

# MORE ABOUT ENV-DATA

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- The GUI
- Annotating non-tracking data
- How results are delivered
- Common issues

# NAVIGATING THE GUI



# CHOOSING AN INTERPOLATION METHOD

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- inverse-distance-weighted = fewer NAs than bilinear
- consider relationship when using categorical QC variables

# ANNOTATING NON-TRACKING DATA: GENERIC CSVS

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```
timestamp,location-long,location-lat  
2007-04-20 00:00:00.000,-90.12345,25.12345  
2007-04-20 03:00:00.000,-90.12345,25.12345  
2007-04-20 06:00:00.000,-90.12345,25.12345
```

# ANNOTATING NON-TRACKING DATA: GENERIC CSVS

---

```
timestamp,location-long,location-lat,height-above-msl  
2007-04-20 00:00:00.000,-90.12345,25.12345,200  
2007-04-20 03:00:00.000,-90.12345,25.12345,201  
2007-04-20 06:00:00.000,-90.12345,25.12345,201
```

# ANNOTATING NON-TRACKING DATA: GENERIC CSVS

---

```
timestamp,location-long,location-lat,height-above-msl  
2007-04-20 00:00:00.000,-90.12345,25.12345,200  
2007-04-20 03:00:00.000,-90.12345,25.12345,201  
2007-04-20 06:00:00.000,-90.12345,25.12345,201
```

height-above-msl and height-above-ellipsoid are different

# ANNOTATING NON-TRACKING DATA: GENERIC CSVS

---

```
timestamp,location-long,location-lat,height-above-msl  
2007-04-20 00:00:00.000,-90.12345,25.12345,200  
2007-04-20 03:00:00.000,-90.12345,25.12345,201  
2007-04-20 06:00:00.000,-90.12345,25.12345,201
```

height-above-msl and height-above-ellipsoid are different  
annotate surface or near-surface equivalent variables

# ANNOTATING NON-TRACKING DATA: GENERIC CSVS

---

```
timestamp,location-long,location-lat,height-above-msl,index
2007-04-20 00:00:00.000,-90.12345,25.12345,200,1
2007-04-20 03:00:00.000,-90.12345,25.12345,201,2
2007-04-20 06:00:00.000,-90.12345,25.12345,201,3
```



# ANNOTATING NON-TRACKING DATA: GRIDDED AREAS

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### Define the grid to annotate

Coordinate reference system	WGS 84	<a href="#">Grid Request Help</a>
Longitude of NW corner	-6	<a href="#">Choose on Map</a>
Latitude of NW corner	55	
Longitude of SE corner	24	
Latitude of SE corner	50	
Number of pixels (longitude)	2100	<a href="#">?</a>
Number of pixels (latitude)	550	
Number of tiles (longitude)	1	<a href="#">?</a>
Number of tiles (latitude)	1	
Timestamps	007-05-15 00:00:00,2007-05-31 00:00:00,2007-06-15 00:00:00 <a href="#">?</a>	
	<a href="#">Add Timestamp</a>	
Output format	geotiff	
Color scheme	Celsius	<a href="#">RGB Mappings</a>
Rescale values to match color map range	<input type="checkbox"/>	

[Cancel](#) [Continue](#)

# AUTOMATED REQUESTS

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R script available for automated requests by advanced users.

# GETTING YOUR RESULTS

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- Notification emails
- Download results from Movebank
- The readme

# HOW LONG WILL MY REQUEST TAKE?

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- Size depends on space & time range of input & requested products.
- Contact after a week or so, or if a request fails.
- Always include your access key if you received one.
- Request as much ahead of time as possible.

My requests

Find a list of your submitted annotation requests below. Click on the links in the table for information on submitted datasets and annotated environmental variables. Read [here](#) for tips on interpreting your results and answers to frequently asked questions.

Request	Timestamp	State	Overview	Details
Svalbard_geese_ECMWF_wind	2019-04-29 14:47:28.794	available	<a href="#">view</a>	<a href="#">view</a> <a href="#">download</a>
Svalbard_geese_ASTER	2019-04-29 14:45:33.468	available		<b>Study:</b> Migration timing in barnacle geese (Svalbard) (data from Kölzsch et al. and Shariatinajafabadi et al. 2014) <b>Access key:</b> 6815954624661110427 <b>Sensor type:</b> GPS 33102, 33103, 33104, 33145, 33953 33954, 64685, 170563, 178199, 186827 <b>Animals:</b> 30507, 30508, 30509, 30510, 30511

Griffin L, Ca  
Forecasting  
ability of ph  
herbivore.  
56.12281  
idmore AK,  
n L, Stahl J

# COMMON ISSUES: MILLISECONDS

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For generic CSVs, the timestamps need milliseconds.\*

In R:

```
timestamp2 <- strptime(timestamp, tz='UTC', usetz=F,  
                        format = "%Y-%m-%d %H:%M:%OS3")
```

\*But not for gridded area requests!

# COMMON ISSUES: REQUESTING LOTS OF VARIABLES

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Separate requests by service.

# COMMON ISSUES: REQUESTING LOTS OF VARIABLES

---

Separate requests by service.

The screenshot shows a web interface with two tabs: "Variables by source" (active) and "Variables by type". The list of variables under "Variables by source" includes:

- ASTER ASTGTM2 Global 30-m DEM [i](#)
- ECMWF Global Atmospheric Reanalysis
  - Interim Full Daily Invariant [i](#)
  - Interim Full Daily at Pressure Levels [i](#)
  - Interim Full Daily at Surface [i](#)
  - Interim Full Daily at Surface Forecast [i](#)
- ETOPO1 1-arc-minute Global Relief Model [i](#)
- GlobCover
- Global Precipitation Measurement
  - IMERG Precipitation V05B [i](#)
- MODIS Land
- MODIS Ocean

A red arrow points from the word "service" to the "IMERG Precipitation V05B" item, indicating that this variable is associated with a specific service.

# COMMON ISSUES: REQUESTING LOTS OF VARIABLES

Separate requests by service.

source/service



type name	files downloaded	files missing	mb downloaded	mb missing
ecmwf2/interim_full_daily/pl	132	0	1776.1937217712402	0.0
ecmwf2/interim_full_daily/sfc	528	0	14197.09994506836	0.0
ecmwf2/interim_full_daily/sfc-fc	133	0	7153.265972137451	0.0
ecmwf2/interim_full_invariant	2	0	0.4423561096191406	0.0
GPM_V05B	12569	1472	64782.41872501373	7586.897952079773

Variables by source | Variables by type

- ⊕ ASTER ASTGTM2 Global 30-m DEM [i](#)
- ⊖ ECMWF Global Atmospheric Reanalysis
  - ⊕ Interim Full Daily Invariant [i](#)
  - ⊕ Interim Full Daily at Pressure Levels [i](#)
  - ⊕ Interim Full Daily at Surface [i](#)
  - ⊕ Interim Full Daily at Surface Forecast [i](#)
- ⊕ ETOPO1 1-arc-minute Global Relief Model [i](#)
- ⊕ GlobCover
- ⊖ Global Precipitation Measurement
  - ⊕ IMERG Precipitation V05B [i](#)
- ⊕ MODIS Land
- ⊕ MODIS Ocean



# COMMON ISSUES: REQUESTING LOTS OF VARIABLES

Separate requests by service.

source/service



type name	files downloaded	files missing	mb downloaded	mb missing
ecmwf2/interim_full_daily/pl	132	0	1776.1937217712402	0.0
ecmwf2/interim_full_daily/sfc	528	0	14197.09994506836	0.0
ecmwf2/interim_full_daily/sfc-fc	133	0	7153.265972137451	0.0
ecmwf2/interim_full_invariant	2	0	0.4423561096191406	0.0
GPM_V05B	12569	1472	64782.41872501373	7586.897952079773

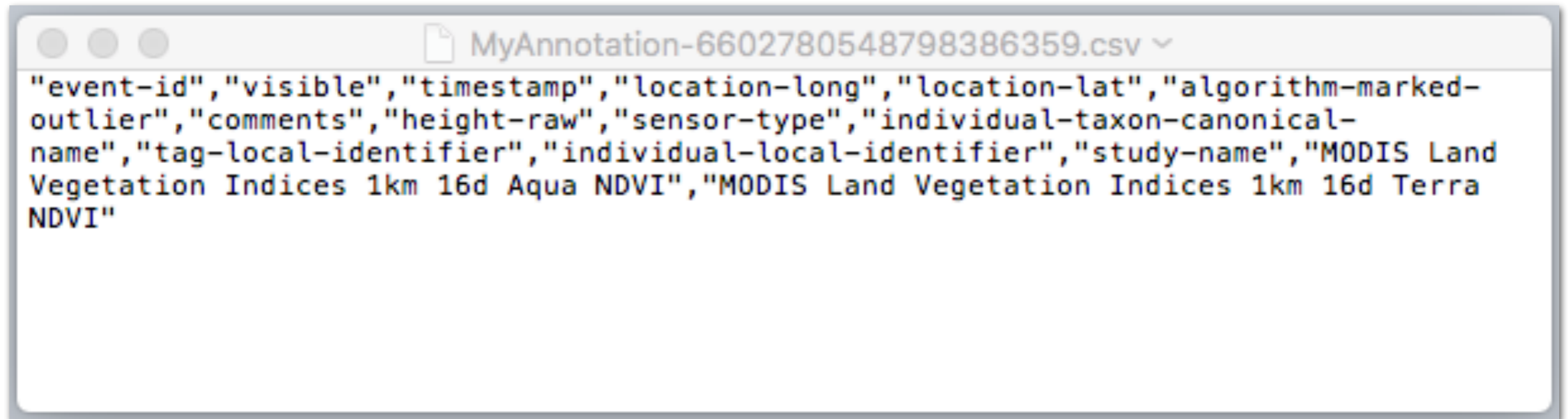
Variables by source | Variables by type

- ⊕ ASTER ASTGTM2 Global 30-m DEM [i](#)
- ⊖ ECMWF Global Atmospheric Reanalysis
  - ⊕ Interim Full Daily Invariant [i](#)
  - ⊕ Interim Full Daily at Pressure Levels [i](#)
  - ⊕ Interim Full Daily at Surface [i](#)
  - ⊕ Interim Full Daily at Surface Forecast [i](#)
- ⊕ ETOPO1 1-arc-minute Global Relief Model [i](#)
- ⊕ GlobCover
- ⊖ Global Precipitation Measurement
  - ⊕ IMERG Precipitation V05B [i](#)
- ⊕ MODIS Land
- ⊕ MODIS Ocean

# COMMON ISSUES: JUST A HEADER

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- Make sure you've selected entities with data!



```
MyAnnotation-6602780548798386359.csv
"event-id","visible","timestamp","location-long","location-lat","algorithm-marked-
outlier","comments","height-raw","sensor-type","individual-taxon-canonical-
name","tag-local-identifier","individual-local-identifier","study-name","MODIS Land
Vegetation Indices 1km 16d Aqua NDVI","MODIS Land Vegetation Indices 1km 16d Terra
NDVI"
```

# COMMON ISSUES: WHY ALL THE MISSING VALUES?

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- Periods or regions with no data in the source files: ocean vs. land, cloudy areas.
- Records outside the temporal or spatial range of the dataset.
- Delay before new data are provided (weeks to months).
- QC variables can sometimes identify causes.

# COMMON ISSUES: WHAT EXCEL MESSES UP

Svalbard geese 1k 16d NDVI-3281758398705165226.csv

Home Layout Tables Charts SmartArt Formulas Data Review

J16 Branta leucopsis

	A	B	C	D	E	J	L	N	O		
1	event-id	visible	timestamp	location-long	location-lat	individual-taxon-canonical-name	individual-local-identifier	MODIS Land Vegetation Indices 1km	6d Aqua NDVI	MODIS Land Vegetation Indices 1km	6d Terra NDVI
2	369336493	TRUE	00:00.0	-3.48383	54.97533	Branta leucopsis	33102		0.514340187		0.417114831
3	369336494	TRUE	00:00.0	-3.48367	54.97567	Branta leucopsis	33102		0.515141211		0.422062809
4	369336495	TRUE	00:00.0	-3.4835	54.9755	Branta leucopsis	33102		0.515048005		0.420547401
5	369336514	TRUE	00:00.0	-3.48383	54.97533	Branta leucopsis	33102		0.515098438		0.412082168
6	369336512	TRUE	00:00.0	-3.48367	54.9755	Branta leucopsis	33102		0.515902299		0.413477755
7	369336513	TRUE	00:00.0	-3.48383	54.9755	Branta leucopsis	33102		0.516087154		0.41031684
8	369336537	TRUE	00:00.0	-3.48367	54.9755	Branta leucopsis	33102		0.516874241		0.411875192
9	369336536	TRUE	00:00.0	-3.48383	54.9755	Branta leucopsis	33102		0.517036825		0.413002702
10	369336560	TRUE	00:00.0	-3.48367	54.9755	Branta leucopsis	33102		0.518170162		0.421126955
11	369336558	TRUE	00:00.0	-3.48383	54.9755	Branta leucopsis	33102		0.518303054		0.422328627
12	369336559	TRUE	00:00.0	-3.48317	54.9755	Branta leucopsis	33102		0.519447506		0.429164181

Svalbard geese 1k 16d NDVI-3281

corrupts  
timestamps

truncates  
values

# THE README FILE

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➤ Keep a local copy with your results.

➤ **Cite in your references!**

1. Env-DATA

2. Annotated data products

3. Tracking data owners (if they're not yours)

Dodge S, Bohrer G, Weinzierl R, Davidson SC, Kays R, Douglas D, Cruz S, Han J, Brandes D, Wikelski M (2013) The Environmental-Data Automated Track Annotation (Env-DATA) System: linking animal tracks with environmental data. *Movement Ecology* 1:3. doi:10.1186/2051-3933-1-3

# THE README FILE

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What input you annotated:

Annotated data for the following Movebank entities are contained in this file:

**Movebank study name:** Migration timing in barnacle geese (Svalbard) (data from Kölzsch et al. and Shariatinajafabadi et al. 2014)

**Annotated Animal IDs:** 33102, 33103, 33104, 33145, 33953, 33954, 64685, 170563, 178199, 186827, 64687, 70564, 70565, 70566, 70567, 70568, 70618, 70619, 78198, 78378, 86824, 86828

Requested on Fri Jan 11 02:40:16 CET 2019

**Access key:** 3281758398705165226

**Requested by:** Sarah Davidson (Movebank support)

# THE README FILE

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Metadata for annotated attributes:

**Name:** MODIS Land Vegetation Indices 1km 16d Aqua NDVI

**Description:** The normalized difference vegetation index: a measure of the concentration of live plant leaves based on remote sensing reflectance measurements. Higher values indicate more vegetation. Estimate is based on the highest quality image for each pixel obtained during each 16-day period (criteria used are low clouds, low view angle and highest NDVI/EVI value).

**Unit:** unitless (NDVI)

**No data values:** -3 (provider), NaN (interpolated)

**Interpolation:** inverse-distance-weighted

# THE README FILE

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Metadata for annotated services:

**Service:** MODIS Land/Vegetation Indices 1-km 16-day |  
Aqua (MYD13A2 V6)  
**Provider:** NASA Land Processes Distributed Active  
Archive Center  
**Datum:** N/A  
**Projection:** N/A  
**Spatial granularity:** 1 km  
**Spatial range (long x lat):** E180.0, W-180.0, N90, S-90  
**Temporal granularity:** 16 day  
**Temporal range:** since July 2002  
**Source link:** <https://doi.org/10.5067/MODIS/MYD13A2.006>  
**Terms of use:** [https://lpdaac.usgs.gov/citing\\_our\\_data](https://lpdaac.usgs.gov/citing_our_data)  
**Related websites:** links to user guides, QC etc.



# UPDATED FILES ON DRIVE

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Rscripts >

EnvDATAvizTrack.R

EnvDATAvizRaster.R

EnvDATAvizAnimate.R

Output\_from\_running\_code