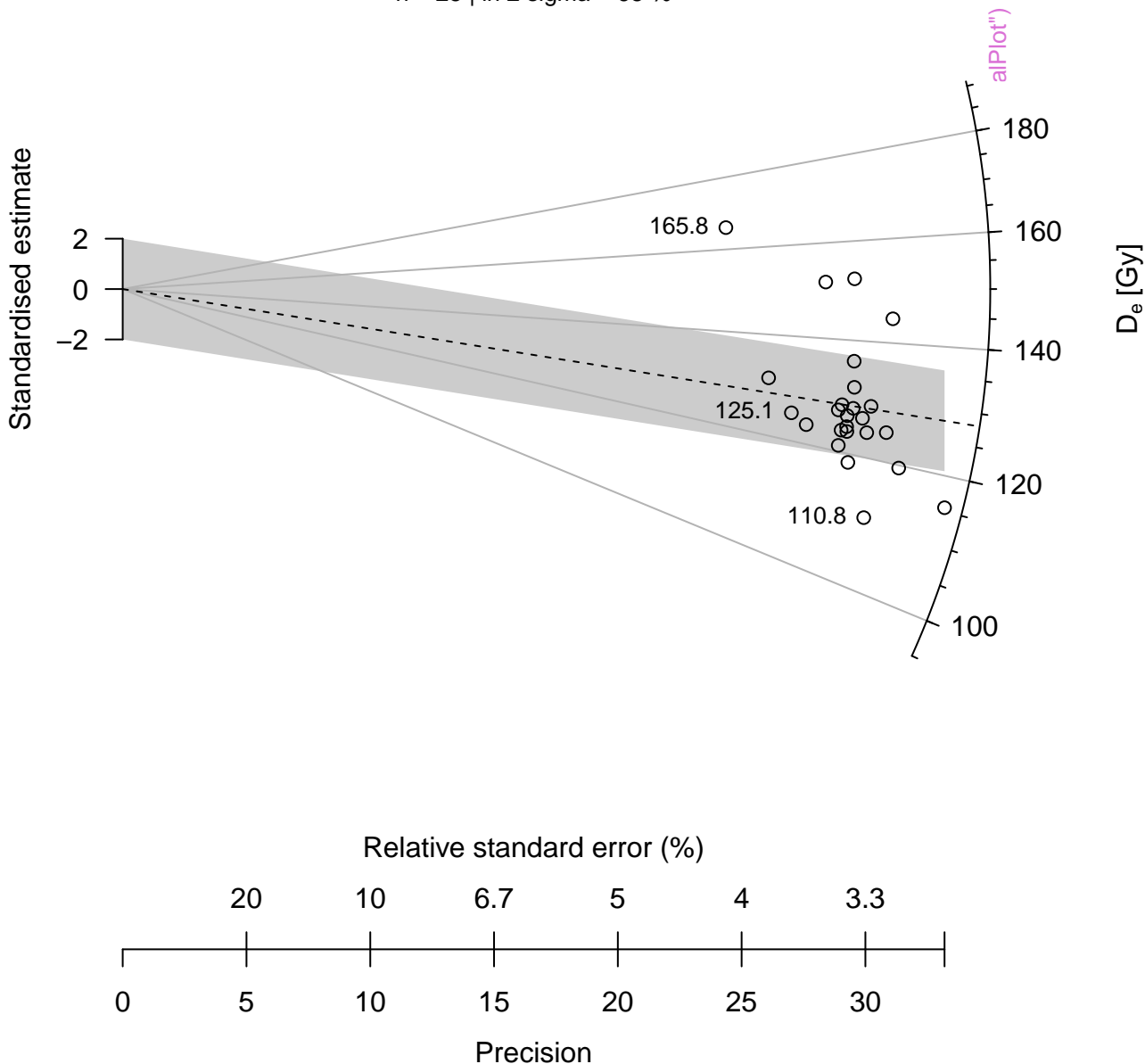
# D<sub>e</sub> distribution

n = 25 | in 2 sigma = 68 %



# D<sub>e</sub> distribution

n = 25 | in 2 sigma = 68 %



# D<sub>e</sub> distribution

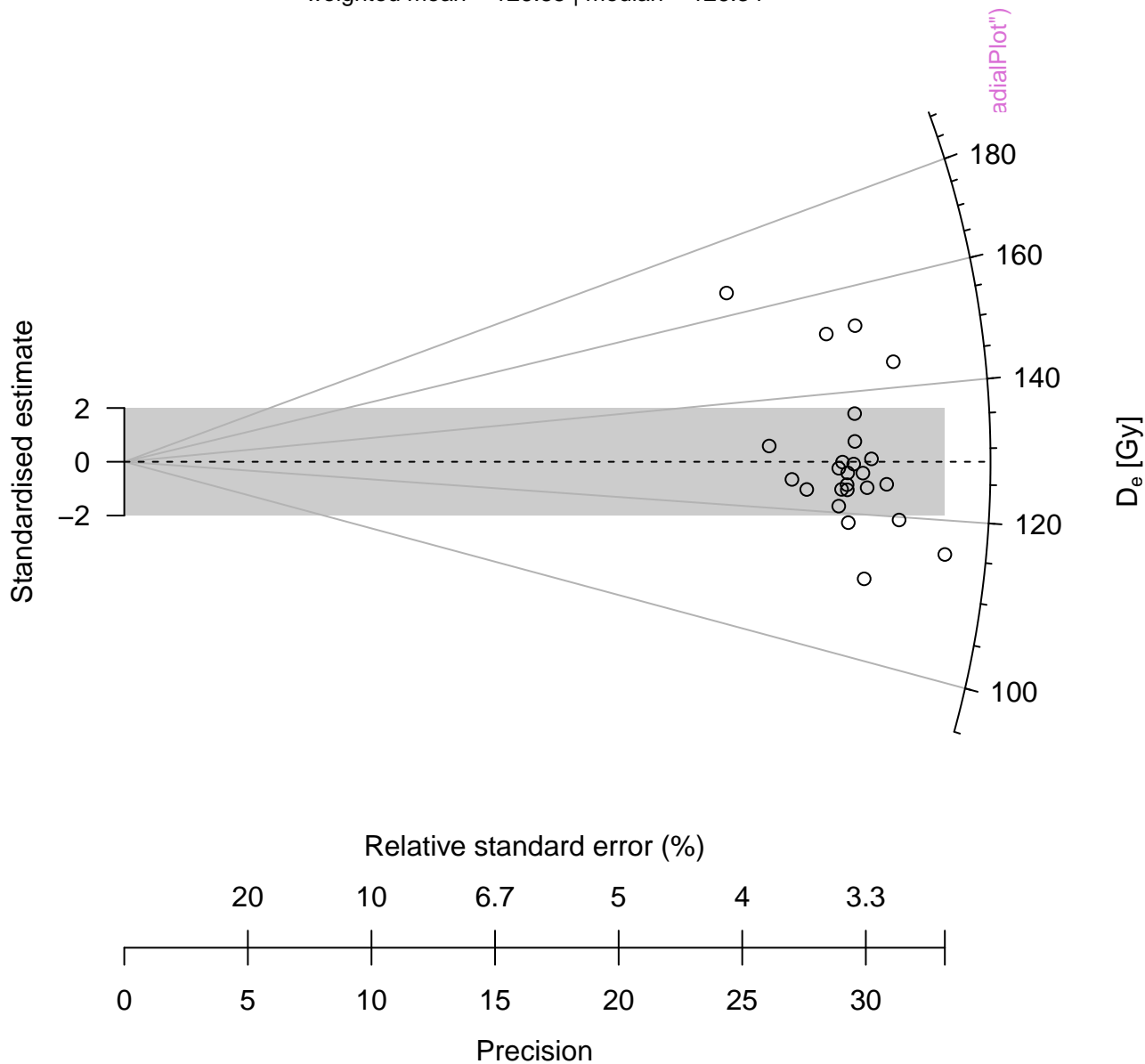
n = 25 | in 2 sigma = 68 %





# D<sub>e</sub> distribution

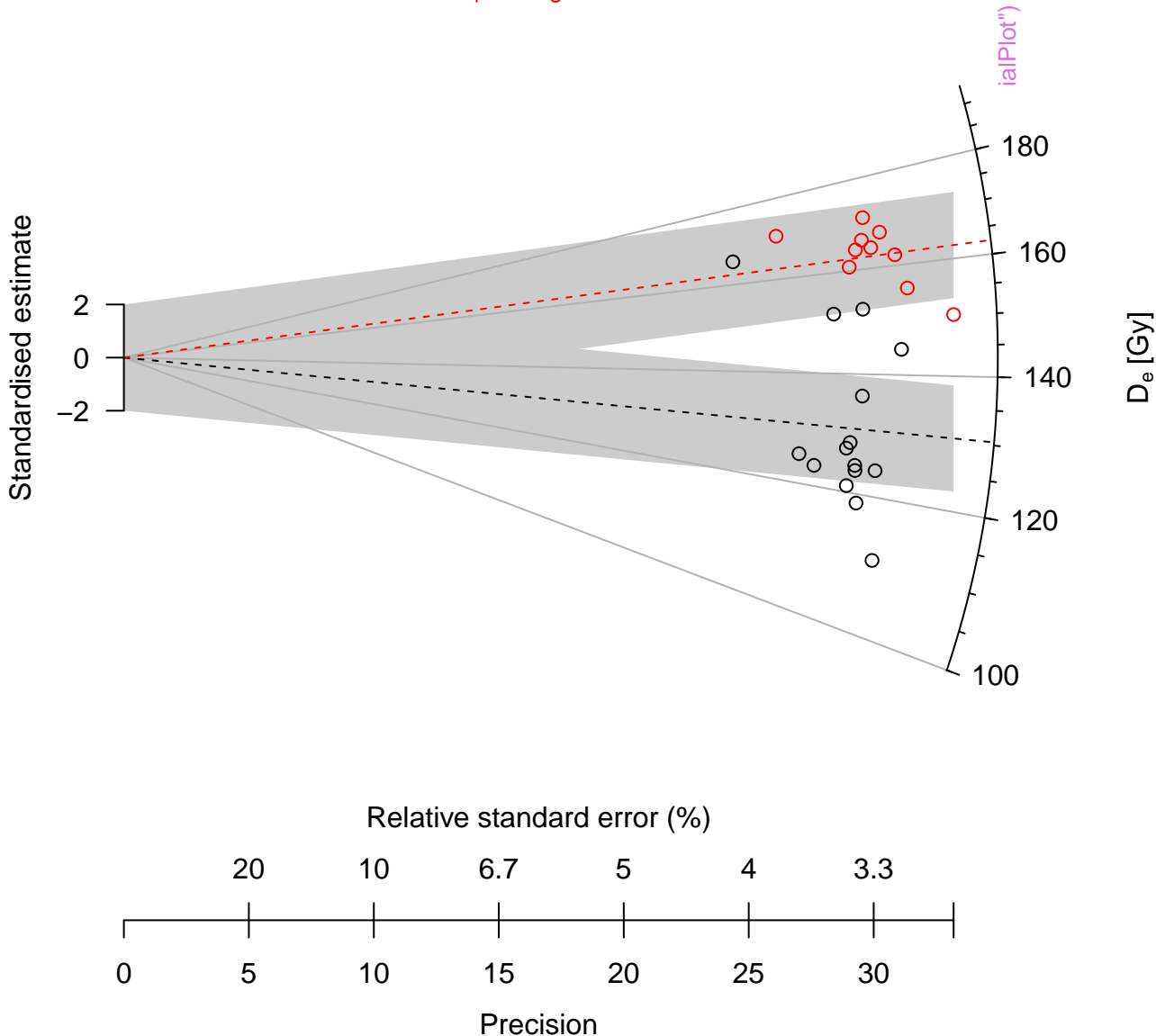
weighted mean = 126.85 | median = 126.34



# D<sub>e</sub> distribution

n = 15 | in 2 sigma = 53.3 %

n = 10 | in 2 sigma = 90 %



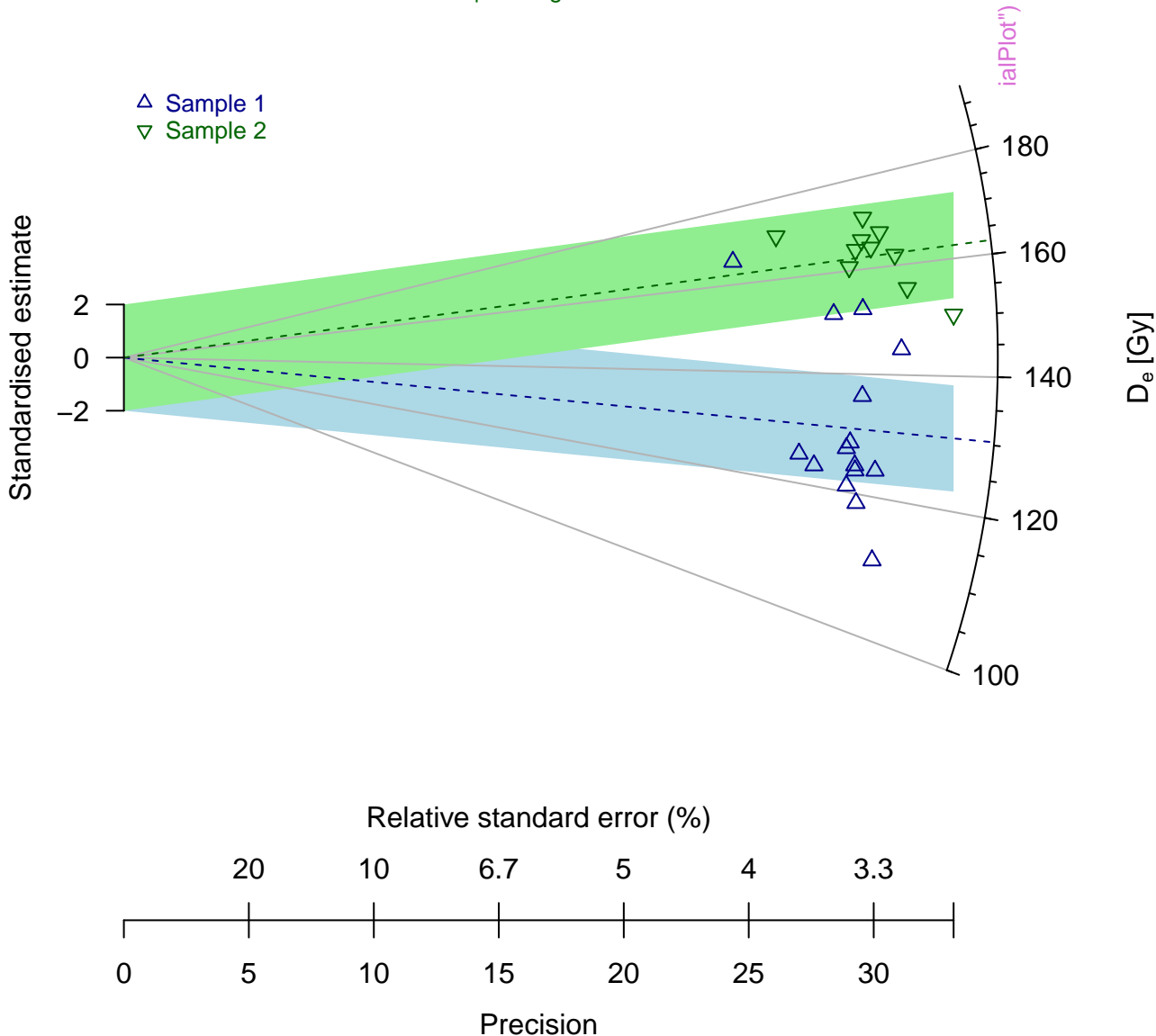
# D<sub>e</sub> distribution

n = 15 | in 2 sigma = 53.3 %

n = 10 | in 2 sigma = 90 %

△ Sample 1

▽ Sample 2

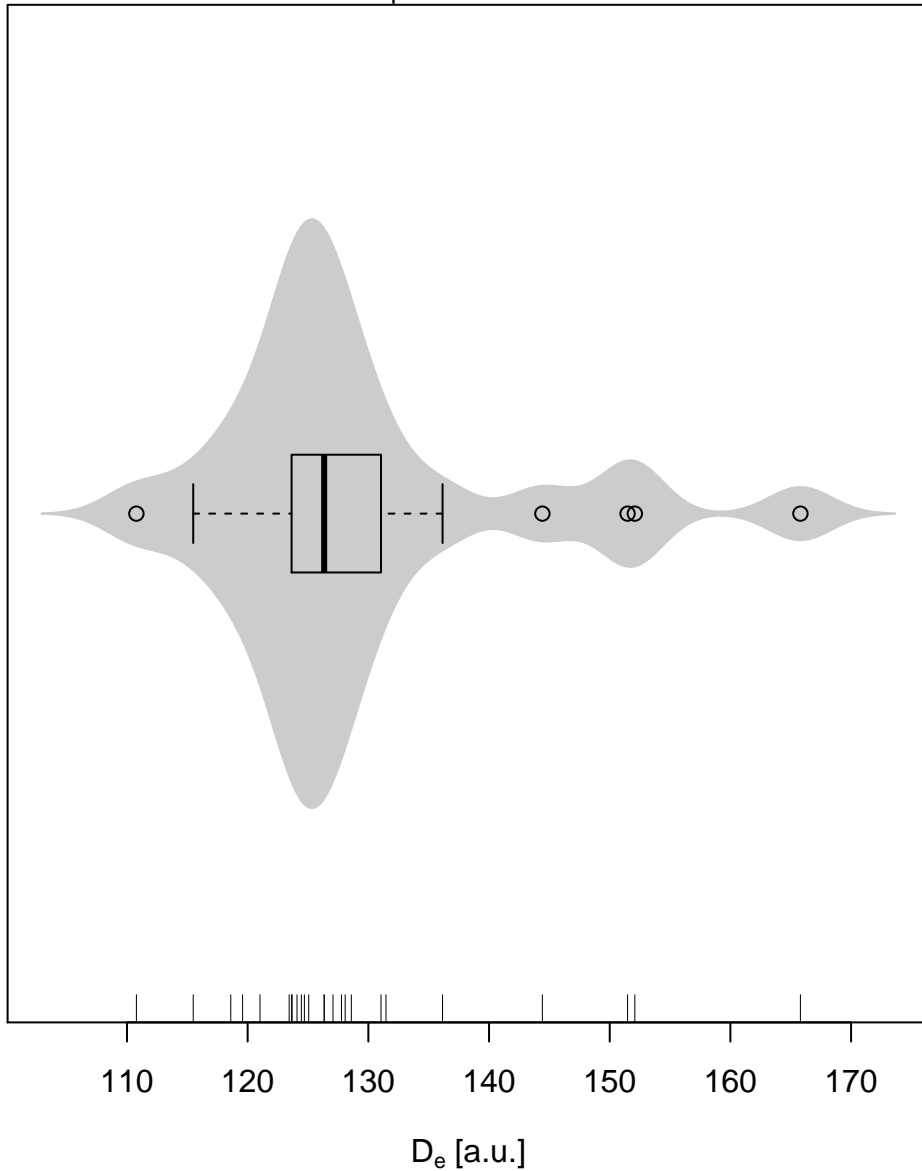


# Violin Plot

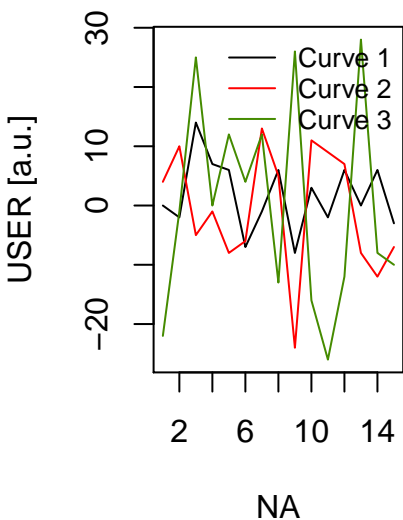
n = 25 | median = 126.34

Density

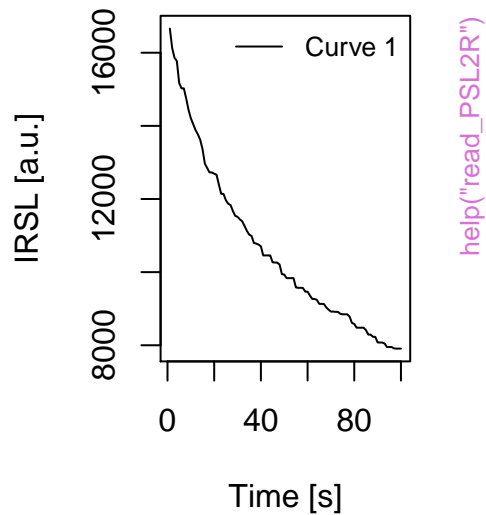
`help("plot_ViolinPlot")`



**USER combined**

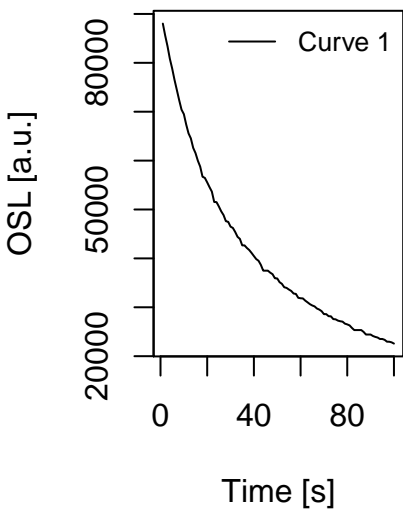


**IRSL combined**



`help("read_PSL2R")`

**OSL combined**



# OSL



# OSL



# OSL





# D<sub>e</sub> distribution

n = 62 | mean = 66.01



# D<sub>e</sub> distribution

n = 62 | mean = 66.01

