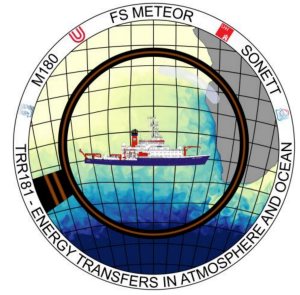


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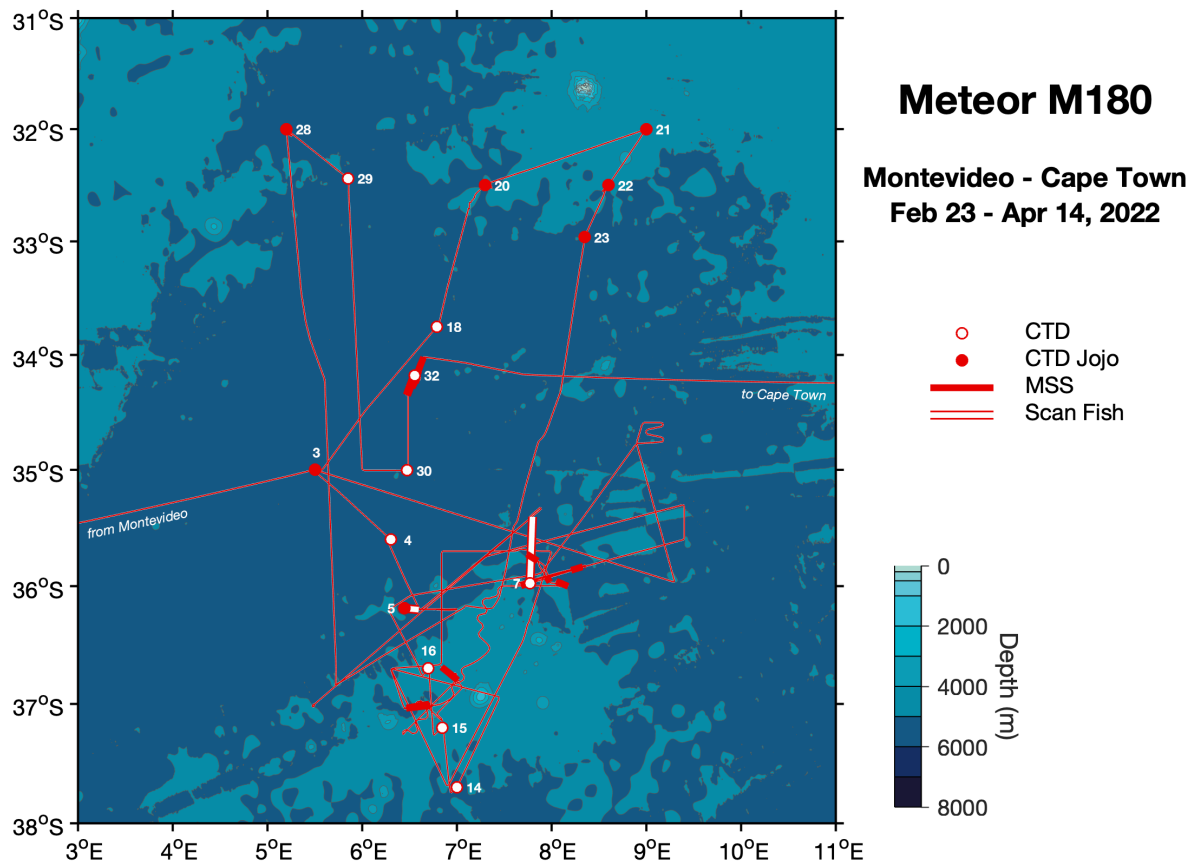
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## RV METEOR Short Cruise Report Cruise M180

Montevideo (Uruguay) - Cape Town (South Africa)  
23.02.2022 - 14.04.2022

Chief Scientist: Maren Walter  
Captain: Rainer Hammacher



## Objectives

The RV METEOR expedition M180 is part of the TRR 181, an interdisciplinary research program of the German Research Foundation (DFG). The topic of TRR181 'Energy transfers in atmosphere and ocean' is the representation of the oceanic and atmospheric energy cycles in climate models. M180 has the aim to better understand the fluxes and dissipation of this energy in the surface layer and the ocean interior to improve the parameterization of these processes in climate models. A suite of different instrumentation was used to observe the energetics in a region south of the Walvis Ridge in the southern East Atlantic. The ridge is a site of strong barotropic to baroclinic energy conversion for the internal tide, forming a so-called tidal beam. The region is also a place of strong meso- and submesoscale activity. Eddies are shedded by the retroflection of the Agulhas current, and the resulting Agulhas rings pass through the working area, forming a diverse structure of eddies, fronts, and filaments. The bathymetry in the region is mainly deep sea plains with water depths around 5000m, with a few seamounts, some of which reach up high enough in the water column to potentially affect eddy translation.

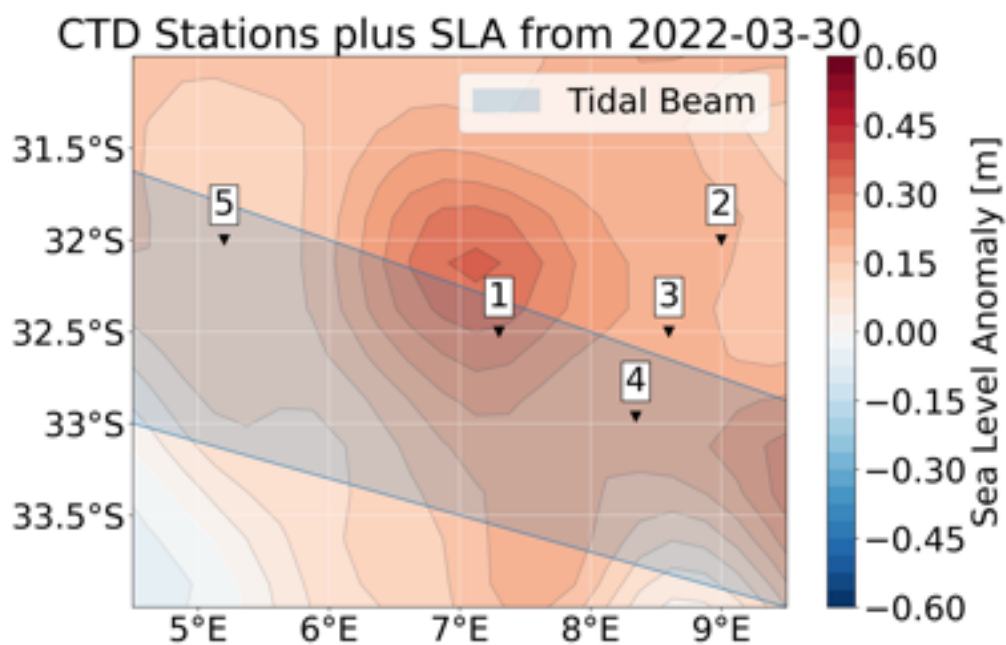
The station work during M180 can be divided into three main packages: Firstly, full depth time series stations of stratification (CTD), currents (Lowered ADCP) and turbulence (microstructure) within the tidal beam to study wave-eddy interaction. Secondly, upper ocean observations of submesoscale variability and mixing, with towed and underway measurements of turbulence, stratification, and flow field. Thirdly, autonomous observations using glider equipped with microstructure, and surface drifter release experiments.

## Narrative

The start of the cruise M180 was dominated by the health and safety measures imposed on us by the pandemic. Luckily, our self-quarantine prior to the cruise proved effective, and none of the participants was tested positive even after boarding the vessel, so we left port of Montevideo as planned on the morning of February 23, 2022 in calm and sunny weather. On February 25, 16:00 UTC, an Argo float was deployed en route, and two CTD test-stations were carried out subsequently. After 12 days of transit, on the evening of March 6 the working area was reached and station work started with a CTD and microstructure time series stations. After some initial problems with the CTD wire and a sensor, everything worked well on March 7. On March 8, 4:15 UTC, the whole CTD/Water sampling system including two Lowered ADCP instruments were lost in 4500m water depth due to a broken wire. After unsuccessfully dredging for the lost instrument, the work was resumed on March 9 with microstructure transects through an eddy, the second Argo float deployment, and some tests of the CTD backup system. On March 10, after the deployment of the first of four gliders, a scanfish survey was started to identify frontal features, guided by satellite altimetry and SST data. On March 12, the analysis of the first sets of shipboard ADCP data revealed that the 75kHz system was not functioning properly; the problem could not be fixed on board, so for the rest of the cruise we had to rely on the 38kHz system, that was mounted in the moon pool alternately with a turbulence echosounder system. After identifying a suitable non-density compensated filament with the scanfish survey on March 13, a submesoscale survey was started on March 14 with a CTD station, the second glider deployment and a microstructure transect. On Mar 15, a surface drifter deployment was carried out in a self-similar fashion to observe the two dimensional turbulence induced by the frontal system. After the drifter release, the microstructure survey was resumed.

On March 17, the last two gliders were deployed, followed by further microstructure surveying. On March 18, the weather was calm enough to accompany the microstructure transects with a towed catamaran that carried a high resolution ADCP to collect surface velocity data undisturbed by the METEOR.

On March 19, dedicated ADCP velocity transects through the eddy field were started, accompanied by multibeam mapping of one large seamount in the area, that is potentially high enough to interfere with the glider paths and had to be taken into account for the glider navigation. After that concluded, on March 21, one of the surveyed eddies was further investigated by a transect with CTD and microstructure. By then, the first glider deployed had not reported its position for four days, therefore a search mission based on the last known position and drift prediction was conducted on March 22/23, but ended unsuccessful. On March 24, the ship passed again the site of the loss of the CTD system, so a final dredge attempt was carried out, also unsuccessful.

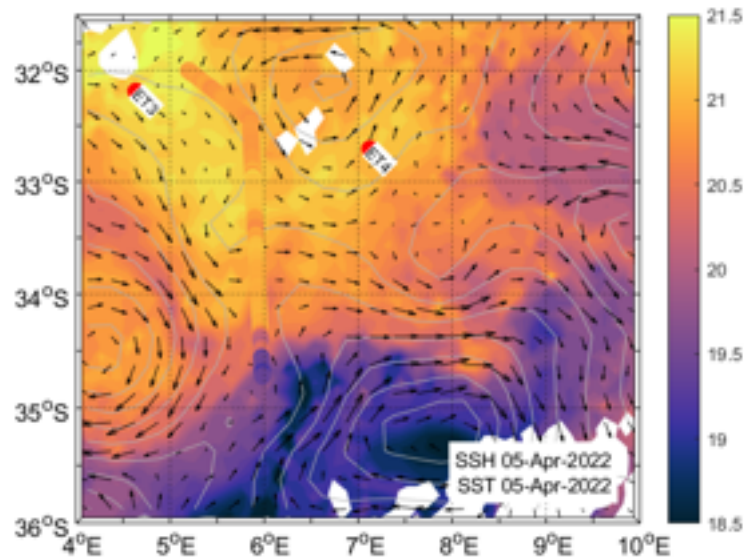


*Figure 2: Position of the CTD/LADCP/microstructure time series stations within the tidal beam area.*

On March 25, the ship reached the position of a long term mooring array in the tidal beam of Walvis Ridge (deployed in 2021, to be recovered in 2023) After a CTD profile, we tried to make acoustic contact to the releaser and position the moorings, but could not find a signal. A subsequent releaser test combined with a CTD confirmed that the water depth of > 5000 m was the likely cause of the failure, as the releaser on the CTD lost contact between 3000 and 4000 m depth. In the early morning of March 26, a time series CTD/LADCP/microstructure station in the tidal beam in vicinity of the mooring site was started. The station ended after approximately 36h, followed by 3 further time series stations starting on March 28, 30 and 31, within and outside of the tidal beam to study the interaction of the internal tide with the present Agulhas ring. After the end of the last of theses stations on April 2, the ship proceeded to the site of the glider deployments and the three remaining gliders were successfully recovered on April 3. After the recovery, the ship transited to a low energy site to the north without high eddy activity, to conduct a

second drifter release and deploy the third Argo float. The float was released on April 5, at 6:40 UTC, followed by the drifter release. After the completion of the release, and a catamaran calibration deployment, the fifth and final time series CTD/LADCP/microstructure station in the tidal beam was started around 16:00 UTC. All these CTD stations were carried out using the backup CTD system, consisting of the ships' water sampling unit and the backup CTD operated on the ships' dredge wire.

In total, 5 time series stations of 36h each were completed in the tidal beam to study wave-eddy interaction. On April 7, a CTD station was carried out at the position of one of the pressure inverted echo sounders that are part of the moored array for the purpose of calibration. After that, in the evening of April 7, the mapping of frontal structures using the SST and microstructure surveys was resumed. This second submesoscale survey was accompanied by a CTD profile with tracer sampling to study upwelling associated with the eddies. On April 10, the weather was once again calm enough to allow a catamaran deployment to complement the microstructure transects.



*Figure 3: SST and eddy field during the second submesoscale survey with position of moorings ET3 and ET4 in the working area.*

In the morning of April 11, scientific work was concluded, thus the METEOR left the working area and we deployed a fourth and last Argo float (April 11, 15:30 UTC) on the way to the port of Cape Town, where we arrived on the morning of April 14, 2022.

## Acknowledgements

We wish to thank captain Rainer Hammacher and his crew for their excellent sea-going support and a great working environment, which immensely contributed to the success of the expedition. The scientific work conducted during this cruise was funded by the German research Foundation (DFG) in the TRR 181 Energy Transfers in Atmosphere and Ocean.

## List of Participants

1. Maren Walter	Chief Scientist	Uni HB
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9. Johannes Becherer	Microstructure, Glider	hereon
10. Mariana Miracca Lage	Microstructure, Glider	hereon
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14. Reiner Steinfeld	CTD, Tracer	Uni HB
15. Peter Dennert	CTD	Uni HB
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17. Jürgen Stake	Moorings, Floats	Uni HB
18. Letizia Roscelli	Microstructure	Uni HB
19. Emelie Breunig	Drifter, CTD	Uni HH
20. Henri Renzelmann	CTD	Uni HB
21. Janne Scheffler	CTD	Uni HB
22. Pablo Sebastián Sáez	CTD	Uni HH
23. Ryan Mole	CTD, ADCP	Uni HH
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## Station List

Station	Date	Gear	Time UTC	Latitude	Longitude	Depth (m)
M180_1-1	2022-02-25	FLOAT	15:59:11	36° 41,534' S	044° 38,728' W	5012
M180_2-1	2022-02-25	CTD	16:24:07	36° 41,323' S	044° 38,966' W	5010
M180_2-2	2022-02-25	CTD	17:35:14	36° 41,355' S	044° 39,558' W	5012
M180_3-1	2022-03-06	CTD	19:42:17	34° 59,932' S	005° 29,886' E	5272
M180_3-2	2022-03-06	VMP	20:32:39	35° 00,071' S	005° 29,872' E	6572
M180_3-3	2022-03-06	CTD	23:38:10	35° 00,006' S	005° 29,982' E	5258
M180_3-4	2022-03-07	CTD	02:12:04	35° 00,007' S	005° 29,986' E	5270
M180_3-5	2022-03-07	CTD	04:54:14	35° 00,004' S	005° 29,983' E	6334
M180_3-6	2022-03-07	VMP	07:48:35	35° 00,188' S	005° 29,830' E	5273
M180_3-7	2022-03-07	CTD	10:19:13	34° 59,976' S	005° 29,969' E	5268
M180_3-8	2022-03-07	CTD	12:52:31	35° 00,006' S	005° 30,000' E	5275
M180_3-9	2022-03-07	VMP	15:19:58	35° 00,036' S	005° 29,975' E	5272
M180_3-10	2022-03-07	CTD	18:15:02	34° 59,999' S	005° 29,980' E	6657
M180_3-11	2022-03-07	CTD	19:43:09	35° 00,005' S	005° 29,981' E	5274
M180_3-12	2022-03-07	CTD	22:32:28	35° 00,005' S	005° 29,982' E	5272
M180_3-13	2022-03-08	CTD	02:19:48	35° 00,005' S	005° 29,982' E	5259
M180_3-13	2022-03-08	CTD	04:14:00	35° 00,006' S	005° 29,985' E	5259
M180_3-14	2022-03-08	DRG	06:41:46	35° 00,004' S	005° 29,981' E	5273
M180_4-1	2022-03-09	CTD	02:10:19	35° 36,044' S	006° 18,022' E	6695
M180_4-2	2022-03-09	VMP	02:55:11	35° 36,067' S	006° 17,945' E	6699
M180_5-1	2022-03-09	VMP	08:54:53	36° 12,001' S	006° 35,910' E	5031
M180_5-2	2022-03-09	CTD	11:12:45	36° 11,997' S	006° 36,059' E	6078
M180_5-3	2022-03-09	SCF	11:53:01	36° 12,035' S	006° 35,770' E	5028
M180_5-4	2022-03-09	CTD	13:54:48	36° 11,366' S	006° 26,302' E	5057
M180_5-5	2022-03-09	FLOAT	15:35:23	36° 11,135' S	006° 26,599' E	5076
M180_5-6	2022-03-09	CTD	17:08:29	36° 11,213' S	006° 26,937' E	5089
M180_5-7	2022-03-09	VMP	22:37:13	36° 12,054' S	006° 59,988' E	5008
M180_5-8	2022-03-10	VMP	01:53:58	36° 12,014' S	006° 48,065' E	5236
M180_5-9	2022-03-10	VMP	05:08:07	36° 11,997' S	006° 36,130' E	5034
M180_5-10	2022-03-10	GLIDER	07:37:00	36° 11,994' S	006° 36,099' E	5036
M180_6-1	2022-03-10	SCF	16:01:15	35° 24,287' S	007° 47,916' E	5082
M180_7-1	2022-03-14	CTD	07:47:09	35° 58,434' S	007° 46,414' E	5073
M180_7-2	2022-03-14	GLIDER	10:04:28	35° 58,376' S	007° 46,709' E	5071
M180_7-2	2022-03-14	GLIDER	12:29:45	35° 58,092' S	007° 46,637' E	5068
M180_7-3	2022-03-14	MSS	15:40:07	35° 49,362' S	008° 20,639' E	6893
M180_7-3	2022-03-14	MSS	16:11:51	35° 49,582' S	008° 20,216' E	5036
M180_7-4	2022-03-14	MSS	19:52:39	35° 59,840' S	007° 40,630' E	4942
M180_7-4	2022-03-15	MSS	02:04:22	35° 57,581' S	007° 49,807' E	6927
M180_7-5	2022-03-15	MSS	04:52:45	35° 51,864' S	008° 12,349' E	4997
M180_7-5	2022-03-15	MSS	08:35:18	35° 50,036' S	008° 19,805' E	5035

M180_8-1	2022-03-15	DRIFT	12:09:43	35° 55,651' S	007° 56,564' E	5023
M180_8-2	2022-03-15	DRIFT	12:25:10	35° 55,370' S	007° 56,733' E	5031
M180_8-3	2022-03-15	DRIFT	12:49:04	35° 55,628' S	007° 56,951' E	5042
M180_8-4	2022-03-15	DRIFT	13:07:42	35° 55,637' S	007° 57,358' E	5049
M180_8-5	2022-03-15	DRIFT	13:35:47	35° 55,343' S	007° 57,168' E	5048
M180_8-6	2022-03-15	DRIFT	14:03:18	35° 55,072' S	007° 56,961' E	5054
M180_8-7	2022-03-15	DRIFT	14:41:47	35° 55,374' S	007° 55,511' E	4990
M180_8-8	2022-03-15	DRIFT	15:29:39	35° 55,479' S	007° 58,353' E	5057
M180_9-1	2022-03-15	MSS	21:23:37	35° 43,574' S	007° 44,303' E	4938
M180_9-1	2022-03-16	MSS	02:15:35	35° 47,095' S	007° 51,184' E	5065
M180_9-2	2022-03-16	MSS	03:30:10	35° 55,562' S	007° 57,080' E	5045
M180_9-2	2022-03-16	MSS	05:33:06	35° 57,920' S	007° 58,846' E	5067
M180_9-3	2022-03-16	MSS	08:50:05	35° 57,469' S	008° 02,964' E	5085
M180_9-3	2022-03-16	MSS	14:28:52	36° 00,081' S	008° 10,410' E	5054
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M180_11-1	2022-03-17	MSS	15:05:47	36° 47,537' S	006° 59,842' E	4755
M180_11-1	2022-03-17	MSS	19:24:29	36° 43,768' S	006° 54,373' E	4859
M180_11-2	2022-03-17	MSS	20:45:26	36° 48,079' S	007° 00,539' E	4741
M180_11-2	2022-03-18	MSS	01:34:56	36° 42,556' S	006° 52,301' E	4857
M180_11-3	2022-03-18	MSS	01:54:20	36° 42,559' S	006° 52,259' E	4855
M180_11-3	2022-03-18	MSS	05:54:07	36° 45,035' S	006° 56,279' E	4824
M180_11-4	2022-03-18	MSS	06:03:13	36° 44,963' S	006° 56,146' E	4824
M180_11-4	2022-03-18	MSS	07:09:28	36° 43,958' S	006° 54,594' E	4855
M180_11-5	2022-03-18	CATM	08:13:27	36° 41,088' S	006° 49,947' E	4852
M180_11-5	2022-03-18	CATM	13:35:04	36° 46,739' S	006° 58,817' E	4785
M180_11-6	2022-03-18	MSS	08:25:59	36° 41,310' S	006° 50,298' E	4855
M180_11-6	2022-03-18	MSS	13:15:57	36° 46,583' S	006° 58,619' E	4789
M180_12-1	2022-03-18	MSS	21:12:15	37° 00,832' S	006° 43,185' E	4570
M180_12-1	2022-03-19	MSS	02:04:48	37° 02,184' S	006° 27,891' E	4959
M180_12-2	2022-03-19	MSS	03:59:55	37° 00,009' S	006° 42,506' E	4788
M180_12-2	2022-03-19	MSS	09:09:16	37° 02,002' S	006° 28,439' E	4995
M180_13-1	2022-03-19	ADCP	09:44:34	37° 02,402' S	006° 26,799' E	4939
M180_13-1	2022-03-21	ADCP	03:52:00	36° 56,538' S	007° 27,013' E	4227
M180_14-1	2022-03-21	CTD	08:49:01	37° 41,982' S	007° 00,054' E	5159
M180_14-2	2022-03-21	VMP	10:20:23	37° 42,091' S	006° 59,914' E	5160
M180_15-1	2022-03-21	CTD	16:24:13	37° 11,950' S	006° 50,862' E	4812
M180_15-2	2022-03-21	VMP	18:01:44	37° 12,547' S	006° 49,490' E	4638
M180_16-1	2022-03-21	CTD	23:14:45	36° 41,997' S	006° 41,915' E	5013
M180_16-2	2022-03-22	VMP	02:29:30	36° 42,322' S	006° 41,547' E	5007
M180_17-1	2022-03-24	DRG	04:13:12	35° 00,027' S	005° 29,954' E	5267
M180_18-1	2022-03-25	CTD	10:27:04	33° 45,096' S	006° 47,373' E	5292
M180_19-1	2022-03-25	MOOR	19:58:03	32° 42,322' S	007° 07,490' E	4997
M180_19-1	2022-03-26	MOOR	01:47:25	32° 38,944' S	007° 08,983' E	

M180_20-1	2022-03-26	CTD	03:22:16	32° 30,017' S	007° 18,008' E	5057
M180_20-2	2022-03-26	CTD	06:53:51	32° 30,010' S	007° 18,014' E	5049
M180_20-3	2022-03-26	VMP	09:52:59	32° 30,031' S	007° 18,082' E	5058
M180_20-4	2022-03-26	CTD	12:48:09	32° 29,984' S	007° 18,023' E	5054
M180_20-5	2022-03-26	CTD	16:09:34	32° 29,984' S	007° 18,011' E	
M180_20-6	2022-03-26	VMP	19:36:09	32° 30,058' S	007° 18,279' E	5047
M180_20-7	2022-03-26	CTD	22:11:19	32° 29,988' S	007° 17,987' E	5060
M180_20-8	2022-03-27	CTD	01:13:45	32° 29,994' S	007° 17,984' E	5048
M180_20-9	2022-03-27	VMP	04:18:11	32° 30,006' S	007° 18,189' E	5052
M180_20-10	2022-03-27	CTD	07:08:11	32° 30,011' S	007° 18,061' E	5065
M180_20-11	2022-03-27	CTD	10:20:12	32° 30,011' S	007° 18,020' E	5050
M180_20-12	2022-03-27	CTD	13:20:12	32° 30,015' S	007° 18,010' E	5049
M180_21-1	2022-03-28	CTD	00:57:38	32° 00,006' S	009° 00,023' E	4944
M180_21-2	2022-03-28	CTD	04:06:03	32° 00,005' S	009° 00,024' E	4943
M180_21-3	2022-03-28	VMP	07:33:41	31° 59,729' S	008° 59,683' E	4944
M180_21-4	2022-03-28	CTD	09:50:55	32° 00,032' S	009° 00,159' E	4944
M180_21-5	2022-03-28	CTD	12:56:14	32° 00,013' S	009° 00,021' E	4948
M180_21-6	2022-03-28	VMP	15:45:52	32° 00,007' S	008° 59,999' E	4944
M180_21-7	2022-03-28	CTD	18:37:49	31° 59,996' S	009° 00,052' E	4947
M180_21-8	2022-03-28	CTD	21:50:04	31° 59,997' S	009° 00,056' E	4946
M180_21-9	2022-03-29	VMP	00:56:42	32° 00,034' S	008° 59,892' E	4943
M180_21-10	2022-03-29	CTD	03:50:04	31° 59,992' S	008° 59,992' E	4947
M180_21-11	2022-03-29	CTD	07:13:37	32° 00,040' S	009° 00,059' E	4947
M180_21-12	2022-03-29	CTD	10:10:08	32° 00,042' S	009° 00,071' E	4946
M180_21-13	2022-03-29	CTD	13:30:41	31° 59,971' S	009° 00,044' E	4947
M180_22-1	2022-03-29	CTD	23:18:43	32° 29,993' S	008° 35,989' E	5013
M180_22-2	2022-03-30	CTD	03:02:56	32° 29,981' S	008° 35,970' E	5014
M180_22-3	2022-03-30	CTD	06:15:50	32° 29,851' S	008° 35,951' E	5014
M180_22-4	2022-03-30	VMP	10:13:11	32° 30,336' S	008° 35,702' E	5017
M180_22-5	2022-03-30	CTD	14:21:49	32° 29,984' S	008° 35,988' E	5012
M180_22-6	2022-03-30	CTD	15:41:36	32° 30,017' S	008° 36,026' E	5015
M180_22-7	2022-03-30	CTD	19:49:32	32° 29,853' S	008° 35,792' E	5011
M180_22-8	2022-03-30	CTD	23:57:58	32° 30,044' S	008° 36,086' E	5014
M180_22-9	2022-03-31	VMP	03:56:07	32° 30,080' S	008° 35,831' E	5016
M180_22-10	2022-03-31	CTD	06:56:21	32° 29,993' S	008° 35,922' E	5013
M180_23-1	2022-03-31	CTD	15:05:15	32° 57,665' S	008° 20,913' E	4948
M180_23-2	2022-03-31	VMP	16:50:04	32° 57,705' S	008° 20,883' E	4947
M180_23-3	2022-03-31	CTD	19:49:05	32° 57,695' S	008° 20,914' E	4947
M180_23-4	2022-03-31	CTD	23:50:51	32° 57,650' S	008° 20,797' E	4937
M180_23-5	2022-04-01	CTD	04:49:27	32° 57,659' S	008° 20,775' E	4932
M180_23-6	2022-04-01	VMP	08:46:31	32° 57,832' S	008° 20,886' E	4936
M180_23-7	2022-04-01	CTD	12:35:16	32° 57,659' S	008° 20,837' E	4951
M180_23-8	2022-04-01	CTD	16:31:05	32° 57,659' S	008° 20,838' E	4948
M180_23-9	2022-04-01	CTD	20:27:26	32° 57,694' S	008° 20,631' E	4923
M180_23-10	2022-04-02	CTD	00:39:53	32° 57,672' S	008° 20,832' E	4939
M180_23-11	2022-04-02	CTD	04:49:56	32° 57,671' S	008° 20,833' E	4949



M180_24-1	2022-04-03	GLIDER	07:30:14	36° 11,160' S	007° 21,440' E	4996
M180_24-2	2022-04-03	GLIDER	09:25:42	36° 10,315' S	007° 04,931' E	5089
M180_24-3	2022-04-03	GLIDER	17:04:53	36° 50,097' S	005° 42,712' E	5018
M180_25-1	2022-04-05	FLOAT	06:42:58	32° 01,879' S	005° 11,503' E	5123
M180_26-1	2022-04-05	DRIFT	07:34:22	31° 59,995' S	005° 11,854' E	5109
M180_26-1	2022-04-05	DRIFT	07:41:06	31° 59,997' S	005° 11,871' E	5104
M180_26-2	2022-04-05	DRIFT	07:59:08	31° 59,915' S	005° 11,785' E	5107
M180_26-3	2022-04-05	DRIFT	08:20:00	31° 59,919' S	005° 11,754' E	5108
M180_26-4	2022-04-05	DRIFT	08:55:15	31° 59,942' S	005° 11,812' E	5108
M180_26-5	2022-04-05	DRIFT	09:14:17	31° 59,967' S	005° 11,821' E	5107
M180_26-6	2022-04-05	DRIFT	09:20:00	31° 59,970' S	005° 11,827' E	5107
M180_26-7	2022-04-05	DRIFT	09:46:31	31° 59,987' S	005° 11,960' E	5103
M180_26-8	2022-04-05	DRIFT	09:54:59	31° 59,997' S	005° 11,966' E	5104
M180_26-9	2022-04-05	DRIFT	09:58:55	32° 00,009' S	005° 11,957' E	5105
M180_26-10	2022-04-05	DRIFT	10:02:58	32° 00,009' S	005° 11,932' E	5106
M180_26-10	2022-04-05	DRIFT	10:17:38	32° 00,046' S	005° 11,948' E	5108
M180_27-1	2022-04-05	CATM	11:42:19	32° 01,818' S	005° 12,913' E	5142
M180_26-11	2022-04-05	DRIFT	13:44:55	32° 01,728' S	005° 12,335' E	5114
M180_26-12	2022-04-05	DRIFT	14:40:20	31° 58,456' S	005° 10,837' E	5048
M180_26-13	2022-04-05	DRIFT	15:23:30	31° 58,454' S	005° 13,937' E	5120
M180_28-1	2022-04-05	CTD	16:12:19	32° 00,002' S	005° 12,008' E	5105
M180_28-2	2022-04-05	CTD	20:17:13	32° 00,030' S	005° 12,001' E	5104
M180_28-3	2022-04-06	VMP	00:40:14	31° 59,964' S	005° 12,168' E	5115
M180_28-4	2022-04-06	CTD	03:51:41	31° 59,965' S	005° 11,936' E	5104
M180_28-5	2022-04-06	CTD	07:54:07	31° 59,966' S	005° 11,935' E	5103
M180_28-6	2022-04-06	VMP	12:04:00	31° 59,996' S	005° 12,010' E	5106
M180_28-7	2022-04-06	CTD	15:03:30	31° 59,960' S	005° 11,883' E	5104
M180_28-8	2022-04-06	CTD	19:03:59	31° 59,988' S	005° 11,980' E	5104
M180_28-9	2022-04-06	VMP	23:02:20	32° 00,251' S	005° 12,099' E	5111
M180_28-10	2022-04-07	CTD	02:00:28	32° 00,024' S	005° 11,935' E	5104
M180_28-11	2022-04-07	CTD	06:06:24	32° 00,023' S	005° 11,939' E	5107
M180_29-1	2022-04-07	CTD	15:22:51	32° 26,377' S	005° 51,000' E	5082
M180_30-1	2022-04-08	CTD	15:43:17	35° 00,248' S	006° 28,431' E	5313
M180_31-1	2022-04-08	MSS	22:39:41	34° 20,925' S	006° 27,895' E	5313
M180_31-1	2022-04-09	MSS	04:56:39	34° 12,832' S	006° 31,439' E	5311
M180_31-2	2022-04-09	MSS	06:46:28	34° 21,338' S	006° 28,752' E	5323
M180_31-2	2022-04-09	MSS	09:49:55	34° 16,864' S	006° 30,713' E	5317
M180_31-3	2022-04-09	CATM	10:55:06	34° 18,578' S	006° 29,962' E	5319
M180_31-4	2022-04-09	MSS	11:06:04	34° 18,283' S	006° 30,089' E	5314
M180_31-4	2022-04-09	MSS	15:07:34	34° 11,730' S	006° 32,940' E	5308

M180_32-1	2022-04-09	CTD	16:50:35	34° 10,739' S	006° 33,141' E	5317
M180_33-1	2022-04-09	MSS	18:57:41	34° 17,400' S	006° 31,567' E	5325
M180_33-1	2022-04-10	MSS	00:35:49	34° 08,865' S	006° 35,302' E	5294
M180_33-2	2022-04-10	MSS	02:18:28	34° 16,038' S	006° 32,428' E	5320
M180_33-2	2022-04-10	MSS	06:31:34	34° 08,419' S	006° 35,759' E	
M180_33-3	2022-04-10	CATM	09:50:17	34° 15,117' S	006° 33,322' E	
M180_33-4	2022-04-10	MSS	10:07:33	34° 14,662' S	006° 33,653' E	
M180_33-4	2022-04-10	MSS	12:02:18	34° 11,861' S	006° 34,822' E	
M180_33-5	2022-04-10	MSS	13:17:13	34° 13,422' S	006° 33,278' E	
M180_33-5	2022-04-10	MSS	18:57:18	34° 04,478' S	006° 37,192' E	
M180_33-6	2022-04-10	MSS	22:29:47	34° 10,665' S	006° 34,521' E	
M180_33-6	2022-04-11	MSS	05:03:11	34° 01,091' S	006° 38,713' E	
M180_34-1	2022-04-11	FLOAT	15:32:52	34° 12,606' S	008° 56,594' E	5078

## Abbreviations

**FLOAT** - Argo float

**CTD** - conductivity-temperature depth probe with water sampling unit and lowered acoustic Doppler current profiler (LADCP)

**VMP** - turbulence microstructure (0-1000m, self contained)

**MSS** - turbulence microstructure (0-200m)

**SCF** - towed ScanFish (with CTD)

**GLIDER** - glider with microstructure

**DRIFT** - surfacer drifter release

**DRG** - Dredge (for lost CTD equipment)

**CATM** - towed Catamaran

**ADCP** - transect with vessel mounted 38kHz Acoustic Doppler Current Profiler

**MOOR** - depth sounding for mooring equipment