



TEMPERATURE PROFILES

Temperature profiles provide information about the environment of the tagged animal during the deployment period. These are reported as Profiles of Depth and Temperature (PDT). On Wildlife Computers tags, a PDT is developed by measuring the external (environmental) temperature as a function of depth. The tag records depth (rounded to the nearest 8 m) and min and max temperature to the nearest 0.2° C observed at each depth. The depth range is from -40 m to 2000 m with a resolution of 8 m (4 m on either side of the recorded depth). The temperature range is from 0° C to 50° C and any negative temperatures recorded will be reported as 0° C. How these temp-depth profiles are collected and summarized may differ between tag types.

MiniPAT PDT

On a MiniPAT tag, temperature and depth data are collected as part of “Summary Messages” meaning that the data are packaged by summary period (programmed by the user before deployment). The temperature and depth sensor data are recorded at the archival sample interval.

“Profiles” are generated based on the depths visited by the tag during each summary period. There are two types of PDT profiles that can be transmitted:

1. Low-Resolution Profiles: these profiles are the default when the tag remains above 400 m during the summary period. The tag creates a “profile” using eight different depths that is transmitted in one Argos message.
2. High-Resolution Profiles: these profiles are the default when the tag ventures deeper than 400 m during the summary period. The tag creates a “profile” using 16 different depths transmitted in TWO Argos messages.

The depths are chosen dynamically to include the minimum (min) and maximum (max) depths detected during the summary period with the remaining depths (6 or 14) arranged equally between the min and max. For each depth in a “profile” the min and max observed temperatures to the nearest 0.2° C are reported. In high-resolution profiles, every other depth-temp pair is transmitted in the first message, and the remaining data are transmitted in the second message. This allows you to see the entire range of the profile even if only one message is received.

SPLASH10 PDT

PDTs on a SPLASH10 tag are developed similarly to the PAT-style as described but depth and temperature are sampled at the histogram sampling rate.

Tags Containing This Data Product

MiniPAT

Tags Containing This Data Product

SPLASH10

SPLASH10-F

TEMPERATURE PROFILES – CONTINUED

DIVE PDT

The dive PDT is used to capture a temperature profile representing a vertical slice of the ocean (the end of a dive). Sampling of the depth and temperature pairs begins when the tag goes deeper than the user-configurable minimum dive depth and ends when it returns to the surface. To ensure that each dive eventually ends, there is a three-hour limit on dive duration. The tag will sample the store depth-temperature pairs for the deepest dive during each histogram summary period. The most recent temperature recorded at a particular depth is retained as part of the “profile.” For example, if an animal moves up and down past 30 m in depth during a single dive, then the temperature recorded the last time it passed 30 m during the dive is what will appear in the profile.

The tag captures the deepest dive during the summary period using real-time processing. For each histogram summary period, the tag will select the single deepest dive. If the current dive is deeper than the previous dive, data collected from the current dive will overwrite the data being held in the divePDT buffer from some previous dive. Data are continuously sampled at the histogram sampling rate, the tag will consolidate the depth-temperature pairs from the divePDT buffer into a “profile” for transmission via Argos. The data are reported in the divePDT.csv file. The number of messages created from this data product is a function of dive duration and the number of depth-temperature pairs saved from the dive. It can range from just a few data points up to 2000. Consequently, turning on this data product could result in creating hundreds of Argos messages.

Tags Containing This Data Product

SPLASH10
SPLASH10-F

FIXED DEPTH PDT

Fixed depth temperature profiles are available on SPLASH tags and report temperature at predetermined depths corresponding to either the World Ocean Database (2013) or World Ocean Atlas 1994 (WOA94) depth tables. Or, the tag can automatically choose which depth table to use based on a priority order. The first priority would be to minimize the number of messages, and the second priority would be to maximize the number of depths reported. This choice could occur if the number of messages generated by the profile is the same for either WOA94 or WOD13. Similar to the DivePDT, these profiles store temperature-depth pairs from the deepest dive within the histogram summary period. Temperature and depth will be collected every two seconds on selected dive ascents. If a dive descends 10% deeper than any previous dive in the current summary period, then all previous data are cleared and new temperature-depth data are collected every two seconds for the remainder of the current dive. The temperature is saved if the depth of the reading corresponds with one of the WOD13 or WOA94 depth tables. To increase the likelihood of a reading, depths within 10% of the WOD13 or WOA94 depths are also allowed. When the instrument reaches the surface and reads “dry,” data collection is stopped and a Fastloc® GPS snapshot is taken. The Fastloc reading for the deepest dive is NOT set but saved internally until the end of the summary period.

Tags Containing This Data Product

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At the end of a summary period there will be one temperature profile that resulted from a single ascent of the deepest dive. There will also be one Fastloc snapshot associated with that dive. The resulting message includes a minute resolution timestamp and value that indicates the length of the ascent that produced the profile. This later value provides a quantitative measure of profile quality.

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