

L_n, L_x curves

ALQ Pos. 1

T_n, T_x curves



Cutheat – TL curves



IRSLT

IRSL/BOSL = 0.88%



IRSL curve (10 s)



help("Analyse_SAR_OSLdata")

unkown measurement





Fig. 4 – Bos & Wallinga (2012)





`help("CW2pLM")`



Fig. 4 – Bos & Wallinga (2012)





Fig. 4 – Bos & Wallinga (2012)

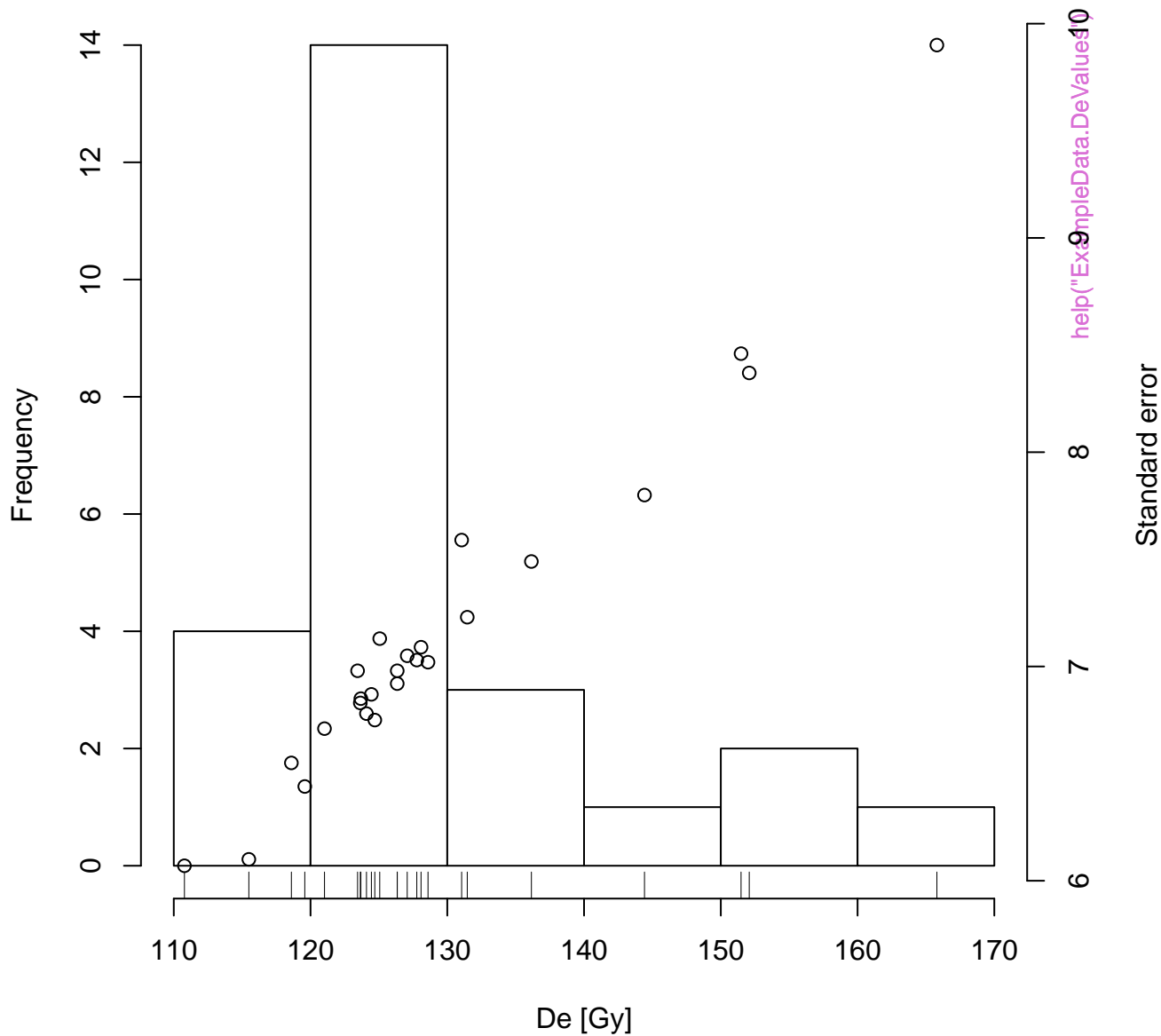




Histogram



Histogram





`help("ExampleData.FittingLM")`



help("ExampleData.LxTxData")



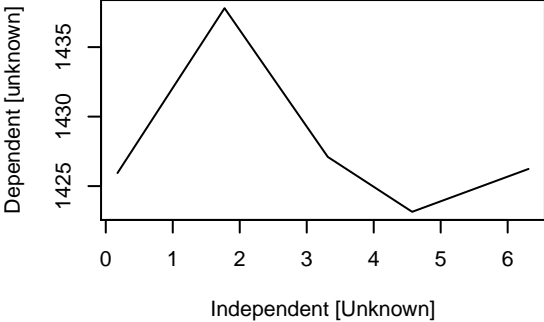
`help("ExampleData.LxTxOSLData")`



`help("ExampleData.LxTxOSLData")`

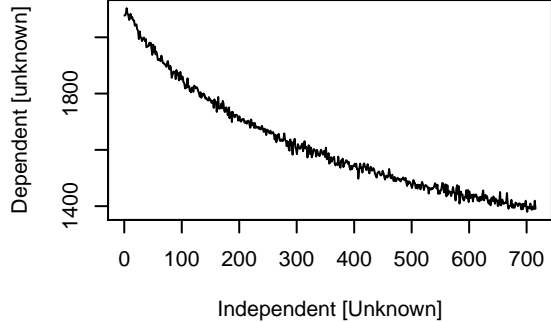
RF

#1



RF

#2



help("ExampleData.RLum.Analysis")

RLum.Data.Image



OSL (UVVIS)



help("ExampleData.XSYG")

RLum.Data.Spectrum



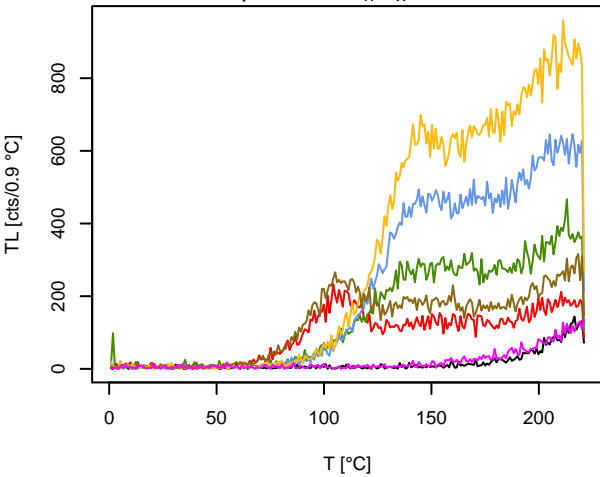
[help\("ExampleData.XSYG"\)](#)

IR-RF

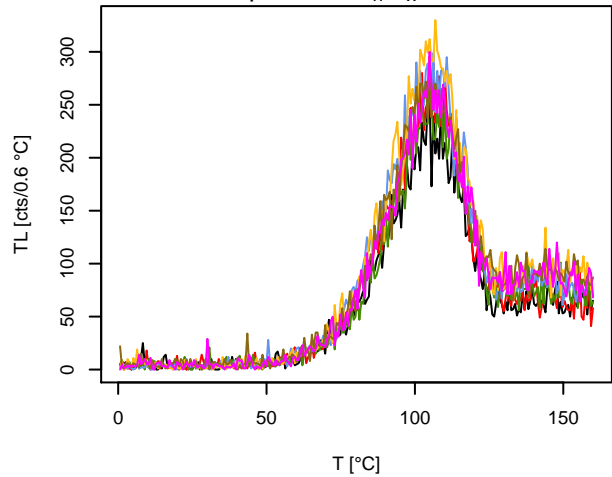
$D_e = 623.25$ (608.39 638.67)



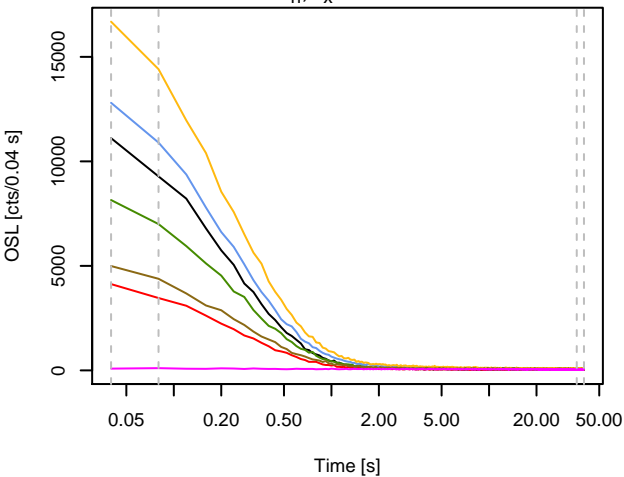
TL previous L_n, L_x curves



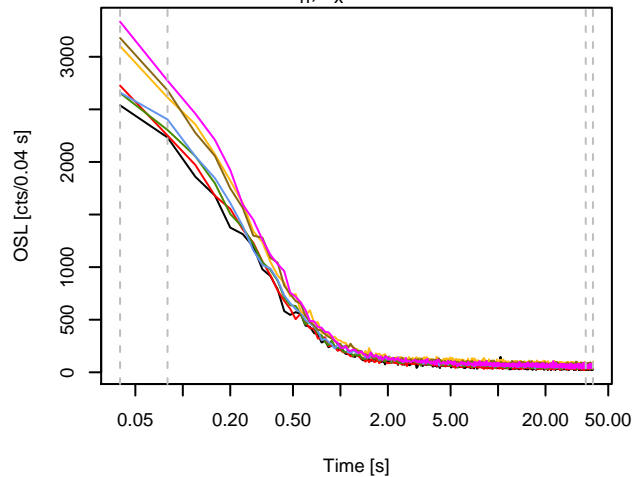
TL previous T_n, T_x curves



L_n, L_x curves



T_n, T_x curves



●
Natural
(0)

●
R1
(450)

●
R2
(1050)

●
R3
(2000)

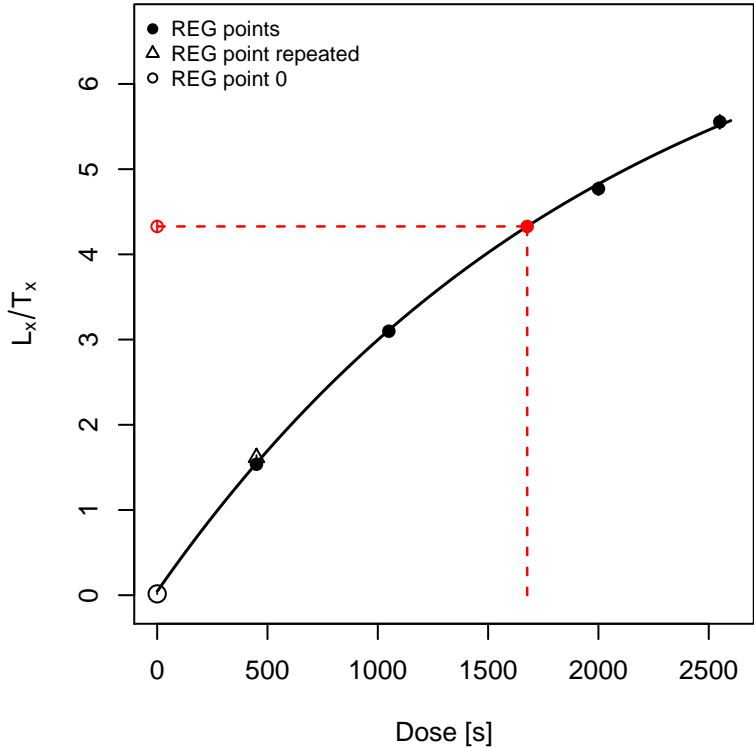
●
R4
(2550)

●
R5
(450)

●
R0
(0)

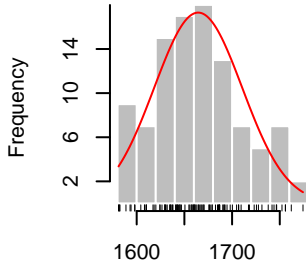
Growth curve

$D_e = 1677.16 \pm 46.11$ | fit: EXP

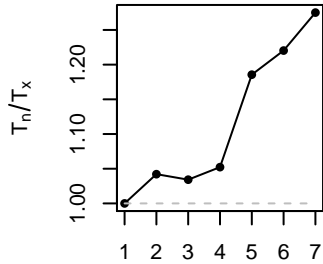


D_e from MC simulation

$D_{eMC} = 1664.49 \pm 46.11$ | quality = 99.2 %



Test dose response



Rejection criteria

Recycling ratio



Recuperation rate

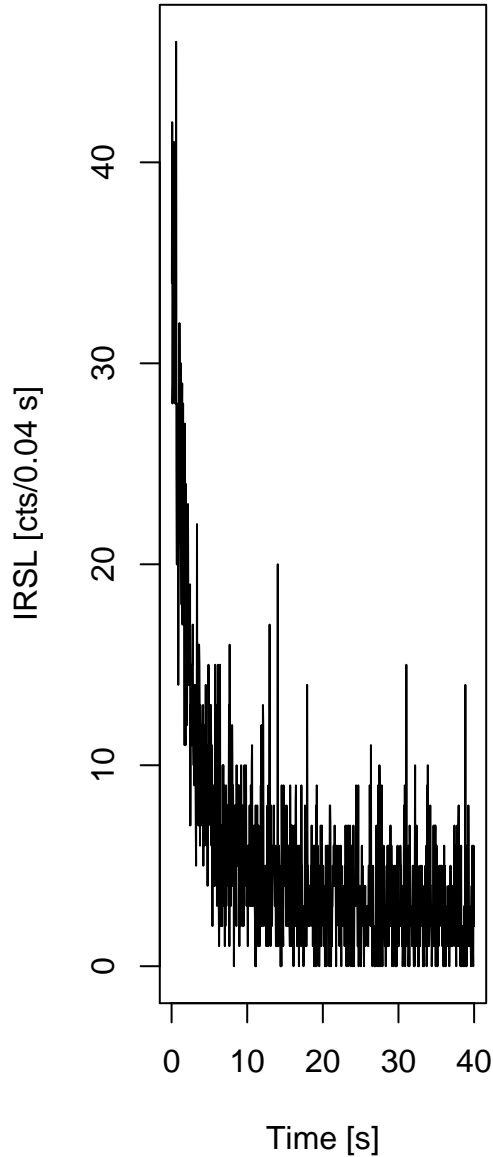


Palaeodose error



- 0.2 + 0.2

IRSL

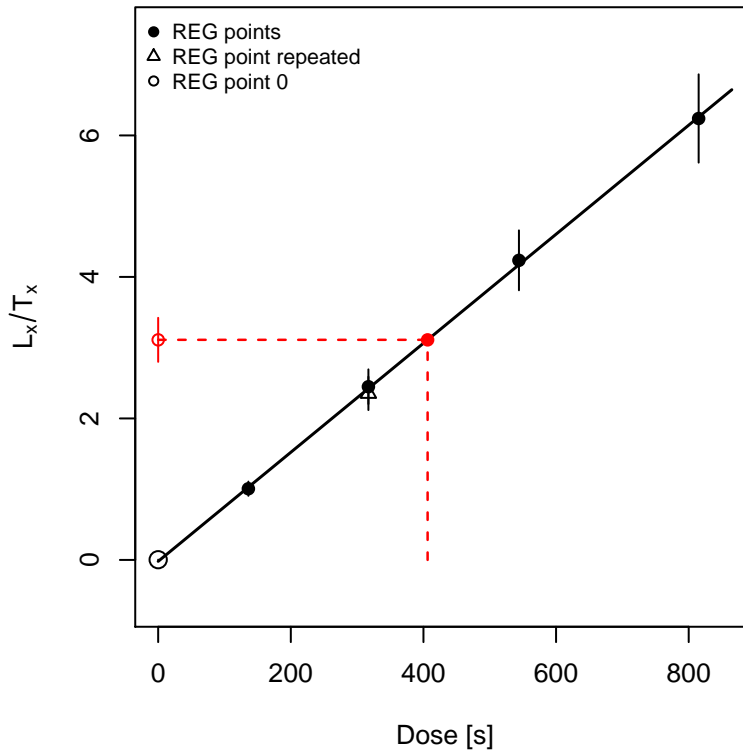


`help("analyse_SAR.CWOSL")`

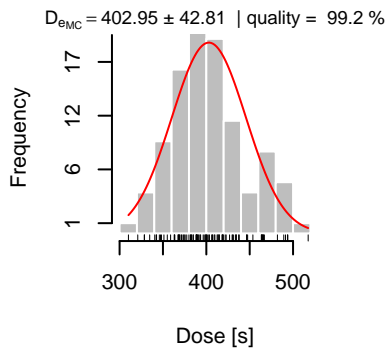
L_n, L_x curves T_n, T_x curvesPlateau test L_n, L_x curvesplateau Test T_n, T_x curves

Growth curve

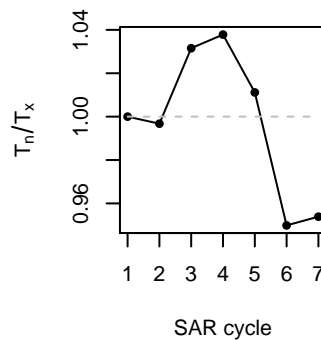
$D_e = 406.28 \pm 42.81$ | fit: LIN



D_e from MC simulation



Test dose response



Pseudo pIRIR data set based on quartz OSL

TL
pseudolRSL1
pseudolRSL2

help("analyse_pIRIRSequence")

Pseudo pIRIR data set based on quartz OSL

TL previous L_n, L_x curves



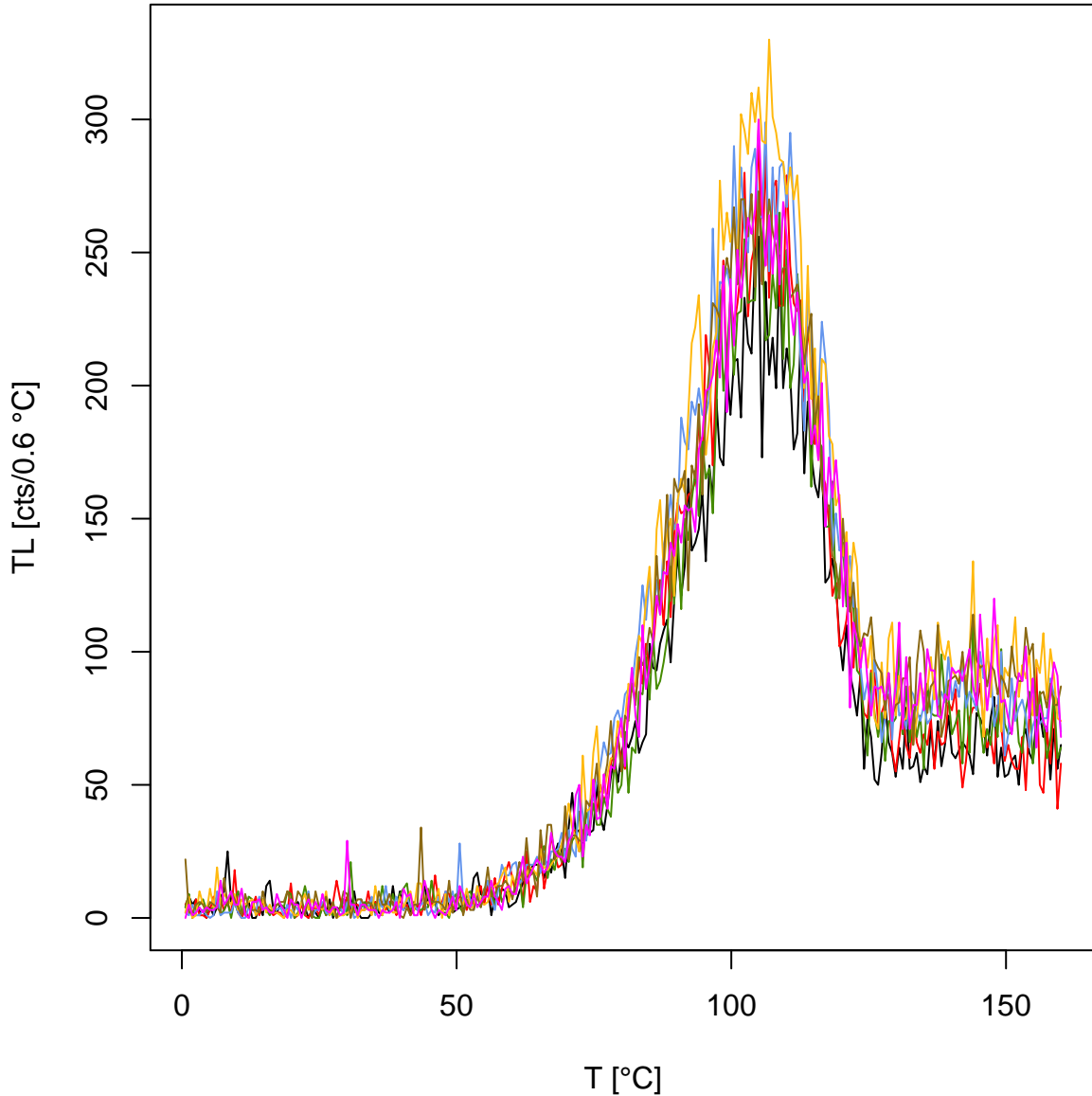
help("analyse_pIRIRSequence")

Pseudo pIRIR data set based on quartz OSL



Pseudo pIRIR data set based on quartz OSL

TL previous T_n, T_x curves



```
help("analyse_pIRSequence")
```

Pseudo pIRIR data set based on quartz OSL



Pseudo pIRIR data set based on quartz OSL

$D_e = 1677.16 \pm 46.11$ | fit: EXP



D_e from MC simulation

D_{MC} = 1664.49 ± 46.11 | quality = 99.2 %



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

$D_e = 1677.16 \pm 48.13$ | fit: EXP



help("analyse_pIRIRSequence")

D_e from MC simulation

D_{e,MC} = 1663.13 ± 48.13 | quality = 99.2 %



n = 100 , valid fits = 100

help("analyse_pIRSequence")

Test dose response



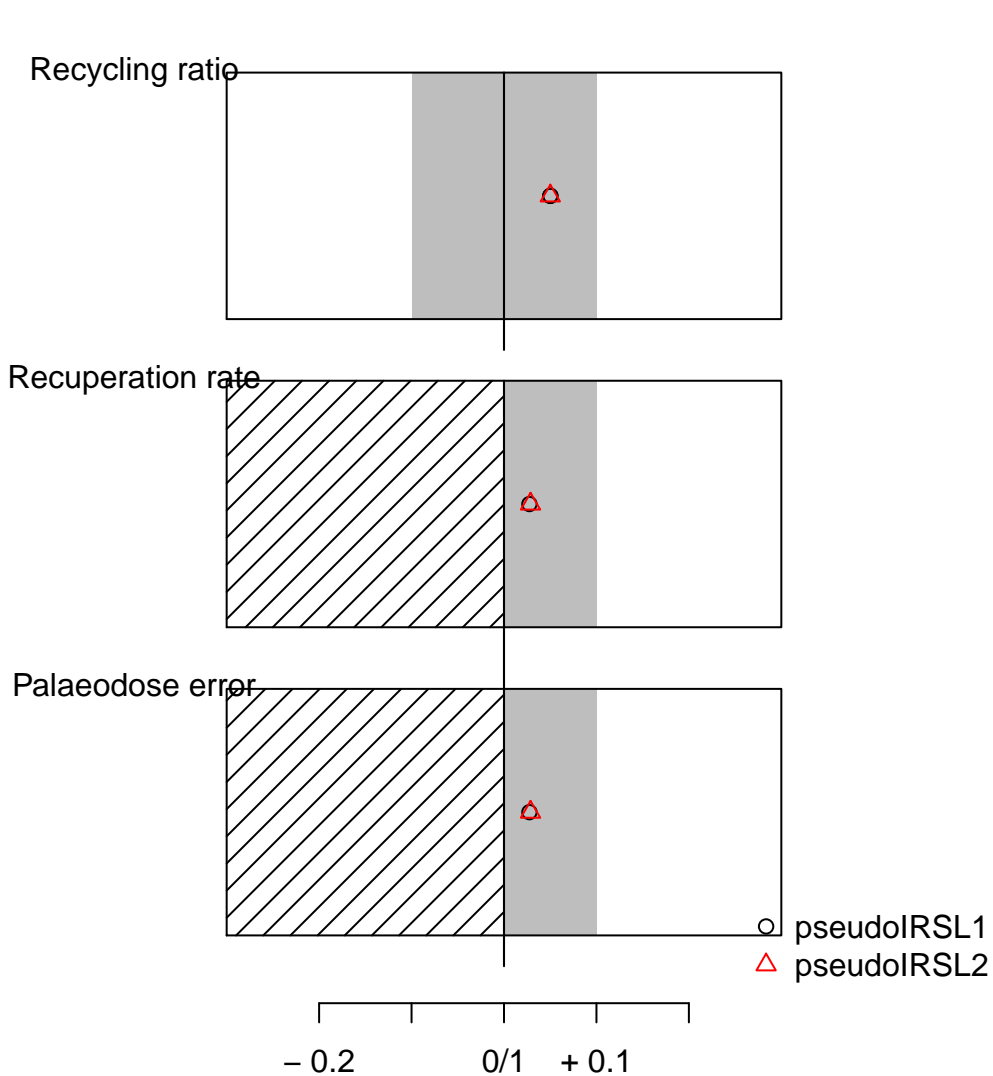
Summarised growth curves



Sensitivity change



Rejection criteria



Monte Carlo Simulation

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





Finite Mixture Model

$\sigma_b = 0.2 \mid n = 62$

Normal distributions



Proportion of components



Statistical criteria



help("calc_FiniteMixture")

used values = 22













3-parameter Minimum Age Model

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

n = 62

mean = 69.93

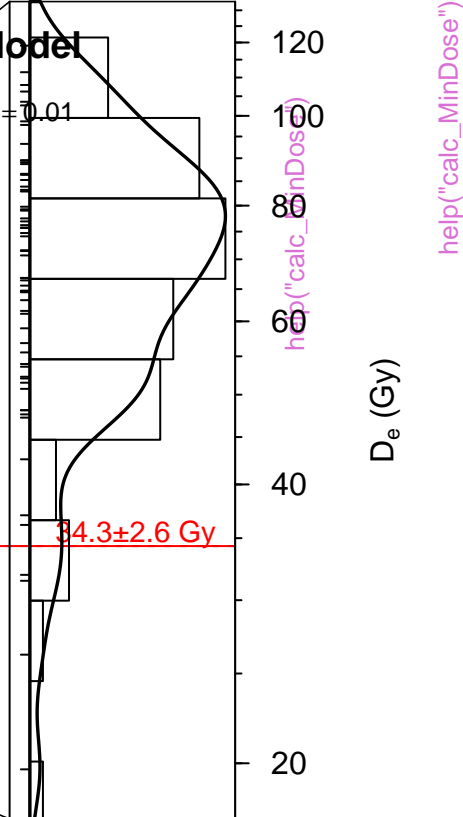
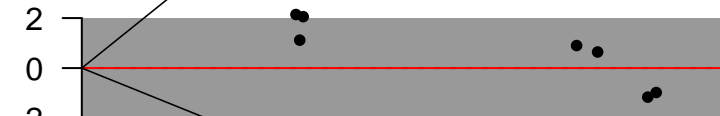
weighted mean = 59.3

median = 71.07

in confidence interval = 41.9 %

Standardised estimate

2
0
-2



Relative standard error (%)

20

10

6.7

0

n

15

0

5

Precision

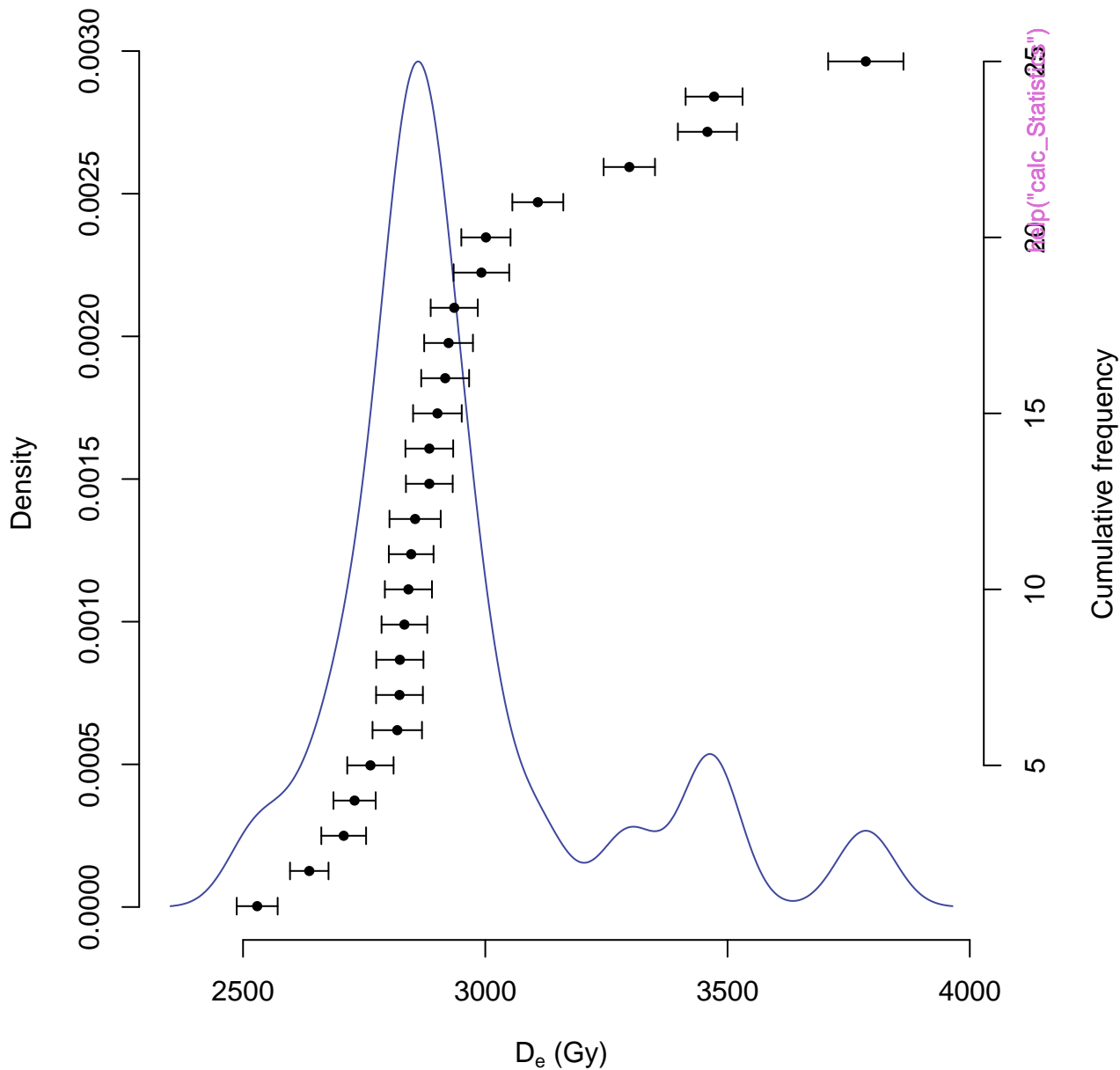
10

15

Density (bw 0.1)

0.106

D_e distribution

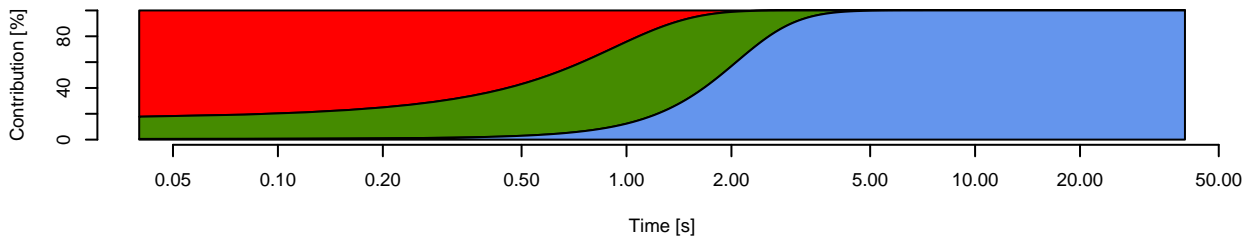


CW Curve Fit

Default



Component contribution to sum curve



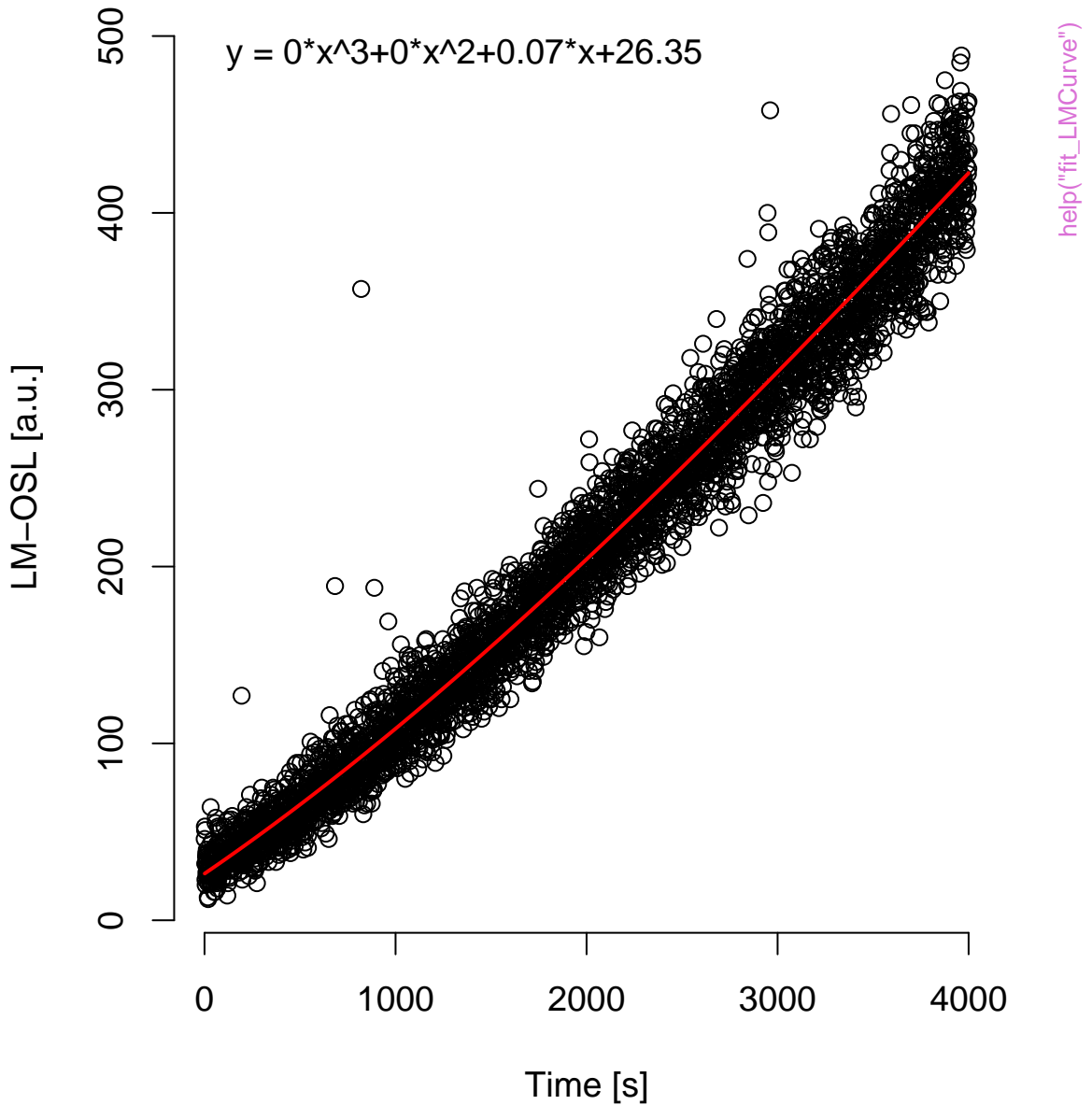
Default



Component contribution to sum curve



Background



Default



Component contribution to sum curve



Default



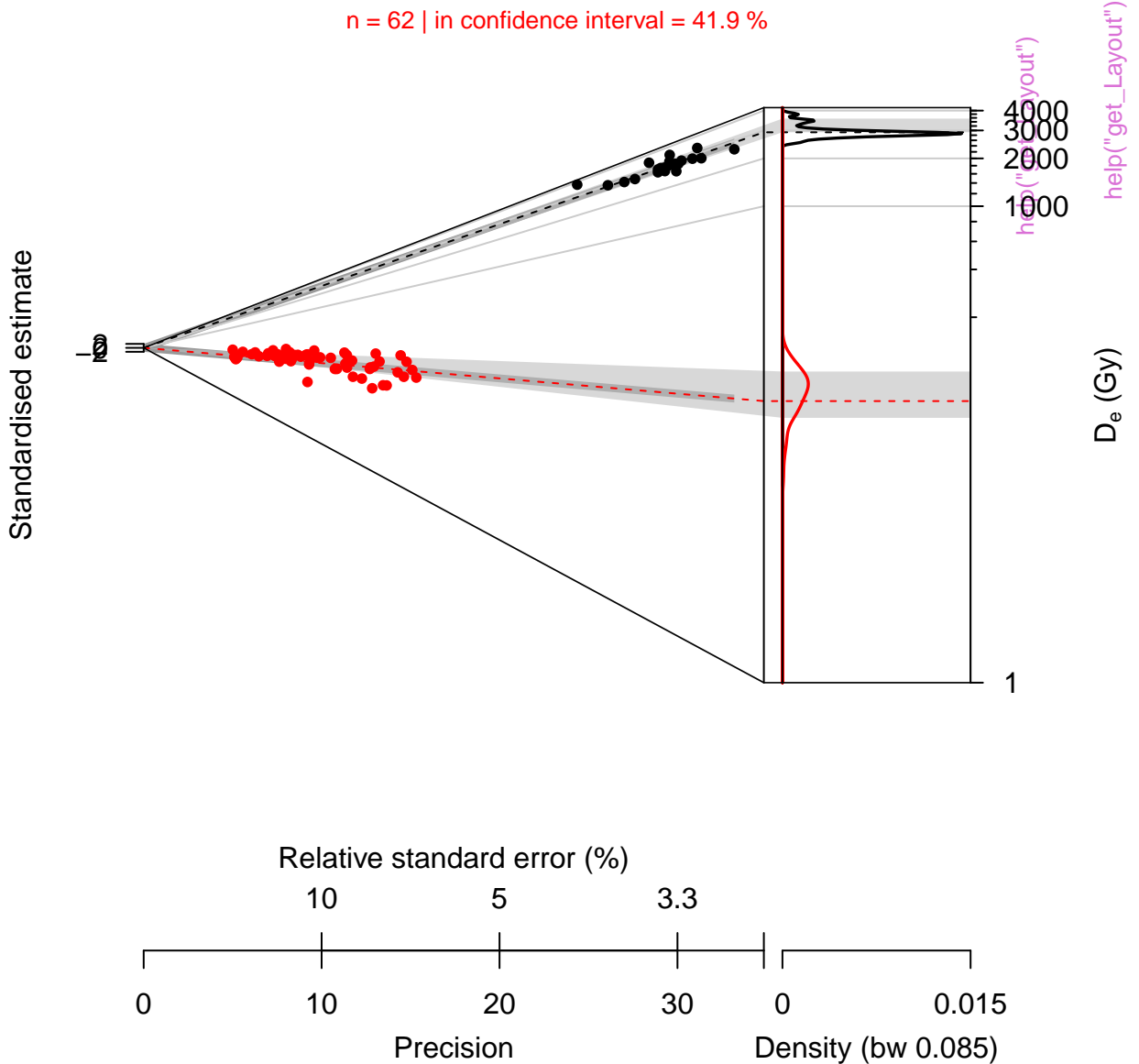
Component contribution to sum curve



D_e distribution

n = 25 | in confidence interval = 68 %

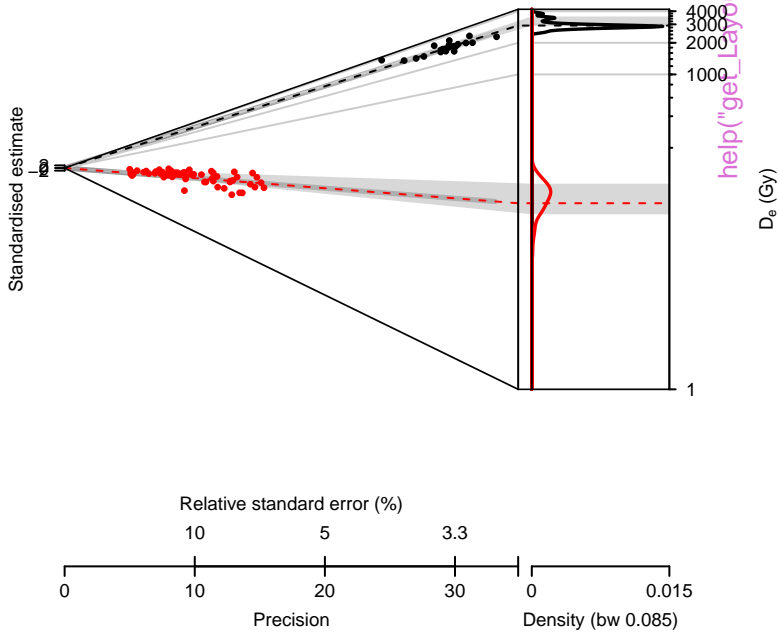
n = 62 | in confidence interval = 41.9 %



D_e distribution

n = 25 | in confidence interval = 68 %

n = 62 | in confidence interval = 41.9 %



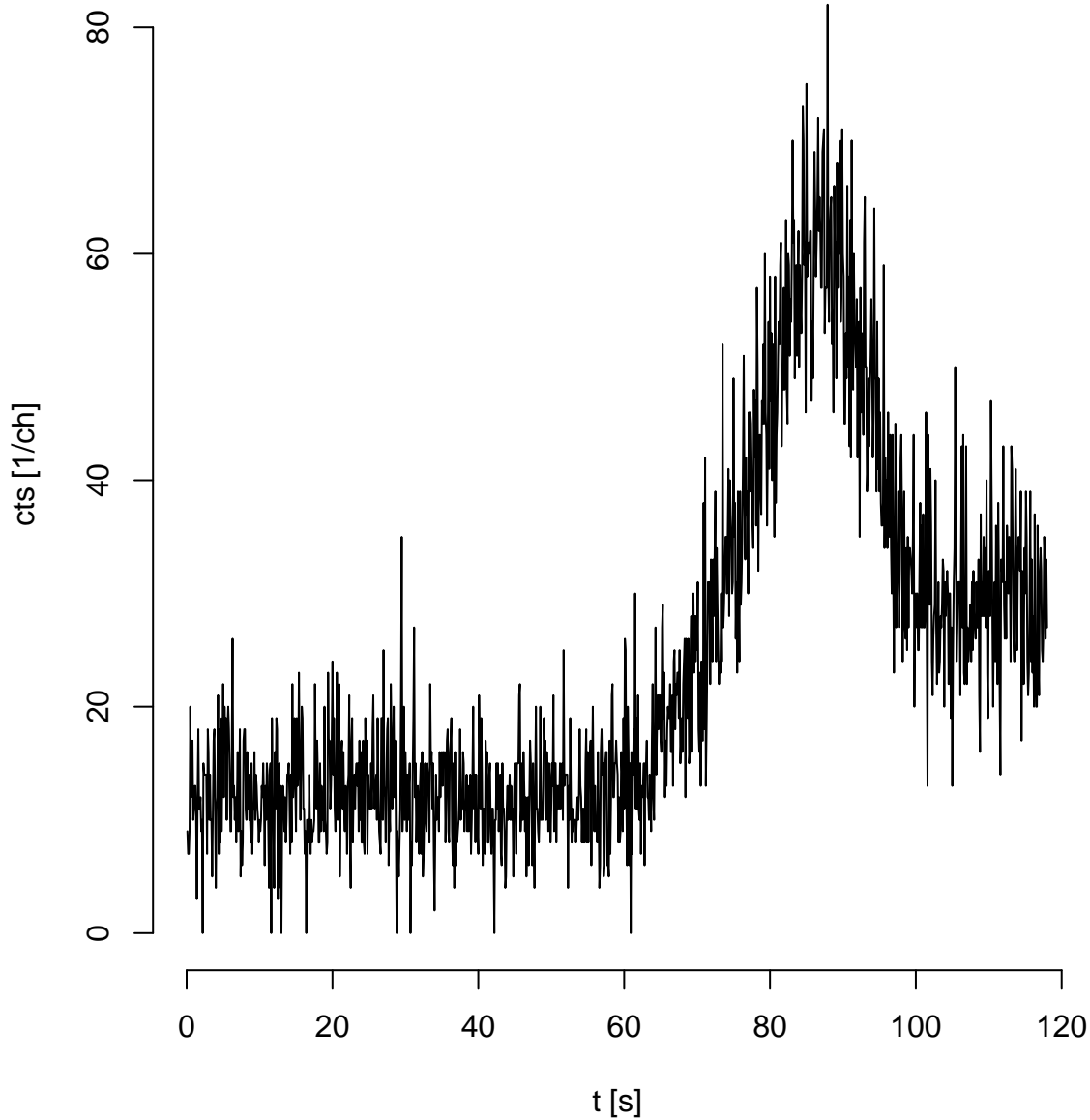
help("get_Layout")

help("get_Layout")

Profile log likelihood for σ_{OD}

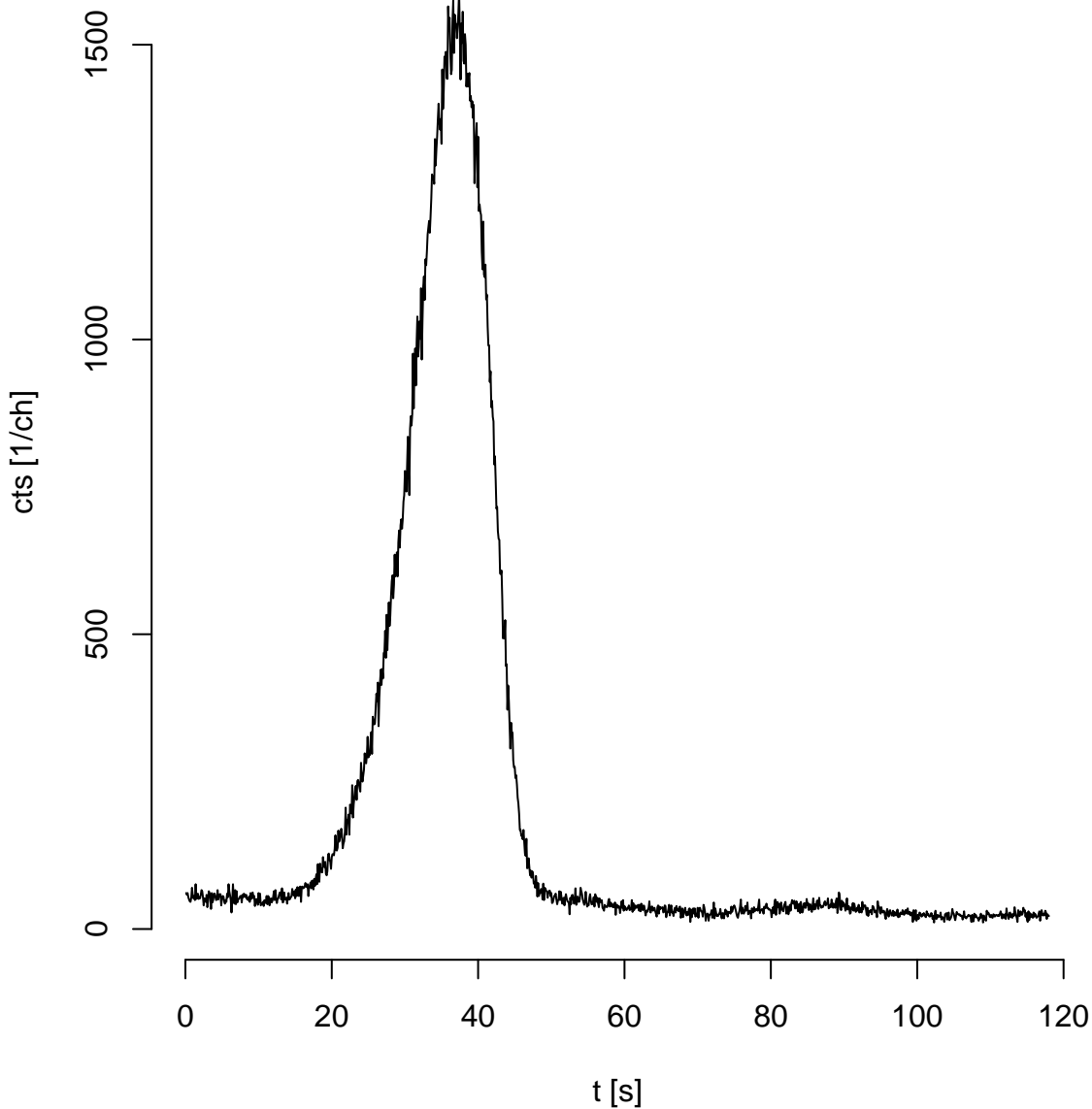


TL (UVVIS)



help("merge_RLum.Data.Curve")

TL (UVVIS)



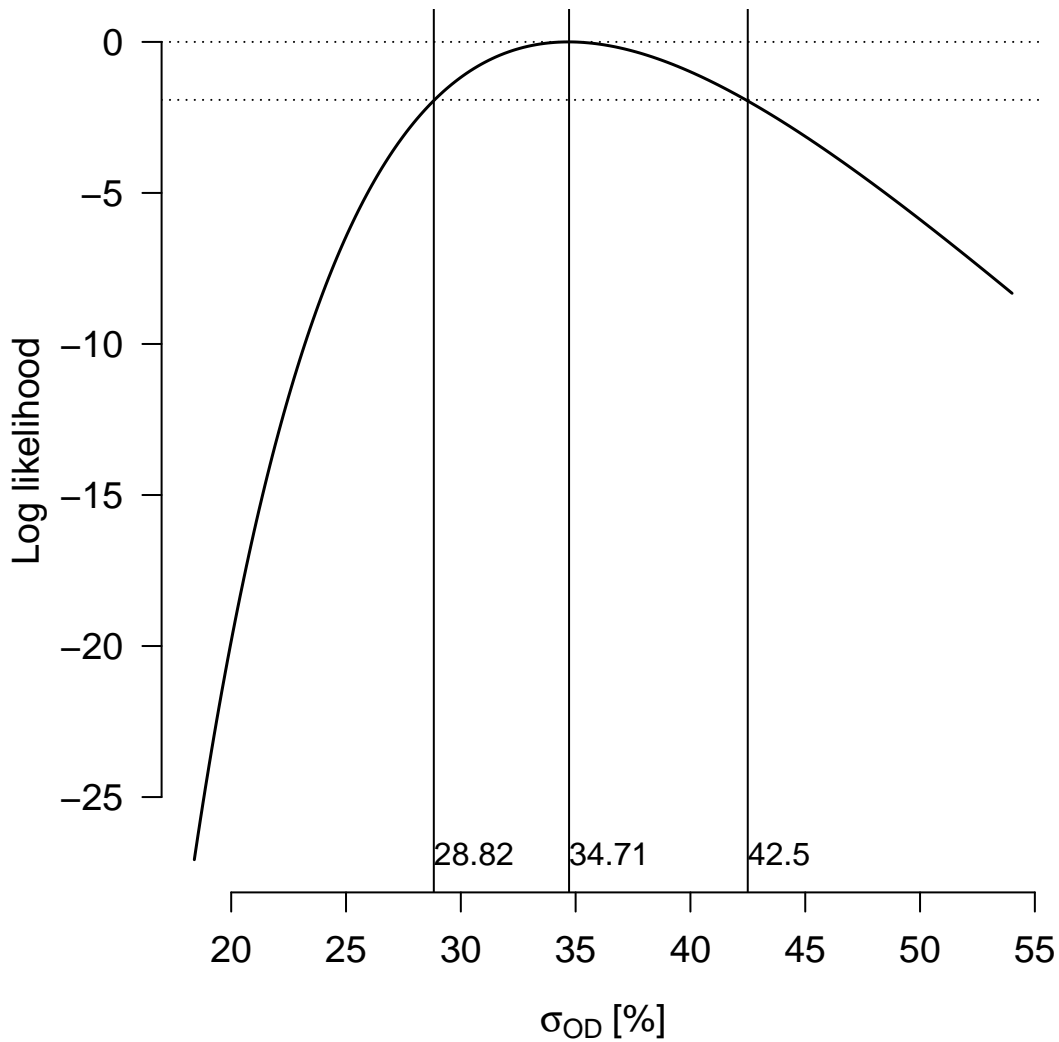
help("merge_RLum.Data.Curve")

TL (UVVIS)

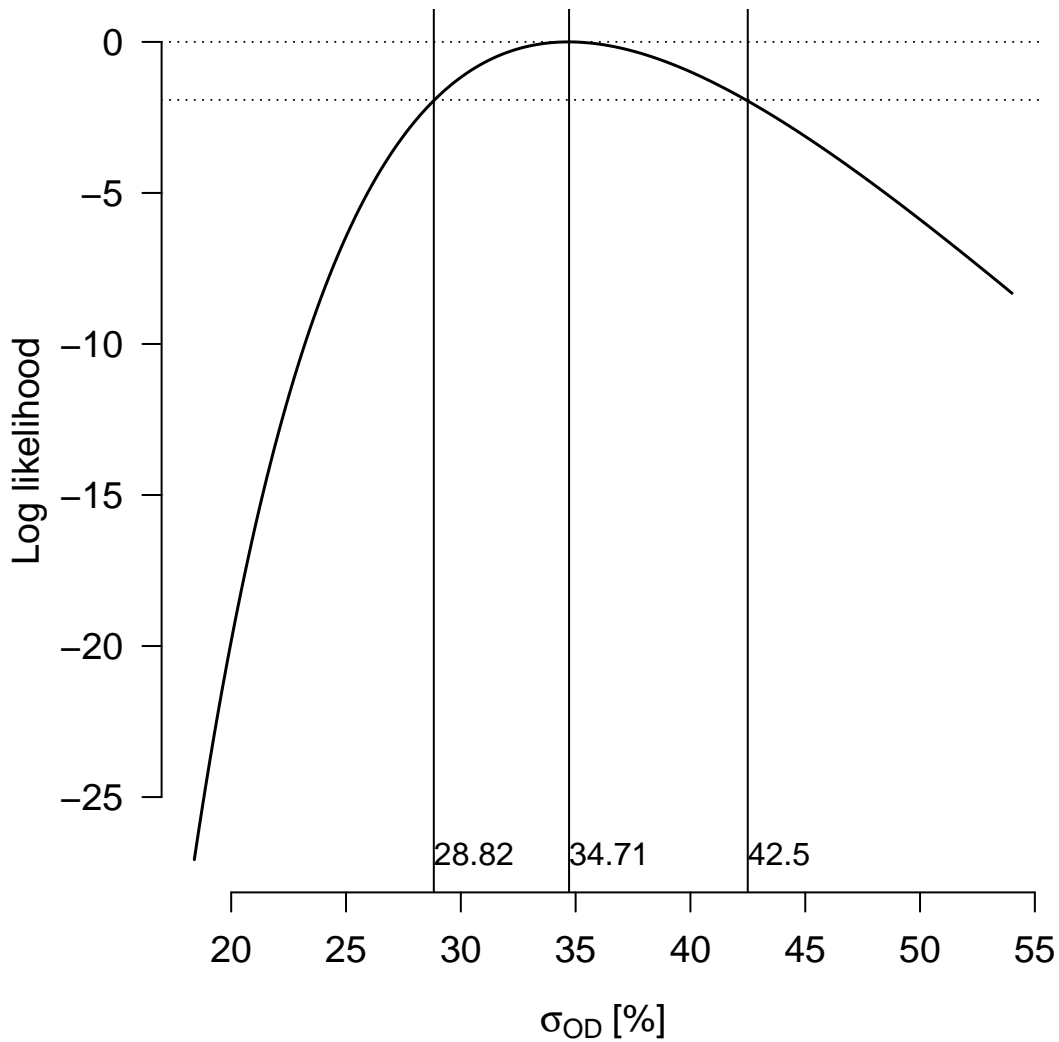


help("merge_RLum.Data.Curve")

Profile log likelihood for σ_{OD}



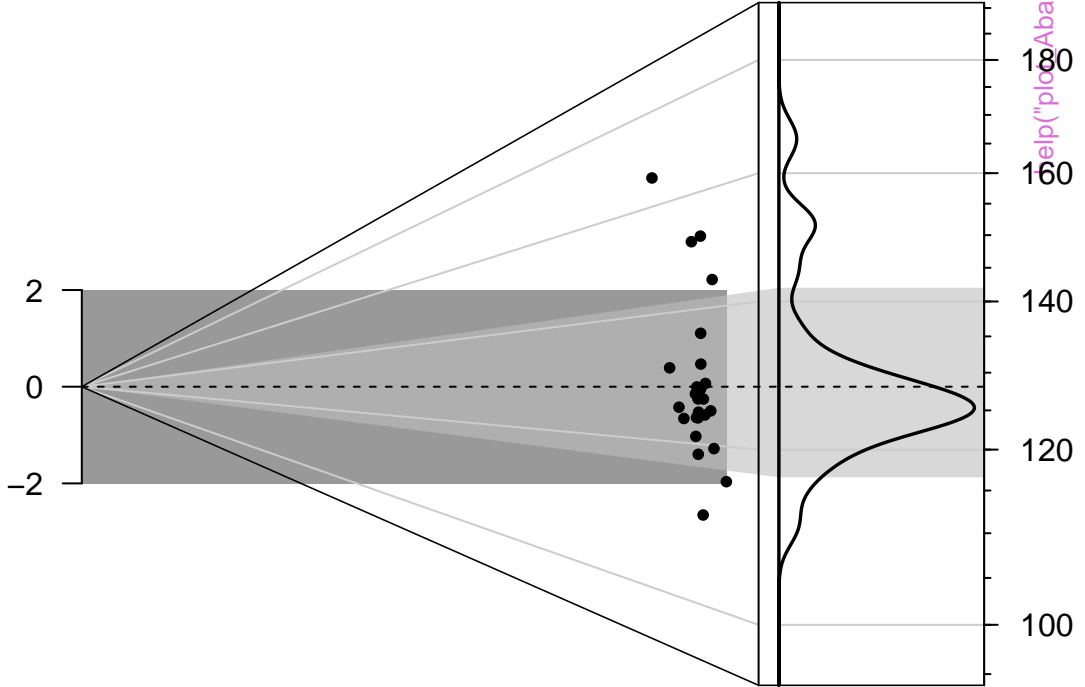
Profile log likelihood for σ_{OD}



D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

20 10 6.7

0

5

10

15

0

0.068

Precision

Density (bw 0.02)

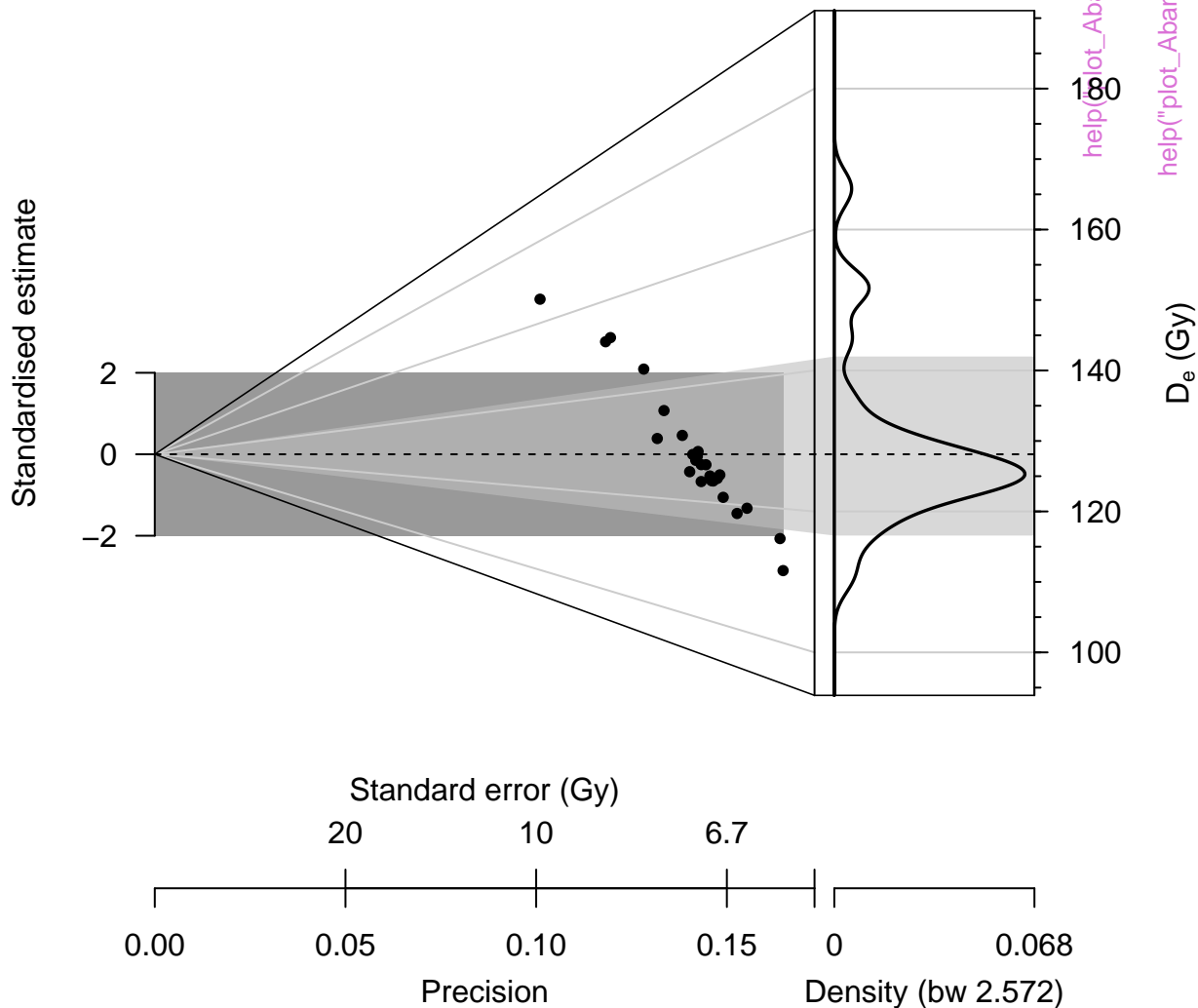
D_e (Gy)

help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

D_e distribution

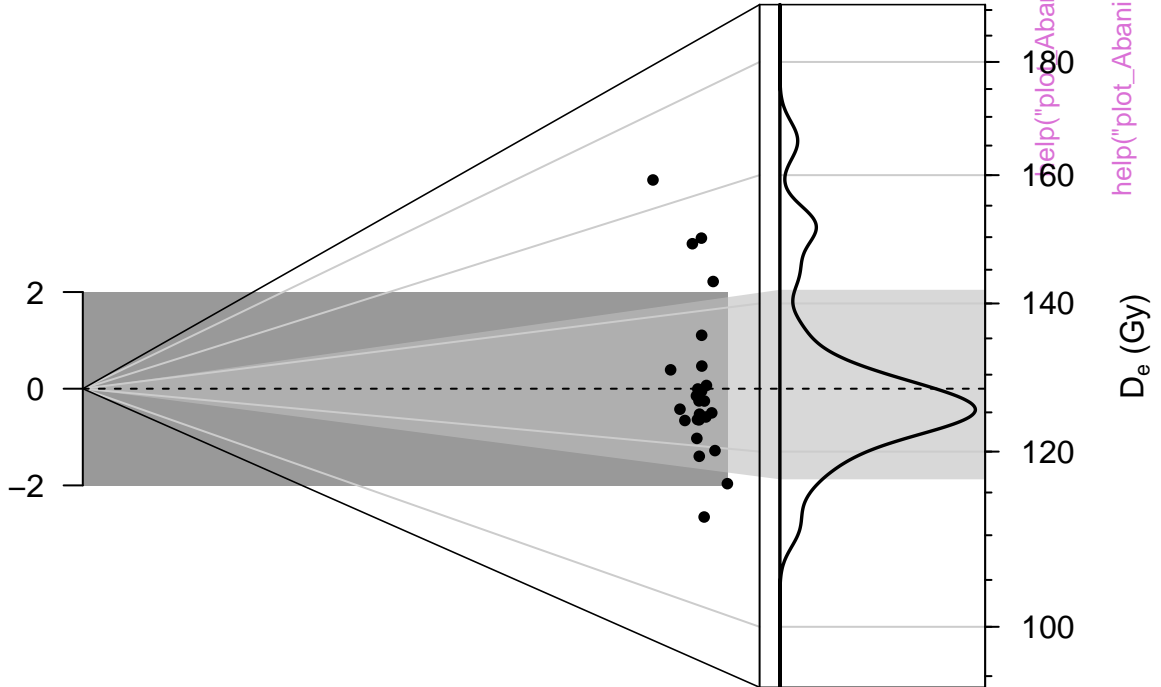
n = 25 | in confidence interval = 76 %



D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0

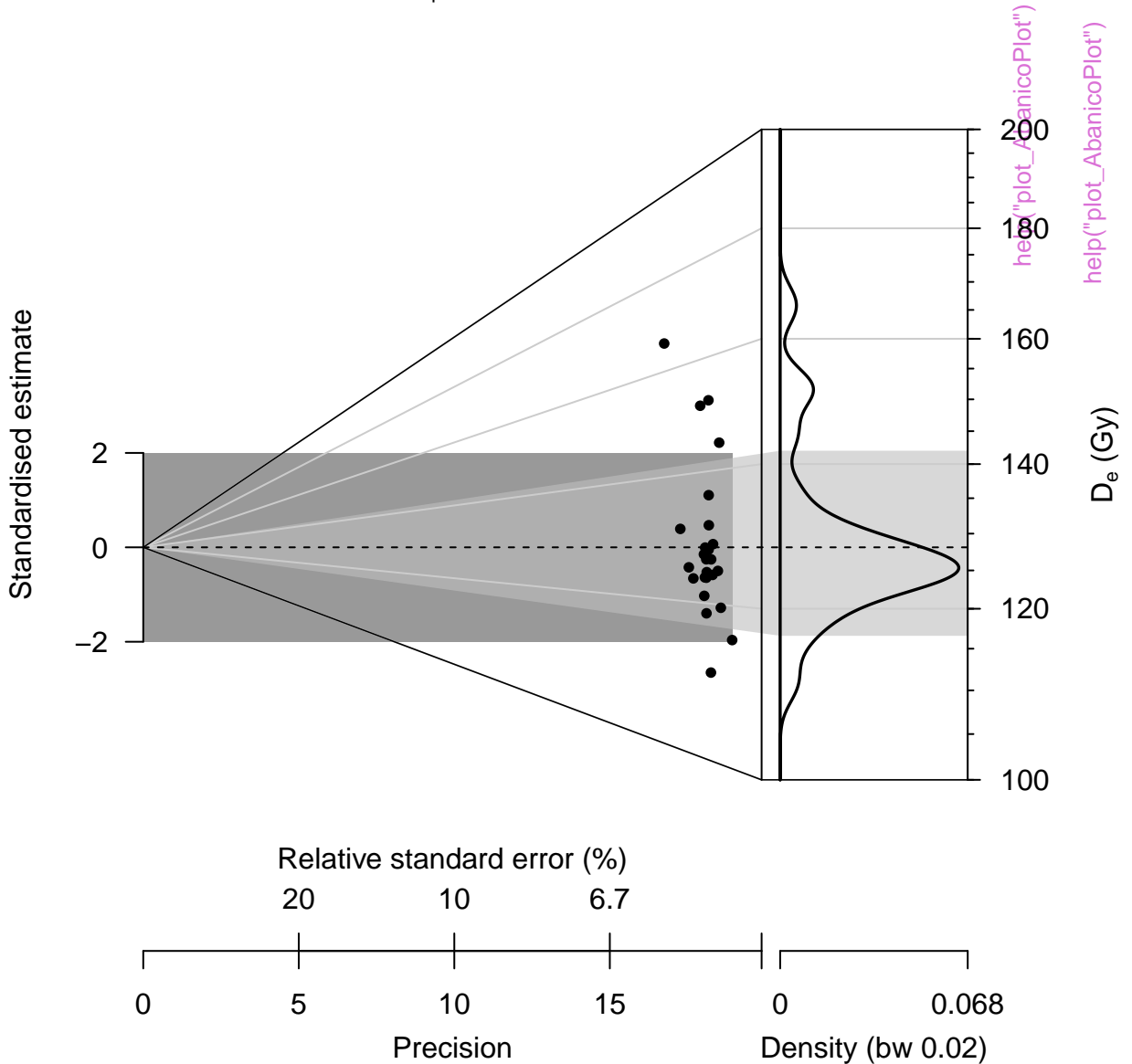
0.068

Precision

Density (bw 0.02)

D_e distribution

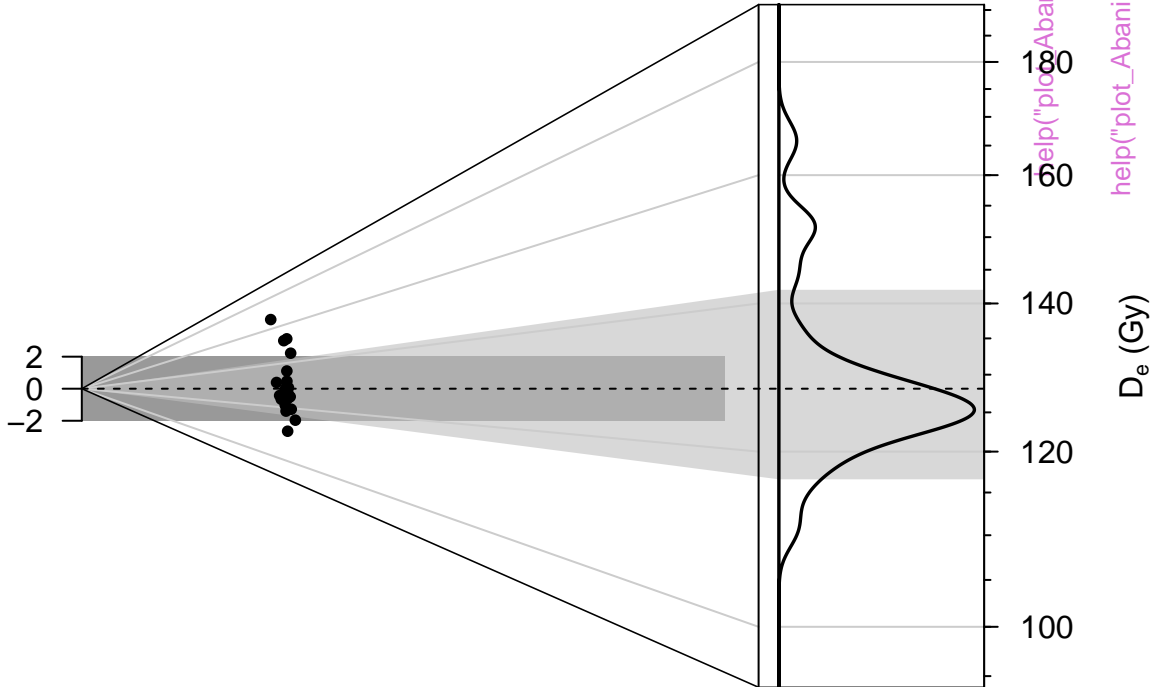
n = 25 | in confidence interval = 80 %



D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

5

2.5

1.7

0

20

40

600

0.068

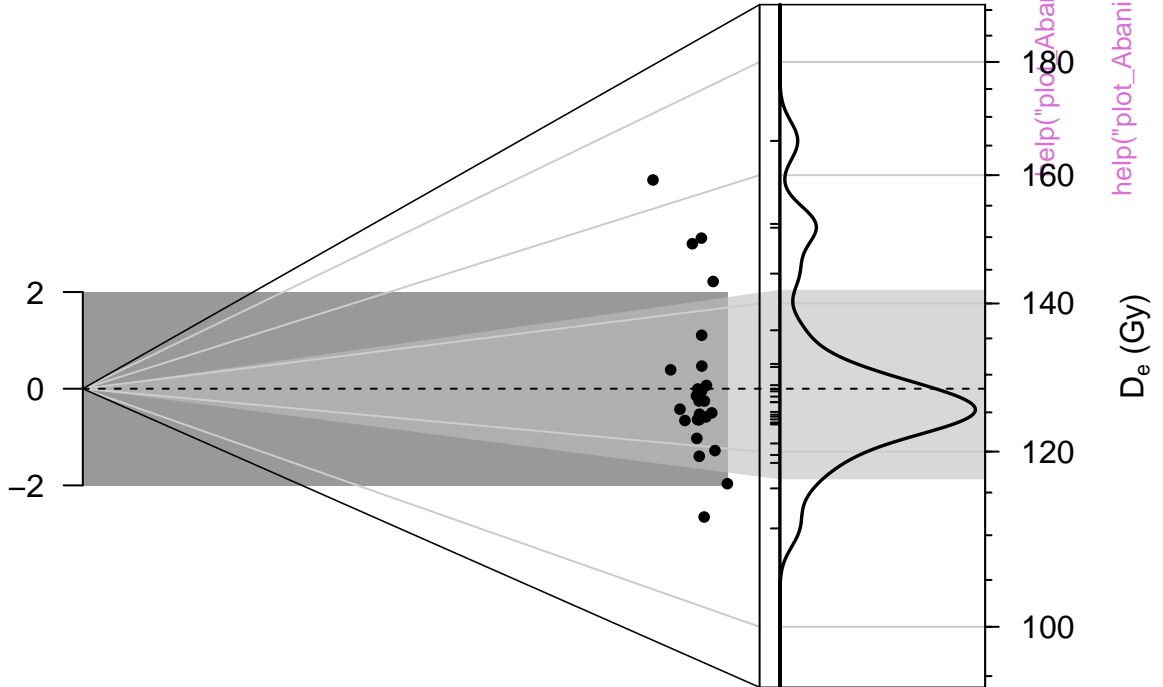
Precision

Density (bw 0.02)

D_e distribution

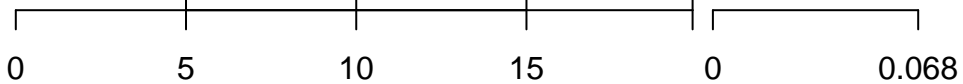
n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

20 10 6.7



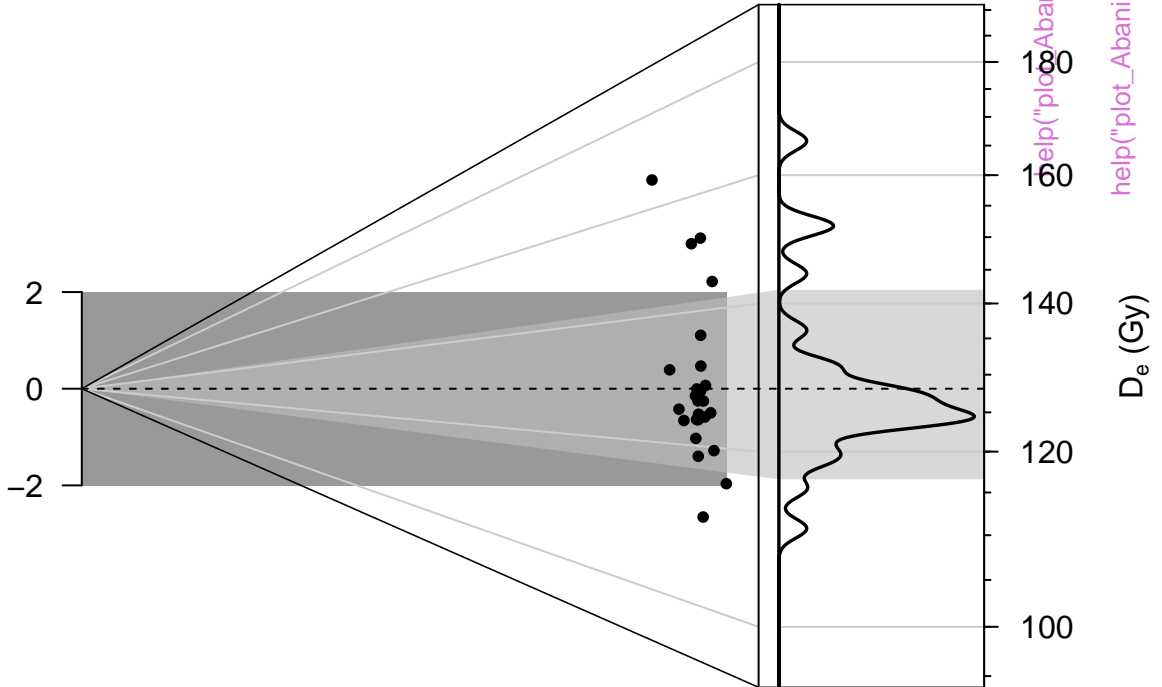
Precision

Density (bw 0.02)

D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

20 10 6.7

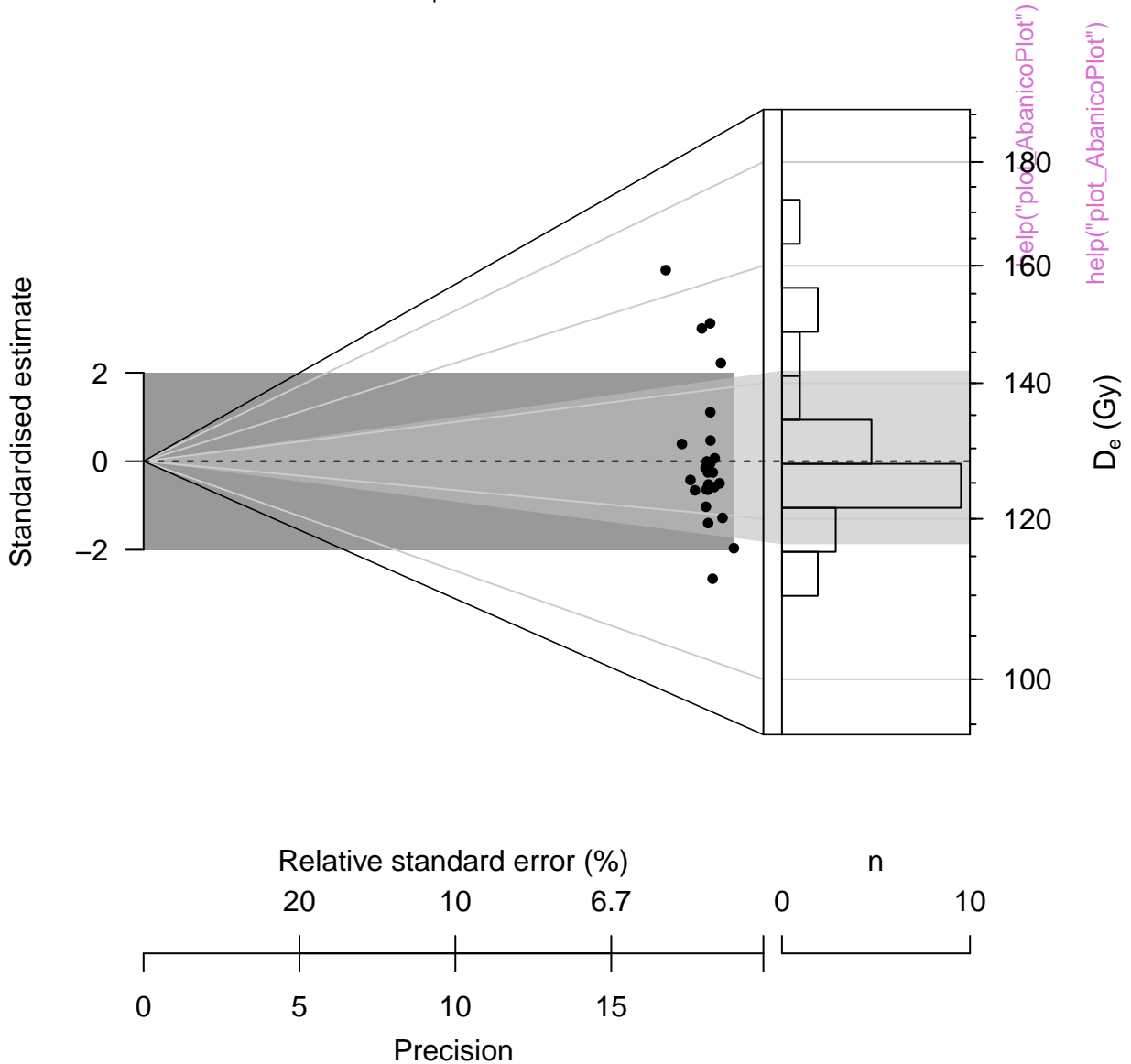
0 5 10 15 0 2.015

Precision

Density (bw 0.01)

D_e distribution

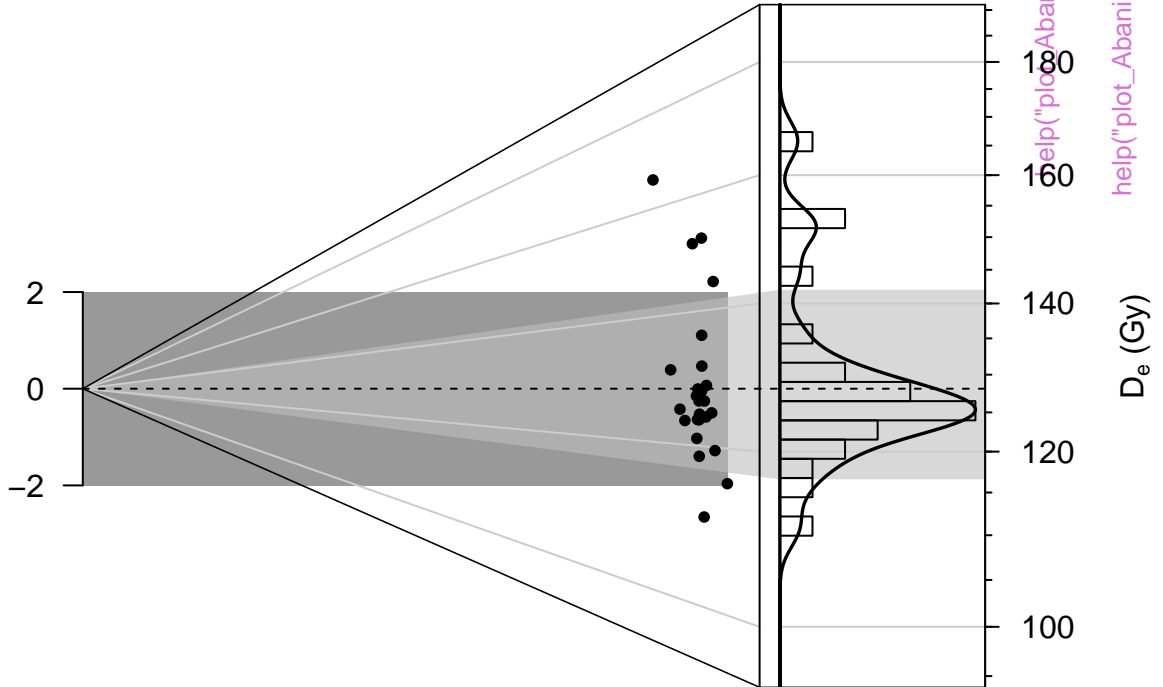
n = 25 | in confidence interval = 80 %



D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

20

10

6.7

n

0

6

0

5

10

15

0

0.068

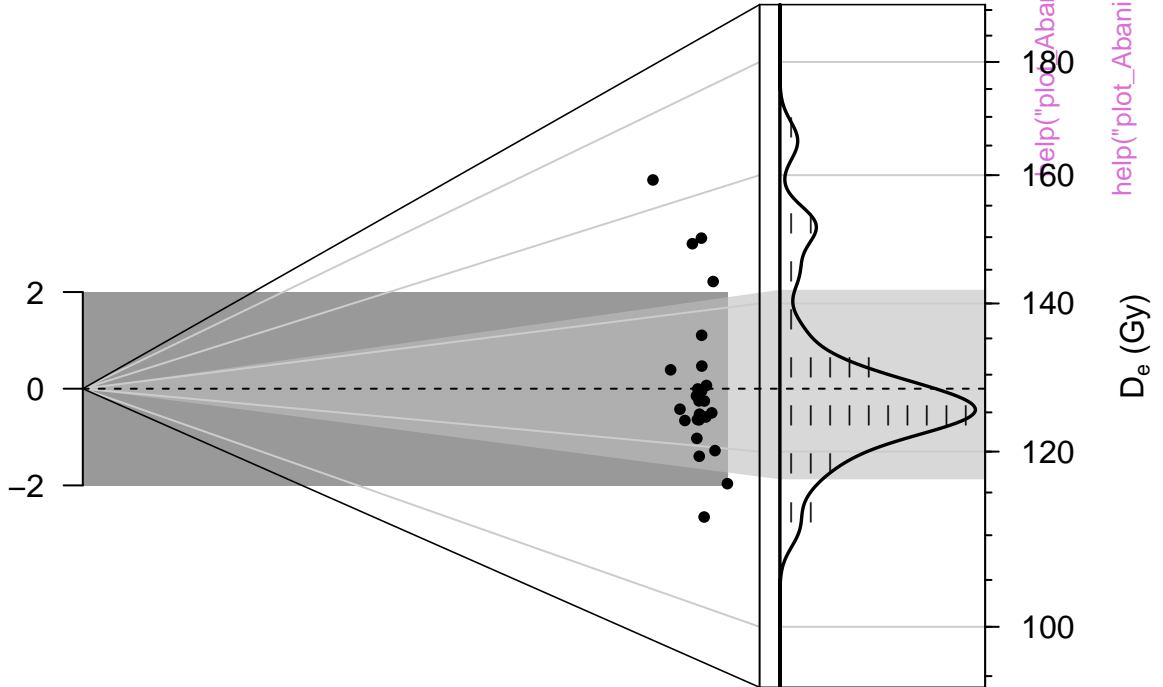
Precision

Density (bw 0.02)

D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0

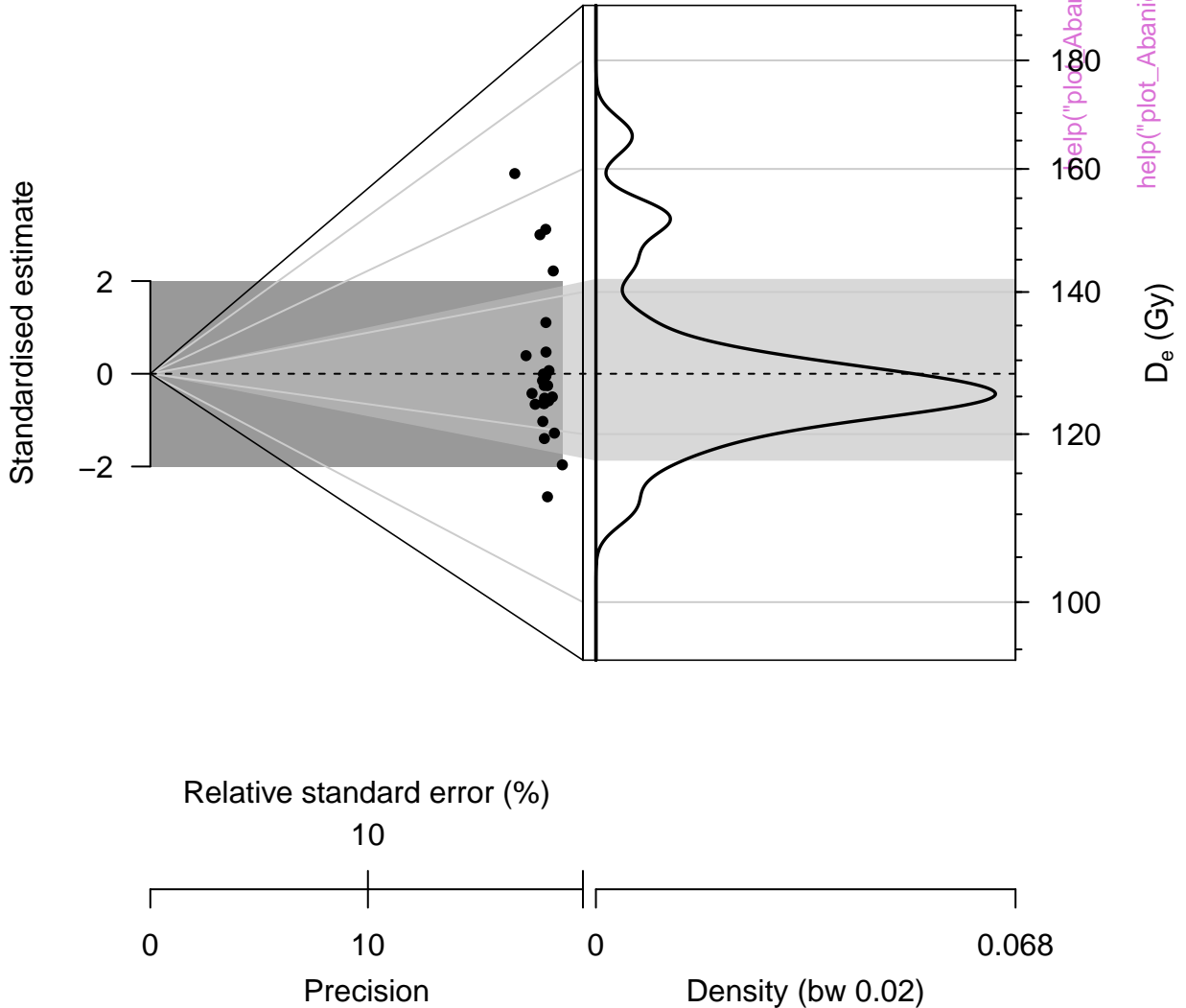
0.068

Precision

Density (bw 0.02)

D_e distribution

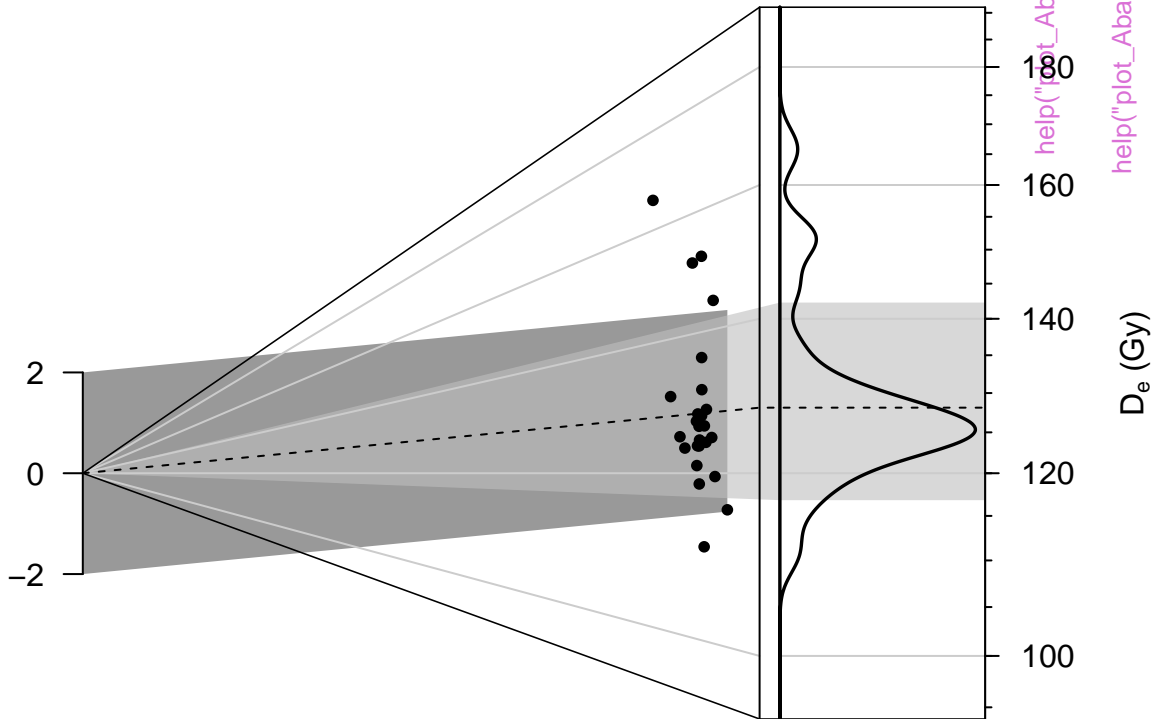
n = 25 | in confidence interval = 80 %



D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

20 10 6.7

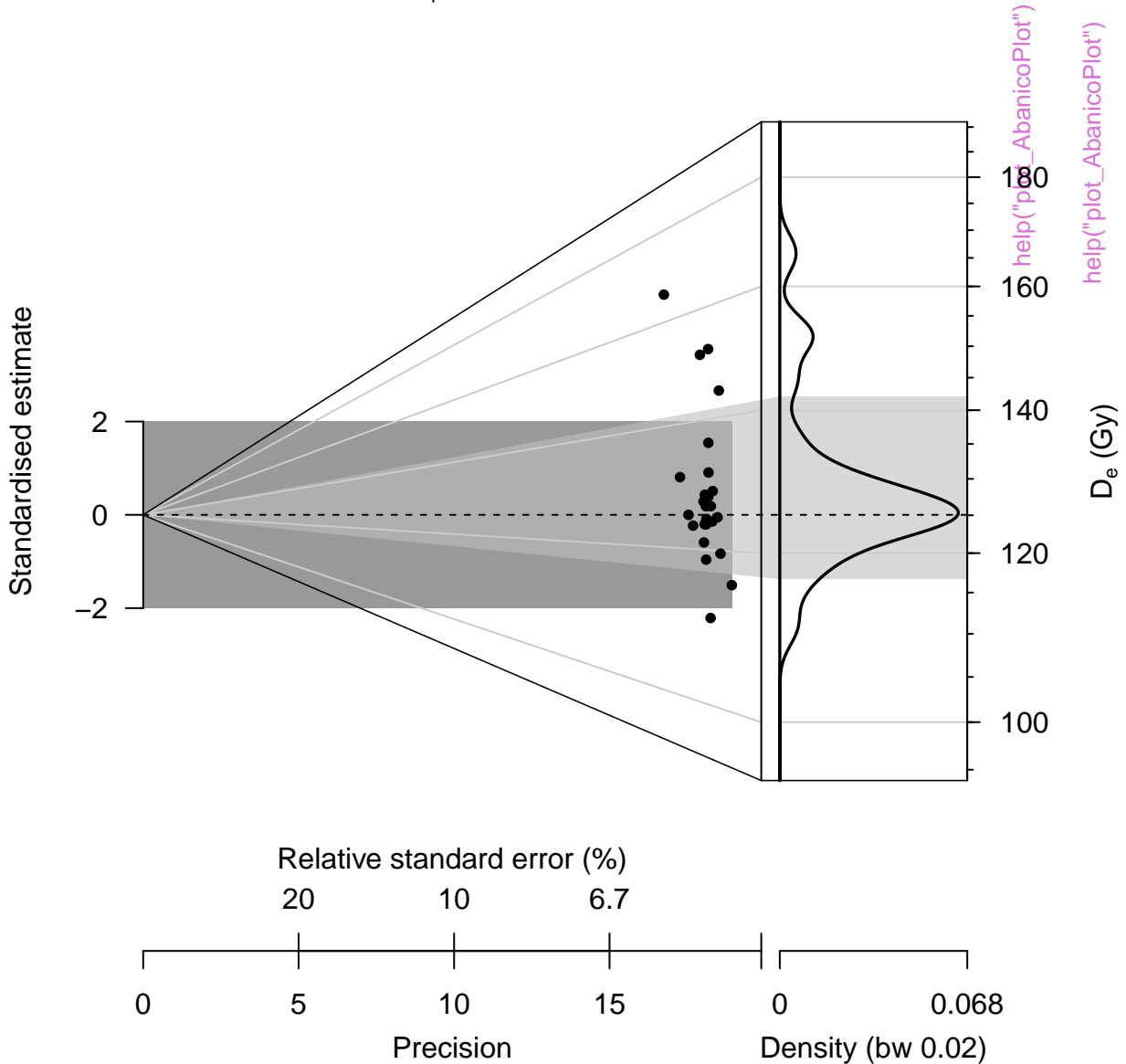
0 5 10 15 0 0.068

Precision

Density (bw 0.02)

D_e distribution

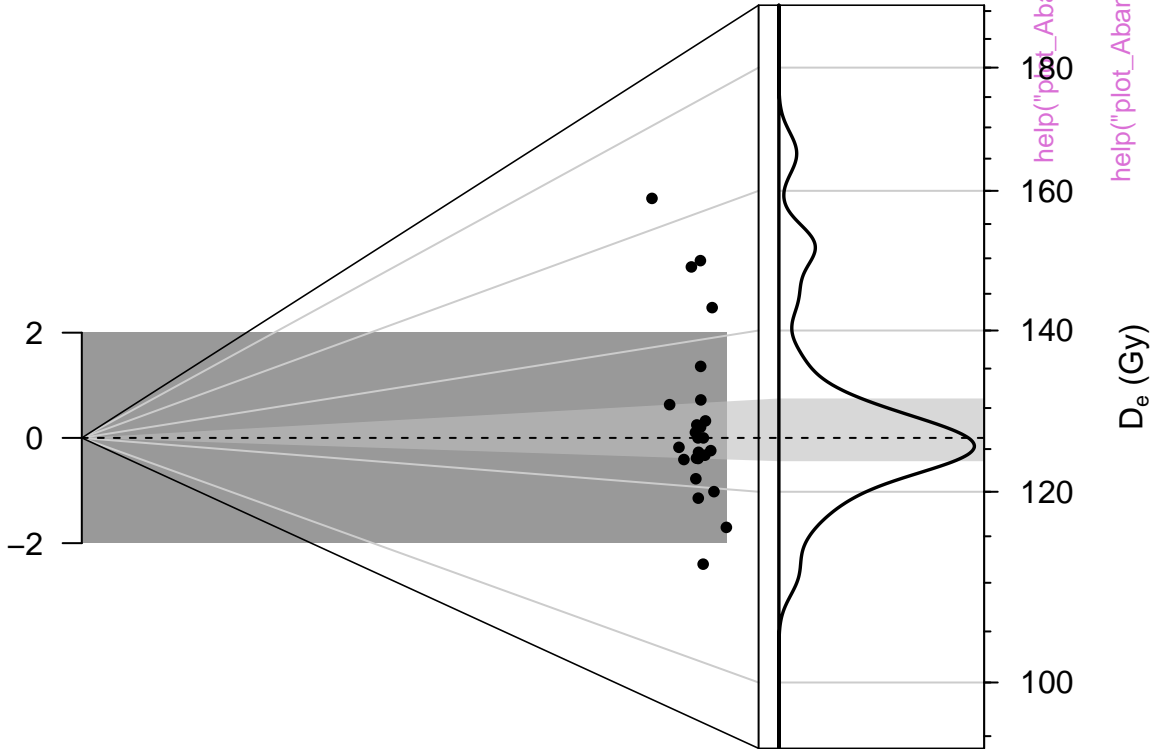
n = 25 | in confidence interval = 80 %



D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

20 10 6.7

0

5

10

15

0

0.068

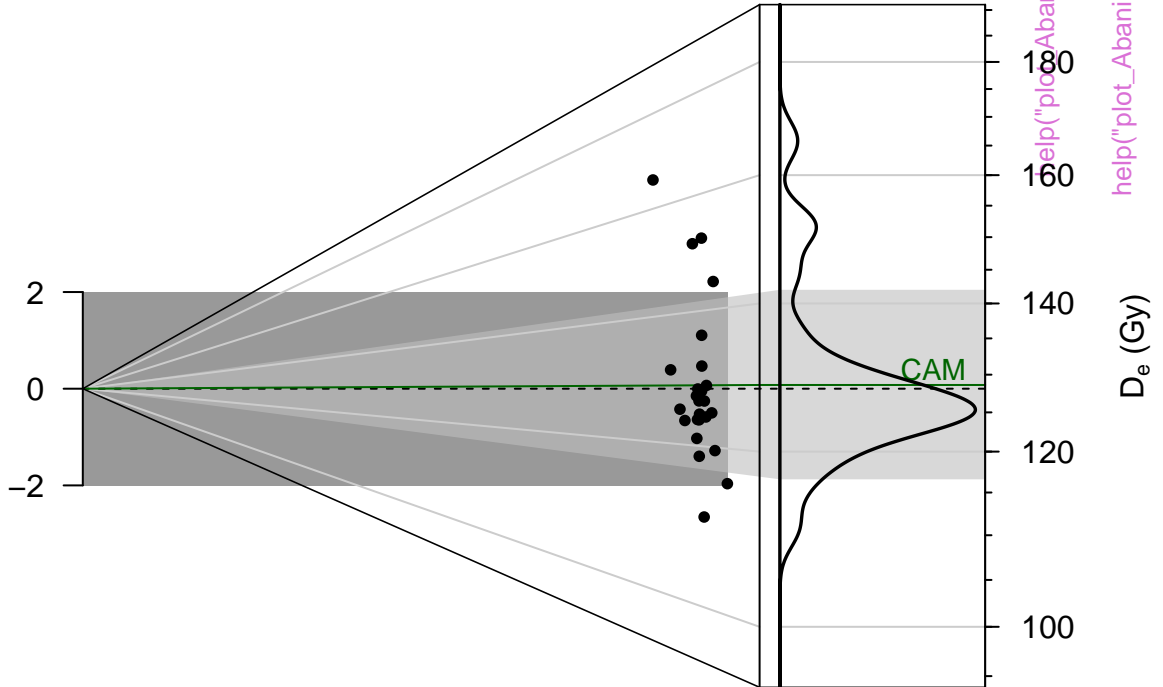
Precision

Density (bw 0.02)

D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

20 10 6.7

0 5 10 15 0 0.068

Precision

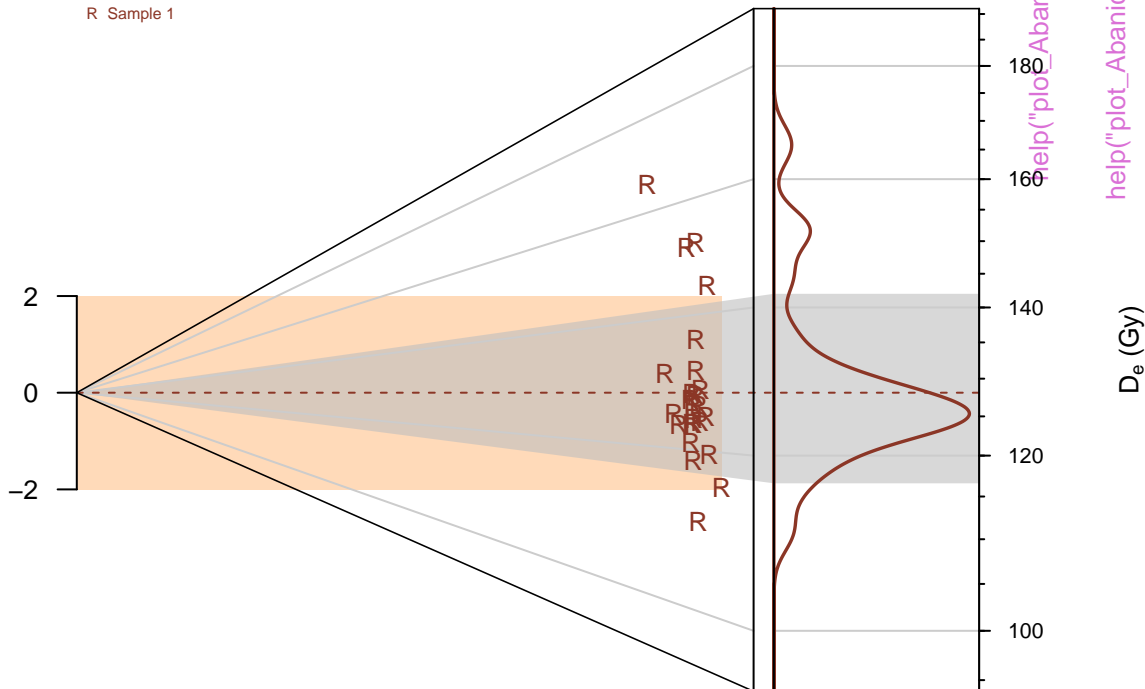
Density (bw 0.02)

D_e distribution

n = 25 | in confidence interval = 80 %

R Sample 1

Standardised estimate



Relative standard error (%)

20

10

6.7

0

5

10

15

0

0.068

Precision

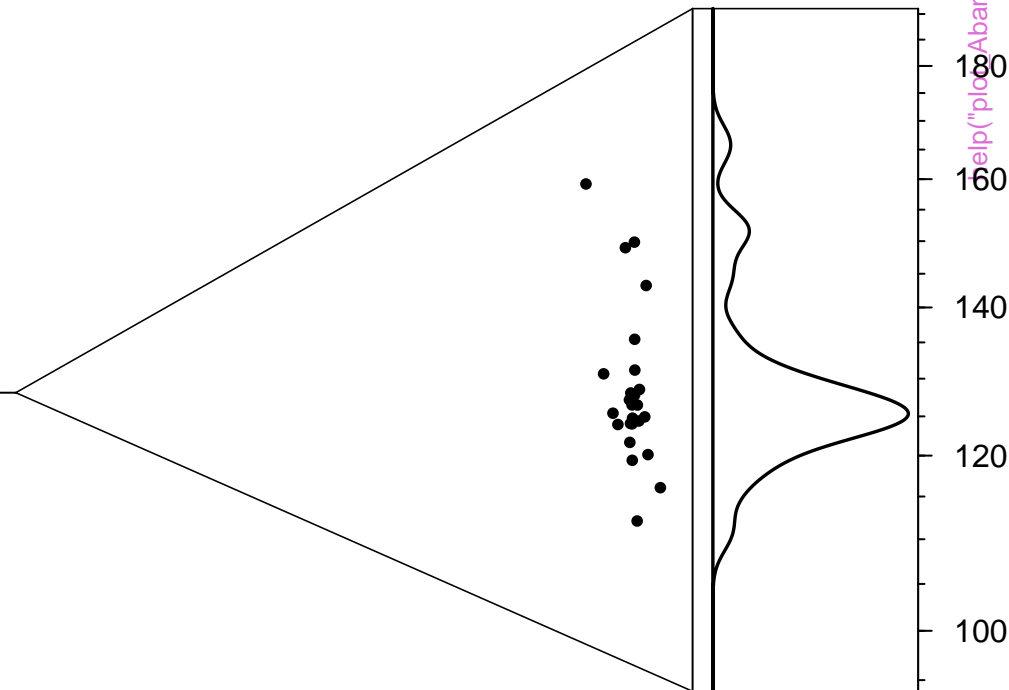
Density (bw 0.02)

D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate

0



help("plot_AbanicoPlot")

help("plot_AbanicoPlot")

D_e (Gy)

Relative standard error (%)

20

10

6.7

0

5

10

15

0

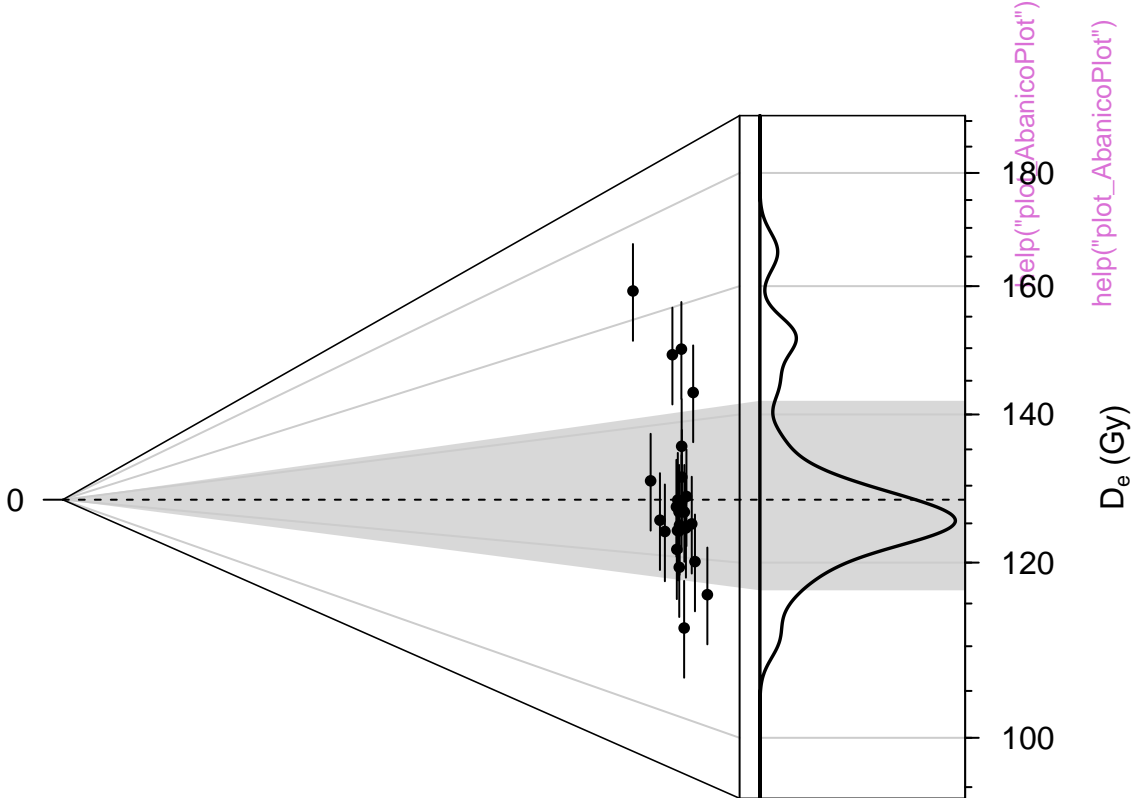
0.068

Precision

Density (bw 0.02)

D_e distribution

n = 25 | in confidence interval = 80 %



Relative standard error (%)

20

10

6.7

0

5

10

15

0

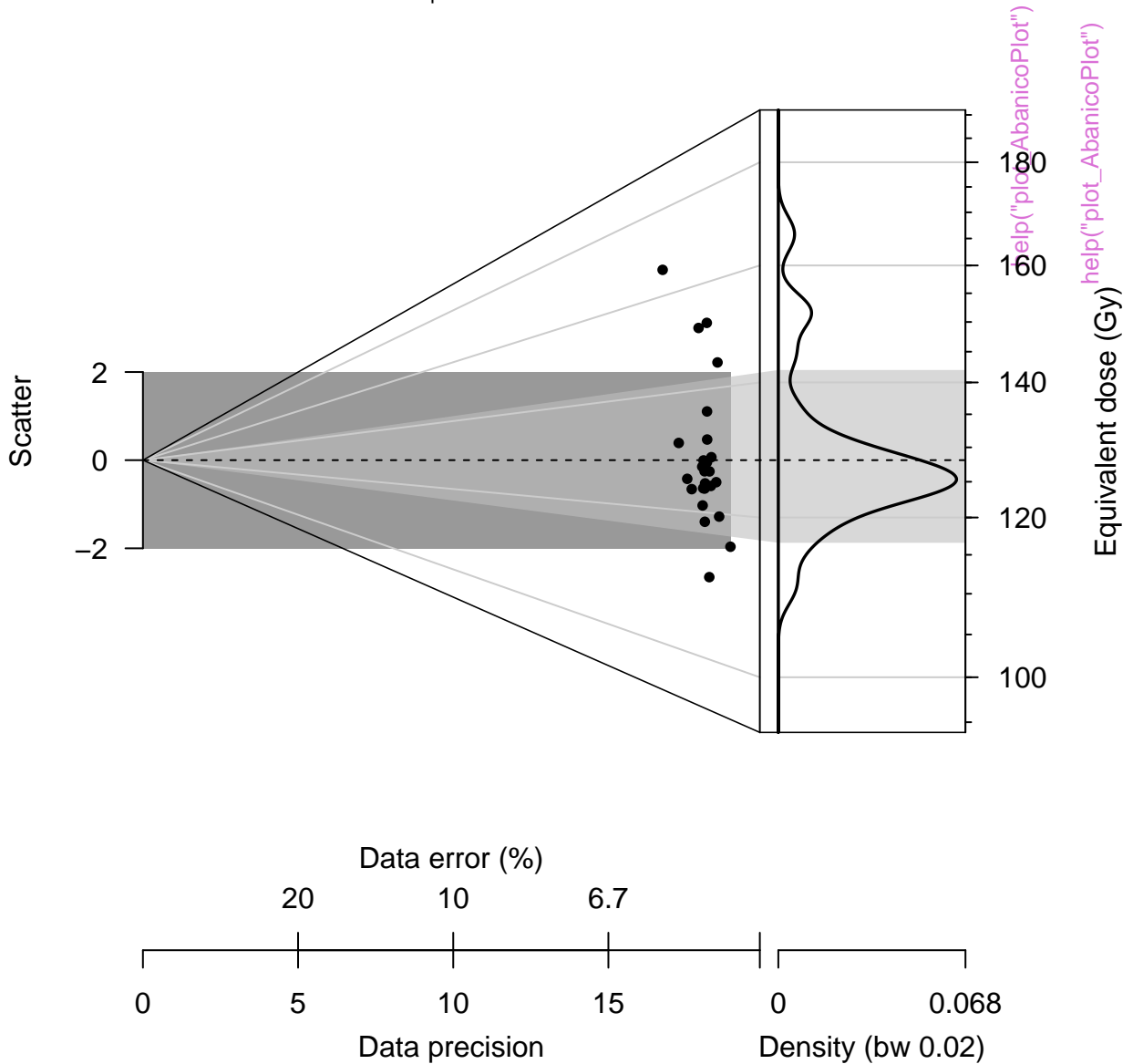
0.068

Precision

Density (bw 0.02)

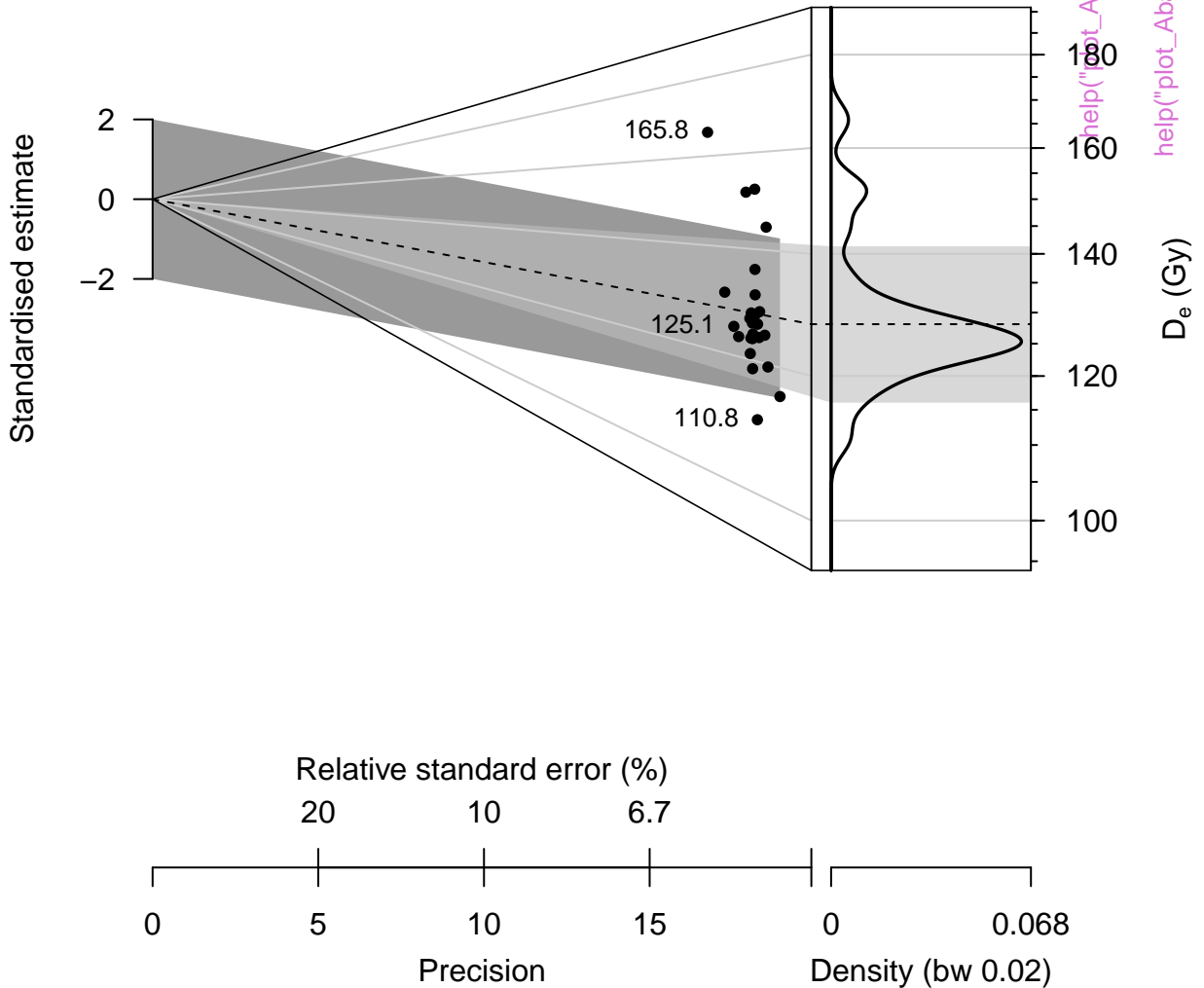
D_e distribution

n = 25 | in confidence interval = 80 %



D_e distribution

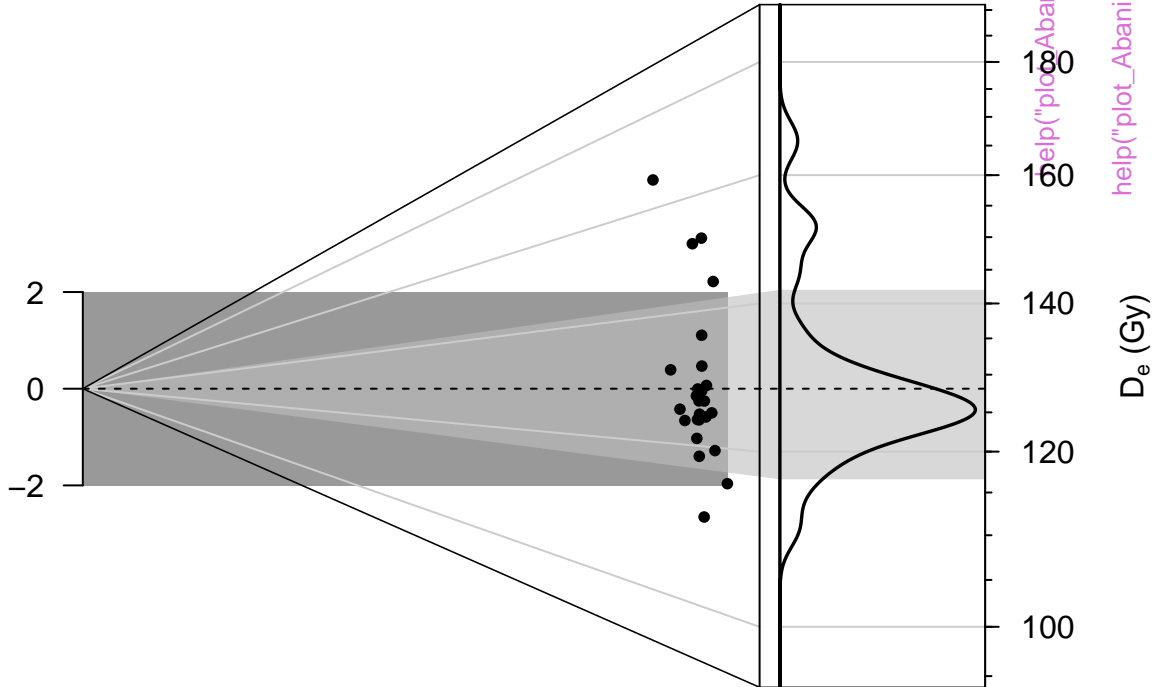
n = 25 | in confidence interval = 80 %



D_e distribution

n = 25 | in confidence interval = 80 %

Standardised estimate



Relative standard error (%)

20 10 6.7

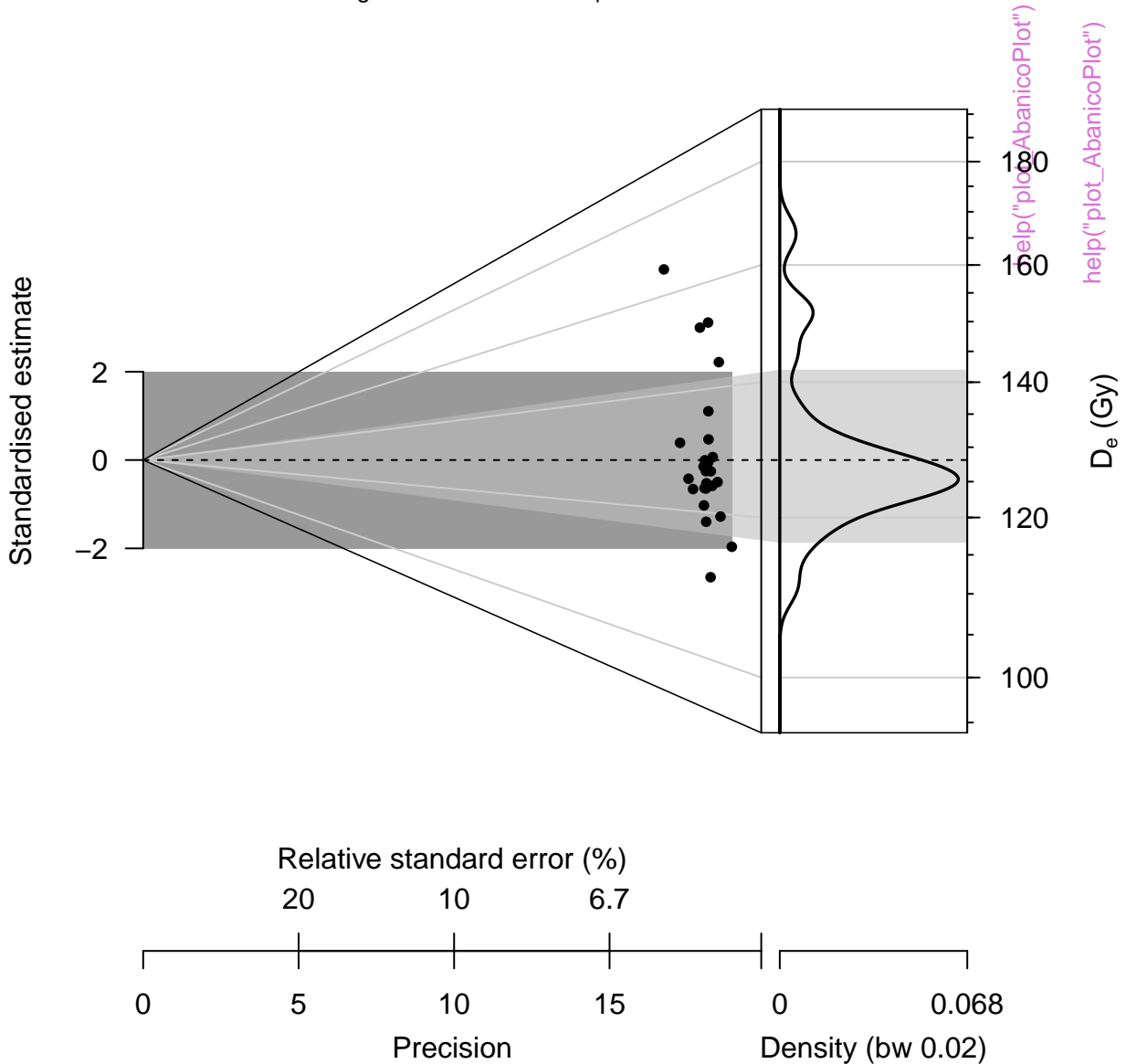
0 5 10 15 0 0.068

Precision

Density (bw 0.02)

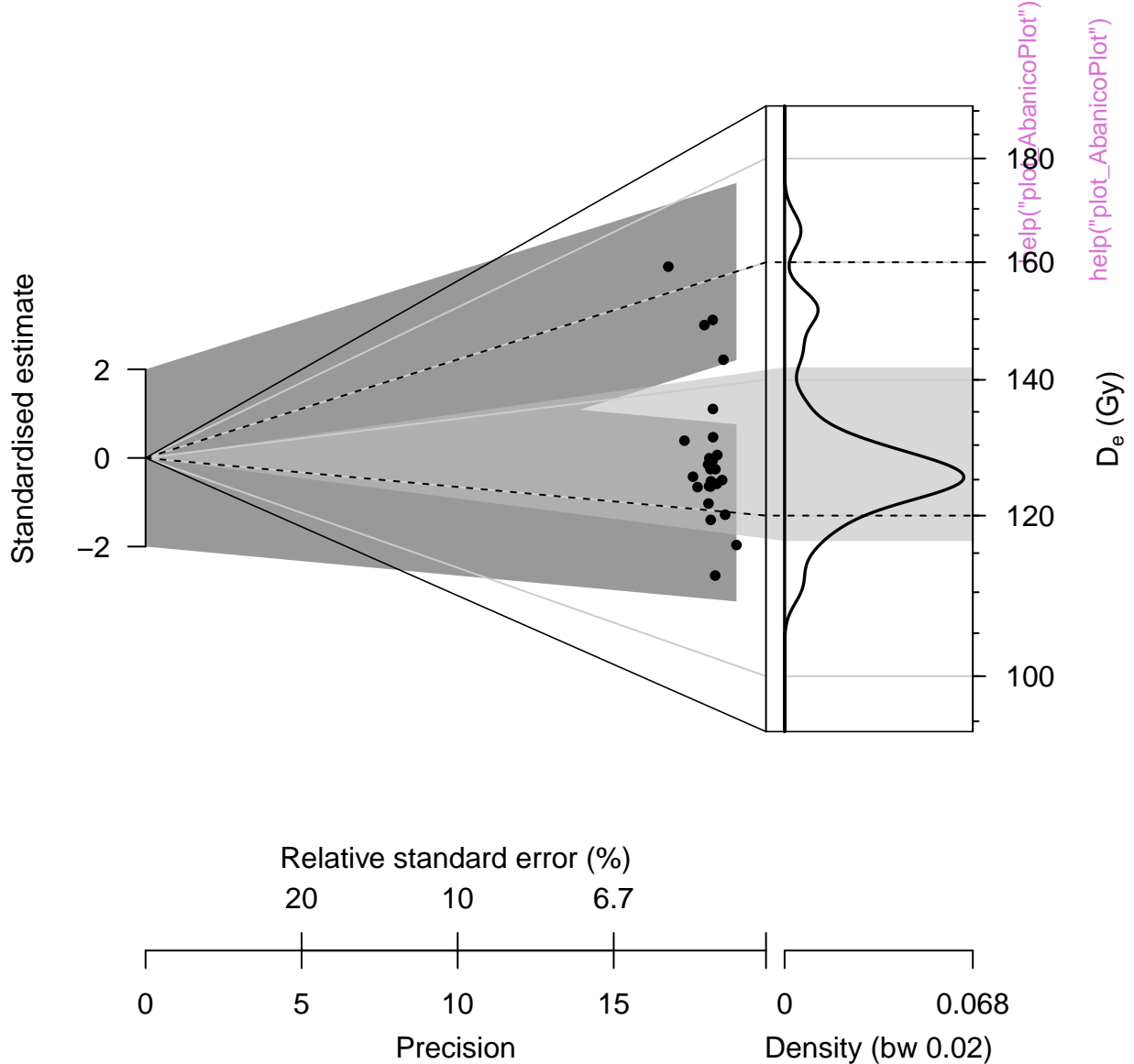
D_e distribution

weighted mean = 128.12 | median = 126.34



D_e distribution

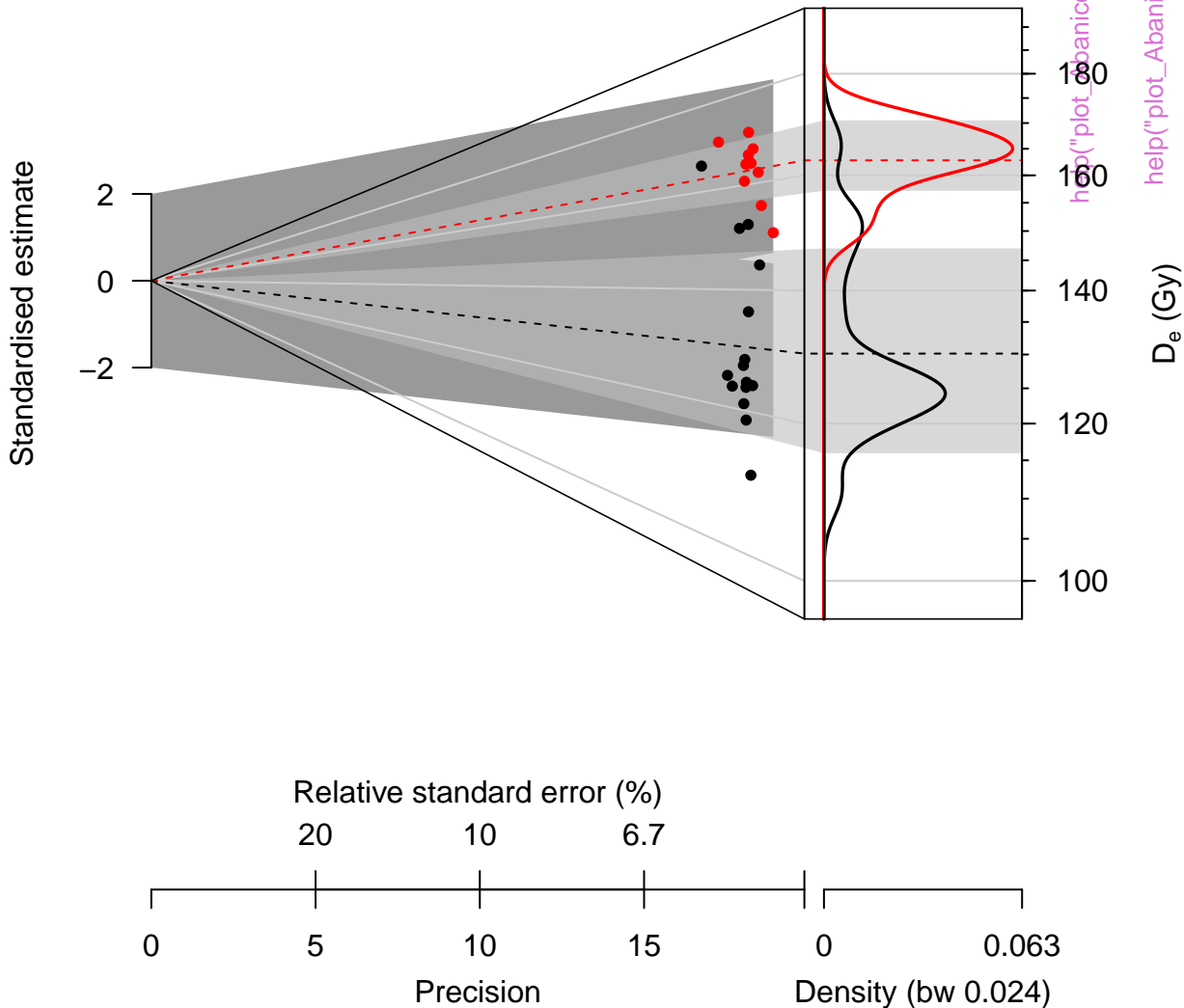
n = 25



D_e distribution

n = 15 | in confidence interval = 73.3 %

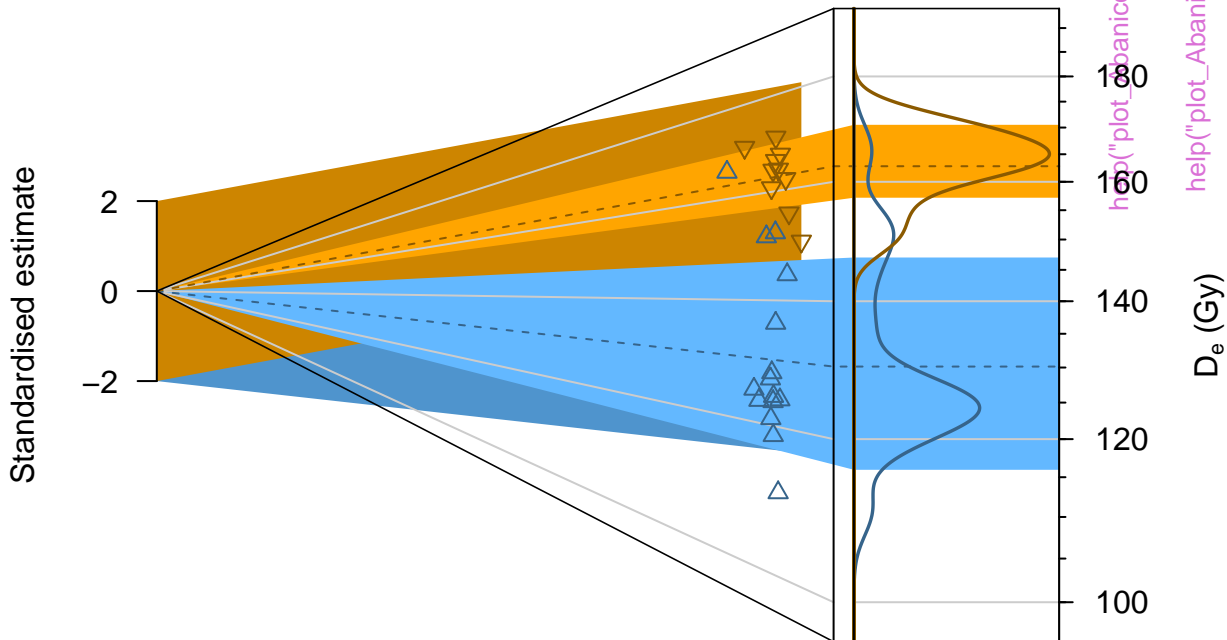
n = 10 | in confidence interval = 100 %



D_e distribution

n = 15 | in confidence interval = 73.3 %

n = 10 | in confidence interval = 100 %



Relative standard error (%)

20

10

6.7

0

5

10

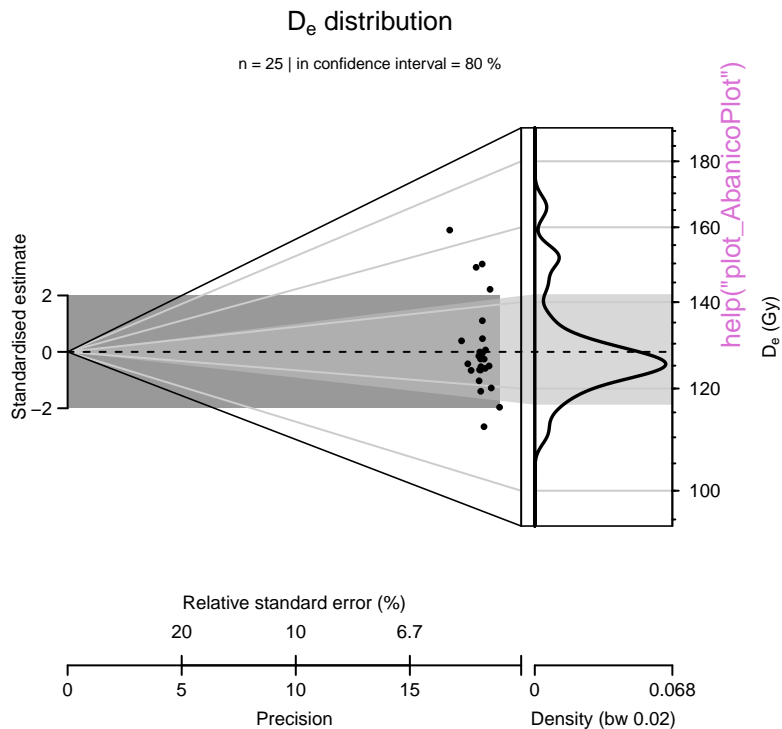
15

0

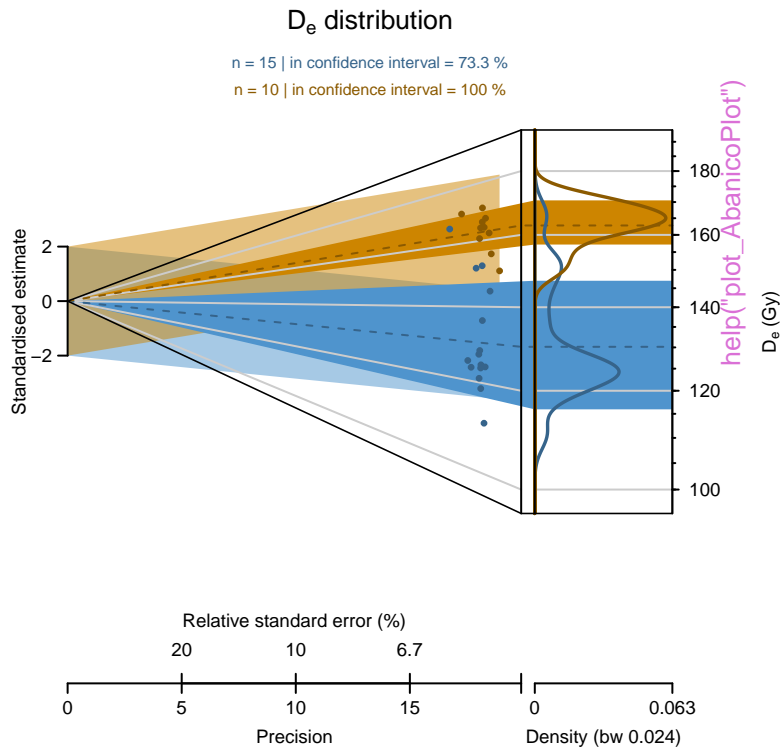
0.063

Precision

Density (bw 0.024)



`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

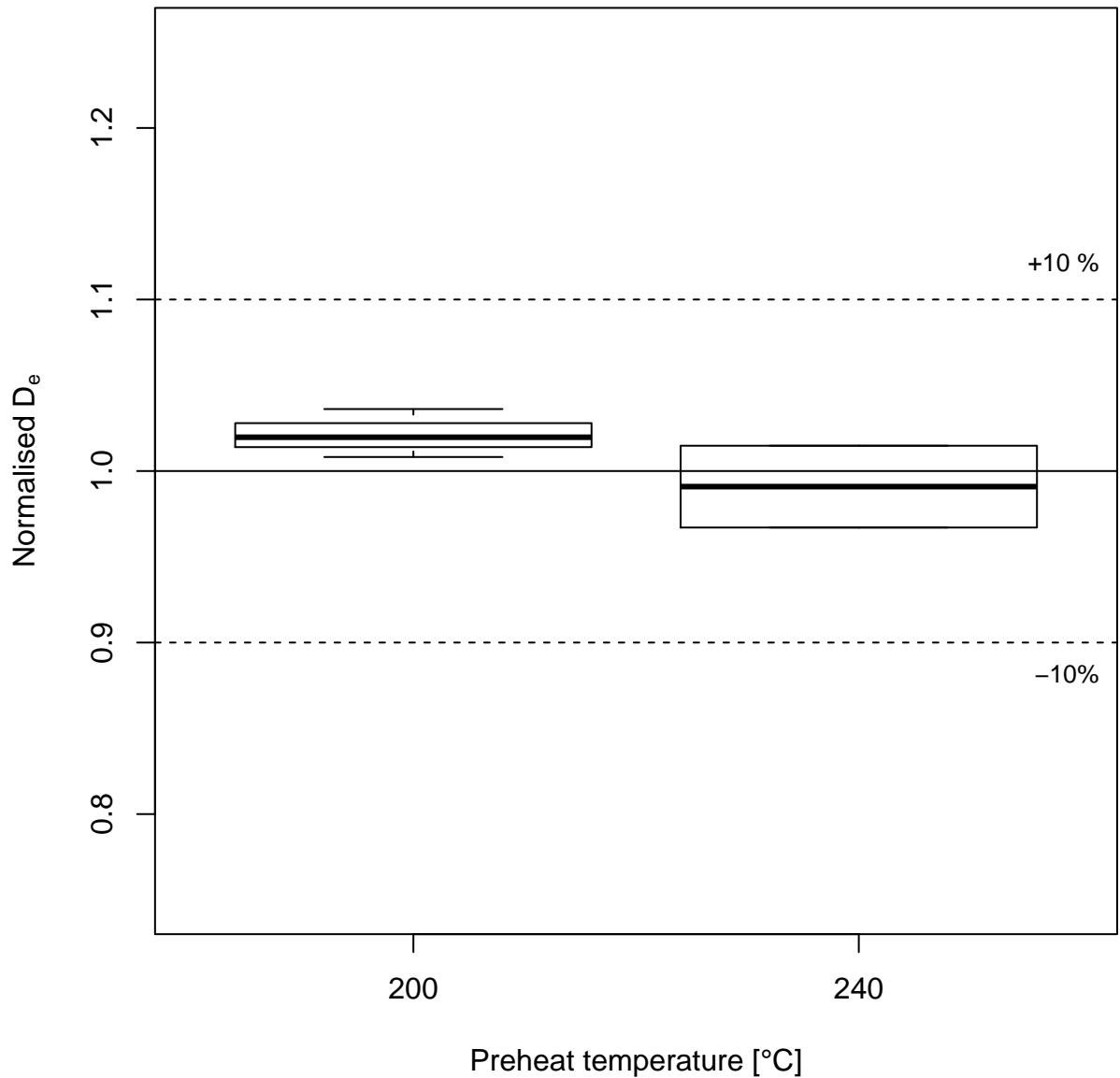
Example data



Dose recovery test

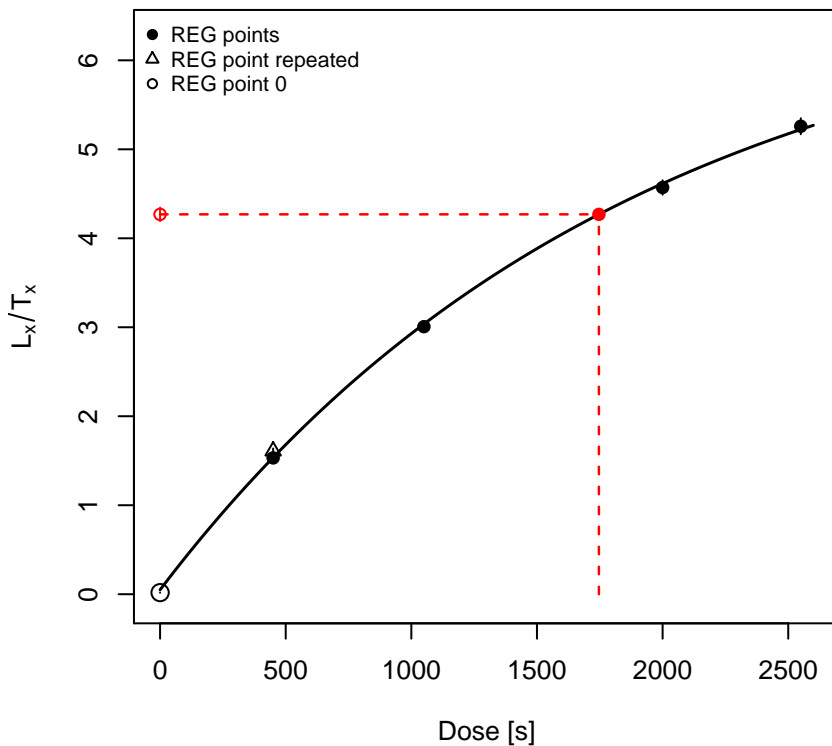


Dose recovery test



Growth curve

$D_e = 1746.54 \pm 57.45$ | fit: EXP



D_e from MC simulation



Test dose response



Growth curve

$D_e = 1746.54 \pm 59.97$ | fit: EXP



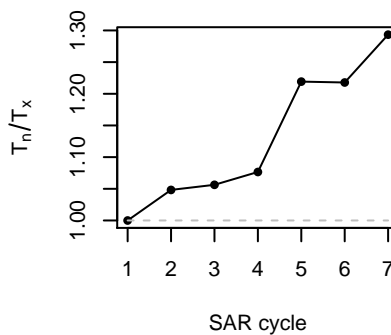
D_e from MC simulation

$D_{eMC} = 1732.18 \pm 59.97$ | quality = 99.2 %



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

Test dose response



Growth curve

$D_e = 1746.54 \pm 61.2$ | fit: EXP



D_e from MC simulation

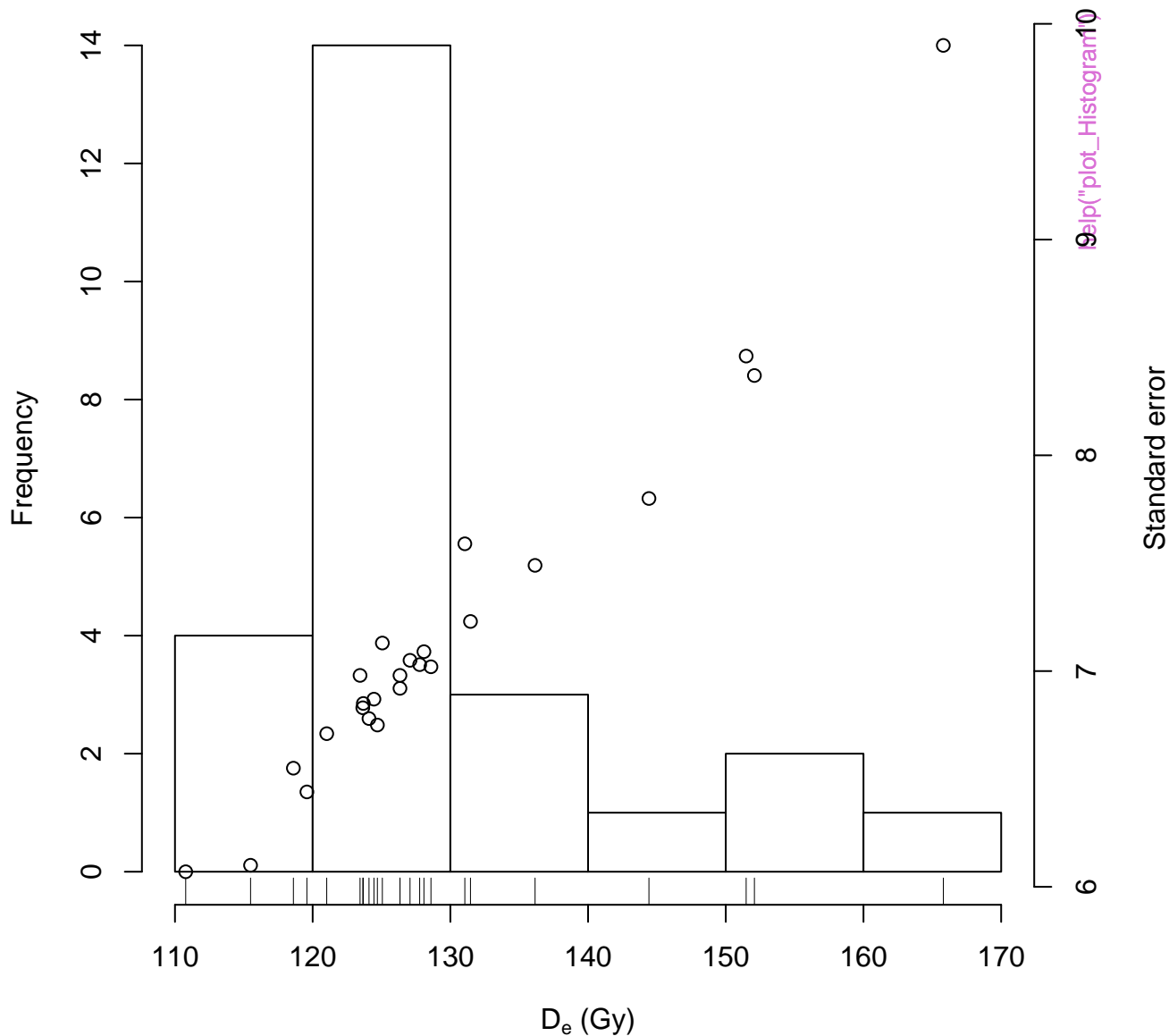
D_{MC} = 1743.04 ± 61.2 | quality = 99.8 %



Test dose response



Histogram



Histogram of De-values

Example data set



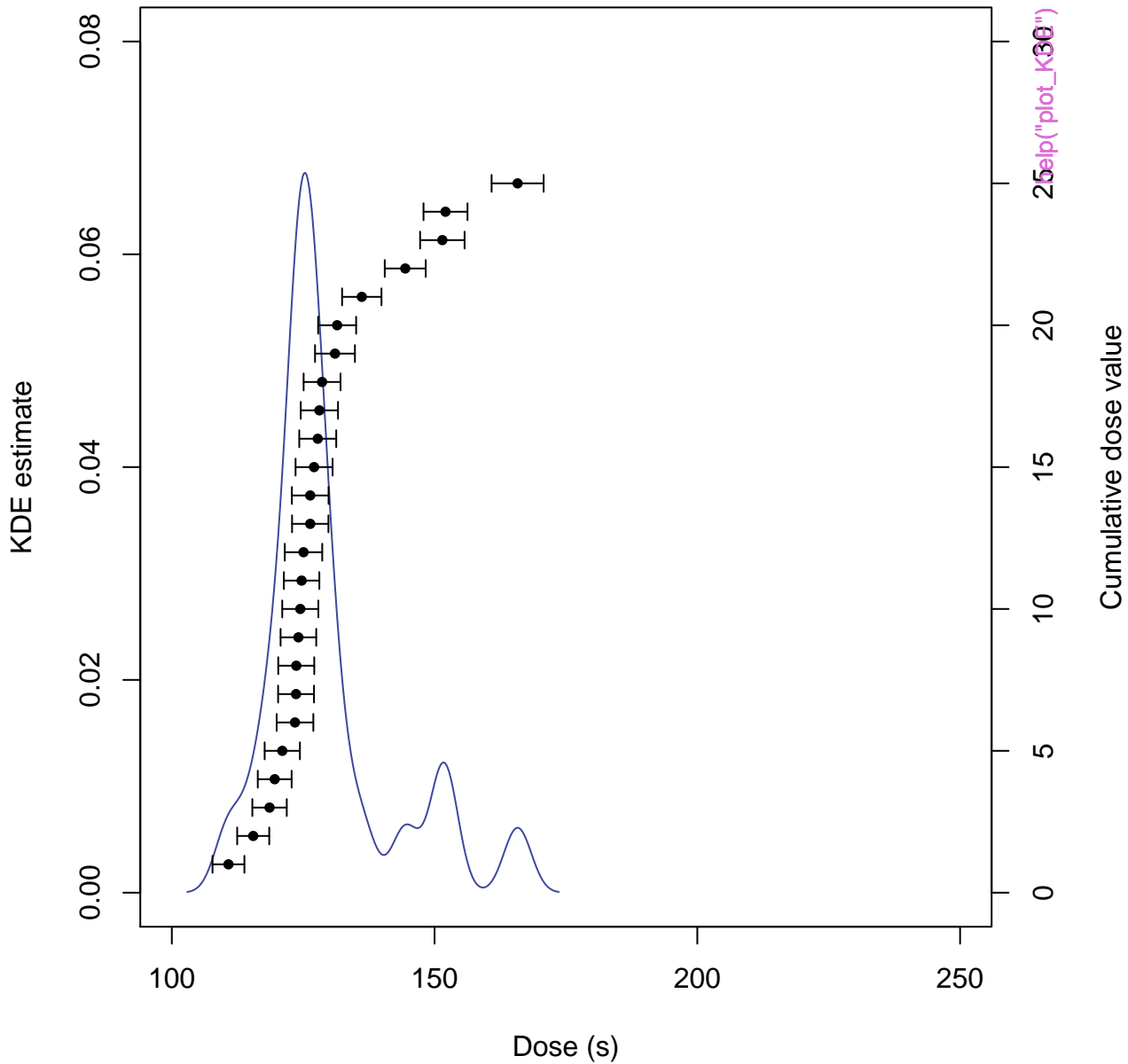
D_e distribution



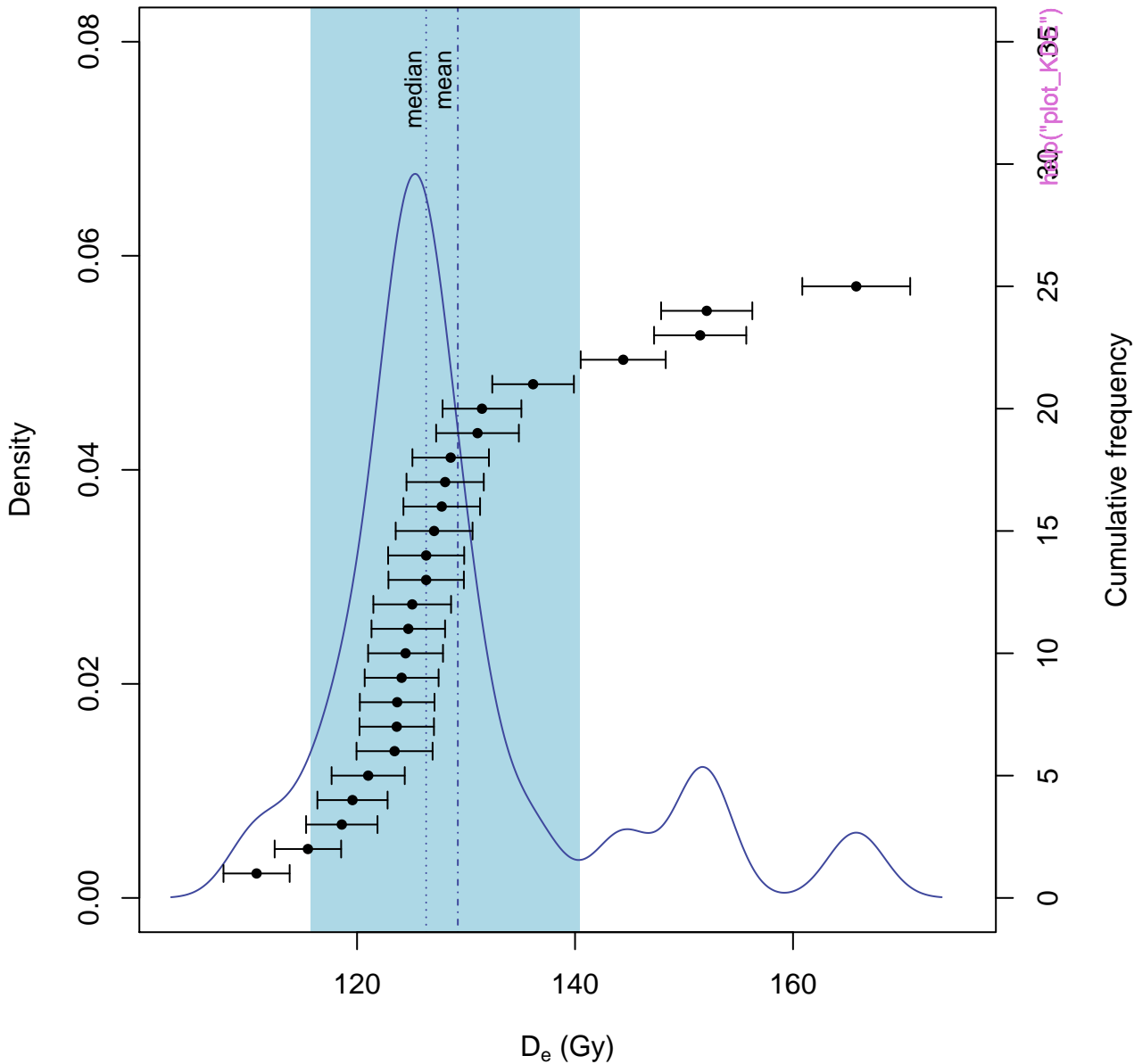
D_e distribution



Dose distribution



D_e distribution



D_e distribution

n = 25 | median = 126.34 | skewness = 1.34



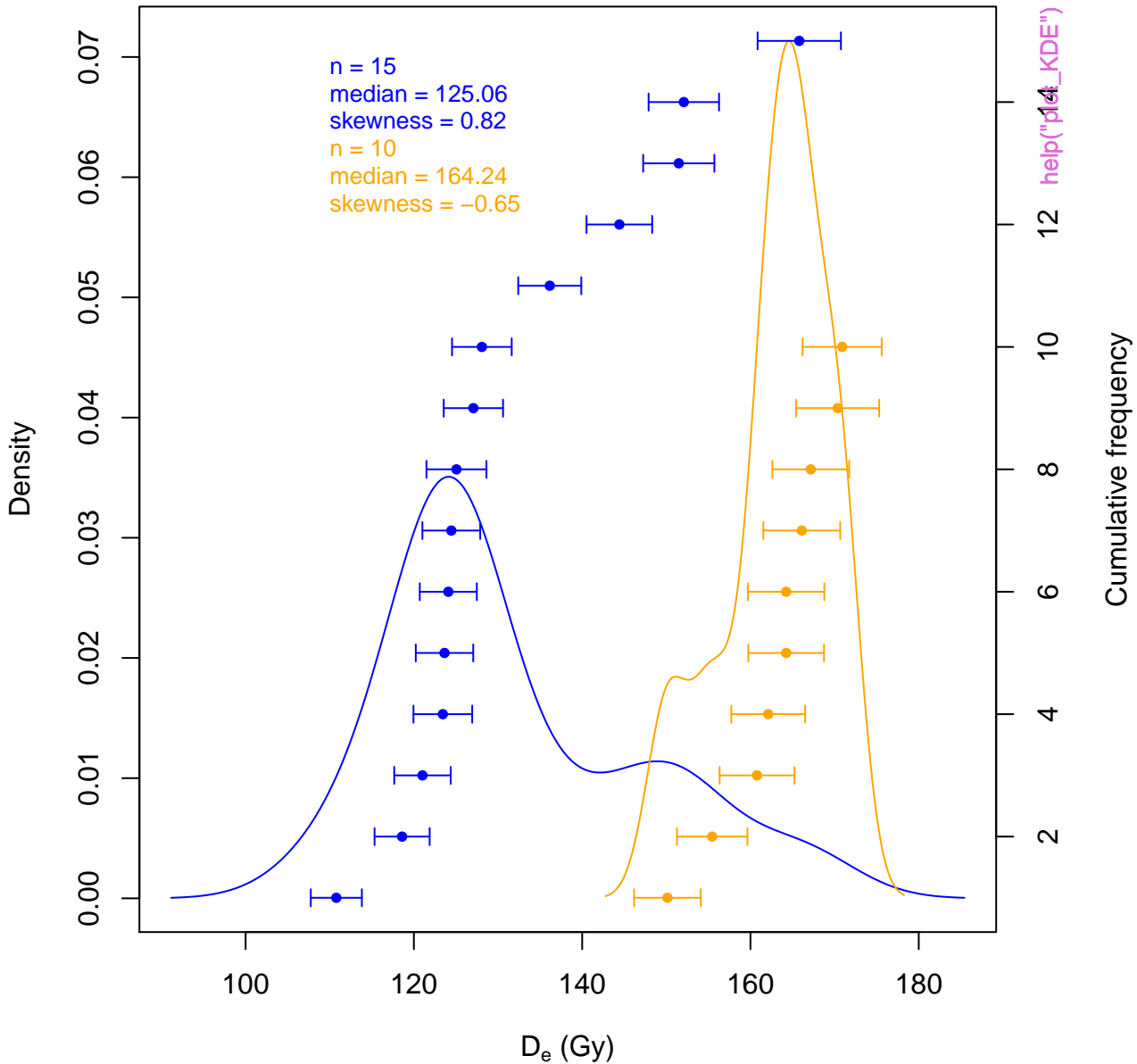
D_e distribution



D_e distribution

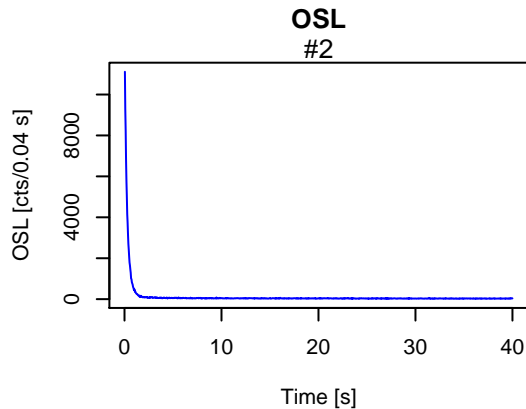
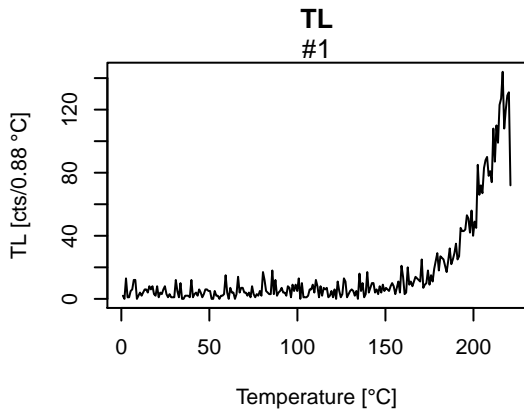


D_e distribution

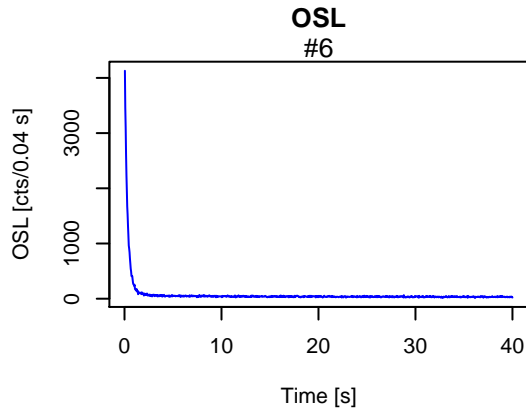
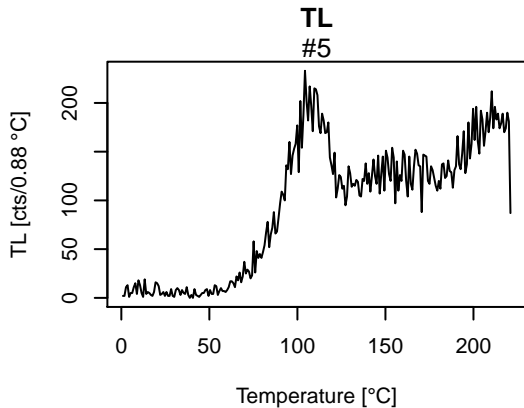
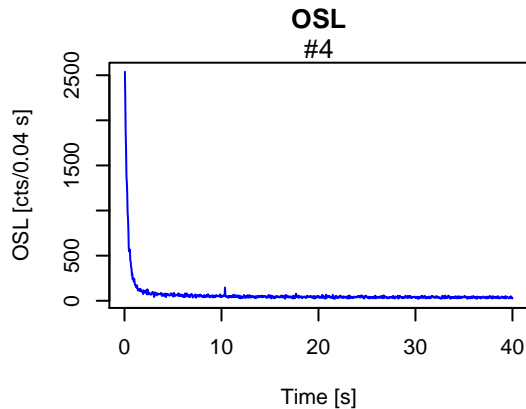
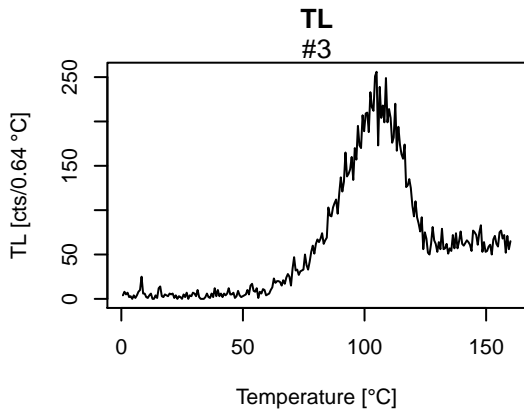


D_e distribution

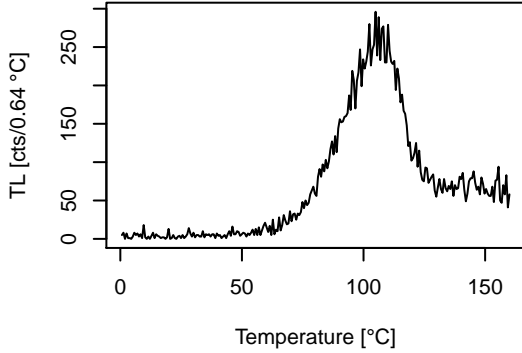




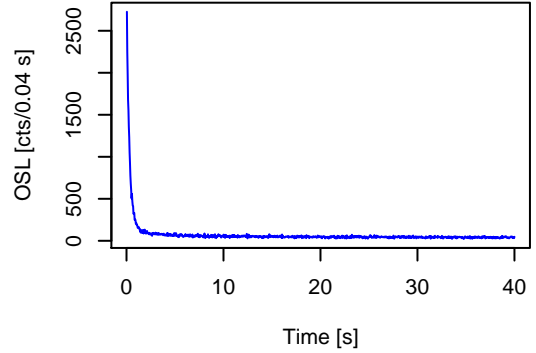
help("plot_RLum.Analysis")



TL
#7

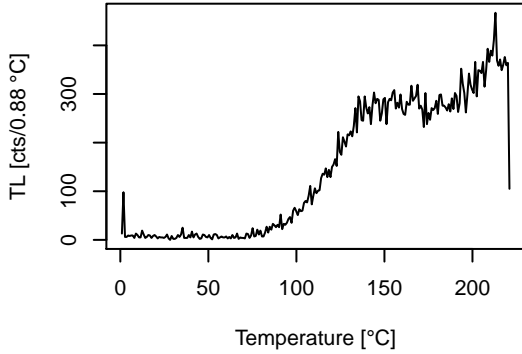


OSL
#8

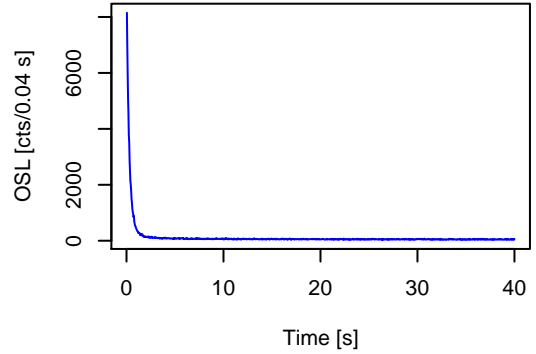


help("plot_RLum.Analysis")

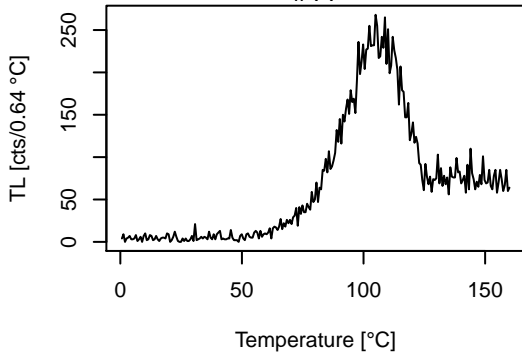
TL
#9



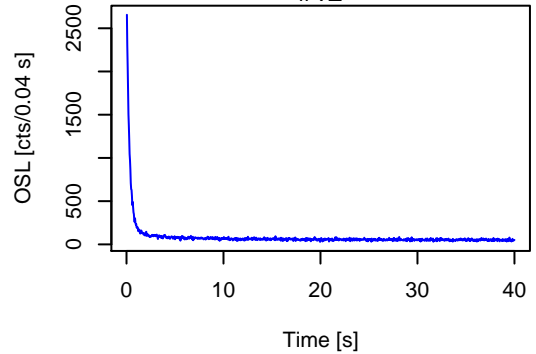
OSL
#10



TL
#11



OSL
#12





help("plot_RLum.Analysis")





help("plot_RLum.Analysis")

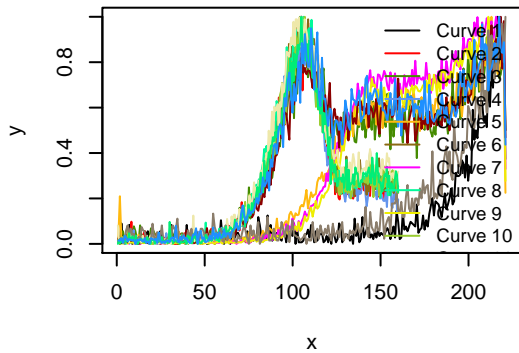




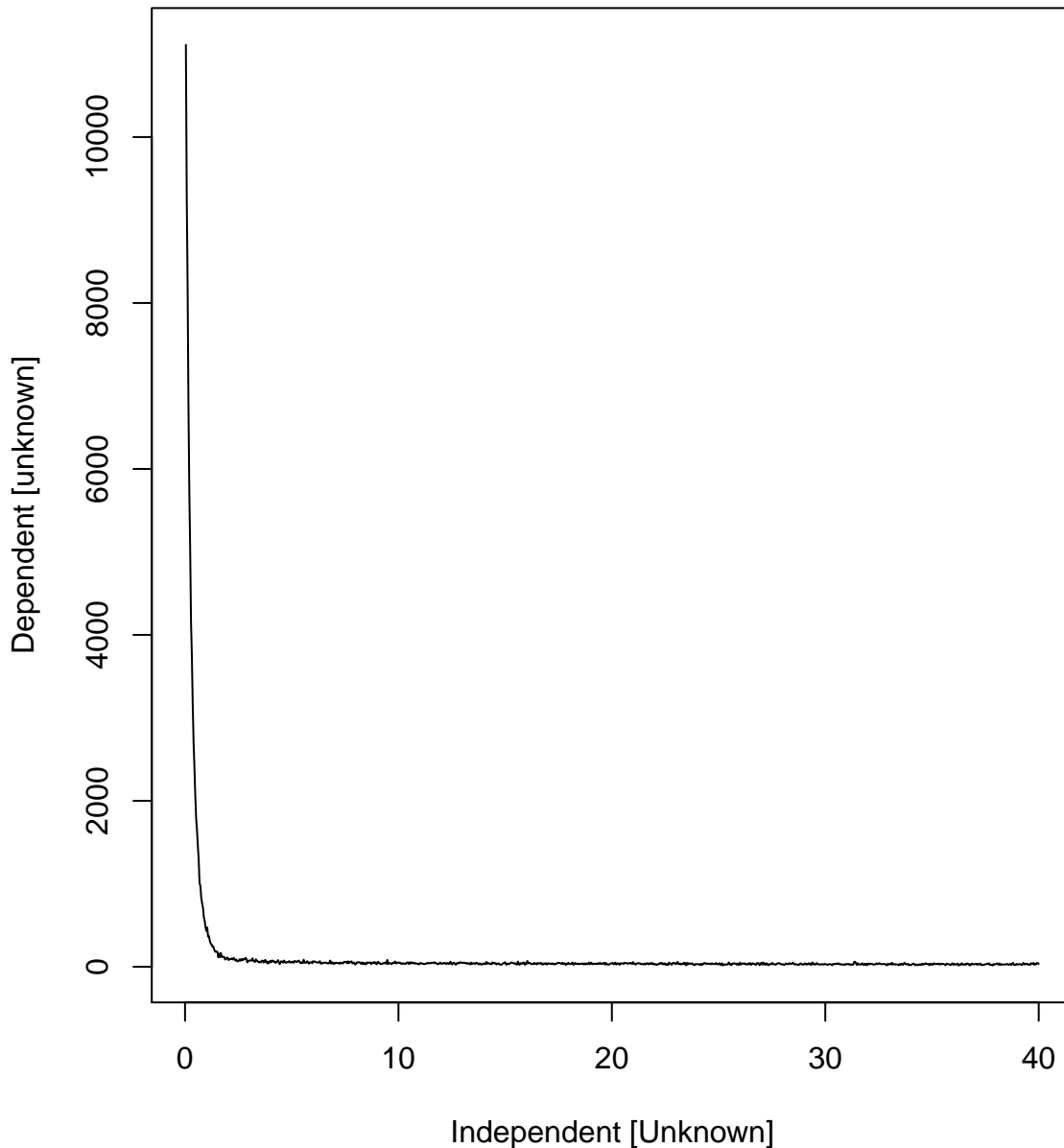
help("plot_RLum.Analysis")



TL combined



unkown curve type



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

RLum.Data.Image



RLum.Data.Spectrum



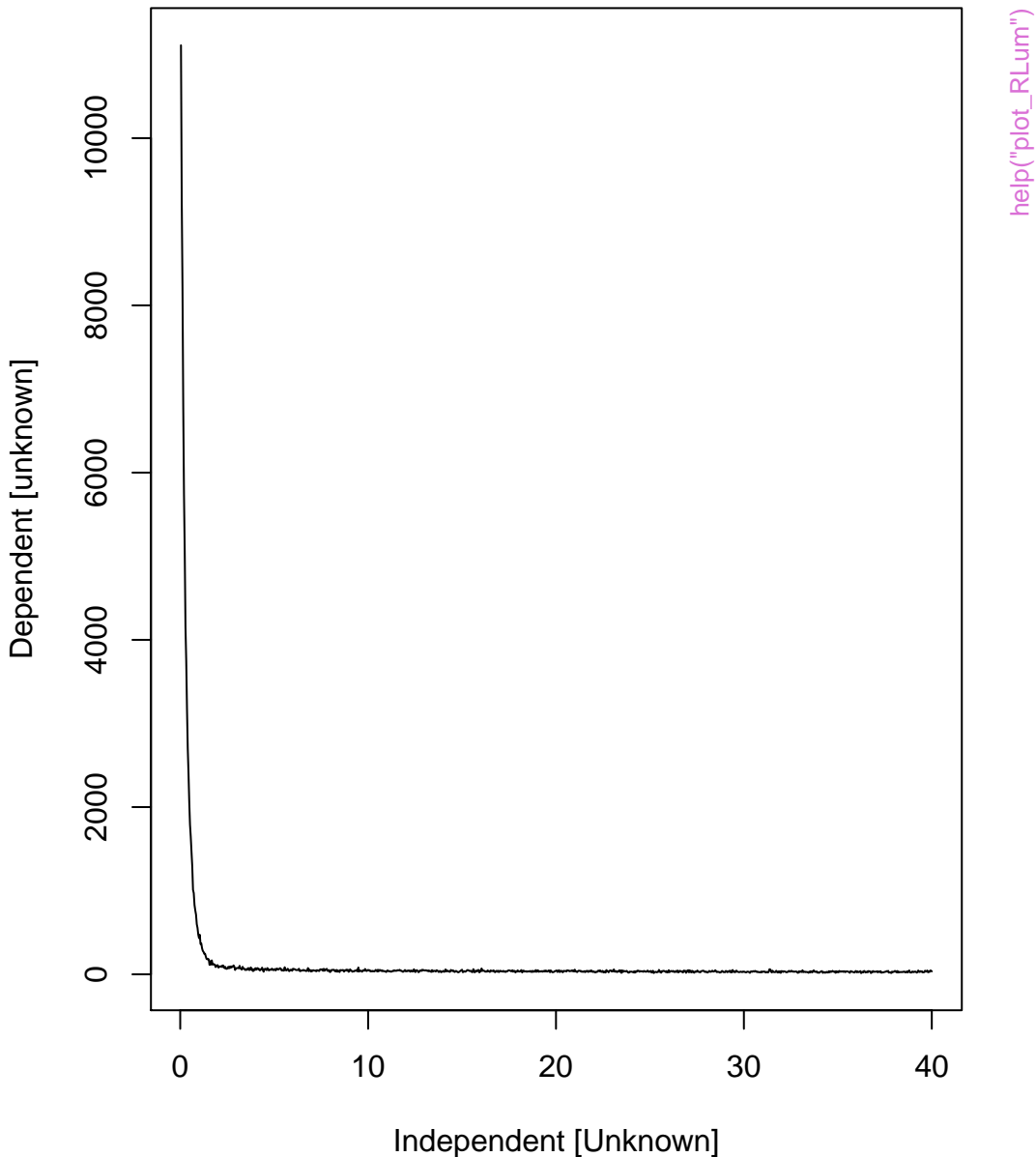
[help\("plot_RLum.Data.Spectrum"\)](#)

RLum.Data.Spectrum



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

unkown curve type



Likelihood profile: gamma

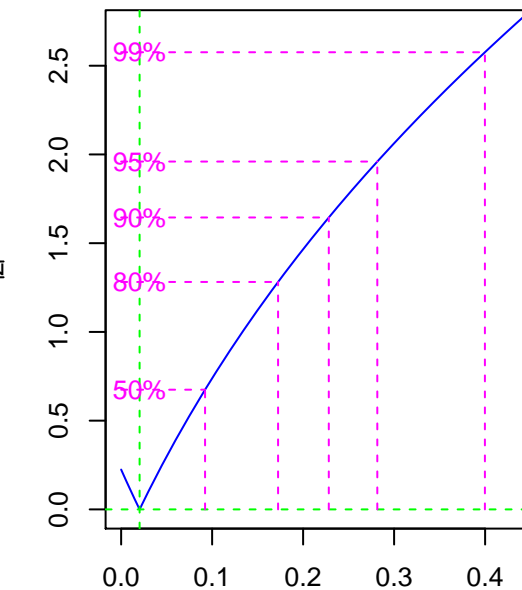


Likelihood profile: sigma



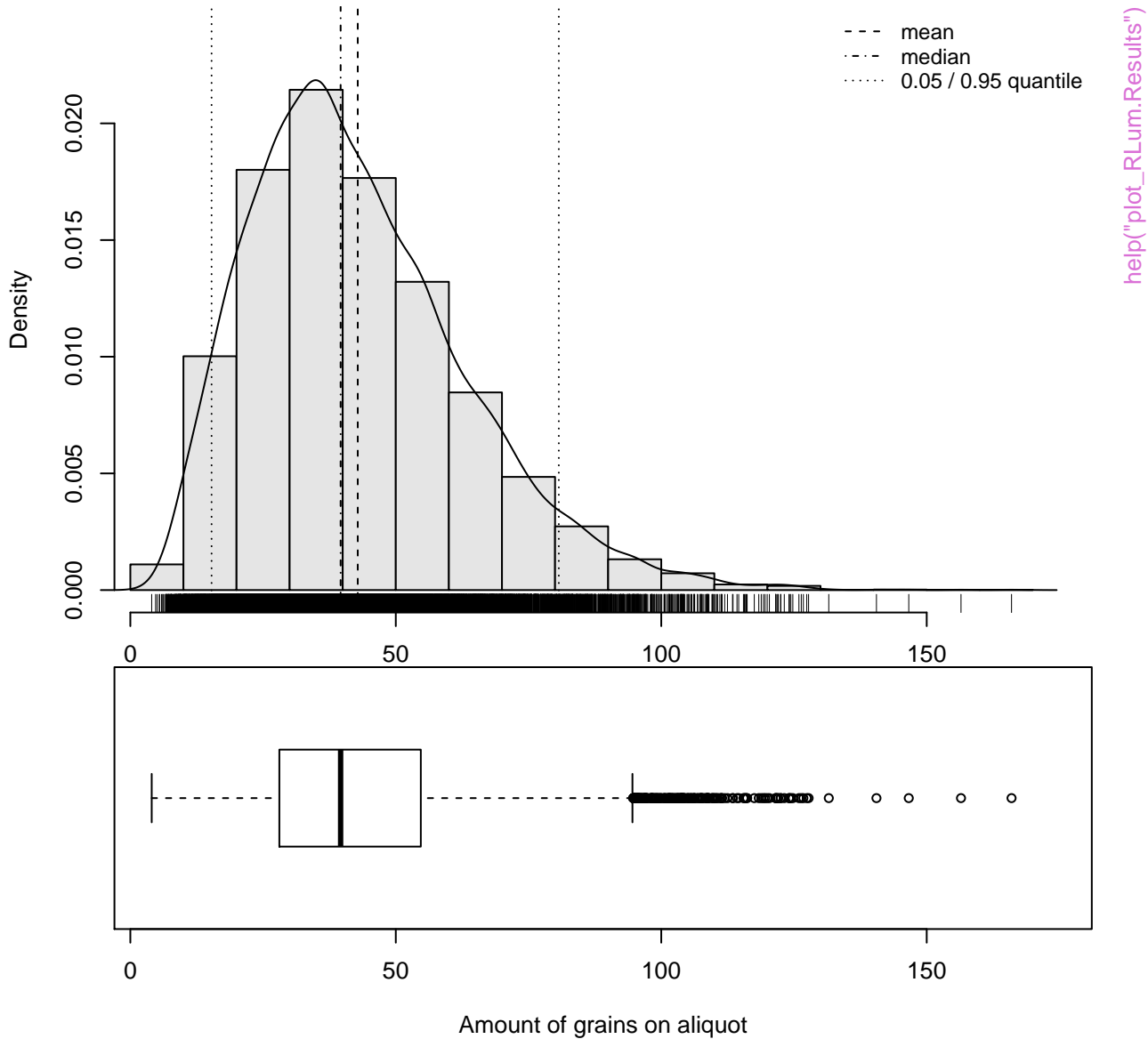
help("plot_RLum.Results")

Likelihood profile: p0



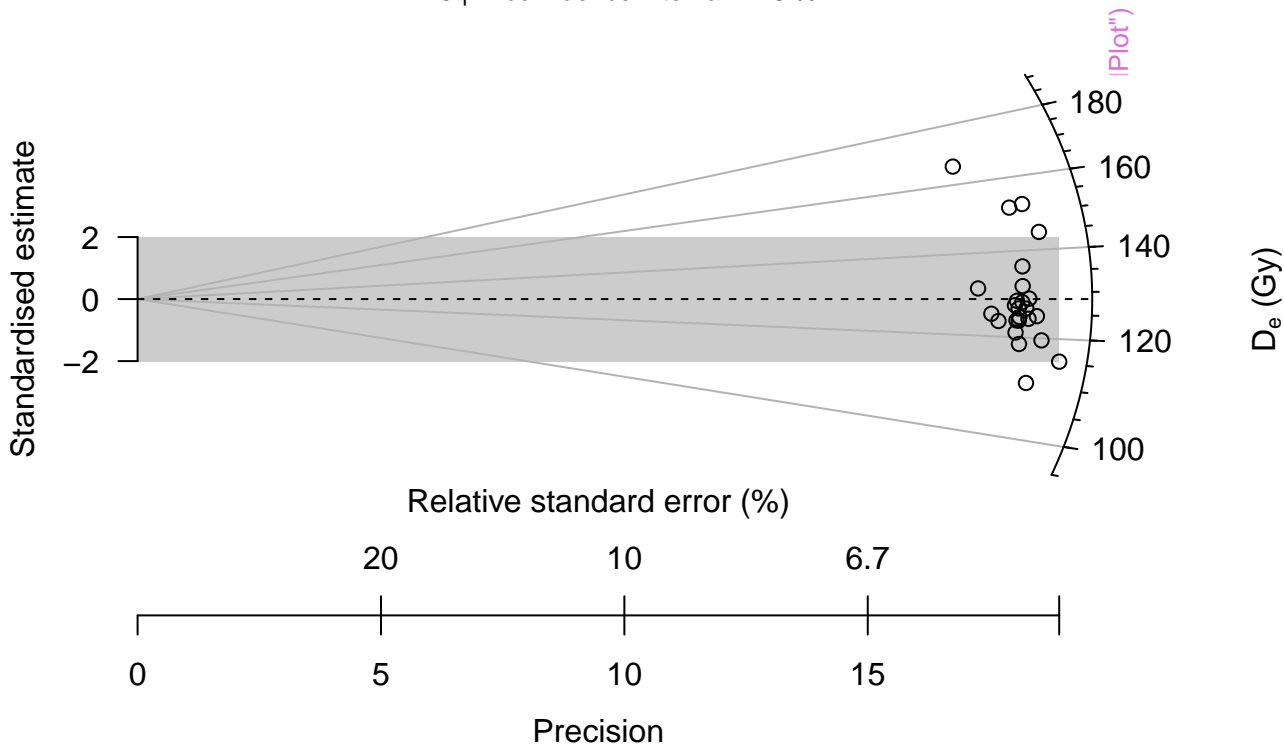
Monte Carlo Simulation

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



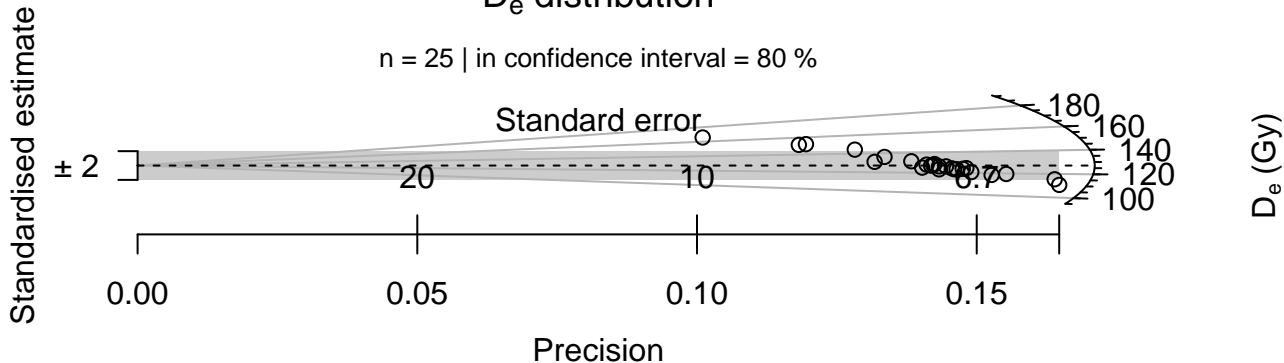
D_e distribution

n = 25 | in confidence interval = 76 %



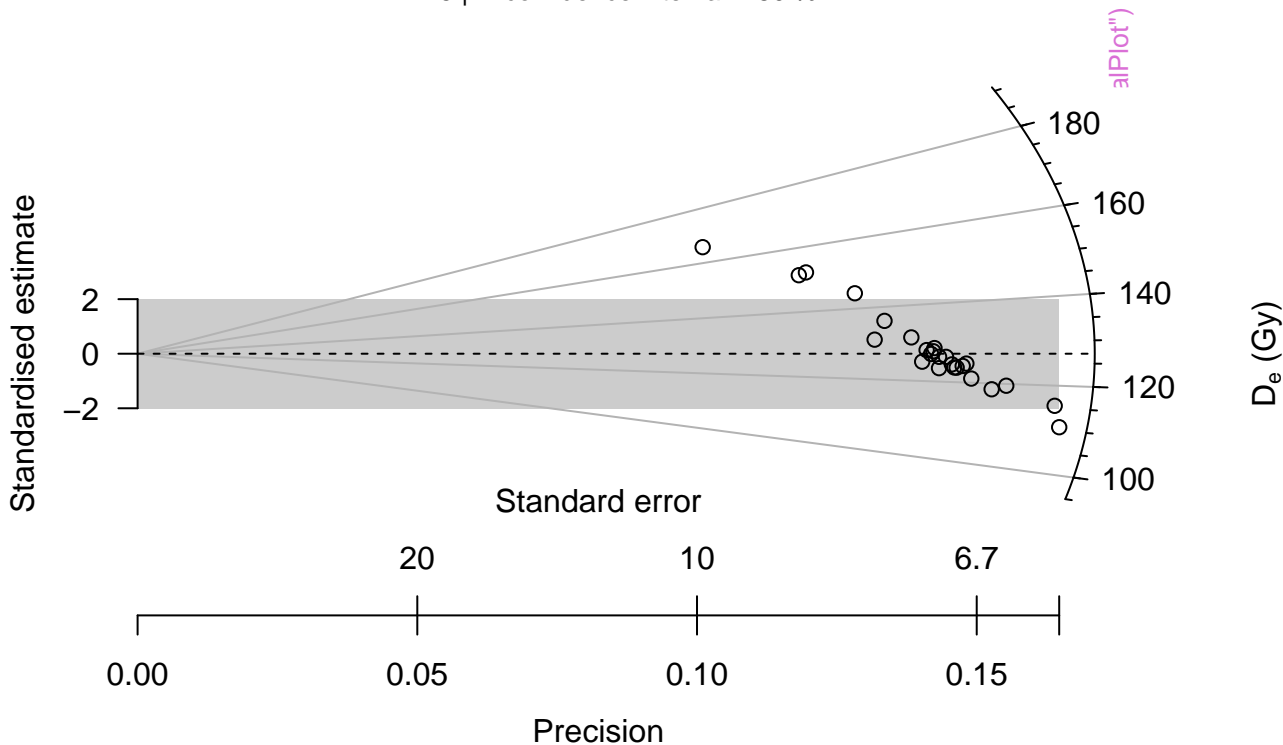
D_e distribution

n = 25 | in confidence interval = 80 %



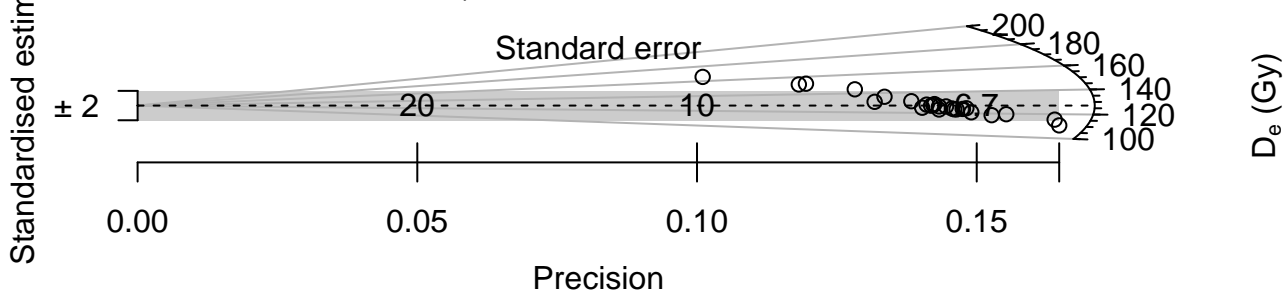
D_e distribution

n = 25 | in confidence interval = 80 %



D_e distribution

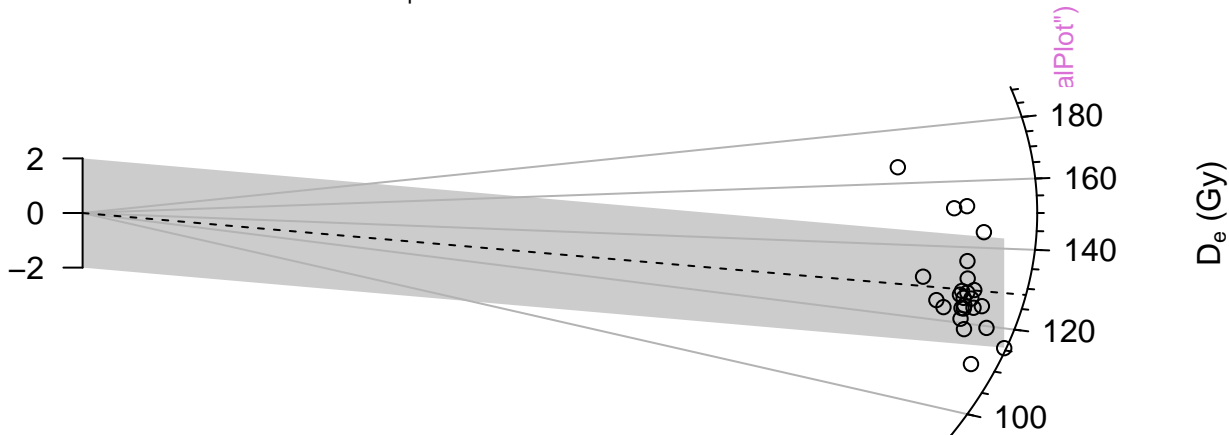
n = 25 | in confidence interval = 80 %



D_e distribution

n = 25 | in confidence interval = 76 %

Standardised estimate



Relative standard error (%)

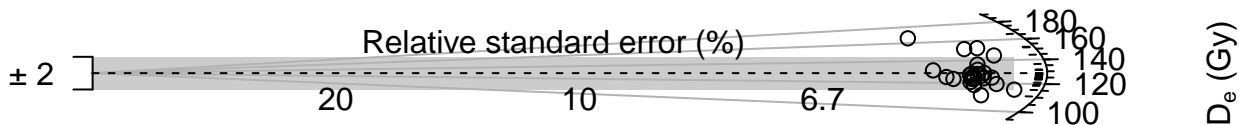


Precision

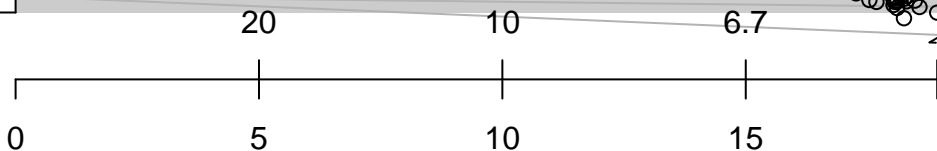
D_e distribution

n = 25 | in confidence interval = 76 %

Standardised estimate



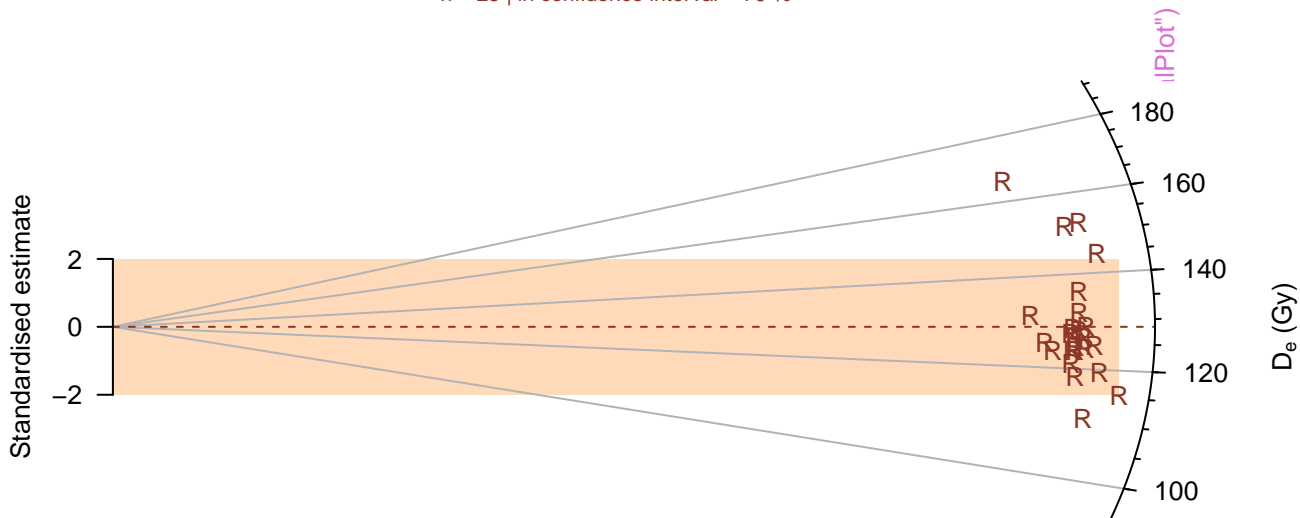
Relative standard error (%)



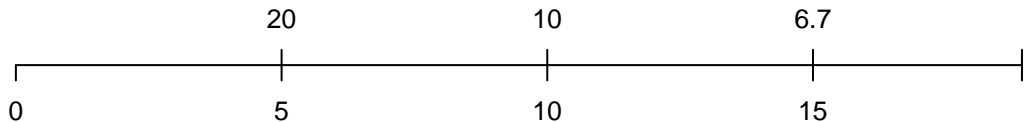
Precision

D_e distribution

n = 25 | in confidence interval = 76 %



Relative standard error (%)



Precision

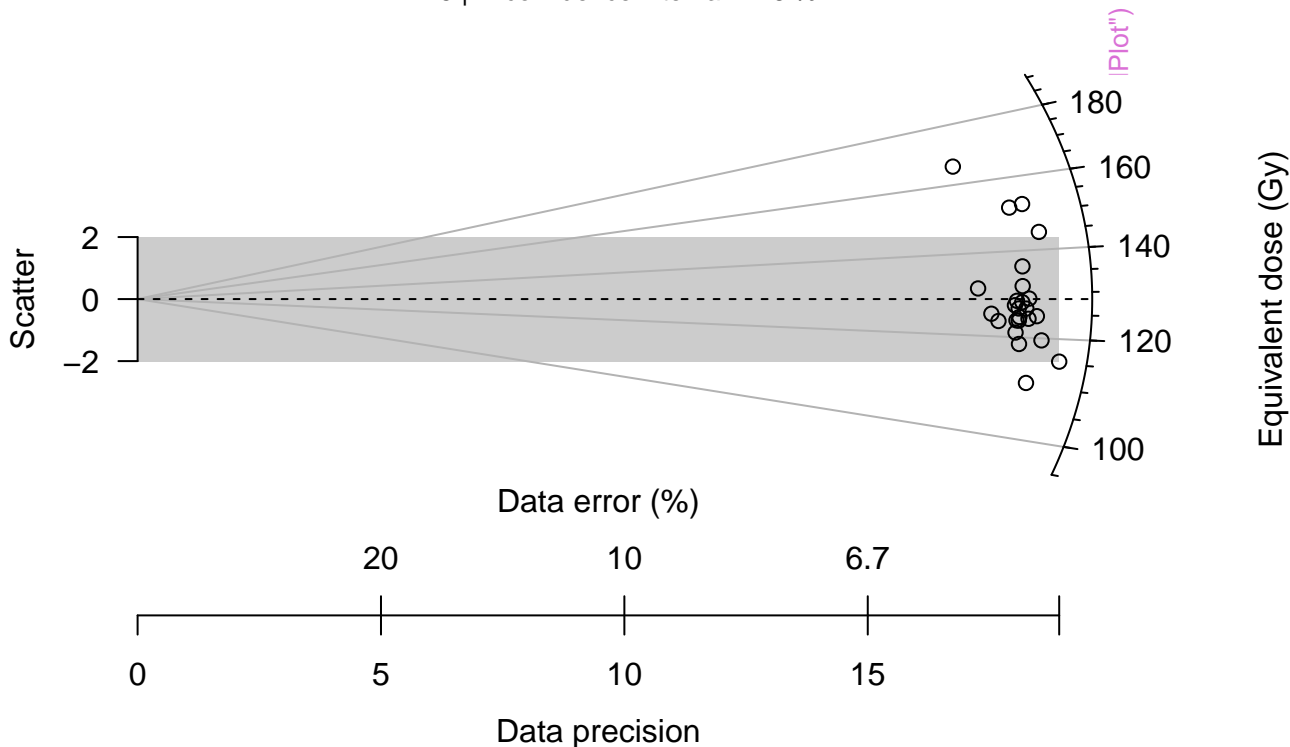
D_e distribution

n = 25 | in confidence interval = 76 %



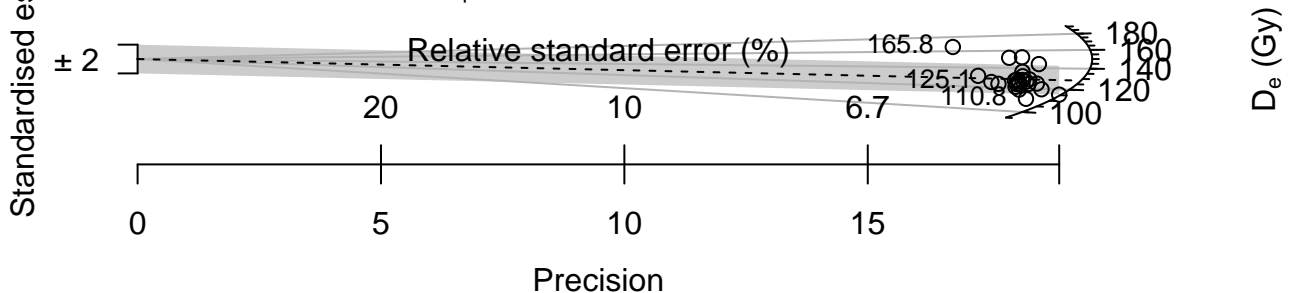
D_e distribution

n = 25 | in confidence interval = 76 %



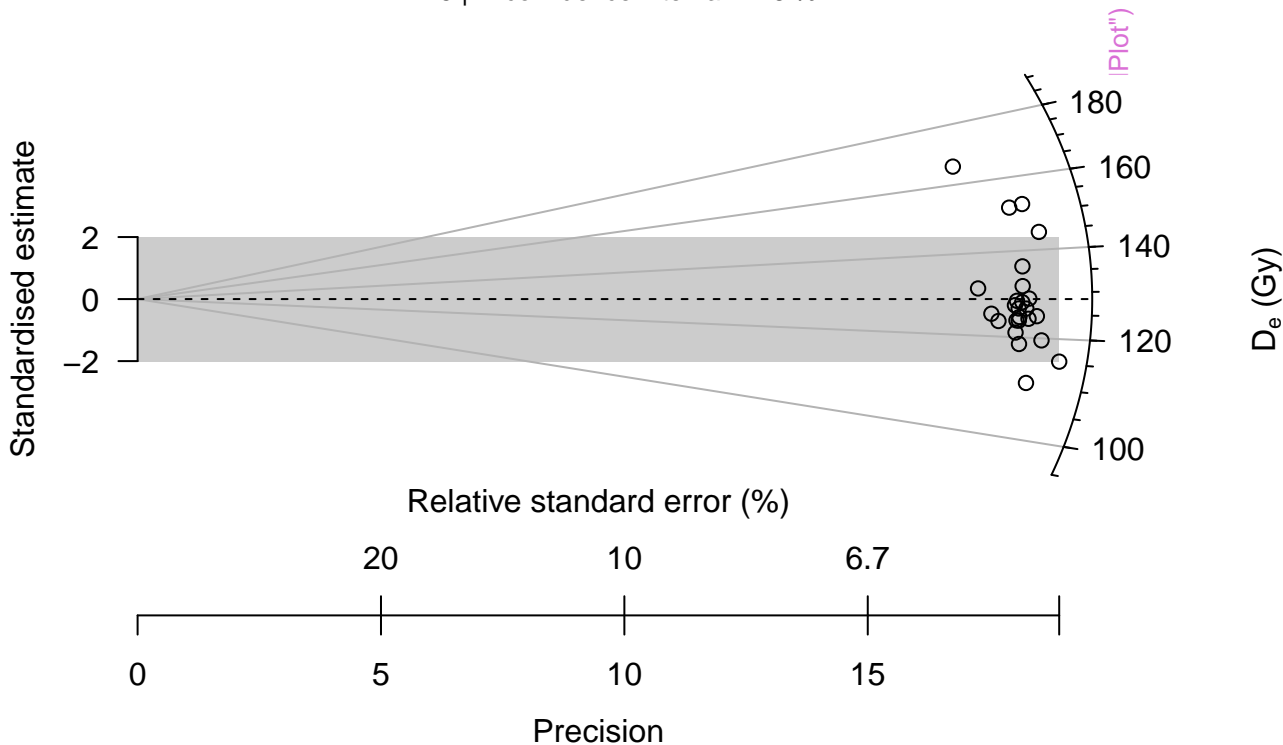
D_e distribution

n = 25 | in confidence interval = 76 %



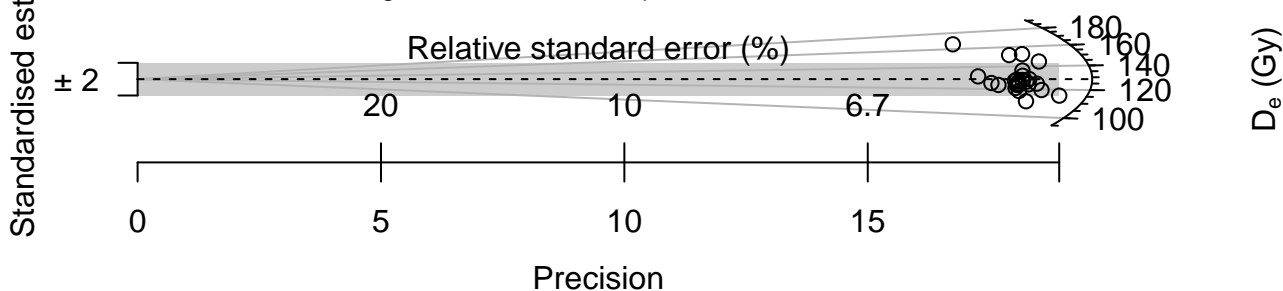
D_e distribution

n = 25 | in confidence interval = 76 %



D_e distribution

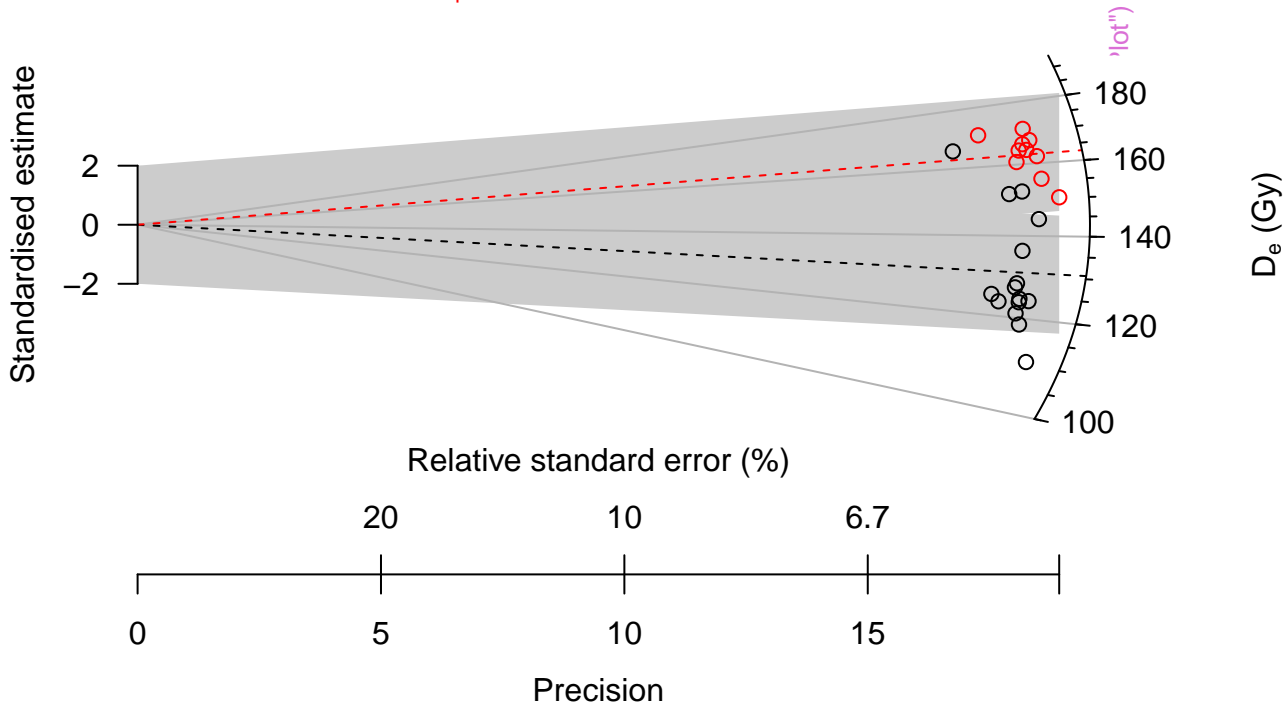
weighted mean = 128.12 | median = 126.34



D_e distribution

n = 15 | in confidence interval = 73.3 %

n = 10 | in confidence interval = 100 %



D_e distribution

n = 15 | in confidence interval = 73.3 %

n = 10 | in confidence interval = 100 %

