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ADS (ACTIVITY PER DIVE SEGMENT)—PHOCID

ADS—Phocid is a dive-segment analysis data product available on our prototype SCOUT-DSA tags and uses onboard processing of accelerometer and depth data to provide detailed characteristics for individual dives. This data product was developed for use on elephant seals with tags placed in a known orientation. Consequently, some calculators require a specific orientation of the accelerometer axes in order to report accurate metrics. This data product will work well for other phocid seals or animals that stroke in a similar manner (horizontally along the Y axis). The algorithm uses a 3-axis accelerometer sampling at 16 Hz and a depth sensor that is sampled at 1 Hz. The tag samples and stores sensor data during every dive and continues logging data until the tag returns to the surface. Any dives ≤ 52 min will be analyzed, but longer dives will be ignored. At the end of each qualifying dive, the sensor data are processed and the results, along with the raw data, are stored permanently to tags archive. In addition to being stored on the tag, the processed results are opportunistically transmitted back to the researcher via Argos.

Tags Containing This Data Product

Prototype SCOUT-DSA

Data

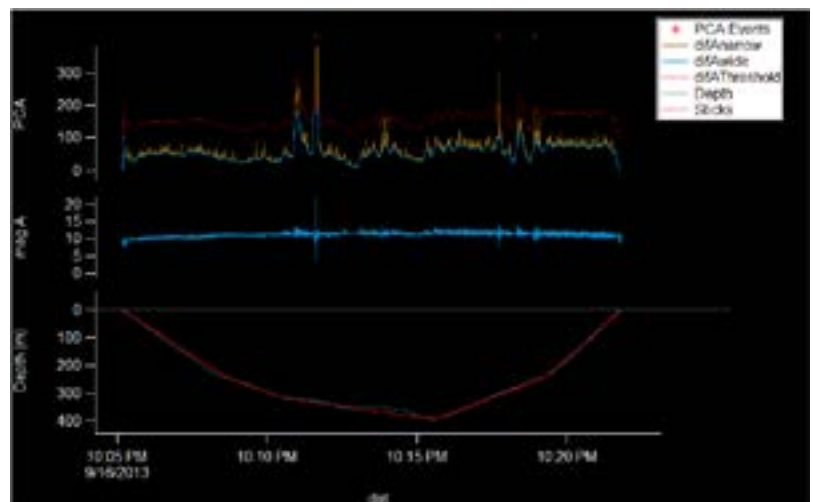
You will set what qualifies as a “dive” when programming the tag. On the tag, each qualifying dive is broken into five segments using a Broken Stick algorithm. Once the dive is split into five segments we run both low- and high-pass filters on the data (we use a phase-correct 2nd order IIR Butterworth filter with a corner frequency of 0.2 Hz, [Cox et al 2018](#)). The filtered data are then used to calculate pitch, activity count, and swim effort.

Pitch: calculated to the nearest degree once per second for the first and last dive segments. This is done using one sample of each second’s low-pass filtered acceleration data. The segment’s one-second pitch values are then averaged to produce an average pitch for the entire segment.

Activity Counts: calculated for each dive segment using the methods described in Cox et al (2018). These are shown as ‘PCA’ in the graph on the right.

Swim Effort: calculated for each dive segment as the absolute value of the high-pass filtered “Y” axis of the acceleration data, summed over each segment. In addition to calculating the above parameters for dive segments, ADS—Phocid also reports:

- Light readings at two depths: shallow (10 ± 5 m) and deep (150 ± 5 m)
- Temperature at two depths: shallow (2 ± 5 m) and deep (200 ± 5 m)
- The 1-second change in acceleration magnitude (difAnarrow)
- The 11-second change in acceleration magnitude (difAwide)



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