



HISTOS

The Histos.csv file contains multiple data products. It is a combination of behavior histograms (Time at Depth (TAD), Time at Temperature (TAT), Dive Duration, and Dive Max Depth histograms), along with timeline data (Percent Timelines and Twenty Minute Timelines). The timeline data are typically used to identify haul-out periods for animals that spend time on land, but can also be used to identify significant time at the surface should a tag read "dry" for long periods of time (i.e. Sperm whales logging) or when animals are above or below a user-specified depth threshold. The other data are generally used to infer animal behavior while at sea. The type of data available in this data product will vary by tag type.

Tags Containing This Data Product

SPLASH10

Behavior Histograms

For each type of histogram per day, you can select between 1 – 14 bins for SPLASH10 tags and either enable or disable all 1-12 bins for MiniPAT and SPOT tags. Additionally, you can specify the summary period that will be used to fill the bins (e.g. 6 hr). The summary period, start time (GMT), and number of bins can be adjusted depending on your study questions, the number of messages you want to send via Argos, and the study duration. These histograms do not differentiate between when the tag is wet or dry, they include any depth or temperature recorded during the summary period.

Time At Depth

When configuring your tag, you select the number of desired bins and the upper limits for said bins. The Time at Depth (TAD) histograms show the percent of time that your animal/tag spent within each depth bin during the summary period. For example, if you selected 1-hour summary periods, starting at 0800, with bin settings of 0, 5, 10, and 20 m; your first rows of data may look like this:

Tags Containing This Data Product

SPLASH10

MiniPAT

HistType	Date	NumBins	Sum	Bin1	Bin2	Bin3	Bin4
TADLIMITS				0	5	10	20
TAD	7/22/2016 8:00	4	100	25	55	20	0
TAD	7/22/2016 9:00	4	100	0	100	0	0

HISTOS – CONTINUED

The above data show that for the 0800 GMT hour, the animal spent 25% of the hour (15 min) shallower than 0 m, 55% of the hour (33 min) was spent between 0.1 and 5 m, and 20% of the hour (12 min) was spent between 5.1 and 10 m. During the 0900 GMT hour, the animal spent 100% of the hour between 0.1 and 5 m. Note that if any data occurs in any bin, the bin will indicate a “1” even if scaling would have rounded the bin down to “0.” The “Sum” column of all TAD and TAT histograms should be 100 (the sum of all the percentages for that summary period).

Time At Temperature

This data product is configured exactly the same as the Time at Depth histogram, but with temperatures being reported instead of depths. Temperatures are reported in °C. In the following example, the upper limits of the bins were set to 21, 24, 27, and 30 °C with a 1-hour summary period.

Tags Containing This Data Product

SPLASH10
MiniPAT
SPOT

HistType	Date	NumBins	Sum	Bin1	Bin2	Bin3	Bin4
TATLIMITS				21	24	27	30
TAT	7/22/2016 8:00	4	100	38	37	15	10
TAT	7/22/2016 9:00	4	100	86	7	7	0

The above data show that the during the 0800 GMT hour, the animal spent 38% of the time below 21 °C, 37% of the time between 21.1 and 24 °C, 15% of the time between 24.1 and 27 °C, and 10% of the time between 27.1 and 30 °C.

Dive Max Depth & Dive Duration

These data products are configured the same as the TAD and TAT histograms, but are populated with counts of dives to specified depth and duration ranges instead of proportions of time. The maximum value for any bin is 254; consequently, if a bin has a count of 255, this indicates that there were 255+ dives counted in that bin during the summary period. (ie. All bins get capped at 255 dives.)

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HistType	Date	NumBins	Sum	Bin1	Bin2	Bin3	Bin4
DiveDepthLIMITS				5	10	15	20
DiveDepth	7/22/2016 8:00	4	7	0	2	4	1
DiveDepth	7/22/2016 9:00	4	4	0	0	0	4
DiveDurationLIMITS				60	120	180	240
DiveDuration	7/22/2016 8:00	4	7	0	6	0	1
DiveDuration	7/22/2016 9:00	4	4	0	0	4	0

HISTOS – CONTINUED

The above data show that, for the 0800 GMT hour, there were 2 dives between 5.1 – 10 m, 4 dives to 10.1 – 15 m, and 1 dive between 15.1 – 20 m. These dives were followed by 4 dives that lasted 120.1 – 180 sec at a depth of 15.1 – 20 m. These durations correspond to 6 dives between 60.1 – 120 sec, and 1 dive between 180.1 – 240 sec.

Timeline Data

Percent Timeline

Within the Histos.csv spreadsheet, the Percent Timeline data have a HistType = "Percent." This timeline records the percentage of time spent above a threshold depth within 24 1-hour blocks per day. In other words, there are 24 bins presented in the Histos.csv file, each bin represents a 1-hour period of the day. Within each bin is the percentage of time the tag was "dry" or above a user-specified depth. When programming your tag, you can choose the "Low-Resolution" option, which would round the percentages to the nearest 10%, or the "High-Resolution" option, which would round the percentages to the nearest 1%.

Tags Containing This Data Product

SPLASH10

SPOT

These Percent Timelines are often referred to as Percent Dry Timelines if the wet/dry sensor is used instead of a threshold depth. This is usually done to identify haul-out periods or surface behavior for air-breathing animals.

Twenty Minute Timeline

The Twenty-Minute Timeline data have a HistType = "TwentyMinuteTimeline." These timelines record whether the tag was deeper or shallower than a threshold depth for more than 10 min within each 20-minute period. In the Histos.csv file there are 72 bins for this data product, with each bin representing a 20 minute period of the day. The wet/dry sensor can also be used as the threshold instead of a specific depth. In the transmitted data, if a tag was deeper than the threshold or wet for more than half of the 20 minutes, there is a "1" in the bin for that period. If it was shallower or dry, there will be a "0" in the bin.

Tags Containing This Data Product

SPLASH10

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