

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

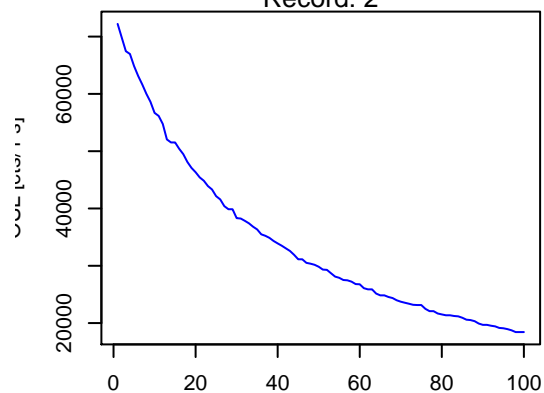


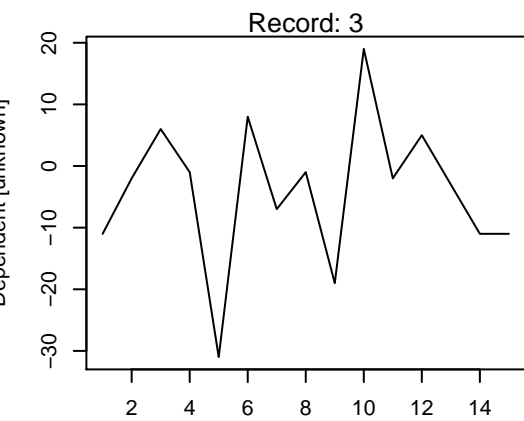
help("ExampleData.portableOSL")

Record: 2



Record: 2





USER

Record: 4



IRSL

Record: 4

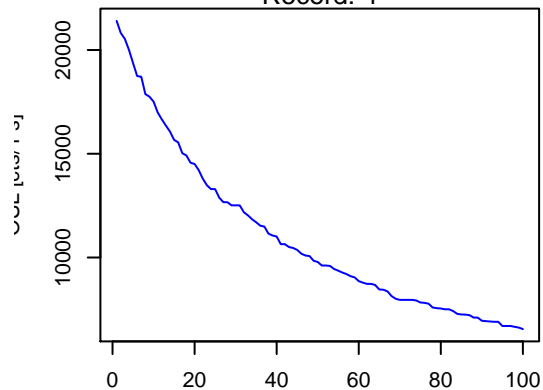


help("ExampleData.portableOSL")

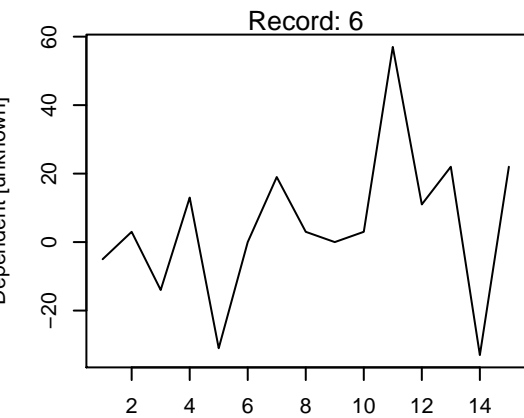
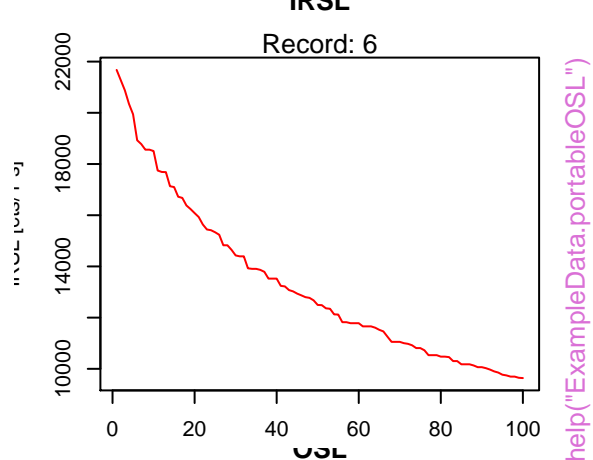
Record: 4



Record: 4







USER

Record: 7



IRSL

Record: 7



help("ExampleData.portableOSL")

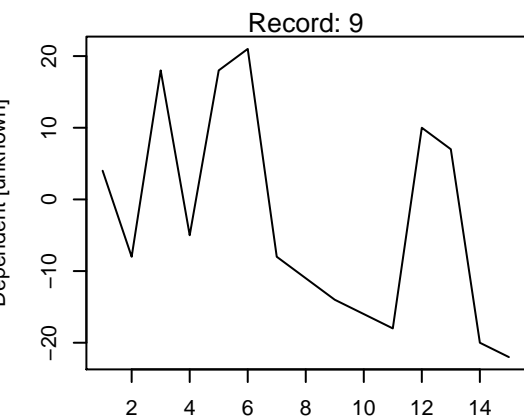
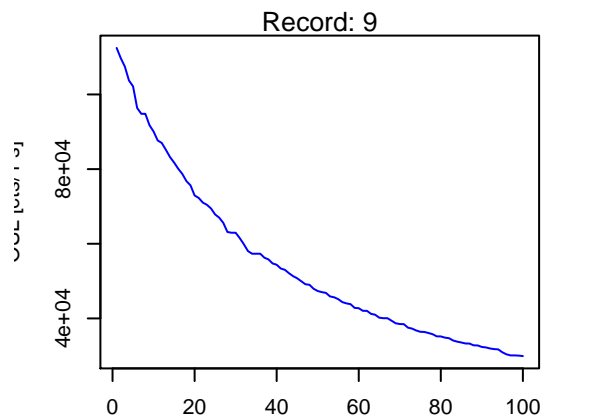
Record: 7



Record: 7





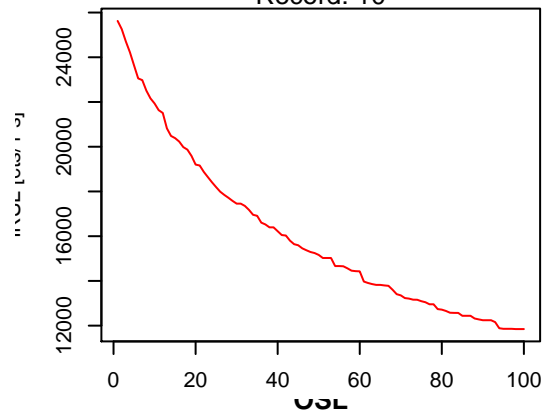


USER

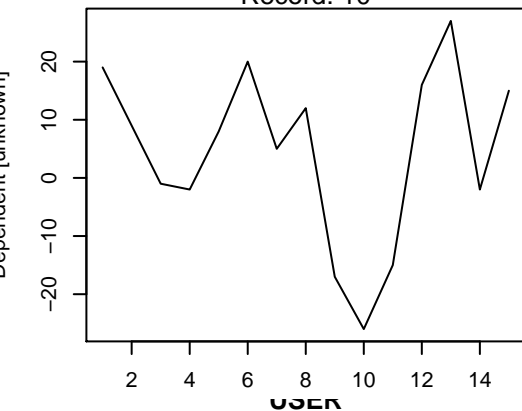
Record: 10



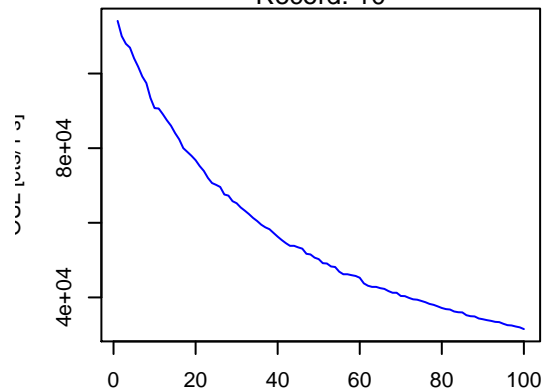
Record: 10



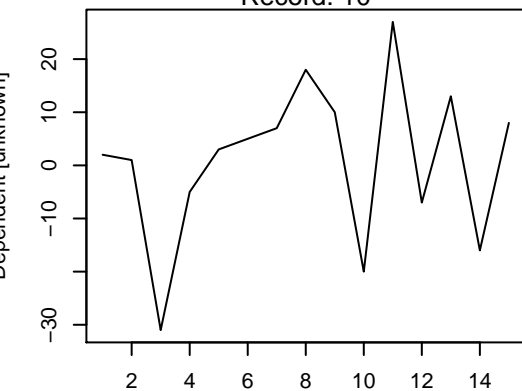
Record: 10



Record: 10



Record: 10



help("ExampleData.portableOSL")



USER

Record: 12



IRSL

Record: 12



help("ExampleData.portableOSL")

Record: 12



Record: 12



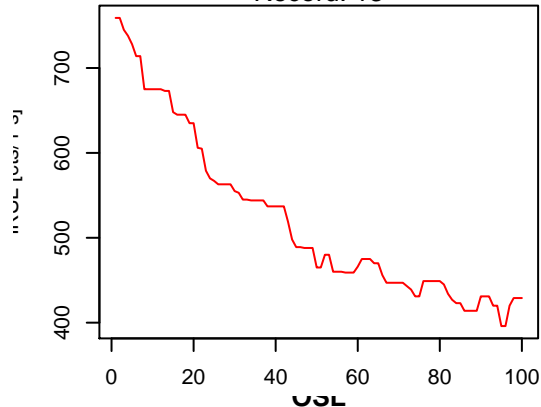
USER

Record: 13

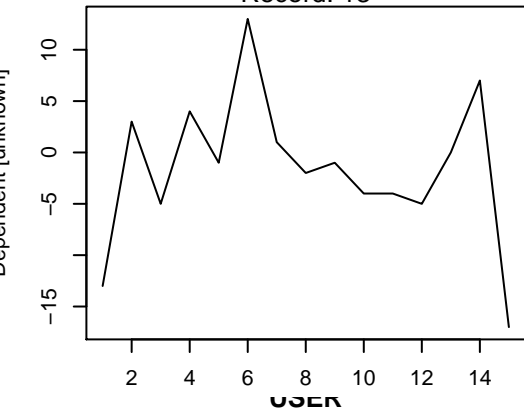


IRSL

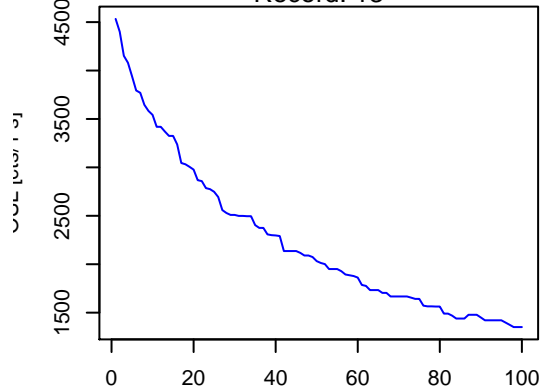
Record: 13



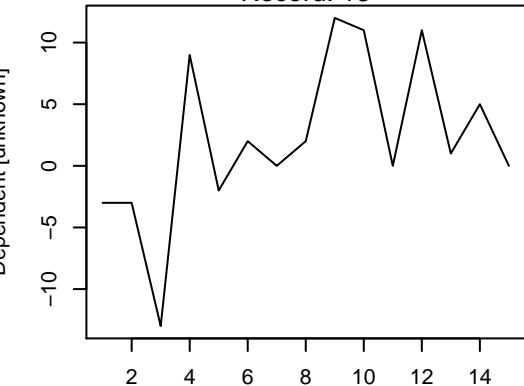
Record: 13



Record: 13



Record: 13



help("ExampleData.portableOSL")

USER

Record: 14



IRSL

Record: 14



help("ExampleData.portableOSL")

Record: 14



Record: 14



USER

Record: 1



IRSL

Record: 1



help("PSL2Riseo.BinfileData")

Record: 1



Record: 1



USER

Record: 2



IRSL

Record: 2



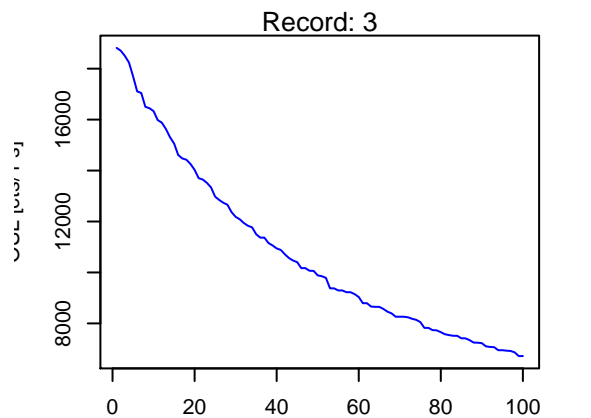
help("PSL2Riseo.BinfileData")

Record: 2



Record: 2



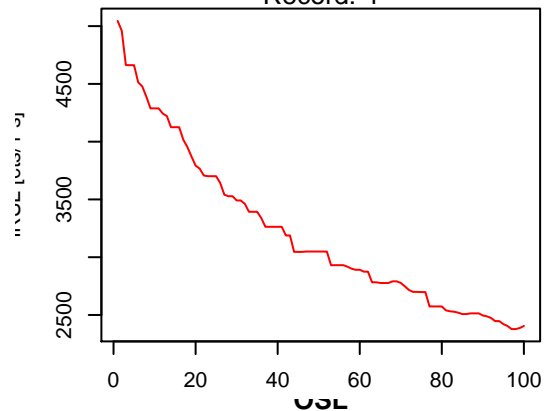


USER

Record: 4

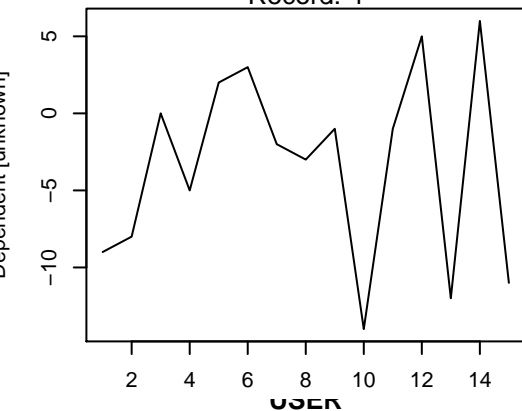


Record: 4

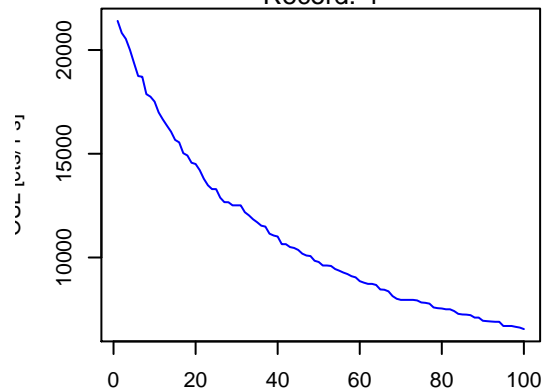


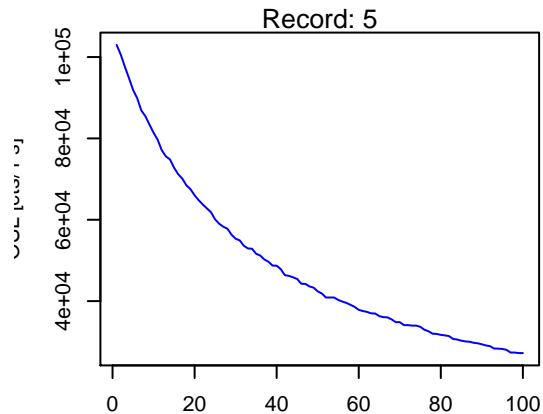
help("PSL2Risee.BINfileData")

Record: 4



Record: 4







USER

Record: 7



IRSL

Record: 7



help("PSL2Riseo.BinfileData")

Record: 7



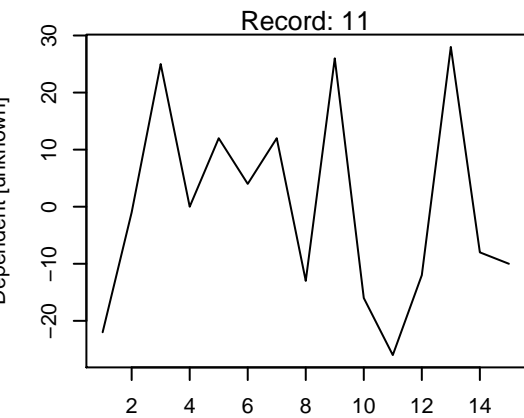
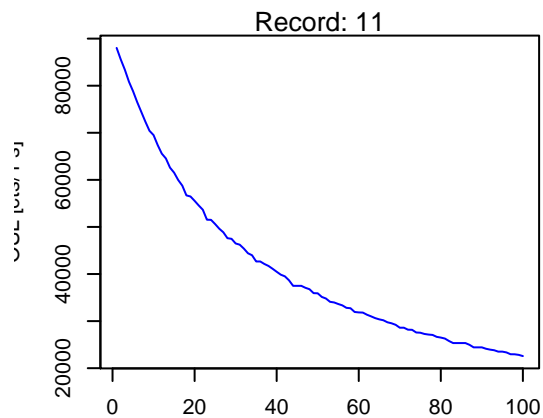
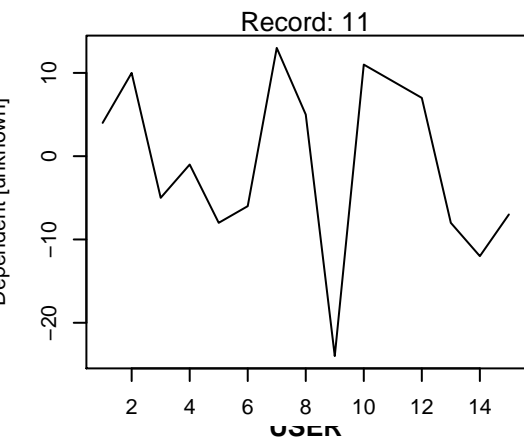
Record: 7











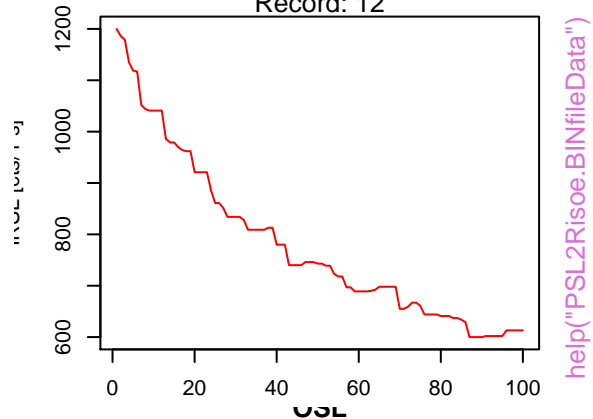
USER

Record: 12



IRSL

Record: 12



Record: 12



Record: 12



Record: 12



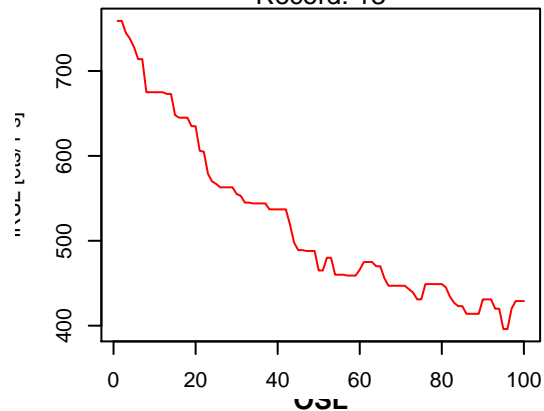
USER

Record: 13



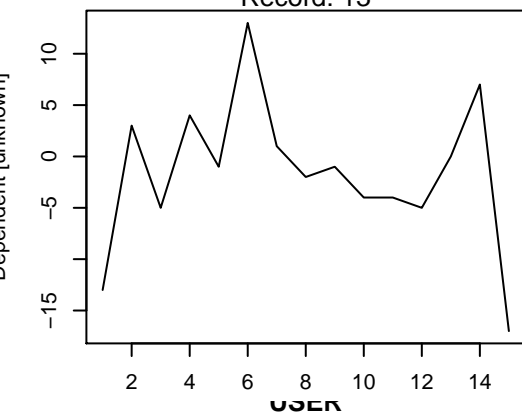
IRSL

Record: 13

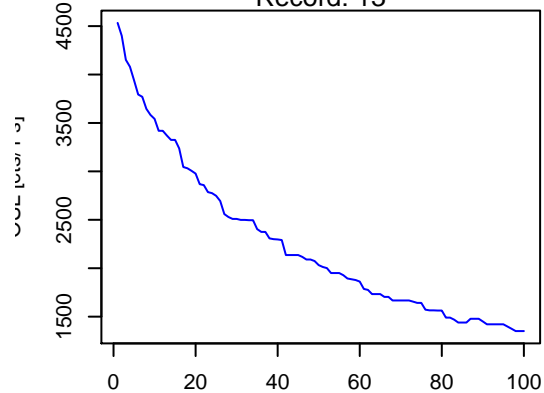


help("PSL2Riseo.BINfileData")

Record: 13



Record: 13



USER



IRSL



help("PSL2Riseo.BINfileData")



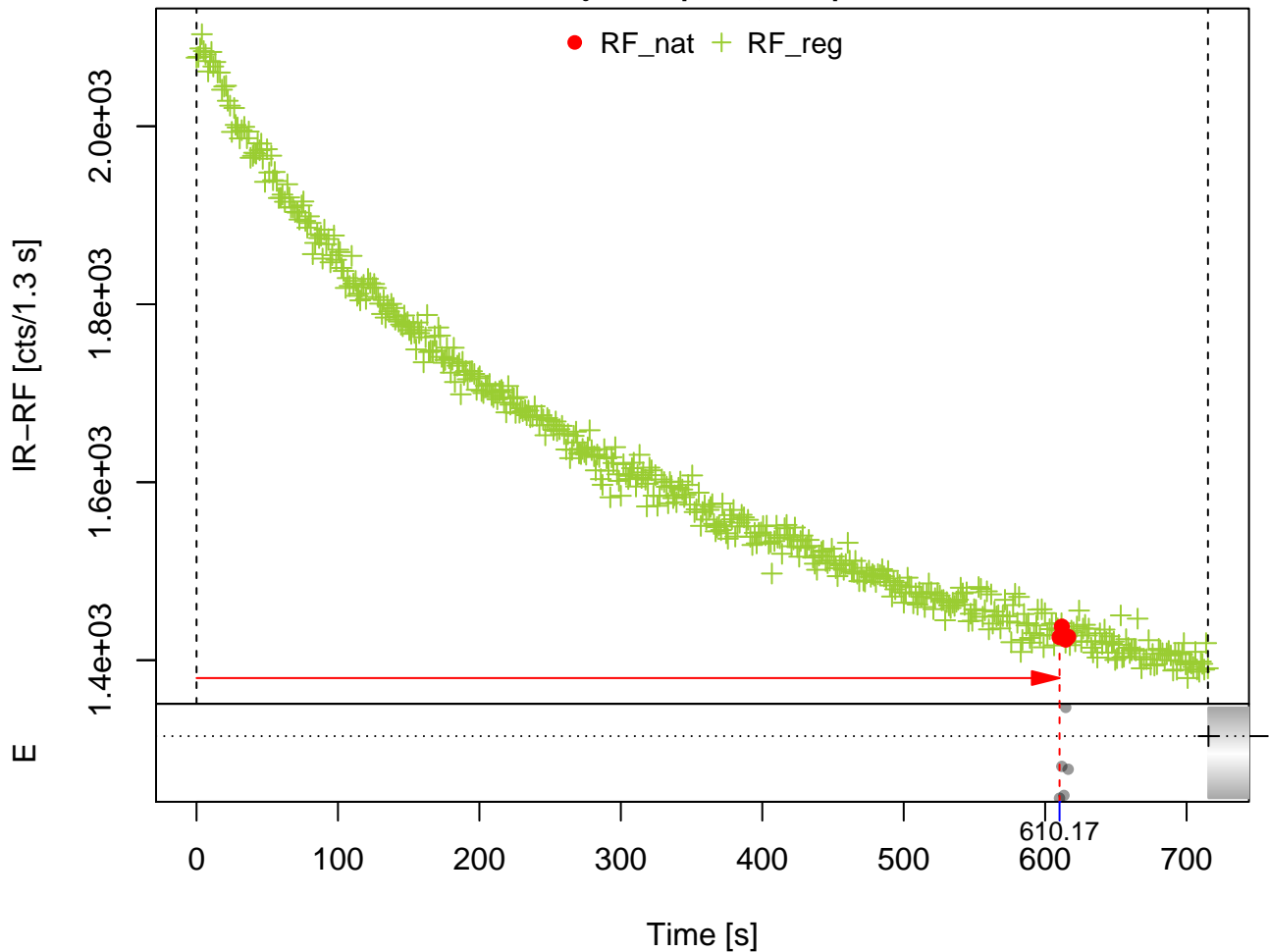
IR-RF

$D_e = 623.25$ [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)

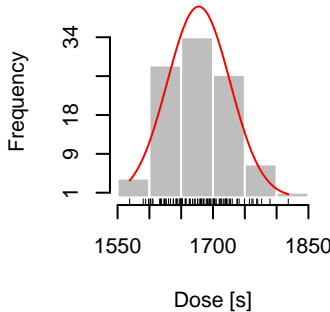
Growth curve

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

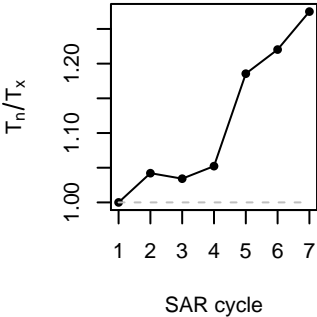


D_e from MC simulation

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

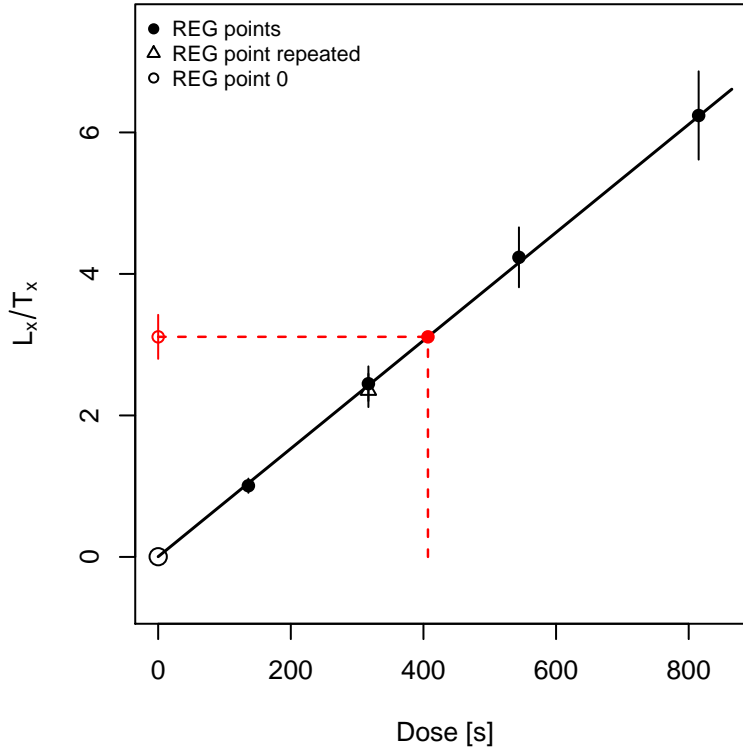
Natural
(815)

Natural
(0)

Natural
(317)

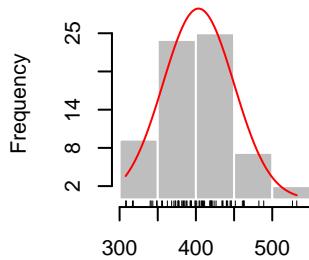
Growth curve

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

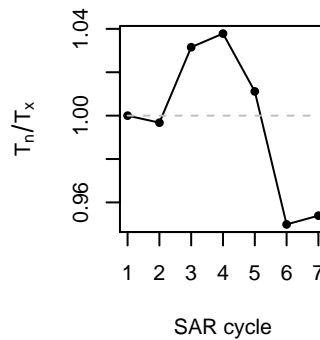


D_e from MC simulation

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



Test dose response



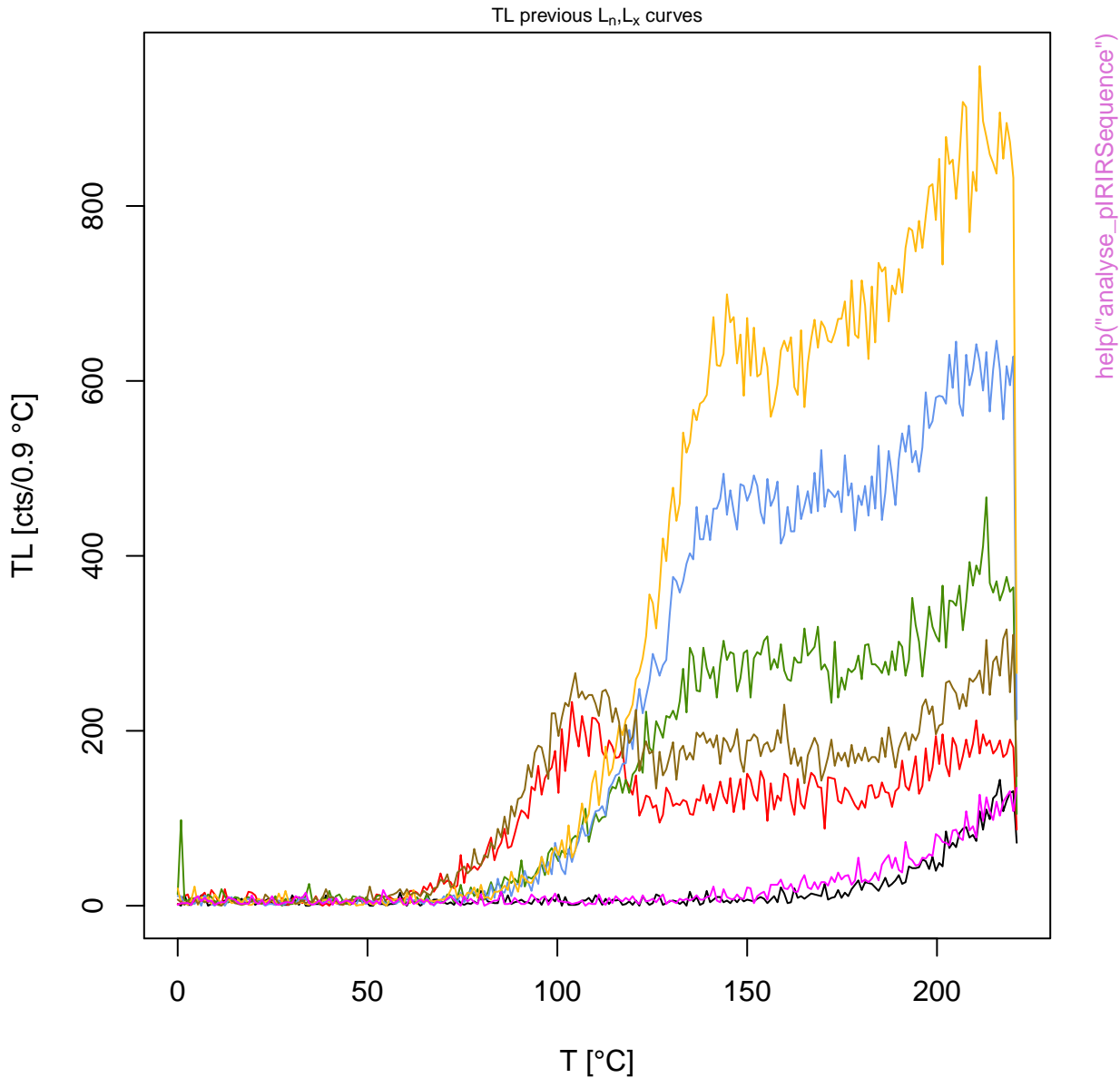
Dose [s]
n = 100, valid fits = 67

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



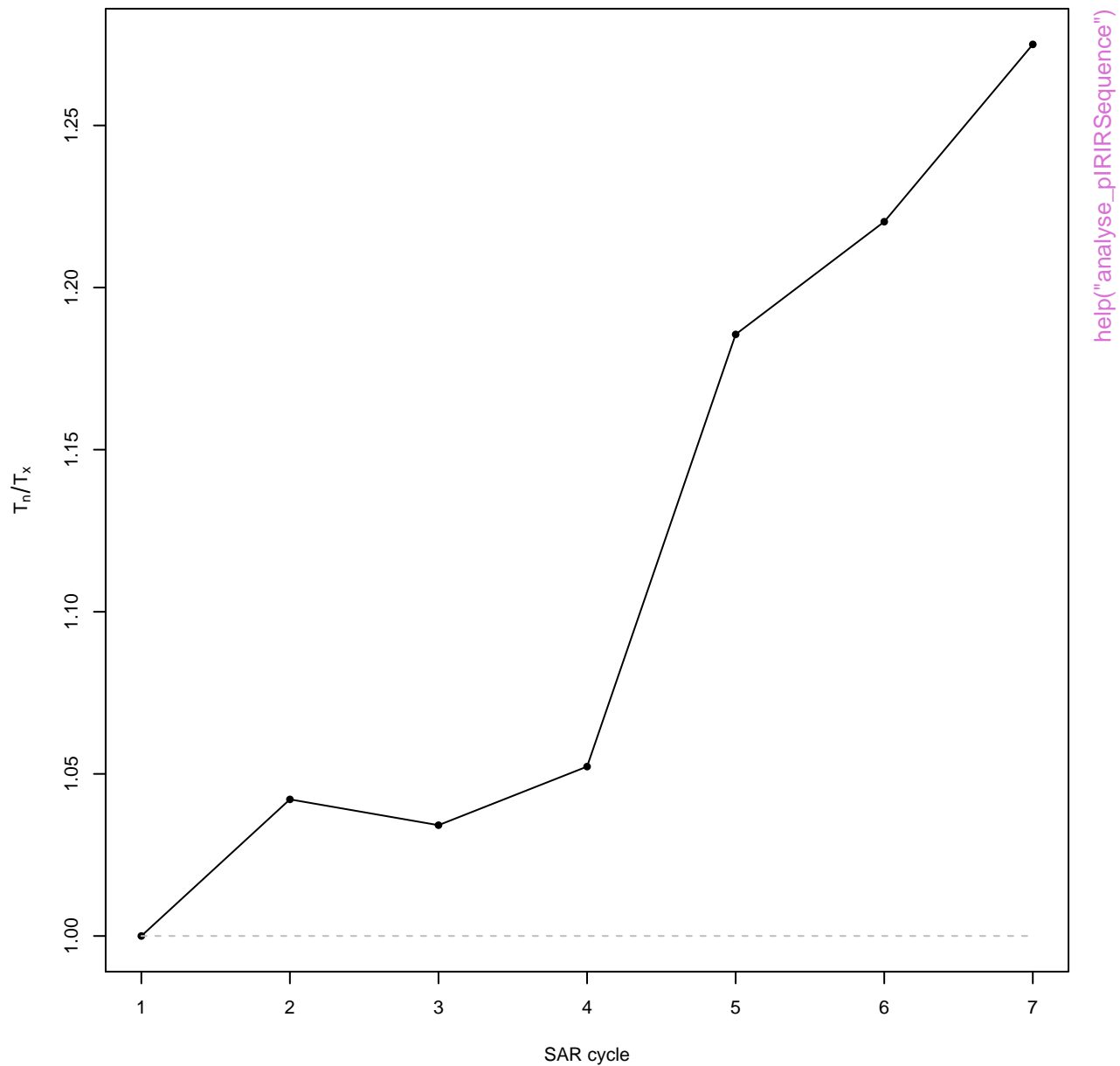
D_e from MC simulation

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]

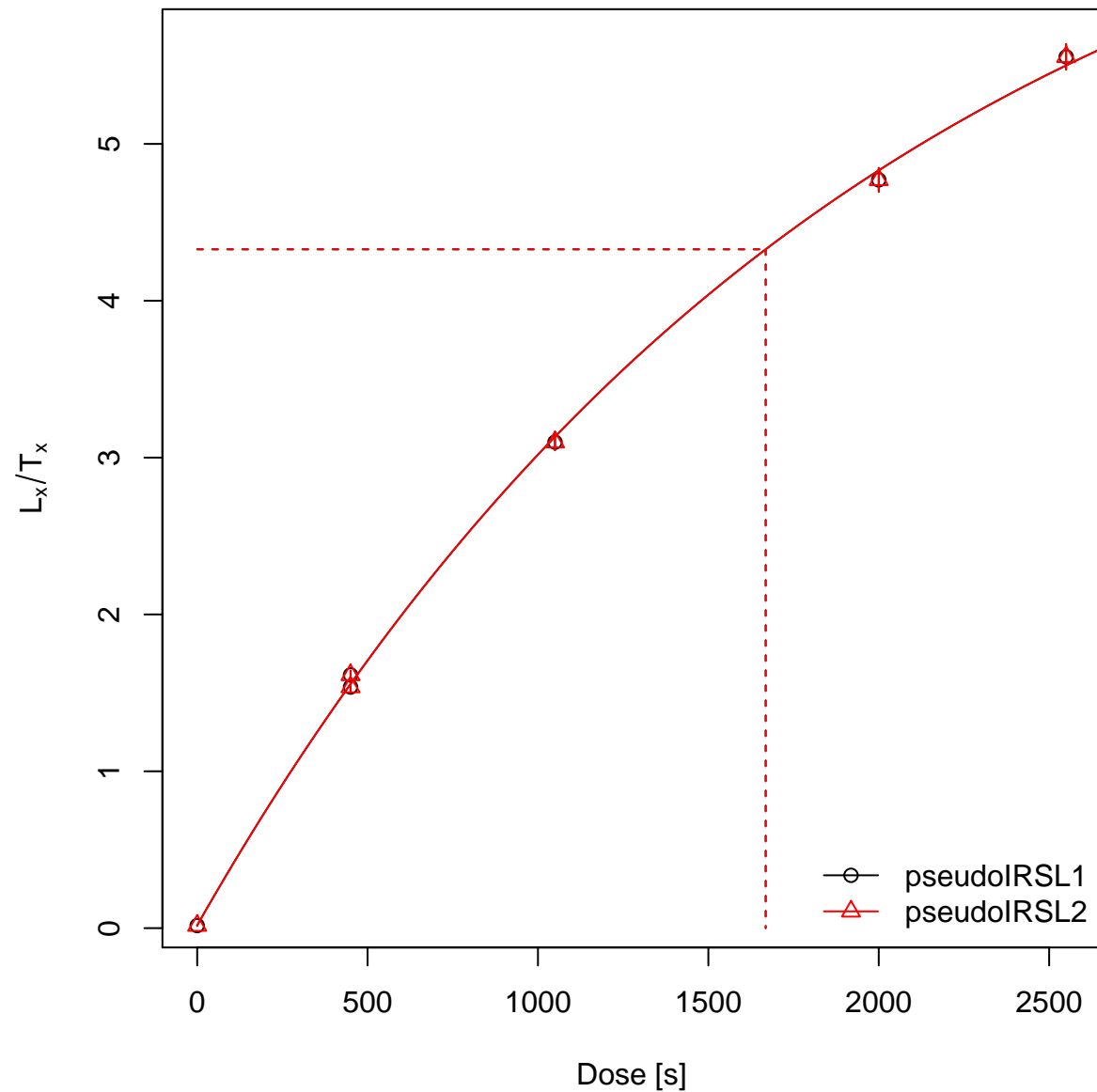
n = 100 , valid fits = 100

help("analyse_pIRSequence")

Test dose response



Summarised Dose Response Curves

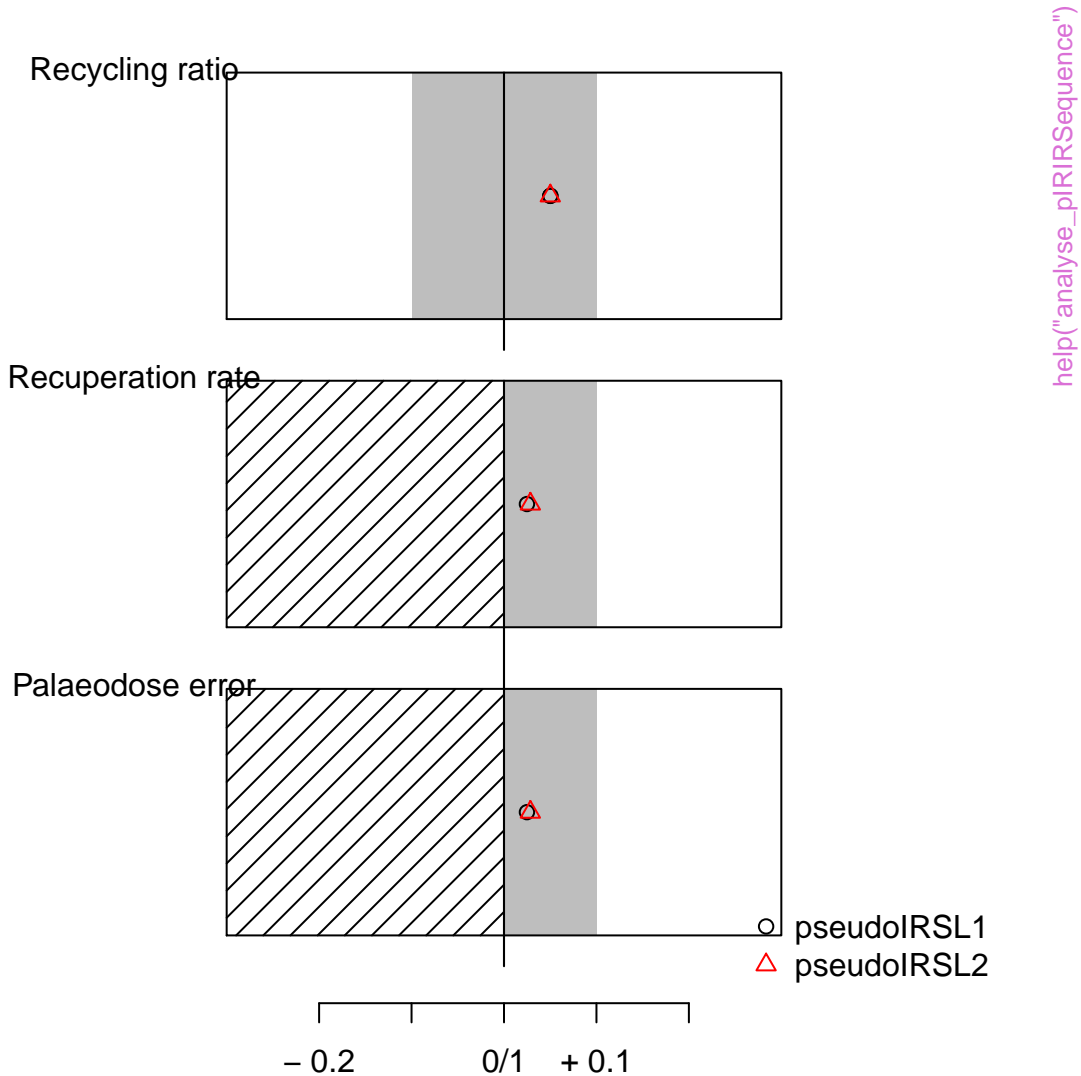


help("analyse_pIRSequence")

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

$\sigma_b = 0.2 \mid n = 62$

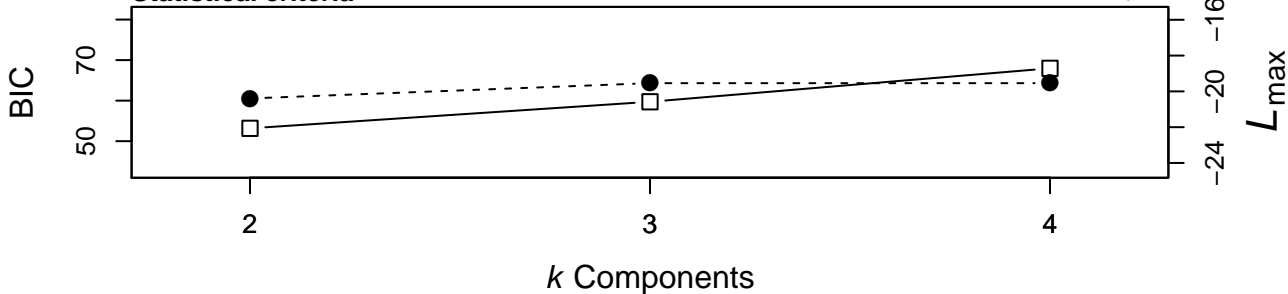
Normal distributions



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



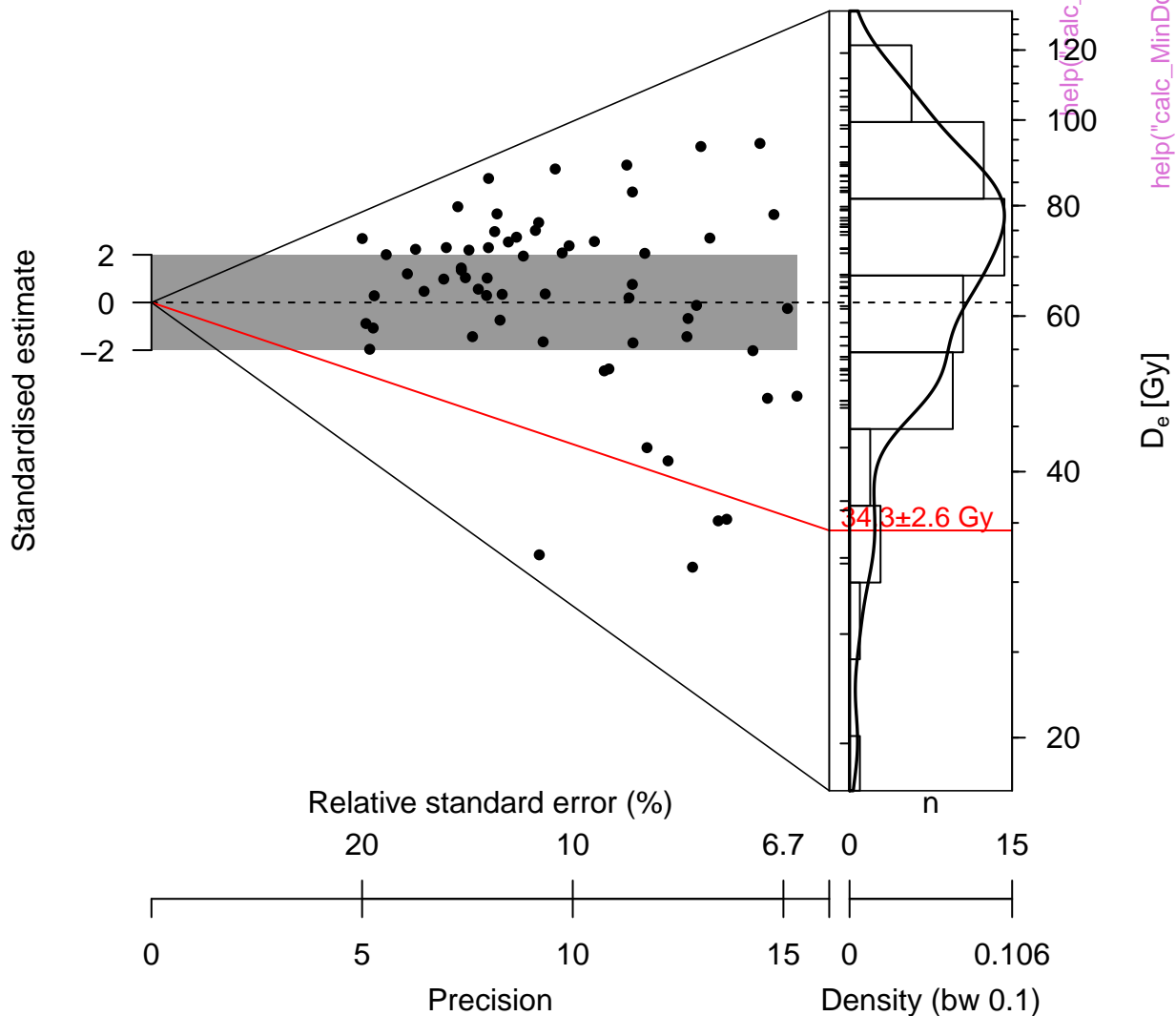
help("calc_MinDose")

Likelihood profile: p0



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

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



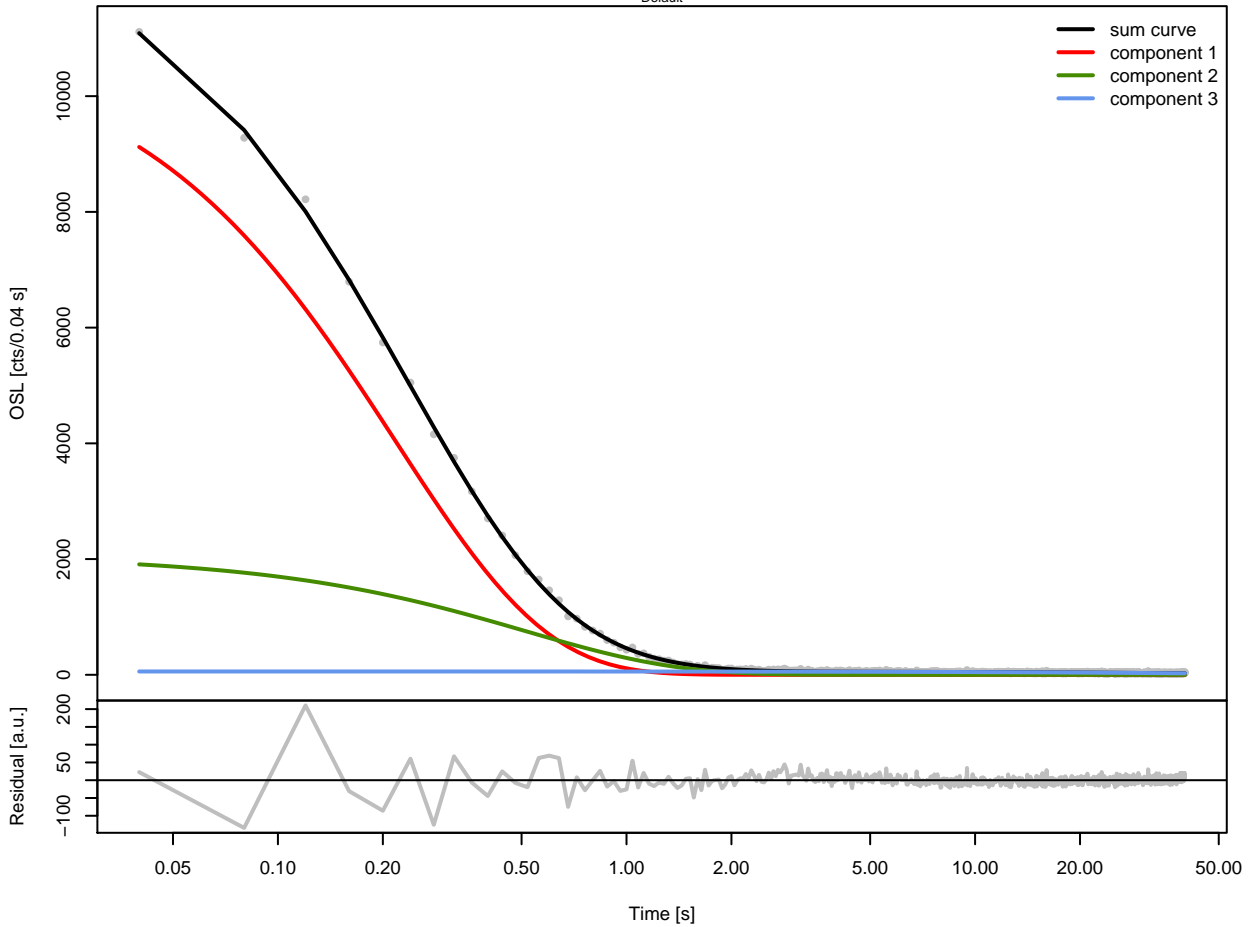
help("calc_ThermalLifetime")

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



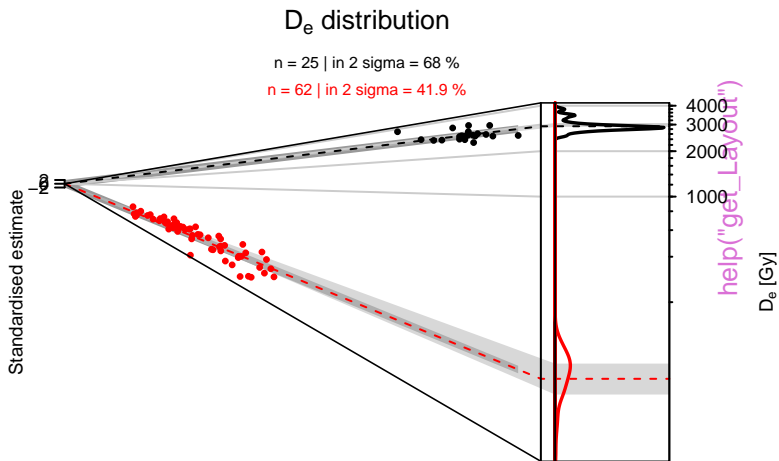
D_e distribution

n = 25 | in 2 sigma = 68 %

n = 62 | in 2 sigma = 41.9 %

Standardised estimate





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}

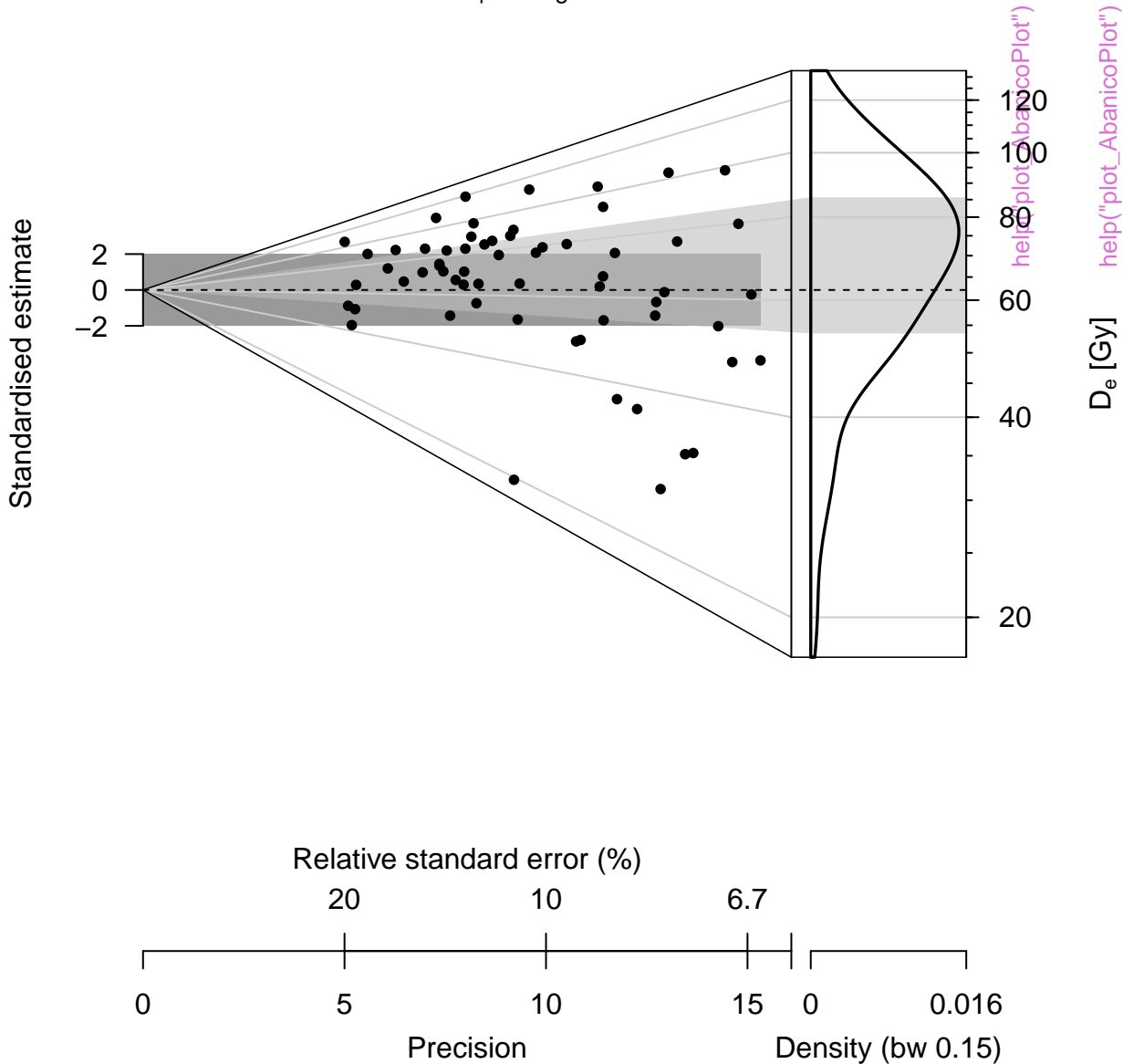


Profile log likelihood for σ_{OD}



D_e distribution

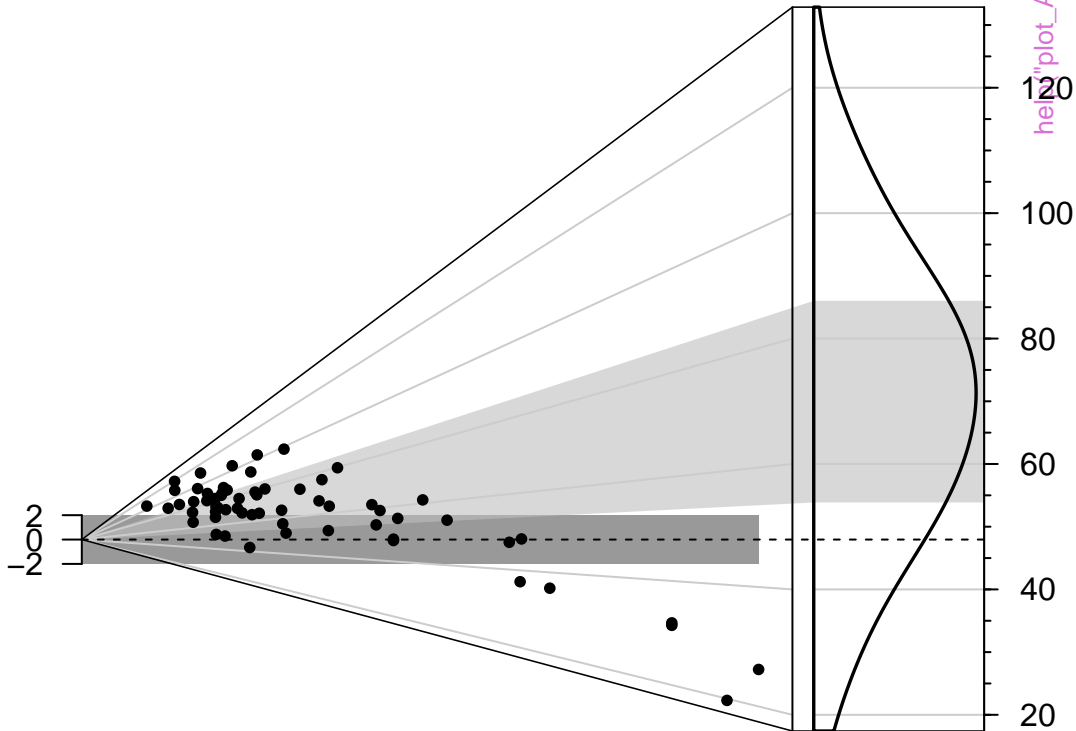
n = 62 | in 2 sigma = 41.9 %



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 %



D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

5

0

5

10

15

200

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0

0.264

Precision

Density (bw 0.04)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



D_e [Gy]

help("plot_AbanicoPlot")

D_e distribution

n = 62 | in 2 sigma = 41.9 %

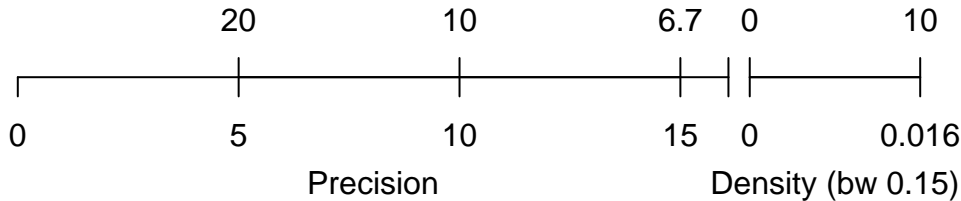
Standardised estimate



D_e [Gy]

Relative standard error (%)

n



D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

Relative standard error (%)

20

10

6.7

0

5

10

15

0

0.016

Precision

Density (bw 0.15)

D_e distribution

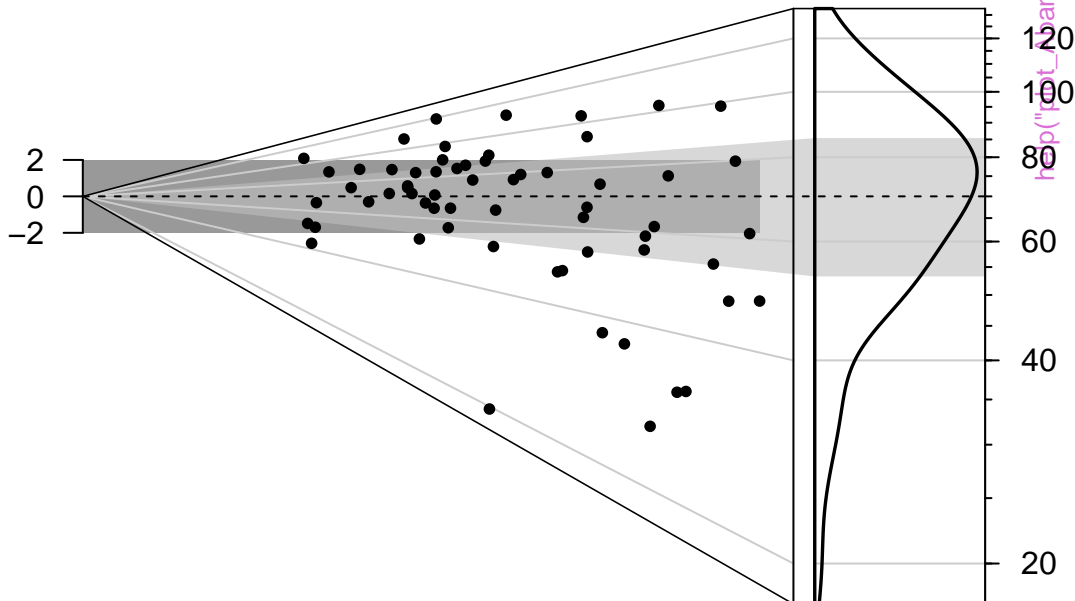
n = 62 | in 2 sigma = 41.9 %



D_e distribution

n = 62 | in 2 sigma = 53.2 %

Standardised estimate



help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 54.8 %

Standardised estimate



D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 54.8 %

Standardised estimate



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

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %

R Sample 1

Standardised estimate



D_e [Gy]

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 %

Standardised estimate

0

help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

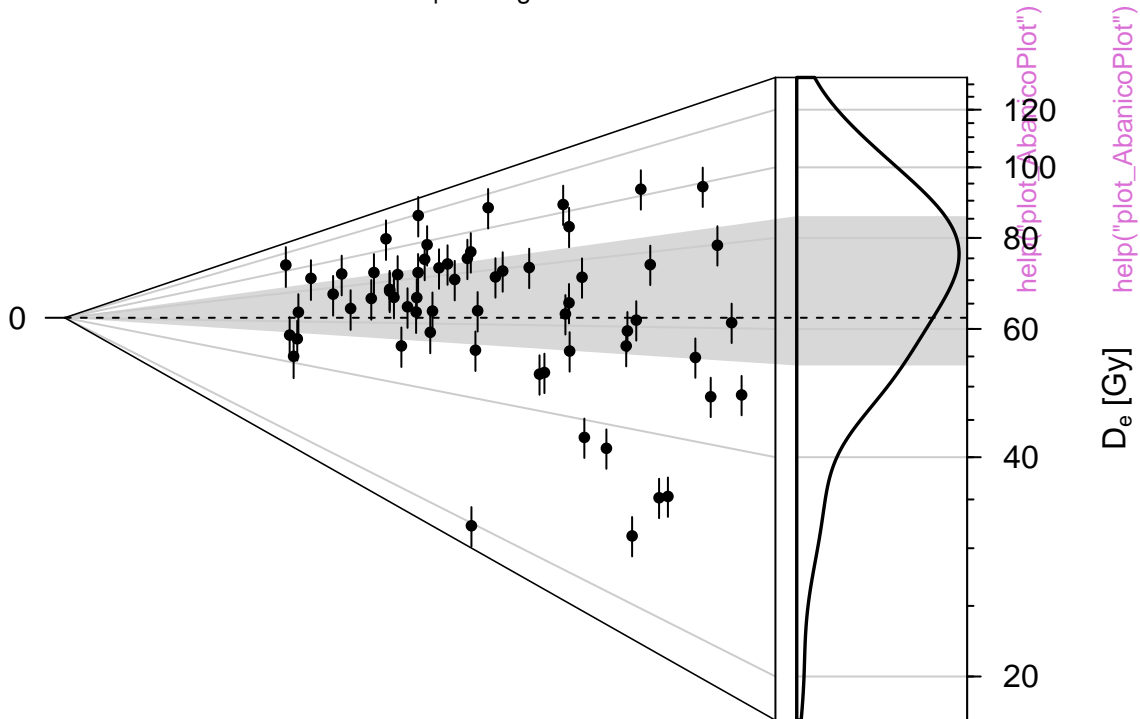
Precision

Density (bw 0.15)



D_e distribution

n = 62 | in 2 sigma = 41.9 %



D_e distribution

n = 62 | in 2 sigma = 41.9 %



D_e distribution

n = 62 | in 2 sigma = 41.9 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %



D_e distribution

median = 69.75

Standardised estimate



D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

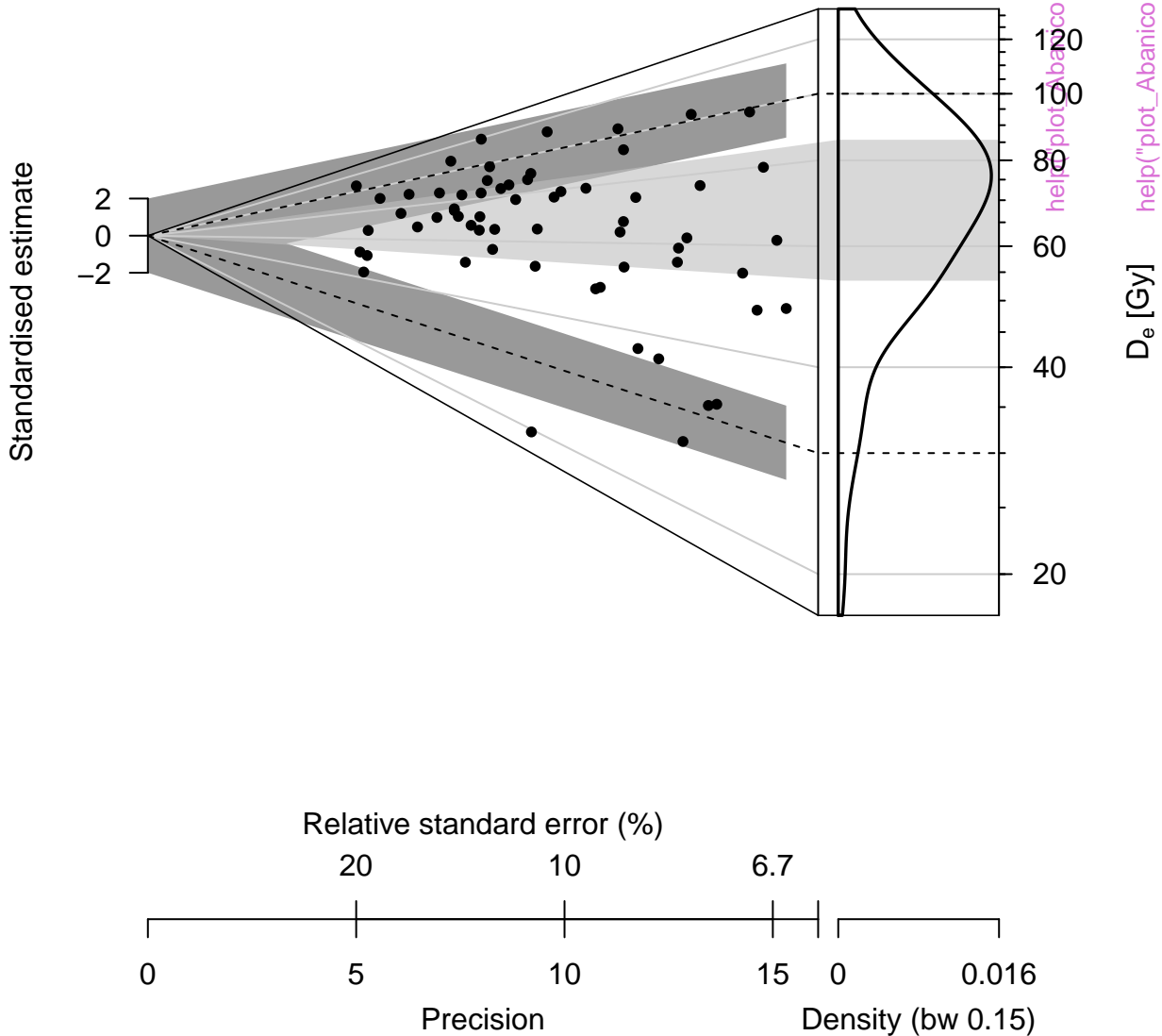
0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62 | in 2 sigma = 41.9 %



D_e distribution

n = 30 | in 2 sigma = 46.7 %

n = 32 | in 2 sigma = 87.5 %

Standardised estimate



help(plot_AbanicoPlot")

help("plot_AbanicoPlot")

D_e [Gy]

Relative standard error (%)

20

10

6.7

0

5

10

15

0.032

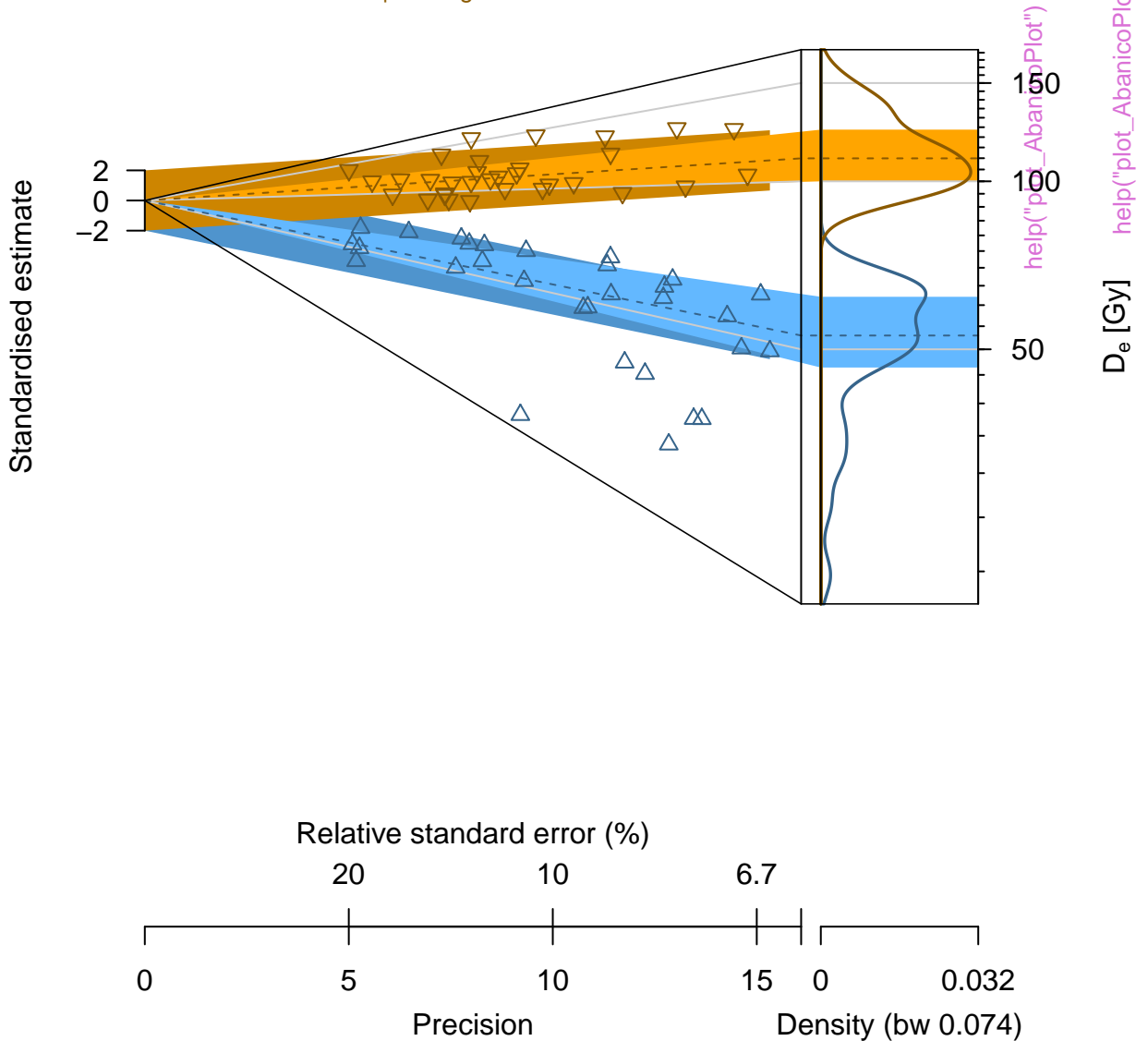
Precision

Density (bw 0.074)

D_e distribution

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

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





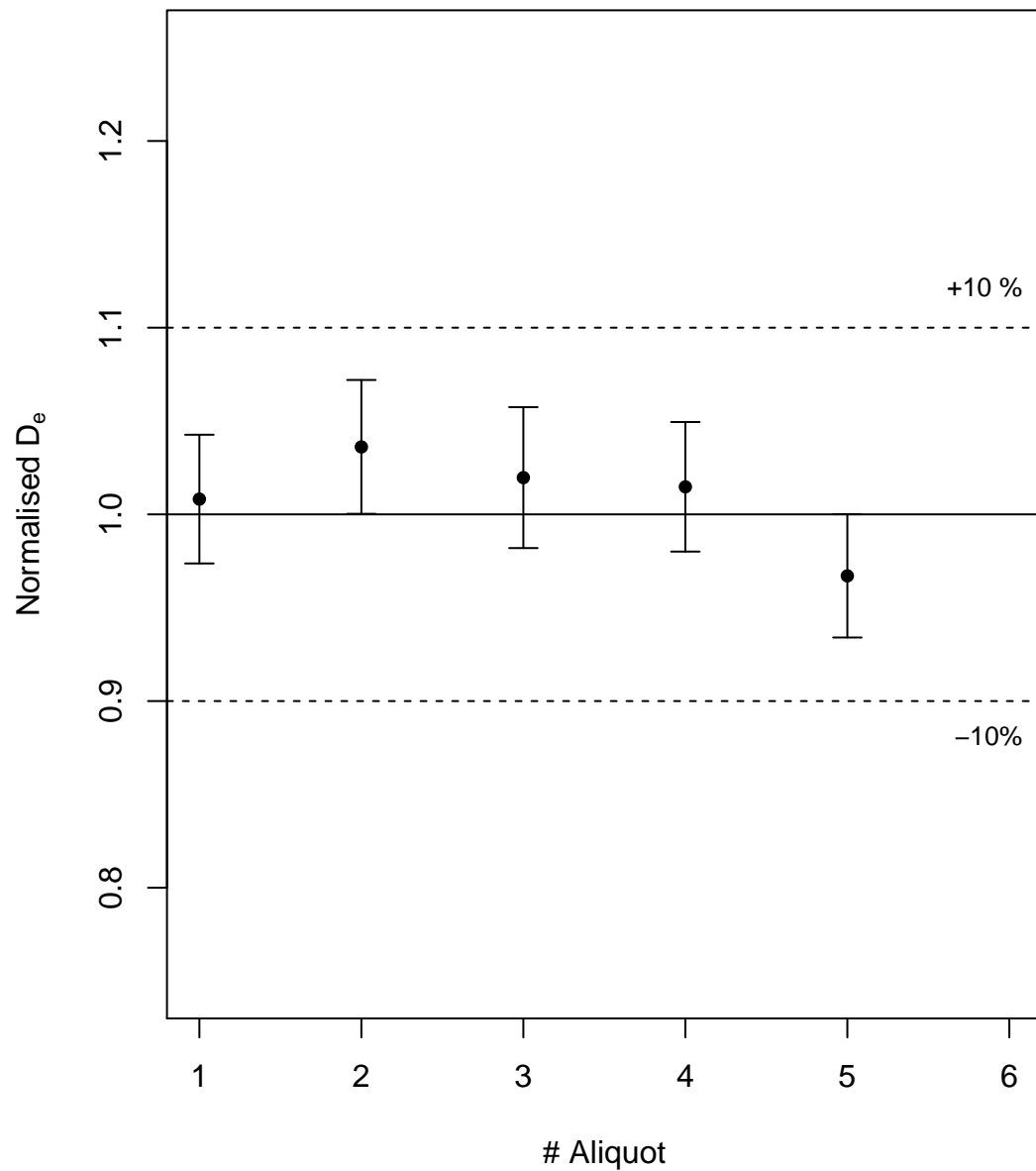
help("plot_AbanicoPlot")



help("plot_AbanicoPlot")

Dose recovery test

Example data



Dose recovery test



Dose recovery test



Dose recovery test



Dose recovery test



Dose recovery test

| n = 5 | weighted mean = 1.01 |

| n = 5 | weighted mean = 1 |



Dose recovery test



Dose recovery test

Example data



Dose recovery test



Dose recovery test



Filter Combination



`help("plot_FilterCombinations")`

Filter Combination



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

Growth curve

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



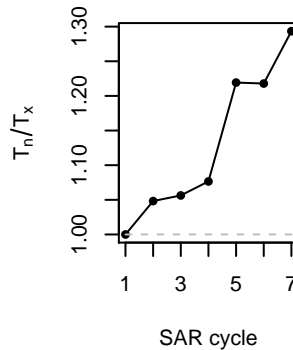
D_e from MC simulation

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



n = 100 , valid fits = 100

Test dose response



Growth curve

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



D_e from MC simulation

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



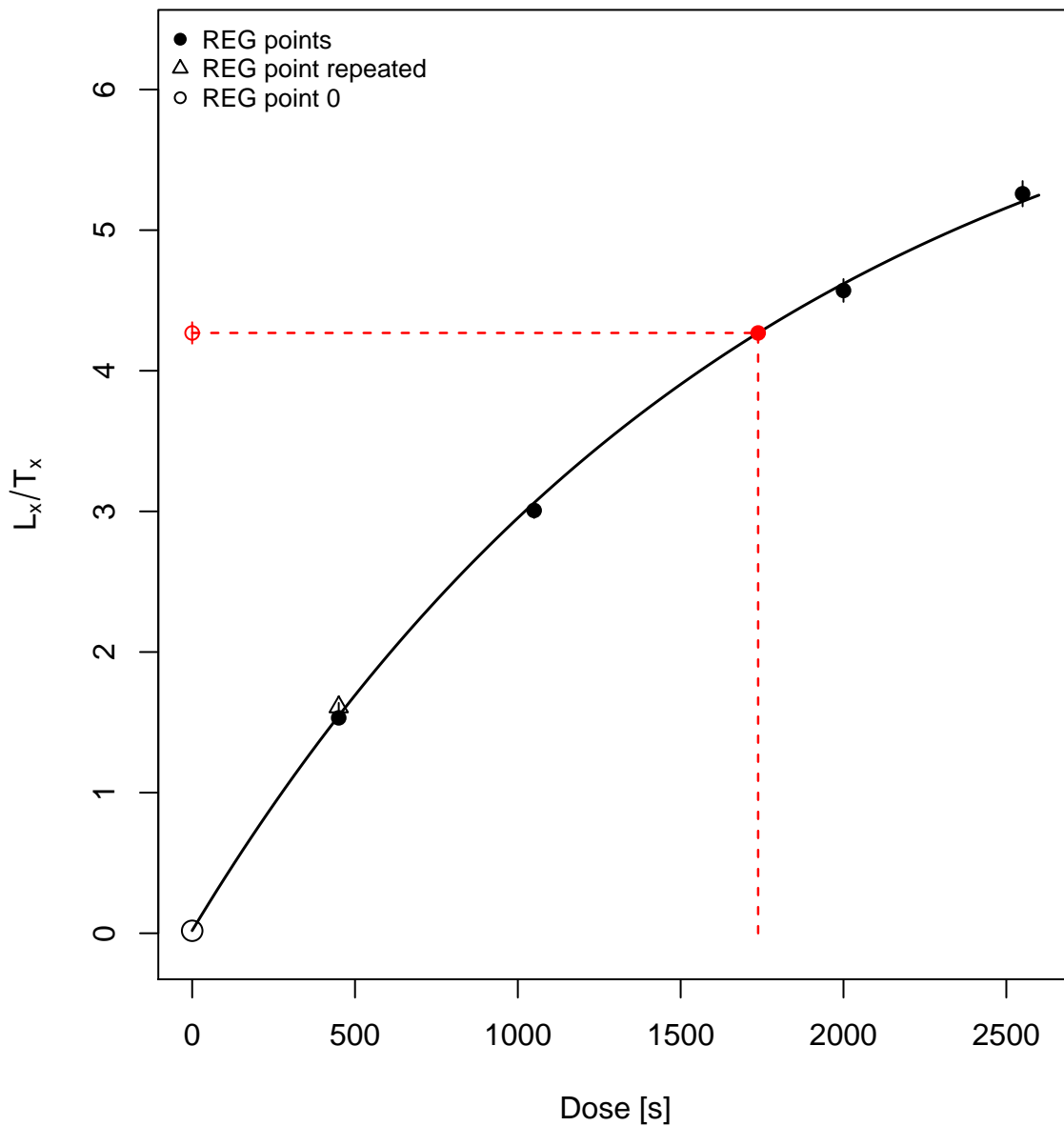
Dose [s]
n = 100 , valid fits = 100

Test dose response



Growth curve

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



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

D_e from MC simulation

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

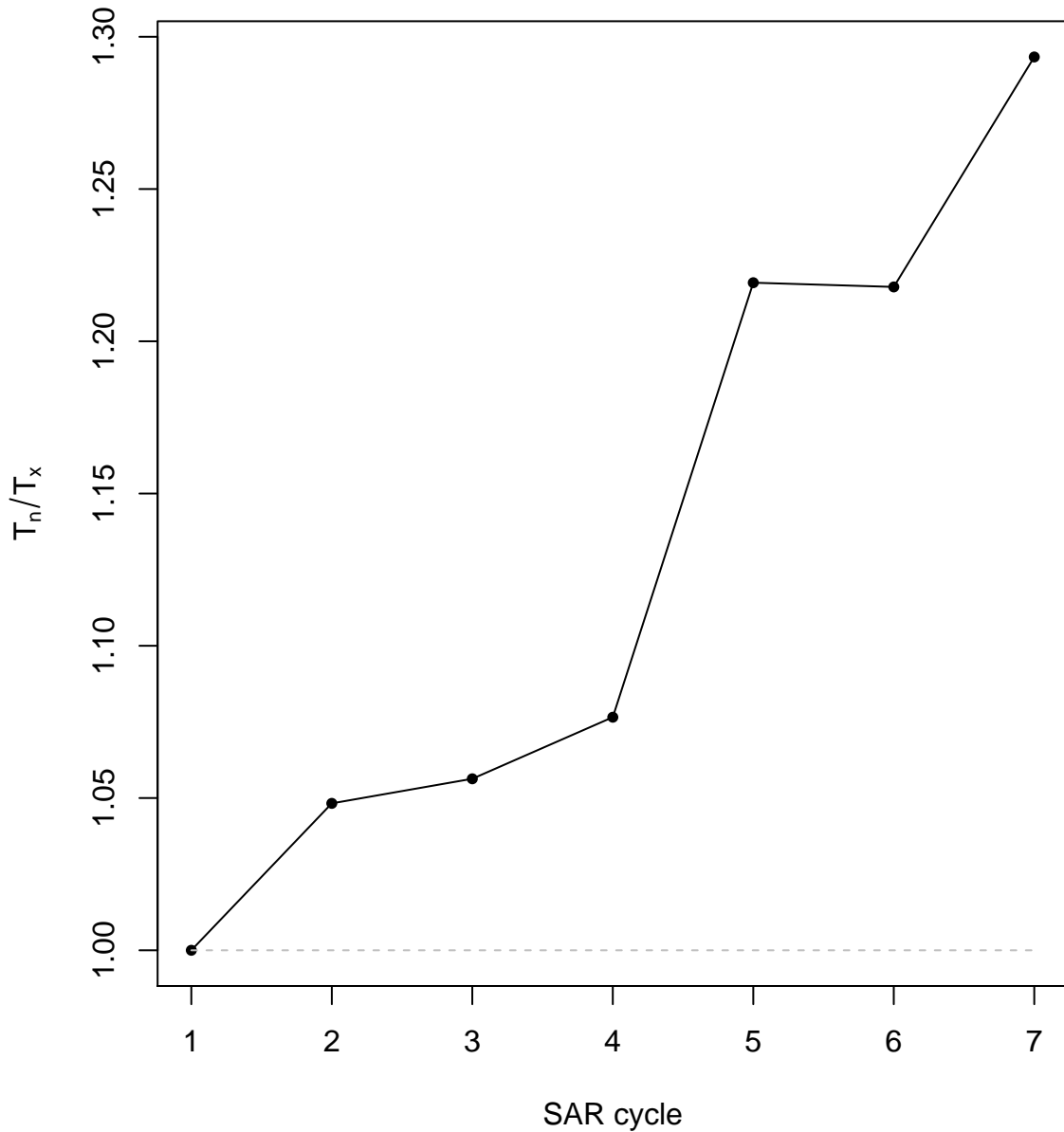


Dose [s]

n = 100 , valid fits = 100

help("plot_GrowthCurve")

Test dose response



help("plot_GrowthCurve")



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

Histogram



Histogram of De-values

Example data set



D_e distribution



D_e distribution



Dose distribution



D_e distribution



D_e distribution

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



D_e distribution



D_e distribution



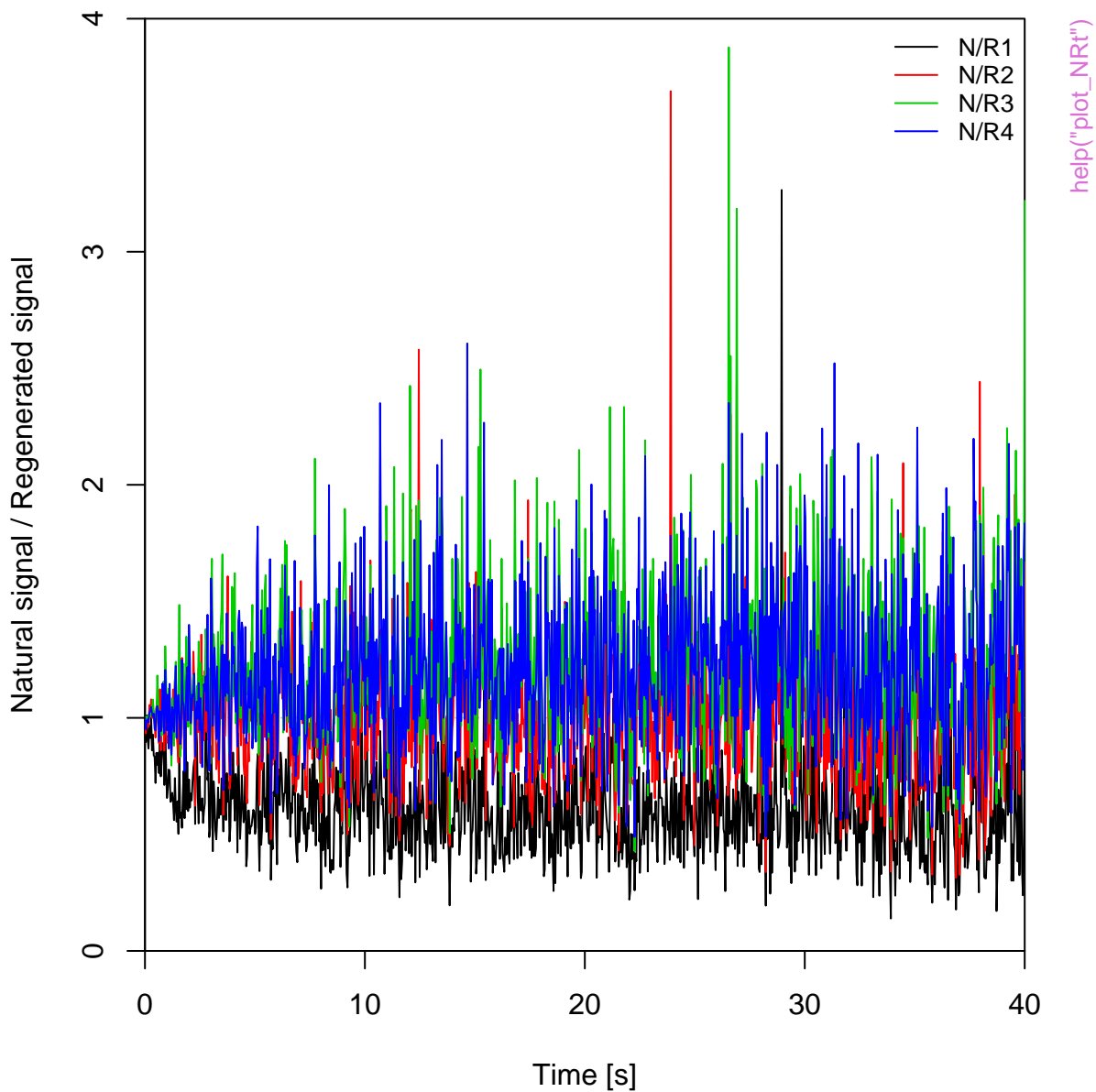
D_e distribution



D_e distribution



NR(t) Plot



NR(t) Plot



help("plot_NRt")

NR(t) Plot



NR(t) Plot

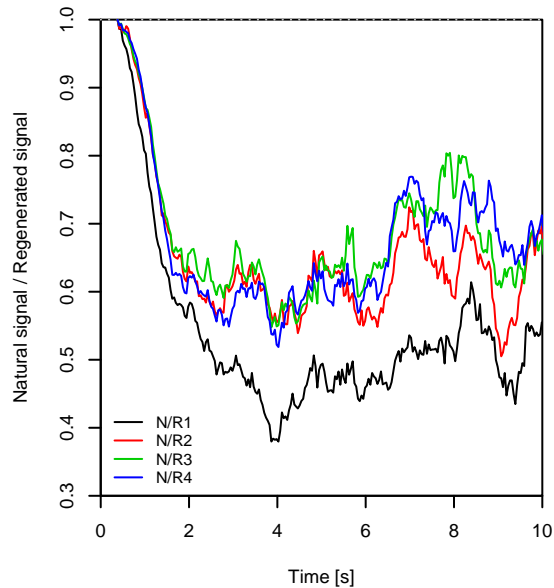


NR(t) Plot



TnTx(t) Plot

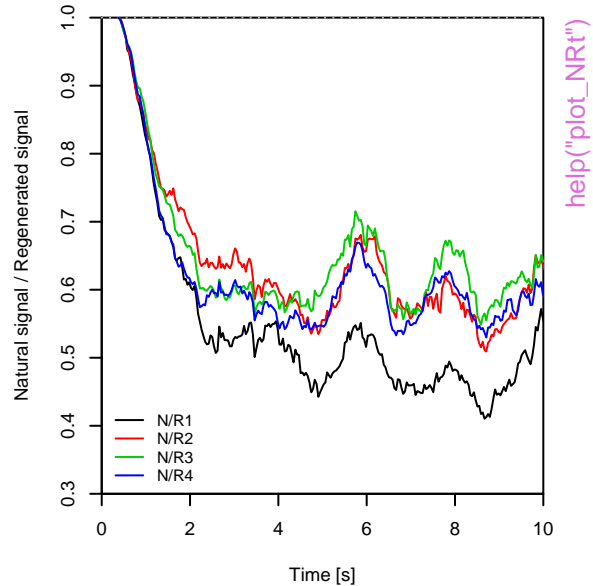


Aliquot #1**Aliquot #2**

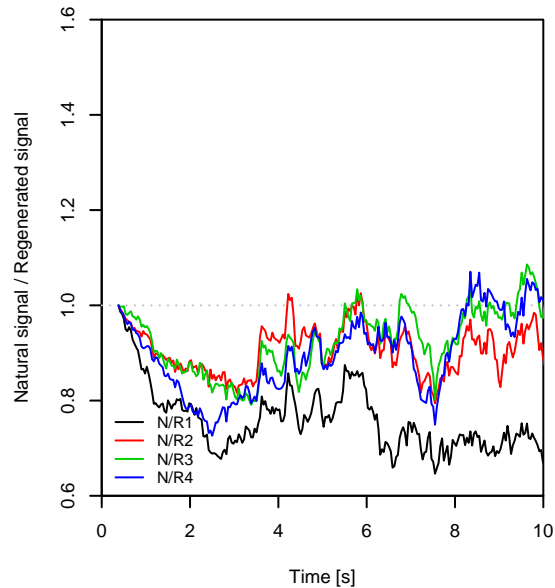
help("plot_NRt")

Aliquot #3**Aliquot #4**

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

Aliquot #9**Aliquot #10**

help("plot_NRt")

Aliquot #11**Aliquot #12**

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

Aliquot #17**Aliquot #18**

help("plot_NRt")

Aliquot #19**Aliquot #20**

Aliquot #21**Aliquot #22**

help("plot_NRt")

Aliquot #23**Aliquot #24**

TL combined



unkown curve type



RLum.Data.Image



RLum.Data.Spectrum



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

RLum.Data.Spectrum



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

RLum.Data.Spectrum



unkown curve type



Likelihood profile: gamma



Likelihood profile: sigma



Likelihood profile: p0



help("plot_RLum.Results")

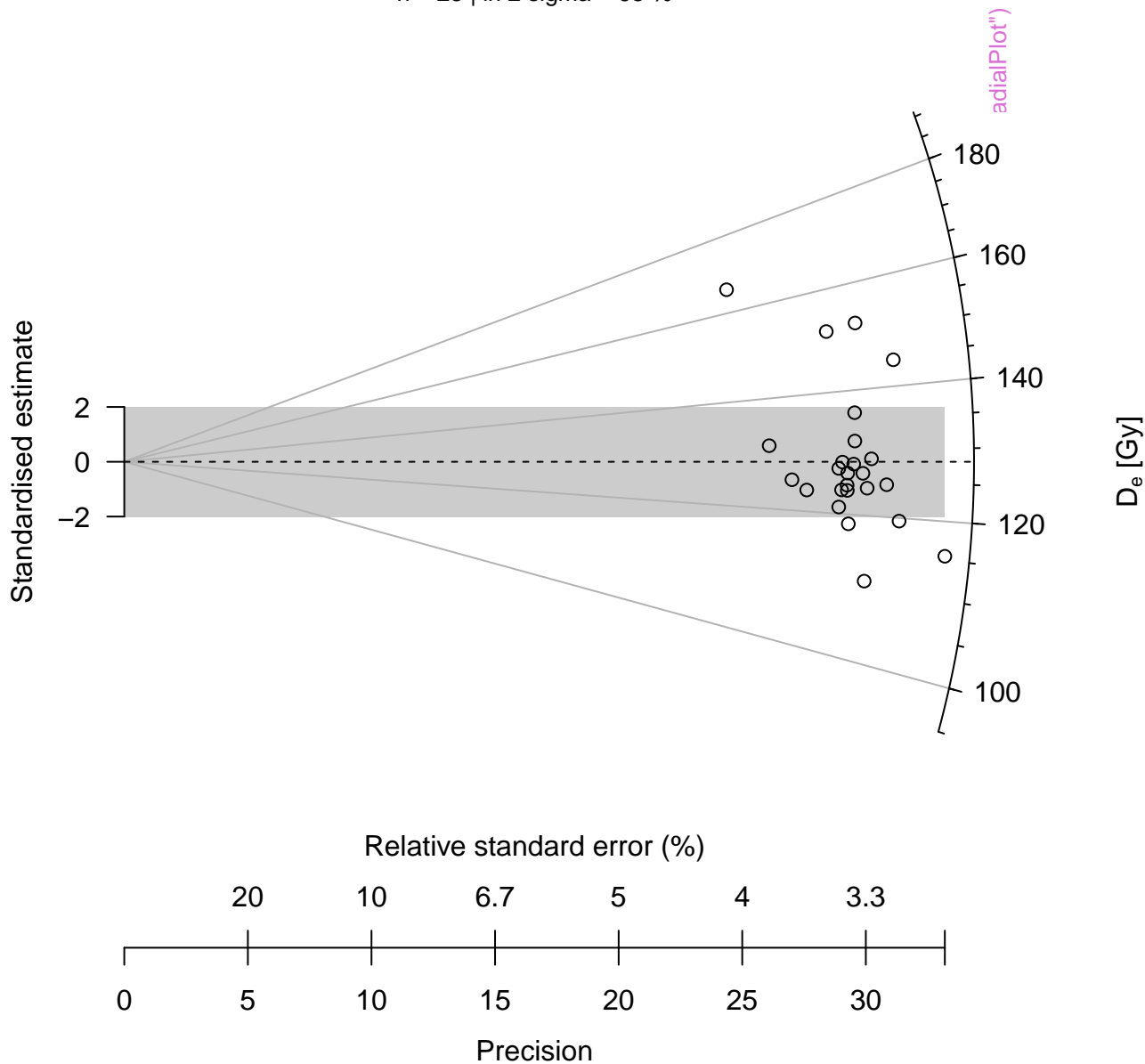
Monte Carlo Simulation

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



D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %



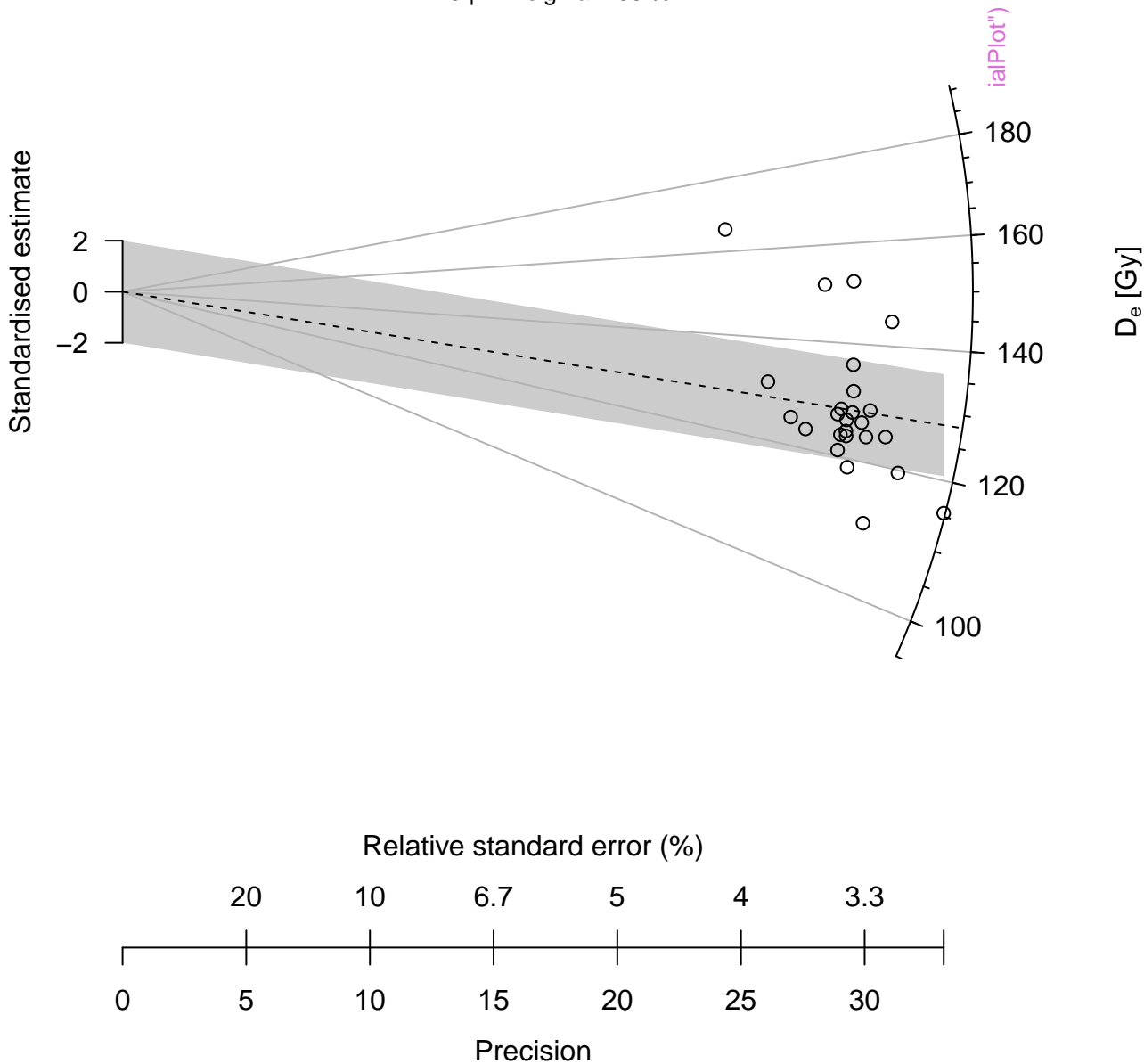
D_e distribution

n = 25 | in 2 sigma = 68 %



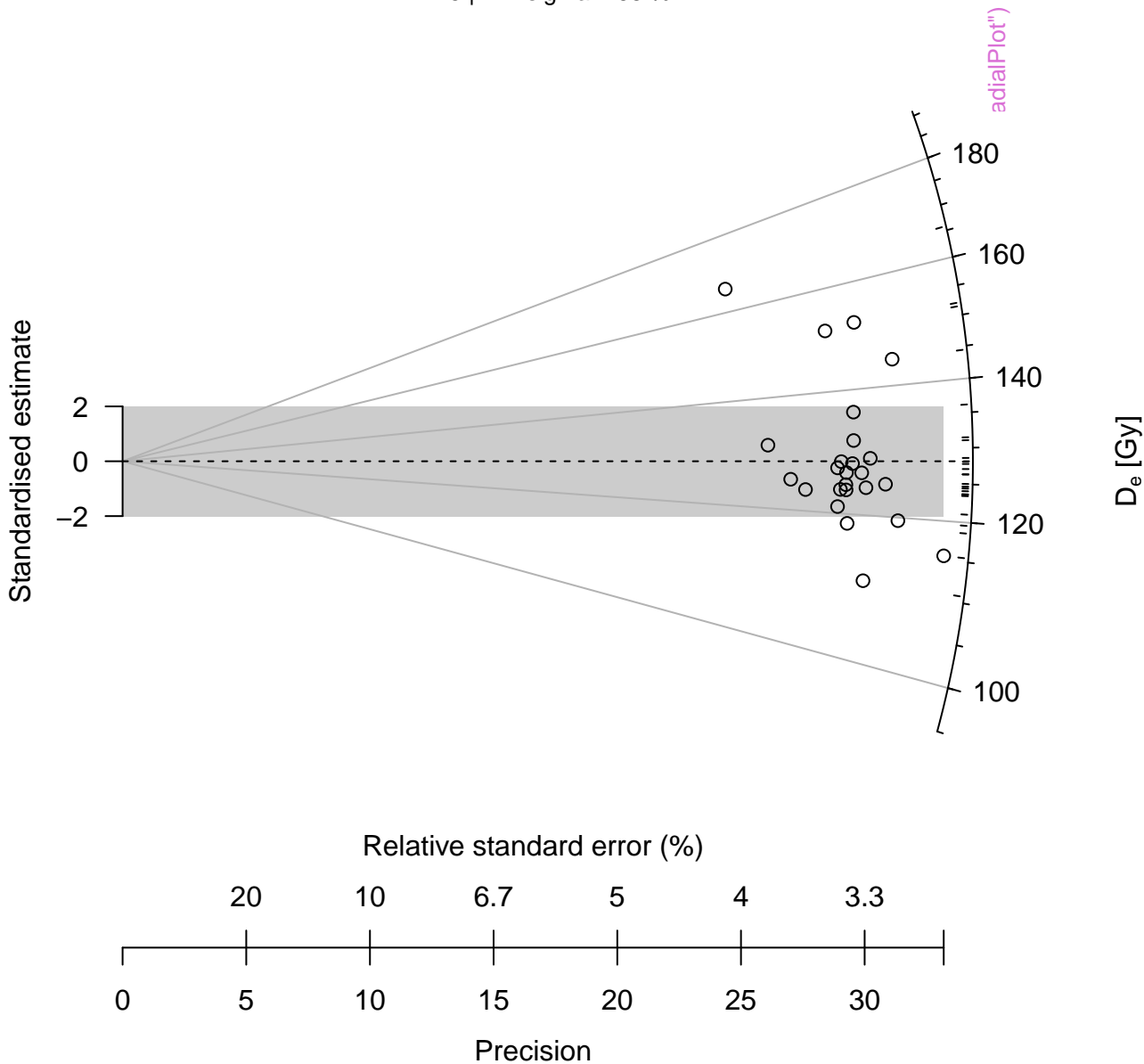
D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %

radialPlot()



D_e distribution

n = 25 | in 2 sigma = 68 %

Standardised estimate

0

0

20

5

10

10

6.7

15

5

20

4

25

3.3

30

Precision

Relative standard error (%)

adialPlot")

180

160

140

120

100

D_e [Gy]



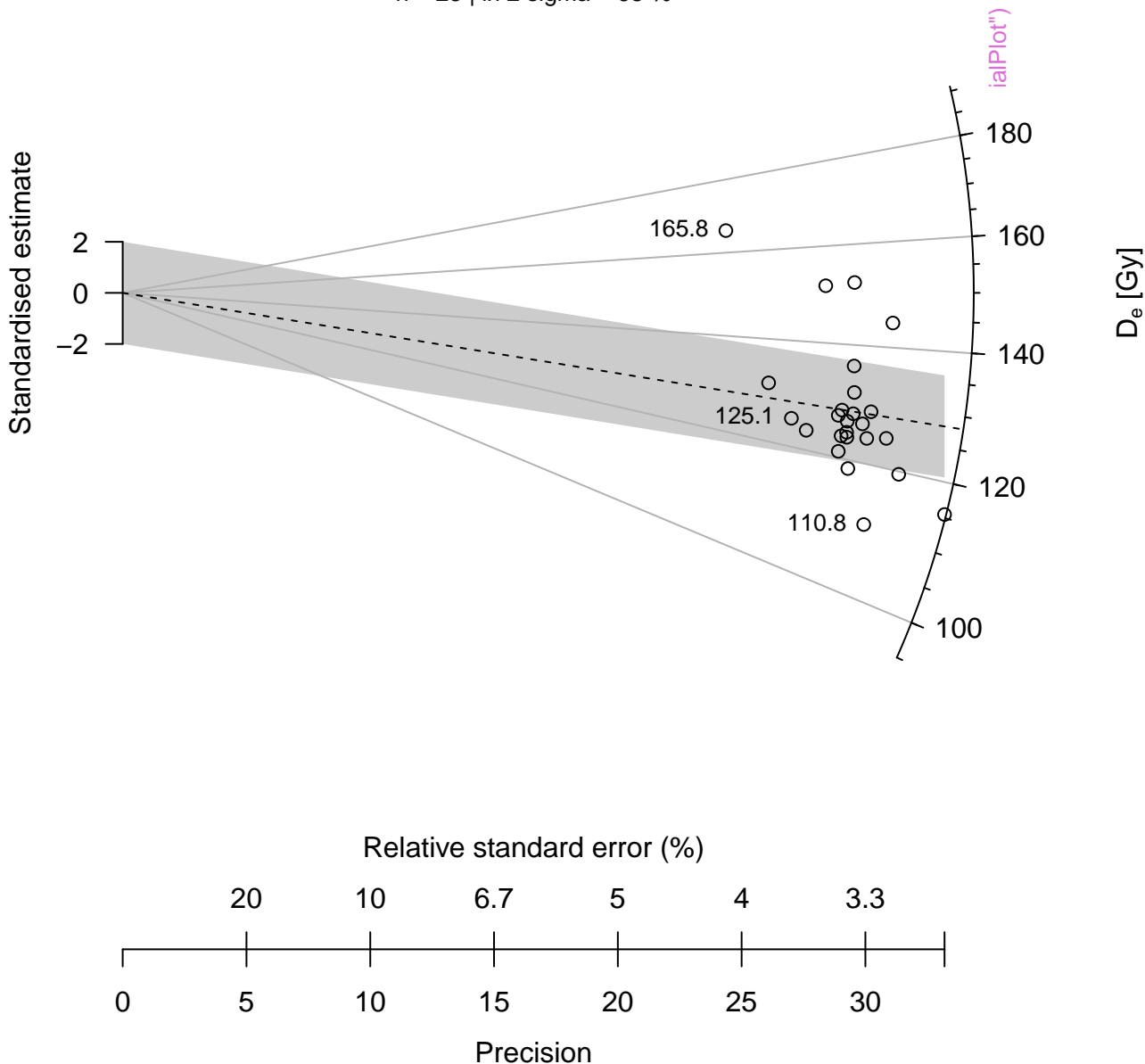
D_e distribution

n = 25 | in 2 sigma = 68 %

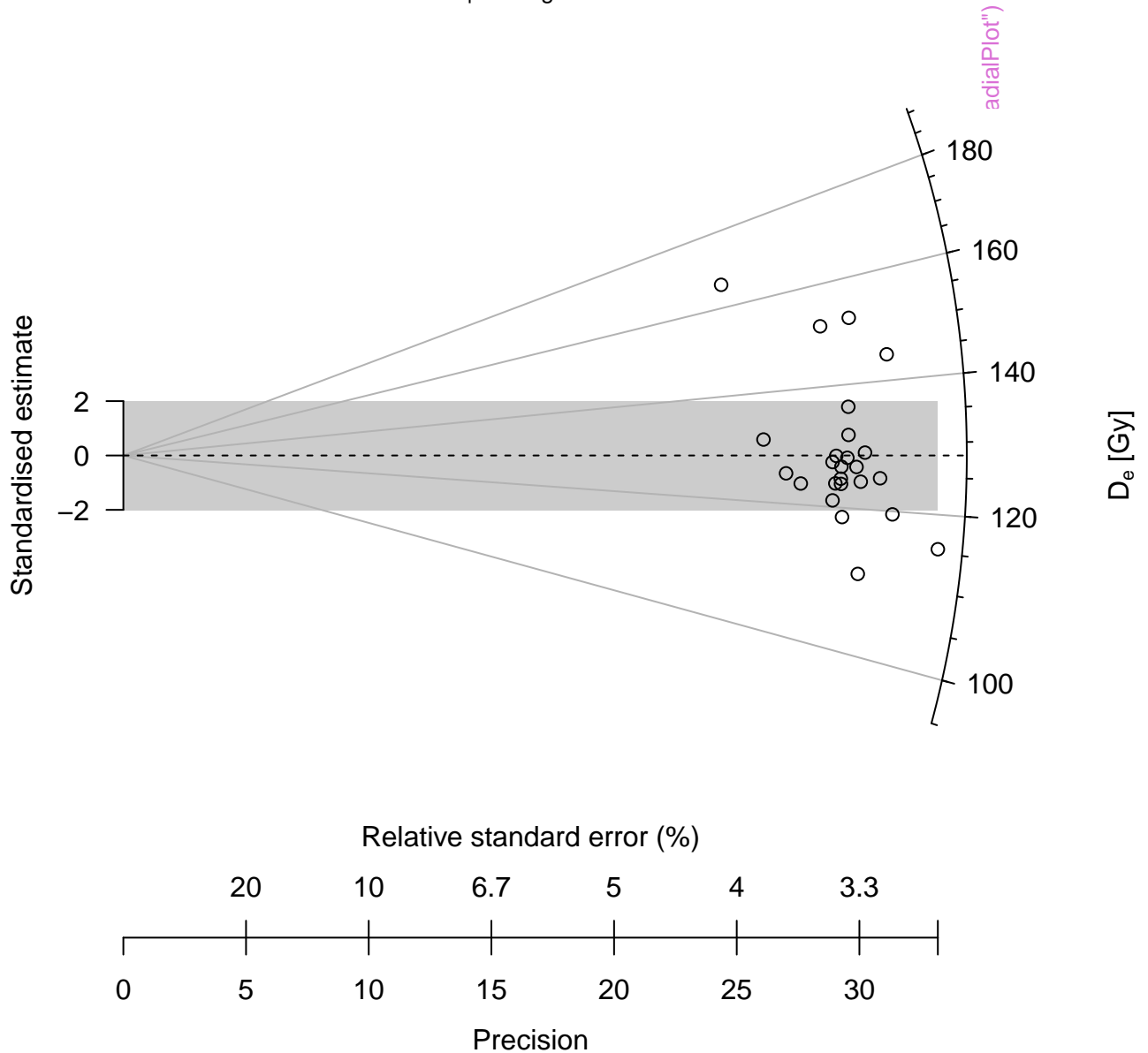


D_e distribution

n = 25 | in 2 sigma = 68 %



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 %



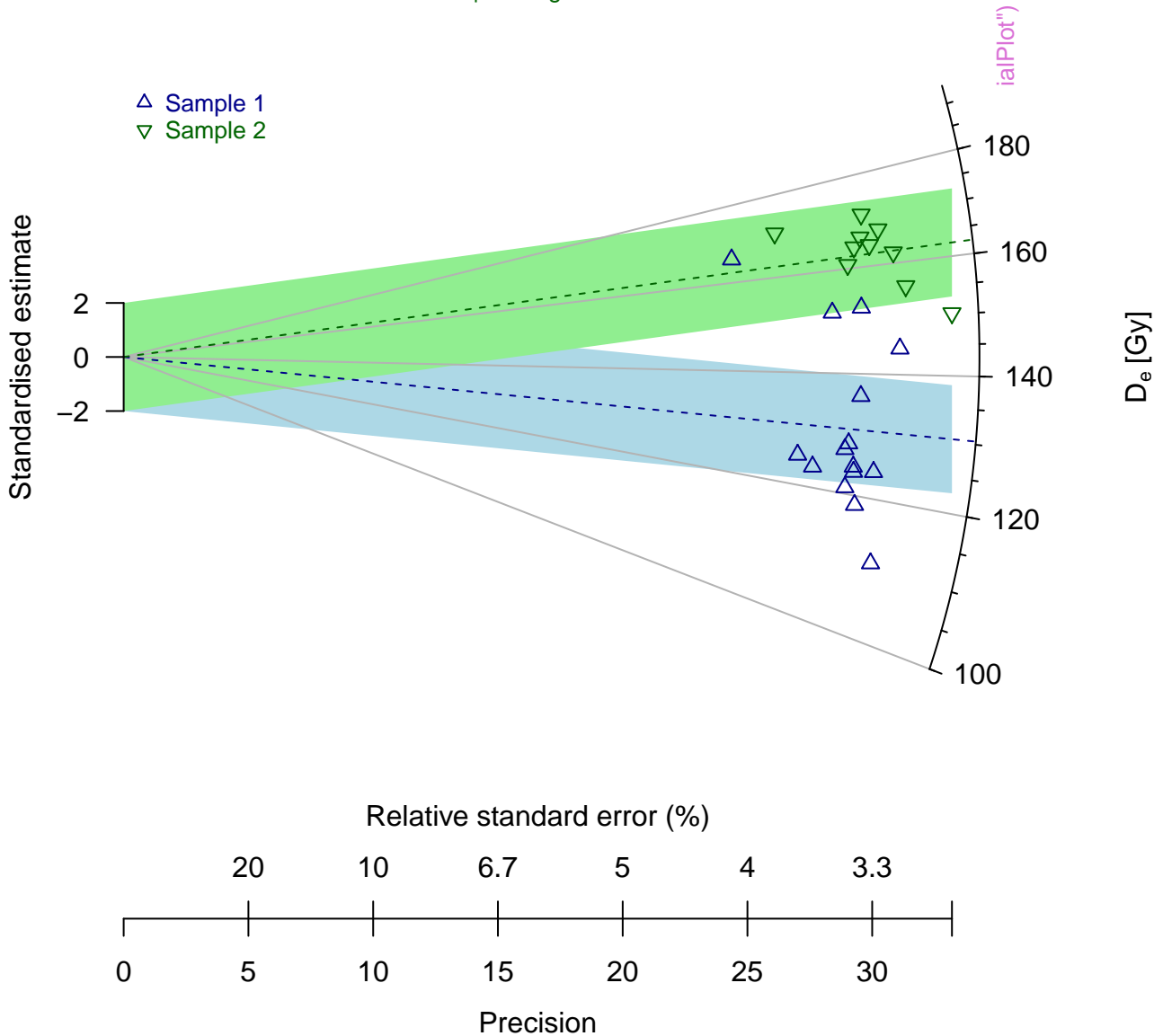
D_e distribution

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

