

DAISY Data Information

Data Files

| Data File | Drift | DAISY | Flow Shield? | Tether Length | Tether Type | Hydrophone |
|--------------------------|-------|-------|--------------|---------------|-------------|-------------------|
| Agate Pass_DAISSY_1.mat | N/A | N/A | No | 2 m | Nylon | icListen HF Reson |
| Agate Pass_DAISSY_8.mat | A | 1 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_9.mat | A | 2 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_10.mat | A | 3 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_11.mat | B | 1 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_12.mat | B | 2 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_13.mat | B | 3 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_14.mat | C | 1 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_15.mat | C | 2 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_16.mat | C | 3 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_17.mat | D | 1 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_18.mat | D | 2 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_19.mat | D | 3 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_20.mat | E | 1 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_21.mat | E | 2 | Yes | 1 m | Rubber | HTI 99-UHF |
| Agate Pass_DAISSY_22.mat | E | 3 | Yes | 1 m | Rubber | HTI 99-UHF |

- Agate Pass_DAISSY_1.mat: data collected dockside of R/V Russell Davis Light with turbine motored in quiescent water. Only hydrophone data and depth were captured since this used a stand-alone hydrophone and pressure logger.
- Agate Pass_DAISSY_8.mat - Agate Pass_DAISSY_22.mat: Drifting tests conducted in Agate Pass, WA with R/V Russell Davis Light moored in the channel and a cross-flow turbine deployed from the bow.

Acoustic Data Files

All [site]_DAISY_[Drift #].mat files follow the same data conventions. Variables are summarized here.

acoustic_proc: acoustic processing parameters

- *V_range*: Voltage range (+/- VDC) for the DAISY hydrophone
- *f_range*: Minimum and maximum frequencies reported
- *cal_path*: Path for sensitivity data [*will be deprecated*]
- *settings*: acoustic processing settings (2)
 - *dt*: duration of each window for frequency-domain processing
 - *win_overlap*: fractional overlap of adjacent windows
 - *taper*: taper applied to each window
 - *settings(1)* contains processing for time-resolved spectrogram plots
 - *settings(2)* contains processing for frequency-resolved periodogram plots
- *f_trunc*: Maximum frequency to store during processing (blank indicates no limit)
- *Pref*: acoustic reference pressure squared ($1e-12$ uPa²)
- *resample_rate*: sample rate for embedded audio for playback

audio: resampled audio for playback purposes

- *time*: datetime (Nx1)
- *v*: voltage (Nx1)
- *fs*: sample rate (equal to *resample_rate*)

boat: position of survey vessel recorded by handheld GPS (if available)

- *time*: datetime (Nx1)
- *lat*: latitude (Nx1)
- *lon*: longitude (Nx1)
- *U*: vessel speed over ground (Nx1) [m/s]
- *cog*: vessel course over ground (Nx1) [degrees true]
- *PDOP*: GPS dilution of precision (Nx1) [not accurate]
- *HDOP*: GPS horizontal dilution of precision (Nx1) [not accurate]
- *x*: UTM easting (Nx1) [m]
- *y*: UTM northing (Nx1) [m]

GPS: DAISY position during drift – this is interpolated to acoustic time stamps

- *time*: datetime (Nx1)
- *lat*: latitude (Nx1)
- *lon*: longitude (Nx1)
- *U*: DAISY speed over ground (Nx1) [m/s]
- *cog*: vessel course over ground (Nx1) [degrees true]
- *U_uncertain*: uncertainty in DAISY speed over ground (Nx1) [not accurate]
- *HDOP*: GPS horizontal dilution of precision (Nx1) [not accurate]
- *x*: UTM easting (Nx1) [m]
- *y*: UTM northing (Nx1) [m]

lower_imu: inertial measurement unit co-located with hydrophone

- *time*: datetime (Nx1)
- *roll*: roll angle (Nx1) [degrees]

- *pitch*: pitch angle (Nx1) [degrees]
- *heading*: yaw angle (Nx1) [degrees]
- *acceleration* (Nx3) [m/s²]
- *magnetometer* (Nx3) [radians?]
- *gyroscope* (Nx3) [radians?]

upper_imu: inertial measurement unit on surface expression

met: Airmar meteorological station on surface expression (if available)

- *time*: datetime (Nx1)
- *lat*: latitude (Nx1)
- *lon*: longitude (Nx1)
- *x*: UTM easting (Nx1) [m]
- *y*: UTM northing (Nx1) [m]
- *airpres*: air pressure (Nx1) [kPa]
- *airtemp*: air temperature (Nx1) [°C]
- *winddir*: wind direction (Nx1) [degrees true]
- *windspd*: wind speed (Nx1) [m/s]
- *roll*: roll angle (Nx1) [degrees]
- *pitch*: pitch angle (Nx1) [degrees]
- *sog*: speed over ground (Nx1) [m/s]
- *cog*: course over ground (Nx1) [m/s]

pressure: pressure logger co-located with hydrophone

- *time*: datetime (Nx1)
- *p*: pressure (Nx1) [kPa]
- *T*: temperature (Nx1) [°C]
- *z*: depth corrected for pressure sensor drift (Nx1) [m]
- *z_rough*: uncorrected depth (Nx1) [m]

spectra: processed acoustic data – each element corresponds to the settings in *acoustic_proc.settings*

- *time*: datetime (Nx1)
- *f*: frequency (Mx1) [Hz]
- *Ppp*: mean-square sound pressure spectral density (MxN) [μPa²/Hz]
 - Pressure spectral density: $10\log_{10}(Ppp/Pref)$ [dB re 1 μPa²/Hz]
- *x*: georeferenced UTM easting (Nx1) [m]
- *y*: georeferenced UTM northing (Nx1) [m]
- *t_end*: end of drift [datetime]

t_end: end of drift [datetime]

t_start: start of drift [datetime]