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**Site L SOFAR Float Experiment,
1982 - 1985**

by

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Technical Report

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Abstract

Lagrangian measurements of low frequency currents in the vicinity of the Gulf Stream and its recirculation region in the western Sargasso Sea were made by tracking SOFAR floats. These floats were tracked using acoustic time of arrival information from an array of five Autonomous Listening Stations (ALSSs) which were moored in the western Sargasso Sea. The ALSSs performed almost flawlessly, returning over 90 percent of the possible data.

Floats were released in three deployments of seven floats each in November 1982, February 1983, and June 1983. The floats were launched in initially coherent arrays (approximately 20 km spacing) at 34°N, 70°W, Site "L", and were ballasted for 700 m depth. The SOFAR floats themselves functioned with somewhat less than expected reliability; four floats failed fairly soon after launch, and several other floats suffered failures of their temperature and pressure telemetry.

The majority of the SOFAR floats launched in this program produced long, and interesting trajectories. These new data will be valuable for estimating first order flow statistics in the dynamically important recirculation region, for visualizing interactions between the Gulf Stream and the New England Seamount Chain, and for estimating one and two particle diffusivities in a region of very high eddy energy.

TABLE OF CONTENTS

	Page
Abstract	1
Table of Contents	2
List of Tables and Figures	3
I. Introduction and Scientific Background	4
II. Field Program	6
a. Float deployments	6
b. ALS deployments	6
III. Data Processing and Float Tracking	10
IV. Float Performance	13
V. Summary Presentations and Discussion	18
Acknowledgments	19
References	32
Appendix A: Individual Float Plots	33
Appendix B: Composite Trajectory Plots for	
Each Month November 1982-November 1984	255
Appendix C: Calendar Conversion Tables -- 1982-1985	281

LIST OF TABLES

	Page
I. Float Launch Information and Differences Between Launch Position and First Tracked Position	8
II. ALS Mooring Positions and Depths	9
III. Float File Statistics	11

LIST OF FIGURES

1. ALS Tracking Array and Float Launch Locations	7
2. Float Time Table	14
3a. Composite Trajectory Plots - All Site L Floats	20
3b. Composite Trajectory Plots - Setting 1	21
3c. Composite Trajectory Plots - Setting 2	22
3d. Composite Trajectory Plots - Setting 3	23
4a. Composite First and Last Point Plots - All Site L Floats . .	24
4b. Composite First and Last Point Plots - Setting 1	25
4c. Composite First and Last Point Plots - Setting 2	26
4d. Composite First and Last Point Plots - Setting 3	27
5. Number of float days in boxes 2 degrees of latitude by 5 degrees of longitude	28
6. Mean velocity in boxes	29
7. Variance ellipses in boxes	30
8. Eddy kinetic energy contours	31

I. INTRODUCTION AND SCIENTIFIC BACKGROUND

In this report we describe a Lagrangian experiment to observe low frequency currents (periods greater than several days) in the vicinity of the Gulf Stream and its recirculation region (Site "L", 34°N, 70°W). The aim of this experiment was to obtain a basic description of currents in this important and interesting region, and, to the extent possible, infer the dynamics of mean flow/eddy interactions in this region and the diffusivity caused by the eddies.

Various data sets, including hydrographic (Dantzler, 1977), current meter (Schmitz, 1984; Schmitz *et al.*, 1983), and early SOFAR float (Richardson, 1983) have shown that the Gulf Stream is the region of greatest eddy kinetic energy (EKE, units are $\text{cm}^2 \text{s}^{-2}$) in the North Atlantic. Numerical models (Holland, 1985) yield a similar picture, and indeed the comparison of observed and modelled EKE fields has been a powerful stimulus driving models toward more realistic parameter ranges and configurations (Holland, 1985; Schmitz and Holland, 1986). The deep mean circulation in the wind-driven models is produced entirely by eddy/mean flow interactions in the recirculation region, and hence the eddy field is of central importance in this region. With this data set we hoped to increase significantly the observational data base on eddy statistics in this region.

Eddies are important also as a means for stirring the ocean and thereby diffusing chemical constituents and dynamically important properties like potential vorticity. For example, analysis of tracer data such as that acquired by the Transient Tracers Observations program will depend crucially upon knowing at least the approximate eddy diffusivity and its variation within the gyre. From the diffusion estimates based on SOFAR float deployments during the Mid-Ocean Dynamics Experiment (MODE) and the Local Dynamics Experiment (LDE) (McWilliams *et al.*, 1983), it appears that the eddy diffusivity due to mesoscale variability is proportional to the local eddy kinetic energy. This implies that the mesoscale eddies hold their integral time scale roughly constant, though it is not a priori obvious why they should. With this investigation we

sample a range of eddy kinetic energy (per unit mass) up to about $200 \text{ cm}^2/\text{sec}^2$.

For single particle diffusion estimates, the optimum sampling strategy would be to deploy floats several months apart so that each float would be independent from the beginning. On the other hand, to estimate two particle dispersion, floats should be released at the same time and with neighbors closer than the energy-containing scale. As a compromise among these conflicting requirements, we chose to deploy three separate clusters of seven floats each, at intervals of several months. The clusters were compact arrays of seven floats with nearest neighbor separations of 20 km intended to sample as many small initial separations as possible. Each array provides 19 pairs at ~ 20 km initial separation, and 7 pairs at ~ 40 km initial separation. If, on the other hand, we had deployed all 21 floats at once in a single compact array, we would have ~ 58 pairs with ~ 20 km initial separation (vs. $14 \times 3 = 42$) and 37 pairs with ~ 40 km initial separation. We would thereby have gained about 50% in the number of particle pairs available for relative diffusion, but at the expense of having most of the floats start off in essentially the same mesoscale feature which reduces the number of effective degrees of freedom in the single particle diffusion estimate.

Array deployments (vs. single deployments) have the additional advantage that during at least the initial stage of the experiment, the data can be used to estimate changes in relative vorticity. This, together with the North-South position of the floats, gives us two of the three terms in the potential vorticity balance.

A choice of 34°N , 70°W (Site L) for the center of the deployment array was made to satisfy the criteria that the deployment should be (1) well within the Gulf Stream recirculation, and (2) in a region of as high a kinetic energy as possible, but consistent with constraints of local homogeneity and stationarity of the eddy variability during the initial evolution of the array to enable diffusion estimates to be made. A depth of 700 m was chosen to maximize kinetic energy, to be close enough to the SOFAR channel to have long range sound propagation, and to

provide an intercomparison with floats launched as part of the LDE and Gulf Stream Recirculation Experiment (GUSREX).

Site L was also the location of a Long-Term Upper Ocean Study (LOTUS, Briscoe and Weller, 1984) which included both CTD surveys and deep moored current meter measurements (Tarbell *et al.*, 1984; 1985). We coordinated our float experiment with LOTUS to (a) use the CTD data and current meter measurements to define the eddy variability in which the floats were deployed, (b) deploy one setting of floats on a LOTUS cruise.

II. FIELD PROGRAM

a. Float Deployments

The cruises required to carry out float deployments were "piggy-backed" on previously scheduled programs. The field work began in May 1982 with deployment of a float cluster at Site L (Figure 1) during LOTUS cruise OC129 aboard R/V OCEANUS. (Table I lists all float launch positions). The second setting was carried out in October 1982 on cruise EN094 aboard R/V ENDEAVOR which was dedicated to Site L, and the final setting occurred in January 1983 on cruise EN100 which was part of the GUSREX program. During the first deployment cruise an XBT or CTD station was made at the site of each float launch. The temperature at 700 db, the nominal target depth, was found to be 15C, where the expected value from historical data was 12C. Hence, the in situ density was slightly less than expected, and the floats were neutrally buoyant at a depth of about 770 db, or about 70 db deeper than the target depth. This was not thought to be a serious change in operating depth, though it did tend to reduce the depth change the floats could undergo before going offscale deep in pressure telemetry (>900 db).

b. ALS Deployments

The ALS net used for tracking these floats is shown in Figure 1, and all positions are listed in Table II. ALS stations C, H, I, J, and K were occupied during 1982 for the GUSREX program. We added reception of a second acoustic channel to the ALSs to accommodate French SOFAR floats which were launched just west of the mid-Atlantic Ridge. Additionally,

SITE L EXPERIMENT MAY 1982 - MAY 1985 ALS TRACKING ARRAY

Figure 1: ALS Tracking Array and Float Launch Positions.

TABLE I

LAUNCH INFORMATION AND DIFFERENCES BETWEEN
LAUNCH POSITION AND FIRST TRACKED POSITION

FLOAT	LAUNCH DATE yyymmddhh	LAUNCH LAT deg N	LAUNCH LON deg W	DATE OF FIRST POS yyymmddhh	FIRST LAT deg N	FIRST LON deg W	LAUNCH POS FIRST DIFF km	LAUNCH POS EST DIFF km	TIME DIFF hr	INITIAL CLOCK ERROR sec
123	82103009	34.18	-70.00	83082113	31.77	-68.78	4.06	4.10	1	-1.3
124	82103001	33.73	-69.99	82103002	33.74	-70.04	4.66	5.20	2	-0.8
125	82103013	34.00	-69.99	82103015	34.01	-70.04	7.16	12.19	18	-0.2
126	82103012	33.91	-70.19	82103106	33.88	-70.25	3.37	3.92	1	-0.8
127	82103006	33.91	-69.81	82103007	33.90	-69.84	1.76	4.11	12	-1.0
128	82103010	34.13	-70.28	82103022	34.13	-70.30	2.19	1.86	3	2.0
129	82103007	34.13	-69.72	82103011	34.12	-69.71	3.88	0.47	12	-2.0
130	83013024	33.91	-69.81	83013112	33.89	-69.84	6.47	7.25	5	-4.0
131	83013107	33.92	-70.18	83013112	33.98	-70.21	15.39	9.89	25	-3.0
132	83013102	33.74	-69.96	83020103	33.76	-70.11	1.86	3.06	8	-2.0
133	83013022	34.18	-70.00	83013105	34.16	-69.99	4.99	5.84	11	-3.0
134	83013108	33.96	-70.09	83013119	33.97	-70.14	3.16	2.30	17	-2.0
135	83013115	34.13	-70.28	83020108	34.14	-70.32	5.99	6.68	10	-0.5
136	83013023	34.13	-69.71	83013109	34.09	-69.74	15.05	7.31	15	-1.0
137	83060920	33.96	-70.10	83061012	33.91	-70.26	25.89	20.41	7	-4.0
138	83060918	34.11	-70.00	83061001	34.03	-70.26	6.20	2.93	5	2.0
139	83060921	33.92	-70.18	83061002	33.89	-70.24	4.13	3.03	3	-1.0
140	83060924	33.73	-69.96	83061003	33.70	-69.98	18.83	2.61	22	1.0
141	83061006	34.18	-70.00	83061104	34.06	-70.15	21.79	6.80	25	0.0
142	83061003	34.13	-69.71	83061105	33.99	-69.87	15.10	3.01	28	-0.1
143	83061018	33.92	-69.82	83061106	33.80	-69.90				

average difference 8.6

11.5

excludes 123

excludes 123

TABLE II

ALS MOORING POSITIONS AND CHANNEL DEPTHS

ALS	LAUNCH DATE	LATITUDE deg N	LONGITUDE deg W	CHANNEL DEPTH m
I	820521	35.99	62.00	1200
K	820523	38.0	55.0	1200
C	820526	35.5	45.91	1300
F	820528	33.3	54.9	1250
H	820601	30.47	67.03	1200
J	820602	31.01	73.05	1200
I	830530	36.06	62.01	1200
K	830531	38.00	54.99	1200
C	830602	35.53	45.03	1200
F	830604	33.40	54.91	1200
H	830617	30.49	67.06	1200
J	830608	31.09	73.05	1200
M	840510	34.19	62.80	1200
K	840512	37.95	54.99	1200
C	840515	35.55	45.14	1200
H	840519	30.47	67.10	1200
J	840521	31.05	72.96	1200

a second independent tape recorder was added to reduce data loss from tape or tape recorder failure. The same ALS net was replaced during 1983, the last year of the GUSREX program, and then the final setting (omitting ALSS I and F and adding M) took place in May 1984. Final recovery of the ALSSs, and the end of float tracking in the western North Atlantic, occurred in September 1985.

Because of unavoidable conflicts in ship scheduling during spring 1984, the second recovery and resetting of the ALS net occurred a few weeks after the ALS cassettes had become filled during 1982-1983. As a result, about thirty days of data were lost in May 1983. All of the floats active at that time (nine floats) have trajectories which have been split into two pieces around this gap (e.g., in Table III note trajectory 127A ending early May 1983, and trajectory 127B beginning in early June 1983). In many cases this gap in time corresponds to a small gap in space along the trajectory which could probably be interpolated with no important loss (or creation) of information. However, the policy of the float group has been not to interpolate across gaps longer than ten days in archived data.

The ALSSs performed very reliably during this entire project and returned virtually all of the possible data.

III. DATA PROCESSING AND FLOAT TRACKING

A report in preparation by W. B. Owens and T. K. McKee will describe the float tracking process in detail. Some elements of the final processing phase are described briefly here.

The ALS cassette tapes containing times of arrivals and telemetry for each of the twenty-five floats were processed at Woods Hole Oceanographic Institution in three phases: The first phase converts the raw data into a time series of possible time of arrivals and amplitudes of their correlations for each ten minute interval that the ALSSs were in the water. The second phase (float tracking) brings the data through three steps: (1) identification and extraction of the float signals for each ALS; (2) tracking the floats (including estimates of the drift of the

TABLE III

FLOAT FILE STATISTICS

FLOAT	START DATE		START POSITION		STOP DATE		STOP POSITION		NO. DAYS	INIT. TEMP. °C	AVE. TEMP. °C	INIT. PRES. dbars	AVE. PRES. dbars
	yymmdd[Julian]	LAT deg N	LONG deg W	LON deg W	yymmdd[Julian]	LAT deg N	LONG deg W	LON deg W					
123A	830823[5570]a	31.68	-68.99	-68.99	840501[5822]	28.18	-72.87	-72.87	253	7.7	7.5	-	-b
123B	840524[5845]	28.29	-73.77	-73.77	841217[6052]	29.72	-77.72	-77.72	208	8.0	7.4	-	-
124A	821101[5275]	33.78	-69.98	-69.98	830503[5458]	33.91	-65.25	-65.25	184	14.9	15.3	865	755
124B	830607[5493]	34.36	-67.97	-67.97	850829[6307]	34.51	-60.46	-60.46	815	15.6	15.2	656	570
125A	821101[5275]	34.01	-69.95	-69.95	830503[5458]	41.81	-60.25	-60.25	184	14.6	8.2	791	690
125B	830602[5488]	41.52	-61.01	-61.01	841019[5993]	36.89	-59.59	-59.59	506	4.5	4.5	709	771
126	821102[5276]	33.92	-70.16	-70.16	830217[5383]	35.91	-67.93	-67.93	108	10.1	8.0	870	696
127A	821101[5275]	33.92	-69.76	-69.76	830503[5458]	28.93	-71.46	-71.46	184	15.4	15.7	822	771
127B	830608[5494]	27.63	-69.29	-69.29	841221[6056]	28.10	-72.47	-72.47	563	15.2	9.3	706	702
128	821101[5275]	34.13	-70.24	-70.24	830209[5375]	35.09	-70.80	-70.80	101	13.1	13.4	822	802
129	821101[5275]	34.13	-69.58	-69.58	830329[5423]	31.53	-72.08	-72.08	149	13.3	10.1	-	-
130A	830202[5368]	33.83	-69.93	-69.93	830502[5457]	34.31	-74.11	-74.11	90	15.0	14.7	825	866
130B	830604[5490]	35.70	-68.13	-68.13	830719[5535]	38.15	-68.47	-68.47	46	13.8	13.3	889	888
131A	830202[5368]	33.96	-70.28	-70.28	830502[5457]	35.16	-70.46	-70.46	90	14.1	13.8	789	800
131B	830610[5496]	33.72	-70.43	-70.43	830923[5601]	33.32	-74.39	-74.39	106	-	-	-	-
132A	830203[5369]	33.77	-70.19	-70.19	830502[5457]	34.96	-69.19	-69.19	89	13.8	14.1	748	758
132B	830604[5490]	34.99	-68.05	-68.05	840503[5824]	31.61	-71.68	-71.68	335	14.6	12.5	763	725
132C	840522[5843]	31.68	-72.61	-72.61	850828[6306]	33.27	-57.08	-57.08	464	10.8	12.4	700	718
133A	830202[5368]	34.16	-70.03	-70.03	830502[5457]	32.41	-75.12	-75.12	90	14.5	13.3	674	704
133B	830607[5493]	32.25	-73.90	-73.90	840410[5801]	38.06	-52.52	-52.52	309	10.7	8.2	744	715
134A	830202[5368]	33.97	-70.17	-70.17	830503[5458]	31.47	-75.20	-75.20	91	11.0	10.4	830	850
134B	830609[5495]	29.45	-76.92	-76.92	830728[5544]	29.79	-78.15	-78.15	50	8.0	7.3	-	-
135A	830203[5369]	34.15	-70.34	-70.34	830503[5458]	33.87	-73.63	-73.63	90	13.9	12.8	835	859
135B	830603[5489]	36.14	-65.76	-65.76	841002[5976]	32.70	-65.35	-65.35	488	12.6	9.1	900	892
136	830202[5368]	34.07	-69.79	-69.79	830411[5436]	31.91	-75.15	-75.15	69	14.0	13.1	864	879
137A	830612[5498]	33.77	-70.44	-70.44	840608[5860]	35.03	-45.93	-45.93	363	14.1	13.4	838	738
137B	840621[5873]	34.17	-46.26	-46.26	840927[5971]	33.33	-52.12	-52.12	99	13.6	14.0	677	687
138	830612[5498]	33.82	-70.48	-70.48	840727[5909]	40.57	-59.49	-59.49	412	13.9	11.3	823	699
139	830612[5498]	33.70	-70.49	-70.49	840824[5937]	38.57	-70.51	-70.51	440	13.4	12.0	744	704
140	830612[5498]	33.60	-70.19	-70.19	850828[6306]	31.40	-42.71	-42.71	809	11.5	10.9	849	719
141	830613[5499]	33.88	-70.29	-70.29	830927[5605]	37.36	-66.60	-66.60	107	12.4	8.9	861	851
142	830613[5499]	33.82	-69.94	-69.94	840725[5907]	29.72	-71.77	-71.77	409	13.0	13.7	770	720
143	830613[5499]	33.67	-70.00	-70.00	850129[6095]	41.21	-37.22	-37.22	597	13.4	10.7	735	682

a Last four digits of Julian day counter. Add 2440000 to get true Julian day.

b Dash indicates no data.

SOFAR float clock); and (3) creation of a FLOATER format (McKee, 1986) file for each float containing raw (unsmoothed) positions and telemetry (pressure and temperature). During the tracking done here we used a constant (for all floats) sound speed, which may need to be adjusted in the future. The third phase includes editing, interpolating, filtering, and smoothing the data to produce final float trajectories complete with velocities, temperature, and pressure.

Trajectory and time series plots were inspected for outliers, and the preliminary FLOATER format files were edited where necessary to eliminate obviously bad positions and temperature and pressure values. Listings of direction and speed derived from consecutive positions were used to detect unusually high speeds that might indicate a bad position. First differences between consecutive temperature and pressure values were calculated. Radical changes in temperature that were not accompanied by a similar change in pressure (or vice versa) were presumed to indicate an erroneous value. Temperature and pressure that drifted outside the range of the sensors were also removed from the data and flagged as erroneous. Temperature and pressure values that were not associated with a position were deleted.

Trajectories having gaps of greater than ten days were broken into subfiles and labeled A, B, C, etc. This was necessary for all floats being tracked in May 1983, since the first setting ALSs reached the end of their tapes before the next ALSs were deployed. Gaps of less than ten days duration in position, temperature, and pressure were linearly interpolated, producing daily values of temperature and pressure from the bi-daily values recorded.

These interpolated series were then filtered using a five point one-day half-width Gaussian filter. Finally, a cubic spline was fitted to the filtered positions and east and north components of velocity were calculated to coincide with the positions at 24-hour intervals.

A float file name is up to six characters long and is made up of three parts:

1. A two letter code to indicate the experiment, in this case, SL (for "Site L").
2. A one to three digit identifier assigned to the float before its launch.
3. A single letter suffix (A, B, C, ...Z) that was added to the file name if the float record was broken into sections due to gaps in the data. An example is float name SL137B -- Experiment Code SL, Float 137, Section B.

The accuracy of the tracking may be judged by comparing the known launch position with the first position calculated by tracking. The difference between these two positions as well as the time difference between launch and the first position are listed in Table I. The position difference is generally small, typically 8.6 km with an average time delay of 11.5 hours, which is more than adequate accuracy for most purposes. Float 123 was not included in these calculations since it failed on deployment and started working at reduced power 9 1/2 months later. To make the fairest comparison between the actual launch position and that based on the acoustic tracking of the float, we have used the first two float positions to extrapolate backwards in time from the first position to estimate a float launch position. The average difference between the actual and estimated launch positions is 5.7 km. A measure of the precision of the tracks can be obtained from (a) the variability in the ranges between a float and the ALSs for each position and (b) the point to point variations in the estimates of the float clock drift. Both of these suggest that the precision of the float positions is approximately 2 km.

IV. FLOAT PERFORMANCE

The floats used in this experiment were very similar in design to the floats deployed in the GUSREX program where they functioned fairly reliably. In this program the floats suffered a failure rate that was higher than expected and, moreover, higher than we feel is acceptable (Figure 2). The average lifetime of floats deployed in the Site L

Figure 2: Float Time Table.

experiment was 419 days, compared to a nominal float lifetime of approximately two years.

The reasons for the reduced lifetime are not known with absolute certainty, however, evidence suggests that the power amplifier output transistors and possibly the acoustic transducer may be at fault. The power level of these floats was 100 Watts (electrical). This was a reduction from the previous levels utilized in the GUSREX experiment (120 Watts) in an effort to limit the dissipation in the output power transistors. Earlier floats operating in the 80 Watt range had lifetimes approaching two years. It was felt that the 100 Watt level was well within the specifications of the output transistors and required to overcome the acoustic loss expected when the floats encountered the Gulf Stream. Over the course of the three deployments these transistors were upgraded to a slightly more robust device. The acoustic resonator was also a focus of attention; over the three deployments, improvements were made in the penetration which carries the high voltage electrical conductors. Several of the floats drifted out of the tracking net due to the poor acoustic properties of the Gulf Stream while others faded suddenly (one or two days) within 180 km of a receiving station. This latter type of failure would be characteristic of a shorted power transistor or acoustic transducer.

Many of the floats reported erratic temperature/pressure telemetry. Some of these erratic data appear oceanographic while others are obvious electronic failures. The T/P circuits were a new design, used for the first time in these floats. Each of the boards had three D.C. regulators that operated at a nominal 12 volts input. Subsequent to the circuit design and the float deployments these regulators were derated by the manufacturer from a nominal operating voltage of 16 volts down to 10 volts. Several floats had T/P failures 60 to 90 days prior to the time when the floats stopped signalling. This suggests that the regulators had fallen out of regulation, and that high currents were depleting the batteries.

Finally, although each of the floats was tested at several stages -- board level, calibration, and completed assemblies -- they were not

subjected to the nominal 6 to 8 month burn-in due to parts procurements delays and cruise schedules. This situation improved with each deployment, and the last group of floats were provided a few months of bench burn-in time. It is notable that this last group of seven floats was markedly more reliable than the first two groups. An annotated list of float performance follows; T and P refer to the telemetered temperature and pressure which have a limited range which can be telemetered: the pressure range was 500 to 900 dbars; the temperature range was 3 to 16°C.

Float Number; Lifetime; Comments

123; 483 days; was not heard immediately after launch, and then after 280 days began signalling with reduced power. T appears normal; P is offscale deep (>900 dbars). Gap of 23 days between first and second ALS setting. This float was heard by one ALS (J) through May 1985 but was not heard at other ALSs because of a weak signal.

124; 1033 days; T is offscale high (>16°C) by the end of the record; P decreased to offscale shallow (<500 dbars) values early in the record. Gap of 35 days between first and second ALS setting.

125; 719 days; T and P show sudden, large changes, and fail 80 days before the end of the record. Gap of 30 days between first and second ALS setting. Heard on ALS J through May 1985 but was out of range of other ALSs because of location.

126; 108 days; T and P show sudden large changes near Gulf Stream vicinity, but do not go offscale. Float dies suddenly, prematurely, suggesting electrical failure.

127; 782 days; T and P are normal during first 400 days, and then P increases suddenly as T decreases indicating rapid depth increase to offscale values. The float continued signalling for another 90 days. Heard on ALS J through May 1985 but was out of range of other ALSs because of location. Gap of 35 days between first and second ALS setting.

128; 101 days; T decreases suddenly and P increases suddenly just before the float fails, suggesting failed pressure regulator and subsequent battery depletion.

129; 149 days; T decreases monotonically from fairly warm values to very cool values heading offscale just before float failure. The P values are offscale deep immediately after launch, suggesting failed pressure regulator and subsequent battery depletion.

130; 167 days; T appears normal. P goes offscale deep about 90 days after launch, suggesting failed pressure regulator and subsequent battery depletion. Gap of 33 days between first and second ALS setting.

131; 233 days; T and P fail about 80 days into the record, suggesting failed pressure regulator and subsequent battery depletion. Gap of 33 days between first and second ALS setting.

132; 937 days; T and P appear normal. Gap of 33 days between first and second ALS setting. A second gap of 20 days is due to tracking difficulties.

133; 434 days; T and P fail about 60 days before the end of the record. Gap of 36 days between first and second ALS setting.

134; 177 days; T decreases and P increases steadily to offscale values about 80 days after launch. This float had a weak signal from the beginning, suggesting a problem with the transducer or power transistor. Gap of 37 days between first and second ALS setting.

135; 608 days; T appears normal though P goes offscale deep within about 80 days and remains near 900 dbars. Gap of 36 days between first and second ALS setting.

136; 69 days; T appears normal, but P goes offscale deep soon after launch. Float fails shortly after, suggesting failed pressure regulator and subsequent battery depletion.

137; 474 days; T and P are normal. Gap of 13 days due to tracking difficulties.

138; 412 days; T and P have a 20 day gap in April 1984, but are otherwise normal.

139; 440 days; T and P are normal. This float appears to have drifted out of range of the ALS net.

140; 809 days; T and P are normal.

141; 107 days; T and P appear normal, but T cools strongly and P goes offscale deep when float is near the Gulf Stream north wall. Float fails soon thereafter, suggesting failed pressure regulator and subsequent battery depletion.

142; 409 days; T and P are normal. Appears to have drifted out of range.

143; 597 days; T and P are normal. Appears to have drifted out of range.

V. SUMMARY PRESENTATIONS AND DISCUSSION

In Figure 3a we show the entire set of trajectories from the Site L experiment, and in Figure 4a we show vectors from the launch point to the final tracked position. The same kind of presentation is made in Figures 3b,c,d and Figures 4b,c,d for the three separate float deployments. When assessing these figures it should be kept in mind that the trajectories are of widely varying duration, from 69 to 1033 days.

There are some notable patterns, however, especially evident in Figure 3a. The overall dispersion of floats was quite asymmetric, with much greater dispersion in a direction east-northeast than to the north, or to the southwest. This dispersion serves to define the shape of the gyre and its recirculation region. Several of the floats were entrained into the Gulf Stream and made long, rapid excursions to the east; only one float crossed over the Gulf Stream northern boundary and moved westward along the continental slope.

When comparing the trajectories from the three deployments (Figures 3b-3d), it is apparent that there is considerable variability between deployments. At the second setting in February 1983 there was a well-developed westsouthwest flow at Site L which carried several floats all the way to the Gulf Stream at about 32°N , 75°W . Four of the seven floats then made long, rapid eastward trajectories characteristic of advection by the Gulf Stream. At the first and third settings the flow at Site L was evidently not as well organized, and the float clusters broke apart quickly and dispersed rapidly in many directions.

Statistical summaries of the data are provided in Figures 5 through 8 where the floats are treated as roving current meters. The region shown was divided into boxes of 2 degrees of latitude by 5 degrees of longitude, and velocity statistics were accumulated within each box and without regard to float identity. The total number of float days in each box is posted in Figure 5. Note that the periphery of the region has relatively few samples (e.g., the box centered on 32°N, 62.5°W has only 91 days of data and from Figure 3a it is evident that this data comes from only one float. It remains for us to estimate the number of effective degrees of freedom in this data set, but suffice it to say that the mean velocities of Figure 6 should be regarded as somewhat dubious over most of the region shown. On the other hand, the eddy kinetic energy (EKE) of Figures 7 and 8 appears to be fairly well defined at least with regards to overall pattern. Aside from the poorly sampled northeast corner, the main feature is an EKE maximum centered on about 38°N, 65°W where EKE just exceeds $600 \text{ cm}^2 \text{ s}^{-2}$. The EKE decreases most rapidly to the north (though we have few samples north of the Gulf Stream). EKE also decreases in a direction upstream from 65°W, and has a value of only about 150-200 off of Cape Hatteras.

Acknowledgments

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The floats were tracked by M. Kennelly and M. E. Zemanovic at Woods Hole Oceanographic Institution using a system developed by W. B. Owens. Technical support was performed by R. Lavoie. M. A. Lucas typed the manuscript.

Figure 3a: Composite Trajectory Plots - All Site L Floats.

Figure 3b: Composite Trajectory Plots - Setting 1.

Figure 3c: Composite Trajectory Plots - Setting 2.

Figure 3d: Composite Trajectory Plots - Setting 3.

SITE L FLOATS NOV 1982 - MAY 1984

Figure 4a: Composite First and Last Point Plots - All Site L Floats.

Figure 4b: Composite First and Last Point Plots - Setting 1.

Figure 4c: Composite First and Last Point Plots - Setting 2.

Figure 4d: Composite First and Last Point Plots - Setting 3.

SITE L, NUMBER OF OBSERVATIONS

Figure 5: Number of float days in boxes 2 degrees of latitude by 5 degrees of longitude.

SITE L, MEAN VELOCITY

Figure 6: Mean velocity in boxes. 20 cm s^{-1}

SITE L, VARIANCE ELLIPSES

Figure 7: Variance ellipses in boxes. 50 cm s^{-1}

Figure 8: Eddy kinetic energy contours.

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APPENDIX A

Individual Float Plots

A trajectory plot and a group of time series plots are presented for each float. The order of the time series plots is stick diagram, u and v velocity component overplot, and temperature and pressure overplot (where data are available). Plots were created for this section with the objective of best presenting the data for a particular float; thus the scales vary. For the time series plots, a common scale has been used for the time axis, but the y axis varies for each float according to the minima and maxima of the variable plotted. Two hundred days of data were plotted on each page. Float files of lengths greater than 200 days were continued on subsequent pages. The time axis is annotated with the last four digits of the Julian day and with the calendar months. Refer to the conversion chart (Appendix C) to convert Julian day to calendar day. Data points are marked daily.

A trajectory for each float is plotted on a mercator projection. For the longitude axis, negative numbers indicate longitudes west of the Greenwich Meridian. Along the trajectories, open circles denote the first float position, small dots mark the daily positions, large dots the tenth day, and every twentieth day is annotated with the last four digits of the Julian date.

Stick plots show velocity for every day of data. The stick length indicates the speed in cm s^{-1} , and the angle the stick makes with the horizontal axis represents the direction. North is toward the top of the page. The east and north components of velocity can be seen separately in overplots plotted to the same scale as the stick plots.

Temperature and pressure are overplotted, temperature on a centigrade scale marked on the left y axis, pressure in decibars marked on the right y axis. Pressure is plotted with deeper values at the bottom of the scale.

SITE L 123A

SITE L 123A

PLOT 1 OF 2
.FIN

SITE L 123A

SITE L 123A

SITE L 123A

SITE L 123A

SITE L 123A

SITE L 123B

SITE L 123B

SITE L 123B

SITE L 123B

SITE L 123B

SITE L 123B

SITE L 123B

SITE L 124A

SITE L 124A

SITE L 124A

SITE L 124A

SITE L 124B

SITE L 124B

JULY 1983

AUGUST

SEPTEMBER

OCTOBER

NOVEMBER

DECEMBER

SITE L 124B

SITE L 124B

SITE L 124B

SEPTEMBER 1985 OCTOBER NOVEMBER DECEMBER JANUARY 1986 FEBRUARY

SITE L 124B

SITE L 124B

SITE L 124B

SITE L 124B

SITE L 124B

SITE L 124B

SITE L 124B

SITE L 124B

SITE L 124B

SITE L 124B

SITE L 125A

SITE L 125A

SITE L 125A

SITE L 125A

SITE L 125B

JUNE 1983 JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

SITE L 125B

SITE L 125B

SITE L 125B

SITE L 125B

SITE L 125B

SITE L 125B

SITE L 125B

SITE L 125B

SITE L 126

SITE L 126

PLOT 1 OF 1
.DAT

1-JUN-87 10:40:55

SITE L 126

SITE L 127A

SITE L 127A

SITE L 127A

SITE L 127A

SITE L 127B

SITE L 127B

PLOT 1 OF 3
.FIN

SITE L 127B

SITE L 127B

SITE L 127B

SITE L 127B

SITE L 127B

SITE L 127B

SITE L 127B

SITE L 127B

66

SITE L 128

SITE L 128

SITE L 128

SITE L 128

SITE L 129

SITE L 129

SITE L 129

SITE L 129

SITE L 130A

SITE L 130A

SITE L 130A

SITE L 130A

SITE L 130B

SITE L 130B

JULY 1983 AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

SITE L 130B

SITE L 130B

SITE L 131A

SITE L 131A

PLOT 1 OF 1
.DAT

1-JUN-87 10:58:42

SITE L 131A

118

SITE L. 131A

SITE L 131B

SITE L 131B

PLOT 1 OF 1
.DAT

1-JUN-87 10:59:00

SITE L 131B

122

PLOT 1 OF 1
.DAT

1-JUN-87 10:58:59

SITE L 132A

SITE L 132A

PLOT 1 OF 1
.FIN

SITE L 132A

SITE L 132A

132B

SITE L 132B

JULY 1983 AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

SITE L 132B

SITE L 132B

SITE L 132B

131

PLOT 2 OF 2
.FIN

26-MAY-87 11:20:08

SITE L 132B

SITE L 132B

SITE L 132C

SITE L 132C

SITE L 132C

SITE L 132C

SITE L 132C

SITE L 132C

SITE L 132C

SITE L 132C

141

PLOT 1 OF 3
.FIN

SITE L 132C

SITE L 132C

SITE L 133A

144

SITE L 133A

PLOT 1 OF 1
.DAT

1-JUN-87 10:59:27

SITE L 133A

SITE L 133A

SITE L 133B

SITE L 133B

JULY 1983
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

SITE L 133B

PLOT 2 OF 2
.DAT

SITE L 133B

SITE L 133B

SITE L 133B

SITE L 133B

SITE L 134A

SITE L 134A

SITE L 134A

SITE L 134A

SITE L 134B

SITE L 134B

SITE L 134B

SITE L 134B

SITE L 135A

SITE L 135A

SITE L 135A

SITE L 135A

SITE L 135B

SITE L 135B

SITE L 135B

169

PLOT 2 OF 3
.FIN

SITE L 135B

SITE L 135B

SITE L 135B

SITE L 135B

SITE L 135B

174

SITE L 135B

175

TEMPERATURE [°C]

PRESSURE [db]

JULIAN DAY

JANUARY 1984
FEBRUARY
MARCH
APRIL
MAY
JUNE

SITE L 135B

176

SITE L 136

SITE L 136

SITE L 136

SITE L 136

SITE L 137A

JULY 1983 AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

SITE L 137A

SITE L 137A

SITE L 137A

SITE L 137A

SITE L 137A

187

SITE L 137B

SITE L 137B

PLOT 1 OF 1
.FIN

SITE L 137B

SITE L 137B

SITE L 138

SITE L 138

PLOT 1 OF 3
.FIN

SITE L 138

SITE L 138

SITE L 138

SITE L 138

SITE L 138

SITE L 138

SITE L 138

SITE L 138

SITE L 139

SITE L 139

PLOT 1 OF 3
.FIN

SITE L 139

SITE L 139

SITE L 139

SITE L 139

SITE L 139

SITE L 139

209

PLOT 1 OF 3
.FIN

SITE L 139

SITE L 140

SITE L 140

SITE L 140

SITE L 140

SITE L 140

SITE L 140

SITE L 140

SITE L 140

SITE L 140

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SITE L 140

SITE L 140

SITE L 140

SITE L 140

SITE L 140

SITE L 141

SITE L 141

SITE L 141

SITE L 142

SITE L 142

SITE L 142

PLOT 3 OF 3
.FIN

SITE L 141

234

SITE L 142

SITE L 142

SITE L 142

SITE L 142

SITE L 142

239

PLOT 1 OF 3
.FIN

SITE L 142

SITE L 142

241

SITE L 143

SITE L 143

SITE L 143

SITE L 143

SITE L 143

247

PLOT 1 OF 4
.FIN

26-MAY-87 11:25:45

SITE L 143

SITE L 143

SITE L 143

SITE L 143

SITE L 143

SITE L 143

253

PLOT 3 OF 4
.FIN

SITE L 143

254

APPENDIX B

Composite Trajectory Plots for November 1982-November 1984
(Mercator projection)

Twenty-five plots are presented showing float tracks acquired during the first two years of the Site L experiment. Arrows mark the current direction at ten day intervals. For the May 1983 plot, data is scarce since the ALS recorders reached the end of their tapes before the second ALS deployment, causing a loss of about one month of data.

SITE L FLOATS NOV 1982

SITE L FLOATS DEC 1982

SITE L FLOATS JAN 1983

The map shows the coastline of the Gulf of Mexico, with latitude and longitude coordinates. The study sites are marked with dots and labeled: SL125A, SL123, SL124, SL126, SL127A, SL128, and SL129. A scale bar indicates 200 km.

259

SITE L FLOATS MAR 1983

SITE L FLOATS APRIL 1983

SITE L FLOATS MAY 1983

SITE L FLOATS JUNE 1983

SITE L FLOATS JULY 1983

[illegible]

SITE L FLOATS SEPT 1983

SITE L FLOATS OCT 1983

SITE L FLOATS NOV 1983

SITE L FLOATS DEC 1983

SITE L FLOATS JAN 1984

271

SITE L FLOATS MAR 1984

SITE L FLOATS APR 1984

SITE L FLOATS MAY 1984

SITE L FLOATS JUNE 1984

SITE L FLOATS JULY 1984

SITE L FLOATS AUG 1984

SITE L FLOATS SEPT 1984

279

SITE L FLOATS NOV 1984

APPENDIX C

Calendar Conversion Tables -- 1982-1985

These tables give the year day and truncated Julian year day for each calendar date for the years 1982 through 1985. The truncated Julian year days range from 4971 to 6247. To convert to true Julian date, add 2440000.5 to these numbers.

JAN							FEB							MAR						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
3	4	5	6	7	8	9	7	8	9	10	11	12	13	7	8	9	10	11	12	13
4973	4974	4975	4976	4977	4978	4979	5008	5009	5010	5011	5012	5013	5014	5036	5037	5038	5039	5040	5041	5042
10	11	12	13	14	15	16	14	15	16	17	18	19	20	14	15	16	17	18	19	20
10	11	12	13	14	15	16	45	46	47	48	49	50	51	73	74	75	76	77	78	79
4980	4981	4982	4983	4984	4985	4986	5015	5016	5017	5018	5019	5020	5021	5043	5044	5045	5046	5047	5048	5049
17	18	19	20	21	22	23	21	22	23	24	25	26	27	21	22	23	24	25	26	27
17	18	19	20	21	22	23	52	53	54	55	56	57	58	80	81	82	83	84	85	86
4987	4988	4989	4990	4991	4992	4993	5022	5023	5024	5025	5026	5027	5028	5050	5051	5052	5053	5054	5055	5056
24	25	26	27	28	29	30	28							28	29	30	31			
24	25	26	27	28	29	30	59							87	88	89	90			
4994	4995	4996	4997	4998	4999	5000	5029							5057	5058	5059	5060			
31																				
31																				
5001																				

APR							MAY							JUN						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
4	5	6	7	8	9	10	2	3	4	5	6	7	8	6	7	8	9	10	11	12
94	95	96	97	98	99	100	122	123	124	125	126	127	128	157	158	159	160	161	162	163
5064	5065	5066	5067	5068	5069	5070	5092	5093	5094	5095	5096	5097	5098	5127	5128	5129	5130	5131	5132	5133
11	12	13	14	15	16	17	9	10	11	12	13	14	15	13	14	15	16	17	18	19
101	102	103	104	105	106	107	129	130	131	132	133	134	135	164	165	166	167	168	169	170
5071	5072	5073	5074	5075	5076	5077	5099	5100	5101	5102	5103	5104	5105	5134	5135	5136	5137	5138	5139	5140
18	19	20	21	22	23	24	16	17	18	19	20	21	22	20	21	22	23	24	25	26
108	109	110	111	112	113	114	136	137	138	139	140	141	142	171	172	173	174	175	176	177
5078	5079	5080	5081	5082	5083	5084	5106	5107	5108	5109	5110	5111	5112	5141	5142	5143	5144	5145	5146	5147
25	26	27	28	29	30		23	24	25	26	27	28	29	27	28	29	30			
115	116	117	118	119	120		143	144	145	146	147	148	149	178	179	180	181			
5085	5086	5087	5088	5089	5090		5113	5114	5115	5116	5117	5118	5119	5148	5149	5150	5151			
							30	31												
							150	151												
							5120	5121												

JUL							AUG							SEP						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
4 185 5155	5 186 5156	6 187 5157	7 188 5158	8 189 5159	9 190 5160	10 191 5161	1 213 5183	2 214 5184	3 215 5185	4 216 5186	5 217 5187	6 218 5188	7 219 5189	5 218 5218	6 249 5219	7 250 5220	8 251 5221	9 252 5222	10 253 5223	11 254 5224
11 192 5162	12 193 5163	13 194 5164	14 195 5165	15 196 5166	16 197 5167	17 198 5168	15 227 5197	16 228 5198	17 229 5199	18 230 5200	19 231 5201	20 232 5202	21 233 5203	12 255 5225	13 256 5226	14 257 5227	15 258 5228	16 259 5229	17 260 5230	18 261 5231
18 199 5169	19 200 5170	20 201 5171	21 202 5172	22 203 5173	23 204 5174	24 205 5175	22 234 5204	23 235 5205	24 236 5206	25 237 5207	26 238 5208	27 239 5209	28 240 5210	19 262 5232	20 263 5233	21 264 5234	22 265 5235	23 266 5236	24 267 5237	25 268 5238
25 206 5176	26 207 5177	27 208 5178	28 209 5179	29 210 5180	30 211 5181	31 212 5182	29 241 5211	30 242 5212	31 243 5213					26 269 5239	27 270 5240	28 271 5241	29 272 5242	30 273 5243		

OCT							NOV							DEC						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
3 276 5246	4 277 5247	5 278 5248	6 279 5249	7 280 5250	8 281 5251	9 282 5252	7 311 5281	8 312 5282	9 313 5283	10 314 5284	11 315 5285	12 316 5286	13 317 5287	5 339 5309	6 340 5310	7 341 5311	8 342 5312	9 343 5313	10 344 5314	11 345 5315
10 283 5253	11 284 5254	12 285 5255	13 286 5256	14 287 5257	15 288 5258	16 289 5259	14 318 5288	15 319 5289	16 320 5290	17 321 5291	18 322 5292	19 323 5293	20 324 5294	12 346 5316	13 347 5317	14 348 5318	15 349 5319	16 350 5320	17 351 5321	18 352 5322
17 290 5260	18 291 5261	19 292 5262	20 293 5263	21 294 5264	22 295 5265	23 296 5266	21 325 5295	22 326 5296	23 327 5297	24 328 5298	25 329 5299	26 330 5300	27 331 5301	19 353 5323	20 354 5324	21 355 5325	22 356 5326	23 357 5327	24 358 5328	25 359 5329
24 297 5267	25 298 5268	26 299 5269	27 300 5270	28 301 5271	29 302 5272	30 303 5273	28 332 5302	29 333 5303	30 334 5304					26 360 5330	27 361 5331	28 362 5332	29 363 5333	30 364 5334	31 365 5335	

31
304
5274

MAY[illegible]

1984

JAN							FEB							MAR						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7				1	2	3	4					1	2	3
1	2	3	4	5	6	7				32	33	34	35					61	62	63
5701	5702	5703	5704	5705	5706	5707				5732	5733	5734	5735					5761	5762	5763
8	9	10	11	12	13	14	5	6	7	8	9	10	11	4	5	6	7	8	9	10
8	9	10	11	12	13	14	36	37	38	39	40	41	42	64	65	66	67	68	69	70
5708	5709	5710	5711	5712	5713	5714	5736	5737	5738	5739	5740	5741	5742	5764	5765	5766	5767	5768	5769	5770
15	16	17	18	19	20	21	12	13	14	15	16	17	18	11	12	13	14	15	16	17
15	16	17	18	19	20	21	43	44	45	46	47	48	49	71	72	73	74	75	76	77
5715	5716	5717	5718	5719	5720	5721	5743	5744	5745	5746	5747	5748	5749	5771	5772	5773	5774	5775	5776	5777
22	23	24	25	26	27	28	19	20	21	22	23	24	25	18	19	20	21	22	23	24
22	23	24	25	26	27	28	50	51	52	53	54	55	56	78	79	80	81	82	83	84
5722	5723	5724	5725	5726	5727	5728	5750	5751	5752	5753	5754	5755	5756	5778	5779	5780	5781	5782	5783	5784
29	30	31					26	27	28	29				25	26	27	28	29	30	31
29	30	31					57	58	59	60				85	86	87	88	89	90	91
5729	5730	5731					5757	5758	5759	5760				5785	5786	5787	5788	5789	5790	5791
APR							MAY							JUN						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7			1	2	3	4	5							
92	93	94	95	96	97	98			122	123	124	125	126						1	2
5792	5793	5794	5795	5796	5797	5798			5822	5823	5824	5825	5826						153	154
8	9	10	11	12	13	14	6	7	8	9	10	11	12	3	4	5	6	7	8	9
99	100	101	102	103	104	105	127	128	129	130	131	132	133	155	156	157	158	159	160	161
5799	5800	5801	5802	5803	5804	5805	5827	5828	5829	5830	5831	5832	5833	5855	5856	5857	5858	5859	5860	5861
15	16	17	18	19	20	21	13	14	15	16	17	18	19	10	11	12	13	14	15	16
106	107	108	109	110	111	112	134	135	136	137	138	139	140	162	163	164	165	166	167	168
5806	5807	5808	5809	5810	5811	5812	5834	5835	5836	5837	5838	5839	5840	5862	5863	5864	5865	5866	5867	5868
22	23	24	25	26	27	28	20	21	22	23	24	25	26	17	18	19	20	21	22	23
113	114	115	116	117	118	119	141	142	143	144	145	146	147	169	170	171	172	173	174	175
5813	5814	5815	5816	5817	5818	5819	5841	5842	5843	5844	5845	5846	5847	5869	5870	5871	5872	5873	5874	5875
29	30						27	28	29	30	31			24	25	26	27	28	29	30
120	121						148	149	150	151	152			176	177	178	179	180	181	182
5820	5821						5848	5849	5850	5851	5852			5876	5877	5878	5879	5880	5881	5882

JUL							AUG							SEP						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
1 183 5883	2 184 5884	3 185 5885	4 186 5886	5 187 5887	6 188 5888	7 189 5889				1 214 5914	2 215 5915	3 216 5916	4 217 5917							1 245 5945
8 190 5890	9 191 5891	10 192 5892	11 193 5893	12 194 5894	13 195 5895	14 196 5896	5 218 5918	6 219 5919	7 220 5920	8 221 5921	9 222 5922	10 223 5923	11 224 5924	2 246 5946	3 247 5947	4 248 5948	5 249 5949	6 250 5950	7 251 5951	8 252 5952
15 197 5897	16 198 5898	17 199 5899	18 200 5900	19 201 5901	20 202 5902	21 203 5903	12 225 5925	13 226 5926	14 227 5927	15 228 5928	16 229 5929	17 230 5930	18 231 5931	9 253 5953	10 254 5954	11 255 5955	12 256 5956	13 257 5957	14 258 5958	15 259 5959
22 204 5904	23 205 5905	24 206 5906	25 207 5907	26 208 5908	27 209 5909	28 210 5910	19 232 5932	20 233 5933	21 234 5934	22 235 5935	23 236 5936	24 237 5937	25 238 5938	16 260 5960	17 261 5961	18 262 5962	19 263 5963	20 264 5964	21 265 5965	22 266 5966
29 211 5911	30 212 5912	31 213 5913					26 239 5939	27 240 5940	28 241 5941	29 242 5942	30 243 5943	31 244 5944		23 267 5967	24 268 5968	25 269 5969	26 270 5970	27 271 5971	28 272 5972	29 273 5973
														30 274 5974						
OCT							NOV							DEC						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
	1 275 5975	2 276 5976	3 277 5977	4 278 5978	5 279 5979	6 280 5980					1 306 6006	2 307 6007	3 308 6008							1 336 6036
7 281 5981	8 282 5982	9 283 5983	10 284 5984	11 285 5985	12 286 5986	13 287 5987	4 309 6009	5 310 6010	6 311 6011	7 312 6012	8 313 6013	9 314 6014	10 315 6015	2 337 6037	3 338 6038	4 339 6039	5 340 6040	6 341 6041	7 342 6042	8 343 6043
14 288 5988	15 289 5989	16 290 5990	17 291 5991	18 292 5992	19 293 5993	20 294 5994	11 316 6016	12 317 6017	13 318 6018	14 319 6019	15 320 6020	16 321 6021	17 322 6022	9 344 6044	10 345 6045	11 346 6046	12 347 6047	13 348 6048	14 349 6049	15 350 6050
21 295 5995	22 296 5996	23 297 5997	24 298 5998	25 299 5999	26 300 6000	27 301 6001	18 323 6023	19 324 6024	20 325 6025	21 326 6026	22 327 6027	23 328 6028	24 329 6029	16 351 6051	17 352 6052	18 353 6053	19 354 6054	20 355 6055	21 356 6056	22 357 6057
28 302 6002	29 303 6003	30 304 6004	31 305 6005				25 330 6030	26 331 6031	27 332 6032	28 333 6033	29 334 6034	30 335 6035		23 358 6058	24 359 6059	25 360 6060	26 361 6061	27 362 6062	28 363 6063	29 364 6064
														30 365 6065	31 366 6066					

1985

JAN							FEB							MAR						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5						1	2						1	2
		1	2	3	4	5						32	33						60	61
		6067	6068	6069	6070	6071						6098	6099						6126	6127
6	7	8	9	10	11	12	3	4	5	6	7	8	9	3	4	5	6	7	8	9
6	7	8	9	10	11	12	34	35	36	37	38	39	40	62	63	64	65	66	67	68
6072	6073	6074	6075	6076	6077	6078	6100	6101	6102	6103	6104	6105	6106	6128	6129	6130	6131	6132	6133	6134
13	14	15	16	17	18	19	10	11	12	13	14	15	16	10	11	12	13	14	15	16
13	14	15	16	17	18	19	41	42	43	44	45	46	47	69	70	71	72	73	74	75
6079	6080	6081	6082	6083	6084	6085	6107	6108	6109	6110	6111	6112	6113	6135	6136	6137	6138	6139	6140	6141
20	21	22	23	24	25	26	17	18	19	20	21	22	23	17	18	19	20	21	22	23
20	21	22	23	24	25	26	48	49	50	51	52	53	54	76	77	78	79	80	81	82
6086	6087	6088	6089	6090	6091	6092	6114	6115	6116	6117	6118	6119	6120	6142	6143	6144	6145	6146	6147	6148
27	28	29	30	31			24	25	26	27	28	29		24	25	26	27	28	29	30
27	28	29	30	31			55	56	57	58	59	60		83	84	85	86	87	88	89
6093	6094	6095	6096	6097			6121	6122	6123	6124	6125	6126		6149	6150	6151	6152	6153	6154	6155
														31						
														90						
														6156						

APR							MAY							JUN						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6				1	2	3	4							1
	91	92	93	94	95	96				121	122	123	124							152
	6157	6158	6159	6160	6161	6162				6187	6188	6189	6190							6218
7	8	9	10	11	12	13	5	6	7	8	9	10	11	2	3	4	5	6	7	8
97	98	99	100	101	102	103	125	126	127	128	129	130	131	153	154	155	156	157	158	159
6163	6164	6165	6166	6167	6168	6169	6191	6192	6193	6194	6195	6196	6197	6219	6220	6221	6222	6223	6224	6225
14	15	16	17	18	19	20	12	13	14	15	16	17	18	9	10	11	12	13	14	15
104	105	106	107	108	109	110	132	133	134	135	136	137	138	160	161	162	163	164	165	166
6170	6171	6172	6173	6174	6175	6176	6198	6199	6200	6201	6202	6203	6204	6226	6227	6228	6229	6230	6231	6232
21	22	23	24	25	26	27	19	20	21	22	23	24	25	16	17	18	19	20	21	22
111	112	113	114	115	116	117	139	140	141	142	143	144	145	167	168	169	170	171	172	173
6177	6178	6179	6180	6181	6182	6183	6205	6206	6207	6208	6209	6210	6211	6233	6234	6235	6236	6237	6238	6239
28	29	30					26	27	28	29	30	31		23	24	25	26	27	28	29
118	119	120					146	147	148	149	150	151		174	175	176	177	178	179	180
6184	6185	6186					6212	6213	6214	6215	6216	6217		6240	6241	6242	6243	6244	6245	6246
														30						
														181						
														6247						

JUL							AUG							SEP						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6					1	2	3	1	2	3	4	5	6	7
	182	183	184	185	186	187					213	214	215	244	245	246	247	248	249	250
	6248	6249	6250	6251	6252	6253					6279	6280	6281	6310	6311	6312	6313	6314	6315	6316
7	8	9	10	11	12	13	4	5	6	7	8	9	10	8	9	10	11	12	13	14
188	189	190	191	192	193	194	216	217	218	219	220	221	222	251	252	253	254	255	256	257
6254	6255	6256	6257	6258	6259	6260	6282	6283	6284	6285	6286	6287	6288	6317	6318	6319	6320	6321	6322	6323
14	15	16	17	18	19	20	11	12	13	14	15	16	17	15	16	17	18	19	20	21
195	196	197	198	199	200	201	223	224	225	226	227	228	229	258	259	260	261	262	263	264
6261	6262	6263	6264	6265	6266	6267	6289	6290	6291	6292	6293	6294	6295	6324	6325	6326	6327	6328	6329	6330
21	22	23	24	25	26	27	18	19	20	21	22	23	24	22	23	24	25	26	27	28
202	203	204	205	206	207	208	230	231	232	233	234	235	236	265	266	267	268	269	270	271
6268	6269	6270	6271	6272	6273	6274	6296	6297	6298	6299	6300	6301	6302	6331	6332	6333	6334	6335	6336	6337
28	29	30	31				25	26	27	28	29	30	31	29	30					
209	210	211	212				237	238	239	240	241	242	243	272	273					
6275	6276	6277	6278				6303	6304	6305	6306	6307	6308	6309	6338	6339					
OCT							NOV							DEC						
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5						1	2	1	2	3	4	5	6	7
		274	275	276	277	278						305	306	335	336	337	338	339	340	341
		6340	6341	6342	6343	6344						6371	6372	6401	6402	6403	6404	6405	6406	6407
6	7	8	9	10	11	12	3	4	5	6	7	8	9	8	9	10	11	12	13	14
279	280	281	282	283	284	285	307	308	309	310	311	312	313	342	343	344	345	346	347	348
6345	6346	6347	6348	6349	6350	6351	6373	6374	6375	6376	6377	6378	6379	6408	6409	6410	6411	6412	6413	6414
13	14	15	16	17	18	19	10	11	12	13	14	15	16	15	16	17	18	19	20	21
286	287	288	289	290	291	292	314	315	316	317	318	319	320	349	350	351	352	353	354	355
6352	6353	6354	6355	6356	6357	6358	6380	6381	6382	6383	6384	6385	6386	6415	6416	6417	6418	6419	6420	6421
20	21	22	23	24	25	26	17	18	19	20	21	22	23	22	23	24	25	26	27	28
293	294	295	296	297	298	299	321	322	323	324	325	326	327	356	357	358	359	360	361	362
6359	6360	6361	6362	6363	6364	6365	6387	6388	6389	6390	6391	6392	6393	6422	6423	6424	6425	6426	6427	6428
27	28	29	30	31			24	25	26	27	28	29	30	29	30	31				
300	301	302	303	304			328	329	330	331	332	333	334	363	364	365				
6366	6367	6368	6369	6370			6394	6395	6396	6397	6398	6399	6400	6429	6430	6431				

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16. Abstract (Limit: 200 words) <p>Lagrangian measurements of low frequency currents in the vicinity of the Gulf Stream and its recirculation region in the western Sargasso Sea were made by tracking SOFAR floats. These floats were tracked using acoustic time of arrival information from an array of five Autonomous Listening Stations (ALSSs) which were moored in the western Sargasso Sea. The ALSSs performed almost flawlessly, returning over 90 percent of the possible data.</p> <p>Floats were released in three deployments of seven floats each in November 1982, February 1983, and June 1983. The floats were launched in initially coherent arrays (approximately 20 km spacing) at 34°N, 70°W, Site "L", and were ballasted for 700 m depth. The SOFAR floats themselves functioned with somewhat less than expected reliability; four floats failed fairly soon after launch, and several other floats suffered failures of their temperature and pressure telemetry.</p> <p>The majority of the SOFAR floats launched in this program produced long, and interesting trajectories. These new data will be valuable for estimating first order flow statistics in the dynamically important recirculation region, for visualizing interactions between the Gulf Stream and the New England Seamount Chain, and for estimating one and two particle diffusivities in a region of very high eddy energy.</p>			
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