

# Package ‘rstoat’

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**Title** R Interface to the 'STOAT' Platform

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## Description

A wrapper for the 'Spatiotemporal Observation Annotation Tool' ('STOAT', <<https://www.mol.org/stoat>>) which allows users to run annotation jobs and retrieve results in the R environment.

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**URL** <https://www.mol.org/stoat>

**BugReports** <https://github.com/MapofLife/rstoat/issues>

**Encoding** UTF-8

**LazyData** true

**Depends** R (>= 2.10)

**Imports** htr, jsonlite, curl, keyring

**Suggests** knitr, rstudioapi, dplyr, rmarkdown

**VignetteBuilder** knitr, rmarkdown

**RoxygenNote** 7.1.2

**NeedsCompilation** no

**Repository** CRAN

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download_annotation	<i>Download annotation results</i>
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## Description

Download results of a successfully completed batch annotation. Requires login, please run mol\_login(<email\_address>)  
 Uses the output from my\_jobs() for the annotation id.

## Usage

```
download_annotation(annotation_id, dir = "annotation_results")
```

## Arguments

annotation_id	The id of the annotation
dir	The directory where to write the annotation.

## Value

The path of the downloaded annotation.

## Examples

```
## Not run:
download_annotation(<annotation_id>, <dir>)

## End(Not run)
```

---

download\_sample\_data    *Download sample annotation data*

---

**Description**

Download the powerful owl and budgerigar sample datasets (both raw occurrence data and annotated data), used in the Introduction vignette, from Map of Life's datastore.

**Usage**

```
download_sample_data(dir = "sample_data")
```

**Arguments**

dir                    The directory where to store the data.

**Value**

The path of the downloaded sample data.

**Examples**

```
## Not run:  
download_sample_data()  
  
## End(Not run)
```

---

get\_products            *Retrieve product metadata*

---

**Description**

Get information on available products for annotation. Get the spatial and temporal buffer limits for use in when creating a custom annotation.

**Usage**

```
get_products()
```

**Value**

A data.frame of spatial and temporal buffer limits

**Examples**

```
## Not run:  
get_products()  
  
## End(Not run)
```

---

job_details	<i>Retrieve annotation job details</i>
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**Description**

Get details of a batch annotation job. Requires login, please run `mol_login(<email_address>)`. Uses the output from `my_jobs()`.

**Usage**

```
job_details(annotation_id)
```

**Arguments**

`annotation_id` The annotation id from from `my_jobs()`.

**Value**

A `data.frame` of layers and their statuses, along with the `annotation_id`, and the `dataset_id` for the custom annotation.

**Examples**

```
## Not run:  
job_details(<annotation_id>)  
  
## End(Not run)
```

---

job_species	<i>View annotation job species</i>
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**Description**

View the species in a completed annotation and other details. Only works for successfully completed jobs. Requires login, please run `mol_login(<email_address>)` Uses the output from `my_jobs()`.

**Usage**

```
job_species(annotation_id)
```

**Arguments**

`annotation_id` The annotation id from from `my_jobs()`.

**Value**

A `data.frame`, with species and counts in this annotation.

**Examples**

```
## Not run:  
job_species(<annotation_id>  
  
## End(Not run)
```

---

melopsittacus\_short     *Short budgerigar sample dataset*

---

**Description**

Dataset containing 1500 annotated records of the budgerigar. Subsampled version of the dataset downloaded using `download_sample_data()`.

**Usage**

```
melopsittacus_short
```

**Format**

A data frame with 1500 rows and 10 variables:

**Source**

See introduction vignette

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mol\_login             *Map of Life Login*

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**Description**

Login to your Map of Life account.

**Usage**

```
mol_login(email, password = NULL)
```

**Arguments**

email	The email address associated with your Map of Life Account.
password	Your map of life password. If left blank, and you are in RStudio you can enter it via a secure popup.

**Value**

No return value

**Examples**

```
## Not run:  
mol_login("your.email@company.com")  
  
## End(Not run)
```

---

my_datasets	<i>View datasets</i>
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---

**Description**

List logged-in user's uploaded datasets (uploaded to <https://mol.org> through <https://mol.org/upload>). Requires login, please run `mol_login(<email_address>)`

**Usage**

```
my_datasets()
```

**Value**

A data frame of a users datasets and their associated ids.

**Examples**

```
## Not run:  
my_datasets()  
  
## End(Not run)
```

---

my_jobs	<i>List all jobs</i>
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---

**Description**

List logged-in user's past and current annotation jobs. Requires login, please run `mol_login(<email_address>)`

**Usage**

```
my_jobs()
```

**Value**

A data.frame containing jobs metadata.

**Examples**

```
## Not run:  
my_jobs()  
  
## End(Not run)
```

---

ninox_short	<i>Short powerful owl sample dataset</i>
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---

**Description**

Dataset containing 1500 annotated records of the powerful owl. Subsampled version of the dataset downloaded using `download_sample_data()`.

**Usage**

```
ninox_short
```

**Format**

A data frame with 1500 rows and 11 variables:

**Source**

See introduction vignette

---

read_output	<i>Read annotation output into R</i>
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**Description**

Convenience function which reads and joins annotation results spread across multiple files for space efficiency. To run this function, please first download annotated data first using `download_annotation()`

**Usage**

```
read_output(directory, drop_event_id = TRUE)
```

**Arguments**

directory	The path of the data.
drop_event_id	Whether to drop the event_id column or not.

**Value**

A data.frame of annotated data, one row per variable per event

**Examples**

```
## Not run:
read_output("path/to/your/downloaded/data/directory")

## End(Not run)
```

---

start\_annotation\_batch

*Start batch annotation*

---

**Description**

Submit a dataset previously uploaded on mol.org for annotation. To upload a dataset please visit <https://mol.org/upload/> Requires login, please run mol\_login(<email\_address>)

**Usage**

```
start_annotation_batch(dataset_id, title, layers)
```

**Arguments**

dataset_id	The id of the dataset. List your datasets with the my_datasets() function.
title	The title of the annotation job.
layers	A list of parameters or vector of codes, of the layers, see the examples below.

**Value**

No return value, check my\_jobs() to confirm successful job submission.

**Examples**

```
## Not run:
start_annotation_batch('<dataset_id>', 'My annotation task', layers = list(
  list(product = "chelsea", variable = "precip", spatial = 1000, temporal = 30)
))
# alternatively supplying the code is fine.
start_annotation_batch('<dataset_id>',
  'My 2nd annotation task', layers = c("modis-ndvi-1000-1", "modis-1st_day-1000-1"))

## End(Not run)
```

---

`start_annotation_simple`*Start simple annotation*

---

## Description

Submit a dataframe for on-the-fly annotation. Does not require login - for use for small numbers of records and pilot jobs.

You can annotate using layers that are on earthengine! Layer parameters: Used by all:

- spatial: The spatial buffer in meters.
- temporal: The temporal buffer in days.

For STOAT layers:

- product: The product e.g "srtm", or "landsat8".
- variable: The variable, e.g "elevation", or "evi".

For non STOAT layers, ie those in Google Earth Engine:

- id: The id of the image in Google Earth Engine, mapped to "product" in the output.
- static: Whether to load the imagery as an ImageCollection or as an Image.
- bands: A list, with one element, which is used to specify which band of the imagery to use for the annotation, mapped to "variable" in the output.
- reducers: A list containing one or more of the following:
  - mean
  - lcv\_count
  - mode
  - median
  - stdev
  - min
  - max
  - stdev

If only one is provided the output will be assigned to "value", else the output will be named the same as the reducer.

## Usage

```
start_annotation_simple(  
  events,  
  layers,  
  coords = c("lng", "lat"),  
  date = "date"  
)
```

**Arguments**

events	A data.frame for on the fly annotation
layers	A list of parameters or vector of codes, of the layers, see the examples below.
coords	A vector of length 2 containing column names for record longitudes, and latitudes.
date	Column name for record dates, dates must take the format YYYY-MM-DD

**Value**

Input data.frame with values from the annotation appended, in addition to unique identifier field event\_id.

- event\_id: A unique identifier for each occurrence
- product: Product used for annotation
- variable: Variable used for annotation
- s\_buff: Spatial buffer in meters applied to occurrence
- t\_buff: Temporal buffer in days applied to occurrence
- value: Annotated value of occurrence from requested layer (mean within buffer), if there is only one reducer (default), then this value will be here.
- stdev: Standard deviation of values within buffer
- valid\_pixel\_count: Number of pixels within buffered area'

**Examples**

```
## Not run:
events <- data.frame(
  event_id = as.character(1:2),
  lng = c(-4, 24),
  lat = c(10, 10),
  date = '2015-01-01'
)

# simple layer string format: PRODUCT-VARIABLE-S_BUFF-T_BUFF
layers <- 'landsat8-evi-100-16'
start_annotation_simple(events, layers)

start_annotation_simple(events, layers)

# For lcv_count (Count of landcover value), 'value' returned is a string of
# landcover counts within the AOI.
# The output format is:
# <LANDCOVER_CLASS>:<COUNT_OF_PIXELS_WITH_THAT_CLASS>
# classes are separated by commas.

start_annotation_simple(events, list(
  list(
    id="COPERNICUS/Landcover/100m/Proba-V-C3/Global",
    s_buff=1000,
```

```
    reducers=list("lcv_count", "mode"),
    static=FALSE,
    t_buff=365,
    bands=list("discrete_classification")
  )
))
```

```
# Annotating with two worldclim layers:
# bio01 is annual mean temperature
# bio12 is annual precipitation
```

```
start_annotation_simple(events, list(
  list(
    "id"= "WORLDCLIM/V1/BIO",
    "s_buff"=1000,
    "reducers"=list("mean"),
    "static"= TRUE,
    "t_buff"= 1,
    "bands"=list("bio01")
  ),
  list(
    "id"= "WORLDCLIM/V1/BIO",
    "s_buff"=1000,
    "reducers"=list("mean"),
    "static"= TRUE,
    "t_buff"= 1,
    "bands"=list("bio12")
  )
))
```

```
## End(Not run)
```

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