



Schmidt Ocean Insititute Expedition Report

Fire and Ice: Volcanic and Glacial Interactions

2024-09-02 - 2024-09-23

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Expedition ID:	FKt240902
Expedition Name:	Fire and Ice: Volcanic and Glacial Interactions
Expedition Website:	https://schmidtoccean.org/cruise/fire-and-ice-volcanic-and-glacial-interactions/
Chief Scientist:	Sebastian Watt
Vessel:	R/V <i>Falkor (too)</i>
Location	Region de Los Lagos, Chile
Start of Expedition :	2024-09-02
Departure Port:	Puerto Montt, Chile
End of Expedition :	2024-09-23
Arrival port:	Talcahuano, Chile
Expedition Duration:	22 days

Description

In 2008, the Chaitén Volcano erupted, spewing ash 30 kilometers into the air while lava flowed down the mountainside and into the fjords below. The nearby town of Chaitén evacuated as the volcano completely transformed the surrounding landscape. While the destruction was easy to observe on land, scientists have not yet closely examined the impacts the eruption had on the surrounding Ocean environments. Dr. Sebastian Watt of the University of Birmingham, UK, and an international team will travel to southern Chile to study the underwater effects of the Chaitén eruption. The research will provide information on how active volcanism impacts the Ocean and marine ecosystem recovery following a major disturbance. Additionally, the team will examine the region's geologic record of eruptions and how glacier formation and recession over time may contribute to eruption events. Their research will expand our knowledge of how volcanic activity affects marine ecosystems and the impact of large, explosive eruptions.

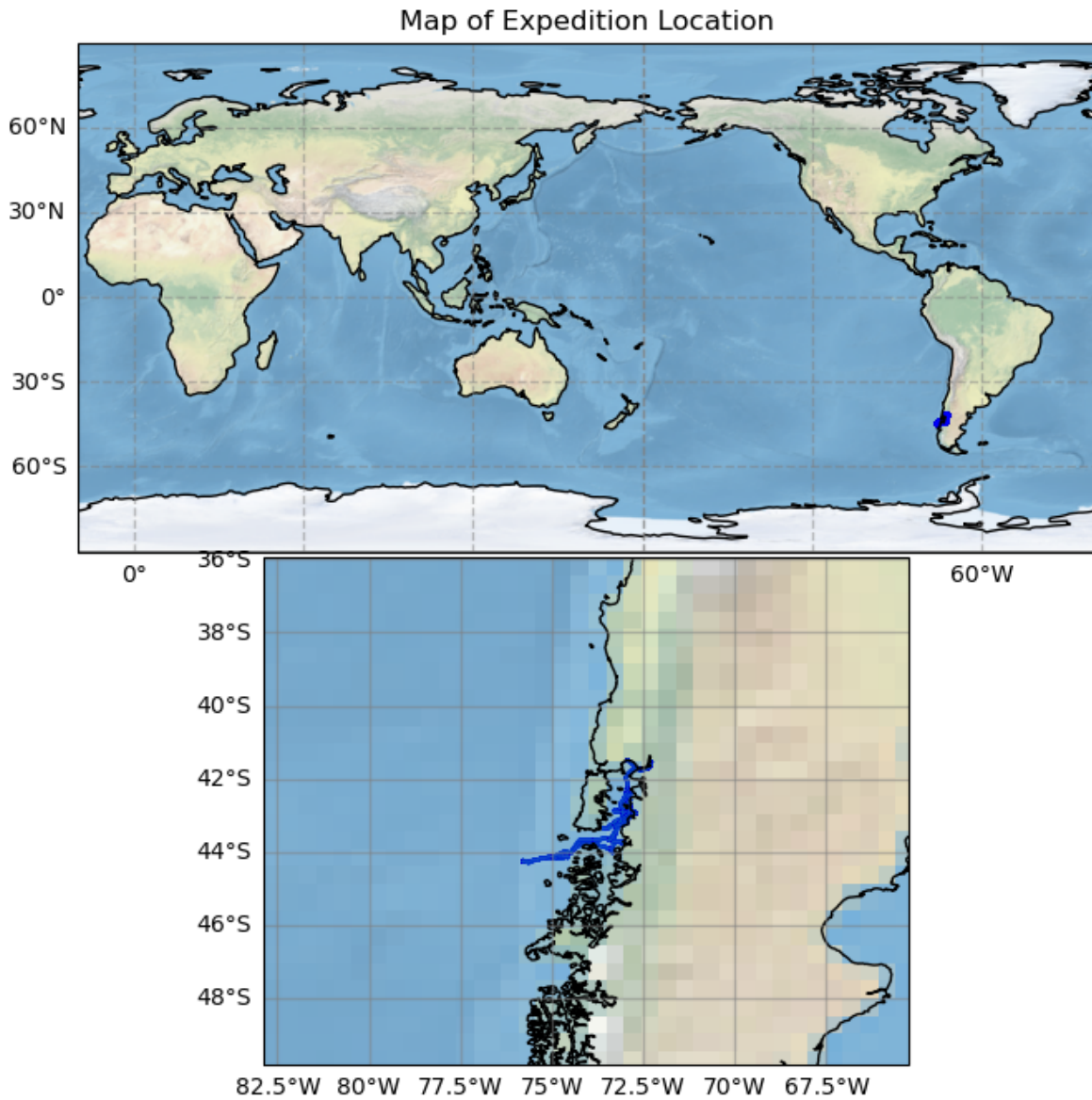
Overview

R/V *Falkor (too)* shipboard raw data will be made available via the [Rolling Deck to Repository](#) after the expedition. ROV *SuBastian* raw data as well as any processed multibeam data from from R/V *Falkor (too)* shipboard multibeam sonar systems will be made available upon completion on [Marine Geoscience Data System](#). Additional data from the expedition will be made publicly available in appropriate data centers. See the individual expedition [website page](#) or search <https://schmidtoccean.org/> for full data and publication lists.

CTD deployments	28
ROV <i>SuBastian</i> deployments	20
ROV <i>SuBastian</i> dive hours	66 hours 14 mins 25 sec
ROV <i>SuBastian</i> samples	226
ARGO floats deployed	0
Data collected	8.6 TB

Location

This expedition took place in the Region de Los Lagos, Chile . Maps of the general location and expedition track are presented below.



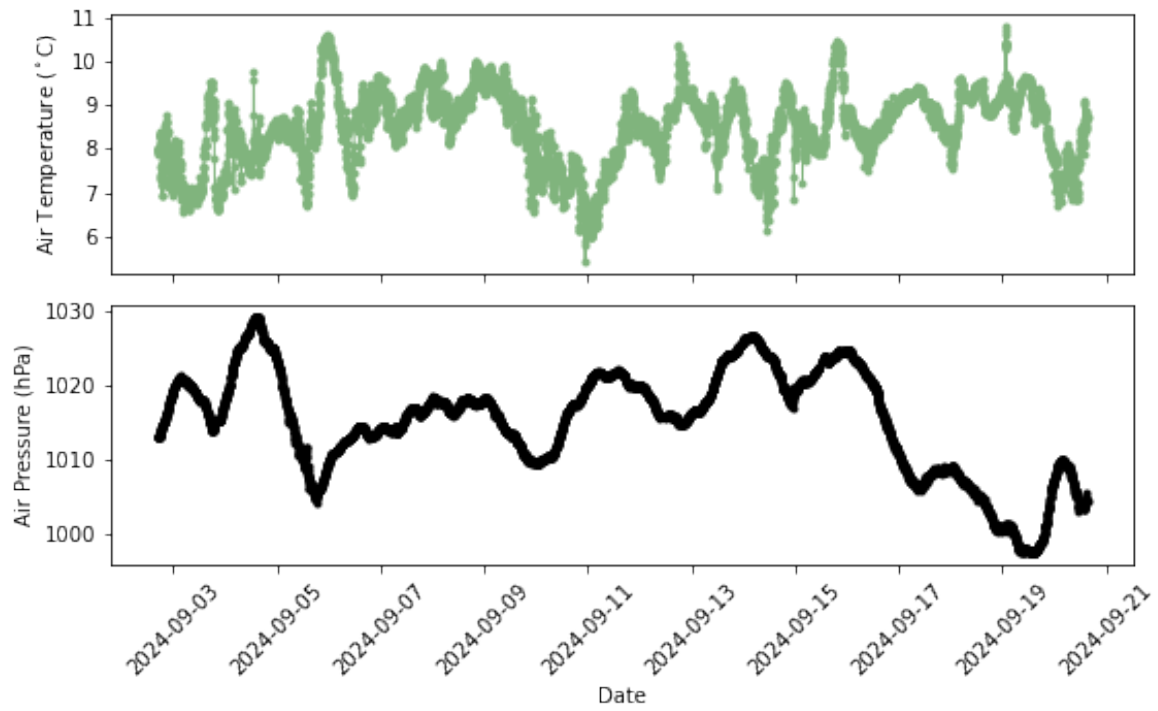
Underway Systems

R/V *Falkor (too)*'s underway seawater sensors and meteorological sensors were run throughout the expedition per the team onboard. All sensor data will be made available via the [Rolling Deck to Repository](#) after the expedition. Statistics and graph shown in this report are based off the data in science systems event logger. The values are gathered on a 5 minute interval from raw data at a higher frequency. For statistics related to raw data values, please review all expedition data. Information below is an overview.

Weather

R/V *Falkor (too)*'s meteorological sensors were run throughout the expedition per the team onboard. Subsampled values are included herein. The table describes the variability seen. A figure of air temperature and relative wind speed from sensors is included. All meteorological sensor data will be made available via the [Rolling Deck to Repository](#) after the expedition.

	count	mean	std	min	25%	50%	75%	max
air-pressure	5730	1015.31	7.09222	997.283	1010.25	1016.39	1020.48	1029.22
air-temperature	5730	8.4799	0.858108	5.42	7.93	8.59	9.1	10.81
relative-wind-dir	5729	163.936	125.819	0	45	134	290	359
relative-wind-speed	5729	14.2066	7.63437	0.117	8.456	13.898	18.875	49.276
true-wind-dir	5729	194.841	140.47	0.043	29.614	239.4	336.184	360
true-wind-speed	5729	13.7308	6.9532	0.3	8.628	13.199	18.055	45.177



Wind Speed (knots) and Direction

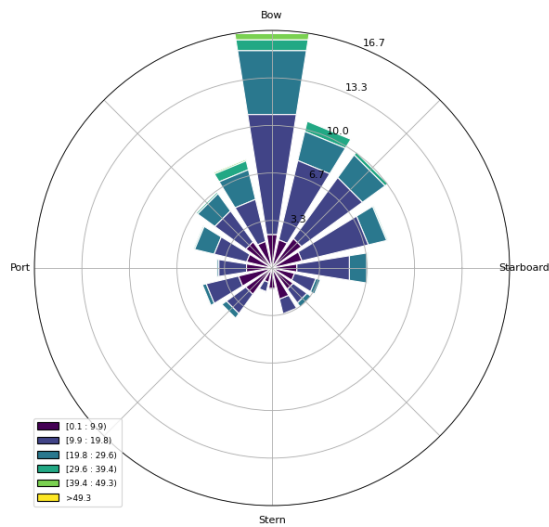


Figure 1: Relative Wind

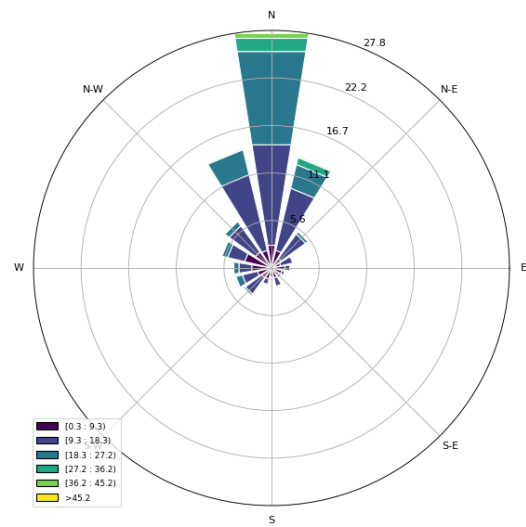
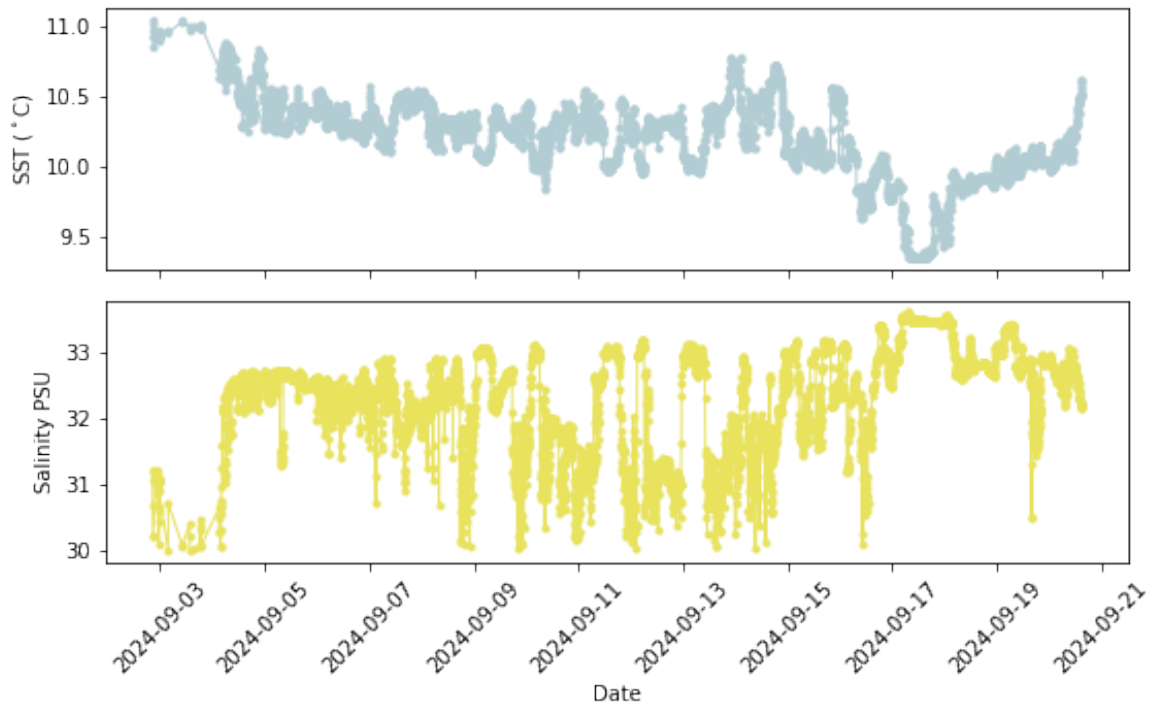


Figure 2: True Wind

Seawater

R/V *Falkor (too)*'s underway seawater sensors were run throughout the expedition per the team on-board. Subsampled values are included herein. The table describes the variability seen. A figure of salinity and temperature from the seawater sensors is included. All seawater sensor data will be made available via the [Rolling Deck to Repository](#) after the expedition.

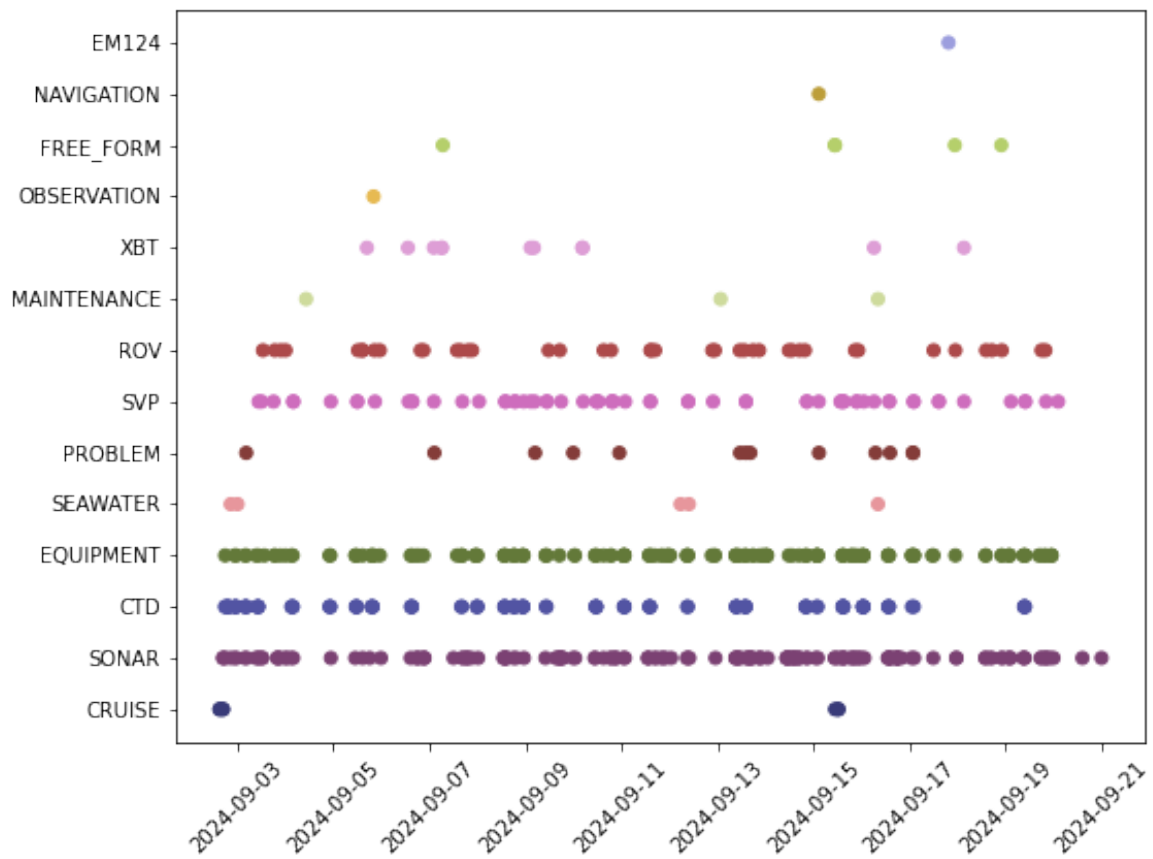
	count	mean	std	min	25%	50%	75%	max
calc-beam-atten-coef	5676	1.00692	0.572308	0.346	0.503	0.826	1.442	10.894
conductivity	5676	3.49175	0.276261	1.248	3.493	3.576	3.603	3.661
corrected-signal-count	5676	12112.3	1576.76	1013	10763	12555	13611	14155
fluorescence-raw	5597	273.379	201.423	62	160	210	306	2128
salinity	5676	31.5961	2.73774	10.633	31.5027	32.34	32.7812	33.596
sound-velocity	5675	1485.7	34.205	0	1486.05	1486.77	1487.21	1489.9
temperature	5676	10.2256	0.311313	8.906	10.038	10.275	10.405	11.052



Event Summary

Events were logged using the classifications listed in the table below. ROV *SuBastian* events are logged separately. See dive reports for information on ROV *SuBastian*. For a list of all events from R/V *Falkor* see the file, FKt240902_sealog_export.csv.

event_value	count
ASNAP	5167
CRUISE	7
CTD	105
EM124	1
EQUIPMENT	162
FREE_FORM	5
MAINTENANCE	3
NAVIGATION	1
OBSERVATION	1
PROBLEM	13
ROV	41
SEAWATER	5
SONAR	174
SVP	63
XBT	11



A subset of events with some auxiliary data is provided below. For all events from R/V *Falkor* with auxiliary data, see the file, FKt240902_sealogExport.csv in the exported data.

CTD

ts	filename	status	longitude	latitude
2024-09-02T17:49:01.316Z	nan	nan	-72.6283	-41.7184
2024-09-02T18:19:12.112Z	nan	CTD Deployed	-72.6558	-41.7134
2024-09-02T19:05:30.377Z	nan	nan	-72.6559	-41.7134
2024-09-02T19:25:03.073Z	nan	nan	-72.6559	-41.7134
2024-09-02T19:26:44.348Z	nan	nan	-72.6559	-41.7134
2024-09-02T19:31:05.165Z	nan	CTD Recovered	-72.6559	-41.7134
2024-09-02T22:42:15.193Z	nan	CTD Deployed	-72.5209	-41.715
2024-09-02T23:00:35.570Z	nan	nan	-72.5209	-41.715
2024-09-02T23:17:11.899Z	nan	nan	-72.5209	-41.715
2024-09-02T23:21:14.348Z	nan	CTD Recovered	-72.5209	-41.715
2024-09-03T03:52:27.869Z	nan	CTD Deployed	-72.4086	-41.6851
2024-09-03T04:11:32.090Z	nan	nan	-72.4086	-41.6851
2024-09-03T04:22:44.101Z	nan	nan	-72.4086	-41.6851
2024-09-03T04:25:52.615Z	nan	CTD Recovered	-72.4086	-41.6851
2024-09-03T10:02:17.866Z	nan	CTD Deployed	-72.3286	-41.5565
2024-09-03T10:14:12.146Z	nan	nan	-72.3286	-41.5565
2024-09-03T10:21:50.991Z	nan	nan	-72.3286	-41.5565
2024-09-03T10:25:04.158Z	nan	CTD Recovered	-72.3286	-41.5565
2024-09-04T03:00:49.164Z	nan	CTD Deployed	-72.6545	-41.7119
2024-09-04T03:21:55.197Z	nan	nan	-72.6546	-41.7119
2024-09-04T03:38:02.860Z	nan	nan	-72.6547	-41.7119
2024-09-04T03:41:56.242Z	nan	CTD Recovered	-72.6547	-41.7119
2024-09-04T22:03:09.740Z	nan	CTD Deployed	-72.9629	-42.305
2024-09-04T22:19:30.596Z	nan	nan	-72.963	-42.305
2024-09-04T22:29:07.776Z	nan	CTD Recovered	-72.963	-42.305
2024-09-05T11:12:06.115Z	nan	CTD Deployed	-72.9681	-42.3549
2024-09-05T11:26:41.111Z	nan	nan	-72.9681	-42.3549
2024-09-05T11:37:56.304Z	nan	nan	-72.9682	-42.3549
2024-09-05T11:41:00.075Z	nan	CTD Recovered	-72.9681	-42.3549
2024-09-05T19:01:34.645Z	nan	CTD Deployed	-72.9617	-42.5591
2024-09-05T19:18:50.562Z	nan	nan	-72.9617	-42.5591
2024-09-05T19:32:07.495Z	nan	nan	-72.9619	-42.5591
2024-09-05T19:35:40.684Z	nan	CTD Recovered	-72.9618	-42.5591
2024-09-06T14:44:19.617Z	nan	CTD Deployed	-72.8772	-42.7859
2024-09-06T15:03:40.680Z	nan	nan	-72.8772	-42.7859
2024-09-06T15:11:16.525Z	nan	nan	-72.8772	-42.7859
2024-09-06T15:15:13.828Z	nan	CTD Recovered	-72.8772	-42.7859
2024-09-07T15:50:16.000Z	nan	CTD Deployed	-72.8711	-42.7663
2024-09-07T16:16:37.596Z	nan	CTD Recovered	-72.8702	-42.7666
2024-09-07T23:38:51.549Z	nan	CTD Deployed	-72.8634	-42.745

ts	filename	status	longitude	latitude
2024-09-07T23:53:26.188Z	nan	nan	-72.8634	-42.7451
2024-09-07T23:56:40.677Z	nan	CTD Recovered	-72.8633	-42.7464
2024-09-08T13:22:49.070Z	nan	CTD Deployed	-72.8485	-42.9235
2024-09-08T13:33:20.738Z	nan	nan	-72.8485	-42.9235
2024-09-08T13:43:11.109Z	nan	nan	-72.8485	-42.9235
2024-09-08T13:45:55.260Z	nan	CTD Recovered	-72.8485	-42.9235
2024-09-08T18:12:11.000Z	nan	CTD Deployed	-72.7845	-42.9229
2024-09-08T18:23:35.862Z	nan	nan	-72.7845	-42.9229
2024-09-08T18:27:04.305Z	nan	nan	-72.7846	-42.9229
2024-09-08T18:32:52.598Z	nan	CTD Recovered	-72.7846	-42.9229
2024-09-08T22:32:44.766Z	nan	CTD Deployed	-72.76	-42.9036
2024-09-08T22:42:11.881Z	nan	nan	-72.7599	-42.9036
2024-09-08T22:46:46.048Z	nan	nan	-72.7598	-42.9036
2024-09-08T22:50:08.603Z	nan	CTD Recovered	-72.7598	-42.9036
2024-09-09T10:13:01.372Z	nan	CTD Deployed	-72.903	-42.8517
2024-09-09T10:31:24.216Z	nan	CTD Recovered	-72.903	-42.8517
2024-09-10T11:03:49.489Z	nan	CTD Deployed	-72.851	-42.8954
2024-09-10T11:12:46.598Z	nan	nan	-72.8511	-42.8954
2024-09-10T11:21:03.038Z	nan	nan	-72.851	-42.8955
2024-09-10T11:23:31.825Z	nan	CTD Recovered	-72.851	-42.8955
2024-09-11T01:05:58.002Z	nan	CTD Deployed	-72.8183	-42.8772
2024-09-11T01:25:16.881Z	nan	nan	-72.8184	-42.8772
2024-09-11T01:26:01.945Z	nan	CTD Recovered	-72.8184	-42.8772
2024-09-11T01:26:14.614Z	nan	nan	-72.8184	-42.8772
2024-09-11T13:53:43.702Z	nan	CTD Deployed	-73.0808	-42.8912
2024-09-11T14:04:08.030Z	nan	nan	-73.0808	-42.8912
2024-09-11T14:13:08.337Z	nan	nan	-73.0808	-42.8912
2024-09-11T14:17:55.591Z	nan	CTD Recovered	-73.0809	-42.8911
2024-09-12T08:50:06.313Z	nan	CTD Deployed	-72.7972	-42.9025
2024-09-12T09:07:47.928Z	nan	CTD Recovered	-72.7972	-42.9025
2024-09-13T09:15:19.027Z	nan	CTD Deployed	-72.9017	-42.9516
2024-09-13T09:25:00.000Z	nan	nan	-72.9017	-42.9517
2024-09-13T09:31:05.375Z	nan	nan	-72.9017	-42.9517
2024-09-13T09:35:16.453Z	nan	CTD Recovered	-72.9017	-42.9517
2024-09-13T13:44:44.701Z	nan	CTD Deployed	-72.78	-42.9094
2024-09-13T13:52:32.992Z	nan	nan	-72.78	-42.9094
2024-09-13T14:02:33.203Z	nan	nan	-72.78	-42.9094
2024-09-13T14:02:38.454Z	nan	CTD Recovered	-72.78	-42.9094
2024-09-14T19:55:47.259Z	nan	CTD Deployed	-72.8606	-42.935
2024-09-14T20:08:23.000Z	nan	nan	-72.8606	-42.935
2024-09-14T20:19:33.776Z	nan	nan	-72.8606	-42.935
2024-09-14T20:22:56.390Z	nan	CTD Recovered	-72.8606	-42.935
2024-09-15T01:34:35.917Z	nan	CTD Deployed	-72.9872	-43.0217
2024-09-15T01:57:51.413Z	nan	CTD Recovered	-72.9872	-43.0217
2024-09-15T14:27:52.000Z	nan	CTD Deployed	-73.3323	-43.1948
2024-09-15T14:38:53.698Z	nan	nan	-73.3323	-43.1948
2024-09-15T14:41:53.603Z	nan	nan	-73.3323	-43.1948

ts	filename	status	longitude	latitude
2024-09-15T14:45:53.418Z	nan	nan	-73.3323	-43.1948
2024-09-15T14:50:56.624Z	nan	nan	-73.3323	-43.1948
2024-09-15T14:53:26.641Z	nan	CTD Recovered	-73.3323	-43.1948
2024-09-16T00:28:30.939Z	nan	CTD Deployed	-72.9635	-43.0044
2024-09-16T00:43:00.000Z	nan	nan	-72.9635	-43.0045
2024-09-16T00:45:40.000Z	nan	nan	-72.9635	-43.0045
2024-09-16T00:49:25.000Z	nan	nan	-72.9635	-43.0045
2024-09-16T00:55:16.677Z	nan	CTD Recovered	-72.9635	-43.0045
2024-09-16T13:18:05.988Z	nan	CTD Deployed	-73.4922	-43.8555
2024-09-16T13:28:00.852Z	nan	nan	-73.4918	-43.8555
2024-09-16T13:36:30.079Z	nan	nan	-73.4919	-43.8556
2024-09-16T13:39:39.928Z	nan	CTD Recovered	-73.4918	-43.8557
2024-09-17T01:09:24.579Z	nan	CTD Deployed	-74.9492	-44.1085
2024-09-17T02:06:06.760Z	nan	CTD Recovered	-74.9492	-44.1085
2024-09-19T09:11:00.342Z	nan	CTD Deployed	-73.8832	-43.6316
2024-09-19T09:24:10.383Z	nan	nan	-73.8831	-43.6316
2024-09-19T09:33:48.064Z	nan	nan	-73.8831	-43.6316
2024-09-19T09:37:22.000Z	nan	CTD Recovered	-73.8832	-43.6316

EQUIPMENT

ts	event_free_text	status
2024-09-02T17:53:22.259Z	empty	Deployed
2024-09-02T22:39:11.887Z	empty	Deployed
2024-09-02T23:25:33.420Z	empty	Recovered
2024-09-03T03:48:59.888Z	empty	USBL Spar
		Deployed
2024-09-03T04:26:26.250Z	empty	USBL Spar
		Recovered
2024-09-03T09:17:11.552Z	empty	USBL Spar
		Deployed
2024-09-03T10:31:10.080Z	empty	USBL Spar
		Recovered
2024-09-03T13:30:52.564Z	empty	Beacons Tracking
2024-09-03T18:38:49.553Z	empty	Recovered
2024-09-03T18:40:11.443Z	Beacon tracking OFF	USBL Spar
		Recovered
2024-09-03T21:25:24.018Z	empty	Deployed
2024-09-04T00:01:14.477Z	empty	Recovered
2024-09-04T02:53:36.531Z	empty	USBL Spar
		Deployed
2024-09-04T03:40:30.157Z	empty	USBL Spar
		Recovered

ts	event_free_text	status
2024-09-04T22:02:15.007Z	empty	USBL Spar
2024-09-04T22:29:34.977Z	empty	Deployed
2024-09-05T11:02:12.977Z	empty	USBL Spar
2024-09-05T11:06:00.182Z	empty	Recovered
2024-09-05T11:41:22.241Z	empty	USBL Spar
2024-09-05T14:32:27.419Z	empty	Deployed
2024-09-05T19:01:23.736Z	empty	Deployed
2024-09-05T19:02:39.769Z	empty	Recovered
2024-09-05T19:37:19.887Z	empty	Beacons Tracking
2024-09-05T20:22:51.981Z	empty	USBL Spar
2024-09-05T23:13:49.239Z	empty	Recovered
2024-09-06T14:35:45.525Z	empty	Deployed
2024-09-06T15:19:15.743Z	empty	Recovered
2024-09-06T17:14:56.237Z	empty	USBL Spar
2024-09-06T18:44:20.265Z	empty	Recovered
2024-09-06T21:03:07.644Z	empty	USBL Spar
2024-09-07T13:48:04.284Z	empty	Recovered
2024-09-07T15:49:21.814Z	empty	USBL Spar
2024-09-07T16:17:24.891Z	empty	Deployed
2024-09-07T16:22:26.837Z	empty	Deployed
2024-09-07T22:52:18.537Z	empty	USBL Spar
2024-09-07T22:59:48.924Z	empty	Recovered
2024-09-07T23:08:24.384Z	empty	Recovered
2024-09-07T23:38:46.770Z	empty	nan
2024-09-08T00:00:16.999Z	empty	USBL Spar
2024-09-08T13:14:30.980Z	empty	Deployed
2024-09-08T13:18:31.435Z	empty	USBL Spar
2024-09-08T13:47:53.850Z	empty	Recovered
2024-09-08T13:50:43.569Z	empty	Deployed
2024-09-08T18:02:49.271Z	empty	Recovered
2024-09-08T18:08:08.556Z	empty	USBL Spar
		Deployed

ts	event_free_text	status
2024-09-08T18:31:54.287Z	empty	USBL Spar
		Recovered
2024-09-08T18:35:57.313Z	empty	Recovered
2024-09-08T22:27:19.000Z	empty	Deployed
2024-09-08T22:30:39.431Z	empty	USBL Spar
		Deployed
2024-09-08T22:51:59.311Z	empty	USBL Spar
		Recovered
2024-09-08T23:02:54.824Z	empty	Recovered
2024-09-09T10:03:54.775Z	empty	USBL Spar
		Deployed
2024-09-09T10:10:08.730Z	empty	Deployed
2024-09-09T10:39:38.363Z	empty	Recovered
2024-09-09T16:57:18.102Z	empty	USBL Spar
		Recovered
2024-09-10T00:30:36.000Z	No beacon attached	Deployed
2024-09-10T00:44:11.000Z	empty	Recovered
2024-09-10T10:43:48.082Z	empty	USBL Spar
		Deployed
2024-09-10T11:00:30.433Z	empty	Deployed
2024-09-10T11:33:11.994Z	empty	Recovered
2024-09-10T15:05:30.883Z	empty	USBL Spar
		Recovered
2024-09-10T18:34:01.601Z	empty	USBL Spar
		Deployed
2024-09-10T18:54:43.362Z	BRAVO on ROV	Beacons Tracking
2024-09-11T01:01:53.172Z	empty	USBL Spar
		Deployed
2024-09-11T01:02:04.577Z	empty	Deployed
2024-09-11T01:12:31.840Z	ECHO	Beacons Tracking
2024-09-11T01:26:30.014Z	Tracking stopped (Beacon ECHO)	Beacons Tracking
2024-09-11T01:26:54.101Z	empty	USBL Spar
		Recovered
2024-09-11T01:27:54.113Z	empty	Recovered
2024-09-11T13:45:57.049Z	empty	USBL Spar
		Deployed
2024-09-11T13:50:01.688Z	empty	Deployed
2024-09-11T14:18:10.457Z	empty	Recovered
2024-09-11T15:01:15.387Z	Beacon BRAVO	Beacons Tracking
2024-09-11T16:46:51.627Z	empty	USBL Spar
		Recovered
2024-09-11T19:46:28.128Z	empty	USBL Spar
		Deployed
2024-09-11T20:36:00.829Z	empty	USBL Spar
		Recovered
2024-09-11T22:43:39.000Z	Successful sediment recovery.	nan
2024-09-11T23:00:49.000Z	empty	nan

ts	event_free_text	status
2024-09-11T23:48:01.000Z	empty	Deployed
2024-09-12T00:17:36.000Z	Note: the first attempt was unsuccessful (grab did not close). The grab was re-deployed without bringing it on deck. The second attempt was successful.	Recovered
2024-09-12T08:39:00.268Z	empty	USBL Spar Deployed
2024-09-12T08:44:15.979Z	empty	Deployed
2024-09-12T09:09:15.002Z	empty	USBL Spar Recovered
2024-09-12T09:15:23.024Z	empty	Recovered
2024-09-12T21:03:25.475Z	empty	USBL Spar Deployed
2024-09-12T22:38:15.199Z	BRAVO is stopped.	Beacons Tracking
2024-09-12T22:40:32.137Z	empty	USBL Spar Recovered
2024-09-13T08:59:41.504Z	empty	USBL Spar Deployed
2024-09-13T09:04:24.986Z	empty	Deployed
2024-09-13T09:37:27.135Z	empty	Recovered
2024-09-13T09:42:01.239Z	empty	USBL Spar Recovered
2024-09-13T11:06:27.981Z	empty	USBL Spar Deployed
2024-09-13T13:41:58.302Z	empty	Deployed
2024-09-13T14:03:55.421Z	empty	USBL Spar Recovered
2024-09-13T14:04:01.956Z	empty	Recovered
2024-09-13T17:42:59.327Z	empty	USBL Spar Deployed
2024-09-13T17:43:52.229Z	empty	Beacons Tracking
2024-09-13T20:49:01.000Z	empty	USBL Spar Recovered
2024-09-13T22:26:06.000Z	Sci Party station ID: Grab03	nan
2024-09-13T22:48:48.000Z	Sci Party station ID: Grab03	nan
2024-09-14T00:09:22.000Z	Sci Party station ID: Grab05	nan
2024-09-14T00:23:50.000Z	Unsuccessful. Grab must have hit the seabed at an angle, hence did not close.	nan
2024-09-14T00:25:59.000Z	Sci Party station ID: Grab05; 2nd attempt	nan
2024-09-14T00:48:03.000Z	Grab did release but rocks prevented the jaws to fully close, some sediment was washed out on the way up.	nan
2024-09-14T11:38:16.462Z	empty	USBL Spar Deployed
2024-09-14T13:19:54.166Z	empty	USBL Spar Recovered

ts	event_free_text	status
2024-09-14T16:43:22.597Z	For ROV dive S0718	USBL Spar Deployed
2024-09-14T19:51:24.105Z	empty	Deployed
2024-09-14T20:23:14.719Z	empty	USBL Spar Recovered
2024-09-14T20:27:14.655Z	empty	Recovered
2024-09-15T01:19:52.338Z	empty	USBL Spar Deployed
2024-09-15T01:34:02.627Z	empty	Deployed
2024-09-15T01:37:42.115Z	ECHO	Beacons Tracking
2024-09-15T01:57:37.908Z	Tracking stopped	Beacons Tracking
2024-09-15T02:00:35.110Z	empty	USBL Spar Recovered
2024-09-15T02:07:10.677Z	empty	Recovered
2024-09-15T14:22:53.500Z	empty	USBL Spar Deployed
2024-09-15T14:24:55.000Z	empty	Deployed
2024-09-15T14:53:20.963Z	empty	USBL Spar Recovered
2024-09-15T14:54:43.226Z	empty	Recovered
2024-09-15T18:47:48.073Z	199m no usbl beacon	nan
2024-09-15T18:55:26.000Z	210m wire out 190kg off weight	nan
2024-09-15T19:11:42.956Z	empty	nan
2024-09-15T20:31:05.108Z	empty	USBL Spar Deployed
2024-09-15T20:42:22.018Z	empty	Beacons Tracking
2024-09-15T22:22:52.000Z	empty	USBL Spar Recovered
2024-09-16T00:21:06.048Z	empty	USBL Spar Deployed
2024-09-16T00:27:20.121Z	empty	Deployed
2024-09-16T00:54:24.469Z	Tracking stopped.	Beacons Tracking
2024-09-16T00:55:06.512Z	empty	USBL Spar Recovered
2024-09-16T00:55:57.943Z	empty	Recovered
2024-09-16T13:11:34.928Z	empty	USBL Spar Deployed
2024-09-16T13:15:14.870Z	empty	Deployed
2024-09-16T13:40:31.124Z	empty	Recovered
2024-09-16T13:41:39.142Z	empty	USBL Spar Recovered
2024-09-17T01:04:28.168Z	empty	USBL Spar Deployed
2024-09-17T01:08:32.841Z	empty	Deployed
2024-09-17T01:13:16.338Z	ECHO on CTD	Beacons Tracking
2024-09-17T02:05:44.748Z	Tracking stopped	Beacons Tracking

ts	event_free_text	status
2024-09-17T02:07:00.379Z	empty	USBL Spar Recovered
2024-09-17T02:09:34.448Z	empty	Recovered
2024-09-17T11:14:53.348Z	empty	USBL Spar Deployed
2024-09-17T11:56:34.864Z	empty	Beacons Tracking
2024-09-17T22:51:11.126Z	empty	USBL Spar Recovered
2024-09-18T13:55:22.855Z	empty	USBL Spar Deployed
2024-09-18T14:03:21.301Z	empty	Beacons Tracking
2024-09-18T22:00:06.951Z	Beacon BRAVO stopped	Beacons Tracking
2024-09-18T22:02:05.258Z	empty	USBL Spar Recovered
2024-09-19T01:36:27.259Z	empty	nan
2024-09-19T01:43:47.000Z	empty	nan
2024-09-19T01:57:57.000Z	Successful attempt	nan
2024-09-19T08:58:19.440Z	empty	USBL Spar Deployed
2024-09-19T09:06:30.380Z	empty	Deployed
2024-09-19T09:38:07.939Z	empty	USBL Spar Recovered
2024-09-19T09:42:23.715Z	empty	Recovered
2024-09-19T16:35:29.262Z	empty	Calibrated
2024-09-19T17:45:38.000Z	empty	USBL Spar Deployed
2024-09-19T19:46:33.000Z	Tracking stopped BRAVO	Beacons Tracking
2024-09-19T19:50:01.600Z	empty	USBL Spar Recovered
2024-09-19T22:44:06.000Z	empty	nan
2024-09-19T22:50:50.000Z	empty	nan
2024-09-19T22:59:21.000Z	empty	nan

ROV

ts	dive_id	status	longitude	latitude
2024-09-03T12:48:32.278Z	FKt240902_ S0703	Deployed	-72.3315	-41.5598
2024-09-03T18:39:45.972Z	S0703	Recovered	-72.3325	-41.5597
2024-09-03T21:38:43.547Z	S0704	Deployed	-72.4015	-41.6778
2024-09-04T00:07:59.000Z	S0704	Recovered	-72.401	-41.6785
2024-09-05T12:20:13.438Z	S0705	Deployed	-72.9681	-42.355
2024-09-05T14:30:54.922Z	S0705	Recovered	-72.9679	-42.3562
2024-09-05T14:32:37.557Z	S0705	Recovered	-72.9679	-42.3562
2024-09-05T20:30:30.880Z	S0706	Deployed	-72.9617	-42.5591

ts	dive_id	status	longitude	latitude
2024-09-05T23:13:24.709Z	S0706	Recovered	-72.9626	-42.5594
2024-09-06T19:35:06.683Z	S0707	Deployed	-72.8769	-42.7861
2024-09-06T21:03:17.738Z	S0707	Recovered	-72.8769	-42.7897
2024-09-07T13:48:08.282Z	S0708	Deployed	-72.8721	-42.7679
2024-09-07T15:34:27.051Z	S0708	Recovered	-72.8712	-42.7663
2024-09-07T19:16:08.226Z	S0709	Deployed	-72.8636	-42.7422
2024-09-07T21:20:37.977Z	S0709	Recovered	-72.8634	-42.745
2024-09-09T11:32:21.000Z	S0710	Deployed	-72.9032	-42.8519
2024-09-09T17:09:18.364Z	S0710	Recovered	-72.9021	-42.8509
2024-09-10T15:04:57.398Z	S0711	Recovered	-72.8499	-42.8959
2024-09-10T18:50:13.930Z	S0712	Deployed	-72.8099	-42.8782
2024-09-11T14:30:03.825Z	S0713	Deployed	-73.0817	-42.8903
2024-09-11T14:41:44.678Z	S0713	Deployed	-73.0817	-42.8903
2024-09-11T16:45:45.000Z	S0713	Recovered	-73.0816	-42.8903
2024-09-12T21:21:49.399Z	S0714	Deployed	-72.7514	-42.9142
2024-09-12T22:40:11.649Z	S0714	Recovered	-72.7528	-42.915
2024-09-13T11:06:32.510Z	S0715	Deployed	-72.782	-42.9062
2024-09-13T13:25:08.545Z	S0715	Recovered	-72.78	-42.9094
2024-09-13T17:43:34.638Z	S0716	Deployed	-72.8002	-42.9215
2024-09-13T20:47:27.000Z	S0716	Recovered	-72.8049	-42.9195
2024-09-14T11:38:02.538Z	S0717	Deployed	-72.812	-42.9275
2024-09-14T13:18:39.829Z	S0717	Recovered	-72.8119	-42.9276
2024-09-14T16:58:09.054Z	S0718	Deployed	-72.8605	-42.9349
2024-09-14T19:41:28.598Z	S0718	Recovered	-72.8606	-42.935
2024-09-15T20:42:04.082Z	S0719	Deployed	-72.9234	-42.9417
2024-09-15T22:19:15.000Z	S0719	Recovered	-72.9261	-42.9436
2024-09-17T11:59:57.000Z	S0720	Deployed	-75.7962	-44.2318
2024-09-17T22:52:01.733Z	S0720	Recovered	-75.8139	-44.2274
2024-09-18T14:09:13.000Z	S0721	Deployed	-74.9968	-44.1149
2024-09-18T17:09:35.140Z	S0721	Problem	-74.9887	-44.1157
2024-09-18T22:03:55.000Z	S0721	Recovered	-74.9734	-44.1087
2024-09-19T17:54:06.000Z	S0722	Deployed	-73.0828	-43.7111
2024-09-19T19:48:51.110Z	S0722	Recovered	-73.0811	-43.7118

SONAR

ts	status	system	longitude	latitude
2024-09-02T16:48:35.810Z	nan	OS38; WH300	-72.7588	-41.6361
2024-09-02T17:00:55.935Z	nan	EM712	-72.7303	-41.6594
2024-09-02T18:01:00.868Z	nan	EM712; SBP29	-72.6405	-41.7172
2024-09-02T20:34:25.119Z	nan	EM124; SBP29	-72.6559	-41.7135

ts	status	system	longitude	latitude
2024-09-02T22:37:37.618Z	nan	EM712; SBP29	-72.5195	-41.715
2024-09-02T23:35:21.000Z	nan	EM124; SBP29	-72.5203	-41.7149
2024-09-03T03:43:04.880Z	nan	EM124; SBP29	-72.4087	-41.6849
2024-09-03T04:39:17.429Z	nan	EM124; SBP29	-72.4005	-41.6808
2024-09-03T09:14:28.090Z	nan	EM124; SBP29	-72.3286	-41.5566
2024-09-03T10:35:15.371Z	nan	SBP29; EM124	-72.3286	-41.5565
2024-09-03T10:35:56.056Z	nan	SBP29; EM124	-72.3288	-41.5564
2024-09-03T12:26:46.919Z	nan	SBP29; EM124	-72.3315	-41.5598
2024-09-03T12:27:03.908Z	nan	EK80	-72.3315	-41.5598
2024-09-03T20:00:07.111Z	nan	SBP29; EM124	-72.3337	-41.5666
2024-09-03T20:01:09.232Z	nan	EK80	-72.3335	-41.567
2024-09-03T20:19:49.512Z	nan	SU90	-72.3358	-41.588
2024-09-03T21:30:00.304Z	nan	SBP29; EM124	-72.4016	-41.6777
2024-09-04T00:15:00.664Z	nan	SBP29; EM124	-72.4028	-41.6804
2024-09-04T00:30:03.000Z	nan	SU90	-72.402	-41.6764
2024-09-04T02:53:47.627Z	nan	SBP29; EM124	-72.6544	-41.7119
2024-09-04T03:54:52.967Z	nan	SBP29; EM124	-72.6548	-41.712
2024-09-04T22:43:44.637Z	nan	SBP29; EM124	-72.9663	-42.3071
2024-09-05T10:54:46.084Z	nan	SBP29; EM124	-72.9687	-42.3564
2024-09-05T14:35:23.050Z	nan	EM124; SBP29	-72.9679	-42.3562
2024-09-05T18:10:58.338Z	nan	SBP29; EM124	-72.9617	-42.5594
2024-09-05T23:45:42.180Z	nan	EM124; SBP29	-72.9027	-42.5592
2024-09-06T14:35:22.098Z	nan	SBP29; EM124; EM712; EM2040	-72.8774	-42.7858
2024-09-06T17:20:31.068Z	nan	EM124; SBP29	-72.8772	-42.7853
2024-09-06T18:00:35.396Z	nan	EM712	-72.8605	-42.7589

ts	status	system	longitude	latitude
2024-09-06T18:43:48.283Z	nan	SBP29; EM124	-72.8785	-42.7867
2024-09-06T21:12:42.917Z	nan	SBP29; EM124; EM712; SU90	-72.8802	-42.7923
2024-09-06T21:14:36.576Z	nan	EK80	-72.881	-42.7918
2024-09-06T21:31:18.194Z	Setting Change	EM124	-72.8841	-42.7698
2024-09-07T12:01:00.993Z	nan	EM124; SBP29; EM712	-72.8722	-42.7688
2024-09-07T16:31:48.109Z	nan	SBP29; EM124; EM712	-72.8668	-42.7633
2024-09-07T16:33:44.433Z	Setting Change	EM712; EM124	-72.8663	-42.7613
2024-09-07T18:34:25.387Z	nan	EM712	-72.8632	-42.744
2024-09-07T18:41:06.636Z	nan	EM124; SBP29	-72.8628	-42.7434
2024-09-07T19:15:13.000Z	nan	EK80	-72.8638	-42.7422
2024-09-07T21:02:07.000Z	nan	EK80	-72.8635	-42.7421
2024-09-08T00:18:32.810Z	nan	SBP29; EM124; EM712	-72.8667	-42.7475
2024-09-08T13:04:30.780Z	nan	EM124; SBP29; EM712	-72.8499	-42.9215
2024-09-08T13:04:37.962Z	nan	EK80	-72.8498	-42.9216
2024-09-08T13:58:52.749Z	nan	EK80	-72.8562	-42.9179
2024-09-08T13:58:59.534Z	nan	SBP29; EM124; EM712	-72.856	-42.9178
2024-09-08T14:14:41.867Z	nan	SBP29; EM124; EM712	-72.8533	-42.9185
2024-09-08T14:33:20.000Z	nan	OS38	-72.8563	-42.9289
2024-09-08T17:55:34.323Z	nan	SBP29; EM124; EM712	-72.7813	-42.9233
2024-09-08T19:20:09.383Z	nan	SBP29; EM124; EM712	-72.7879	-42.9238
2024-09-08T23:12:45.106Z	nan	SBP29; EM124; EM712	-72.7592	-42.9044
2024-09-09T09:59:09.000Z	nan	EK80	-72.9031	-42.8532
2024-09-09T15:33:16.039Z	nan	OS38; WH300	-72.9066	-42.851

ts	status	system	longitude	latitude
2024-09-09T15:34:47.228Z	nan	EK80	-72.9065	-42.8509
2024-09-09T17:11:28.354Z	nan	EK80	-72.9021	-42.8509
2024-09-09T17:13:04.304Z	nan	OS38	-72.9021	-42.8509
2024-09-09T17:17:10.420Z	nan	SBP29; EM124; EM712	-72.9005	-42.8518
2024-09-09T17:49:51.838Z	SIS RESTART	EM712	-72.8534	-42.8976
2024-09-09T18:15:08.242Z	Setting Change	EM712	-72.8102	-42.9213
2024-09-09T18:45:11.804Z	Setting Change	EM712	-72.802	-42.9203
2024-09-09T23:46:13.000Z	nan	SBP29; EM124; EM712	-72.8572	-42.8317
2024-09-10T00:50:57.478Z	nan	EM712; EM124; SBP29	-72.8567	-42.8322
2024-09-10T10:31:51.670Z	nan	EM124; EM712; SBP29; EM2040	-72.8511	-42.8961
2024-09-10T10:51:17.779Z	nan	EK80	-72.851	-42.8955
2024-09-10T15:01:29.326Z	nan	EK80	-72.8499	-42.8959
2024-09-10T18:29:00.701Z	nan	EM124; EM712; SBP29	-72.8036	-42.8755
2024-09-10T18:39:48.159Z	nan	EK80	-72.8101	-42.8781
2024-09-10T20:32:05.025Z	nan	EK80	-72.8087	-42.8788
2024-09-10T21:05:23.056Z	nan	SBP29; EM124; EM712	-72.798	-42.8752
2024-09-10T21:21:06.815Z	Setting Change	EM124; EM712	-72.7779	-42.8871
2024-09-11T00:59:19.634Z	nan	SBP29; EM124; EM712	-72.8182	-42.8772
2024-09-11T01:42:08.041Z	nan	SBP29; EM124; EM712	-72.8182	-42.8772
2024-09-11T13:04:06.741Z	Setting Change	EM712	-73.06	-42.9179
2024-09-11T13:29:30.000Z	nan	EK80	-73.0798	-42.887
2024-09-11T13:29:55.044Z	nan	SBP29; EM124; EM712	-73.0796	-42.8862
2024-09-11T16:44:37.502Z	nan	EK80	-73.0816	-42.8903
2024-09-11T17:04:20.000Z	nan	EM124; SBP29; EM712	-73.0828	-42.8997

ts	status	system	longitude	latitude
2024-09-11T19:46:57.920Z	nan	EM124; SBP29; EM712; EM2040	-72.7937	-42.9031
2024-09-11T20:52:16.102Z	nan	SBP29; EM124; EM712	-72.7934	-42.9041
2024-09-11T21:57:20.889Z	nan	SBP29; EM124; EM712	-72.7631	-42.9101
2024-09-12T00:48:35.000Z	nan	SBP29; EM712; EM124	-72.7755	-42.915
2024-09-12T08:38:32.514Z	nan	SBP29; EM124; EM712	-72.797	-42.9026
2024-09-12T09:16:50.197Z	nan	SBP29; EM124; EM712	-72.7916	-42.9036
2024-09-12T09:53:17.177Z	nan	SBP29; EM124; EM712; EM2040	-72.7342	-42.9098
2024-09-12T22:56:40.792Z	nan	SBP29; EM124; EM712	-72.7731	-42.9143
2024-09-13T08:57:49.664Z	nan	EM124; EM712; EM2040; SBP29	-72.9014	-42.9516
2024-09-13T08:58:42.268Z	nan	EK80	-72.9014	-42.9516
2024-09-13T09:42:09.941Z	nan	SBP29; EM124; EM712	-72.9017	-42.9518
2024-09-13T10:04:01.858Z	nan	EK80	-72.8827	-42.9297
2024-09-13T10:53:03.590Z	nan	SBP29; EM124; EM712; EM2040	-72.7813	-42.9061
2024-09-13T11:08:49.867Z	nan	EK80	-72.782	-42.9062
2024-09-13T14:31:09.172Z	nan	SBP29	-72.78	-42.9103
2024-09-13T14:31:39.815Z	nan	EK80	-72.7801	-42.9107
2024-09-13T16:05:17.126Z	nan	EK80	-72.7341	-42.9052
2024-09-13T16:07:52.778Z	nan	SBP29	-72.7338	-42.9048
2024-09-13T16:07:58.615Z	nan	EM712	-72.7338	-42.9048
2024-09-13T17:06:27.000Z	nan	SBP29; EM124	-72.7756	-42.9188

ts	status	system	longitude	latitude
2024-09-13T17:20:18.414Z	nan	EK80	-72.8	-42.9215
2024-09-13T20:41:37.706Z	nan	EK80	-72.8049	-42.9195
2024-09-13T21:07:25.723Z	nan	SBP29	-72.8131	-42.9093
2024-09-13T22:00:31.062Z	nan	SBP29	-72.8624	-42.8068
2024-09-14T01:05:06.504Z	nan	SBP29; EM124; EM712	-72.8653	-42.7724
2024-09-14T10:31:21.155Z	nan	SBP29; EM124; EM712	-72.8114	-42.9269
2024-09-14T10:36:45.137Z	nan	SBP29	-72.8113	-42.9269
2024-09-14T10:37:27.740Z	nan	EM124	-72.8113	-42.9269
2024-09-14T10:48:27.045Z	nan	EM712	-72.8114	-42.927
2024-09-14T11:18:57.260Z	nan	SBP29; EM124; EM712	-72.8122	-42.9264
2024-09-14T12:16:23.208Z	nan	EK80	-72.8119	-42.9276
2024-09-14T13:17:50.510Z	nan	EK80	-72.8119	-42.9276
2024-09-14T13:54:10.477Z	nan	EM712	-72.807	-42.9272
2024-09-14T14:09:14.474Z	nan	SBP29; EM712	-72.7931	-42.9288
2024-09-14T14:27:13.098Z	nan	EM712	-72.8268	-42.9293
2024-09-14T15:05:14.148Z	nan	EM124; EM712	-72.9014	-42.9423
2024-09-14T16:20:11.368Z	nan	SU90	-72.88	-42.9306
2024-09-14T16:30:17.975Z	nan	SBP29; EM124; EM712	-72.8545	-42.9367
2024-09-14T17:10:42.248Z	nan	EK80	-72.8603	-42.9362
2024-09-14T20:22:52.453Z	nan	EK80	-72.8606	-42.935
2024-09-14T20:58:00.126Z	nan	EM124; SBP29; EM712	-72.8762	-42.9341
2024-09-15T01:00:51.979Z	nan	SBP29; EM124; EM712	-72.9917	-43.0217
2024-09-15T02:05:30.862Z	nan	SBP29; EM124; EM712	-72.9874	-43.0218
2024-09-15T10:39:12.044Z	nan	SBP29; EM124; EM712	-73.5388	-43.3433
2024-09-15T10:39:34.348Z	nan	WH300; OS38	-73.5394	-43.3432

ts	status	system	longitude	latitude
2024-09-15T12:22:51.073Z	nan	WH300; SBP29; EM124; EM712; SU90	-73.5417	-43.3435
2024-09-15T14:20:32.459Z	nan	EK80	-73.3322	-43.1948
2024-09-15T14:22:37.431Z	nan	SBP29; EM124; EM712; EM2040	-73.3323	-43.1948
2024-09-15T15:15:49.188Z	nan	EK80	-73.3348	-43.1979
2024-09-15T15:19:52.318Z	nan	SBP29; EM124; EM712	-73.3329	-43.1977
2024-09-15T18:21:53.252Z	nan	EM712; SBP29; EM124	-73.0806	-42.8901
2024-09-15T19:17:32.000Z	nan	SBP29; EM124; EM712	-73.0806	-42.8901
2024-09-15T20:20:07.745Z	nan	SBP29; EM712; EM124; SU90	-72.9213	-42.9401
2024-09-15T20:21:56.916Z	nan	EK80	-72.9215	-42.9405
2024-09-15T22:11:39.558Z	nan	EK80	-72.926	-42.9432
2024-09-15T22:30:10.691Z	nan	SBP29; EM124; EM712; SU90	-72.9324	-42.9479
2024-09-15T23:50:36.000Z	nan	SBP29; EM124; EM712	-73.0151	-43.0332
2024-09-16T01:23:30.521Z	nan	SBP29; EM124; EM712	-73.0093	-43.0274
2024-09-16T13:08:40.190Z	nan	SBP29; EM124; EM712	-73.4922	-43.8556
2024-09-16T13:09:09.722Z	nan	EK80	-73.4921	-43.8555
2024-09-16T13:48:22.000Z	nan	EK80	-73.4905	-43.8567
2024-09-16T13:48:33.392Z	nan	EK80	-73.4903	-43.8568
2024-09-16T13:58:33.991Z	nan	SBP29; EM124; EM712	-73.4907	-43.8638
2024-09-16T14:34:48.959Z	nan	WH300	-73.5714	-43.8409
2024-09-16T14:35:06.634Z	nan	OS38; WH300	-73.5721	-43.8407
2024-09-16T17:32:30.102Z	Setting Change	EM712; EM124	-74.0077	-43.6917

ts	status	system	longitude	latitude
2024-09-16T17:34:04.903Z	Setting Change	EM124	-74.0128	-43.6918
2024-09-16T17:35:11.122Z	Setting Change	EM712	-74.0164	-43.6919
2024-09-16T17:50:22.148Z	Setting Change	EM124	-74.0676	-43.6932
2024-09-16T17:53:22.257Z	nan	OS38	-74.0772	-43.6933
2024-09-16T18:11:09.726Z	Setting Change	EM124	-74.1329	-43.6946
2024-09-16T19:49:58.832Z	nan	SU90	-74.3518	-43.8592
2024-09-17T00:58:07.805Z	nan	SBP29; EM124; EM712	-74.9492	-44.1085
2024-09-17T02:16:24.485Z	nan	SBP29; EM124; EM712	-74.9498	-44.1087
2024-09-17T11:47:28.617Z	nan	EK80	-75.7962	-44.2318
2024-09-17T23:15:17.131Z	nan	SBP29; EM124	-75.8127	-44.2262
2024-09-17T23:24:28.481Z	nan	EK80	-75.7942	-44.2298
2024-09-18T13:48:36.795Z	nan	SBP29; EM124; EM712	-74.9968	-44.1152
2024-09-18T13:54:05.681Z	nan	EK80	-74.9967	-44.1149
2024-09-18T16:06:14.048Z	nan	OS38	-74.9927	-44.1155
2024-09-18T17:10:31.455Z	nan	EK80	-74.9886	-44.1157
2024-09-18T22:05:52.971Z	nan	SBP29; EM124; EM712	-74.9735	-44.1086
2024-09-18T22:15:05.300Z	nan	EK80	-74.9604	-44.1003
2024-09-19T01:18:52.730Z	nan	SBP29; EM124; EM712	-74.5175	-43.994
2024-09-19T02:13:57.788Z	nan	SBP29; EM124; EM712	-74.5132	-43.9945
2024-09-19T02:17:28.786Z	nan	SBP29; EM124; EM712	-74.5121	-43.9935
2024-09-19T08:57:00.881Z	nan	SBP29; EM124; EM712	-73.8831	-43.6316
2024-09-19T08:58:22.944Z	nan	EK80	-73.8832	-43.6316
2024-09-19T09:35:30.966Z	nan	EK80	-73.8831	-43.6316
2024-09-19T17:33:32.210Z	nan	SBP29; EM124; EM712	-73.083	-43.7108
2024-09-19T17:43:02.963Z	nan	EK80	-73.0833	-43.711
2024-09-19T19:51:52.915Z	nan	EK80	-73.0812	-43.7118

ts	status	system	longitude	latitude
2024-09-19T19:52:00.456Z	nan	SBP29; EM124; EM712	-73.0812	-43.7118
2024-09-19T20:42:25.301Z	nan	OS38	-73.2063	-43.6938
2024-09-19T22:15:23.000Z	nan	SBP29; EM124; EM712	-73.4552	-43.6591
2024-09-19T23:52:50.000Z	nan	SBP29; EM124; EM712	-73.4538	-43.6554
2024-09-20T14:21:15.161Z	nan	SBP29; EM124; EM712	-72.8918	-42.6948
2024-09-20T23:53:42.000Z	nan	SBP29; EM124; EM712	nan	nan

Sensor Metadata

Information related to science systems owned and operated by R/V *Falkor (too)* are listed below.

Navigational Systems

index	0
label	Trimble Applanix POSMV global positioning system
definition	The Position and Orientation Systems for Marine Vessels (POSMV) is a real time kinematic (RTK) and differential global positioning system (DGPS) receiver for marine navigation. It includes an inertial system that provides platform attitude information. The instrument provides accurate location, heading, velocity, attitude, heave, acceleration and angular rate measurements.
instrument_type	Differential Global Positioning System receivers
soi_device	posmv

index	1
label	Kongsberg Seatex Seapath 380 heading, attitude and positioning sensor series
definition	Heading, attitude and positioning sensor series, designed to support hydrographic surveying and dredging activities with high precision navigation measurements. Seapath 380 instruments are composed of a 555-channel dual frequency Real Time Kinematics (RTK) Global Navigation Satellite System (GNSS) receiver and a Motion Reference Unit (MRU) inertial sensor. Different Seapath 380 models within the series determine the type of MRU mounted on the instrument: MRU models be either 5+, 5, H or 3, with associated RMS roll and pitch accuracy of 0.008 deg, 0.02 deg, 0.03 deg and 0.08 deg respectively. Each instrument features 2 cm heave accuracy (delayed signal), and position accuracy of 0.01 m + 1 ppm RMS (X and Y) can be achieved through post processing of satellite and Inertial Measurement Unit (IMU) data. The position solution can use all available satellites, including GPS, GLONASS, Galileo, Beidou and QZSS.
instrument_type	Differential Global Positioning System receivers
soi_device	seapath380

index	2
label	
definition	
instrument_type	
soi_device	f

Flow Through Seawater System Sensors

index	0
label	WET Labs ECO FL Fluorometer
definition	An open flat-face fluorometer that can be used to measure relative chlorophyll, CDOM, uranine, phycocyanin, or phycoerythrin concentrations by directly measuring the amount of fluorescence emission in a sample volume of water.
instrument_type	fluorometer
soi_device	fluorometer
example_output	2023-12-13T00:00:00.906560Z,99/99/99 99:99:99 0.11 695 61 526
file_header	Timestamp, Date, Time, ChlSig_ug/l, NU, ChlSigRaw, Therm*CheckSum

index	1
label	Sea-Bird SBE-45 TSG (Thermosalinograph)
definition	A small externally powered, high-accuracy instrument, designed for shipboard determination of sea surface (pumped-water) conductivity and temperature. It is constructed of plastic and titanium to ensure long life with minimum maintenance. It may optionally be interfaced to an external SBE 38 hull temperature sensor.
instrument_type	thermosalinograph
soi_device	tsg_sbe45
example_output	2023-12-03T10:29:29.558455Z, 28.7849, 5.15907, 31.2515
file_header	Timestamp,t1=Temperature1_C, c1=Conductivity_S/m, s=Salinity_PSU, sv=SoundVelocity_m/s, t2=SBE38_Temperature_C

index	2
label	Sunburst AFT pH
definition	Instruments that measure the hydrogen ion concentration in the water column
instrument_type	pH sensors
soi_device	sunburst_pH
example_output	2023-12-15T00:10:41.308769Z,\$SBSPH,349.0069,29.57,35.00,7.9368,8.62,2023-12-15,00:09:59
file_header	Timestamp,Header,Year_Day, Temperature_C, Salinity_Constant, pH, Battery_Voltage, Date, Time

index	3
label	WET Labs (Sea-Bird WETLabs) C-Star transmissometer
definition	An underwater optical beam transmissometer capable of free-space measurements or mounting in a flow tube with a pump for underway or moored applications. It is available in a variety of wavelengths, typically red, blue or green, with a path length of 10 or 25 cm, and in deep or shallow options.
instrument_type	transmissometer
soi_device	sbe_cst
example_output	2023-12-03T08:47:10.389455Z,CST-2187DR 09964 13004 15300 00.040 532
file_header	Timestamp,SerialNum ReferenceRawCount SignalRawCount CorrectedSignalRawCount CalcBeamAttenCoef_1 / m ThermistorRawCount

Flow Through Seawater System Installations

label	location_long	filename_prefix	installed_date	removal_date	calibration_date	serial_numbers
Sea-Bird SBE-45 TSG (Thermosalinograph)	Flowthrough seawater system, primary	tsg_sbe45_1	2024-08-17		sbe38 : 2024-02-01, sbe45 : 2024-02-16	sbe38 : 1301, sbe45 : 0402
Sea-Bird SBE-45 TSG (Thermosalinograph)	Flowthrough seawater system, secondary	tsg_sbe45_2	2024-08-17		sbe38 : 2024-02-01, sbe45 : 2024-02-29	sbe38 : 1302, sbe45 : 0421

label	location _long	filename _prefix	installed _date	removal _date	calibration _date	serial _numbers
WET Labs ECO FL Fluorometer	Flowthrough seawater system, primary	fluorometer_1	2024-08-17		unit : 2024-02-25	unit : 7473
WET Labs ECO FL Fluorometer	Flowthrough seawater system, secondary	fluorometer_2	2024-08-17		unit : 2024-02-25	unit : 7493
Sunburst AFT pH	Flowthrough seawater system, secondary	pH_2	2023-02-02		unit : 2021-01-11	unit : AP0013
	Flowthrough seawater system, primary	transmissometer_1	2024-08-17		unit : 2024-01-25	unit : 1817DR
	Flowthrough seawater system,secondary	transmissometer_2	2023-10-18	nan	unit : 2022-03-31	unit : 2186

Meterological System Sensors

29

index	0
label	Gill MetPak Pro Weather Station
definition	A multiparameter weather station for measuring various meteorological parameters in marine environments. These include wind speed and direction, temperature, relative humidity, barometric pressure and dew point. The base station combines a Gill WindSonic ultrasonic wind speed and direction sensor, a barometric pressure sensor and Totronic Hygroclip temperature and humidity probe. MetPak Pro includes Gill's MetSet configuration software and MetView data logging and visualisation software. It is also supplied with mast mounting kits. Up to four additional external devices can be connected, such as a Pt100 temperature sensor and tipping bucket rain gauge, plus two analogue sensors. Alternatively, the base station itself can be configured with an optional rain gauge and various remote wind sensors. It can measure wind speeds from 0-60 m/s between 0-359 degrees at +/- 2 percent accuracy in speed and +/- 3 degrees accuracy in direction (at 12 m/s). It measures air temperature from -50 to +100 degC at +/- 0.1 degC accuracy and 0.1 degC resolution.
instrument_type	meteorological packages
soi_device	metpakpro
example_output	2023-12-02T00:00:00.878301Z, Q,132,001.14,1006.4,077.6,+029.9,+025.6,,+99998.0006,+99998.0004,0000.000,+11.7,00, 4F

index	0
file_header	Timestamp,NodeLetter,WindDir_deg,WindSpd_m/s,AirPres_hPa,Humidity_%, AirTemp_C, DewPoint,PRT, AnI/P1, AnI/P2, DigI/P, SupplyVoltage, SupplyCode, CheckSum
index	1
label	Paroscientific Met4
definition	
instrument_type	meteorological packages
soi_device	met4
example_output	2023-12-01T21:03:05.545211Z,\$WIXDR,P,1004.502,hPa,DQ153542,C,31.12,C,DQ20408332,H,70.57,P,DQ20408332
file_header	Timestamp,Header,P,AirPres_hPa,hPa,PresSensorSN, C,AirTemp_C,C,TempSensorSN,H,Humidity_%,P,HumidSensorSN
index	2
label	Biospherical Instruments QSR 2200 surface reference radiometer
definition	A surface reference radiometer to measure scalar irradiance from sunlight with a PAR response. These sensors are often used on ships during on-deck incubations, or while a QSP sensor is vertically profiling, for example, when mounted on a CTD. The QSR-2200 outputs a linear analog signal and is compatible with data loggers that can accept a wide instrument_range of signal voltages. QSR sensors are equipped with a detachable field-of-view cutoff shield to limit its response to light from the upper hemisphere (2π steradians).
instrument_type	radiometer
soi_device	par
example_output	2024-04-13T00:00:00.945723Z,1,0,7,0.001068
file_header	Timestamp,channel,mode,raw_value,scaled_value
index	3
label	Eppley SPP/PIR Radiometers

index	3	
definition	<p>This systems is composed of the Eppley PIR and Eppley SPP. The Eppley Precision Infrared Radiometer (PIR) pyrgometer measures longwave (infrared) radiation. It is housed in a weatherproof titanium canister that has been painted with a very flat black paint that absorbs radiation. A small glass dome at the top of the instrument is covered with an ‘interference coating’ which allows only infrared radiation to come through. Light levels are detected as temperature changes creating voltages in fine wire coil detectors. A precision radiometer used to measure total energy from the sun. This can be either global shortwave irradiance or total irradiance in the plane of array (TPA). It can also be used to measure reflected or albedo irradiance, as well as diffuse shortwave irradiance. It is based on the design of the Eppley PSP pyranometer (https://vocab.nerc.ac.uk/collection/L22/current/TOOL0666/) but exhibits a faster response time, reduced thermal offset and improved cosine response. The SPP has a spectral range from 295-2800 nm, a sensitivity of 8 uV / Wm-2 and an impedance of approximately 700 ohms. It has an operating temperature from -50 to +80 degC. Hourly average measurement uncertainty is approximately 2 percent, daily average measurement uncertainty is approximately 1 percent.</p>	
instrument_type	radiometer	
soi_device	rad	
example_output	2023-12-01T21:03:11.040268Z,\$WIR39,23/12/01,21:15:40,175,-208.5,440.54,33.03,32.44,364.47,39.9,10.0	
file_header	Timestamp,Header,InstrumentDate,InstrumentTime,Samples,PIR_m_VLW_Wm-2,CaseTemp_C,DomeTemp_C,SW_Wm-2,BoardTemp_C,BattVoltage_V	
index	4	
label	Gill Windsonic anemometer	
definition	<p>A 2-axis sonic anemometer measuring horizontal wind speed and direction that is suitable for land-based and marine environments. Available in four options, providing a number of different digital and analogue outputs.</p>	
instrument_type	anemometer	
soi_device	windsonic	
example_output	2023-12-09T00:00:00.004430Z,\$WIMWV,327,R,001.14,M,A*0C	
file_header	Timestamp,Header,RelWindDir_deg,R,RelWindSpd_m/s,M*Checksum	

index	5
label	OSi APG-815 Optical Rain Gauge
definition	A series of optical scintillation rain gauges that measure rain rate in the instrument_range 0.1 to 500 mm/hr; rain accumulation in the instrument_range 0.001 to 999.999 mm with accuracy of 5% accumulation. They operate in temperatures from -40 to 50 degrees C. Versions differ by their electrical outputs , output connections and detection capabilities. Digital output versions include - ORG-815-DR, ORG-815-DS, ORG-815-DC which are capable of distinguishing precipitation by rain or snow. Analog output versions include - ORG-815-DA which does not distinguish precipitation type.
instrument_type	precipitation gauges
soi_device	raingauge
example_output	00 .000 113.127 01*0 4999 0040 0040 019
file_header	Timestamp,WMOCode PrecipRate_mm/hr PrecipAccum_mm 01 D1 D2 D3 D4

Meterological System Installations

label	location_long	filename_prefix	installed_date	removal_date	calibration_date	serial_numbers
Gill MetPak Pro Weather Station	Foremast	mpp_fm	2023-02-02		unit : 2021-11-22	anemometer : 20100008, bracket : 20100024, hydroclip : 20269221
Gill MetPak Pro Weather Station	Wheelhouse Top Starboard Side	mpp_wh_stb	2024-04-19		unit :	anemometer : 17460042, bracket : 17460023, hydroclip : 20393894
Paroscientific Met4	Foremast	met4_fm	2023-02-02		unit : 2021-10-08	unit : 153542

label	location _long	filename _prefix	installed _date	removal _date	calibration _date	serial _numbers
Biospherical Instruments QSR 2200 surface reference radiometer	Foremast - Starboard Side	par_fm_stb	2024-04-24		unit : 2022-04-19	unit : 20589
Biospherical Instruments QSR 2200 surface reference radiometer	Foremast - Port Side	par_fm_port	2024-04-26		unit : 2022-04-19	unit : 20613
	Foremast	rad_fm	2023-02-02		unit : 2020-12-10	IR Ra- diometer : 389613, Pyranome- ter : 38990F3
Gill Windsonic anemometer	Foremast	windsonic_fm	2023-02-02		unit : 2022-05-28	unit : 224900005
OSi APG-815 Optical Rain Gauge	Foremast	raingauge_fm	2024-01-01		unit : 2022-07-18	unit : 22080547

ROV SuBastian Sensors

index	0
label	Aanderaa 4831 oxygen optode

index	0
definition	A dissolved oxygen sensor which provides analogue (0-5V) and digital output (RS-232) to third party data loggers, gliders and floats. Measurement based on the ability of selected substances to act as dynamic fluorescence quenchers. The fluorescent indicator is a special platinum porphyrin complex embedded in a gas permeable foil that is exposed to the surrounding water. In this standard model, a black optical isolation coating protects the complex from sunlight and fluorescent particles in the water. This sensing foil is attached to a window providing optical access for the measuring system from inside a watertight housing. The foil is excited by modulated blue light, and the phase of a returned red light is measured. For improved stability the 4831 optode also performs areference phase reading by use of a red LED that does not produce fluorescence in the foil. This model is fitted with a standard sensing foil. By linearizing and temperature compensating, with an incorporated temperature sensor, the absolute O2 concentration can be determined. Accuracy +/- 1.5% or 2uM; precision +/- 0.2 uM.
instrument_type	dissolved gas sensors
soi_device	sb_oxygen
example_output	
file_header	
index	1
label	Sea-Bird SBE 49 FastCAT CTD
definition	A CTD sensor for use in autonomous platforms. It contains a SBE 3P temperature sensor, a SBE 4C conductivity sensor and a strain-gauge pressure sensor as standard. It can operate in autonomous (16 Hz per sec) or polled mode (transmits each sample). The sensor is depth-rated to 350 m (plastic housing) or 7000 m (titanium housing). Accuracy: +/- 0.002 deg C (temperature), +/- 0.0003 S/m (conductivity), 0.1% of full scale range (pressure).
instrument_type	ctd
soi_device	
example_output	
file_header	
index	2
label	Paroscientific Digiquartz depth sensors 8000

index	2	
definition	A family of encapsulated pressure sensors based on Paroscientific patented technology that determines pressure by measuring the oscillating frequency of a quartz crystal resonator. They are available in depth ranges of 10-140m, 10-700m, 0-700m and 1400-7000m with accuracy of 0.01% full scale or 0.02% full scale for miniature sensors.	
instrument_type	depth sensor	
soi_device		
example_output		
file_header		
index	3	
label	Valeport Mini IPS	
definition		
instrument_type		
soi_device		
example_output		
file_header		
index	4	
label	Valeport uvSVX	
definition		
instrument_type		
soi_device		
example_output		
file_header		
index	5	
label	Tritech Altimeter	
definition		
instrument_type		

index	5
soi_device	
example_output	
file_header	
index	6
label	AMT pH Sensor
definition	
instrument_type	
soi_device	
example_output	
file_header	
index	7
label	Kongsberg M3
definition	
instrument_type	sonar
soi_device	
example_output	
file_header	
index	8
label	PT100 temperature sensor
definition	
instrument_type	temperature
soi_device	
example_output	
file_header	

ROV SuBastian Installations

label	location_long	filename_prefix	installed_date	removal_date	calibration_date	serial_numbers
Aanderaa 4831 oxygen optode	ROV SuBastian	sb_oxygen	2024-01-11		unit : 2023-08-25	unit : 582
Sea-Bird SBE 49	ROV SuBastian	sb_ctd_sbe49	2024-08-24		unit : 2024-05-15	unit : 49-0711
FastCAT CTD	ROV SuBastian	sb_ctd_uvsvx	2024-01-11		unit : 2023-06-07	unit : 81173PTSA1014192
Valeport uvSVX	ROV SuBastian				unit : 18100244	unit : 18100244
Paroscientific	ROV SuBastian				unit : 2024-05-10	unit : 134675
Digiquartz depth sensors 8000	ROV SuBastian		2024-01-11		Valeport PAA-10LX : 2023-05-30	Valeport PAA-10LX : 53279