

# **Technical Note**

## Subject: New features in Risø TL/OSL software released Feb 2013

25-2-2013/TLAP

# File format

With the addition of new attachments and features to the reader, it has been necessary to change the change the format of the BIN file. The new format will be stored as files with the extension .binx to indicate that it has been extended. New versions of Viewer (V. 4.20 and higher) and Analyst (V.4.10 and higher) support this format. The new versions will also be able to deal with the .BIN format and even future updated versions of the .binx format (with loss of header information that may be added later).

The version 3, 4 and 6 bin file format is documented in the "Sequence Editor" and "Viewer" manuals available on the home page <u>www.osl.risoe.dk</u> and in the *Manuals* folder after installation of the software. Version 5 has been used internally for a short period, and the new Analyst and Viewer versions will be able to read these files.

# Sequence Editor V.4.20

Storage of background and uncorrected data

If you select "Save non-corrected and background data" in the sequence options, both non-corrected, background and corrected data will be stored if you choose background subtraction a TL command





Corrected data will be stored as CurveNo = 0, non-corrected as CurveNo = 1, and background data as CurveNo = 2.



CurveNo is a a parameter stored in the header which may be read with the Viewer and Analyst programs

#### Administration and use of irradiation dose rate calibrations

The TL/OSL reader will be used to estimate the dose that the samples have received after dose reset. In order to make the conversion to radiation dose, it is necessary to know the dose rate of the built-in source that is used in the measurement protocol. The irradiation dose rate will normally be established by a calibration procedure, and the calibration may vary with e.g. grain size and sample support.

The Sequence Editor has been extended with an "Irradiation dose rate" form in the "Options" menu, where the calibrations may be typed in.

-	Current [Gy/s]	Measured [Gy/s]	Meas. @date	Name	Comment	Edit
•	0.1074	0.1100	01-01-2012	Test cal	This is for coarse grain samples (150-250 um)	
2	0.0964	0.0987	07-01-2012	Fine grain	This is for fine grain samples	
2						
2						
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ieleu ha :	ct none source: Current [Gy/s]	Measured [Gy/s]	Meas. @date	Name	Comment	
ielei ha :	ct none source: Current [Gy/s]	Measured (Gy/s)	Meas. @date	Name	Comment	
ielei ha :	ct none source: Current [Gy/s]	Measured (Gy/s)	Meas. @date	Name	Comment	Cancel
iha :	ct none source: Current [Gy/s]	Measured (Gy/s)	Meas. @date	Name	Comment	Cancel

In the form you may select a beta- and/or alpha- dose rate calibration. When a measurement is done, the current dose rate and associated dose rate error, i.e. measured dose rate and dose rate error corrected for radioactive decay, is stored with the data in the bin-file. This enables Analyst to make a conversion of estimated dose from *equivalent seconds* (s) to *Grays* (Gy).

To type in or edit a calibration you press "Edit", and press "Save" when you are done.

When the sequence run starts, the setup form shows which irradiation sources are used in the sequence, and if beta and/or alpha sources are used, the name of the currently selected calibration is shown

Sequence:	
The sequence will be started in a checks will be made of the seque Sequence Checks ↓ Uses blue stimulation ↓ Uses > 500°C ↓ Uses > 500°C ↓ Uses single grains ↓ Uses beta irradiation Cal: Fine grain A ↓ Uses alpha irradiation	tew moments. First, a few ence. Please wait System Checks Baud Rate: 115000 I⊽ Mini Sys Connection System ID: 334 I Elapsed Lamp Time I⊽ MiniSys Carousel Size : 48 (1.97s per position) I Dark Count I Calib. LED
<ul> <li>☐ Uses X-ray irradiation</li> <li>☐ Uses Pulsed OSL</li> <li>☐ Uses Photon Timer</li> <li>☐ Uses XRF</li> <li>☐ Uses Sample camera</li> <li>☐ Creates a log file</li> <li>0 days 0 hrs 1 mins Estimated run time:</li> </ul>	



### Support of new attachments

The Sequence Editor now supports the Sample Camera attachment. This means that if sample camera is selected in "System Options" then the "Options->Sample Camera Setup" appear and the "Photo" command may be selected for a cell in the sequence grid.

The Sequence Editor also supports a new model of Photon Timer board (TimeHarp 260). The model of Photon Timer board is selected in the "System Options" menu.

### Updated help

The help function has been updated for all the Risø programs and changed to the compiled html type which is standard for later MS Windows version. The content of the Help file is now also available as a pdf manual for Sequence Editor and Viewer installed with the reader and available on the home page www.osl.risoe.dk





# Analyst

Calculated dose in Gy

The user may select whether to work in seconds (default) or in Gy

unction	Çurve	Pitter a	Opti	ions												
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					N	Natural	50gmai	104	1014	100	0.593	0.037		Dose rate: 0.0546 ± 0.0020 Gy/s Parameters	on 25/1	11/2
					RI	0	113	104	938	125	0.011	0.014		Use prev. BG for test dose		E
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When "Convert to Gy" is selected, dose response curve and De are converted from seconds to Gy



### Sequence view

Now a "Sequence view" is introduced. In "Sequence view" the sequence that produced the data is shown and the selected data are highlighted as cells with a red background. You can switch freely between the "Classic view" and "Sequence view"



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642	23	16	Natural	450.00	110	TL		
643	1	16	Natural	80.00	1	OSL		
644	3	16	Natural	450.00	110	TL		
645	4	16	Natural	450.00	2000	IRSL		
646	7	16	Natural	150.00	110	TL		
647	8	16	Natural	150.00	2000	IRSL		
648	10	16	Natural	150.00	2000	IRSL		
649	13	16	Natural	450.00	110	TL		
650	14	16	Natural	450.00	2000	IRSL		
651	17	16	Natural	150.00	110	TL		
652	18	16	Natural	150.00	2000	IRSL		
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"Classic view"

"Sequence view"

### Customised graphs

All graphs in Analyst can now be customised, e.g.:

- Log axes
- Font size
- Axis labels
- Symbol size
- Line thickness





#### Recuperation acceptance criteria

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New Acceptance criteria based on recuperation (uses the zero dose point) has been added. The criteria may be specified as % of Nat, % of signal from largest dose, or as an absolute value in Gy or secs

### Double exponential fit

Single *Exponential* curve fitting is not OK for some samples, such as the one shown below. Now *Double Exponential* curve fitting is made available





### Show asymmetric errors

It is now possible to show asymmetric errors, but currently these are NOT propagated through when combining  $D_{e}\xspace$  values

inctio Curve Fitting	Options										
55,000 50,000 45,000 40,000 35,000	✓         Convert to Gy           ✓         Show error limits           ✓         Show Ts/Tn graph           ✓         Show asymmetric error	ŧ.,					••	• •	8		
30,000- 25,000- 15,000- 5,000- 0 5 10	15 20 25 30 35 4 Time (s)		8 6 4 2 0 0	2 3	4 S	6 7 RCycle	0.9	10 11	xyori 3 2 1 0	50	T00 150 200 250 300 350 400 450 50 D001(0))
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		81	125	38042	4634	31482	5197	1.271	0.021		Use recycled points for fitting
regration Limits		82	250	28464	4729	29848	5080	2.170	0.036		race gowin curve though argin
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11 🕲 241 🖁	5	8.4	1000	145570	6970	34138	6020	4.926	0.078		Measurement error (%)
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### Fading test

Fading test and estimation of fading rate is now made possible. You select the relevant data as you do for the SAR procedure and press "Fading test -> Single Aliquot Fading/ Single Grain Fading"

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422	False	1	30	Natu	ral	150.00	171				
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424	False	1	30	Natu	ral	150.00	694				
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The time between start of irradiation and start of measurement is automatically recorded in the bin-file. This time is compensated for the duration of the irradiation to give t\* (Aitken (1985), Appendix F, p. 280)

$$t^* = \frac{1}{e} \frac{t_2^{\frac{t_2}{t_2 - t_1}}}{t_1^{\frac{t_1}{t_2 - t_1}}}$$

where  $t_2$  is the time since start of irradiation and  $t_1$  is the time since end of irradiation .

From this the fading rate g (in %/decade based on  $t_0$ = 48 hours) is estimated.

