

Package ‘xlum’

May 17, 2025

Type Package

Title Read, Write, and Convert XLUM Data

Version 0.1.0

Maintainer Sebastian Kreutzer <sebastian.kreutzer@uni-heidelberg.de>

Description Support for the XLUM file format for exchange and long-term preservation of luminescence data. Facilitated are the import and export of XLUM files and the conversion from other formats commonly used to store luminescence (dating) data.

License GPL-3

URL <https://r-lum.github.io/xlum/>

Depends R (>= 4.4),
utils

Imports methods,
base64enc (>= 0.1),
Luminescence (>= 1.0.1),
xml2 (>= 1.3.8)

Suggests spelling (>= 2.2),
testthat (>= 3.1.3)

Encoding UTF-8

Language en-GB

LazyData true

RoxygenNote 7.3.2

Collate 'convert_Daybreak2xlum.R'
'convert_binx2xlum.R'
'convert_psl2xlum.R'
'convert_rlum2xlum.R'
'convert_xsyg2xlum.R'
'methods.R'
'read_xlum.R'
'utils.R'
'validate_xlum.R'
'write_xlum.R'
'xlum-package.R'

Contents

xlum-package	2
convert_binx2xlum	3
convert_Daybreak2xlum	4
convert_psl2xlum	5
convert_rlum2xlum	6
convert_xsyg2xlum	7
read_xlum	8
validate_xlum	9
write_xlum	10

Index	11
--------------	-----------

xlum-package	<i>Read, Write, and Convert xlum Data</i>
--------------	-------------------------------------------

Description

Support for the XLUM-file format for exchange and long-term preservation of luminescence data. Facilitated are the import and export of XLUM-files and the conversion from other ASCII and binary formats commonly used to store luminescence (dating) data.

Details

Support contact

- <https://github.com/R-Lum/xlum/discussions>

Bug reporting

- <https://github.com/R-Lum/xlum/issues>

Project source code repository

- <https://github.com/R-Lum/xlum>

Package maintainer

Sebastian Kreutzer, Institute of Geography, Heidelberg University (Germany),
<sebastian.kreutzer@uni-heidelberg.de>

Funding

Between 2020–2022, the work of Sebastian Kreutzer as maintainer of the package has received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 844457 (CREDit), and the work was carried out at the Geography & Earth Sciences, Aberystwyth University (United Kingdom)

Author(s)

Maintainer: Sebastian Kreutzer <sebastian.kreutzer@uni-heidelberg.de> ([ORCID](#))

Other contributors:

- Christoph Burow ([ORCID](#)) [contributor]

See Also

Useful links:

- <https://r-lum.github.io/xlum/>

`convert_binx2xlum`*Convert Risø BIN/BINX to XLUM*

Description

Wrapped function to quickly convert BIN/BINX files to xlum (files)

Usage

```
convert_binx2xlum(file, out_file = NULL, ...)
```

```
convert_bin2xlum(file, out_file = NULL)
```

Arguments

<code>file</code>	character (required): file
<code>out_file</code>	character (optional): output file, if set a file output is created
<code>...</code>	support for a limited number of additional arguments to be forwarded to Luminescence::read_BIN2R : position, n.records

Value

Depending on the setting. If `out_file == NULL` an [xml2::xml_document](#) object is returned, if file is set the function attempts to write an `*.xlum` file⁴.

Function version

0.1.0

How to cite

Kreutzer, S., 2025. `convert_binx2xlum()`: Convert Risø BIN/BINX to XLUM. Function version 0.1.0. In: Kreutzer, S., 2025. `xlum`: Read, Write, and Convert XLUM Data. R package version 0.1.0. <https://r-lum.github.io/xlum/>

Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

See Also

[convert_rlum2xlum](#), [Luminescence::read_BIN2R](#)

Examples

```
## Not run:  
file <- system.file("extdata/BINfile_V8.binx", package = "Luminescence")  
convert_binx2xlum(file)  
  
## End(Not run)
```

convert_Daybreak2xlum *Convert Daybreak TXT and DAT files to XLUM*

Description

Wrapped function to quickly convert Daybreak files to xlum (files)

Usage

```
convert_Daybreak2xlum(file, out_file = NULL)
```

Arguments

file **character (required)**: file
out_file **character (optional)**: output file, if set a file output is created

Value

Depending on the setting. If out_file == NULL an **xml2::xml_document** object is returned, if file is set the function attempts to write an *.xlum file‘.

Function version

0.1.0

How to cite

Kreutzer, S., 2025. convert_Daybreak2xlum(): Convert Daybreak TXT and DAT files to XLUM. Function version 0.1.0. In: Kreutzer, S., 2025. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0. <https://r-lum.github.io/xlum/>

Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

See Also

[convert_rlum2xlum](#), [Luminescence::read_Daybreak2R](#)

Examples

```
## load package example data
## for loading own data use
## file <- file.choose()
file <- system.file("extdata/Daybreak_TestFile.txt", package = "Luminescence")
convert_Daybreak2xlum(file)
```

convert_psl2xlum	<i>Convert SUERC PSL-files to XLUM</i>
------------------	----------------------------------------

Description

Wrapped function to quickly convert PSL files to xlum (files) from the portable luminescence system produced by the SUERC

Usage

```
convert_psl2xlum(file, out_file = NULL)
```

Arguments

file **character (required)**: file

out_file **character (optional)**: output file, if set a file output is created

Value

Depending on the setting. If out_file == NULL an **xml2::xml_document** object is returned, if file is set the function attempts to write an *.xlum file'.

Function version

0.1.0

How to cite

Kreutzer, S., 2025. convert_psl2xlum(): Convert SUERC PSL-files to XLUM. Function version 0.1.0. In: Kreutzer, S., 2025. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0. <https://r-lum.github.io/xlum/>

Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

See Also

[convert_rlum2xlum](#), [Luminescence::read_PSL2R](#)

Examples

```
## load package example data
## for loading own data use
## file <- file.choose()
file <- system.file("extdata", "DorNie_0016.psl", package = "Luminescence")
convert_psl2xlum(file)
```

convert_rlum2xlum	<i>Convert RLum-class objects to the XLUM format</i>
-------------------	------------------------------------------------------

Description

Converts [Luminescence::RLum](#) objects to xlum format

Usage

```
convert_rlum2xlum(rlum, file = NULL)
```

Arguments

rlum	Luminescence::RLum.Data and Luminescence::RLum.Analysis or a list of it (required): input for the conversion
file	character (<i>optional</i>): file name for the export, if NULL (the default), an xml2::xml_document object is returned

Details

The function tries to make a best possible conversion of the [Luminescence::RLum](#) to the xlum format. [Luminescence::RLum.Results](#) objects are not supported.

Because of the nature the [Luminescence::RLum](#) structure, the nodes `<xlum/>`, `<sample/>` are set automatically because the [Luminescence::RLum](#) does not distinguish between different samples.

Value

Depending on the setting. If `file == NULL` an [xml2::xml_document](#) object is returned, if file is set the function attempts to write an `*.xlum` file.

Function version

0.1.0

How to cite

Kreutzer, S., 2025. convert_rlum2xlum(): Convert RLum-class objects to the XLUM format. Function version 0.1.0. In: Kreutzer, S., 2025. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0. <https://r-lum.github.io/xlum/>

Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

See Also

[Luminescence::RLum.Data](#), [write_xlum](#)

Examples

```
data(ExampleData.RLum.Analysis,
     envir = environment(),
     package = "Luminescence")
convert_rlum2xlum(IRSAR.RF.Data)
```

convert_xsyg2xlum	<i>Convert Freiberg Instruments XSYG files to XLUM</i>
-------------------	--------------------------------------------------------

Description

Wrapped function to quickly convert Freiberg Instruments XSYG-files to xlum (files)

Usage

```
convert_xsyg2xlum(file, out_file = NULL)
```

Arguments

file **character (required)**: file
 out_file **character (optional)**: output file, if set a file output is created

Value

Depending on the setting. If out_file == NULL an [xml2::xml_document](#) object is returned, if file is set the function attempts to write an *.xlum file¹.

Function version

0.1.0

How to cite

Kreutzer, S., 2025. convert_xsyg2xlum(): Convert Freiberg Instruments XSYG files to XLUM. Function version 0.1.0. In: Kreutzer, S., 2025. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0. <https://r-lum.github.io/xlum/>

Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

See Also

[convert_rlum2xlum](#), [Luminescence::read_XSYG2R](#)

Examples

```
## load package example data
## for loading own data use
## file <- file.choose()
file <- system.file("extdata/XSYG_file.xsyg", package = "Luminescence")
convert_xsyg2xlum(file)
```

read_xlum

Import XLUM files

Description

Imports XLUM-files using [xml2::read_xml](#). Comes with a few convenience features, such as the transformation of string lists to numeric vectors where meaningful.

Usage

```
read_xlum(file, verify = TRUE, output = "xlum_list")
```

Arguments

file	character (required): path to file
verify	logical (<i>with default</i>): enable/disable format validation
output	character (<i>with default</i>): output object of the import, supported are "xml_document", "list", "xlum_list" (the default)

Details

Supported output options

"xlum_list" (default): imports XML-data and coerces them to list. Numeric values for level <curve> are transposed into [numeric](#) vectors for better handling

"list": imports XML-data and coerces it to a [list](#), no further treatment of data

"xml_document": unprocessed output from [xml2::read_xml](#)

Value

The output depends on the setting selected in output. It will be either an [xml2::xml_document](#), [list](#), or a [list](#) of class xlum_list.

Function version

0.1.0

How to cite

Kreutzer, S., 2025. read_xlum(): Import XLUM files. Function version 0.1.0. In: Kreutzer, S., 2025. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0. <https://r-lum.github.io/xlum/>

Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

See Also

[xml2::read_xml](#), [validate_xlum](#), [write_xlum](#)

Examples

```
file <- system.file("extdata/xlum_example.xlum", package="xlum")
read_xlum(file)
```

validate_xlum	<i>Validate xlum format against an XSD reference schema</i>
---------------	-------------------------------------------------------------

Description

A a convenience wrapper around [xml2::xml_validate](#) against the reference format description shipped with [xlum-package](#)

Usage

```
validate_xlum(file, xsd_version = NULL)
```

Arguments

file	xml2::xml_document (required): object to test
xsd_version	numeric (<i>optional</i>): specify format version for the validation, e.g., 1, 1.1. The default is NULL, which will use the most recent version

Value

Results of the validation [logical](#) with attributes

How to cite

Kreutzer, S., 2025. validate_xlum(): Validate xlum format against an XSD reference schema. In: Kreutzer, S., 2025. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0. <https://r-lum.github.io/xlum/>

Author(s)

Sebastian Kreutzer, Geography & Earth Sciences, Aberystwyth University

Examples

```
file <- system.file("extdata/xlum_prototype.xlum", package = "xlum")
validate_xlum(file)
```

write_xlum	<i>Write XLUM-files</i>
------------	-------------------------

Description

Create XLUM-files using [xml2::read_xml](#)

Usage

```
write_xlum(x, file, encode_base64 = FALSE, ...)
```

Arguments

x	xlum_list, list , xml2::xml_document (required) : input object
file	character (required): valid file path and file name with ending .xlum (will be add automatically if needed)
encode_base64	logical (<i>with default</i>): enable/disable base64 encoding for values in the <curve/> node. Please note that this parameter works only if the input is of class xlum_list
...	further arguments to be passed to xml2::write_xml

Value

Creates an XML-file with ending *.xlum

Function version

0.1.0

How to cite

Kreutzer, S., 2025. write_xlum(): Write XLUM-files. Function version 0.1.0. In: Kreutzer, S., 2025. xlum: Read, Write, and Convert XLUM Data. R package version 0.1.0. <https://r-lum.github.io/xlum/>

Author(s)

Sebastian Kreutzer, Institute of Geography, Heidelberg University, Heidelberg (Germany)

See Also

[xml2::write_xml](#), [read_xlum](#)

Examples

```
file <- system.file("extdata/xlum_prototype.xlum", package="xlum")
out_file <- tempfile()

xlum_data <- read_xlum(file)
write_xlum(xlum_data, out_file)
```

Index

* IO

read_xlum, 8
write_xlum, 10

* datagen

convert_rlum2xlum, 6

* package

xlum-package, 2

character, 3–8, 10

convert_bin2xlum (convert_binx2xlum), 3

convert_binx2xlum, 3

convert_Daybreak2xlum, 4

convert_psl2xlum, 5

convert_rlum2xlum, 3–5, 6, 7

convert_xsyg2xlum, 7

list, 6, 8, 10

logical, 8–10

Luminescence::read_BIN2R, 3

Luminescence::read_Daybreak2R, 4

Luminescence::read_PSL2R, 5

Luminescence::read_XSYG2R, 7

Luminescence::RLum, 6

Luminescence::RLum.Analysis, 6

Luminescence::RLum.Data, 6, 7

Luminescence::RLum.Results, 6

numeric, 8, 9

read_xlum, 8, 10

validate_xlum, 9, 9

write_xlum, 7, 9, 10

xlum (xlum-package), 2

xlum-package, 2, 9

xml2::read_xml, 8–10

xml2::write_xml, 10

xml2::xml_document, 3–10

xml2::xml_validate, 9