

L_n, L_x curves

ALQ Pos. 1

T_n, T_x curves



help("Analyse_SAR OSLdata")

unknown measurement

Cutheat – TL curves



IRSLT

IRSL/BOSL = 0.88%



IRSL curve (10 s)







Fig. 4 – Bos & Wallinga (2012)





`help("CW2pLM")`



Fig. 4 – Bos & Wallinga (2012)





Fig. 4 – Bos & Wallinga (2012)





Histogram



Histogram





`help("ExampleData.FittingLM")`



`help("ExampleData.LxTxData")`



help("ExampleData.LxTxOSLData")



`help("ExampleData.LxTxOSLData")`

RF

#1



RF

#2



help("ExampleData.RLum.Analysis")

RLum.Data.Image



OSL (UVVIS)



help("ExampleData.XSYG")

RLum.Data.Spectrum



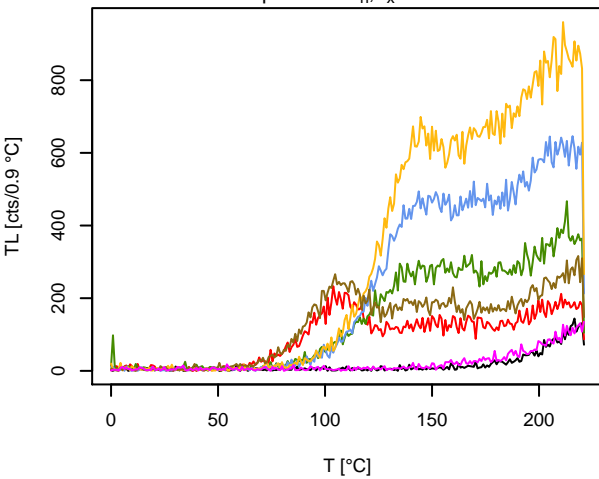
[help\("ExampleData.XSYG"\)](#)

IR-RF

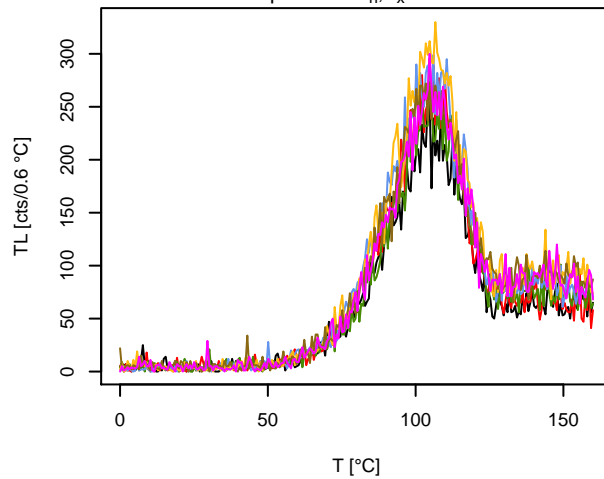
$D_e = 623.25$ [600.63 ; 635.8]



TL previous L_n, L_x curves



TL previous T_n, T_x curves



Growth curve

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

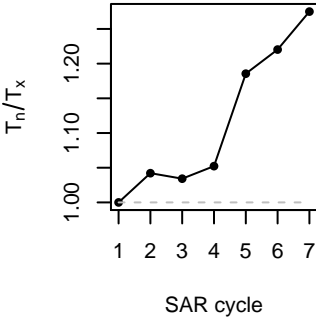


D_e from MC simulation

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



Test dose response



Rejection criteria

Recycling ratio



Recuperation rate



Palaeodose error



- 0.2 + 0.2

IRSL



`help("analyse_SAR.CWOSL")`

L_n, L_x curves



T_n, T_x 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

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



D_e from MC simulation

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



Test dose response



Pseudo pIRIR data set based on quartz OSL

TL
pseudolRSL1
pseudolRSL2

help("analyse_pIRIRSequence")

Pseudo pIRIR data set based on quartz OSL



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

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



D_e from MC simulation

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



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

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



help("analyse_pIRIRSequence")

D_e from MC simulation

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



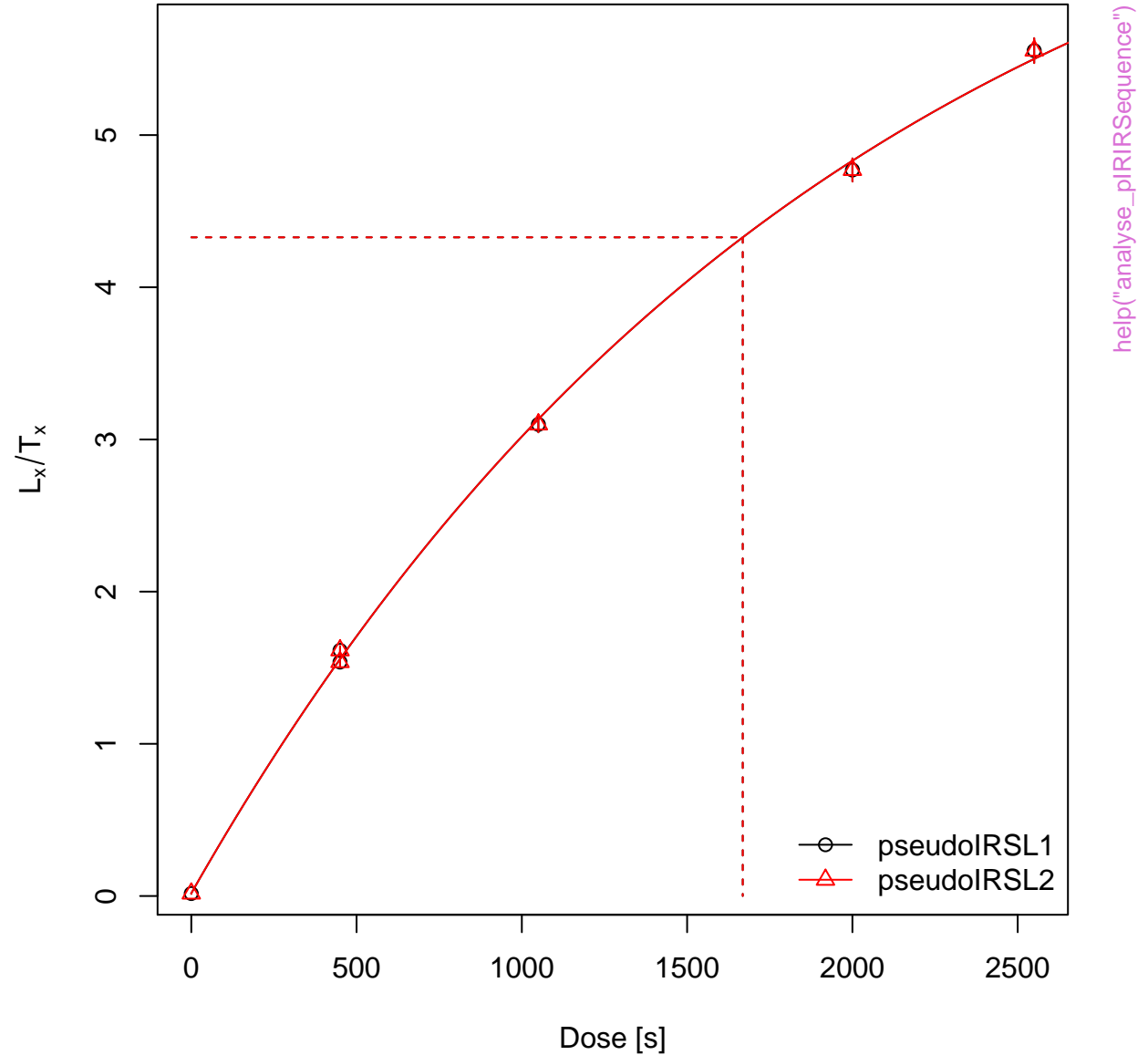
n = 100 , valid fits = 100

help("analyse_pIRSequence")

Test dose response



Summarised growth curves



Sensitivity change



Rejection criteria

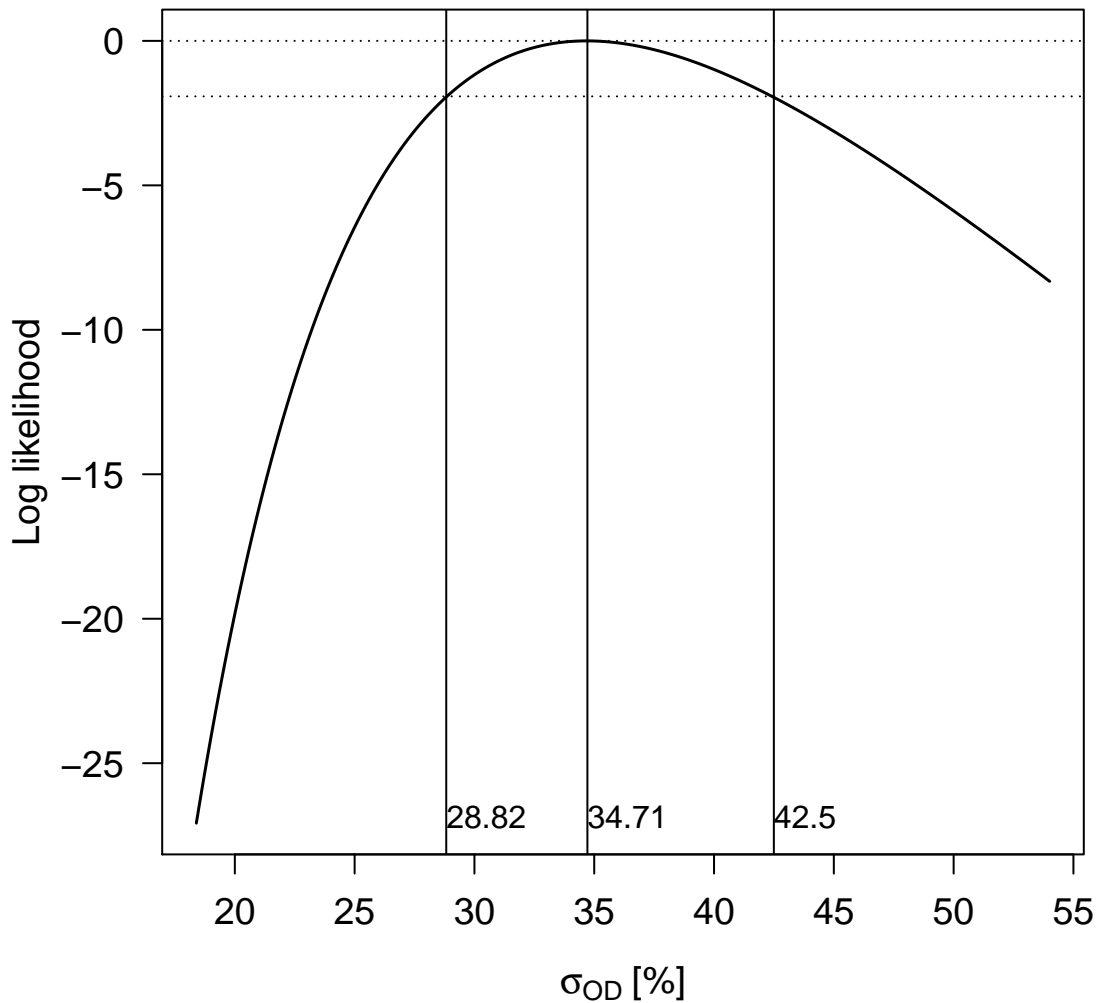


Monte Carlo Simulation

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



Profile log likelihood for σ_{OD}



Finite Mixture Model

$\sigma_b = 0.2 \mid n = 62$

Normal distributions



Proportion of components



Statistical criteria



help("calc_FiniteMixture")

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

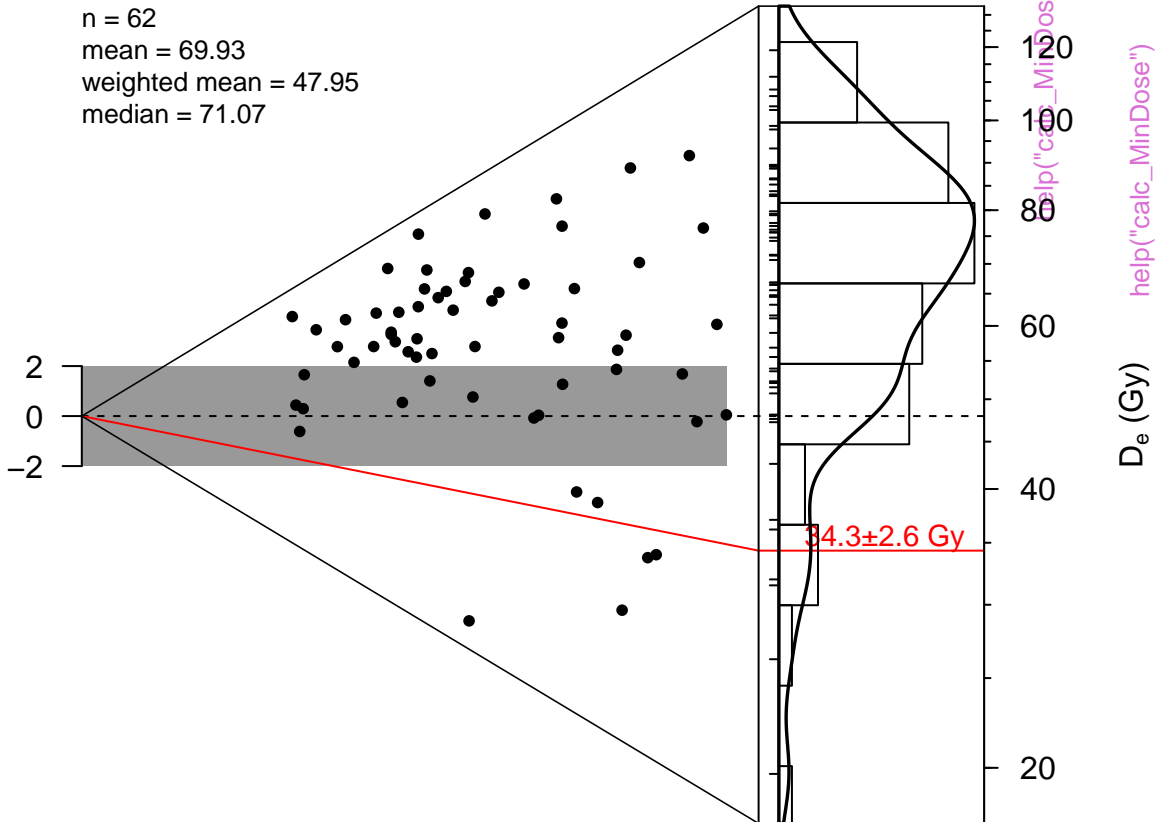
n = 62

mean = 69.93

weighted mean = 47.95

median = 71.07

Standardised estimate



Relative standard error (%)

n

20

10

6.7

0

15

0

5

10

15

0.106

Precision

Density (bw 0.1)

Source Dose Rate Prediction

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



help("calc_SourceDoseRate")

D_e distribution



gSGC and resulting De



CW Curve Fit

Default



Component contribution to sum curve



Default



Component contribution to sum curve



Background



Default



Component contribution to sum curve



Default



Component contribution to sum curve



D_e distribution

n = 25

n = 62

Standardised estimate



D_e (Gy)

help("get_Layout")

help("get_Layout")

Relative standard error (%)

10

5

3.3

0

10

20

30

0 0.015

Precision

Density (bw 0.085)

D_e distribution

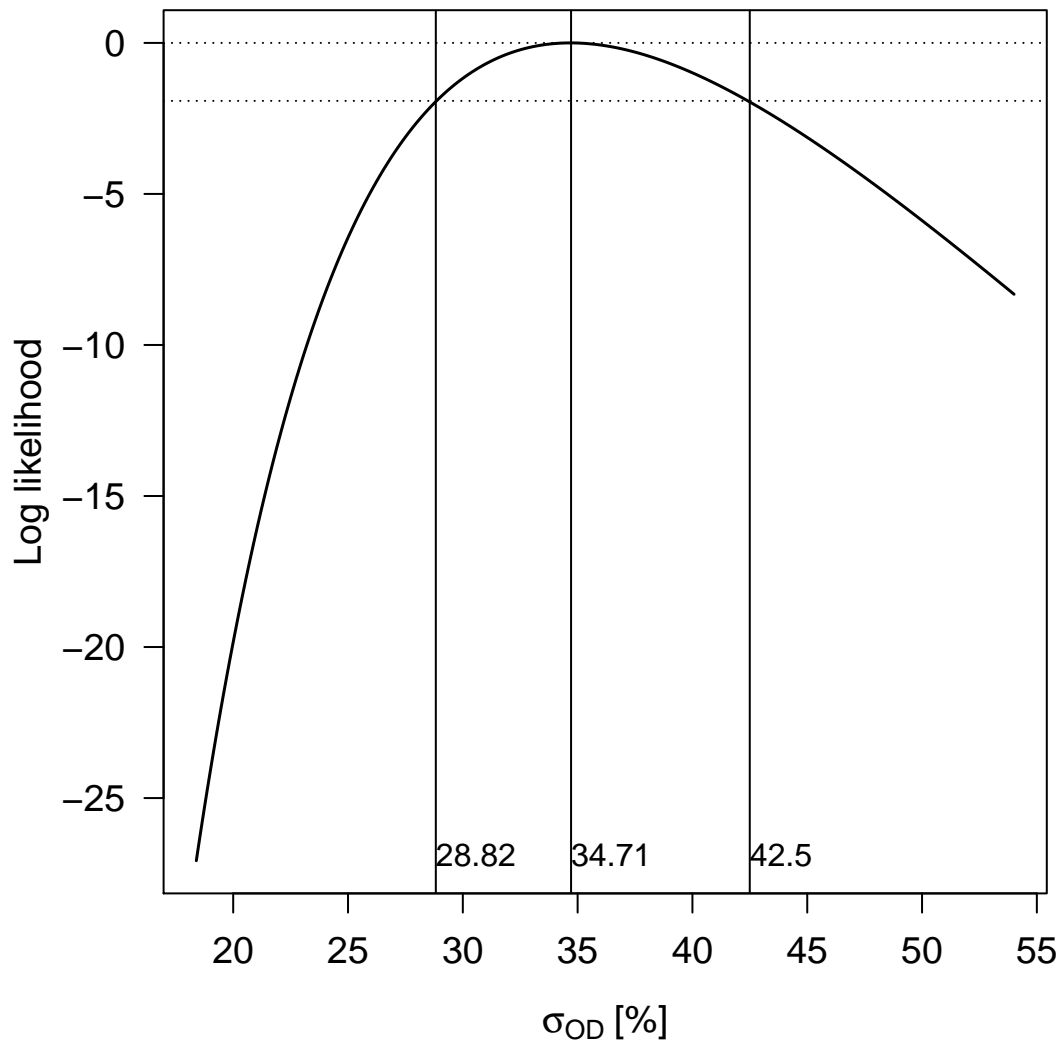
n = 25

n = 62



help("get_Layout")

Profile log likelihood for σ_{OD}



TL (UVVIS)



help("merge_RLum.Data.Curve")

TL (UVVIS)



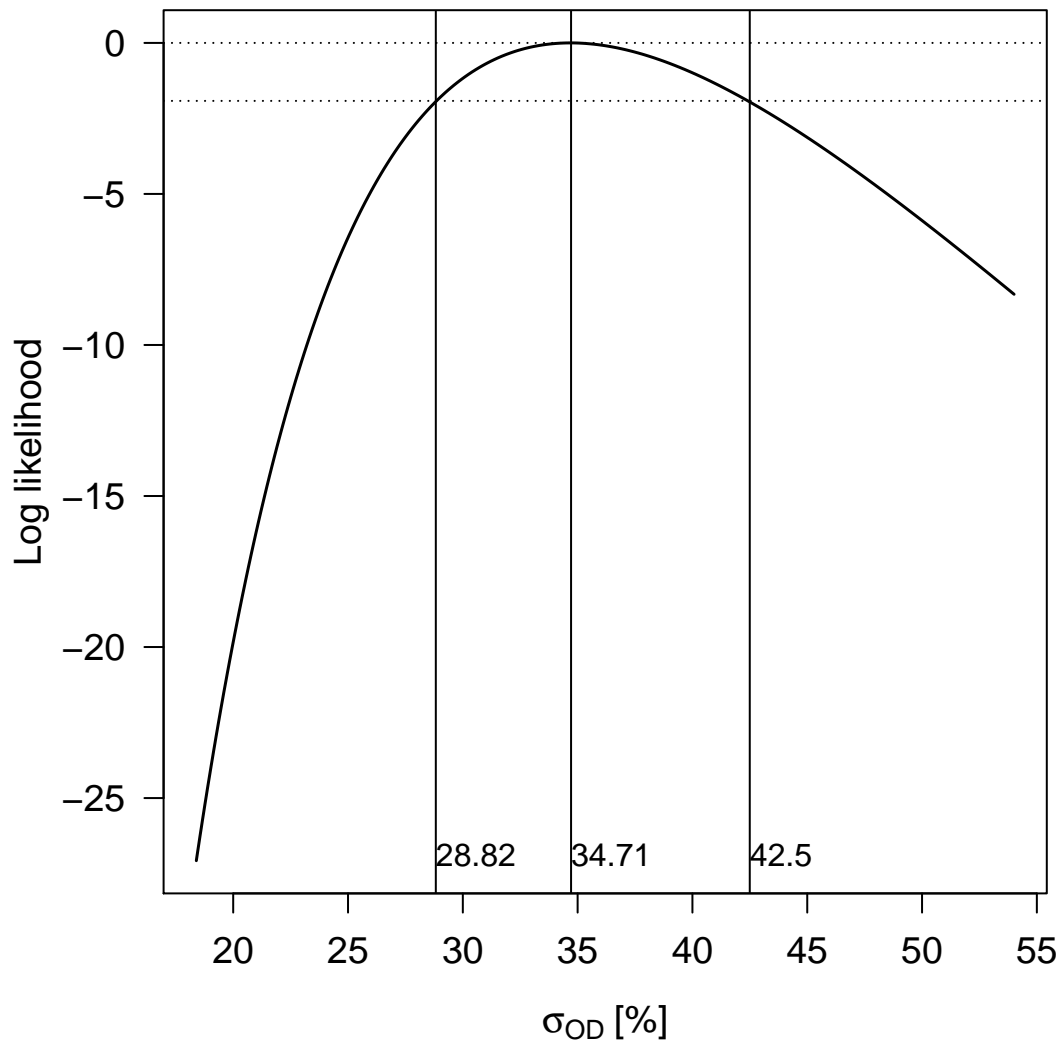
help("merge_RLum.Data.Curve")

TL (UVVIS)

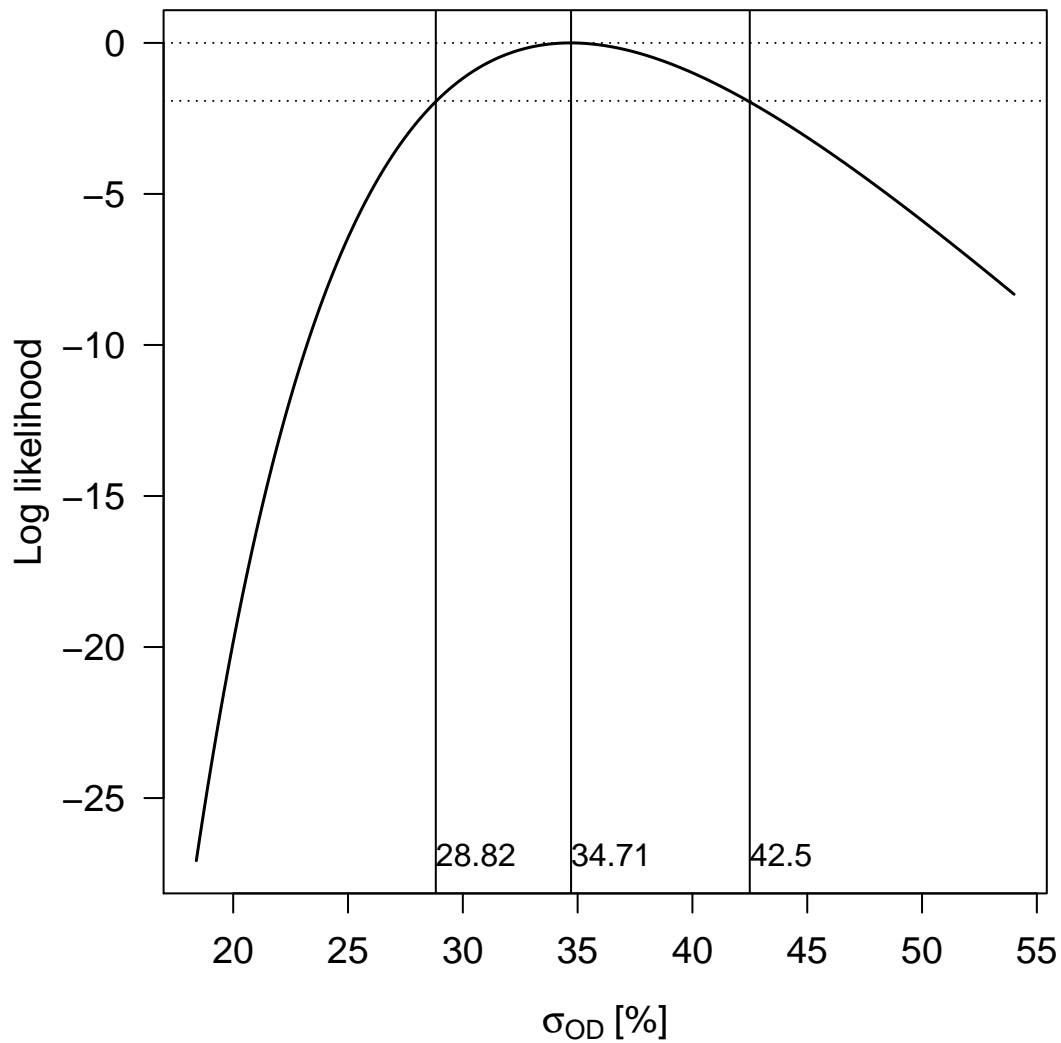


help("merge_RLum.Data.Curve")

Profile log likelihood for σ_{OD}



Profile log likelihood for σ_{OD}



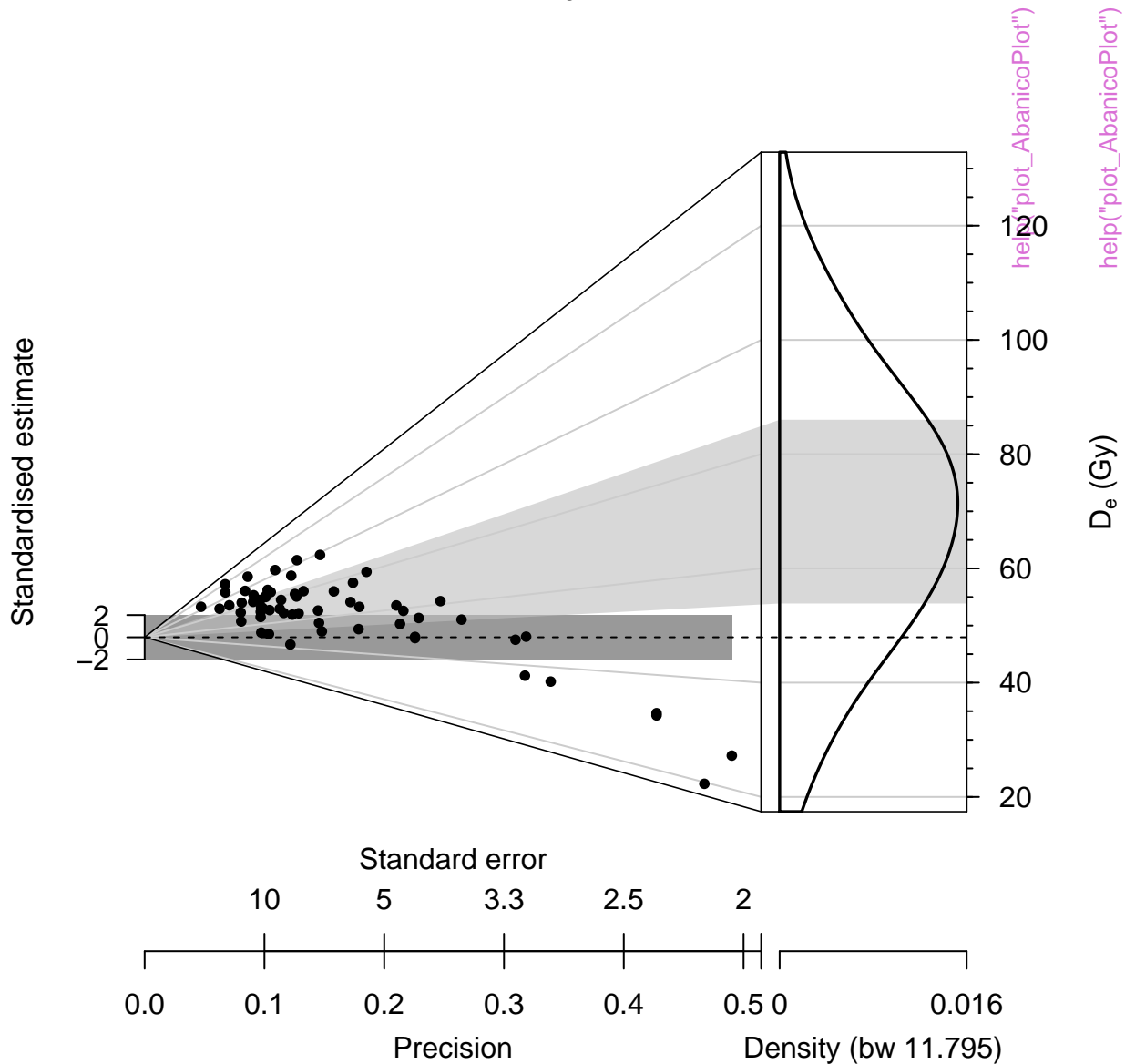
D_e distribution

n = 62



D_e distribution

n = 62



D_e distribution

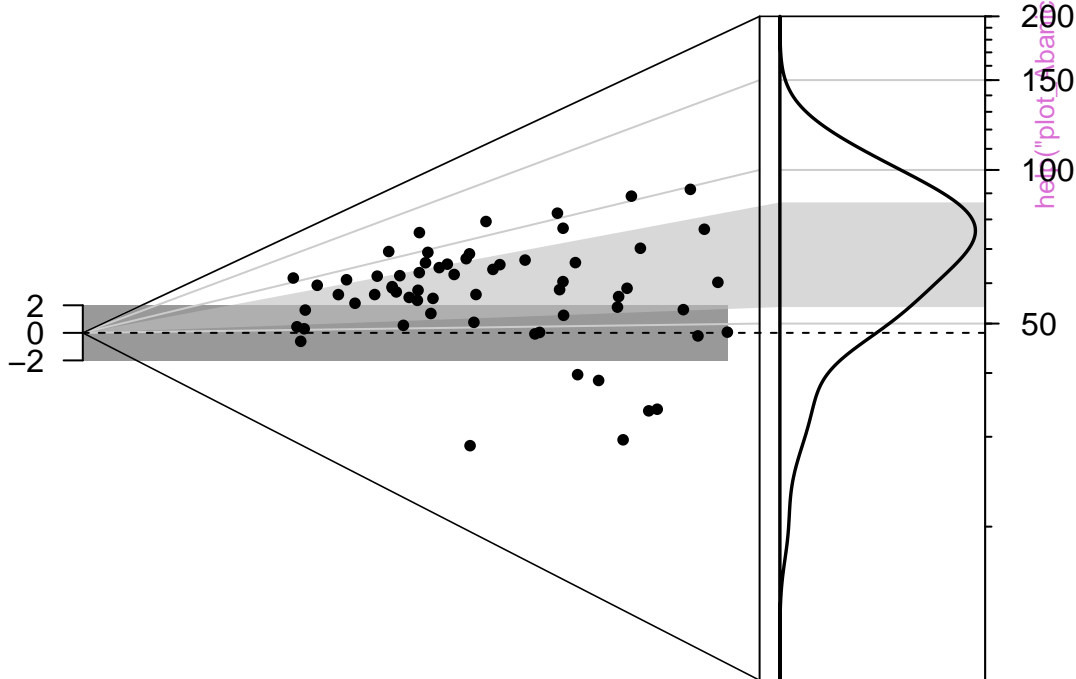
n = 62



D_e distribution

n = 62

Standardised estimate



help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

D_e (Gy)

Relative standard error (%)

20

10

6.7

0

5

10

15

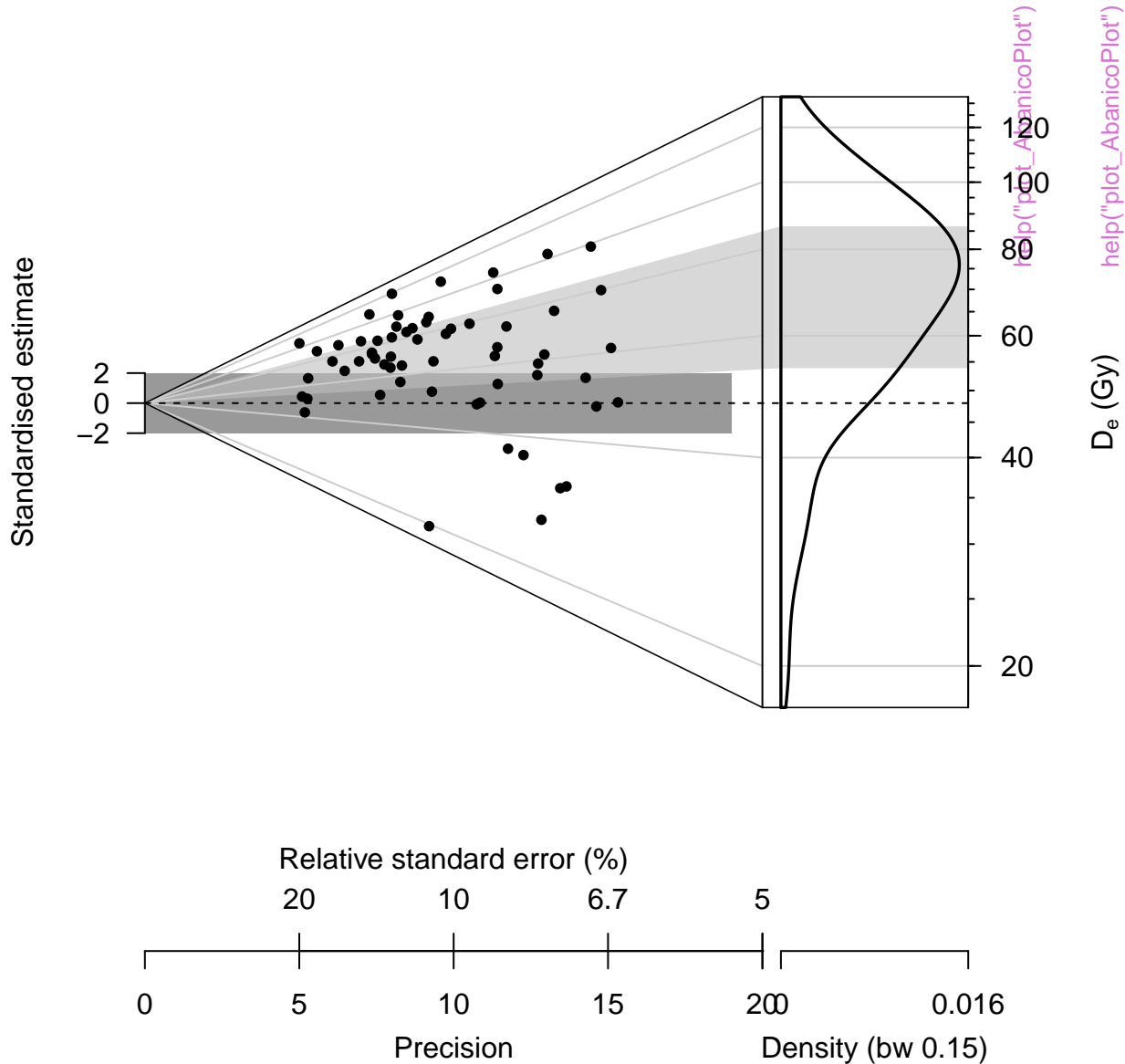
0.016

Precision

Density (bw 0.15)

D_e distribution

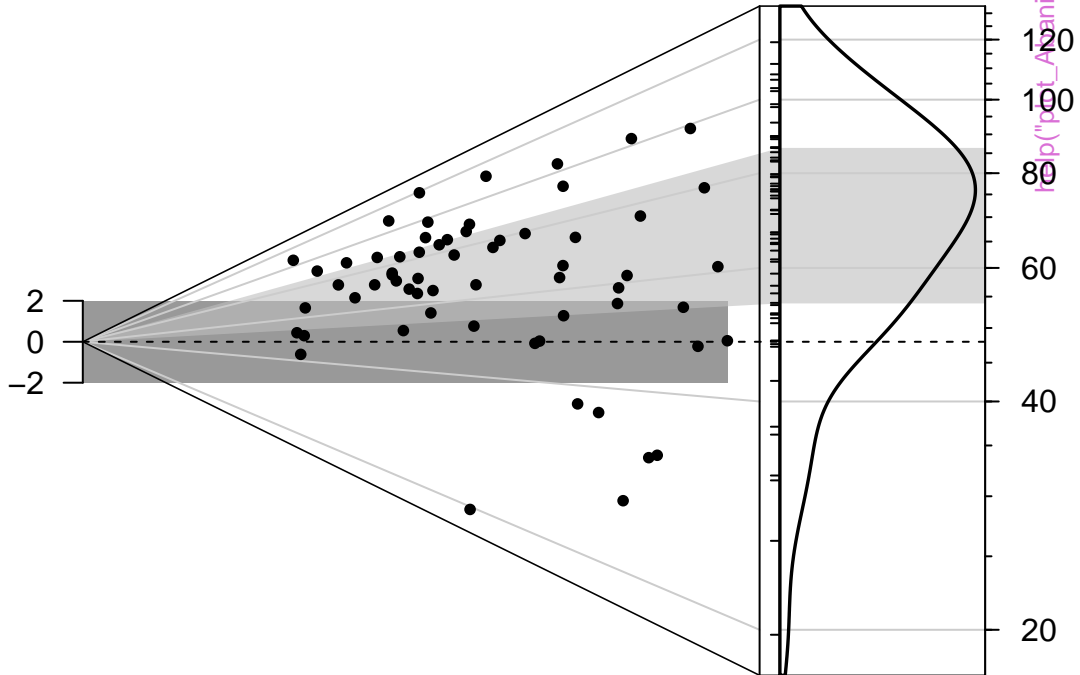
n = 62



D_e distribution

n = 62

Standardised estimate



D_e (Gy)

help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

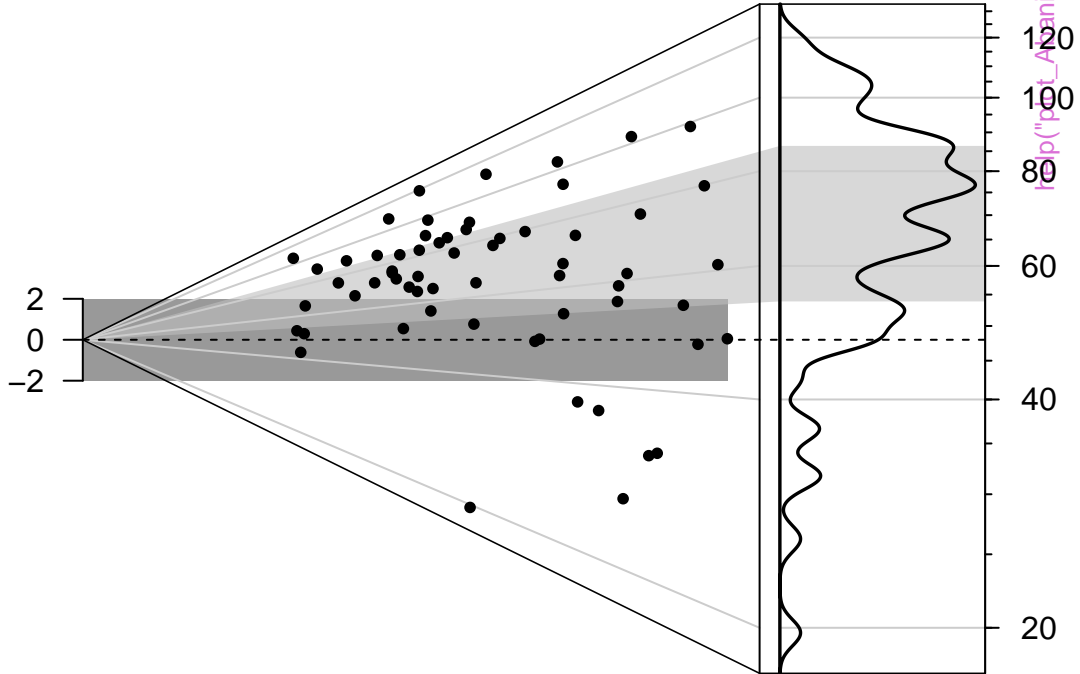
Precision

Density (bw 0.15)

D_e distribution

n = 62

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0

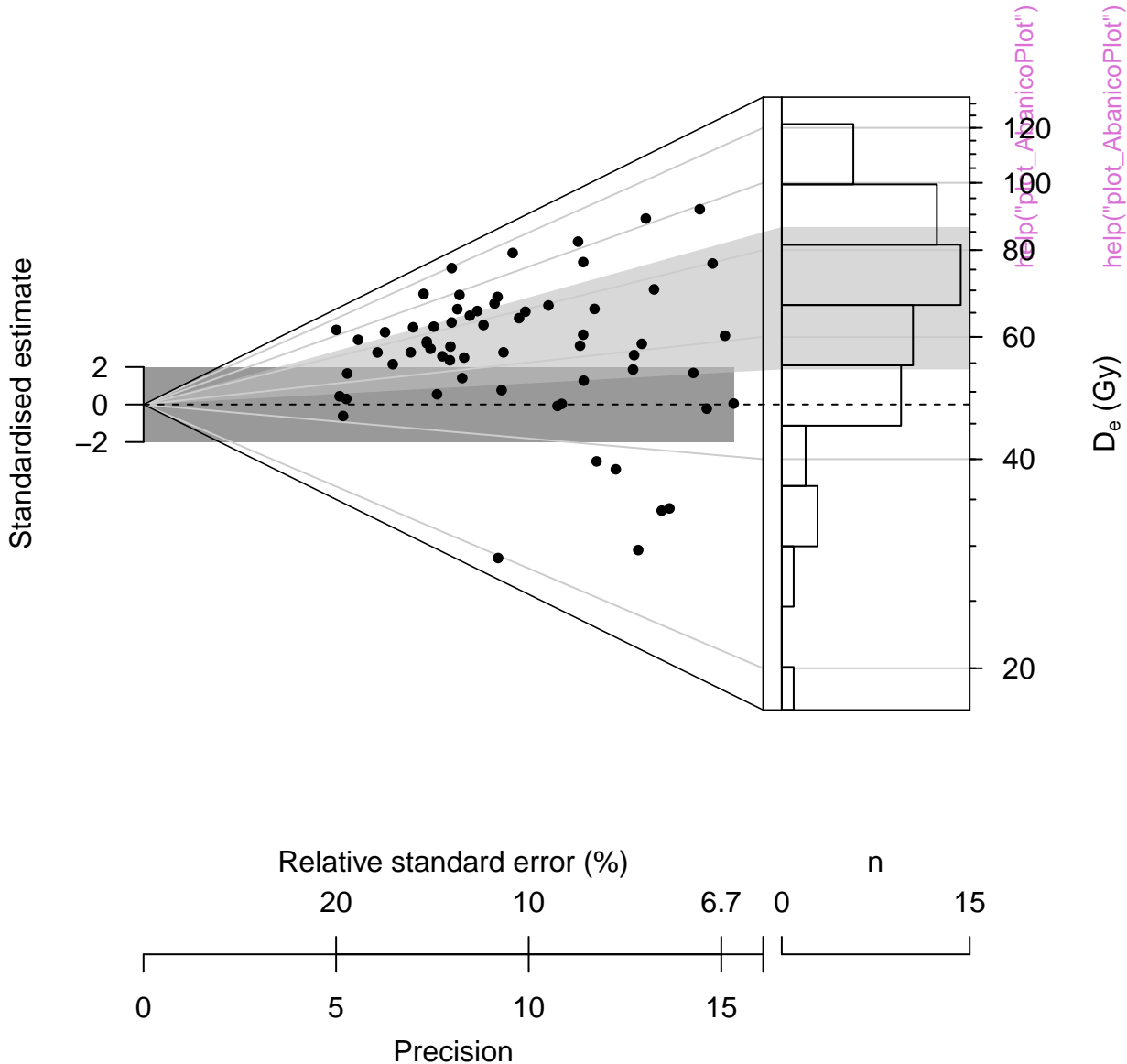
0.264

Precision

Density (bw 0.04)

D_e distribution

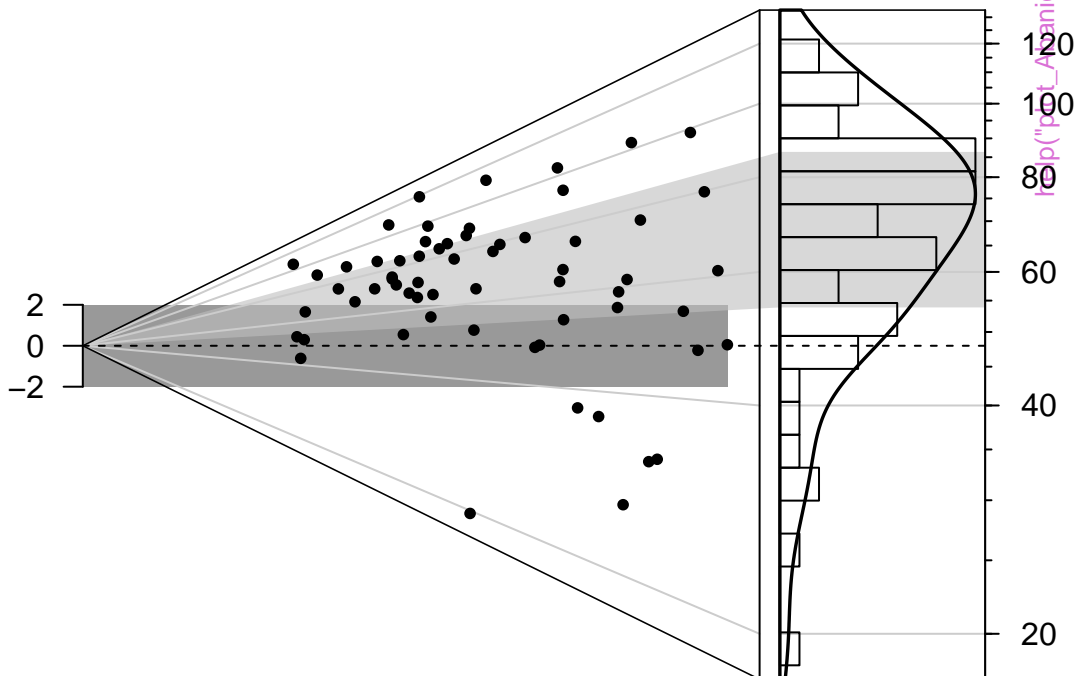
n = 62



D_e distribution

n = 62

Standardised estimate



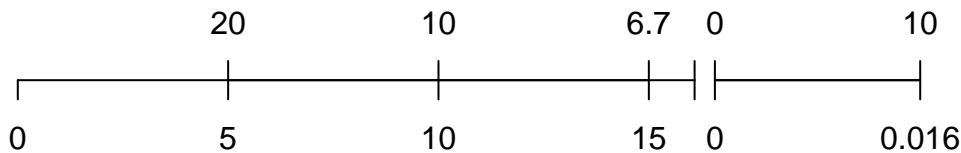
help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

D_e (Gy)

Relative standard error (%)

n



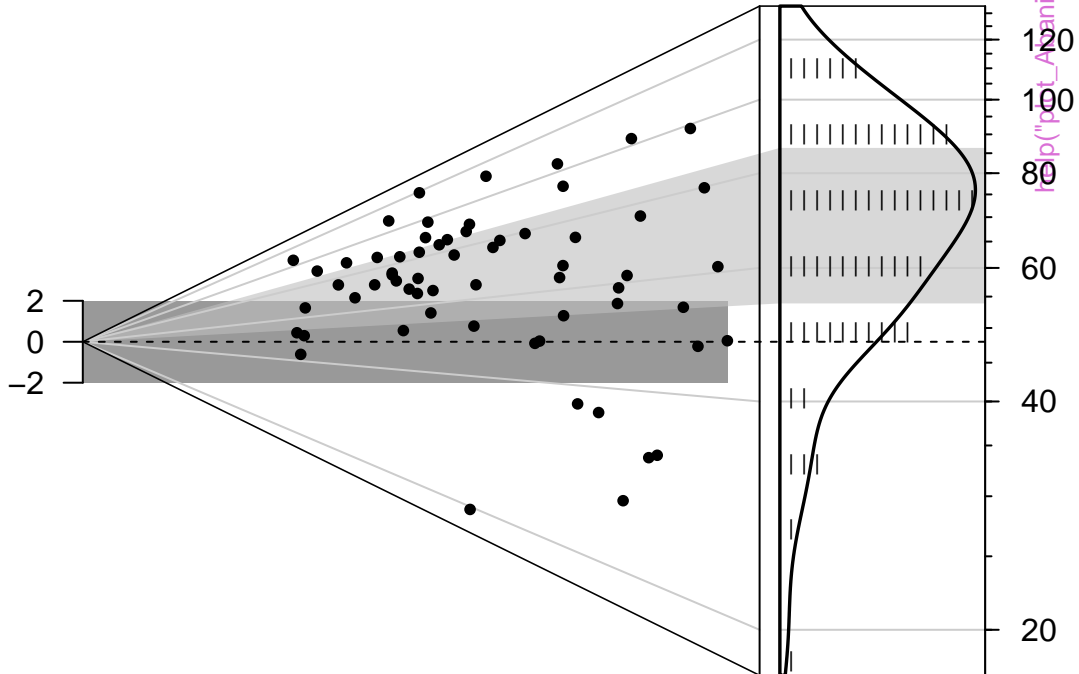
Precision

Density (bw 0.15)

D_e distribution

n = 62

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62



D_e distribution

n = 62

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

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

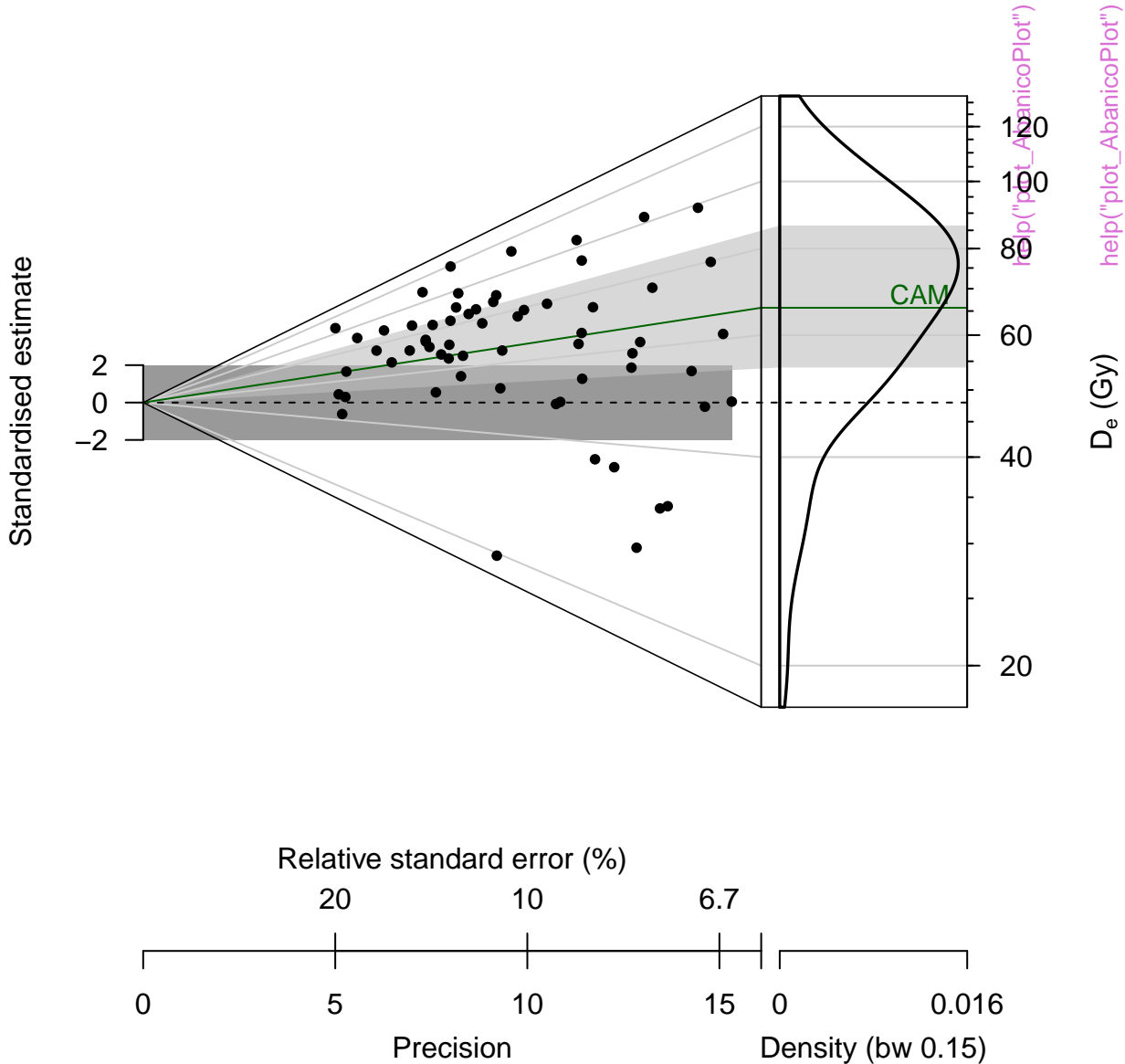
0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62



D_e distribution

n = 62

R Sample 1

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0

0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62



D_e distribution

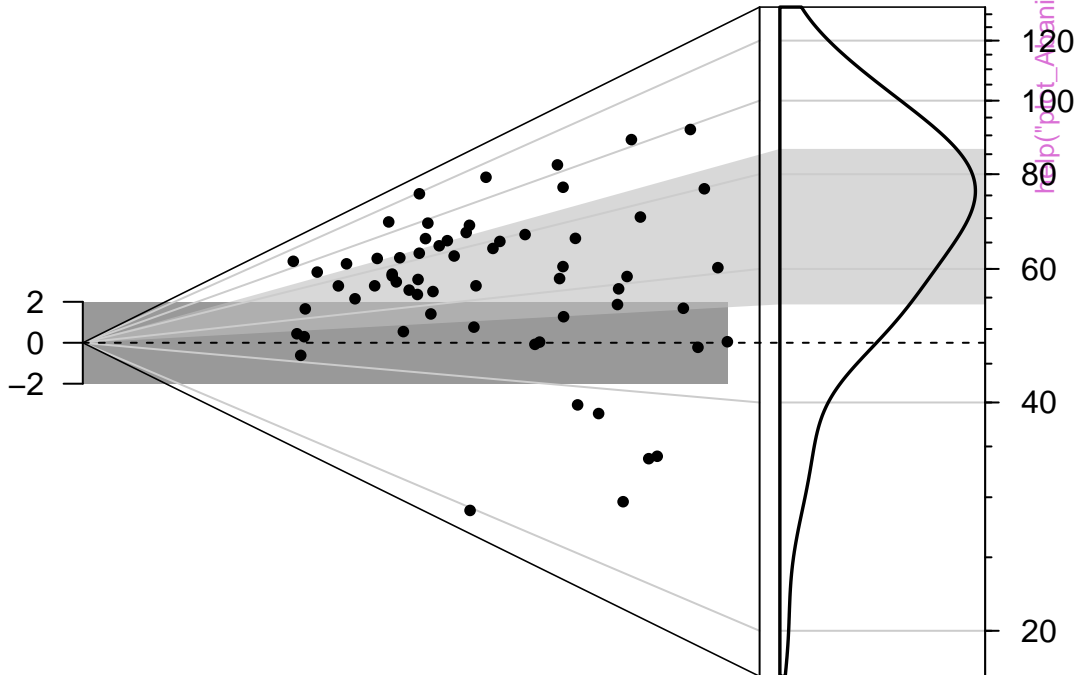
n = 62



D_e distribution

n = 62

Scatter



Equivalent dose (Gy)
`help("plot_AbanicoPlot")`

Data error (%)

20

10

6.7

0

5

10

15

0.016

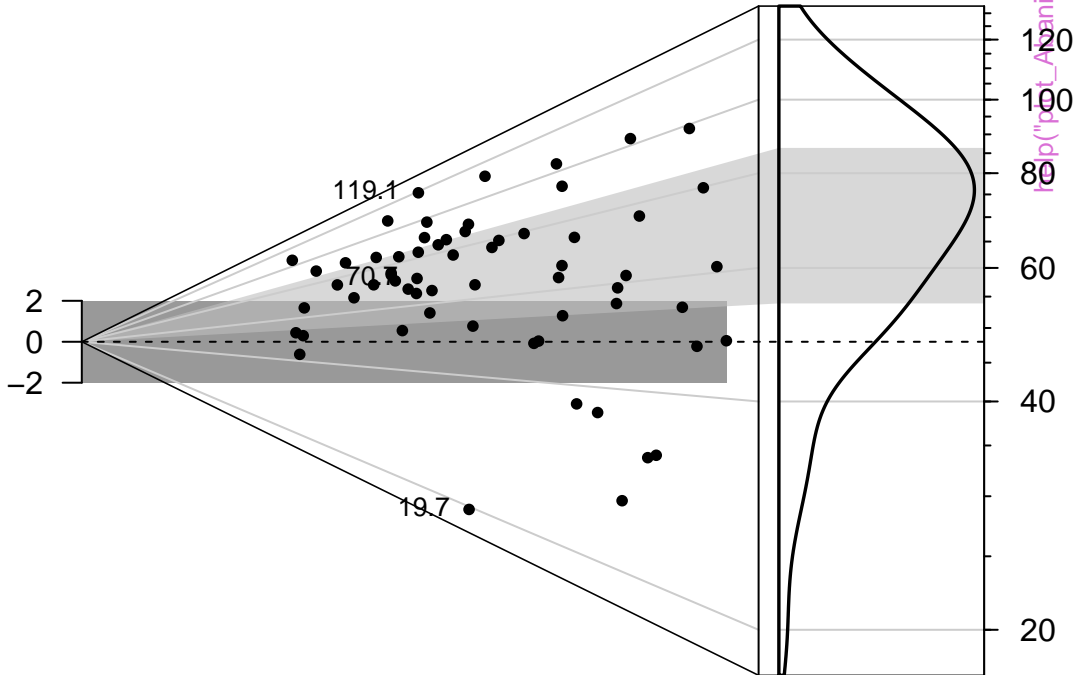
Data precision

Density (bw 0.15)

D_e distribution

n = 62

Standardised estimate



D_e (Gy)

Relative standard error (%)

20

10

6.7

0

5

10

15

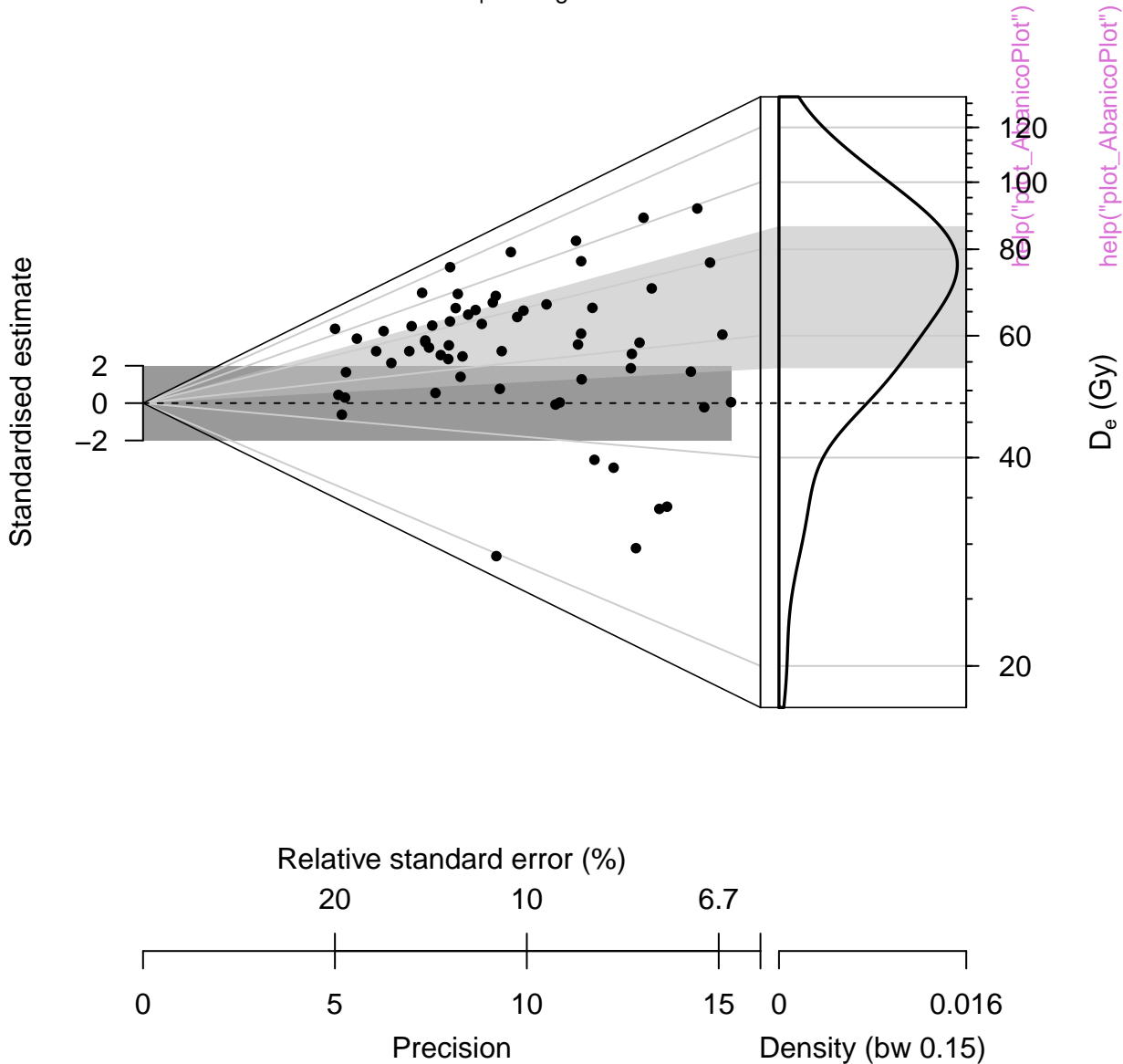
0.016

Precision

Density (bw 0.15)

D_e distribution

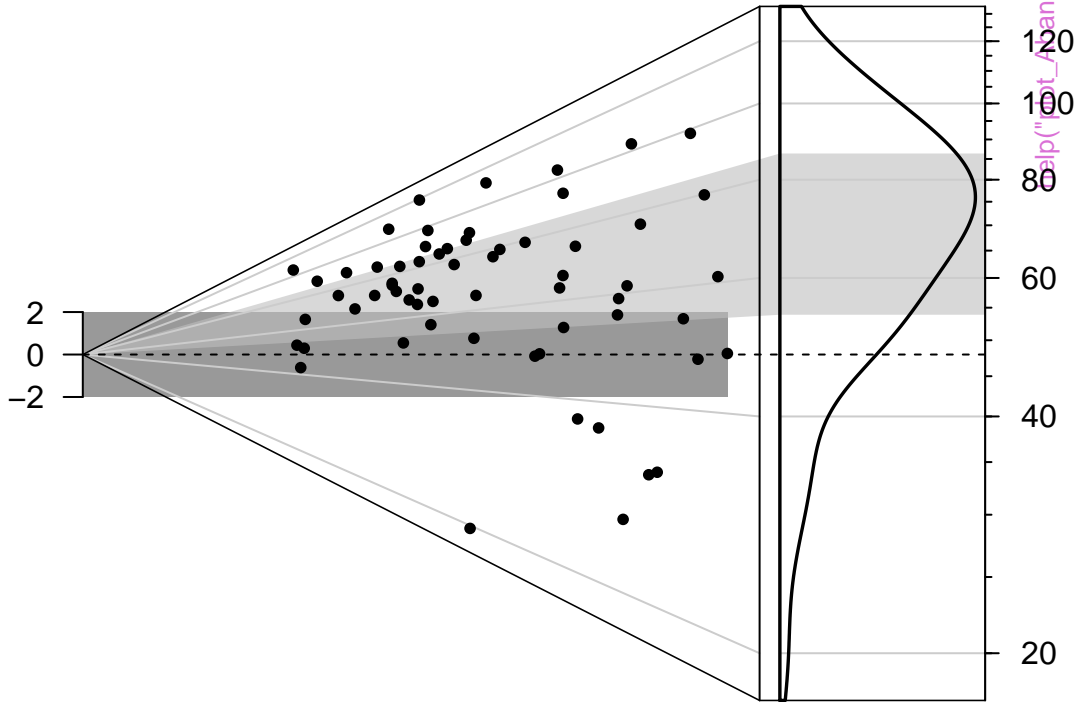
n = 62 | in 2 sigma = 22.6 %



D_e distribution

weighted mean = 47.95
median = 71.07

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

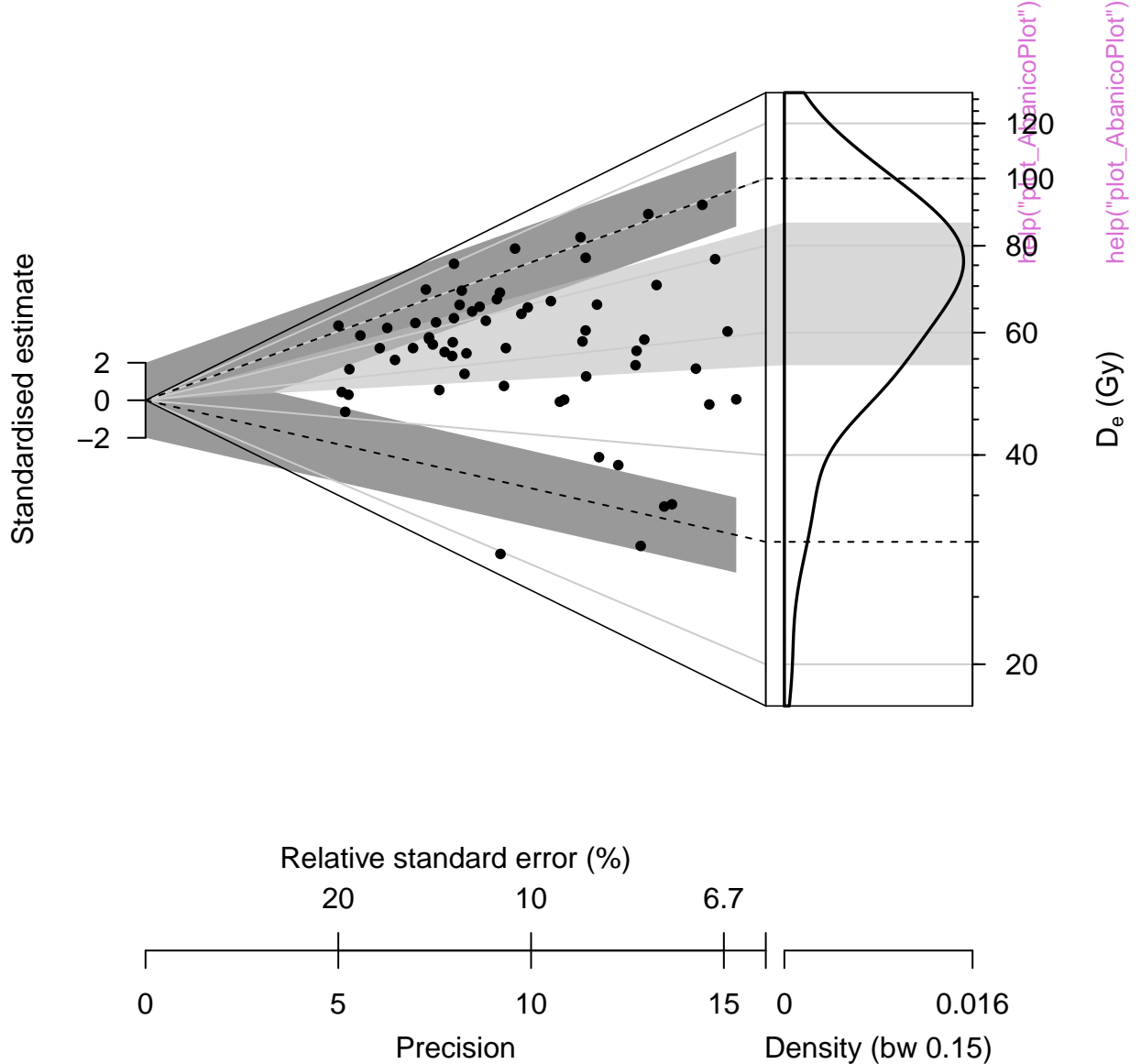
0.016

Precision

Density (bw 0.15)

D_e distribution

n = 62



D_e distribution

n = 30

n = 32

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0.032

Precision

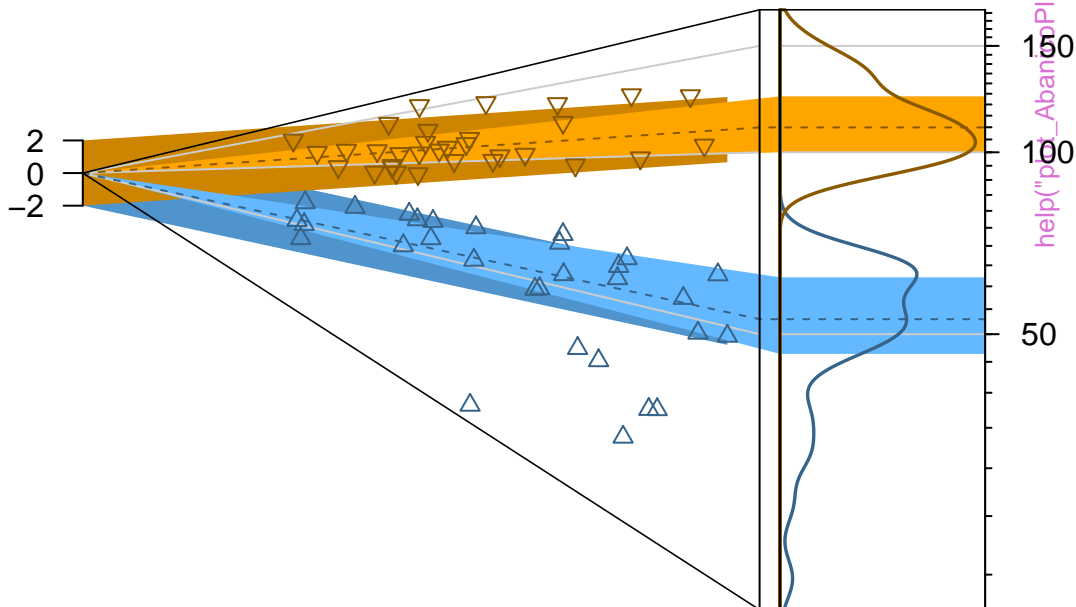
Density (bw 0.074)

D_e distribution

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

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

Standardised estimate



D_e (Gy)

help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

Relative standard error (%)

20

10

6.7

0

5

10

15

0.032

Precision

Density (bw 0.074)



`help("plot_AbanicoPlot")`



help("plot_AbanicoPlot")

Dose recovery test

Example data



Dose recovery test



Dose recovery test



Dose recovery test



Dose recovery test



Dose recovery test

| n = 5 | weighted mean = 1.01 |

| n = 5 | weighted mean = 1 |



Dose recovery test



Dose recovery test

Example data



Dose recovery test



Dose recovery test



Growth curve

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



D_e from MC simulation

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



Test dose response



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

Growth curve

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



D_e from MC simulation

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



Test dose response



Growth curve

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



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

D_e from MC simulation

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



help("plot_GrowthCurve")

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 = 126.34 | skewness = 1.34



D_e distribution



D_e distribution



D_e distribution



D_e distribution



NR(t) Plot



NR(t) Plot



help("plot_NRt")

NR(t) Plot



NR(t) Plot



NR(t) Plot



TnTx(t) Plot



Aliquot #1**Aliquot #2**

help("plot_NRt")

Aliquot #3**Aliquot #4**

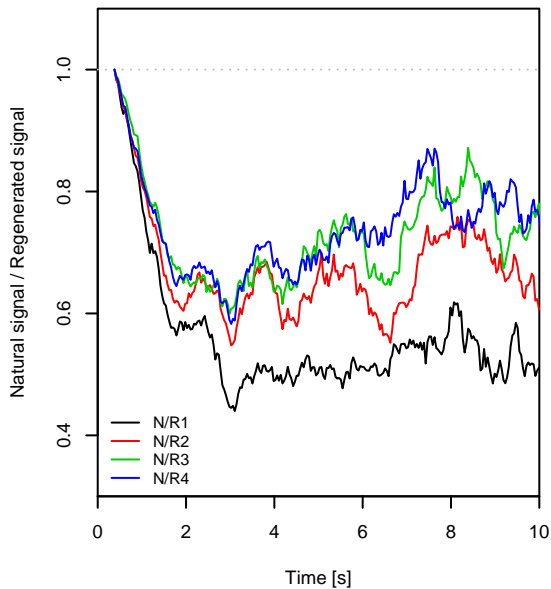
Aliquot #5**Aliquot #6****Aliquot #7****Aliquot #8**

Aliquot #9**Aliquot #10**

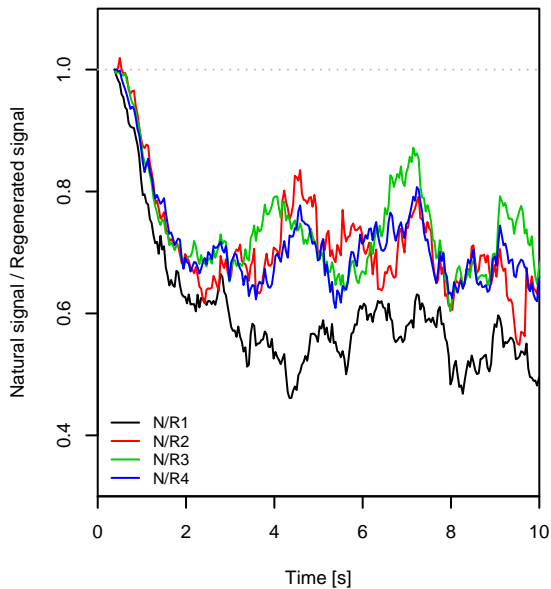
help("plot_NRt")

Aliquot #11**Aliquot #12**

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

Aliquot #17**Aliquot #18**

help("plot_NRt")

Aliquot #19**Aliquot #20**

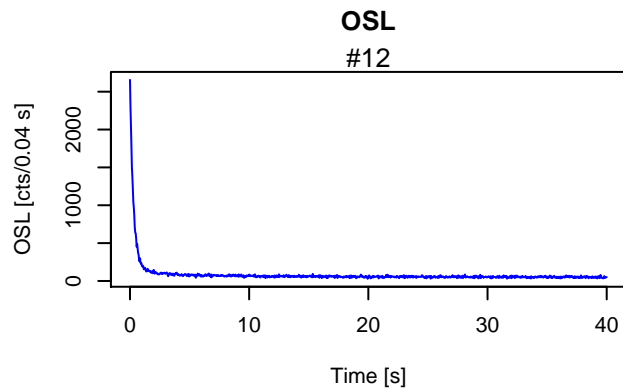
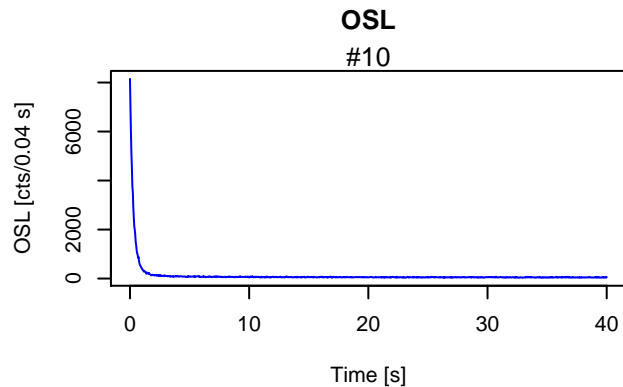
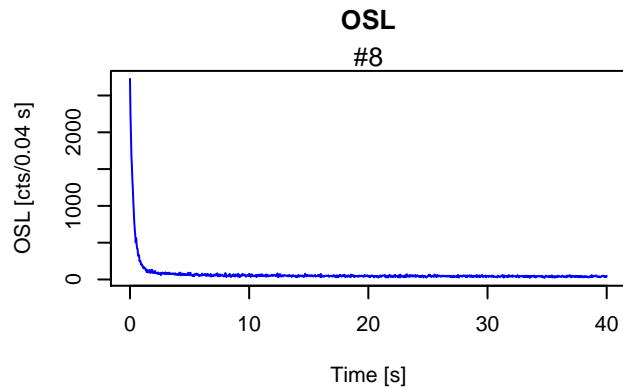
Aliquot #21**Aliquot #22**

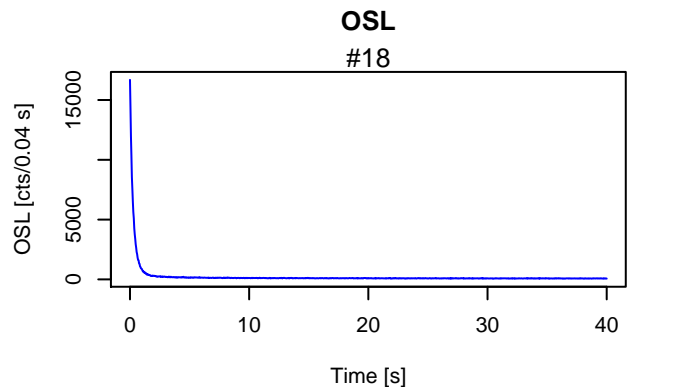
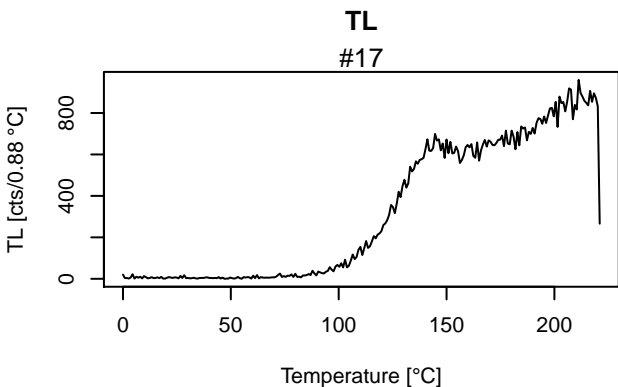
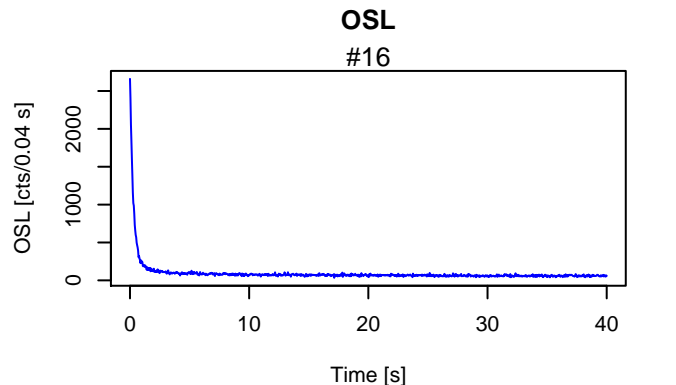
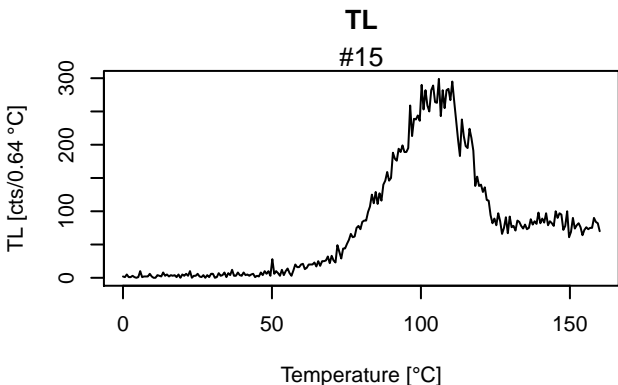
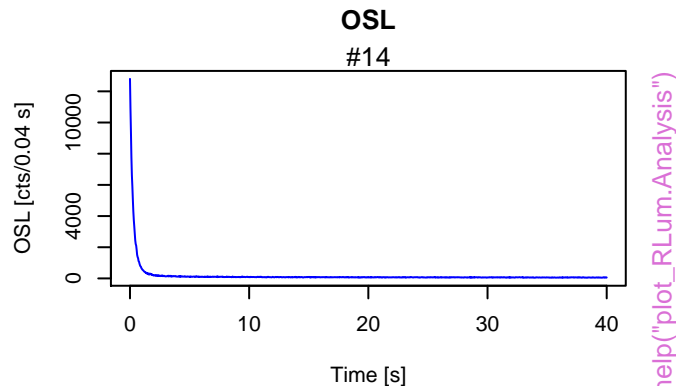
[help\("plot_NRt"\)](#)

Aliquot #23**Aliquot #24**

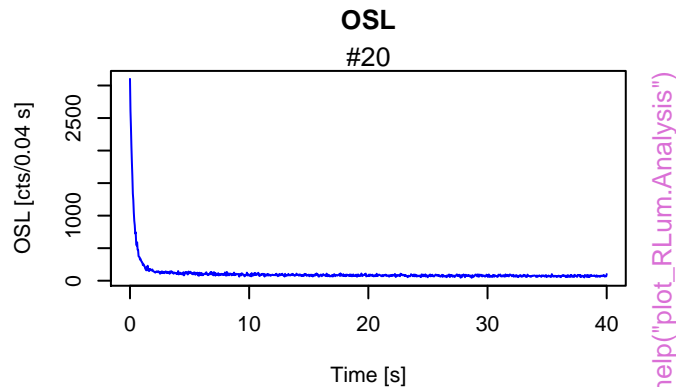


help("plot_RLumAnalysis")

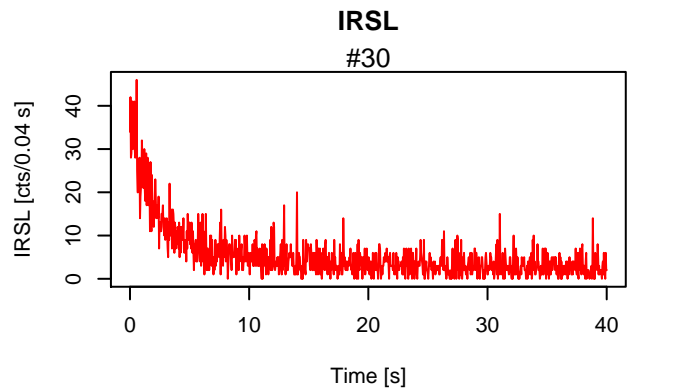
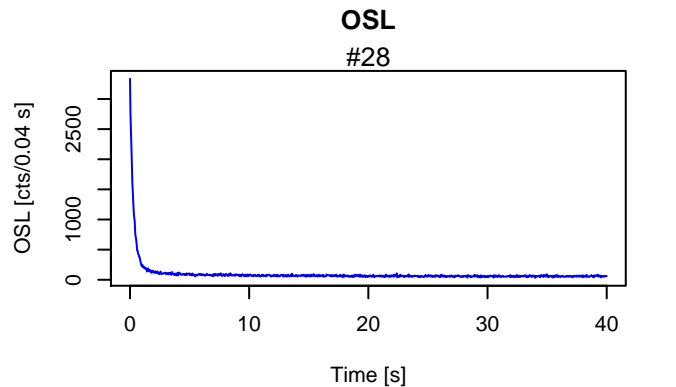
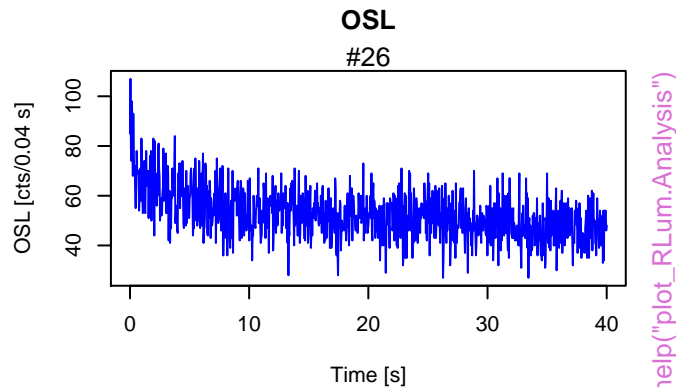




help("plot_RLumAnalysis")

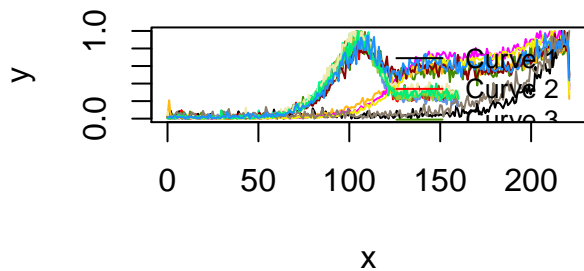


help("plot_RLum_Analysis")



help("plot_RLumAnalysis")

TL combined



unkown curve type



RLum.Data.Image



RLum.Data.Spectrum



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

RLum.Data.Spectrum



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

unkown curve type



Likelihood profile: gamma



Likelihood profile: sigma



help("plot_RLum.Results")

Likelihood profile: p0



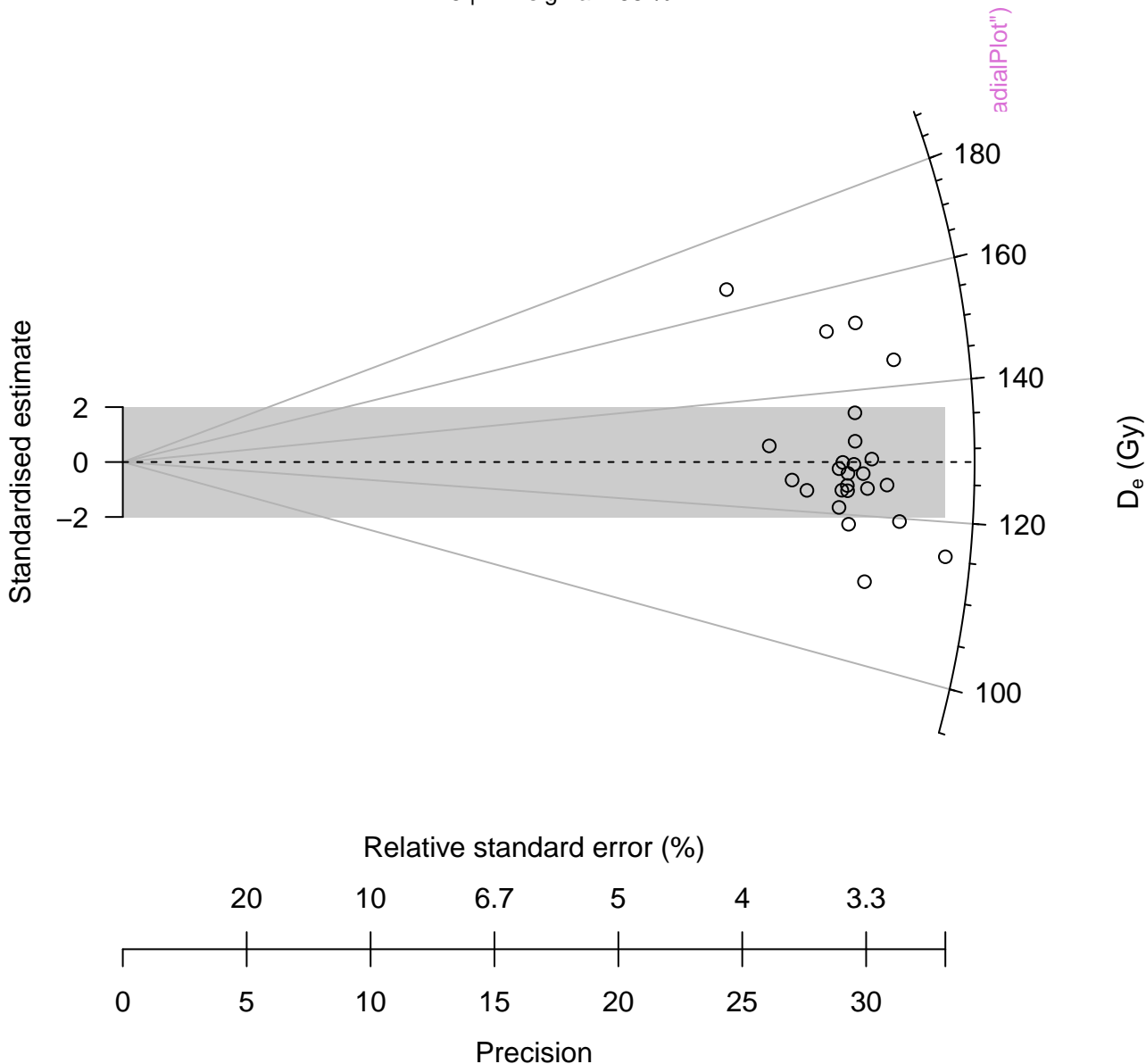
Monte Carlo Simulation

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



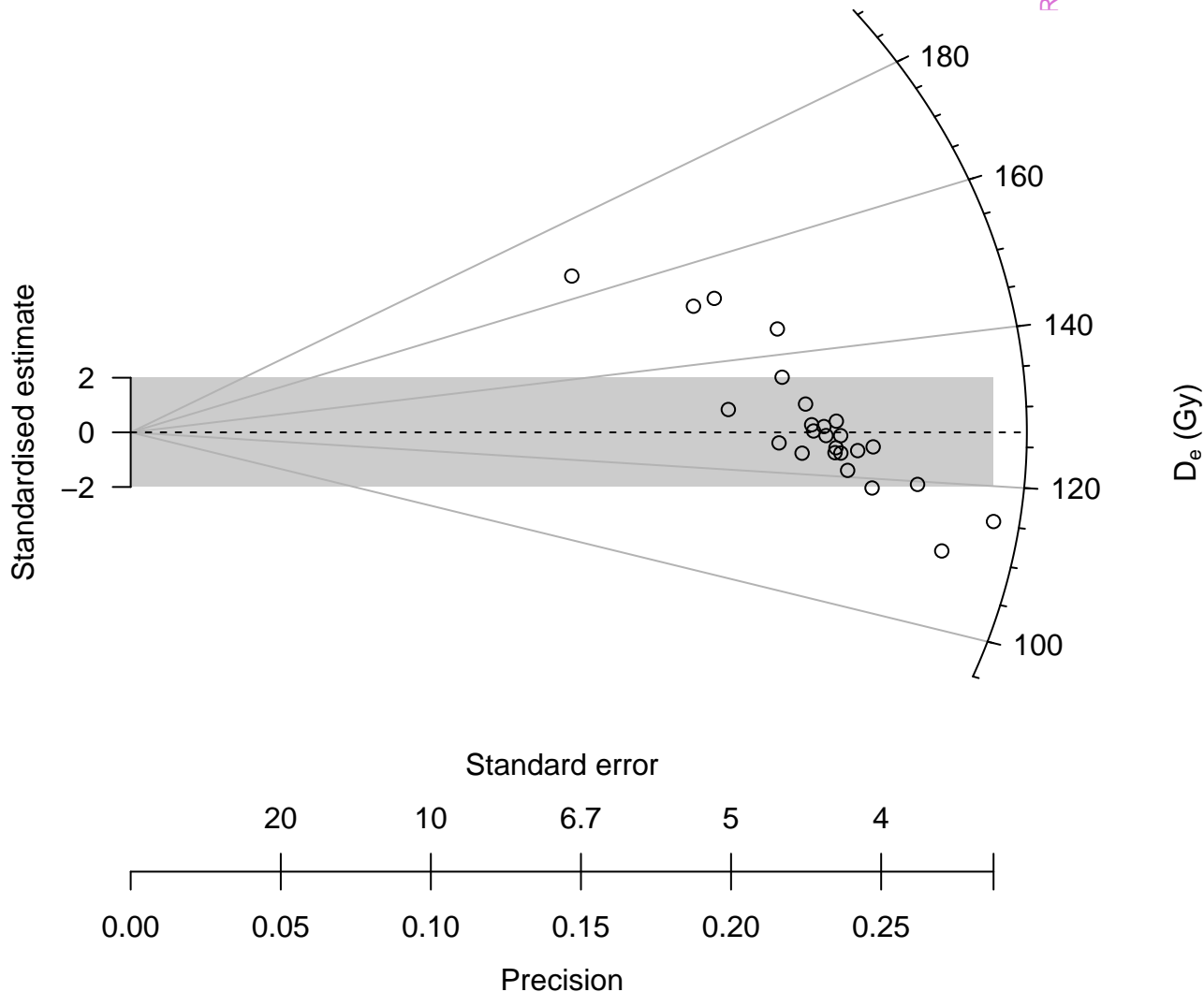
D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

n = 25 | in 2 sigma = 68 %



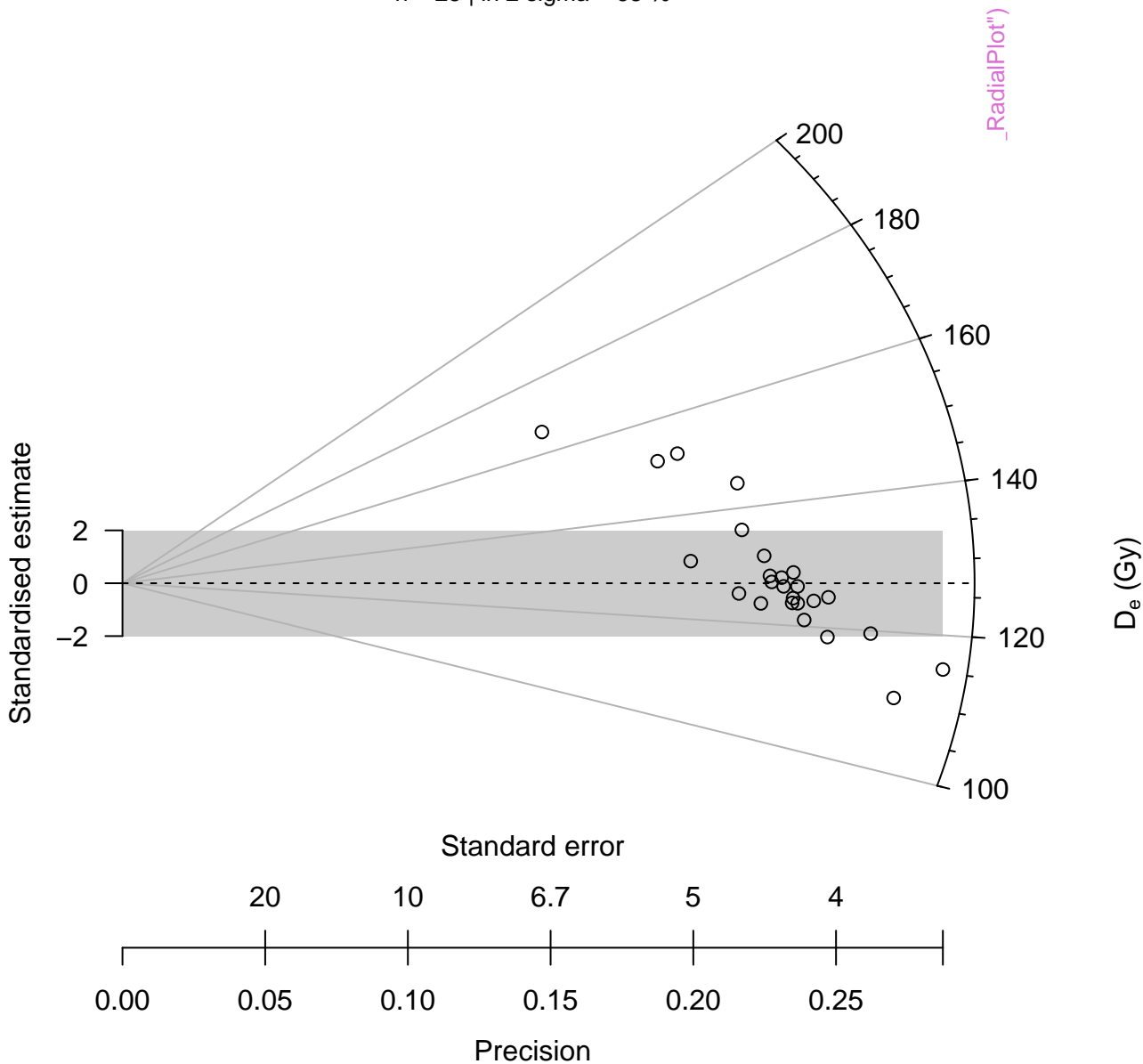
D_e distribution

n = 25 | in 2 sigma = 68 %



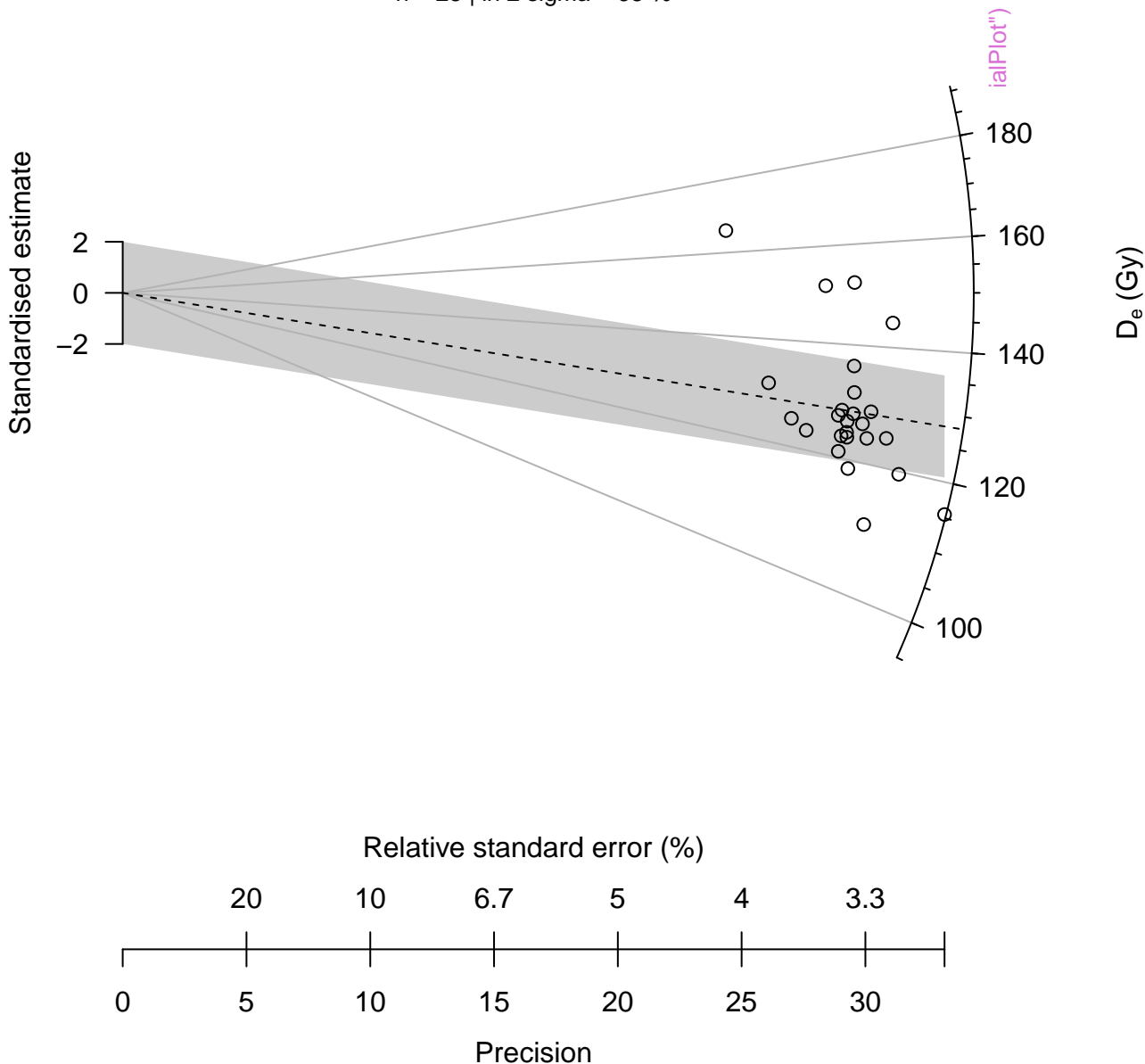
D_e distribution

n = 25 | in 2 sigma = 68 %



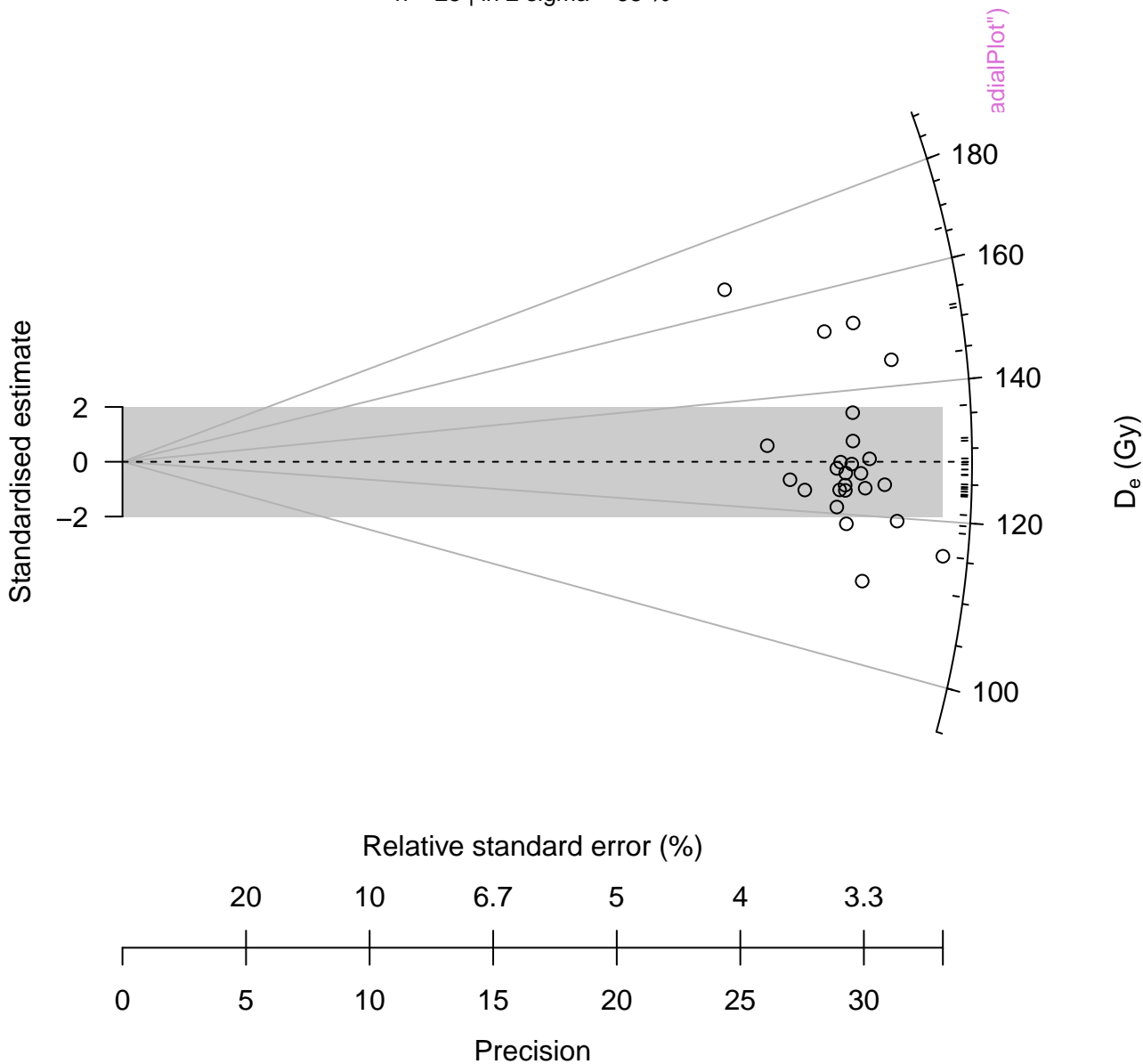
D_e distribution

n = 25 | in 2 sigma = 68 %



D_e distribution

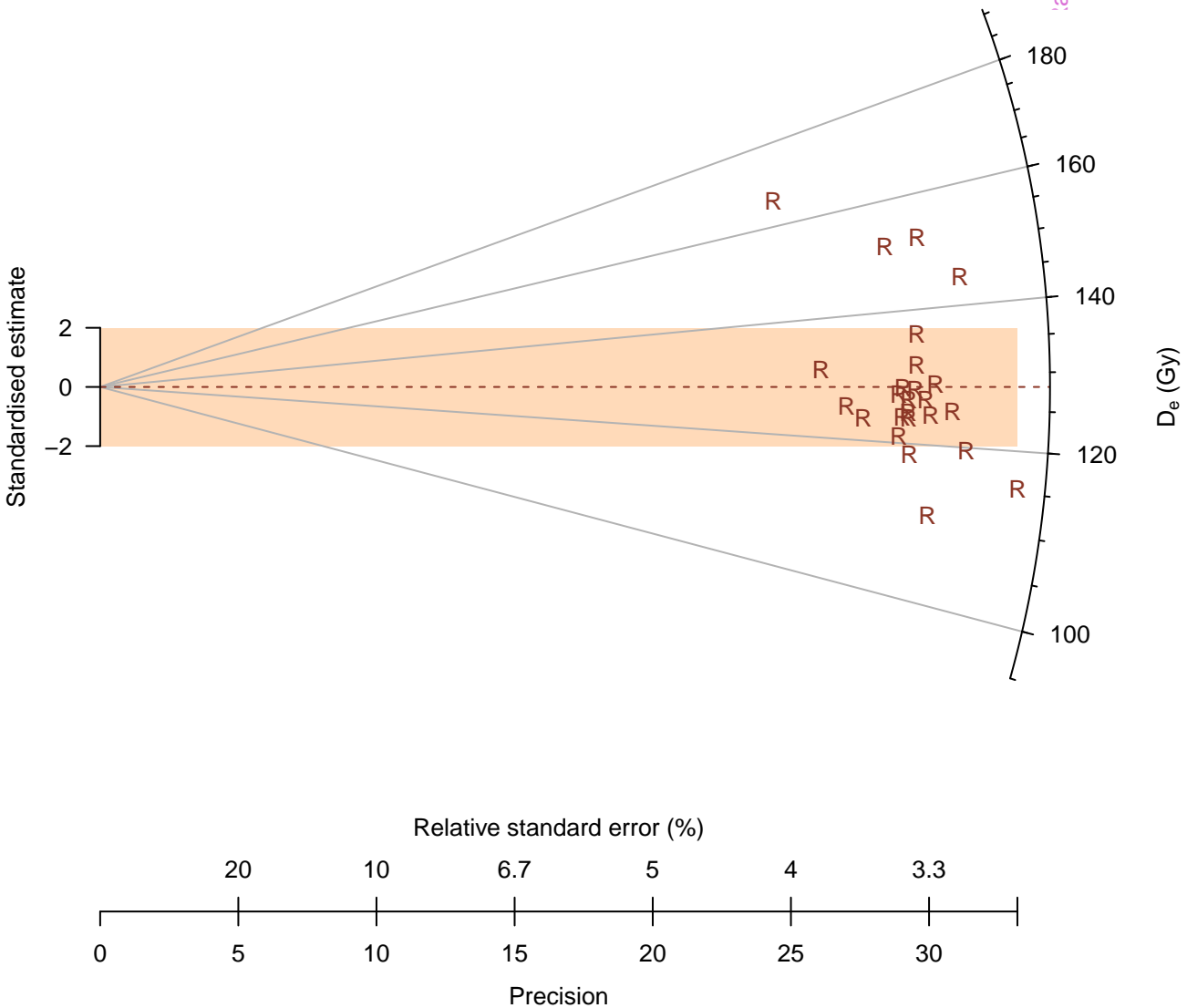
n = 25 | in 2 sigma = 68 %



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")

D_e (Gy)

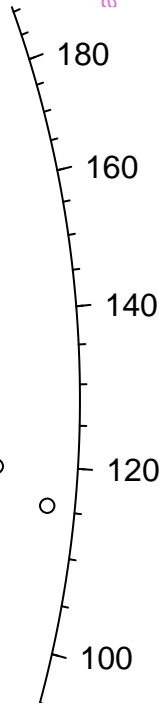
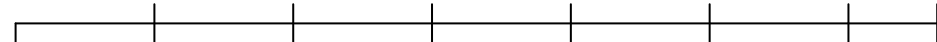
180

160

140

120

100



24

26

27

28

29

30

31

32

33

34

35

36

37

38

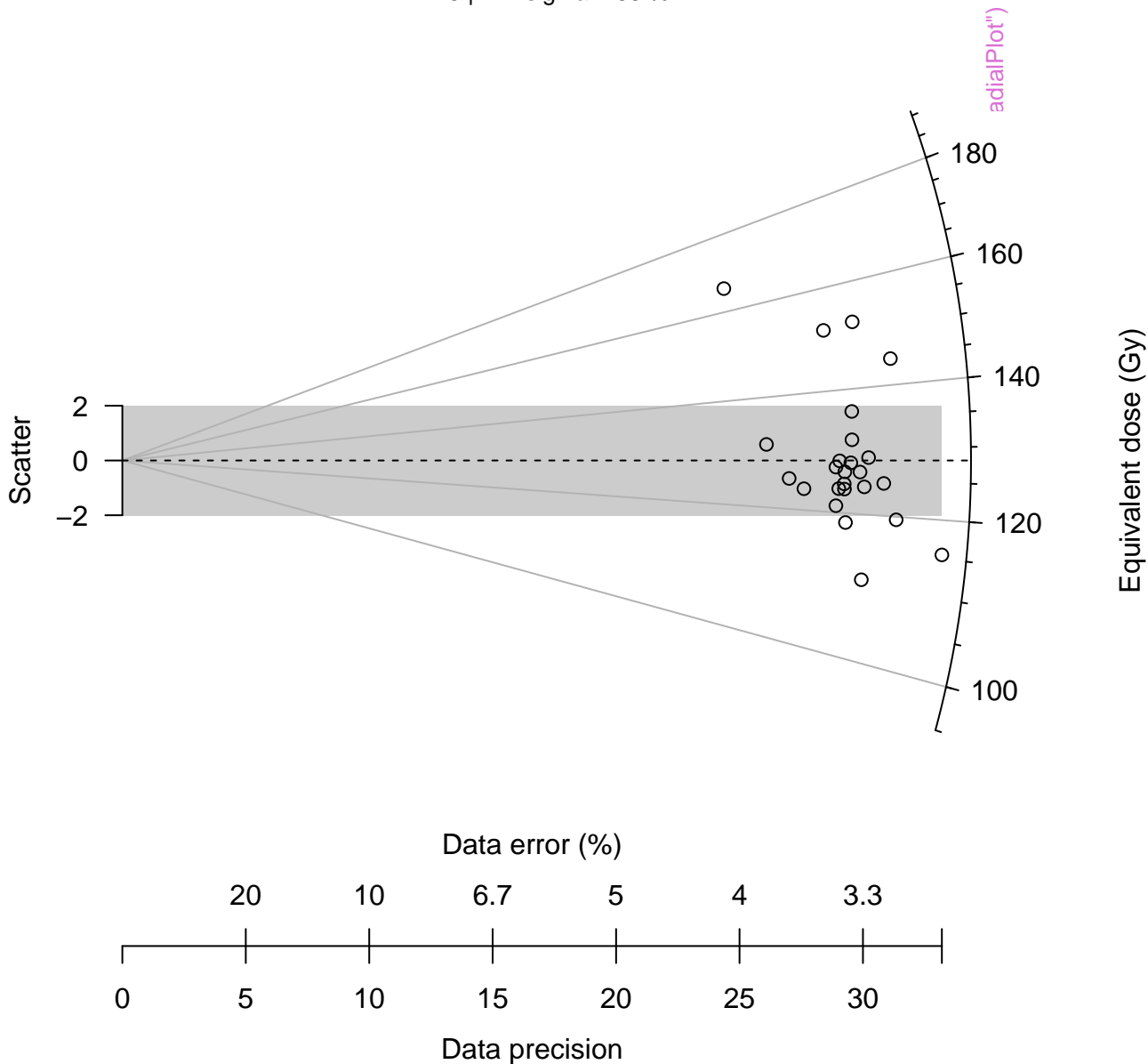
39

40

41

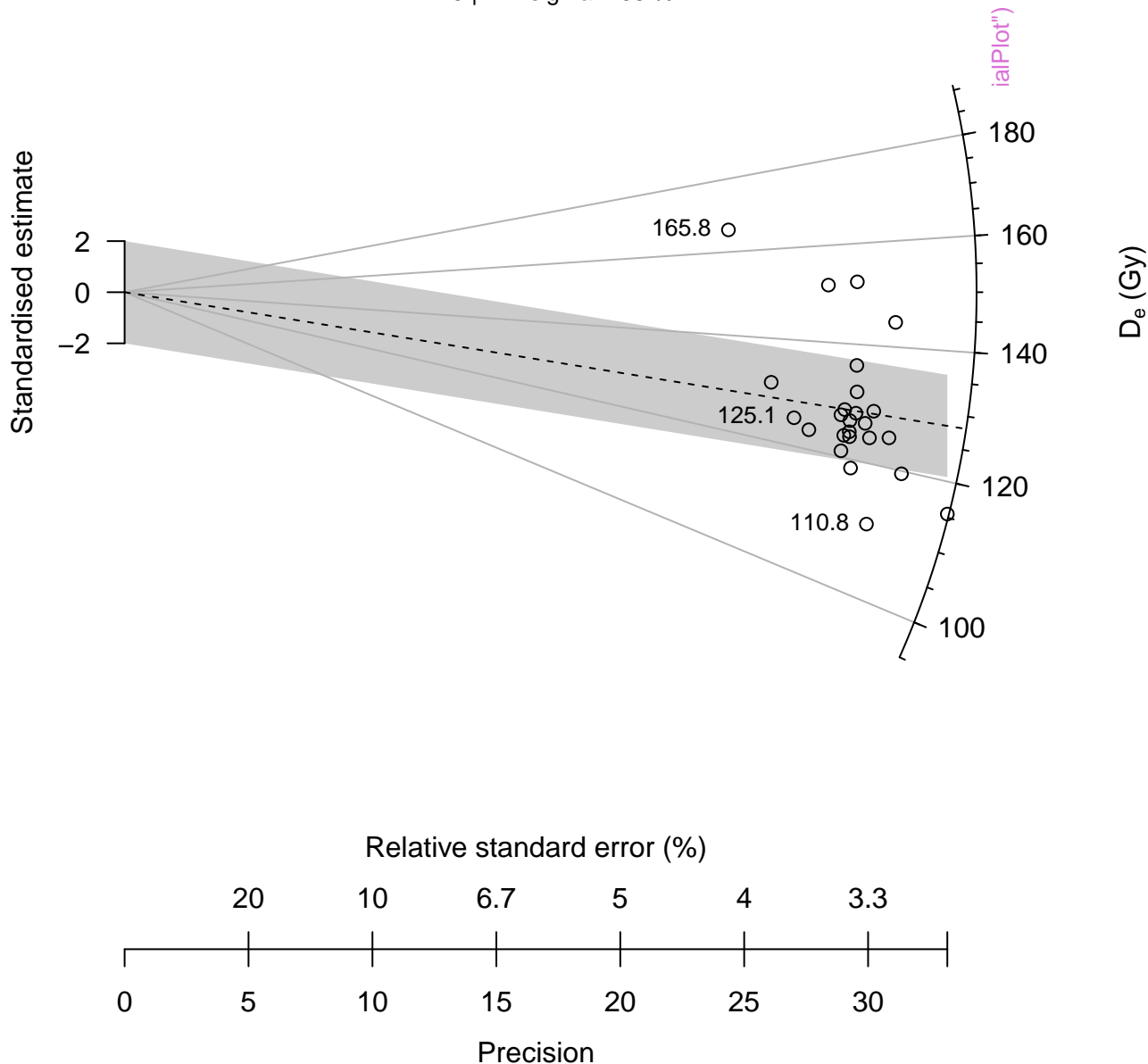
D_e distribution

n = 25 | in 2 sigma = 68 %



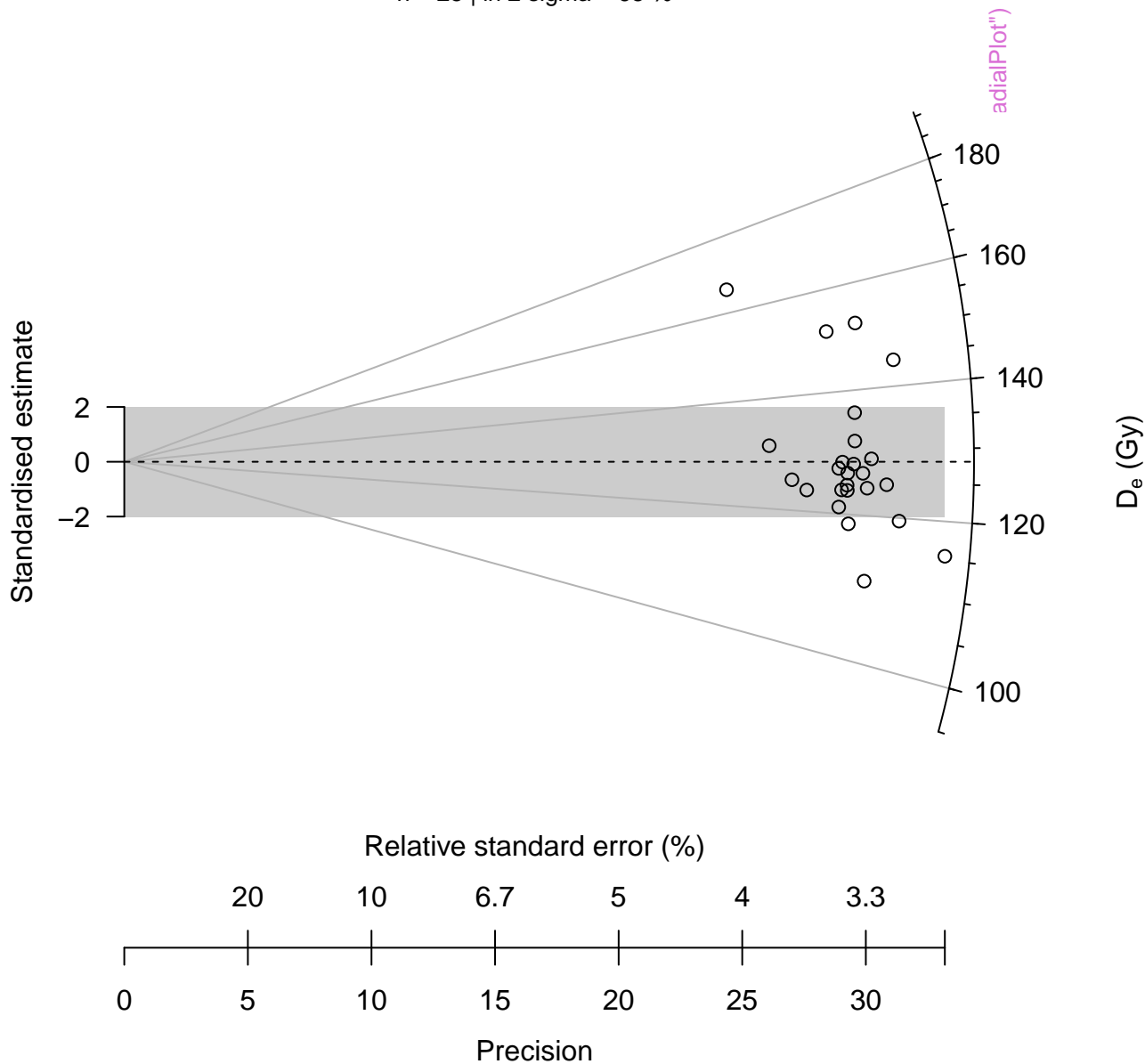
D_e distribution

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 %



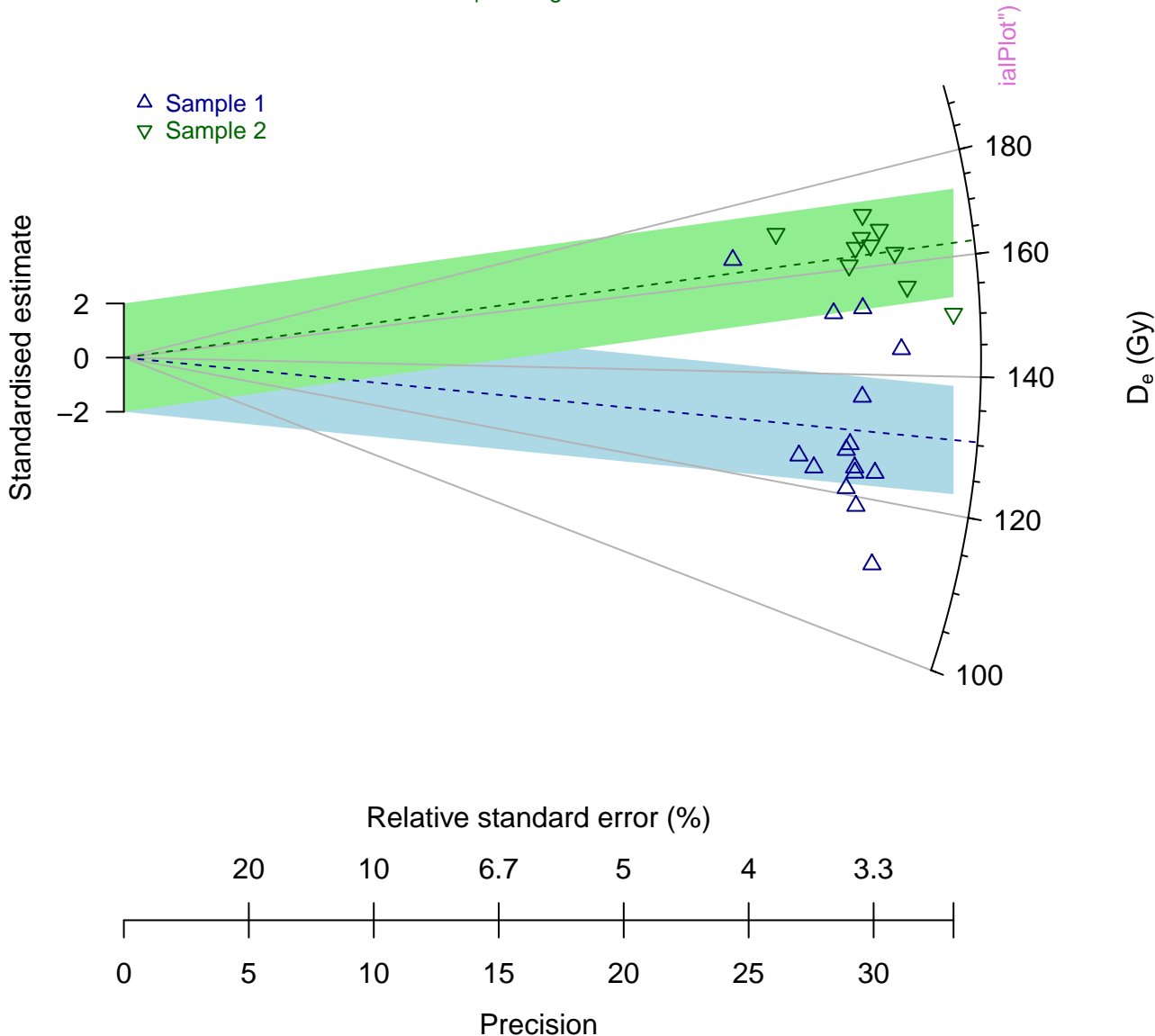
D_e distribution

n = 15 | in 2 sigma = 53.3 %

n = 10 | in 2 sigma = 90 %

△ Sample 1

▽ Sample 2



Violin Plot

n = 25 | median = 126.34

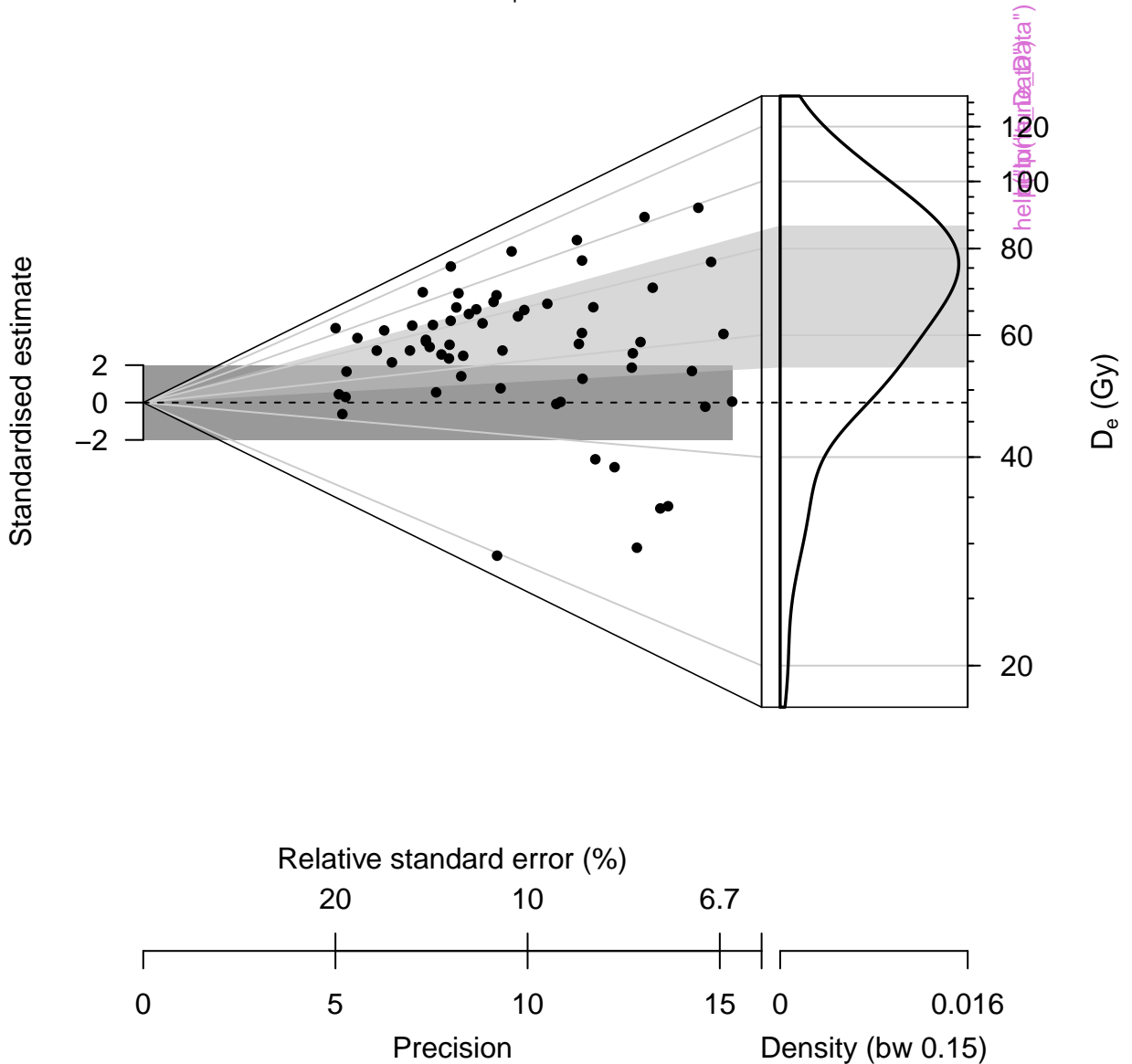
Density



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

D_e distribution

n = 62 | mean = 69.93



D_e distribution

n = 62 | mean = 69.93

