Package 'RLumSTARR'

January 2, 2021

Type Package

Title Spatially Resolved Radiofluorescence Analysis (EXPERIMENTAL PACKAGE)

Version 0.1.0.9000-56

Author Sebastian Kreutzer [aut, cre] (<https://orcid.org/0000-0002-0734-2199>),
Dirk Mittelstrass [aut] (<https://orcid.org/0000-0002-9567-8791>)

Maintainer Sebastian Kreutzer <sebastian.kreutzer@aber.ac.uk>

Description Analysing spatially resolved radiofluorescence data using ImageJ. A collection of functions to support early work on the subject.

License GPL-3

Depends R (>= 3.5.0),
utils,
methods

Imports Luminescence (>= 0.9.8),
rjags (>= 4-8),
coda (>= 0.19-1)

Encoding UTF-8

Language en-GB

LazyData true

RoxygenNote 7.1.1

R topics documented:

RLumSTARR-package *SpaTiAlly Resolved Radiofluorescence*

Description

A collection of functions to analyse spatially resolved radiofluorescence data

Details

Funding

- Sebastian Kreutzer received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 844457 (CREDit).

Author(s)

Sebastian Kreutzer, Geography & Earth Sciences, Aberystwyth University (United Kingdom)
Dirk Mittelstrass (Germany) , RLum Developer Team

References

##TODO

create_RFCurveArray *Create Multidimensional Curve Arrays from File input*

Description

Helper function to create a multidimensional curve array to prepare the Bayesian process

Usage

```
create_RFCurveArray(files)
```

Arguments

`files`	list	(**required**): list of `.rf` files to be imported

Value

Returns a list with two arrays for the `RF_nat` and the `RF_reg` curve

Function version

0.1.0

How to cite

Kreutzer, S., 2021. create_RFCurveArray(): Create Multidimensional Curve Arrays from File input. Function version 0.1.0. In: Kreutzer, S., Mittelstrass, D., 2021. RLumSTARR: Spatially Resolved Radiofluorescence Analysis (EXPERIMENTAL PACKAGE). R package version 0.1.0.9000-56.

Author(s)

Sebastian Kreutzer, Geography & Earth Sciences, Aberystwyth University (United Kingdom) , RLum Developer Team

Examples

```
##TODO
```

`extract_TRUELight` *Extract True Light from the Camera Measurements using a Bayesian Approach*

Description

A Bayesian modelling approach to extract the true light using the expanding region-of-interest (ROI) approach proposed by Cunningham and Clark-Balzan (2017). The function will return the results for a single curve.

Usage

```
extract_TRUELight(data, ROI = 1, method_control = list())
```

Arguments

`data`	array (**required**): curve array created by create_RFCurveArray
`ROI`	numeric (*with default*): ROI to be analysed
`method_control`	list (*optional*): parameter to be passed to `rjags`. Supported are `n.chain`, `n.iter`, `thin`, `variable.names`, `model`

Value

Returns a list with an Luminescence::RLum.Data.Curve object (the RF curve with the true light) and the rjags::coda.samples output for further processing. *Note: Regardless the observed variable, the parameter alpha will be always be used to create the curve*

Function version

0.1.0

How to cite

Kreutzer, S., 2021. extract_TRUELight(): Extract True Light from the Camera Measurements using a Bayesian Approach. Function version 0.1.0. In: Kreutzer, S., Mittelstrass, D., 2021. RLum-STARR: Spatially Resolved Radiofluorescence Analysis (EXPERIMENTAL PACKAGE). R package version 0.1.0.9000-56.

Author(s)

Sebastian Kreutzer, Geography & Earth Sciences, Aberystwyth University (United Kingdom) , RLum Developer Team

References

Cunningham, A.C., Clark-Balzan, L., 2017. Overcoming crosstalk in luminescence images of mineral grains. Radiation Measurements 106, 498–505. doi:10.1016/j.radmeas.2017.06.004

Examples

```
##TODO
```

`get_MCMCParameter` *Extracts a parameter from an MCMC list*

Description

Short cut to extract a parameter from an MCMC list. If more processing is wanted, the `'coda'` package can be used

Usage

```
get_MCMCParameter(mcmc, parameter, prob = 0.95, unlist = TRUE)
```

Arguments

`mcmc`	coda::mcmc or coda::mcmc.list (**required**) input
`parameter`	character (**required**): name of the parameter to be extracted
`prob`	numeric (*with default*): probability for the HPD calculation
`unlist`	logical (*with default*): if `TRUE` the output is a matrix otherwise a list

Value

Returns a matrix with the parameter value or a list

Function version

0.1.0

How to cite

Kreutzer, S., 2021. get_MCMCParameter(): Extracts a parameter from an MCMC list. Function version 0.1.0. In: Kreutzer, S., Mittelstrass, D., 2021. RLumSTARR: Spatially Resolved Radiofluorescence Analysis (EXPERIMENTAL PACKAGE). R package version 0.1.0.9000-56.

Author(s)

Sebastian Kreutzer, Geography & Earth Sciences, Aberystwyth University (United Kingdom) , RLum Developer Team

See Also

coda::HPDinterval

Examples

```
##TODO
```

`run_ImageJ` *Run ImageJ SR-RF macro*

Description

The script runs the SR-RF ImageJ macro in batch mode out of R

Usage

```
run_ImageJ(
  path,
  RF_nat = "default",
  RF_reg = "default",
  bg_rm = "take_from_RF_reg",
  image_group_size = 5,
  image_alignment = TRUE,
  first_slices_rm = FALSE,
  noise_tolorance = 10,
  ROI_size = 10,
  center_x = 0.5,
  center_y = 0.5,
  diameter = 0.9,
  use_predefined_ROIs = FALSE,
  channel_time = 5,
  save_workflow_images = FALSE,
  save_additional_results = FALSE,
  save_signal_decay_videos = FALSE,
  offset_time = 0,
  .ImageJ = "/Applications/Fiji.app/Contents/MacOS/ImageJ-macosx"
)
```

Arguments

`path`	character (**required**): path to files to be analysed
`RF_nat`	character (*default*): name of the RF_nat file
`RF_reg`	character (*default*): name of the RF_reg file
`bg_rm`	character (*with default*): background subtraction options. Allowed are `none` (no background subtraction), `take_from_RF_reg` (takes the last 100 channels from the RF_reg signal: dangerous) or <your file name> (this does not work in batch mode)
`image_group_size`	numeric (*with default*): grouping value for running median to remove outliers
`image_alignment`	logical (*with default*): enable/disable image alignment
`first_slices_rm`	logical (*with default*): remove first slice of each curve set

`noise_tolorance`
: numeric (*with default*): noise tolerance parameter

`ROI_size`
: numeric (*with default*): ROI size in pixel

`center_x`
: numeric (*with default*): aliquot ROI centre x-coordinate

`center_y`
: numeric (*with default*): aliquot ROI centre y-coordinate

`diameter`
: numeric (*with default*): relative diameter aliquot ROI

`use_predefined_ROIs`
: logical (*with default*): use pre-defined ROIs imported from a file `ROIs.zip` found in the same folder as the files

`channel_time`
: numeric (*with default*): channel time, this parameter was set the moment the sequence was written

`save_workflow_images`
: logical (*with default*): enable/disable writing of additional workflow images

`save_additional_results`
: logical (*with default*): enable/disable writing of additional workflow images

`save_signal_decay_videos`
: logical (*with default*): enable/disable writing of additional workflow videos

`offset_time`
: numeric (*with default*): offset time for the time axis

`.ImageJ`
: numeric (*with default*): Path to ImageJ (the macro is shipped with the package)

Value

This functions returns the path of the analysed data

Function version

0.1.0

How to cite

Kreutzer, S., 2021. run_ImageJ(): Run ImageJ SR-RF macro. Function version 0.1.0. In: Kreutzer, S., Mittelstrass, D., 2021. RLumSTARR: Spatially Resolved Radiofluorescence Analysis (EXPERIMENTAL PACKAGE). R package version 0.1.0.9000-56.

Author(s)

Sebastian Kreutzer, Geography & Earth Sciences, Aberystwyth University (United Kingdom) , RLum Developer Team

Examples

```
##TODO
```

Index