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GSO TECHNICAL REPORT 2000-2

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UCT OCEANOGRAPHY REPORT 2000-1

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BERICHTE aus dem INSTITUT FÜR MEERESKUNDE

an der CHRISTIAN-ALBRECHTS-UNIVERSITÄT – KIEL, IFM 318

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KAPEX RAFOS Float Data Report 1997-1999

Part A: The Agulhas- and South Atlantic Current Components

DOI 10.3289/IFM_BER_N318

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- October 2000 -

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Abstract

This data report presents trajectories and corresponding in-situ data for all acoustically tracked RAFOS floats that were deployed within the Agulhas and the South Atlantic Current components of KAPEX. KAPEX stands for Cape of Good Hope Experiment, Kaap die Goeie Hoop Eksperimente or Kap der Guten Hoffnung Experiment in the three languages of the participating authors. The objective of the program was to study the interocean exchange of subsurface waters south of Africa between the Atlantic and the Indian Oceans. A total of 92 floats were deployed during four cruises at depths between 100 – 1200 m during March 1997 and June 1998. It is the first time that eddy-resolving floats are used to measure ocean flow patterns at intermediate and thermocline levels off southern Africa.

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Introduction

This is the final data report of RAFOS float data collected by the Institut für Meereskunde, Kiel (IfM-Kiel), the University of Rhode Island (URI) and the University of Cape Town (UCT) during the 1997-1999 Cape of Good Hope Experiment (KAPEX) around southern Africa [Boebel et al., 1998a; Lutjeharms et al., 1997]. The objective of the program, funded by the National Science Foundation (USA) and the Bundesministerium für Bildung, Forschung und Technologie (Germany), was to study the interocean exchange of subsurface waters south of Africa between the Atlantic and Indian Oceans. Ninety-two floats were deployed at depths between 100 and 1200 m. The floats recorded arrival times of sound signals from moored sound sources, generally twice a day, together with measurements of the ambient pressure, temperature and in selected cases (URI floats) oxygen. Some IfM-Kiel floats acquired data only once per day to prolong their mission length, while the URI floats took additional pressure and temperature measurements every 6 hours.

Four separate float deployments took place: March/April 1997, December 1997, February 1998 and June 1998. On the first cruise on the RV Polarstern 35 IfM-Kiel floats were deployed in the Cape Basin [Boebel et al., 1998b]. The second cruise made use of SA KUSWAG V to deploy 17 URI floats off Port Elizabeth, South Africa. The third deployment was handled by scientists and crew of RV Dr. Fridtjof Nansen to deploy 4 IfM-Kiel and 6 URI floats off Walvis Bay, Namibia. The final cruise was onboard SA KUSWAG I to deploy 30 URI floats on two legs off Durban, South Africa. CTD casts were taken during all deployments from RV Polarstern and RV Dr. Fridtjof Nansen, while XBT data were collected during the Kuswag cruises. Float missions varied between several weeks and two years. The floats were tracked using a total of 11 sound sources manufactured by the Webb Research Corporation. The sources were deployed during the RV Polarstern cruises (March/April 1997 and March 1999) and two RV Seward Johnson cruises (August and September 1997).

Description of RAFOS Floats

The floats used in the project fall into two general categories: quasi-isobaric and isopycnal floats. Floats deployed by IfM Kiel are of the quasi-isobaric type and based on electronics provided by BathySystems of Rhode Island. The floats were assembled at the IfM Kiel from parts. Floats deployed by URI are of isopycnal character and based on the standard WOCE RAFOS float boards manufactured at URI. Floats were assembled at URI and supplemented with a compressee that provided a system compressibility close to that of seawater.

Float performance in terms of number of instruments returning to the surface and transmitting data versus the number instruments launched was 87% (80 out of 92 floats), which is about 5% below the usual rate. The lower rate is mostly due to the floats assigned to the Namibia deployment (4 lost out of 10), which is characterized by two handicaps; a) it used several reconstructed floats which were assembled from bits and pieces of floats that have either failed earlier rigorous testing or which had been used before and had eventually been recovered by coincidence; b) the floats were launched in fairly shallow water due to limitations of the cruise track.

Two other technical aspects of the IfM Kiel floats stand out. First, floats that **failed to transmit the whole data vector** (marked XMS in Table 1 and Table 5) carry without exception float numbers <= 200. This could indicate that some of the transmitter batteries used for this batch of floats were defective or past their shelf lifetime, and had less energy available than the batteries used for floats with higher serial numbers[1]. The second aspect concerns the floats' resistance to **corrosion and subsequent leakage**. Such a problem was experienced by 8 of the 37 floats produced in Kiel. The end plates and release plugs for these floats were of varying materials or had undergone different surface treatments. Endplates were usually made of German V4A grade stainless-steel, but endplate surfaces were electro-polished after the machining process in some cases while not in others . The release plug was either made of German V2A stainless-steel and painted, or from German V4A grade stainless-steel, which was explicitly shipped to the US for the manufacturing of the releases. From all floats that showed rapid sinking due to corrosion (marked PPP in Table 1, and Table 5), most featured an unpolished end-plate (6 floats with unpolished versus 2 floats with polished endplates) in combination with a German V4A release plugs (6 V4A versus 2 V2A). This should not lead to the conclusion that the V4A release plugs trigger corrosion, since we experienced corrosion with German V2A plugs as well in earlier experiments. The more plausible conclusion is that the unpolished (German V4A) end-plate is more prone to corrosion than the electro-polished version.

URI floats featured different materials (an anodized aluminum end plate for one) which mostly avoided the problems listed above (only one sinking float), but other problems occurred. An unusually large number of floats **lost their dropweights** (10 out of 53) after approximately 1 month, continuing their mission at the surface. Fish bite at the monofilament

[1] Note to the Kiel float development team: The color of the float data sheet binders indicates that a transition between production series occurred between float 200 and 201.

connection between compressee and float could be a possible explanation for this behavior, especially in light of the fact that all but one of these floats were ballasted for the shallower isopycnal (26.8 σ_θ), where fish-bite is more likely.

A substantial number of floats (15 out of 53) **surfaced early** due to the fact that the floats went to a greater than expected pressure which triggered the emergency release procedure. This behavior does not reflect a malfunctioning of the float (only 1 float URI shows signs of leakage), but the fact that the 27.2 σ_θ isopycnal, for which all these floats were ballasted, reached greater depths then originally anticipated from historic hydrographic data. In fact, this might be interpreted as scientific result, rather than as a grievance.

Float Ballasting

All IfM-Kiel floats were pre-ballasted at the Institut für Meereskunde an der Universität Kiel and fine-tuned to the depth of a salinity minimum onboard RV Polarstern after taking a CTD cast at the site of deployment. URI floats were ballasted for two density surfaces (σ_θ = 26.8 and 27.2) at the Graduate School of Oceanography, URI. These floats were not fine tuned at sea but used as ballasted at URI. For details of the ballasting procedures please refer to Rossby et al. [1986], König and Zenk [1992], Swift and Riser [1993], Boebel et al. [1995] and Anderson-Fontana et al. [1996].

Deployment of Sound Sources

The sound sources were built by Webb Research Corporation and have proven a reliable component over many years. The source were moored at depths between 800 and 1000 m, depending on the local depth of the sound channel. Most sourced functioned reliably for the duration of the study, but two sources failed prematurely. Source R3, deployed from RV Seward Johnson in September 1997 failed to transmit from the very beginning. No signals at all were received by any of the floats from this source. Sound Source K7 failed after a deployment period of 18 months. Signals from its ARGOS watchdog were received, indicating the at least the top flotation of the mooring broke loose, either causing the source to either sink beyond its crush depth or, if the failure occurred below the source, to rise with the flotation package to the surface. To compensate for the resulting loss of acoustic coverage an additional sound source (K11) was moored from RV Polarstern in March 1999. Mooring K10 was meanwhile successfully recovered in May 1999 by RV Polarstern.

The Kiel moorings were designed by Dieter Carlsen (IfM-Kiel), all other (WHOI and URI) moorings by John Kemp (WHOI). Table 6 lists the deployment dates and locations of the

sound sources mooring , and their transmission times. The parameter "-offset" refers to any offset that would have been directly measured prior to the source deployment, while "-add_offset" indicates clock offsets at launch time that have empirically been determined and proved to provide the most consistent tracking results. Note that these additional offsets have been used with the IfM-Kiel floats only, while they were set to 0 for tracking of the URI floats. The "-drift" parameter indicates sound source clock drifts empirically determined by comparing expected and measured time of arrivals prior to the float surfacing.

Deployment of Floats

The deployment strategy of the project was to capture the main constituents of water flowing into the Cape Basin (Figure 1). Water was expected to enter the Cape Basin from the south via the South Atlantic Current and from the east via the Agulhas Current leakage. The first KAPEX cruise departed Cape Town on March 21, 1997 [Boebel et al., 1998b] on RV Polarstern. This cruise served three main objectives: a) to capture the presumed inflow of Antarctic Intermediate Water (AAIW) from the western Atlantic into the Cape Basin across its southern and western boundaries (the Agulhas Ridge and southern Walvis Ridge, Figure 2); b) to reveal the meridional extent of the South Atlantic Current (Figure 1) and the presumed associated strong eastward intermediate depth flow along the Subtropical Convergence; and c) to study the early kinematic evolution of an Agulhas Ring near its formation site, the Agulhas Retroflection, and the influence of these rings on the intermediate water layer.

To capture the Cape Basin inflow (topic a) and the South Atlantic Current (topic b), 30 floats were distributed evenly along the southwestern and southern perimeter of the Cape Basin and along 3 quasi-meridional sections across the Subtropical Front/South Atlantic Current regime (Figure 1). Five additional floats were reserved for deployment into an Agulhas Ring (topic c), which was searched for and identified in upper layer velocity records from shipboard ADCP and thermocline depth measurements using 152 XBTs. CTD casts to depths between 1500 and 2000 m were taken prior to each RAFOS float deployment to enable the individual adjustment of the float's density and, accordingly, its initial drift depth, which was chosen to coincide with the local core depth of the AAIW layer.

For the purpose of capturing the inflow with the Agulhas Current, isopycnal RAFOS floats were launched into the core of the Agulhas Current. The first launch position was close to the city of Port Elizabeth (Figure 1), at the eastern end of the Agulhas Bank (KV, Figure 2) on December 3, 1997. Here the shelf is much wider than at the more northerly launch sites where subsequent deployments took place. The exact location of the current was first estab-

lished by contemporaneous satellite images in the thermal infrared and subsequently *in situ* by carrying out an XBT (expendable bathythermograph) section roughly at right angles to the coast. The inshore edge of the Agulhas Current was found more than 60 km offshore and the floats launched at distances between 62 and 80 km, i.e. well within the high speed jet of the current.

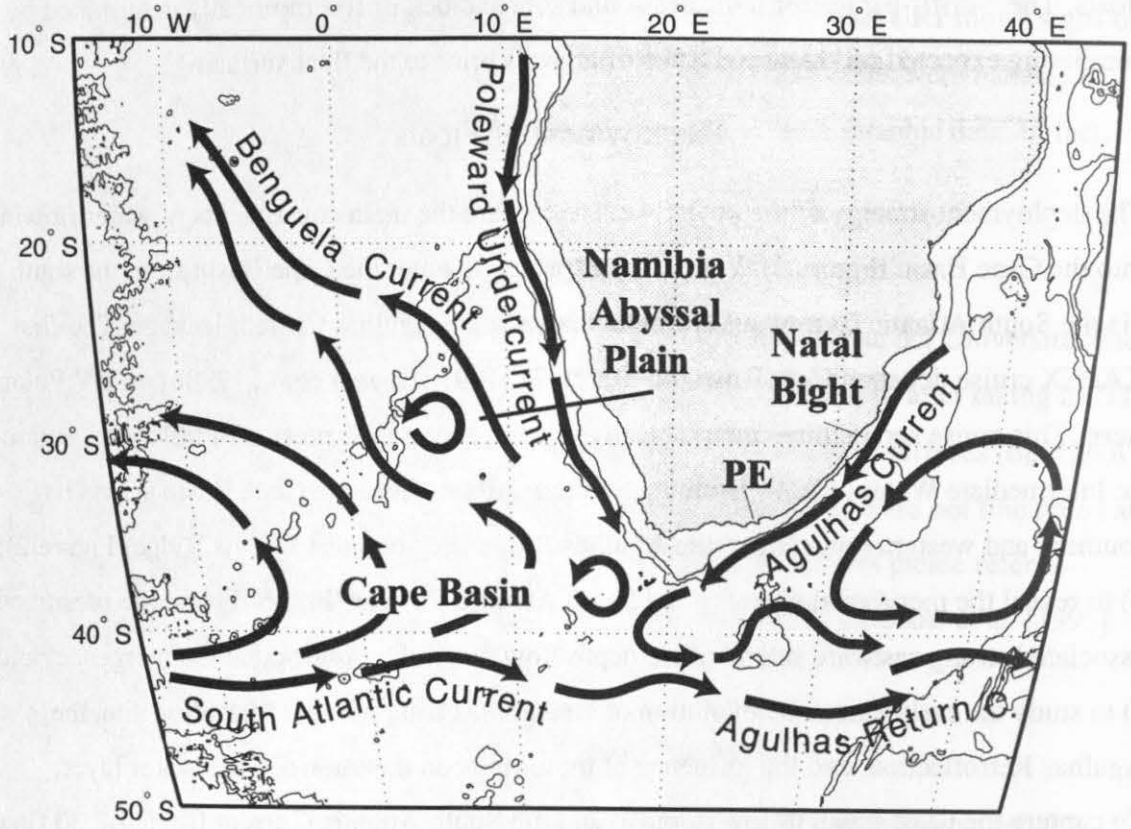

Figure 1: Schematic diagram of presumed thermocline and intermediate water flow around southern Africa. PE indicates the location of Port Elizabeth while the location of other relevant cities is given in Figure 2. Isobaths represent 0, 1000 and 3000m depths, with areas shallower than 1000m and 0m respectively hatched lighter (blue) and darker (ochre/yellow), for b/w or color display of the plot.

The next launch into the Agulhas Current took place on 13 and 15 June 1998. The first of these (KI, Figure 2) was at about 31 °S, south-west of Durban. Using XBTs, the landward border of the current was established using the definition used by *Gründlingh* [1983]. It is the intersection of the 200 m depth level and the 15°C isotherm. This was found at a distance of about 40 km from the shore on 13 June (Figure 2). Floats were then launched in 3 groups of 5 floats each at distances of 42 to 58 km offshore, where the 10° C isotherm intersected the 350 m, the 450 m and the 600 m isobath, to make sure they were well into the current.

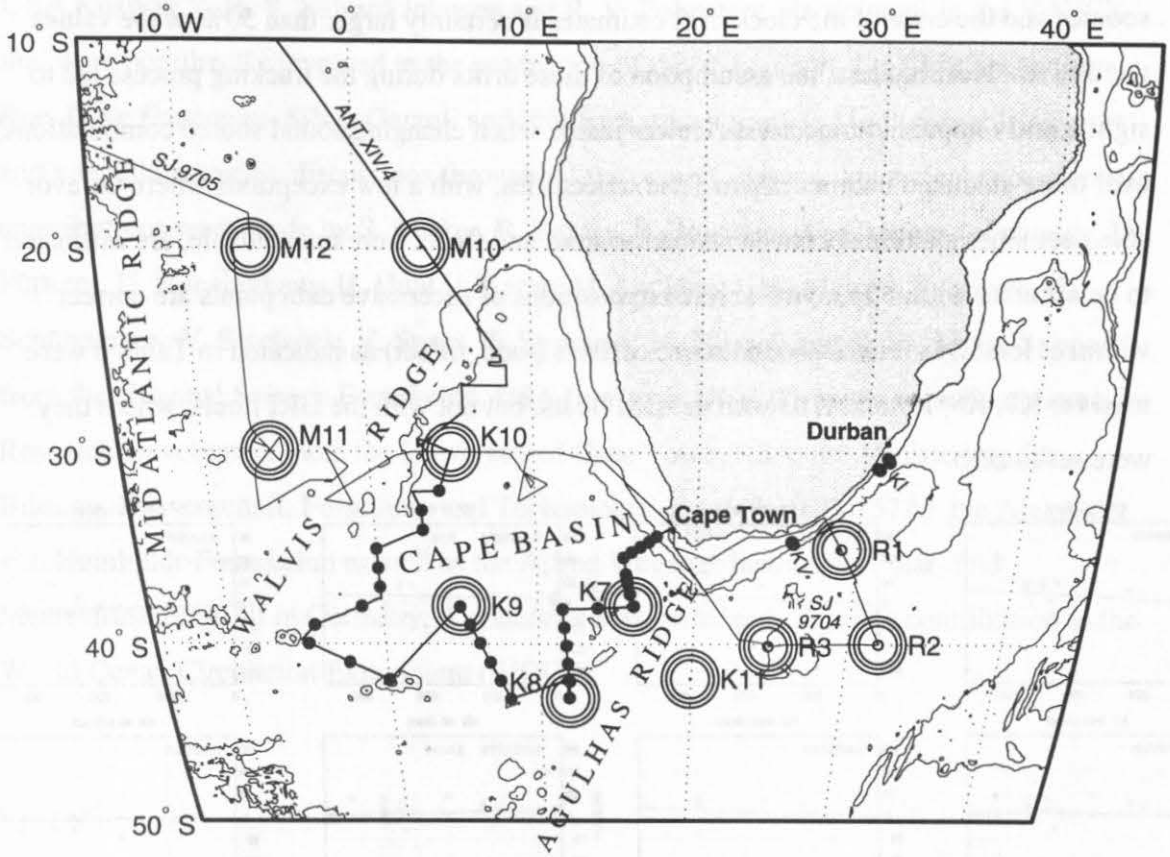

Figure 2: RAFOS float deployment sites and sound source locations. Sound sources are indicated by 3 concentric circles and straight lettering, float launch positions by solid dots. Cruise tracks are indicated by thin lines and labeled with italic letters. Isobaths as in Figure 1.

The launch positions on 15 June 1998 were about 100 km to the northeast of the previous site, directly off Durban and at a wider section of the shelf (Figure 2). The launch sites of 3 groups of floats were defined by the intersection of the 10° C isotherm and the 520 m, 620 m and 700 m isobath. Since the shelf slope is less steep here, the launch sites were farther offshore than at the previous location. The launch position at 700 m is believed to have been close to the maximum velocity core [Beal and Bryden, 1999] whereas the others were closer to its shoreward edge.

Float Tracking

Float tracking was performed using the newly developed ARTOA II GUI package for Matlab (contact oboebel@gso.uri.edu for a free version of this software). In a first step sound source drifts were determined from the observed difference between estimated and measured TOAs (times of arrival) at the first and last day (measurement) of the float's subsurface mission. The results were plotted and an estimate of the sound source drift made on a least square basis. Sound source drifts were small (less than 0.01 seconds per day) for all sound

sources and the error of the clock drift estimates is certainly larger than 50% of the values themselves. Nevertheless, the assumption of these drifts during the tracking process led to significantly improved trajectories (fewer jumps when changing sound source combinations) over those calculated without drifts. The trajectories, with a few exceptions where unfavorable geometric situations between sound sources and floats were unavoidable, are estimated to be accurate within 5 km, while relative positions of successive data points are correct within at least 2 km. Initial sound source offsets (-add_offset) as indicated in Table 6 were used for K7, K8, K9 and K10 with the IfM floats, but not with the URI floats, where they were set to zero.

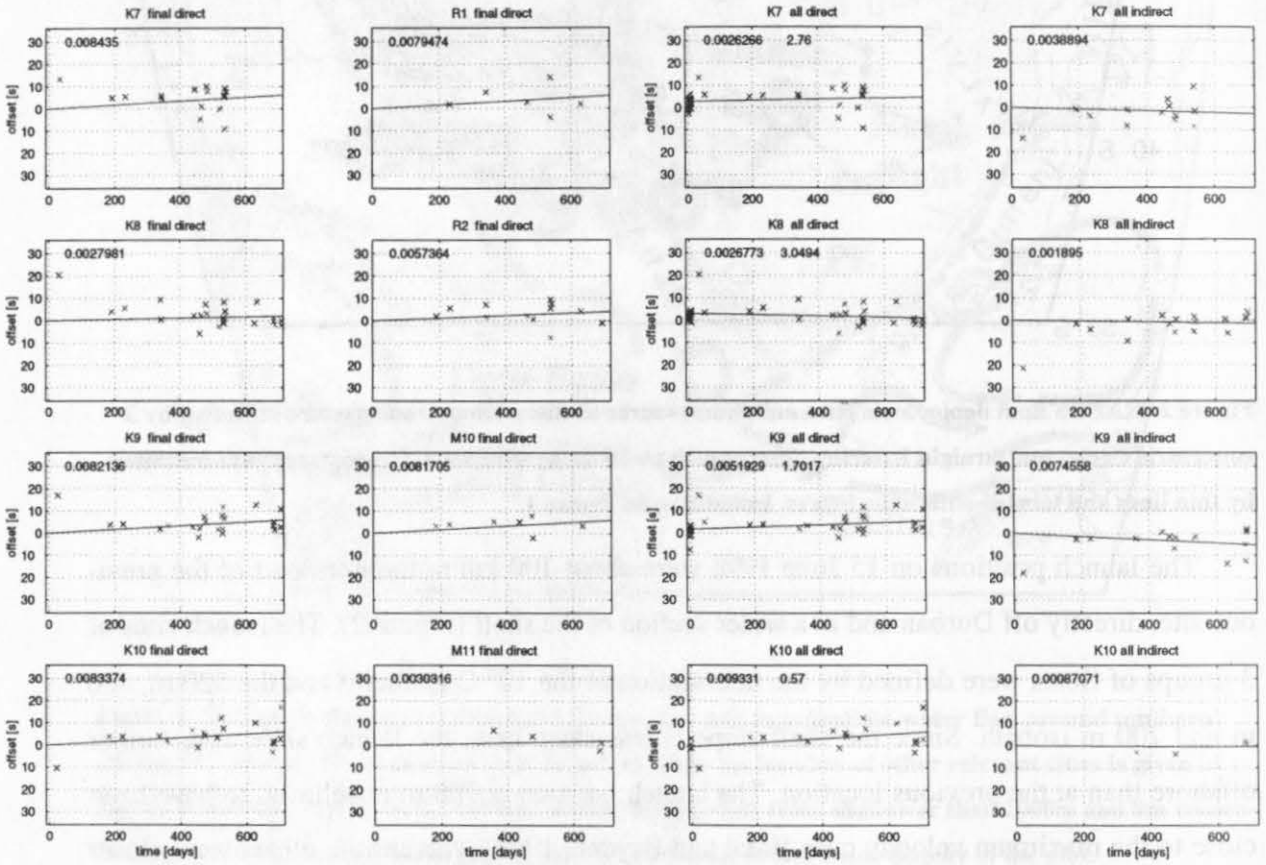

Figure 3: Sound source drift estimates. A drift and initial offset are calculated where possible "All direct" is based on the difference between measured and estimated sound signals arrival times for both, launch and surface times. "All indirect" is based on the difference between these initial and final offsets . "Final direct" is similar to "all direct", but includes only the TOA offsets at the surfacing of the float and assumes zero seconds offset between float and sound source at float launch time.

Acknowledgements

Excellent support by all officers and crews of vessels involved in the KAPEX is greatly appreciated. These vessels were, in alphabetical order, R. V. Dr. Fridtjof Nansen, SA Kuswag

I, SA Kuswag V, R. V. Seward Johnson and R. V. Polarstern. Participants in the KAPEX that were not directly involved in the production of this data report, i.e. Chris Duncombe Rae, Dave Fratantoni, Silvia Garzoli and Phil Richardson provided indispensable support and valuable scientific discussions throughout the project. Essential technical and scientific contributions were made by S. Becker, R. Berger, P. Bouchard, D. Carlsen, J. Fontaine, D. Fütterer, U. Hueninghaus, H. Hunt, J. Kemp, M. Lankhorst, M. Menzel, P. Meyer, H. Schünemann, V. Smetacek, V. Strass, T. Strømme, M. Nielsen and C. Wooding. Support from the National Science Foundation, USA (grant no. OCE-96-17986); the Foundation for Research Development and the University of Cape Town, RSA; the Ministerium für Bildung, Wissenschaft, Forschung und Technologie (grant Nr. 03F0157A), the Alexander von Humboldt-Foundation as well as the Alfred Wegener Institut für Polar- und Meeresforschung, all in Germany, is gratefully acknowledged. This is a contribution to the World Ocean Circulation Experiment (WOCE).

Tables

Table 1: Launch parameters of floats deployed during ANT XIV/2 on RV Polarstern. The table indicates the float's serial number, the target pressure, temperature and density, its listening schedule and the final status (DNS = did not show, AOK = all OK, XMS= ARGOS transmission short, PPP = emergency pressure release, BAT = main mission battery low).

.	*latitude*	*longitude*	*location*	*pressure [dbar]*	*temperature [°C]*	$\sigma_{p.T.S.}$ *[g cm^{-3}]*	*listening schedule*	*status*
IfM-117	34°59.33'S	00°00.47'W	leg e	950	3.92	31.62	00:30	DNS
IfM-176	34°51.35'S	16°30.99'E	leg a	651	4.27	30.23	00:30	AOK
IfM-183	36°16.08'S	15°38.49'E	leg a, AR	1049	5.13	32.01	00:30	XMS
IfM-184	36°45.57'S	15°45.54'E	leg a, AR	849	8.33	30.76	00:30	XMS
IfM-185	38°04.21S	13°49.50'E	leg b	961	4.24	31.60	00:30	XMS
IfM-186	34°18.51'S	17°32.27'E	leg	650	4.71	30.17	00:30; 12:30	XMS/PPP
IfM-195	34°35.35'S	17°02.86'E	leg a	676	4.28	30.34	00:30; 12:30	XMS
IfM-196	35°07.11'S	15°58.92'E	leg a	651	5.04	30.21	00:30; 12:30	XMS
IfM-199	35°24.01'S	15°28.39'E	leg a	649	4.60	30.13	00:30; 12:30	XMS
IfM-200	36°26.39'S	15°41.39'E	leg a, AR	1048	4.96	31.98	00:30; 12:30	XMS
IfM-201	33°00.06'S	03°00.91'E	leg e	900	4.41	31.33	04:30; 12:30; 20:30;	BAT
IfM-202	31°59.07'S	04°09.50'E	leg e	899	4.41	31.36	00:30	AOK
IfM-203	40°05.59'S	11°47.15'E	leg c	802	3.14	31.00	00:30	AOK
IfM-204	42°56.12'S	11°55.20'E	leg c	602	4.01	29.95	00:30	AOK
IfM-205	40°59.62'S	06°46.10'E	leg d	652	4.10	30.19	00:30	AOK
IfM-206	38°00.30'S	05°01.63'E	leg d	751	4.44	30.60	00:30	AOK
IfM-207	40°00.14'S	05°02.96'W	leg e	801	3.60	30.60	00:30	AOK
IfM-208	36°59.10'S	00°00.30'W	leg e	901	3.93	31.36	00:30	AOK
IfM-210	35°59.91'S	00°00.17'W	leg e	899	4.22	31.33	00:30	DNS
IfM-215	36°36.52'S	15°43.06'E	leg a, AR	1050	5.35	31.97	00:30; 12:30	AOK
IfM-216	37°19.56'S	15°54.00'E	leg a, AR	901	7.25	31.07	00:30; 12:30	PPP
IfM-217	37°58.44'S	16°08.07'E	leg a, AR	839	4.63	31.00	00:30; 12:30	AOK
IfM-218	38°07.91'S	11°34.88'E	leg c	875	4.60	31.16	00:30; 12:30	PPP
IfM-219	39°07.73'S	11°40.56'E	leg c	839	4.26	31.06	00:30; 12:30	PPP
IfM-220	41°03.81'S	11°51.30'E	leg c	596	3.75	29.95	00:30; 12:30	AOK
IfM-221	42°01.94'S	11°57.15'E	leg c	801	3.38	30.95	00:30; 12:30	AOK
IfM-222	42°59.47'S	08°00.01'E	leg d	701	3.59	30.45	00:30; 12:30	PPP
IfM-223	41°59.59'S	07°22.61'E	leg d	749	3.71	30.66	00:30; 12:30	PPP
IfM-224	39°57.59'S	06°09.96'E	leg d	800	3.69	30.90	00:30; 12:30	BAT
IfM-225	38°58.88'S	05°35.57'E	leg d	750	3.93	30.65	00:30; 12:30	AOK
IfM-226	41°56.82'S	00°01.17'W	leg e	749	4.13	30.61	00:30; 12:30	AOK
IfM-227	40°59.67'S	02°31.24'W	leg e	800	3.89	30.87	00:30; 12:30	PPP
IfM-228	39°00.18'S	04°29.98'W	leg e	803	3.66	30.92	00:30; 12:30	DNS
IfM-229	37°59.88'S	01°18.25'W	leg e	799	3.68	30.90	00:30; 12:30	AOK
IfM-230	34°00.13'S	03°00.15'E	leg e	901	4.27	31.37	00:30	AOK

Table 2: Agulhas float launch parameters, launched from RV KUSWAG V on December 3, 1997. All floats listened twice a day for sound signals (00:30; 12:30). Abbreviations as in Table 1, with DWL = drop weight lost, and JAM = jammed compressee.

	latitude [°S]	*longitude [°E]*	*location*	*launched with*	σ_T	*status*
URI-446	34°41.55'	26°00.36'	center	449, 457, 481, 483, 484, 485, 487	27.2	AOK
URI-449	34°41.58'	26°00.14'	center	446, 457, 481, 483, 484, 485, 487	26.8	AOK
URI-457	34°41.59'	25°58.87'	center	446, 449, 481, 483, 484, 485, 487	27.2	AOK
URI-481	34°41.59'	25°58.17'	center	446, 449, 457, 483, 484, 485, 487	26.8	PPP
URI-483	34°41.58'	25°58.54'	center	446, 449, 457, 481, 484, 485, 487	27.2	DWL
URI-484	34°41.61'	25°57.88'	center	446, 449, 457, 481, 483, 485, 487	26.8	DWL
URI-485	34°41.56'	25°59.79'	center	446, 449, 457, 481, 483, 484, 487	27.2	PPP
URI-486	34°34.01'	25°53.65'	extreme inshore	490, 493 495	27.2	PPP
URI-487	34°41.59'	25°59.49'	center	446, 449, 457, 481, 483, 484, 485	26.8	DNS
URI-488	34°38.79'	25°55.46'	inshore	489, 491, 492, 494	27.2	DNS
URI-489	34°41.56'	25°59.16'	center	488, 491, 492, 494	26.8	JAM
URI-490	34°33.89'	25°53.37'	extreme inshore	486, 493, 495	26.8	AOK
URI-491	34°38.77'	25°56.04'	inshore	488, 489, 492, 494	26.8	AOK
URI-492	34°38.76'	25°55.79'	inshore	488, 489, 491, 494	26.8	AOK
URI-493	34°33.86'	25°53.24'	extreme inshore	486, 490, 495	26.8	DWL
URI-494	34°38.79'	25°55.28'	inshore	488, 489, 491, 492	27.2	PPP
URI-495	34°33.97'	25°53.51'	extreme inshore	486, 490, 493	27.2	PPP

Table 3: Launch parameters of floats set from aboard RV Fridtjof Nansen (Namibia Floats). Abbreviation as above, XSC = transmission scrambled due to data overflow. Abbreviations as in Table 1 and Table 2.

float no.	*latitude*	*longitude*	*location*	*launched with*	*density*	*pressure [dbar]*	*temperature [°C]*	*listening schedule*	*status*
IfM-92	20°47.38'S	11°45.06'E	north	471	31.6	900	3.4	00:30; 12:30	AOK
IfM-182	21°47.27'S	12°19.91'E	south	470	31.6	900	3.4	00:30	PPP
IfM-470	21°47.27'S	12°19.91'E	south	182	31.6	900	3.4	00:30	DNS
IfM-471	20°47.38'S	11°45.06'E	north	92	31.6	900	3.4	00:30	DNS
URI-439	21°50.18'S	12°52.76'E	inshore	450	26.8			00:30; 12:30	XSC
URI-450	21°50.18'S	12°52.76'E	inshore	439	26.8			00:30; 12:30	DNS
URI-454	21°52.12'S	12°42.38'E	offshore	470	26.8			00:30; 12:30	XSC
URI-470	21°52.12'S	12°42.38'E	offshore	454	26.8			00:30; 12:30	DWL
URI-478	21°52.00'S	12°47.47'E	center	482	26.8			00:30; 12:30	AOK
URI-482	21°52.00'S	12°47.47'E	center	478	27.2			00:30; 12:30	DNS

Table 4: Launch parameters of Agulhas float set from RV KUSWAG I on June 13 and 15, 1998. All floats listened twice a day for sound signals (00:30; 12:30). Abbreviations as in Table 1

float no.	*latitude*	*longitude*	*location*	*launched with*	σ_T	*status*
URI-496	30°17.9'S	31°19.9'E	inshore/north	498, 504, 503, 499	26.8	AOK
URI-498	30°17.8'S	31°19.9'E	inshore/north	496, 504, 503, 499	27.2	PPP
URI-499	30°17.7'S	31°19.9'E	inshore/north	496, 498, 504, 503	27.2	AOK
URI-500	30°21.8'S	31°26.5'E	center/north	512, 509, 505, 501	27.2	PPP
URI-501	30°21.9'S	31°26.5'E	center/north	512, 509, 505, 500	27.2	PPP
URI-503	30°17.7'S	31°19.9'E	inshore/north	496, 498, 504, 499	26.8	AOK
URI-504	30°17.8'S	31°19.9'E	inshore/north	496, 498, 503, 499	26.8	DWL
URI-505	30°21.9'S	31°26.4'E	center/north	512, 509, 501, 500	27.2	PPP
URI-506	30°29.4'S	31°29.6'E	offshore/north	514, 513, 508, 507	27.2	PPP
URI-507	30°29.4's	31°29.5'E	offshore/north	514, 513, 508, 506	27.2	PPP
URI-508	30°29.5'S	31°29.4'E	offshore/north	514, 513, 507, 506	27.2	AOK
URI-509	30°22.0'S	31°26.4'E	center/north	512, 505, 501, 500	26.8	AOK
URI-511	30°47.7'S	30°47.1'E	extreme inshore/south	515, 516, 517, 518	27.2	PPP
URI-512	30°22.0'S	31°26.3'E	center/north	509, 505, 501, 500	26.8	AOK
URI-513	30°29.5'S	31°29.5'E	offshore/north	514, 508, 507, 506	26.8	AOK
URI-514	30°29.5'S	31°29.4'E	offshore/north	513, 508, 507, 506	26.8	DNS
URI-515	30°47.3'S	30°47.4'E	extreme inshore/south	516, 517, 511, 518	26.8	DWL
URI-516	30°47.5'S	30°47.3'E	extreme inshore/south	515, 517, 511, 518	26.8	DWL
URI-517	30°47.6'S	30°47.2'E	extreme inshore/south	515, 516, 511, 518	27.2	PPP
URI-518	30°47.8'S	30°46.9'E	extreme inshore/south	515, 516, 517, 511	26.8	DWL
URI-519	30°49.8'S	30°51.5'E	inshore/south	523, 522, 525, 521	27.2	AOK
URI-521	30°49.9'S	30°51.4'E	inshore/south	523, 522, 525, 519	27.2	DNS
URI-522	30°49.5'S	30°51.9'E	inshore/south	523, 525, 519, 521	26.8	DWL
URI-523	30°49.4'S	30°52.0'E	inshore/south	522, 525, 519, 521	26.8	AOK
URI-524	30°52.1'S	30°55.5'E	center/south	529, 527, 524, 528	26.8	DWL
URI-525	30°49.6'S	30°51.7'E	inshore/south	523, 522, 519, 521	27.2	PPP
URI-526	30°51.7'S	30°55.8'E	center/south	529, 527, 524, 528	26.8	DWL
URI-527	30°51.5'S	30°55.8'E	center/south	529, 526, 525, 528	27.2	PPP
URI-528	30°52.2'S	30°55.4'E	center/south	529, 527, 526, 524	27.2	PPP
URI-529	30°51.0'S	30°56.2'E	center/south	527, 526, 524, 528	26.8	DNS

Table 5: Technical float parameters and (subjective) comments regarding float performance after evaluation of float data. Abbreviations as in Table 1 and Table 2. Duration gives the programmed mission length, endurance the useful days of data retrieved. The term "sinks" refers to instances where a leakage results in an increasing float weight and hence sinking, whereas "descend" refers to mostly isopycnal floats following deepening isopycnals to their bail out pressure. No leakages are assumed in this latter case. Note that "V4A" and "G" both identify V4A releases, but describe notes taken independently at the lab and just prior to the float launch.

	software	*release*	*end-plate*	*duration [days]*	*endurance [days]*	*comments*
IfM-92	4th-93	V2A		180	157	AOK
IfM-117	4th-93	V2A/raw		360	0	DNS
IfM-176	12D3	V2A/green	raw	720	718	AOK
IfM-182	12D3	V2A		720	311	rises after 4 months, probably due to weight loss caused by corrosion, sinks after 10 months: PPP
IfM-183	12D3	green		720	717	XMS
IfM-184	12D3	green	polished	720	715	XMS
IfM-185	12D3	V2A/white	raw	540	538	XMS
IfM-186	12D4	V2A/white	raw	540	526	XMS, PPP, sinks after 16 months
IfM-195	12D4	V2A/white	raw	540	531	XMS
IfM-196	12D4	V2A/white	polished	540	532	XMS
IfM-199	12D4	V2A/white	polished	540	538	XMS
IfM-200	12D4	V2A/blank	polished	540	535	XMS
IfM-201	4th-93	V4A/G		30	23	BAT; float interface defect, float on default mission, starting at 12:30.
IfM-202	4th-93	V4A/G		360	358	AOK
IfM-203	12D3	V4A	raw	540	537	AOK
IfM-204	12D3	V4A/G	raw	630	627	AOK
IfM-205	12D3	V4A/G	polished	690	686	AOK
IfM-206	12D3	V4A/G	polished	690	687	AOK
IfM-207	12D3	V4A/G	raw	690	688	AOK
IfM-208	12D3	V4A/G		690	687	AOK, sank during the last two months of missions, but finished mission before reaching bail out pressure.
IfM-210	12D3	V4A	polished	690	0	DNS
IfM-215	12D4	V4A/V4A		540	535	AOK
IfM-216	12D4	V4A/V4A		540	464	sinks after 13 moths: PPP
IfM-217	12D4	V4A/G	polished	540	538	AOK
IfM-218	12D4	V4A/G	polished	540	343	sinks after 10 months: PPP
IfM-219	12D4	G		540	342	sinks after 9 months: PPP

IfM-220	12D4	G	polished	540	537	AOK
IfM-221	12D4	G	polished	540	537	AOK
IfM-222	12D4	V4A/G		540	464	sinks after 14 months: PPP
IfM-223	12D4	V4A/G		540	206	sinks after 6 months: PPP
IfM-224	12D4	V4A/G		480	229	surfaces early, reason unclear, no PPP, classified as BAT due to lack of other evidence or better ideas.
IfM-225	12D4	V4A/G	polished	480	478	AOK
IfM-226	12D4	V4A/G		540	536	AOK
IfM-227	12D4	V4A/G	polished	540	440	sinks after 10 months: PPP
IfM-228	12D4	V4A/G		480	0	DNS
IfM-229	12D4	V4A/G		480	478	AOK
IfM-230	12D3	V4A.G		630	627	AOK
IfM-470	4th-SeaScan		anodized	360	0	DNS
IfM-471	4th-SeaScan		anodized	360	0	DNS
URI-439	4th		anodized	570	0	transmission scrambled (mission too long)
URI-446	4th		anodized	60	58	AOK
URI-449	4th		anodized	60	58	AOK, but incorrect temperature : T deleted
URI-450	4th		anodized	360	0	DNS
URI-454	4th		anodized	570	0	transmission scrambled (mission too long)
URI-457	4th		anodized	360	340	AOK
URI-470	4th		anodized	570	93	on surface after 3 months, continued mission to day 454, bails out with unexplained 'too deep' flag
URI-478	4th		anodized	360	96	TOAs lost after 2 ½ months, possibly grounded, gradual rise to surface months 5-8, mission end on surface
URI-481	4th		anodized	360	134	sinks after 4 months: PPP
URI-482	4th		anodized	570	0	DNS
URI-483	4th		anodized	540	12	drop-weight lost after 2 weeks, completes mission at surface
URI-484	4th		anodized	540	5	drop-weight lost after 2 weeks, completes mission at surface
URI-485	4th		anodized	660	322	descends to emergency release pressure: PPP after 10 ½ months
URI-486	4th		anodized	540	108	descends to emergency release pressure: PPP after 3 ½ months
URI-487	4th		anodized	660	0	DNS
URI-488	4th		anodized	360	0	DNS
URI-489	4th		anodized	540	23	JAM: compressee jammed near surface after 3 weeks, finished most of mission on or near surface.
URI-490	4th		anodized	60	44	AOK
URI-491	4th		anodized	360	358	AOK
URI-492	4th		anodized	540	538	AOK

URI-493	4th	anodized	660	43	on surface after ½ months, ended mission early after 524 of nominal 660 days (reason unclear).
URI-494	4th	anodized	540	183	descend to emergency release pressure: PPP after 6 months
URI-495	4th	anodized	660	137	descends to emergency release pressure: PPP after 3 ½ months
URI-496	4th	anodized	270	268	AOK
URI-498	4th	anodized	270	96	descends to emergency release pressure: PPP after 3 months
URI-499	4th	anodized	270	269	AOK
URI-500	4th	anodized	450	12	descends to emergency release pressure: PPP after ½ month
URI-501	4th	anodized	270	36	descends to emergency release pressure: PPP after 1 month
URI-503	4th	anodized	360	359	AOK
URI-504	4th	anodized	450	379	at surface after 380 days (lost dropweight), finishes 450 day mission
URI-505	4th	anodized	360	27	descends to emergency release pressure: PPP after 1 month
URI-506	4th	anodized	450	26	descends to emergency release pressure: PPP after 1 months
URI-507	4th	anodized	270	66	descends to emergency release pressure: PPP after 2 months
URI-508	4th	anodized	360	359	AOK
URI-509	4th	anodized	270	269	AOK
URI-511	4th	anodized	450	30	descends to emergency release pressure: PPP after 2 ½ months
URI-512	4th	anodized	360	359	AOK
URI-513	4th	anodized	450	449	AOK
URI-514	4th	anodized	270	0	DNS
URI-515	4th	anodized	360	25	on surface after 50 days, lost dropweight
URI-516	4th	anodized	450	25	on surface after 50 days, lost dropweight
URI-517	4th	anodized	270	20	descends to emergency release pressure: PPP after 2 months
URI-518	4th	anodized	270	27	on surface after 30 days, lost dropweight
URI-519	4th	anodized	360	359	AOK, past sound source range at end of mission
URI-521	4th	anodized	450	0	DNS
URI-522	4th	anodized	360	16	on surface after 30 days, lost dropweight
URI-523	4th	anodized	450	408	AOK
URI-524	4th	anodized	270	70	on surface after 2 ½ months, lost dropweight
URI-525	4th	anodized	270	19	descends to emergency release pressure: PPP after 2 months
URI-526	4th	anodized	360	33	on surface after 35 days, lost dropweight
URI-527	4th	anodized	360	26	descends to emergency release pressure: PPP after 68 days
URI-528	4th	anodized	450	27	descends to emergency release pressure: PPP after 29 days
URI-529	4th	anodized	450	0	DNS

Table 6: Sound source parameters used to track KAPEX floats. For explanations of the parameters "-drift", "-offset" and "-add_offset" see chapter "Deployment of Sound Sources".

-sourcename	*K7*	*K8*	*K9*	*K10*
-sourcetype	WEBB	WEBB	WEBB	WEBB
-sourceowner	IfM Kiel	IfM Kiel	IfM Kiel	IfM Kiel
-position	37.988°S 16.095°E	42.960°S 11.972°E	37.983°S 5.085°E	30.002°S 5.007°E
-depth	1000	1000	1000	1000
-begemis	1997 3 24 12 0	1997 3 26 12 0	1997 3 29 12 0	1997 4 4 12 0
-endemis	1998 9 20 12 0			1999 5 14 12 0
-offset	1997 3 24 0	1997 3 26 0	1997 3 29 0	1997 4 4 0
-drift	0.008	0.003	0.008	0.008
-reftime	1 30	1 0	0 30	1 0
-schedule	12	12	12	12
-signallength	80	80	80	80
-add_offset	2.8	3.0	1.7	0
-sound_speed	1481	1477	1478	1480

-sourcename	*K11*	*R1*	*R2*	*R3*
-sourcetype	WEBB	WEBB	WEBB	WEBB
-sourceowner	IfM Kiel	URI	URI	URI
-position	41.893°S 19.933°E	34.976°S 29.018°E	40.005°S 31.994°E	40.117°S 24.889°E
-depth	1000	1000	1000	1000
-begemis	1999 3 21 00 0	1997 8 30 00 0	1997 8 27 0 0	1997 8 25 0 0
-endemis				1997 8 25 0 0
-offset	1999 3 21 0	1997 8 30 0	1997 8 27 0	1997 8 25 0
-drift	0.000	0.005	0.006	0.000
-reftime	0 30	1 30	1 0	0 30
-schedule	12	12	12	12
-signallength	80	80	80	80
-add_offset	NaN	NaN	NaN	NaN
-sound_speed	1478	1489	1484	1482

-sourcename	*M10*	*M11*	*M12*
-sourcetype	WEBB	WEBB	WEBB
-sourceowner	WHOI	WHOI	WHOI
-position	19.935°S 3.942°E	29.986°S -5.978°E	20.010°S -6.024°E
-depth	736	1000	1000
-begemis	1997 4 8 12 0	1997 9 16 12 0	1997 9 20 12 0
-endemis			
-offset	1997 4 8 0	1997 9 16 0	1997 9 20 0
-drift	0.008	0.003	0.000
-reftime	0 30	1 30	1 0
-schedule	12	12	12
-signallength	80	80	80
-add_offset	NaN	NaN	NaN
-sound_speed	1480	1480	1480

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Figure 4: Summary plot of isobaric (IfM-Kiel) RAFOS float trajectories. Isobaths as in Figure 1.

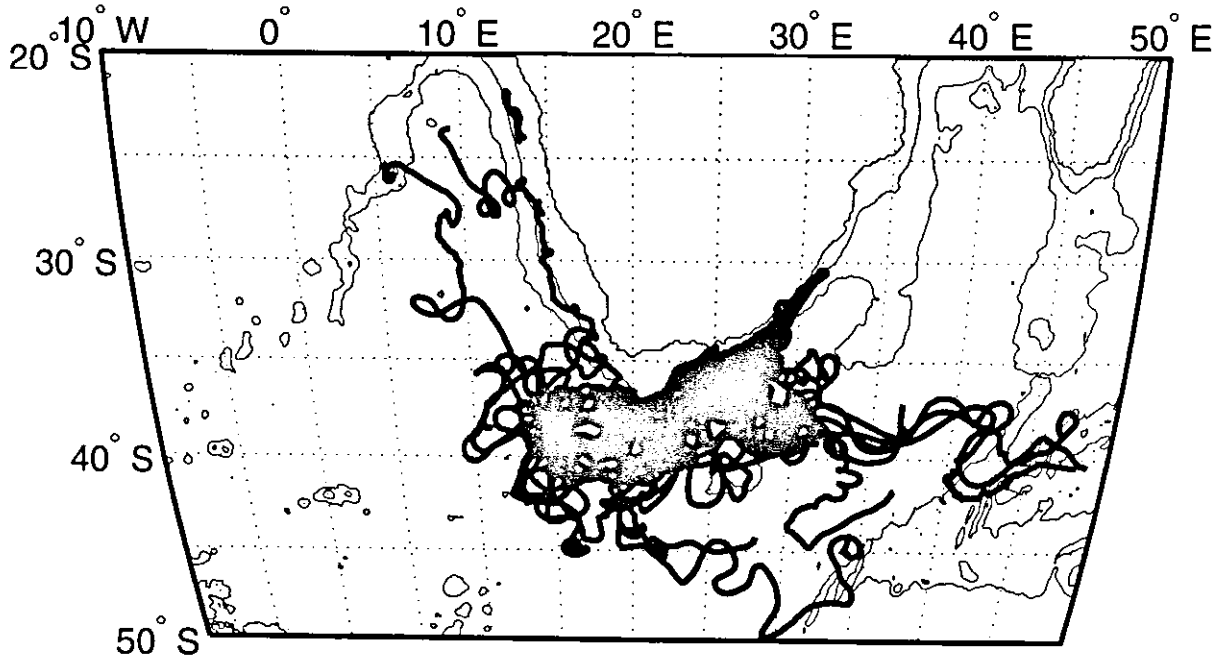
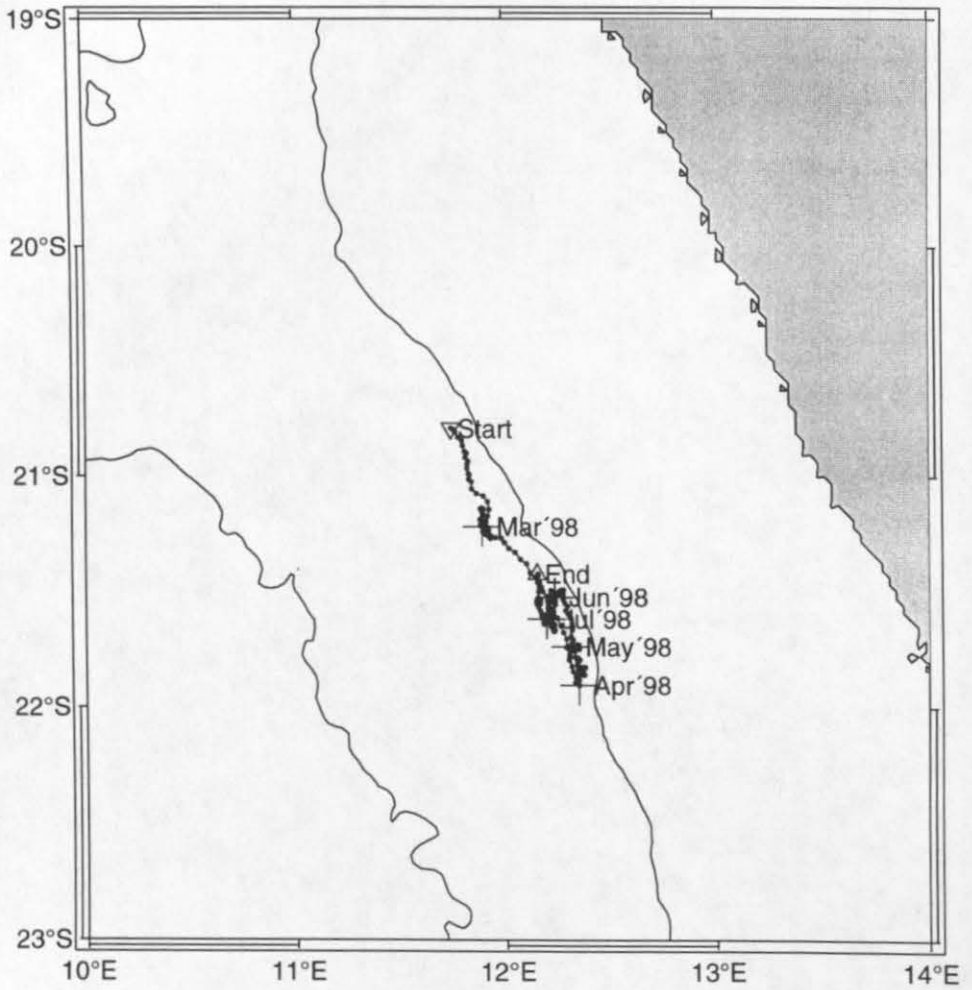
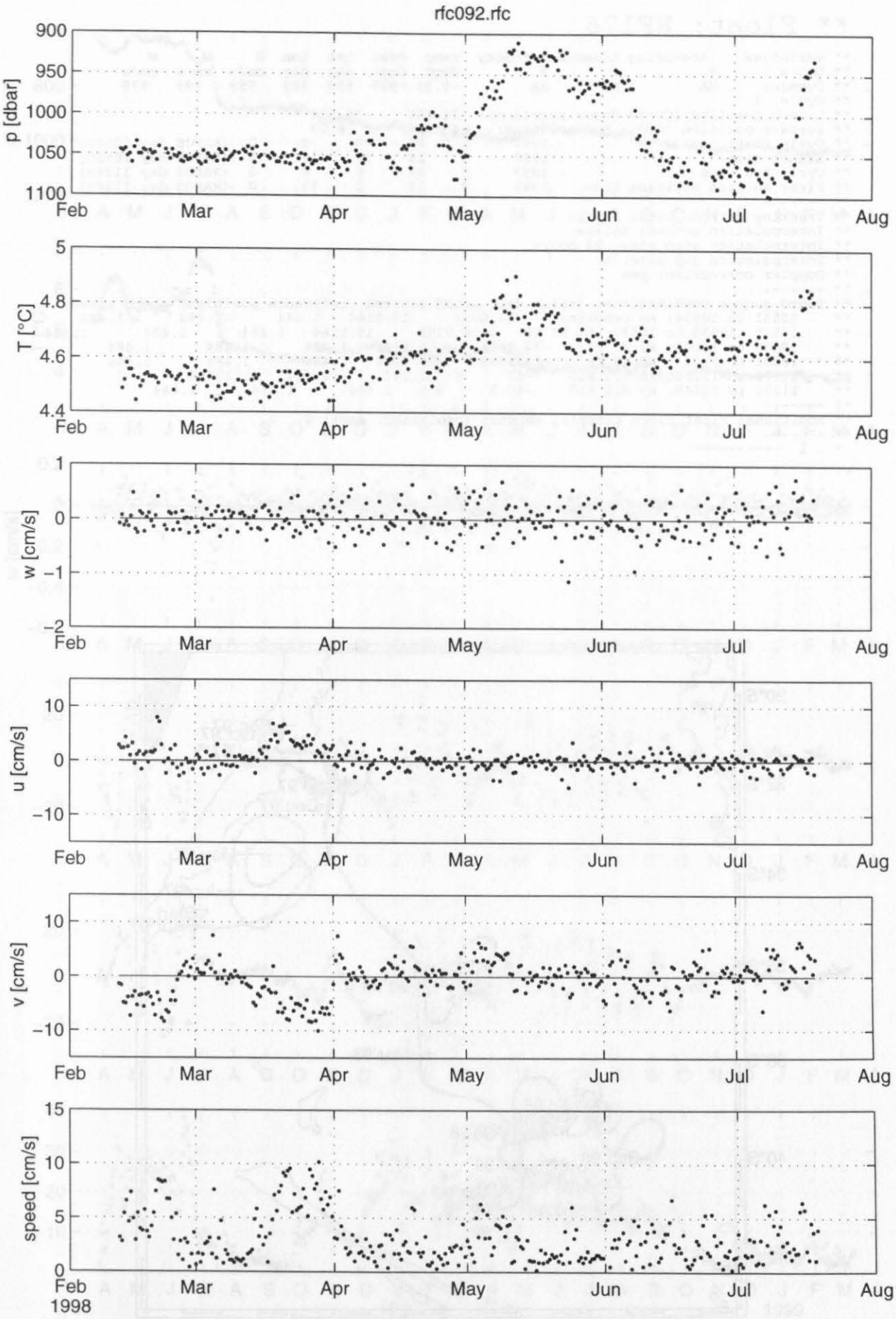


Figure 5: Summary plot of isopycnal (URI) RAFOS floats. Isobaths on this plot and on all consecutive trajectory plots as in Figure 1.

** Float: RF092

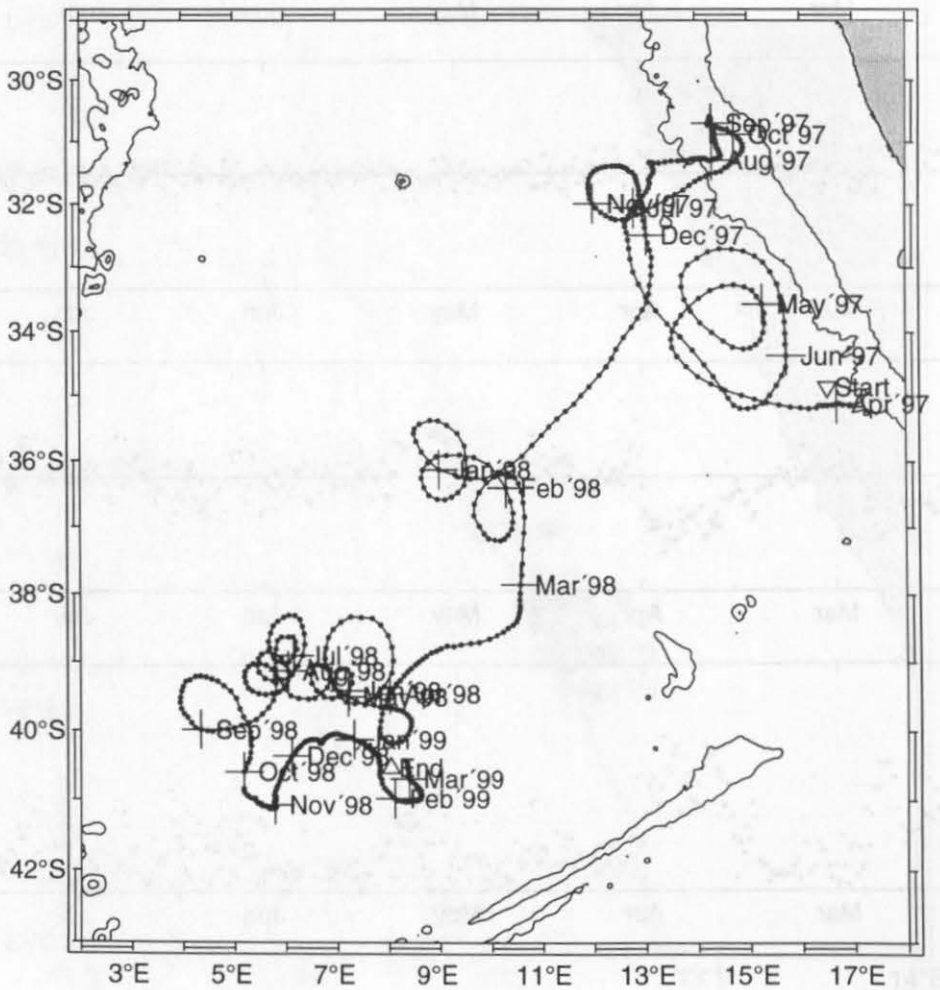
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat   Lon   U     V     W
** Units     : #          #       #         degC  dbar  deg   deg   cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999   999    999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -20.79     11.751
** Surface position (Cycle End position) : -21.42     12.156
** Cycle Start time             : 1998     1    20    12     0     0   (RAFOS day 10834.5)
** Launch time                  : 1998     2    11    20    17     0   (RAFOS day 10856)
** Cycle End time               : 1998     7    19     0     0     0   (RAFOS day 11014)
** First surface Position time  : 1998     7    19     2    37     0   (RAFOS day 11014)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10857 to 11014: M10 K10    -20.7896      11.751   1.49       1.49       1.49
** -------
** Additional Float clock offsets, seconds (beginning, end): 6   -12
** -------
*   1  ----------
```

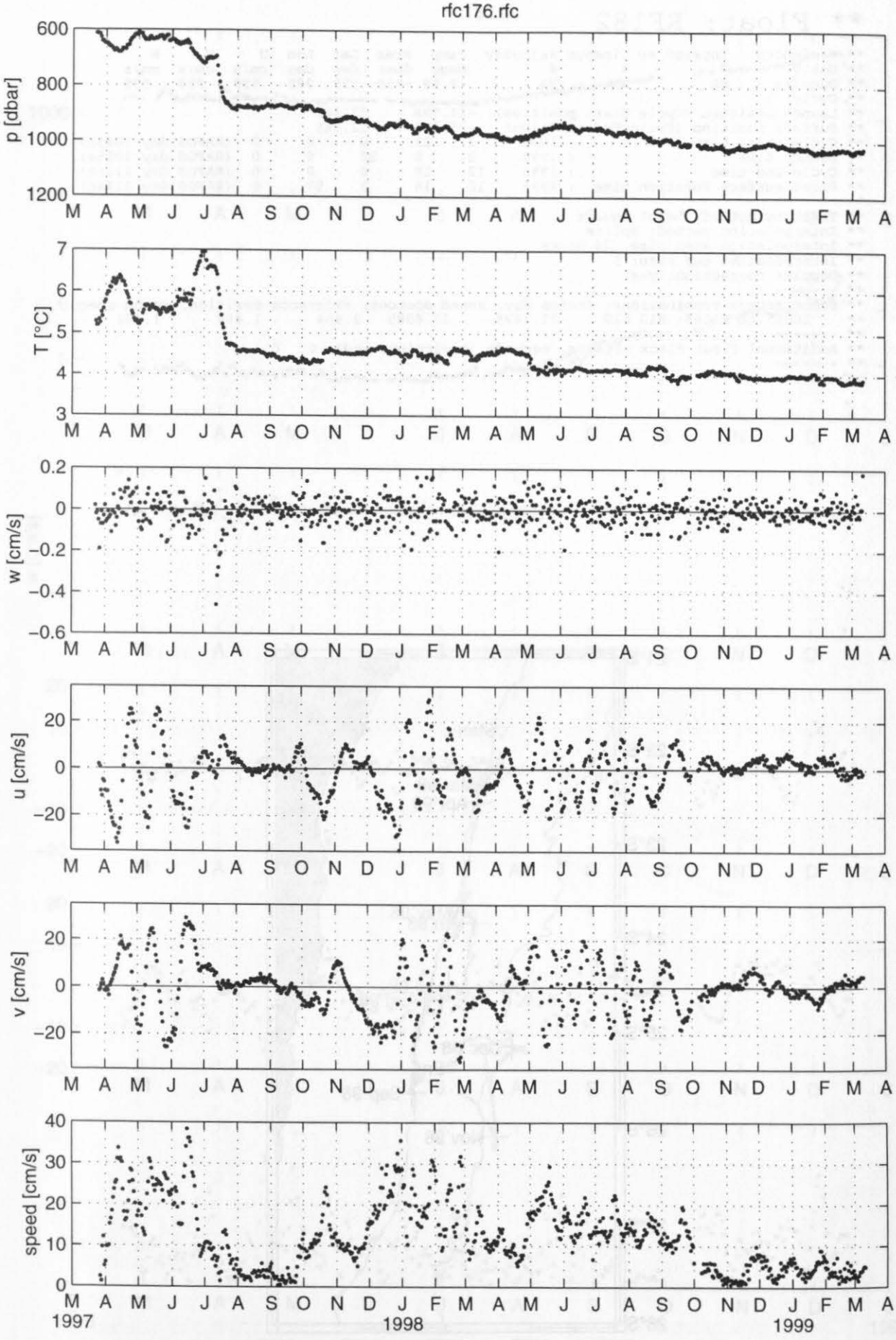



rfc092.rfc
p [dbar]
900
950
1000
1050
1100
T [°C]
5
4.8
4.6
4.4
w [cm/s]
1
0
−1
−2
u [cm/s]
10
0
−10
v [cm/s]
10
0
−10
speed [cm/s]
15
10
5
0
Feb
1998
Mar
Apr
May
Jun
Jul
Aug

** Float: RF176

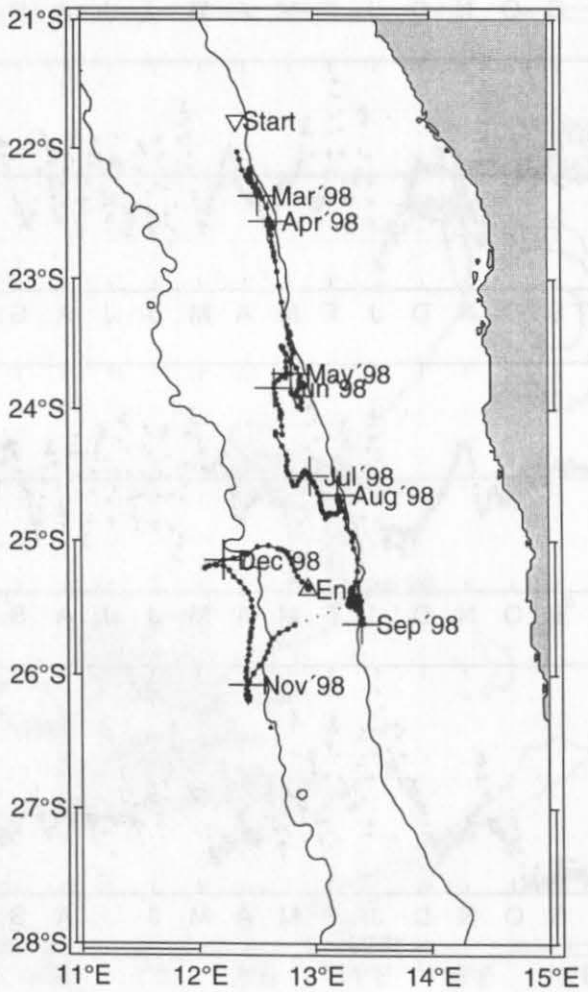
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.856     16.516
** Surface position (Cycle End position) : -40.536      8.03
** Cycle Start time             : 1997    3    22     0     0     0   (RAFOS day 10530)
** Launch time                  : 1997    3    22    16    30     0   (RAFOS day 10530)
** Cycle End time               : 1999    3    11     0     0     0   (RAFOS day 11249)
** First surface Position time  : 1999    3    11     2    39     0   (RAFOS day 11249)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10531 to 10534: no tracking    -34.0058     16.5164   1.484      1.484      1.484
**    10535  10535 to 10537: K7 K8 K8    -34.9558     16.5164   1.484      1.484      1.484
**    10538 to 10800: K7 K9 K9     -34.9558     16.5164   1.484      1.484      1.484
**    10801 to 11077: K7 K8 K8     -34.9558     16.5164   1.484      1.484      1.484
**    11078 to 11150: K8 K10 K10     -42      6   1.484      1.484      1.484
**    11151 to 11249: K8 K10 K10     -40.3     6.2   1.484      1.484      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

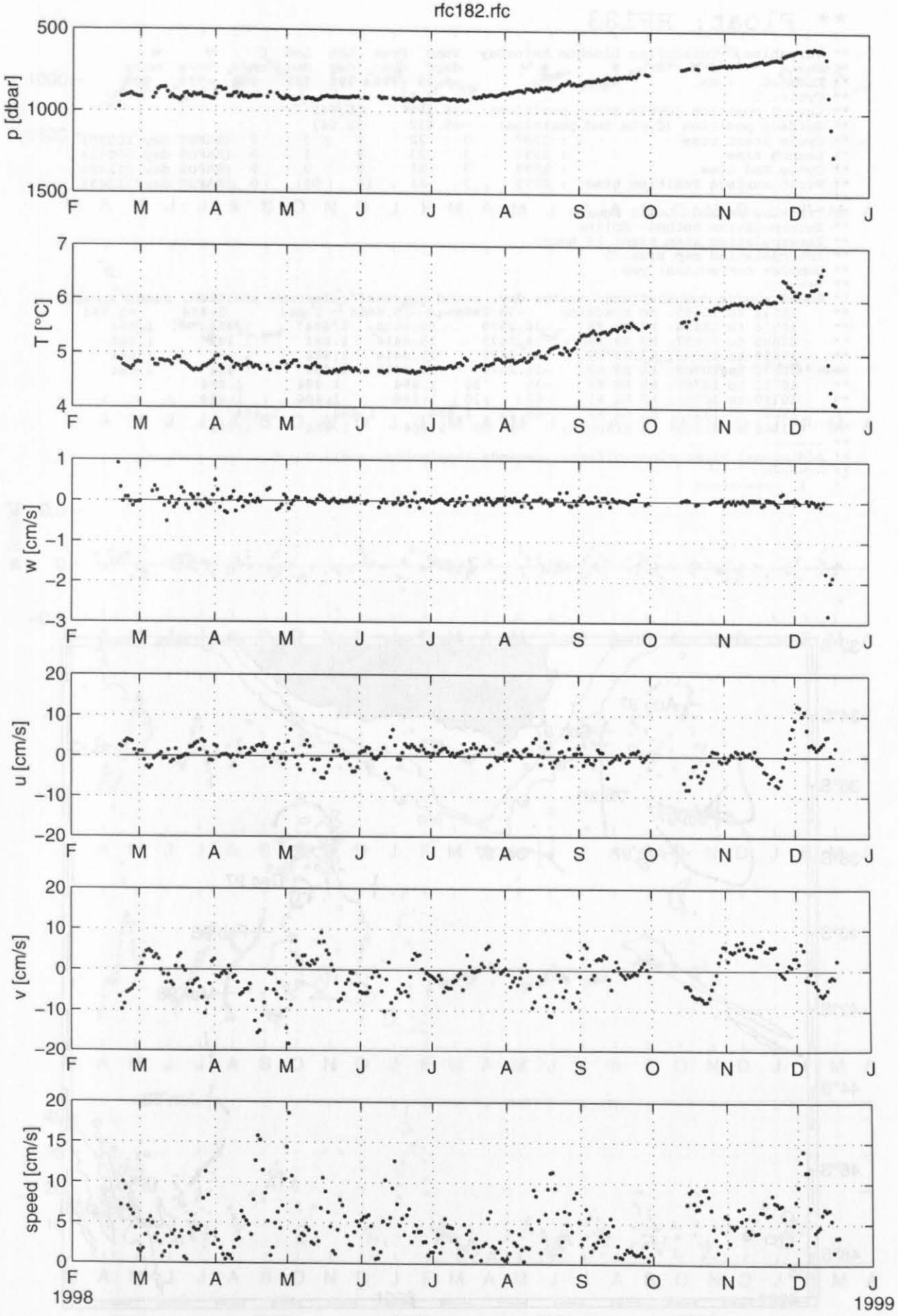



rfc176.rfc
p [dbar]
T [°C]
w [cm/s]
u [cm/s]
v [cm/s]
speed [cm/s]
M A M J J A S O N D J F M A M J J A S O N D J F M A
1997
1998
1999

** Float: RF182

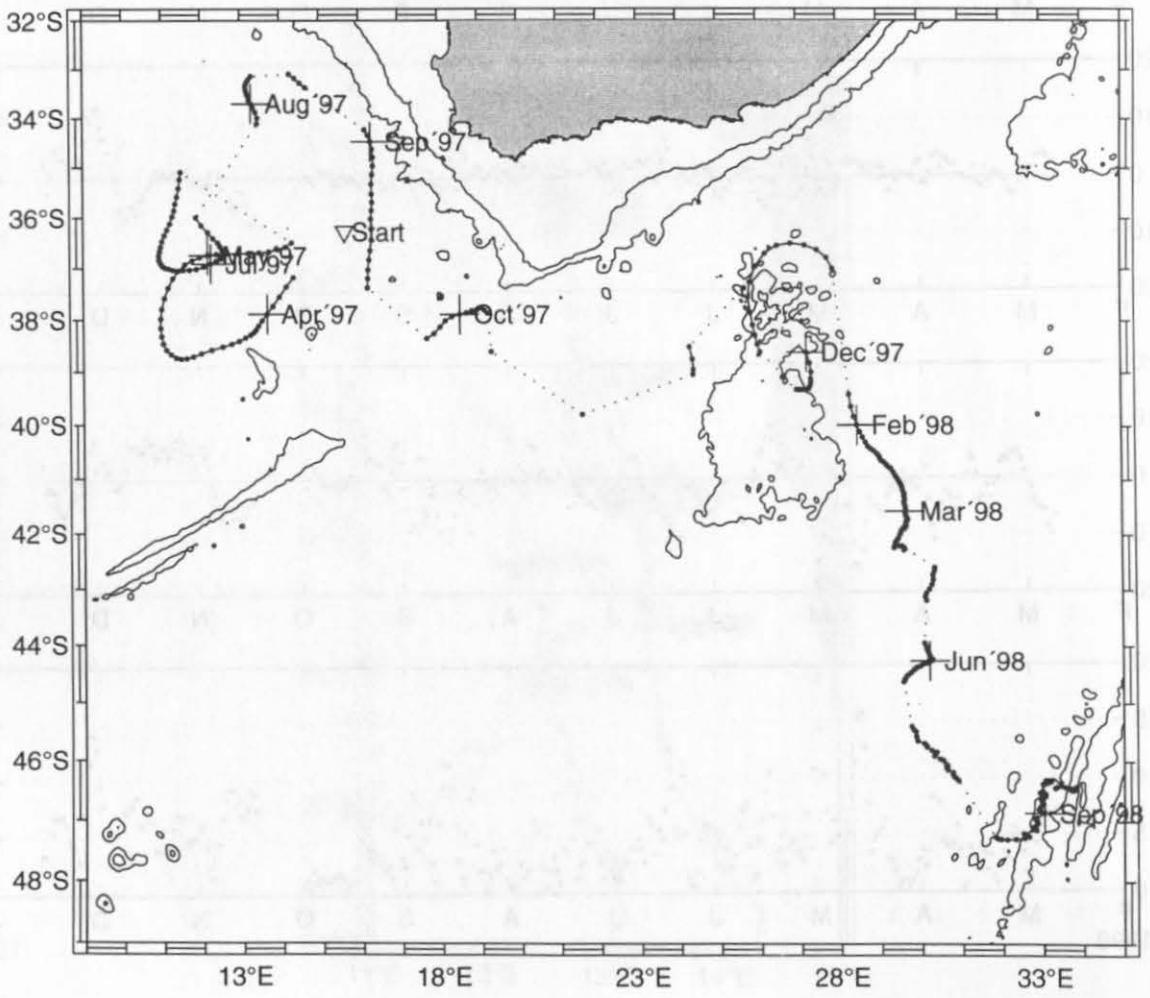
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -21.788     12.332
** Surface position (Cycle End position) : -25.359     12.945
** Cycle Start time              : 1998    1    21     0     0     0   (RAFOS day 10835)
** Launch time                   : 1998    2     9    22     8     0   (RAFOS day 10854)
** Cycle End time                : 1998   12    18     0     0     0   (RAFOS day 11166)
** First surface Position time   : 1998   12    18     2    57     0   (RAFOS day 11166)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10855 to 11166: M10 K10    -21.7878     12.4985   1.484      1.484      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

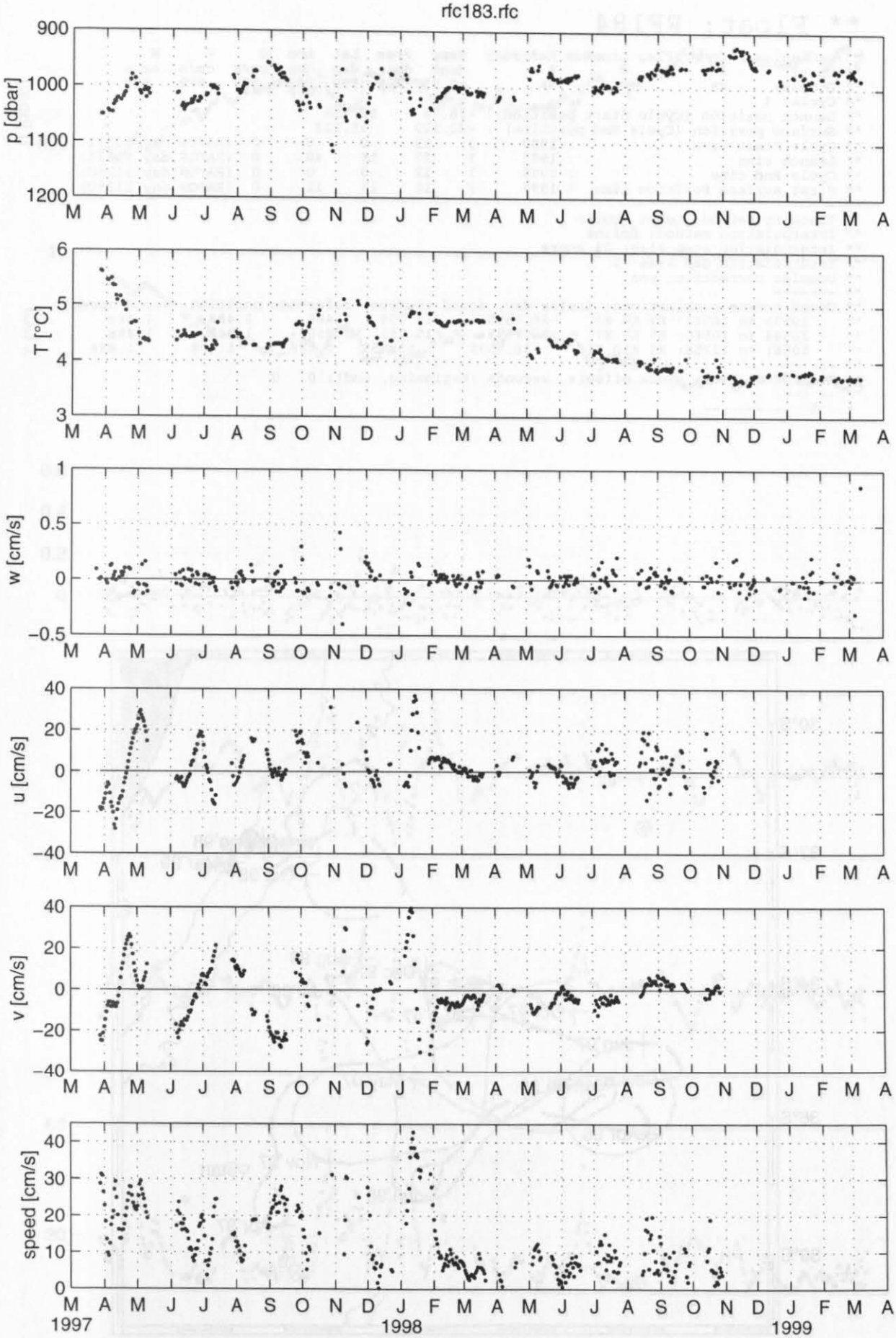



rfc182.rfc
p [dbar]
500
1000
1500
T [°C]
7
6
5
4
w [cm/s]
1
0
−1
−2
−3
u [cm/s]
20
10
0
−10
−20
v [cm/s]
20
10
0
−10
−20
speed [cm/s]
20
15
10
5
0
F M A M J J A S O N D J
1998
1999

** Float: RF183

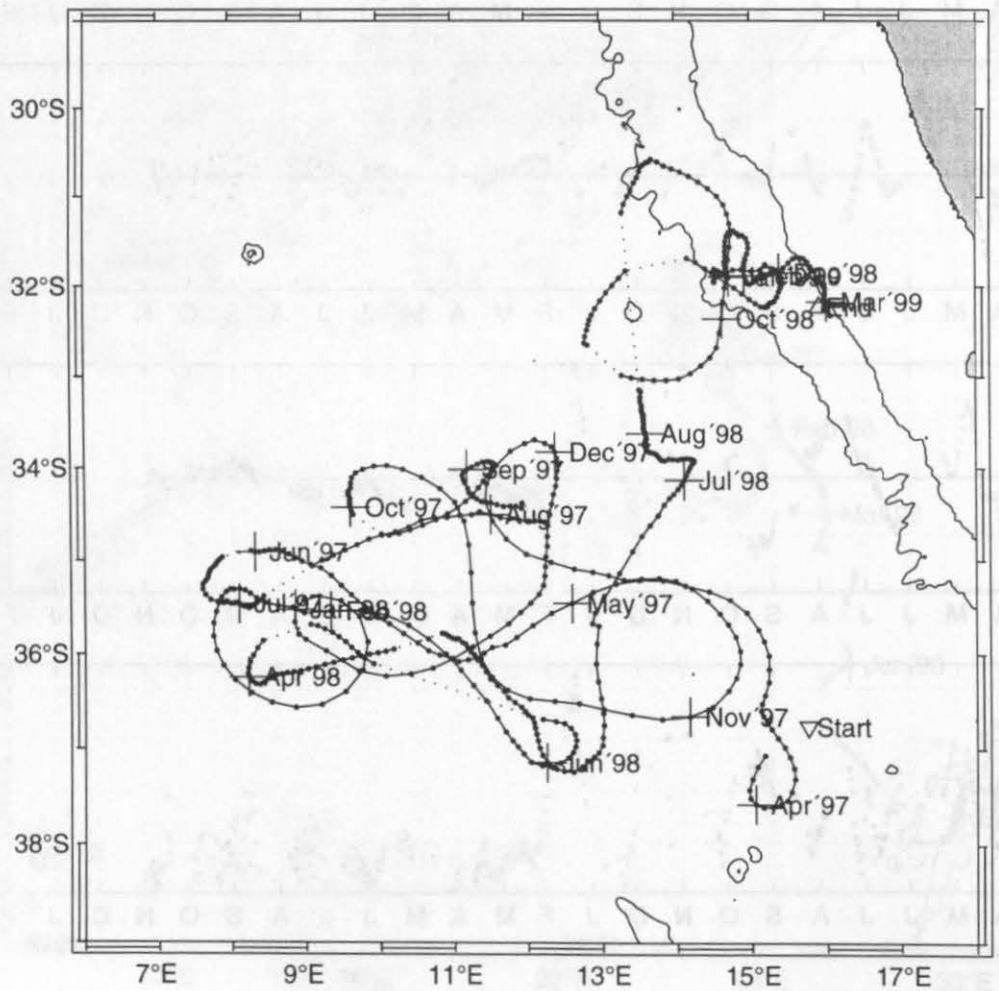
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -36.268     15.641
** Surface position (Cycle End position) : -45.432     38.543
** Cycle Start time              : 1997   3   22   0    0    0   (RAFOS day 10530)
** Launch time                   : 1997   3   23   9    1    0   (RAFOS day 10531)
** Cycle End time                : 1999   3   11   0    0    0   (RAFOS day 11249)
** First surface Position time   : 1999   3   11   14   54   0   (RAFOS day 11249)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10532 to 10535: no tracking    -36.2679     15.6414   1.484      1.484      1.484
**    10536 to 10604: K7 K8 K8    -36.2679     15.6414   1.484      1.484      1.484
**    10605 to 10657: K7 K9 K9    -36.2679     15.6414   1.484      1.484      1.484
**    10658 to 10690: K7 K9 K9    -36.2679     15.6414   1.484      1.484      1.484
**    10691 to 10709: K8 K9 K9    -36.2679     15.6414   1.484      1.484      1.484
**    10710 to 10789: K9 K8 K8    -35      30   1.484      1.484      1.484
**    10790 to 11002: K7 R1 R1    -42      30   1.484      1.484      1.484
**    11003 to 11115: R1 R2 R2    -46 25   1.484      1.484      1.484
**    11116 to 11249: no tracking    -44 40   1.484      1.484      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

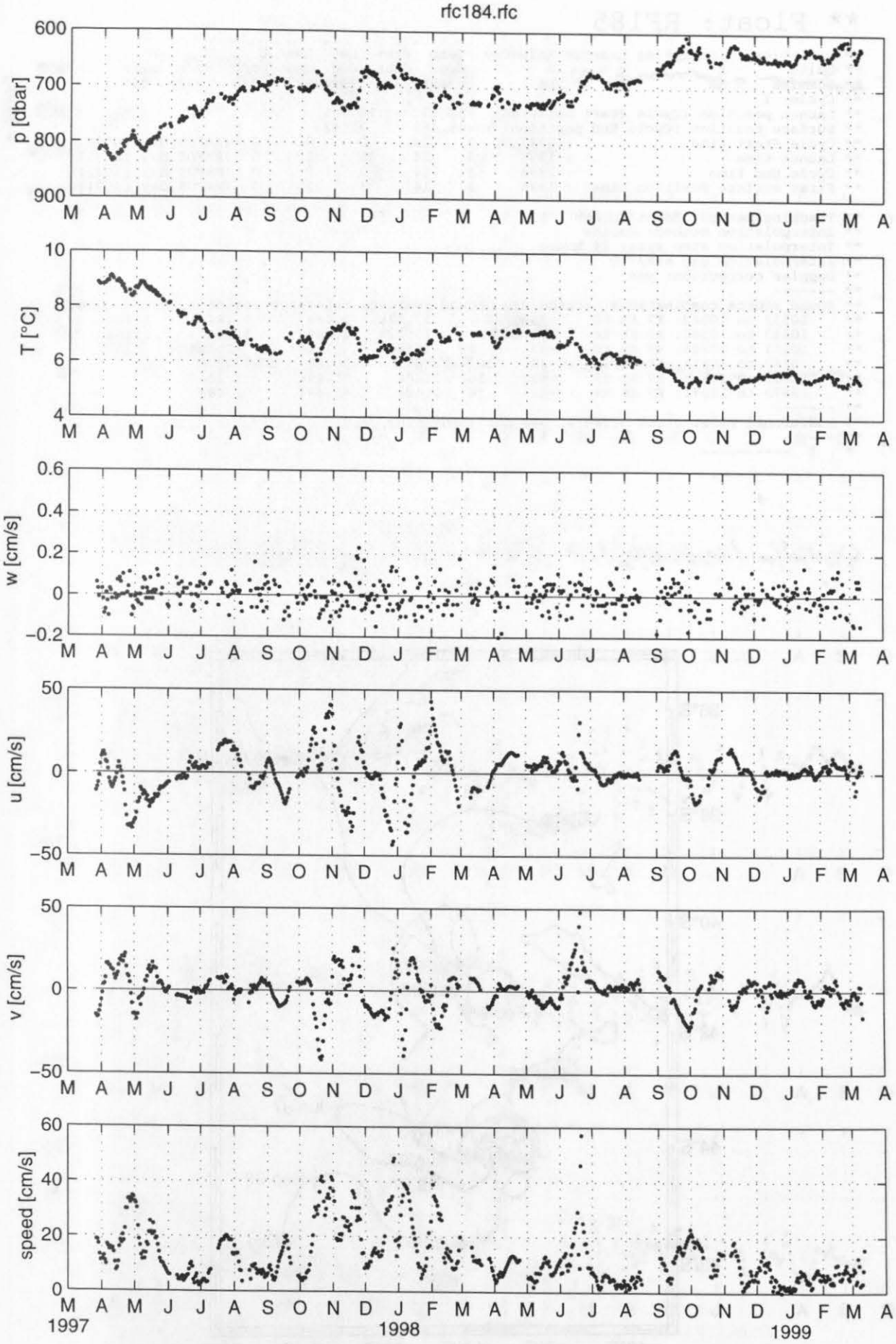



rfc183.rfc
p [dbar]
900
1000
1100
1200
T [°C]
6
5
4
3
w [cm/s]
1
0.5
0
−0.5
u [cm/s]
40
20
0
−20
−40
v [cm/s]
40
20
0
−20
−40
speed [cm/s]
40
30
20
10
0
M A M J J A S O N D J F M A M J J A S O N D J F M A
1997
1998
1999

** Float: RF184

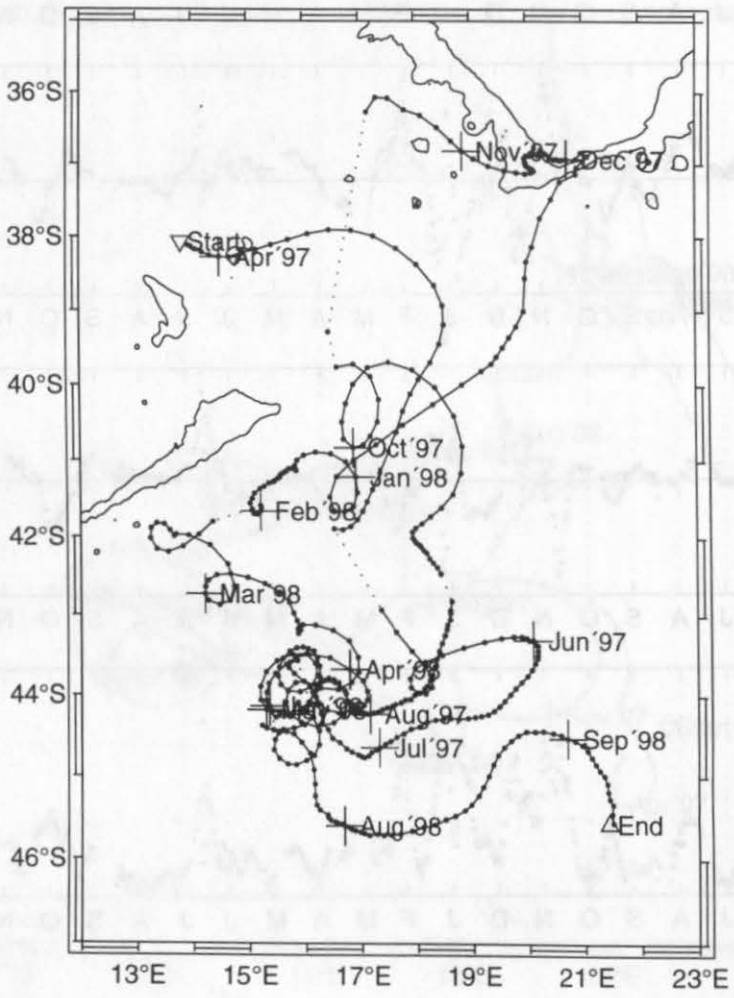
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -36.76     15.759
** Surface position (Cycle End position) : -32.229    15.923
** Cycle Start time             : 1997    3    23     0     0     0   (RAFOS day 10531)
** Launch time                  : 1997    3    23    16    40     0   (RAFOS day 10531)
** Cycle End time               : 1999    3    12     0     0     0   (RAFOS day 11250)
** First surface Position time  : 1999    3    12    13    11     0   (RAFOS day 11250)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10535 to 10543: K7 K8 K8     -36.7595      15.759   1.488      1.488      1.488
**    10544 to 10560: K9 K7 K7     -36.7595      15.759   1.488      1.488      1.488
**    10561 to 11250: K9 K10 K10    -36.7595      15.759   1.488      1.488      1.488
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

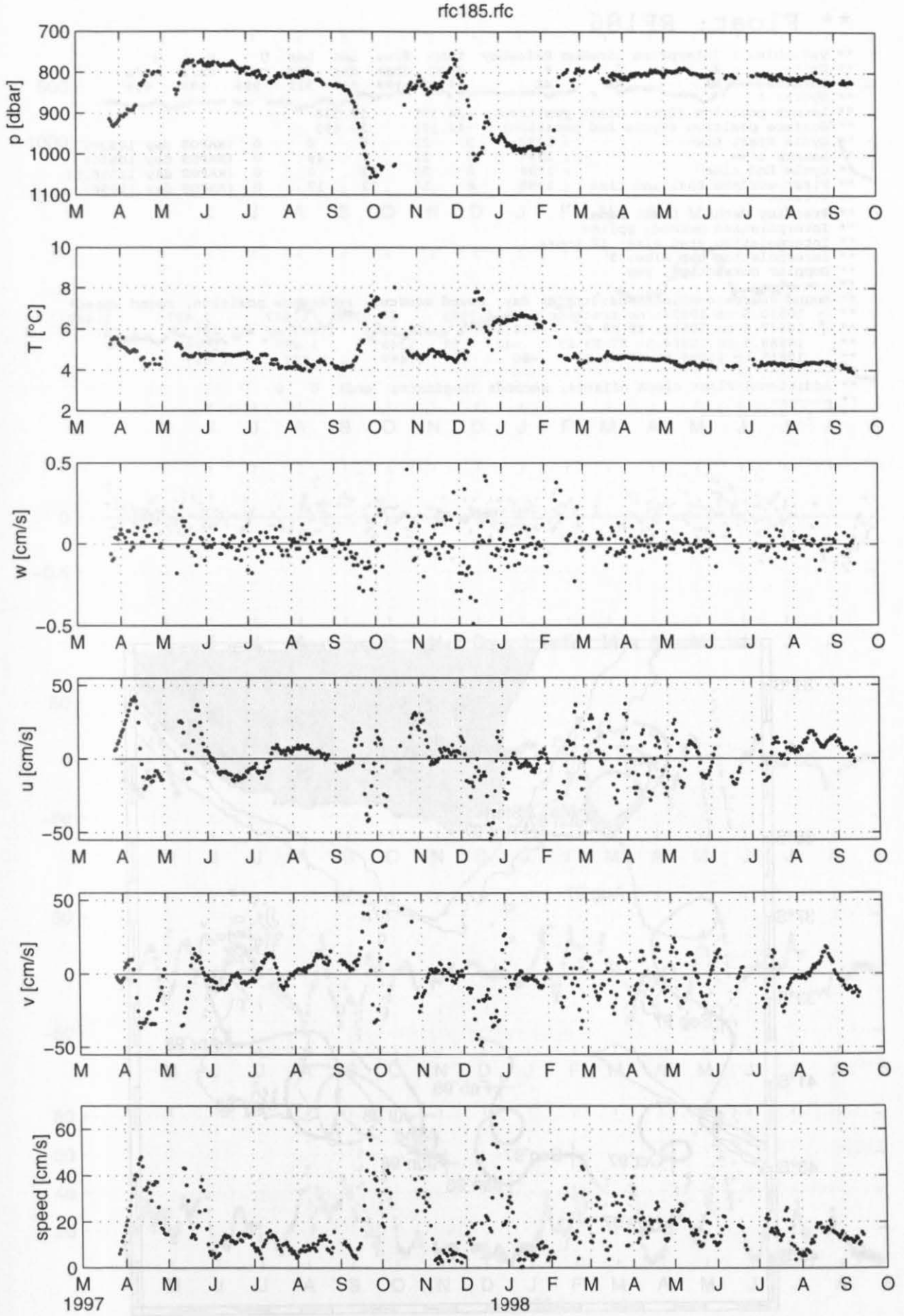



rfc184.rfc
p [dbar]
600
700
800
900
T [°C]
10
8
6
4
w [cm/s]
0.6
0.4
0.2
0
−0.2
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
60
40
20
0
M A M J J A S O N D J F M A M J J A S O N D J F M A
1997
1998
1999

** Float: RF185

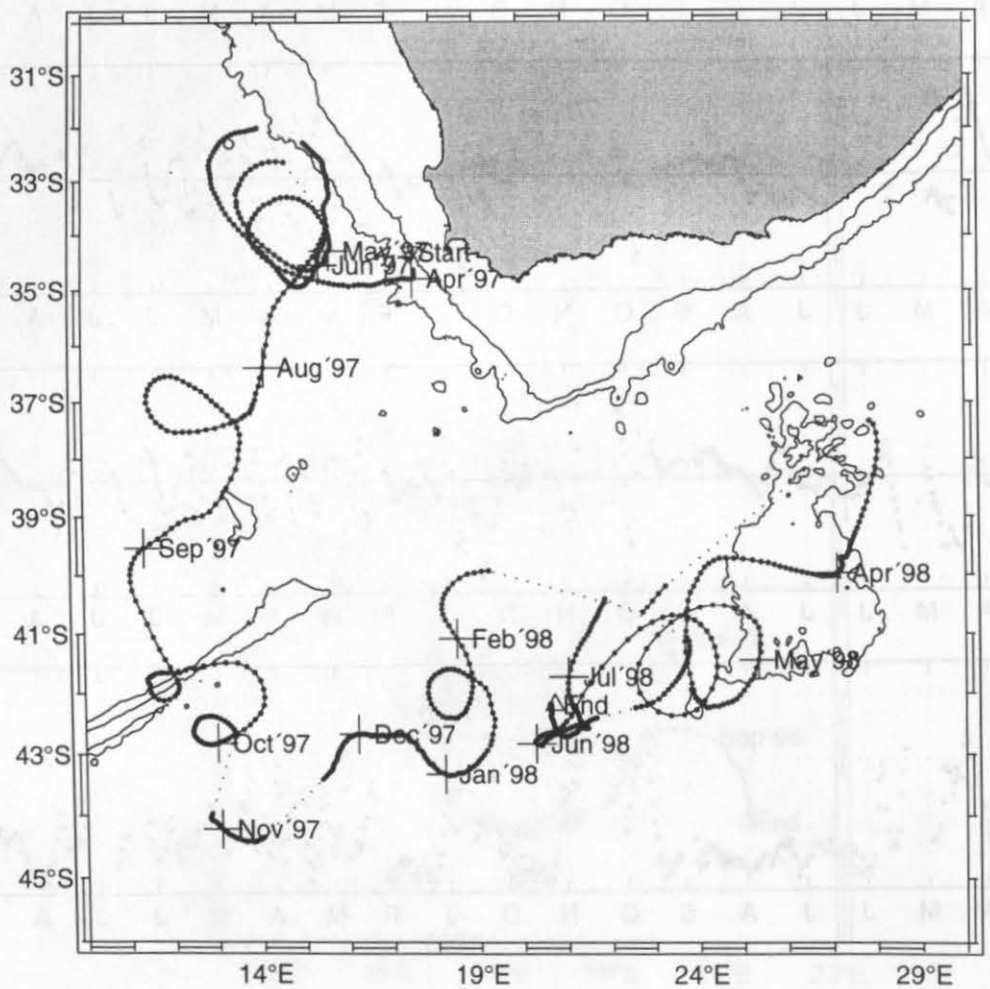
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -38.07     13.825
** Surface position (Cycle End position) : -45.569    21.428
** Cycle Start time              : 1997    3    24     0     0     0   (RAFOS day 10532)
** Launch time                   : 1997    3    24    21     2     0   (RAFOS day 10532)
** Cycle End time                : 1998    9    14     0     0     0   (RAFOS day 11071)
** First surface Position time   : 1998    9    14     3    21     0   (RAFOS day 11071)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10533 to 10542: K7 K8 K8    -38.0702      13.825   1.484      1.484      1.484
**    10543 to 10560: K9 K8 K8    -38.0702      13.825   1.484      1.484      1.484
**    10561 to 10746: K7 K8 K8    -42      18   1.484      1.484      1.484
**    10747 to 10854: K8 K9 K9    -38     16   1.484      1.484      1.484
**    10855 to 10872: K7 K9 K9    -42      16   1.484      1.484      1.484
**    10873 to 11071: K7 K8 K8    -42      16   1.484      1.484      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

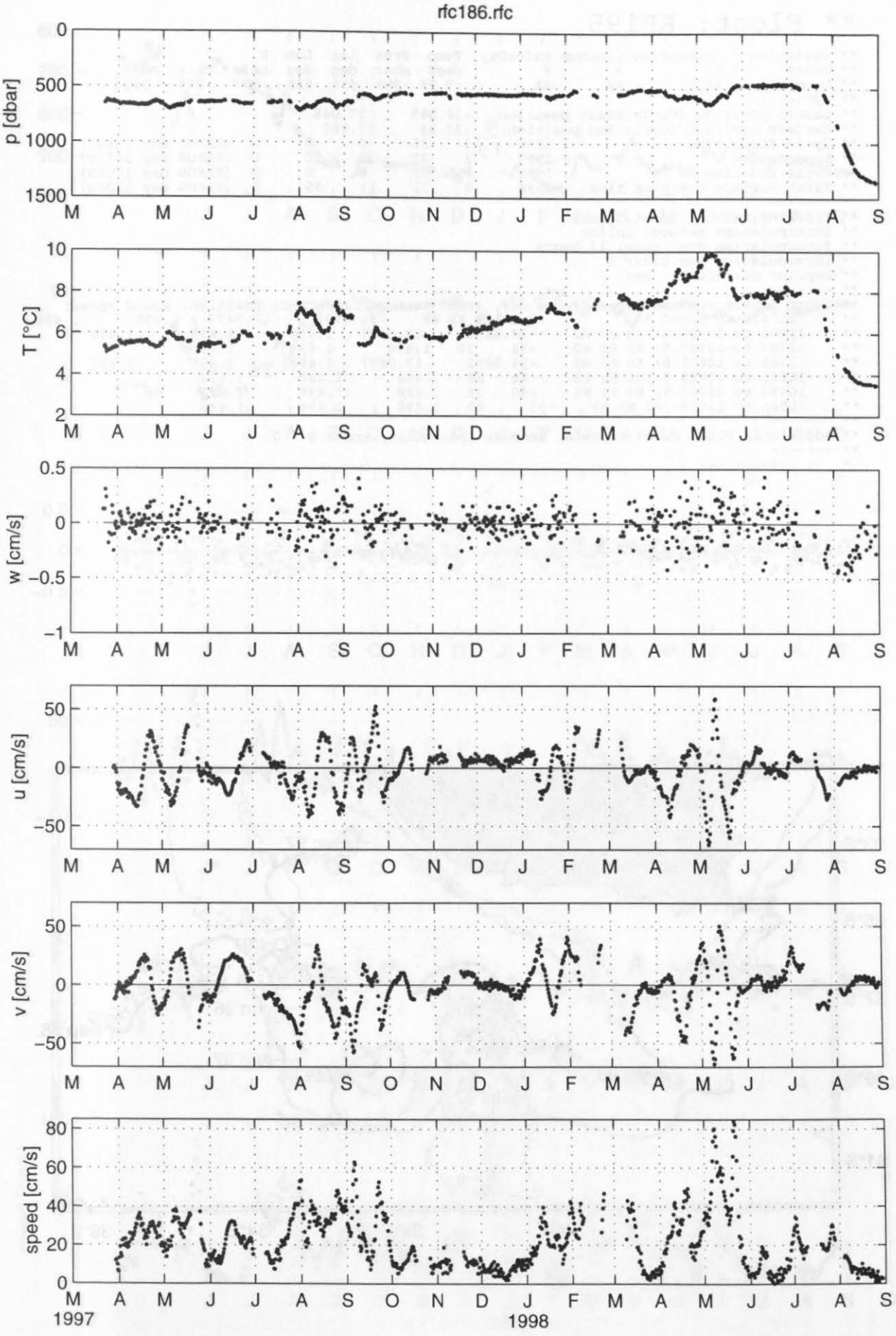



rfc185.rfc
p [dbar]
700
800
900
1000
1100
T [°C]
10
8
6
4
2
w [cm/s]
0.5
0
−0.5
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
60
40
20
0
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF186

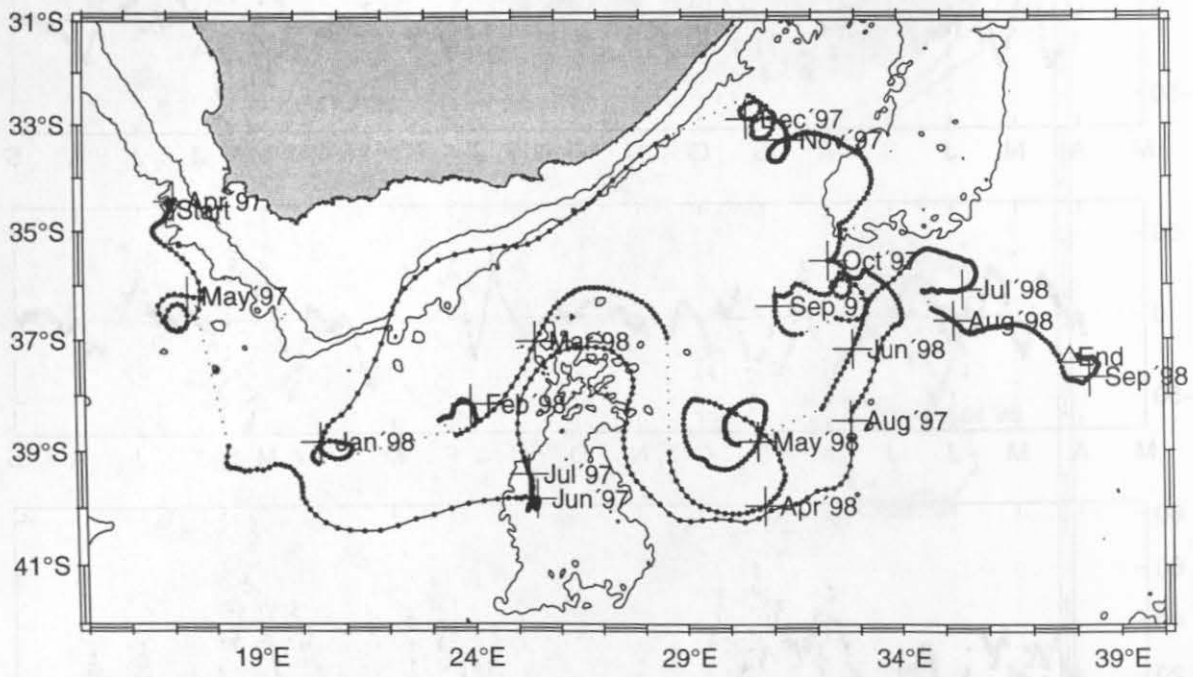
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.309     17.538
** Surface position (Cycle End position) : -42.191     20.699
** Cycle Start time              : 1997    3    22     0     0     0   (RAFOS day 10530)
** Launch time                   : 1997    3    22     7    49     0   (RAFOS day 10530)
** Cycle End time                : 1998    8    30    12     0     0   (RAFOS day 11056.5)
** First surface Position time   : 1998    8    30    12    17     0   (RAFOS day 11056)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10530.5 to 10537: no tracking     -34.3085     17.5378   1.487      1.487      1.487
**    10537.5 to 10688: K8 K9 K9     -34.3085     17.5378   1.487      1.487      1.487
**    10688.5 to 10864.5: K7 K9 K9     -42     10   1.487      1.487      1.487
**    10865 to 11056.5: K7 R1 R1     -40     25   1.487      1.487      1.487
** -------
** Additional Float clock offsets, seconds (beginning, end): 0    0
** -------
 *   1  ----------
```

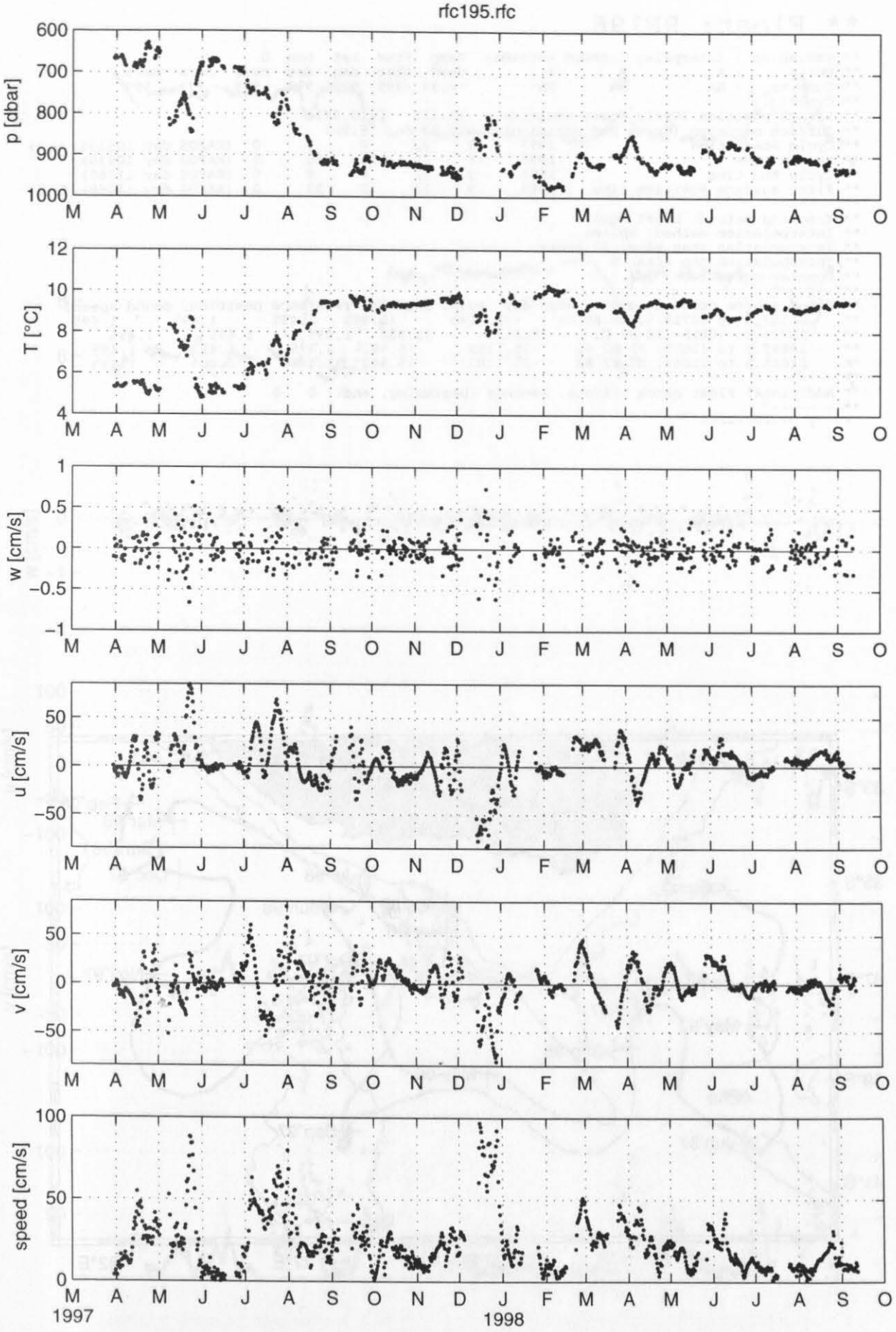



rfc186.rfc
p [dbar]
T [°C]
w [cm/s]
u [cm/s]
v [cm/s]
speed [cm/s]
M A M J J A S O N D J F M A M J J A S
1997
1998

** Float: RF195

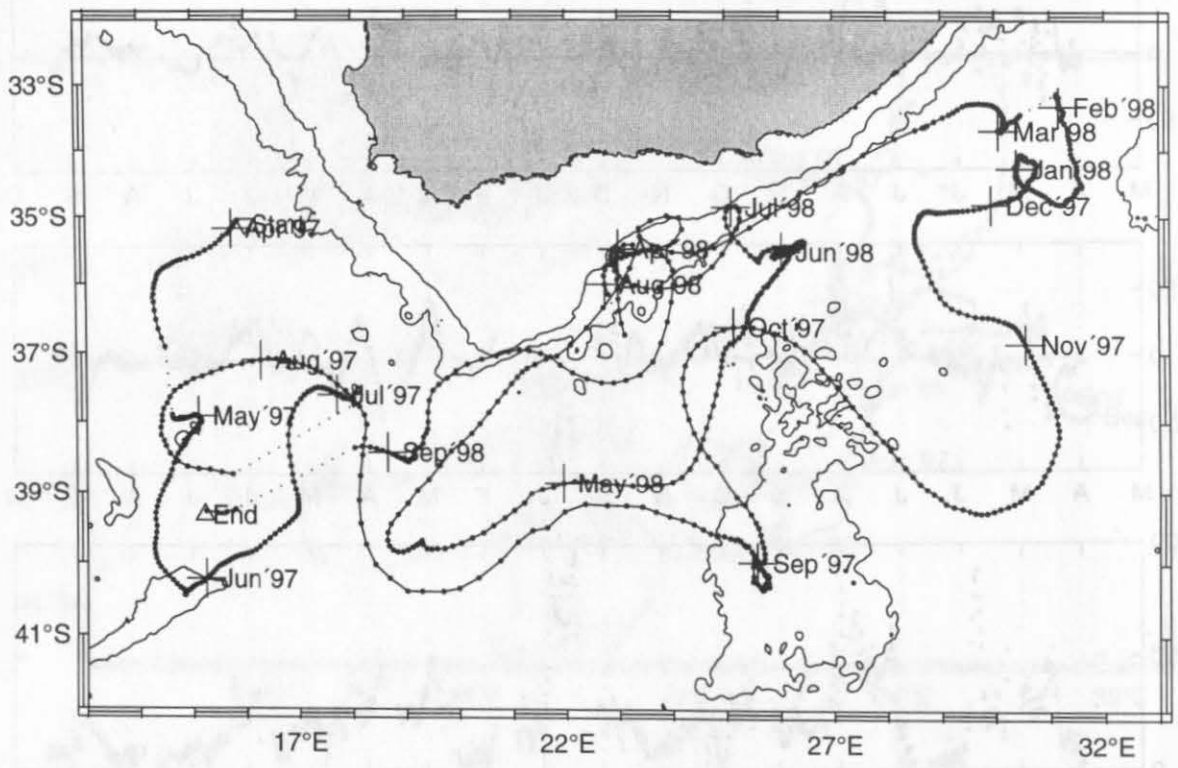
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.589     17.048
** Surface position (Cycle End position) : -37.33      37.867
** Cycle Start time              : 1997    3    22     0     0     0   (RAFOS day 10530)
** Launch time                   : 1997    3    22    12    10     0   (RAFOS day 10530)
** Cycle End time                : 1998    9    12     0     0     0   (RAFOS day 11069)
** First surface Position time   : 1998    9    12    11    35     0   (RAFOS day 11069)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10538.5 to 10690.5            0.5: K8 K9 K9    -34.5891     17.0477   1.498      1.498
**    10691 to 10706.5: K8 R2 R2    -34.5891     17.0477   1.498      1.498      1.498
**    10707 to 10787.5: R1 R2 R2    -34    30    1.498      1.498      1.498
**    10788 to 10801.5: K8 R2 R2    -34.5891     17.0477   1.498      1.498      1.498
**    10802 to 10889.5: R1 R2 R2    -40    25    1.498      1.498      1.498
**    10890 to 10960.5: K7 R1 R1    -40    25    1.498      1.498      1.498
**    10961 to 11069: R1 R2 R2      -35    40    1.498      1.498      1.498
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

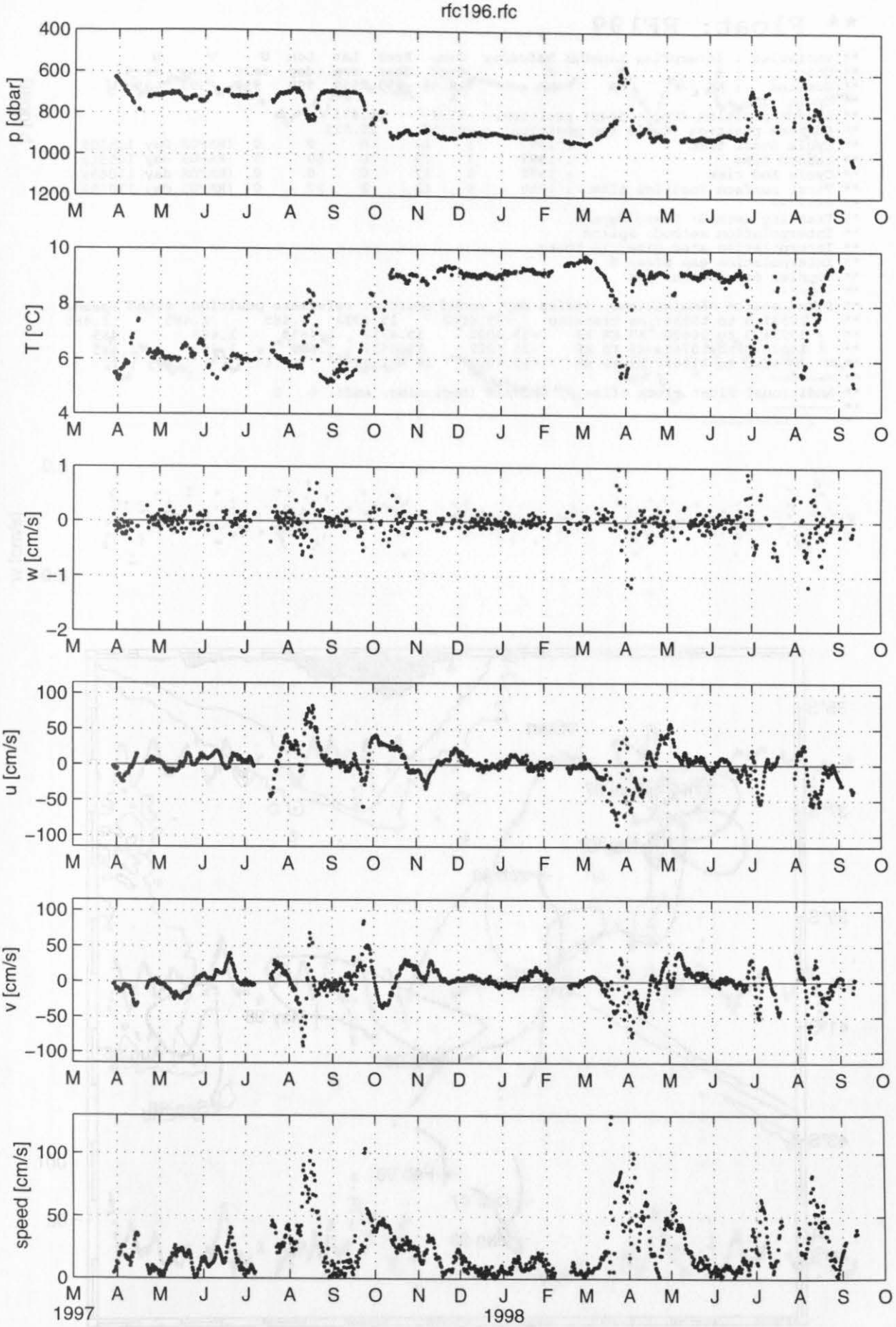



rfc195.rfc
p [dbar]
T [°C]
w [cm/s]
u [cm/s]
v [cm/s]
speed [cm/s]
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF196

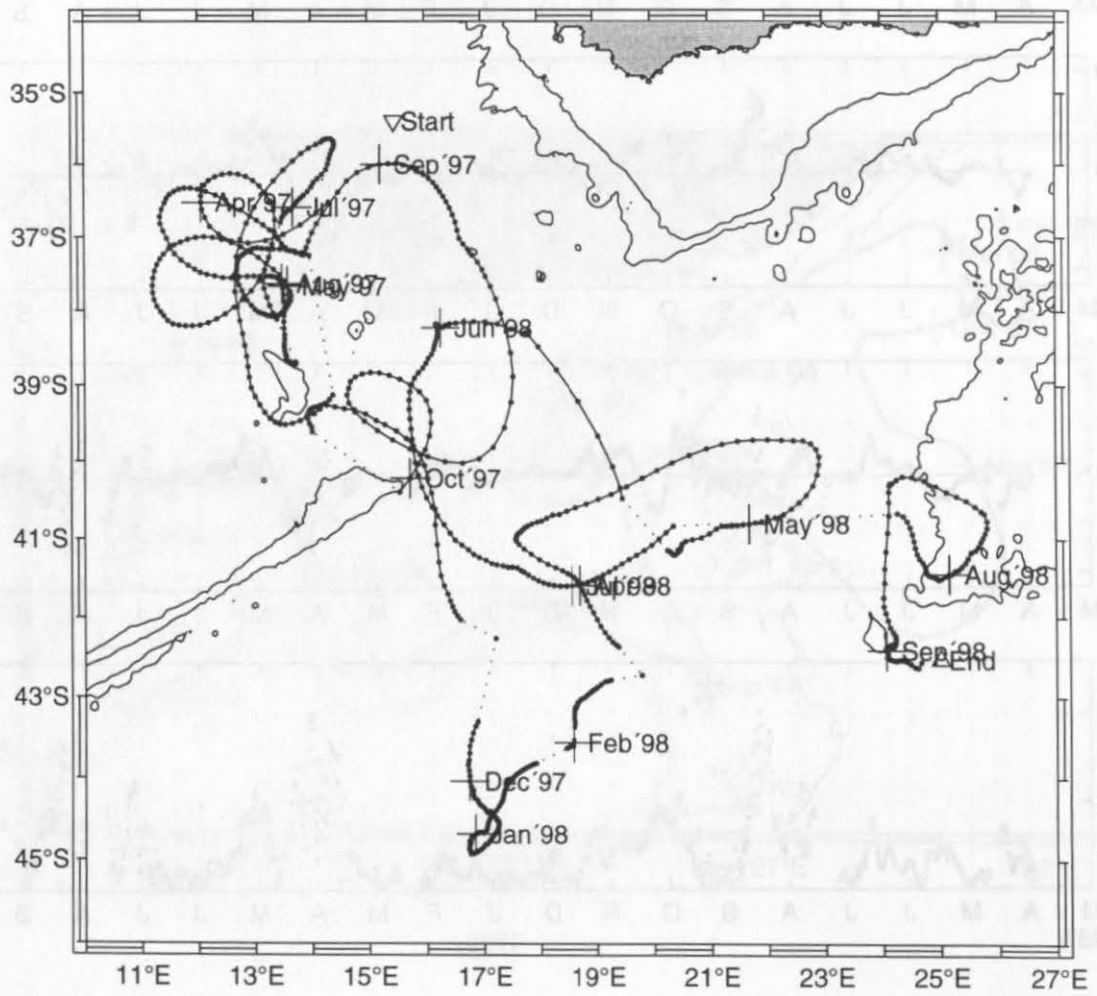
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -35.118     15.982
** Surface position (Cycle End position) : -39.33      15.207
** Cycle Start time              : 1997    3    22     0     0     0   (RAFOS day 10530)
** Launch time                   : 1997    3    22    20    50     0   (RAFOS day 10530)
** Cycle End time                : 1998    9    12     0     0     0   (RAFOS day 11069)
** First surface Position time   : 1998    9    12     2    33     0   (RAFOS day 11069)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10537.5 to 10715.5: K8 K9 K9     -35.1185      15.982   1.495      1.495      1.495
**    10716 to 10895: K8 R2 R2     -35.1185      15.982   1.495      1.495      1.495
**    10895.5 to 11025: R1 R2 R2     -35.1185      15.982   1.495      1.495      1.495
**    11025.5 to 11069: K8 R2 R2     -35.1185      15.982   1.495      1.495      1.495
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

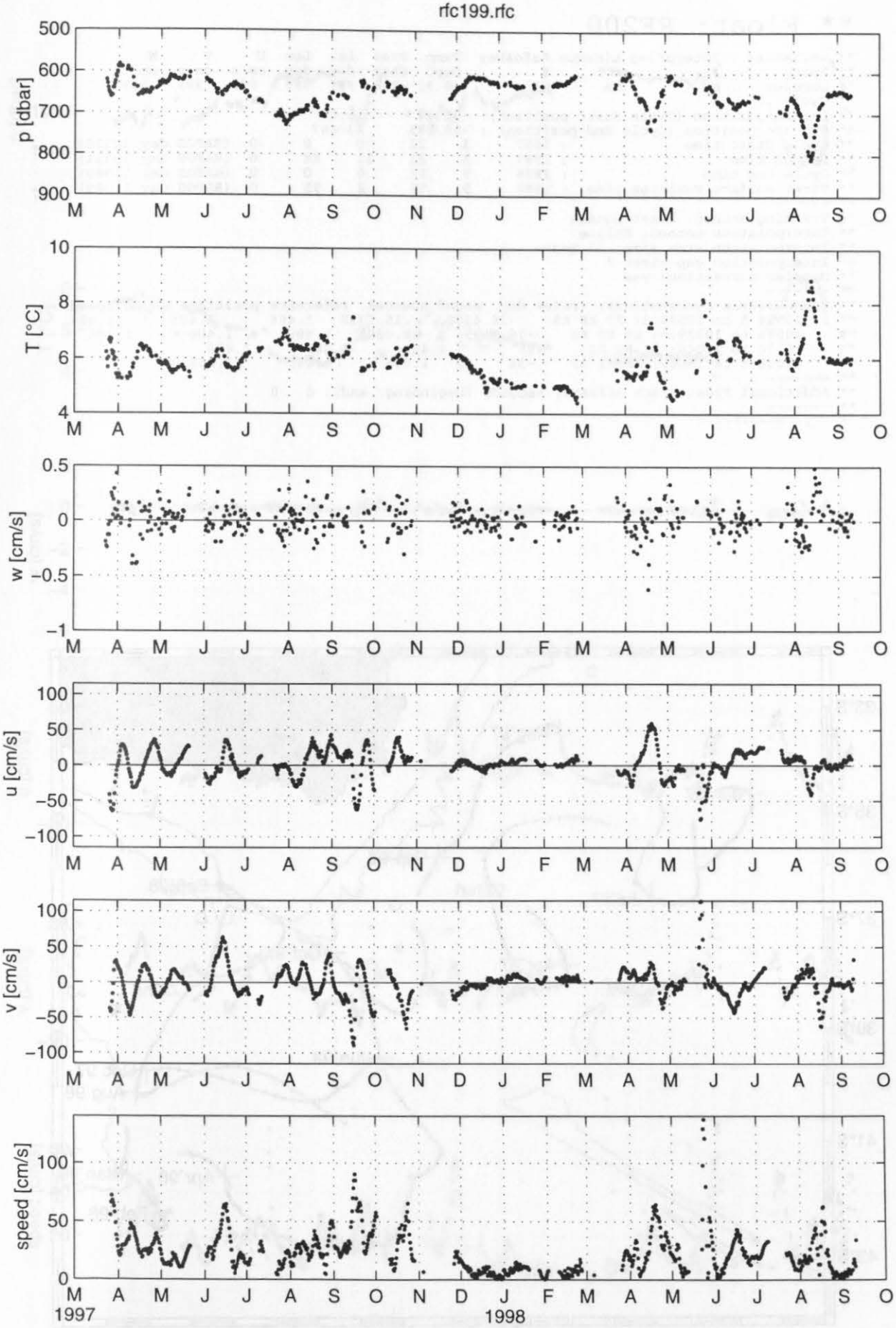



rfc196.rfc
p [dbar]
400
600
800
1000
1200
T [°C]
10
8
6
4
w [cm/s]
1
0
−1
−2
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
100
50
0
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF199

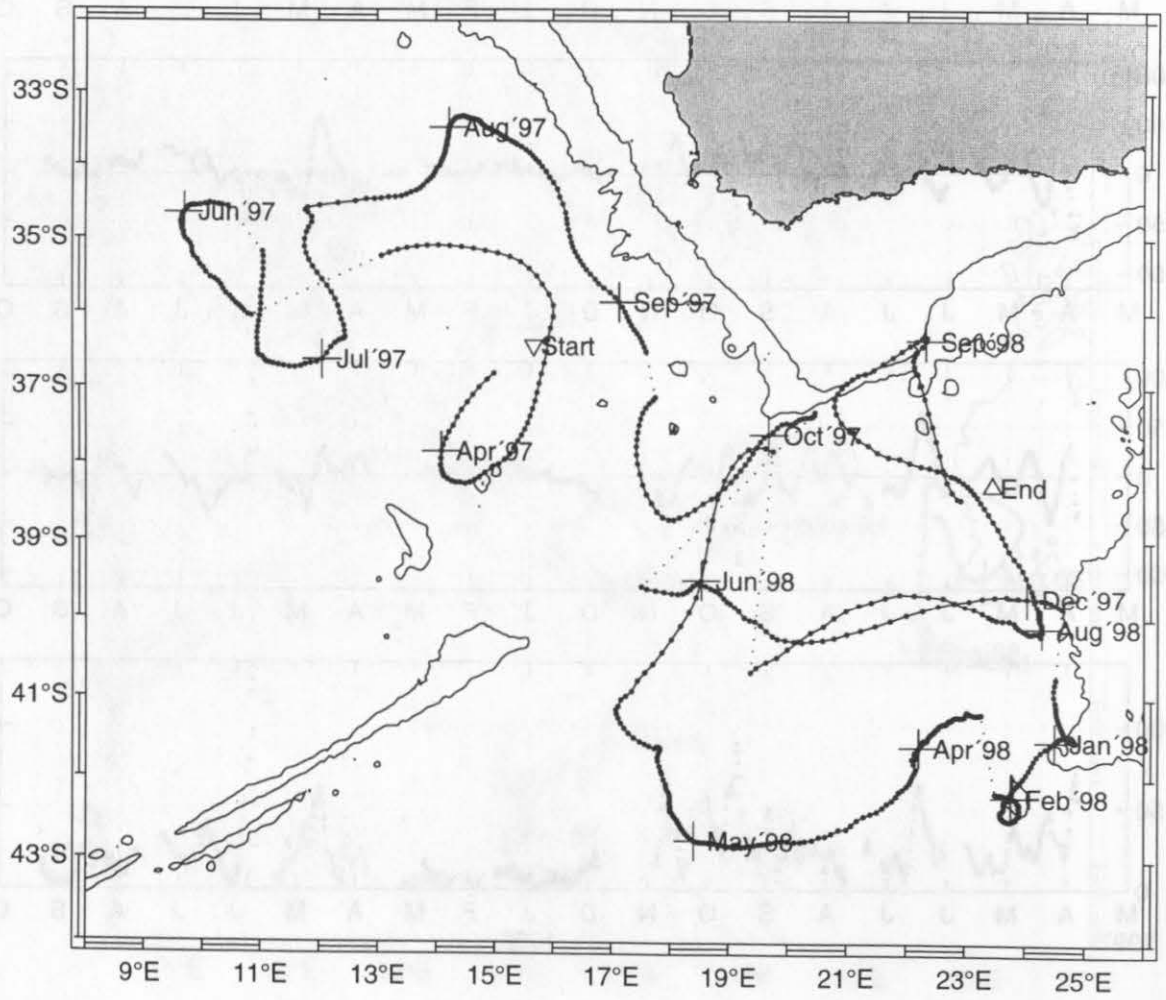
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -35.4     15.473
** Surface position (Cycle End position) : -42.52    25.011
** Cycle Start time              : 1997   3   22    0    0    0   (RAFOS day 10530)
** Launch time                   : 1997   3   23    0   50    0   (RAFOS day 10531)
** Cycle End time                : 1998   9   12    0    0    0   (RAFOS day 11069)
** First surface Position time   : 1998   9   12    2   27    0   (RAFOS day 11069)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10531.5 to 10534: no tracking    -35.4002     15.4732   1.485      1.485      1.485
**    10534.5 to 10600: K7 K8 K8    -35.4002     15.4732   1.485      1.485      1.485
**    10600.5 to 10745: K9 K8 K8    -35.4002     15.4732   1.485      1.485      1.485
**    10745.5 to 11069: K7 K8 K8    -42.4002    18   1.485      1.485      1.485
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

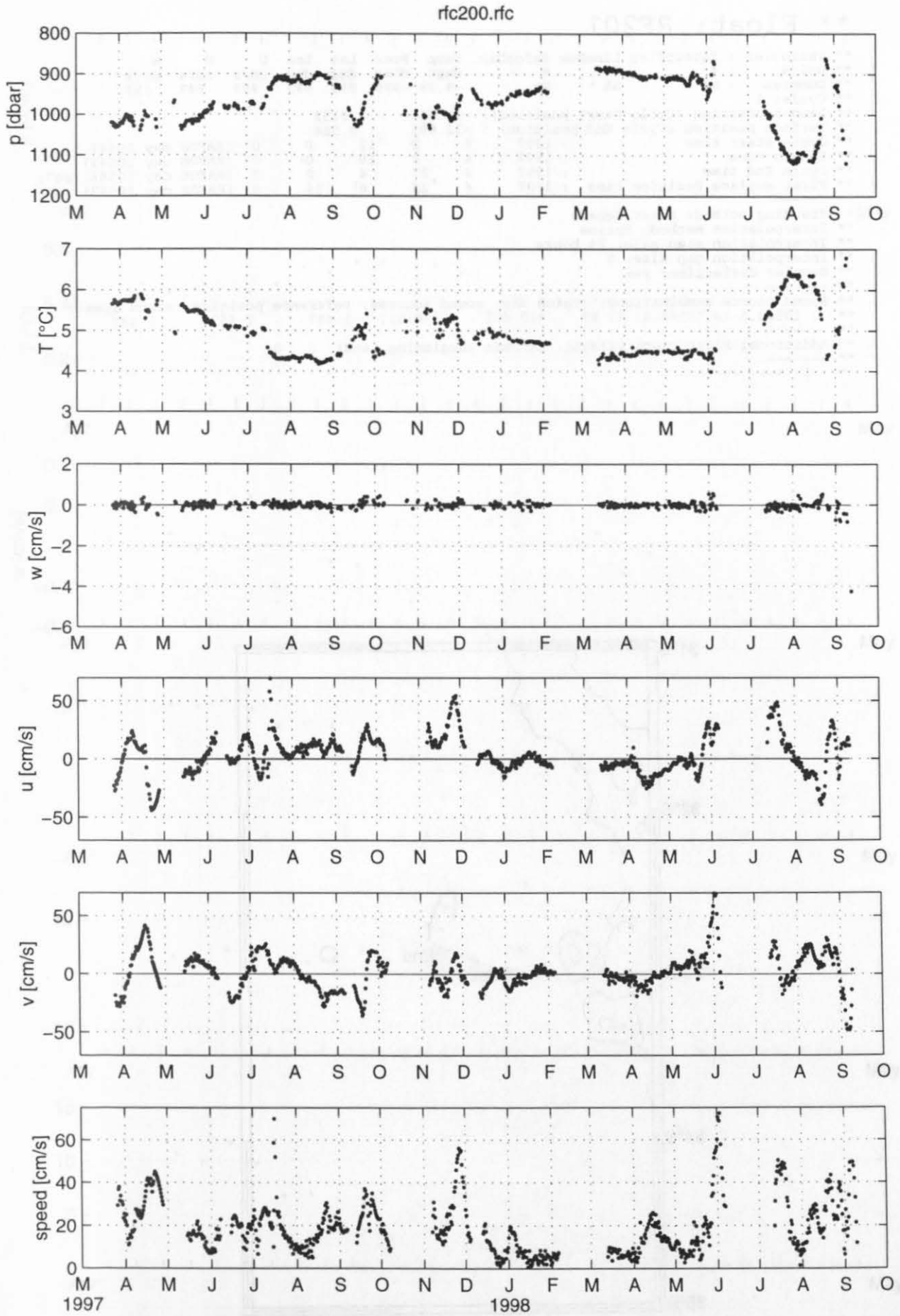



rfc199.rfc
p [dbar]
500
600
700
800
900
T [°C]
10
8
6
4
w [cm/s]
0.5
0
−0.5
−1
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
100
50
0
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF200

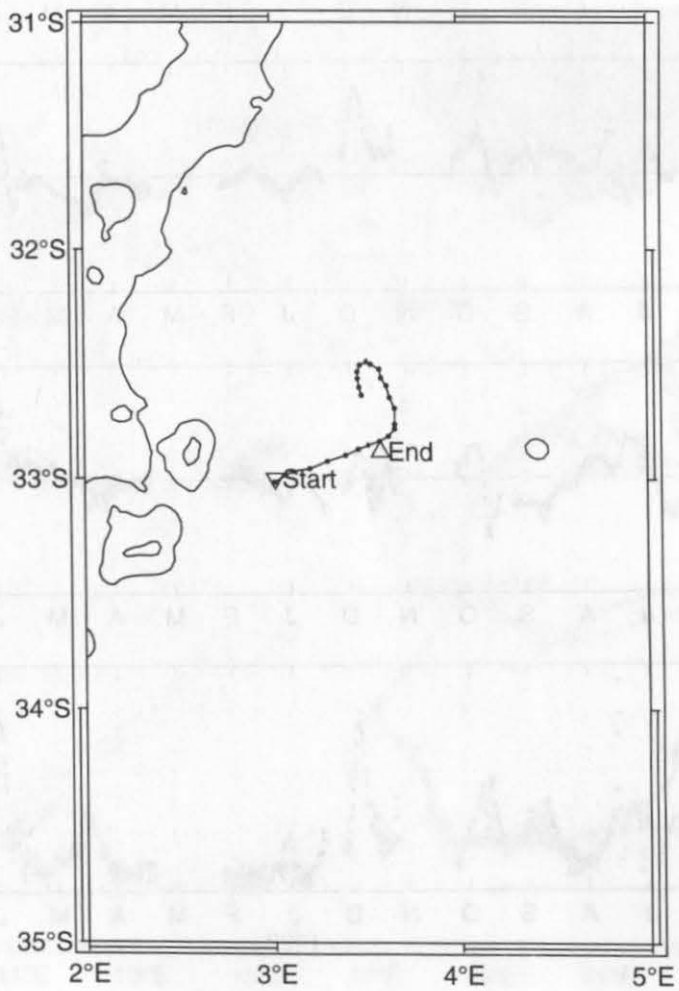
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -36.44      15.69
** Surface position (Cycle End position) : -38.285     23.467
** Cycle Start time             : 1997   3   22    0    0    0  (RAFOS day 10530)
** Launch time                  : 1997   3   23   11   48    0  (RAFOS day 10531)
** Cycle End time               : 1998   9   12    0    0    0  (RAFOS day 11069)
** First surface Position time  : 1998   9   12    2   33    0  (RAFOS day 11069)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10534.5 to 10583.5: K7 K8 K8    -36.4399     15.6899   1.486      1.486      1.486
**    10584 to 10729.5: K9 K8 K8     -36.4399     15.6899   1.486      1.486      1.486
**    10730 to 11048: R1 R2 R2     -40    20   1.486      1.486      1.486
**    11048.5 to 11069: K8 R2 R2     -34    20   1.486      1.486      1.486
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
*   1  ----------
```

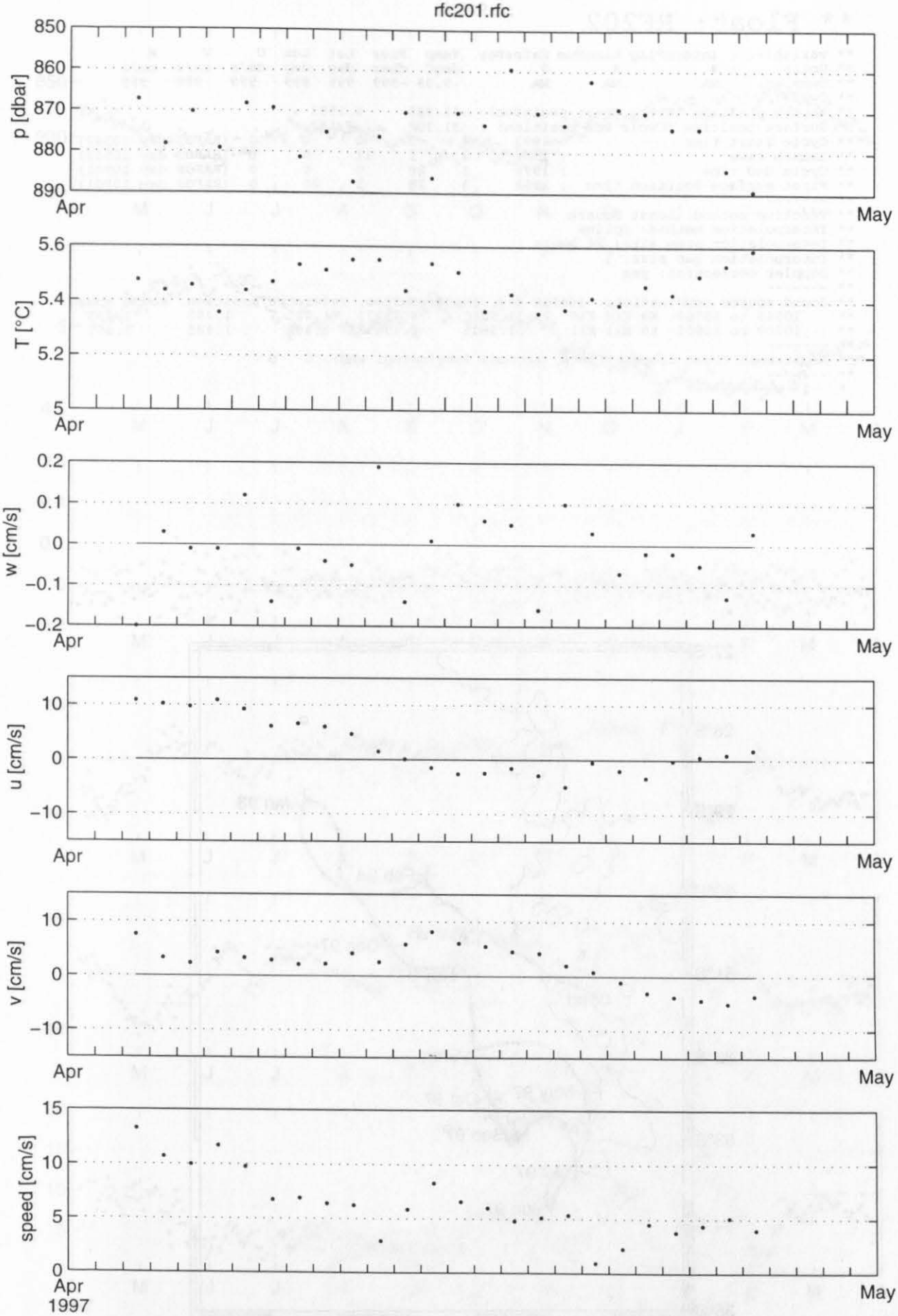



rfc200.rfc
p [dbar]
800
900
1000
1100
1200
T [°C]
7
6
5
4
3
w [cm/s]
2
0
−2
−4
−6
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
60
40
20
0
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF201

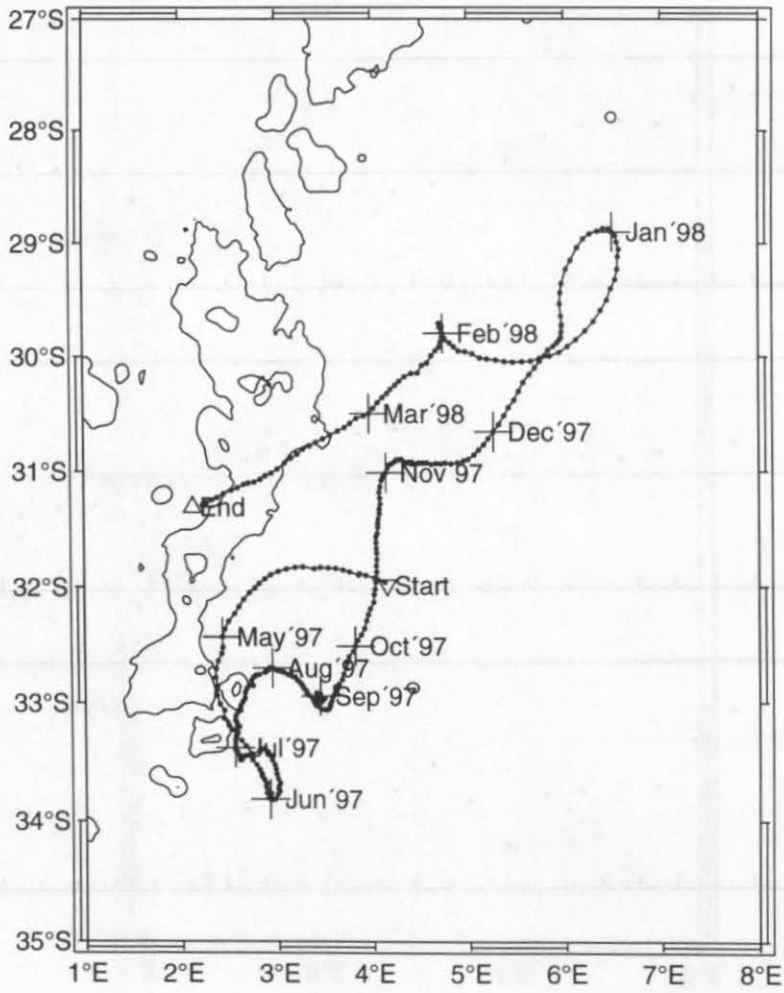
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -33.001     3.0152
** Surface position (Cycle End position) : -32.881      3.584
** Cycle Start time              : 1997    4     2    12     0     0   (RAFOS day 10541.5)
** Launch time                   : 1997    4     3    10     0     0   (RAFOS day 10542)
** Cycle End time                : 1997    4    27     4     0     0   (RAFOS day 10566.1667)
** First surface Position time   : 1997    4    28     6    14     0   (RAFOS day 10567)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10542.5 to 10565.5: K7 K9    -33.001     3.01517   1.487      1.487      1.487
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

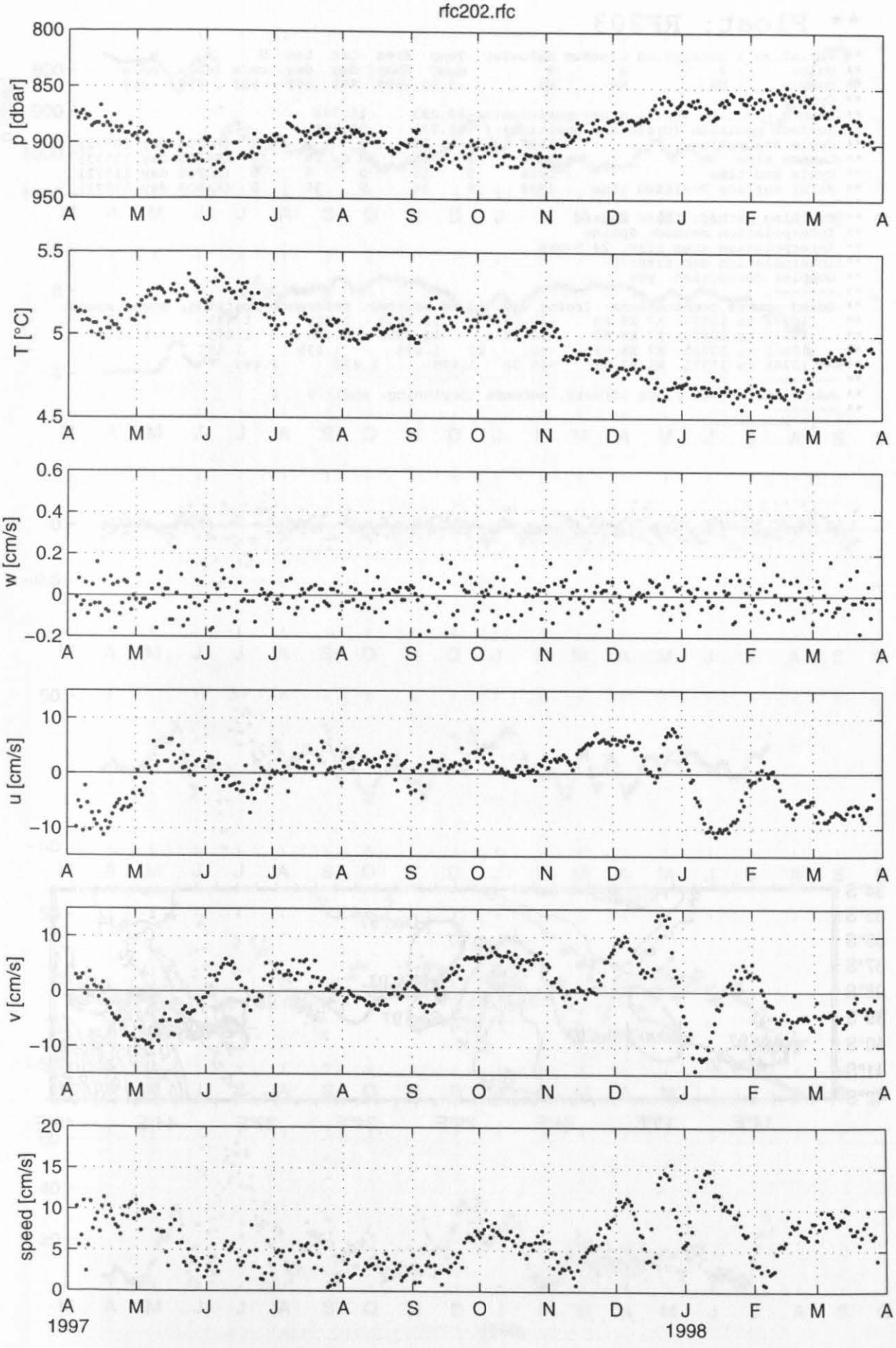



rfc201.rfc
p [dbar]
850
860
870
880
890
Apr
May
T [°C]
5.6
5.4
5.2
5
Apr
May
w [cm/s]
0.2
0.1
0
−0.1
−0.2
Apr
May
u [cm/s]
10
0
−10
Apr
May
v [cm/s]
10
0
−10
Apr
May
speed [cm/s]
15
10
5
0
Apr
1997
May

** Float: RF202

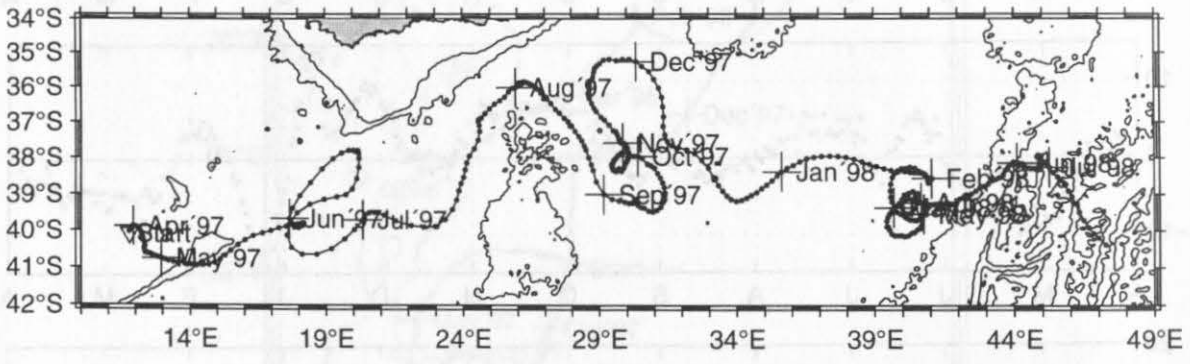
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -31.985      4.1583
** Surface position (Cycle End position) : -31.307      2.132
** Cycle Start time              : 1997    4     3     0     0     0   (RAFOS day 10542)
** Launch time                   : 1997    4     3    11     0     0   (RAFOS day 10542)
** Cycle End time                : 1998    3    28     0     0     0   (RAFOS day 10901)
** First surface Position time   : 1998    3    28     3    20     0   (RAFOS day 10901)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10543 to 10708: K9 K10 K10    -31.9845     4.15833   1.485       1.485       1.485
**    10709 to 10901: K9 M11 M11    -31.9845     4.15833   1.485       1.485       1.485
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

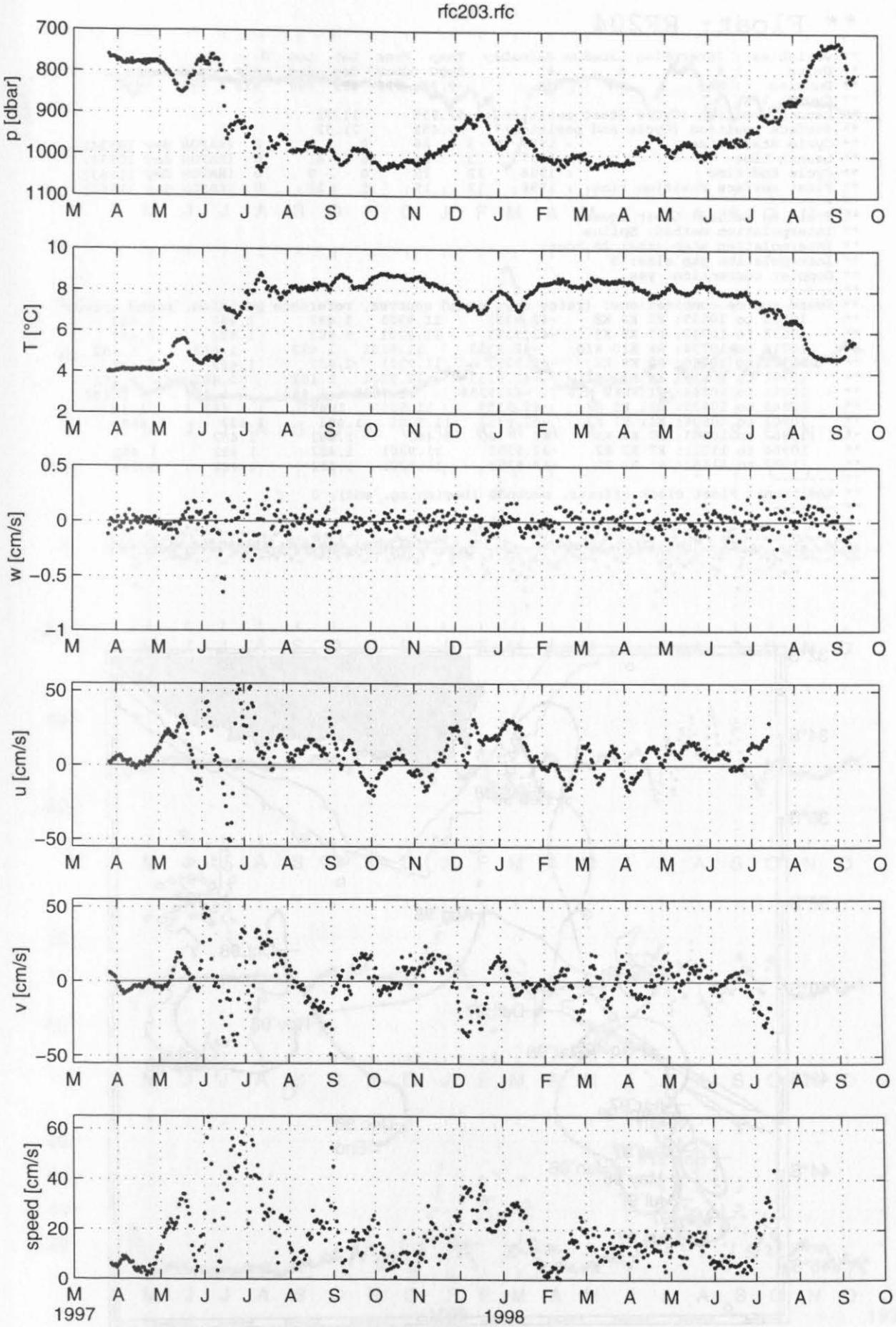



rfc202.rfc
p [dbar]
800
850
900
950
T [°C]
5.5
5
4.5
w [cm/s]
0.6
0.4
0.2
0
−0.2
u [cm/s]
10
0
−10
v [cm/s]
10
0
−10
speed [cm/s]
20
15
10
5
0
A M J J A S O N D J F M A
1997
1998

** Float: RF203

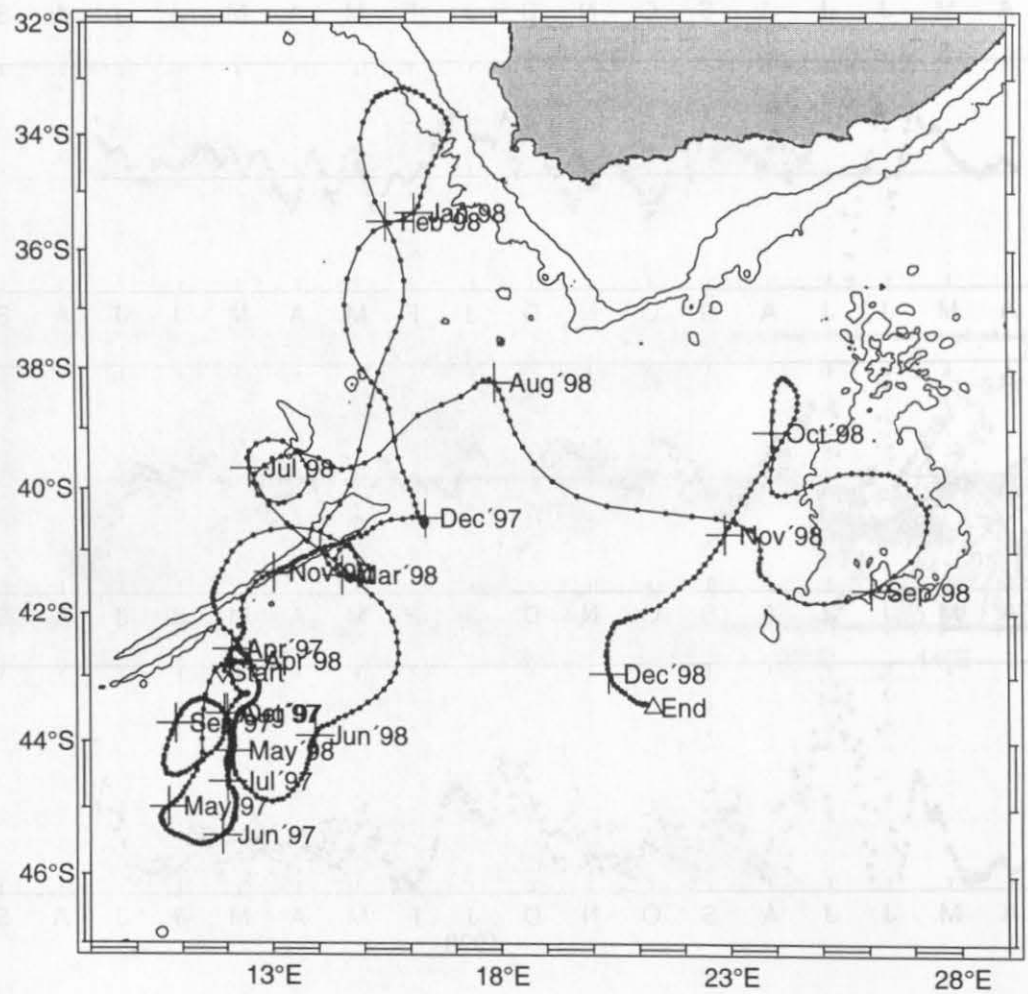
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -40.093     11.786
** Surface position (Cycle End position) : -43.731     59.219
** Cycle Start time              : 1997    3    24     0     0     0  (RAFOS day 10532)
** Launch time                   : 1997    3    25    18    55     0  (RAFOS day 10533)
** Cycle End time                : 1998    9    14     0     0     0  (RAFOS day 11071)
** First surface Position time   : 1998    9    14     9    38     0  (RAFOS day 11071)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10534 to 10570: K7 K8 K8     -40.0932     11.7858   1.495      1.495      1.495
**    10571 to 10600: K7 K9 K9     -40.0932     11.7858   1.495      1.495      1.495
**    10601 to 10785: K7 K8 K8     -40.    20   1.495      1.495      1.495
**    10786 to 11071: R1 R2 R2     -40 50   1.495      1.495      1.495
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

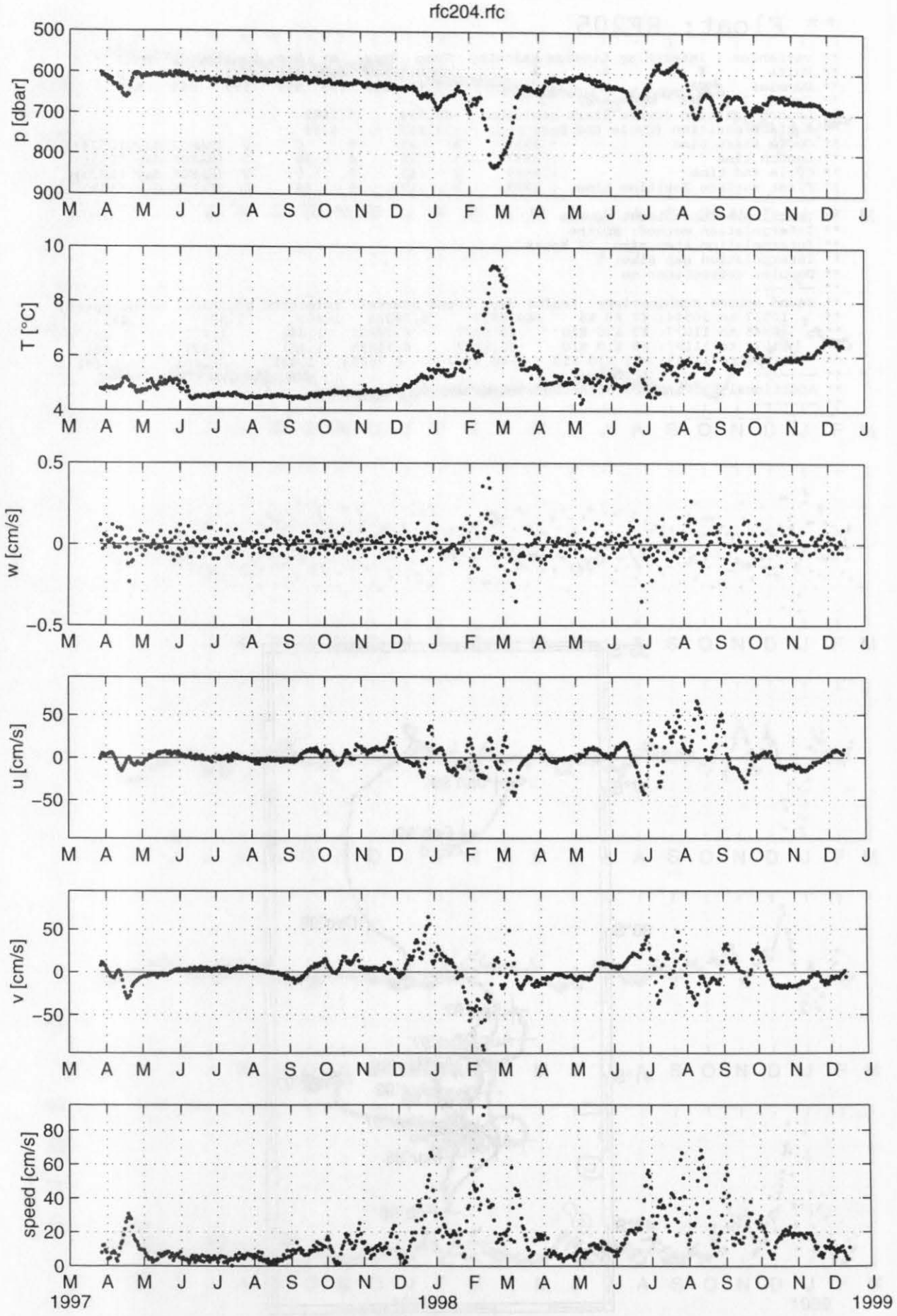



rfc203.rfc
p [dbar]
700
800
900
1000
1100
T [°C]
10
8
6
4
2
w [cm/s]
0.5
0
−0.5
−1
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
60
40
20
0
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF204

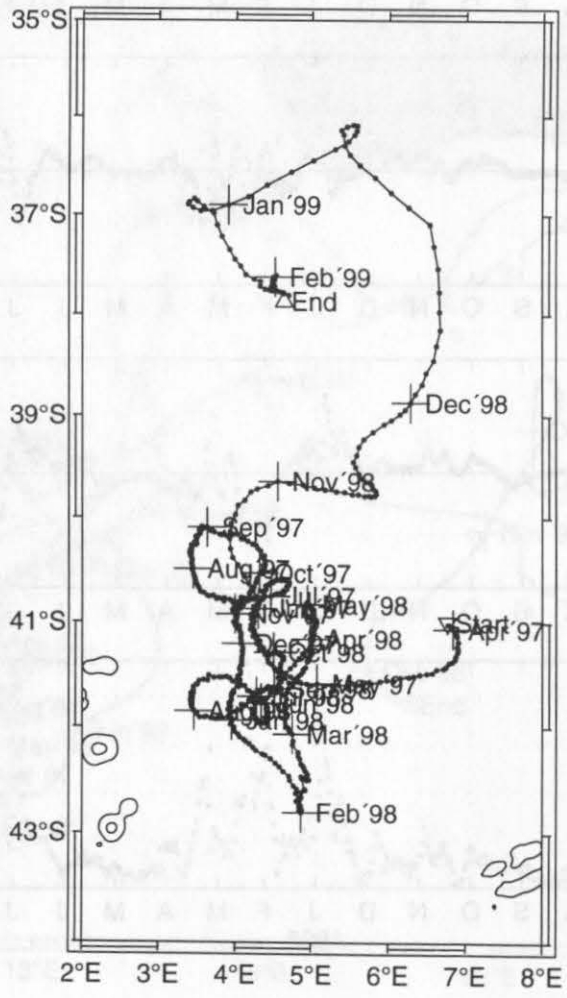
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -42.935      11.92
** Surface position (Cycle End position) : -43.451      21.32
** Cycle Start time             : 1997    3    26     0     0     0  (RAFOS day 10534)
** Launch time                  : 1997    3    26    16    41     0  (RAFOS day 10534)
** Cycle End time               : 1998   12    15     0     0     0  (RAFOS day 11163)
** First surface Position time  : 1998   12    15     5    22     0  (RAFOS day 11163)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10535 to 10537: K7 K8 K8     -42.9353     11.9201   1.482      1.482      1.482
**    10538 to 10715: K7 K9 K9     -42.9353     11.9201   1.482      1.482      1.482
**    10716 to 10774: R1 K10 K10     -42.9353     11.9201   1.482      1.482      1.482
**    10775 to 10790: R2 K8 K8     -42.9353     11.9201   1.482      1.482      1.482
**    10791 to 10810: K8 M11 M11     -42.9353     11.9201   1.482      1.482      1.482
**    10811 to 10844: M11 M10 M10     -42.9353     11.9201   1.482      1.482      1.482
**    10845 to 10900: M11 K8 K8     -42.9353     11.9201   1.482      1.482      1.482
**    10901 to 10906: M11 K7 K7     -42.9353   11.9201   1.482      1.482      1.482
**    10907 to 10963: K7 K8 K8     -44     20   1.482      1.482      1.482
**    10964 to 11021: K7 R2 R2     -42.9353     11.9201   1.482      1.482      1.482
**    11022 to 11162: R1 R2 R2     -42.9353     11.9201   1.482      1.482      1.482
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

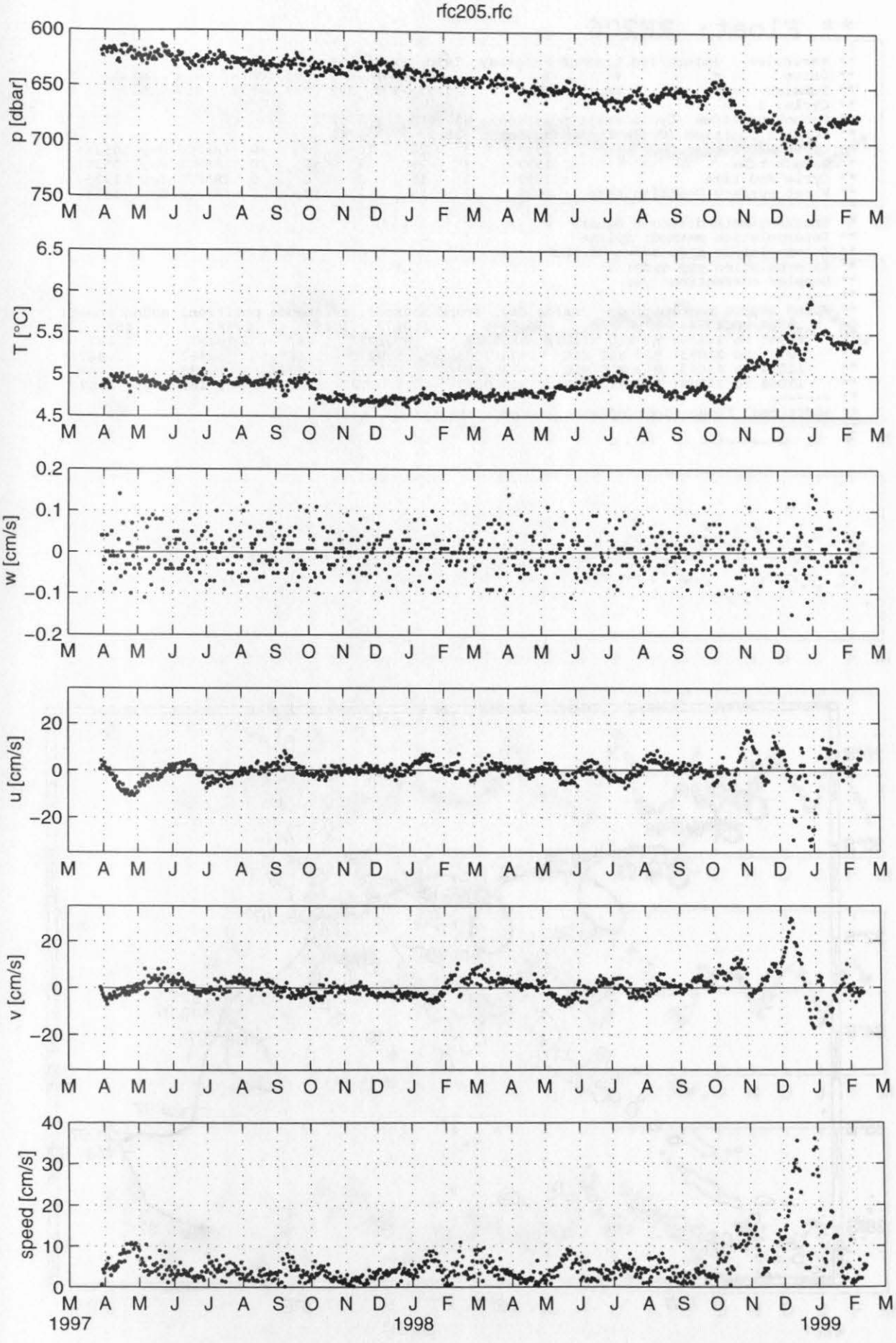



rfc204.rfc
p [dbar]
500
600
700
800
900
T [°C]
10
8
6
4
w [cm/s]
0.5
0
−0.5
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
80
60
40
20
0
M A M J J A S O N D J F M A M J J A S O N D J
1997
1998
1999

** Float: RF205

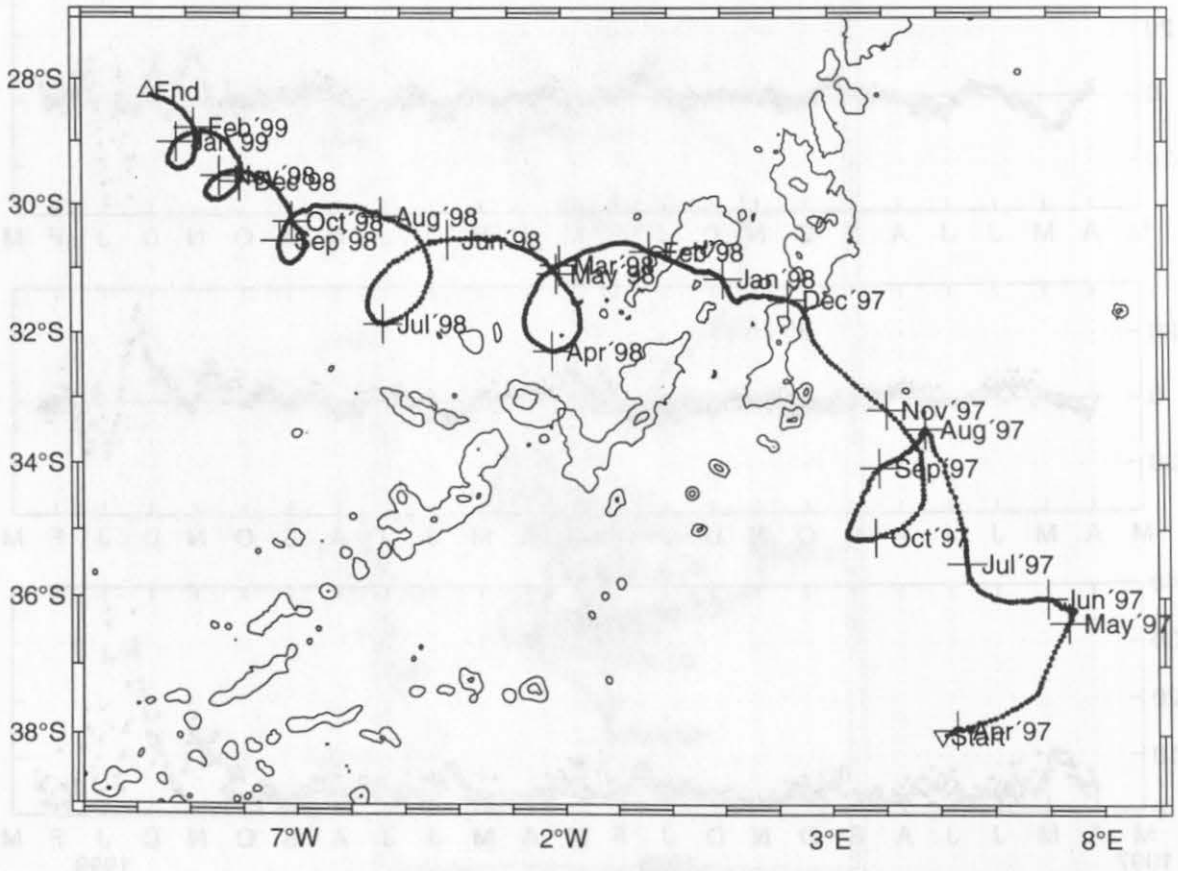
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -40.994      6.7683
** Surface position (Cycle End position) : -37.867        4.64
** Cycle Start time              : 1997    3    26     0     0     0   (RAFOS day 10534)
** Launch time                   : 1997    3    28     4    30     0   (RAFOS day 10536)
** Cycle End time                : 1999    2    13     0     0     0   (RAFOS day 11223)
** First surface Position time   : 1999    2    13     6    38     0   (RAFOS day 11223)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: no
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10537 to 10544: K7 K8 K8     -40.9937     6.76833   1.481      1.481      1.481
**    10545 to 11077: K7 K10 K10    -40.9937     6.76833   1.481      1.481      1.481
**    11078 to 11197: K8 K10 K10    -40.9937     6.76833   1.481      1.481      1.481
**    11198 to 11223: M11 K10 K10    -40.9937     6.76833   1.481      1.481      1.481
** -------
** Additional Float clock offsets, seconds (beginning, end): 2   4
** -------
*   1  ----------
```

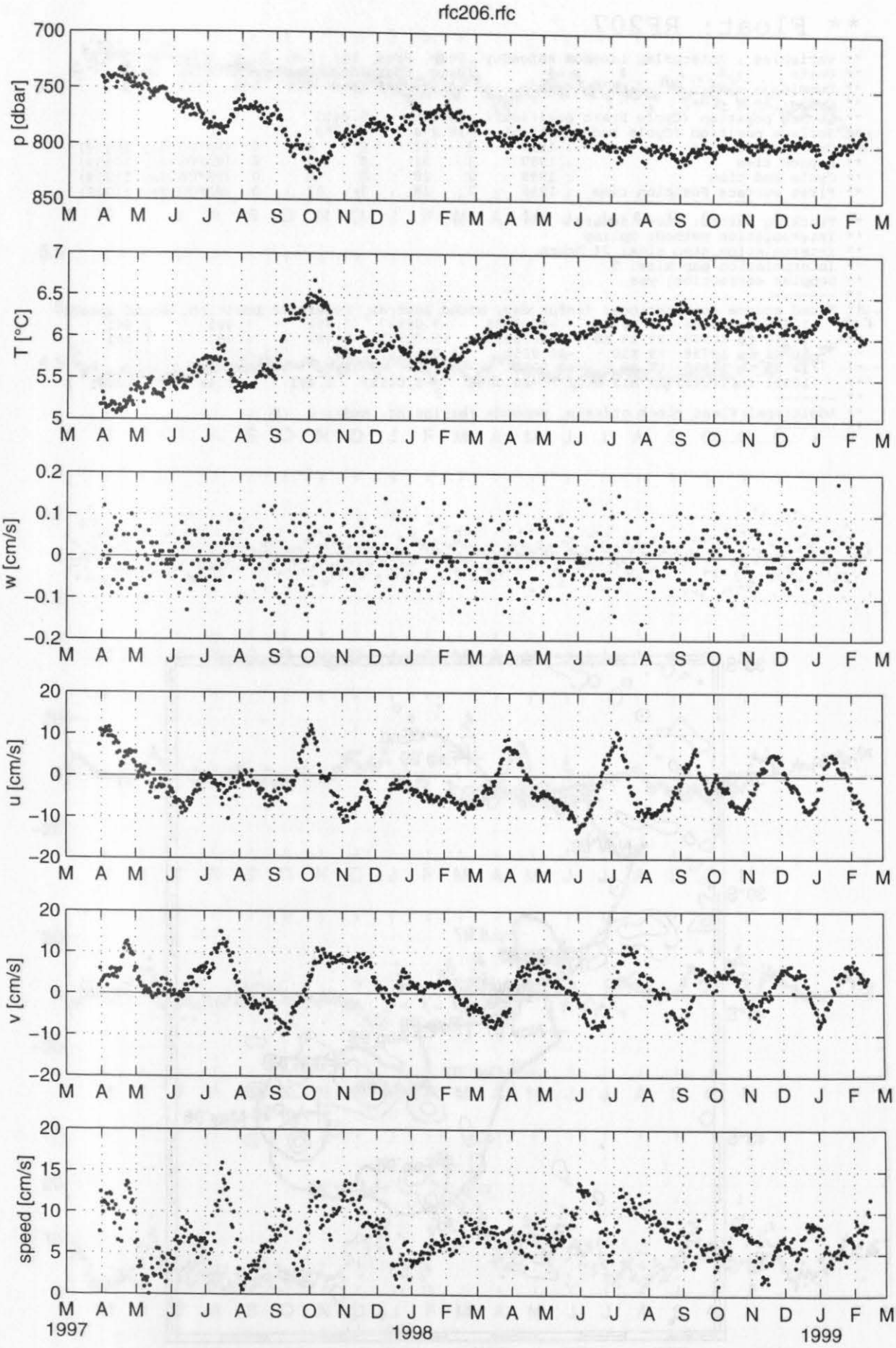



rfc205.rfc
p [dbar]
600
650
700
750
T [°C]
6.5
6
5.5
5
4.5
w [cm/s]
0.2
0.1
0
−0.1
−0.2
u [cm/s]
20
0
−20
v [cm/s]
20
0
−20
speed [cm/s]
40
30
20
10
0
M A M J J A S O N D J F M A M J J A S O N D J F M
1997
1998
1999

** Float: RF206

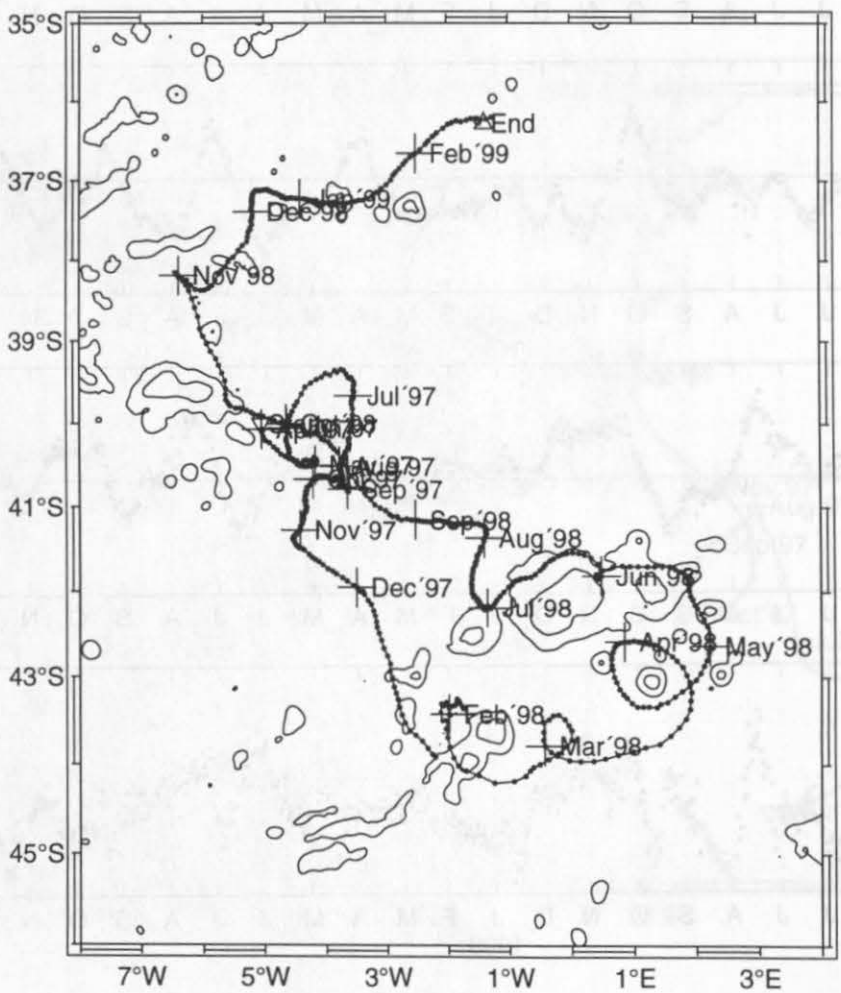
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -38.005     5.0272
** Surface position (Cycle End position) : -28.2      -9.741
** Cycle Start time              : 1997    3    28    0     0     0   (RAFOS day 10536)
** Launch time                   : 1997    3    29    8    56     0   (RAFOS day 10537)
** Cycle End time                : 1999    2    15    0     0     0   (RAFOS day 11225)
** First surface Position time   : 1999    2    15    7    32     0   (RAFOS day 11225)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10538 to 10544: K7 K8 K8     -38.0049      5.0272   1.487      1.487      1.487
**    10545 to 10800: K7 K10 K10    -38.0049      5.0272   1.487      1.487      1.487
**    10801 to 11053: M12 K10 K10    -38.0049      5.0272   1.487      1.487      1.487
**    11054 to 11063: M12 M10 M10    -38.0049      5.0272   1.487      1.487      1.487
**    11064 to 11225: M12 K10 K10    -38.0049      5.0272   1.487      1.487      1.487
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
  *   1  ----------
```

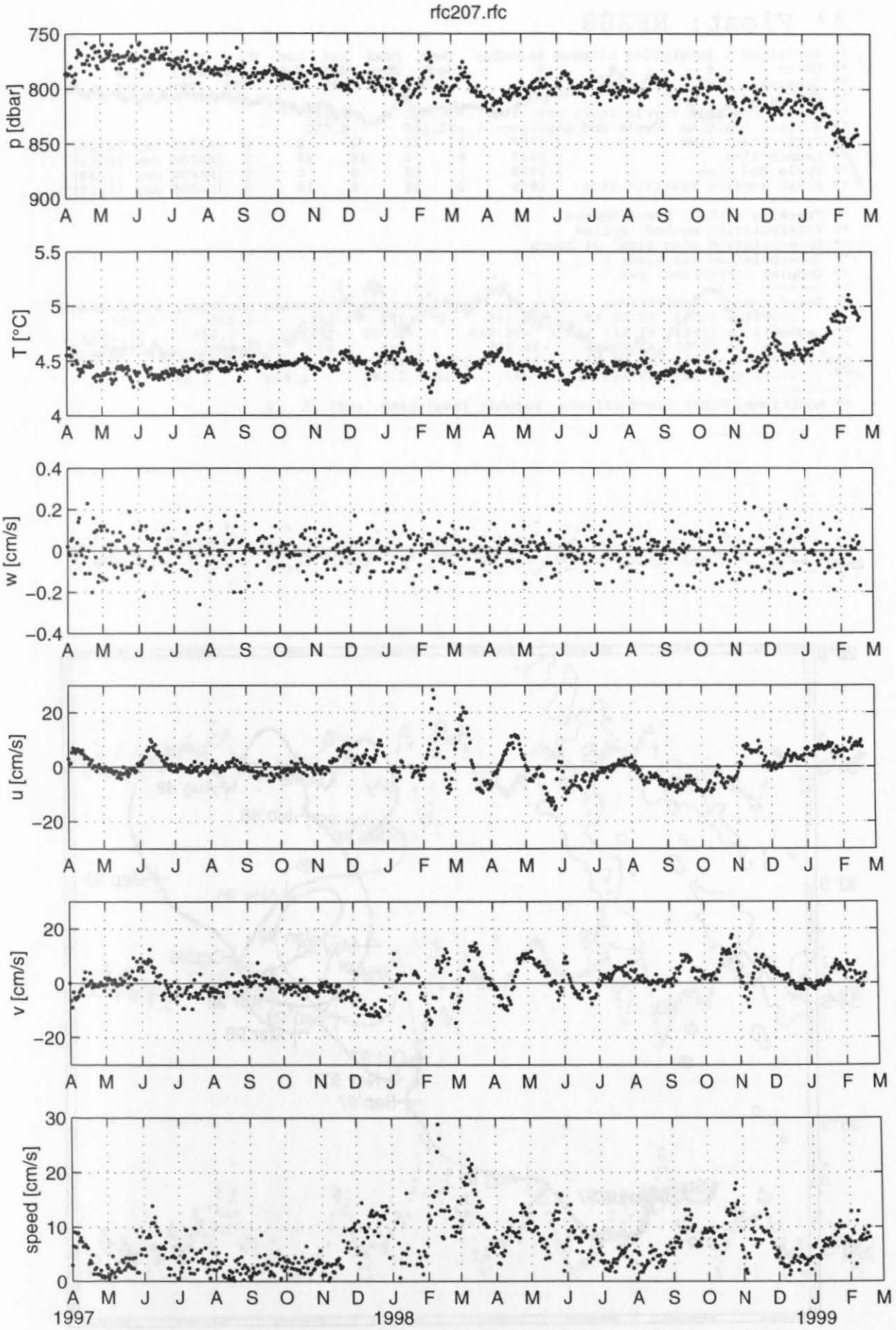



rfc206.rfc
p [dbar]
700
750
800
850
T [°C]
7
6.5
6
5.5
5
w [cm/s]
0.2
0.1
0
−0.1
−0.2
u [cm/s]
20
10
0
−10
−20
v [cm/s]
20
10
0
−10
−20
speed [cm/s]
20
15
10
5
0
M A M J J A S O N D J F M A M J J A S O N D J F M
1997
1998
1999

** Float: RF207

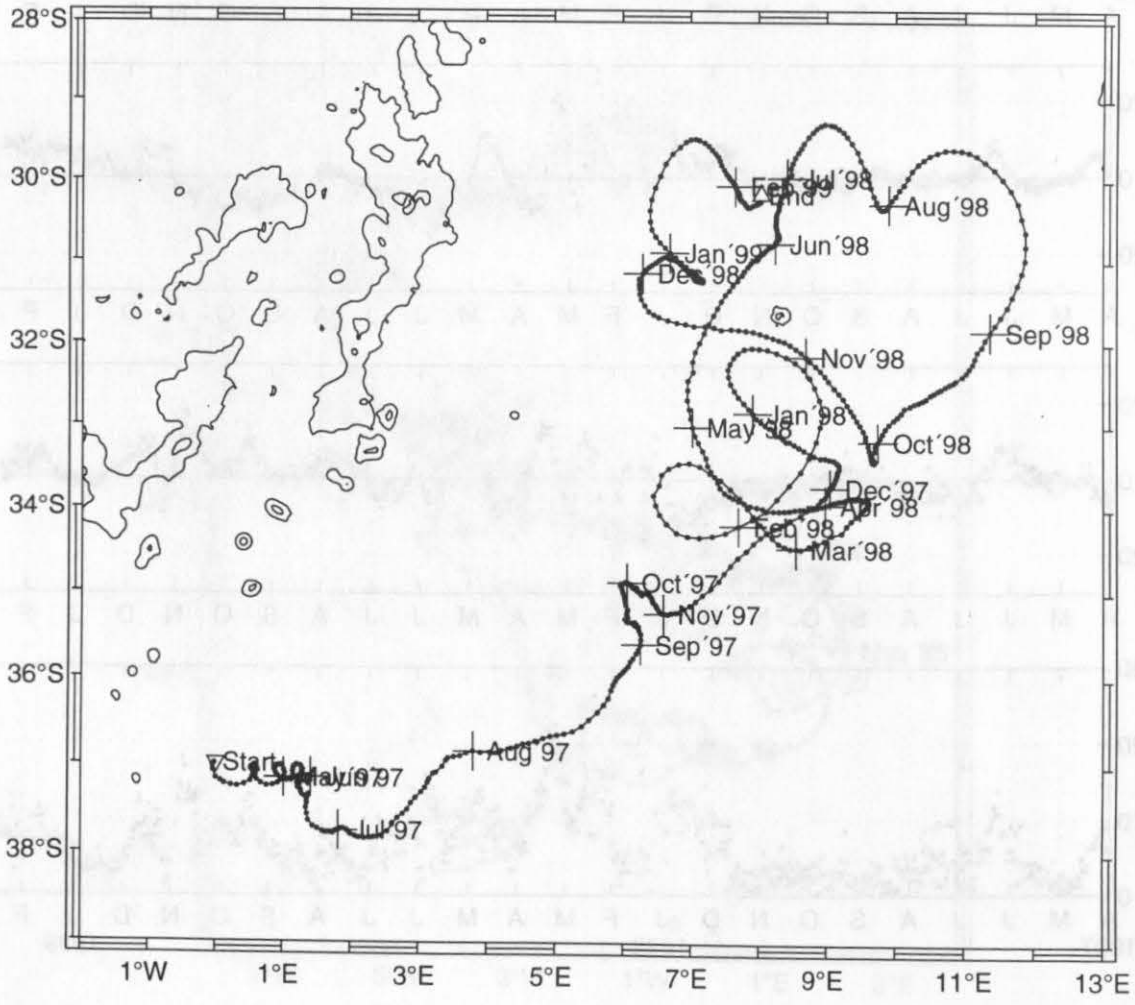
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -40.006    -5.0493
** Surface position (Cycle End position) : -36.274    -1.388
** Cycle Start time              : 1997   3   31   0   0   0  (RAFOS day 10539)
** Launch time                   : 1997   3   31   9   2   0  (RAFOS day 10539)
** Cycle End time                : 1999   2   18   0   0   0  (RAFOS day 11228)
** First surface Position time   : 1999   2   18   3   12  0  (RAFOS day 11228)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10540 to 10544: K7 K8 K8     -40.0058    -5.04927   1.481      1.481      1.481
**    10545 to 10700: K9 K8 K8     -40.0058    -5.04927   1.481      1.481      1.481
**    10701 to 10798: K9 K10       -40.0058    -5.04927   1.481      1.481      1.481
**    10799 to 10950: K9 K8        -40.0058    -5.04927   1.481      1.481      1.481
**    10951 to 11228: K9 M11 M11   -40.0058    -5.04927   1.481      1.481      1.481
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

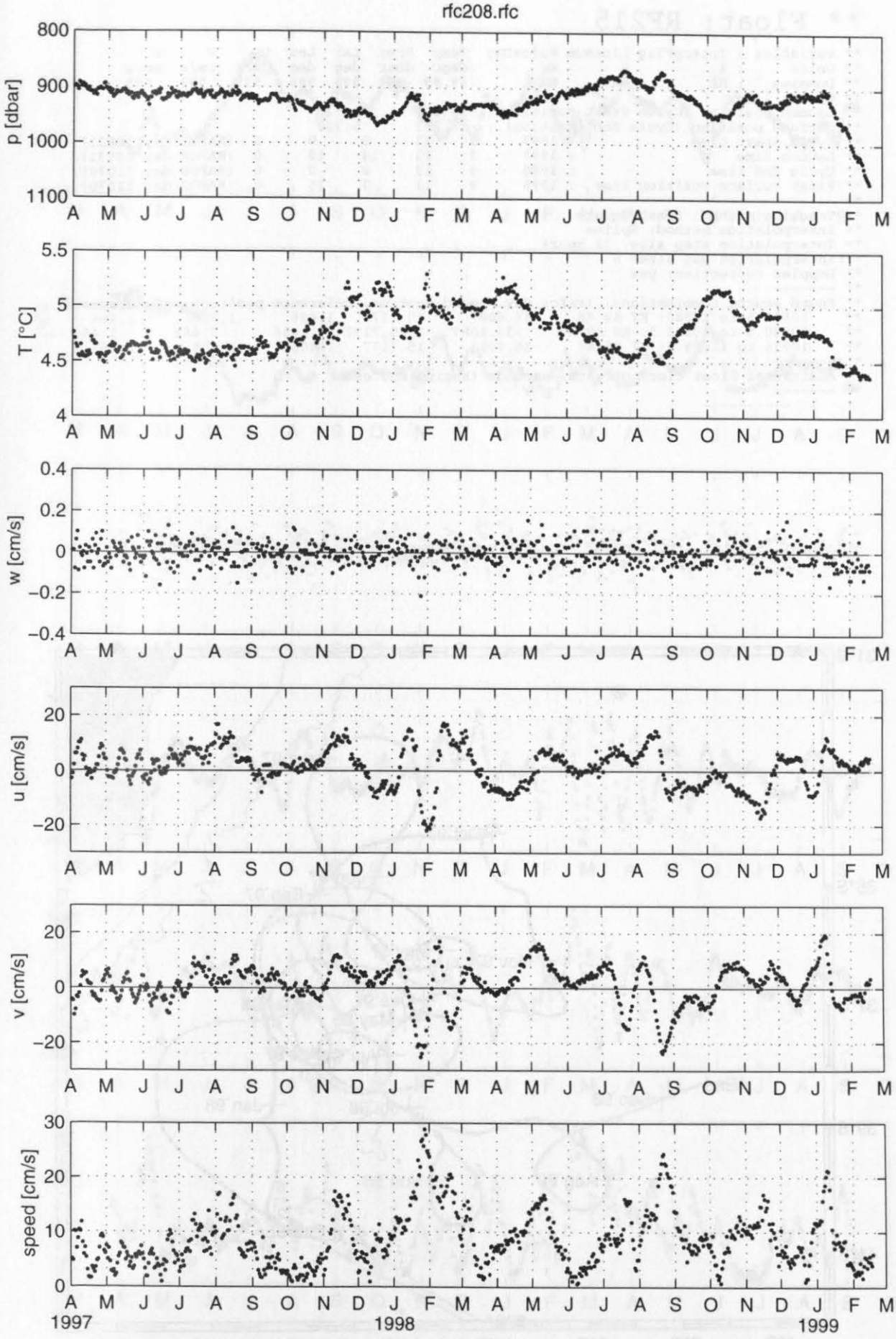



rfc207.rfc
p [dbar]
750
800
850
900
T [°C]
5.5
5
4.5
4
w [cm/s]
0.4
0.2
0
−0.2
−0.4
u [cm/s]
20
0
−20
v [cm/s]
20
0
−20
speed [cm/s]
30
20
10
0
A M J J A S O N D J F M A M J J A S O N D J F M
1997
1998
1999

** Float: RF208

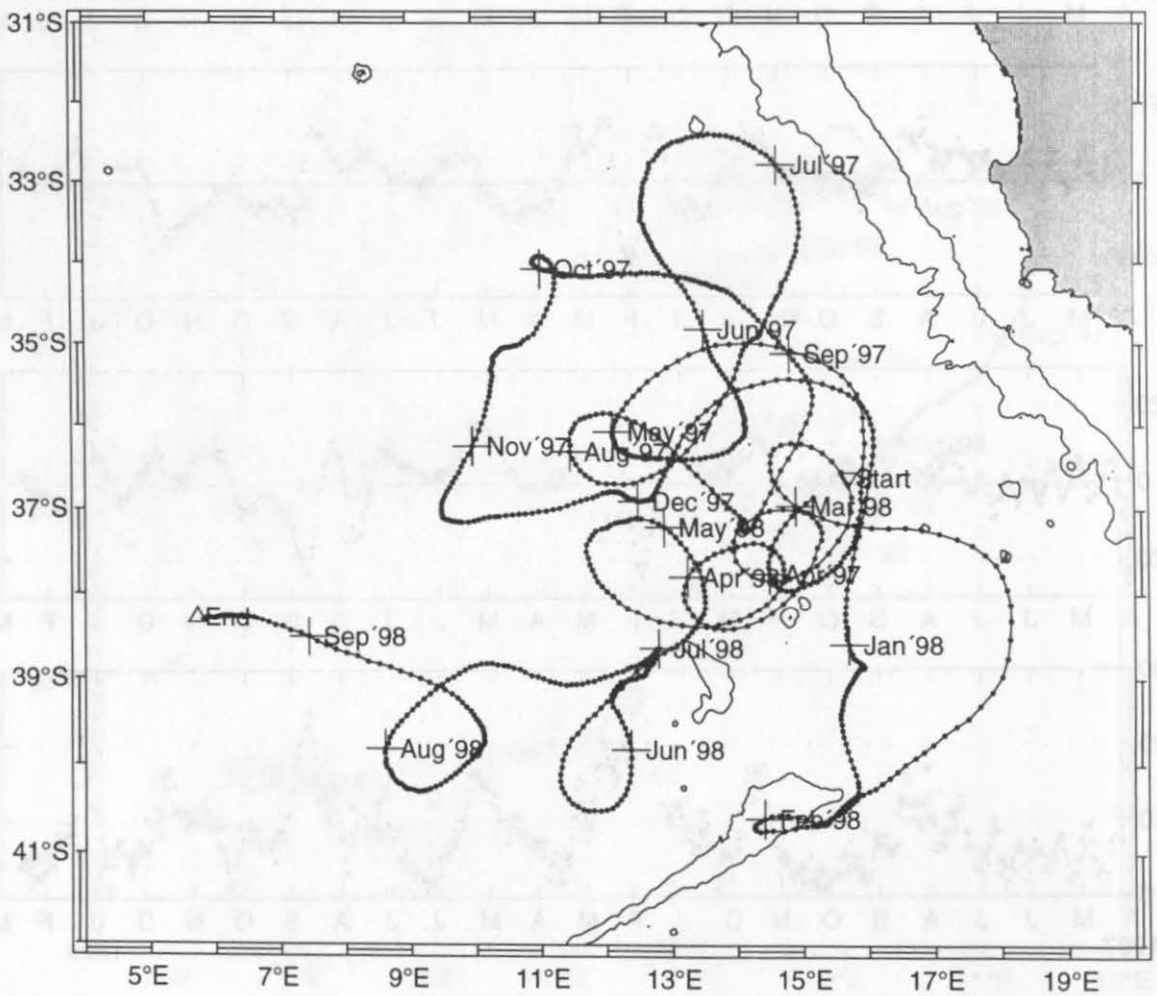
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -36.985       0.005
** Surface position (Cycle End position) : -30.166       8.058
** Cycle Start time              : 1997    3    31     0     0     0  (RAFOS day 10539)
** Launch time                   : 1997    4     1    14    37     0  (RAFOS day 10540)
** Cycle End time                : 1999    2    18     0     0     0  (RAFOS day 11228)
** First surface Position time   : 1999    2    18     3    10     0  (RAFOS day 11228)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10541 to 10543: K7 K8 K8     -36.985       0.005   1.485       1.485       1.485
**    10544 to 10644: K9 K10 K10    -36.985       0.005   1.485       1.485       1.485
**    10645 to 10700: K7 K8 K8     -36.985       0.005   1.485       1.485       1.485
**    10701 to 11060: K9 K7 K7     -34      10   1.485       1.485       1.485
**    11061 to 11228: K9 K10 K10    -33      10   1.485       1.485       1.485
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
*   1  ----------
```

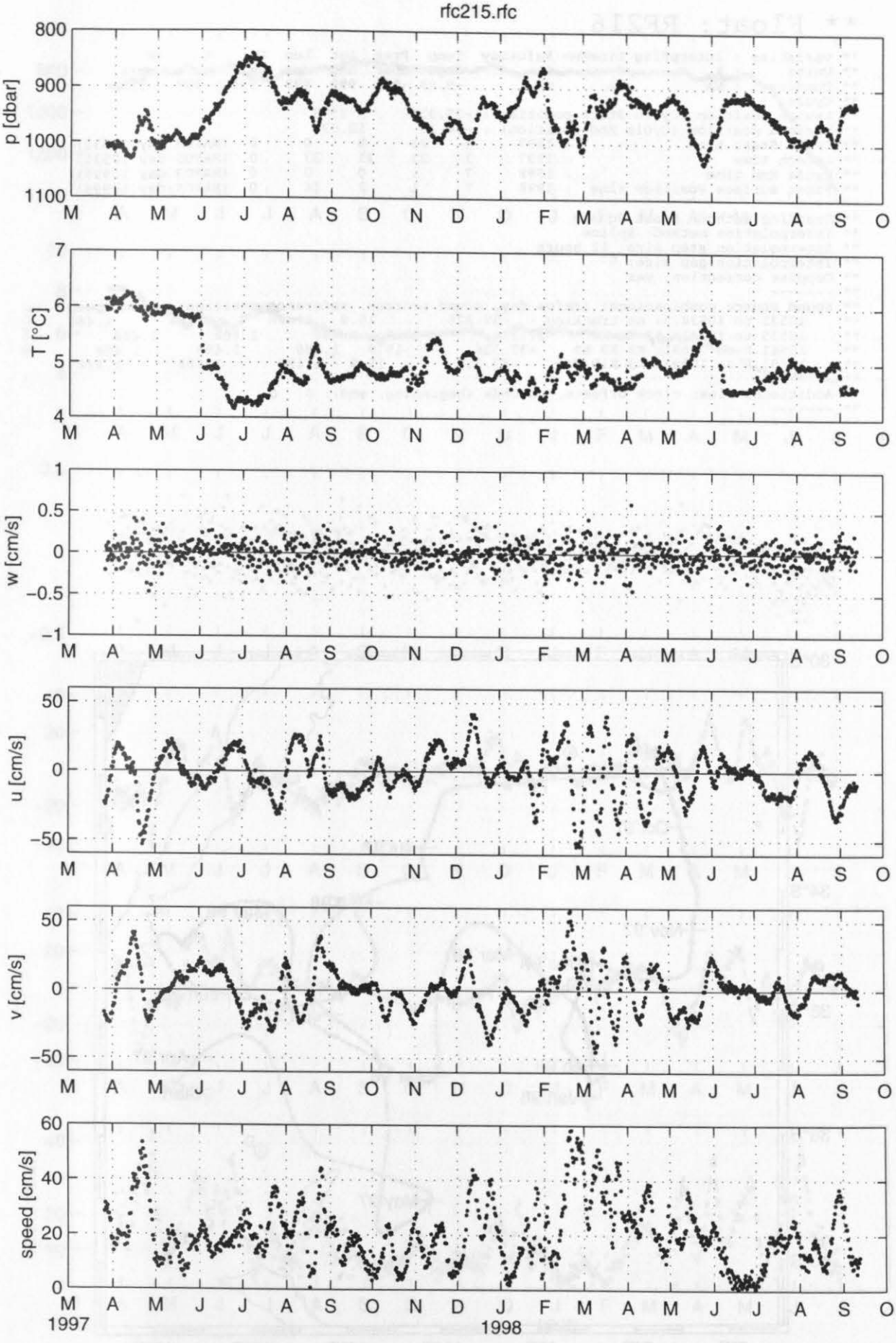



rfc208.rfc
p [dbar]
800
900
1000
1100
T [°C]
5.5
5
4.5
4
w [cm/s]
0.4
0.2
0
−0.2
−0.4
u [cm/s]
20
0
−20
v [cm/s]
20
0
−20
speed [cm/s]
30
20
10
0
A M J J A S O N D J F M A M J J A S O N D J F M
1997
1998
1999

** Float: RF215

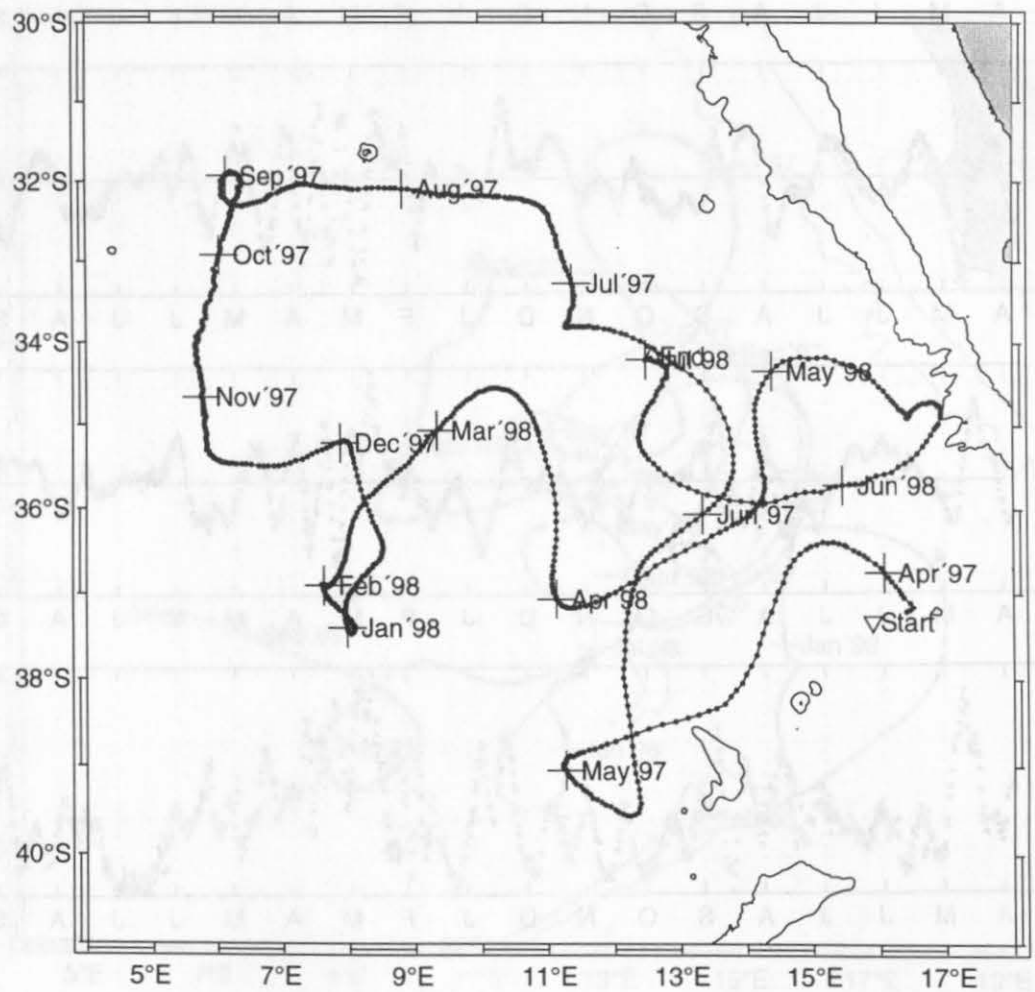
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -36.609      15.718
** Surface position (Cycle End position) : -38.283       5.723
** Cycle Start time              : 1997     3    23     0     0     0   (RAFOS day 10531)
** Launch time                   : 1997     3    23    14    10     0   (RAFOS day 10531)
** Cycle End time                : 1998     9    13     0     0     0   (RAFOS day 11070)
** First surface Position time   : 1998     9    13     2    25     0   (RAFOS day 11070)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10534.5 to 10580: K7 K8 K8    -36.6087     15.7177   1.486       1.486       1.486
**    10580.5 to 10933.5: K8 K9 K9    -36.6087     15.7177   1.486       1.486       1.486
**    10934 to 11069.5: K7 K8 K8    -36.6087     15.7177   1.486       1.486       1.486
** -------
** Additional Float clock offsets, seconds (beginning, end): 0    0
** -------
 *   1  ----------
```

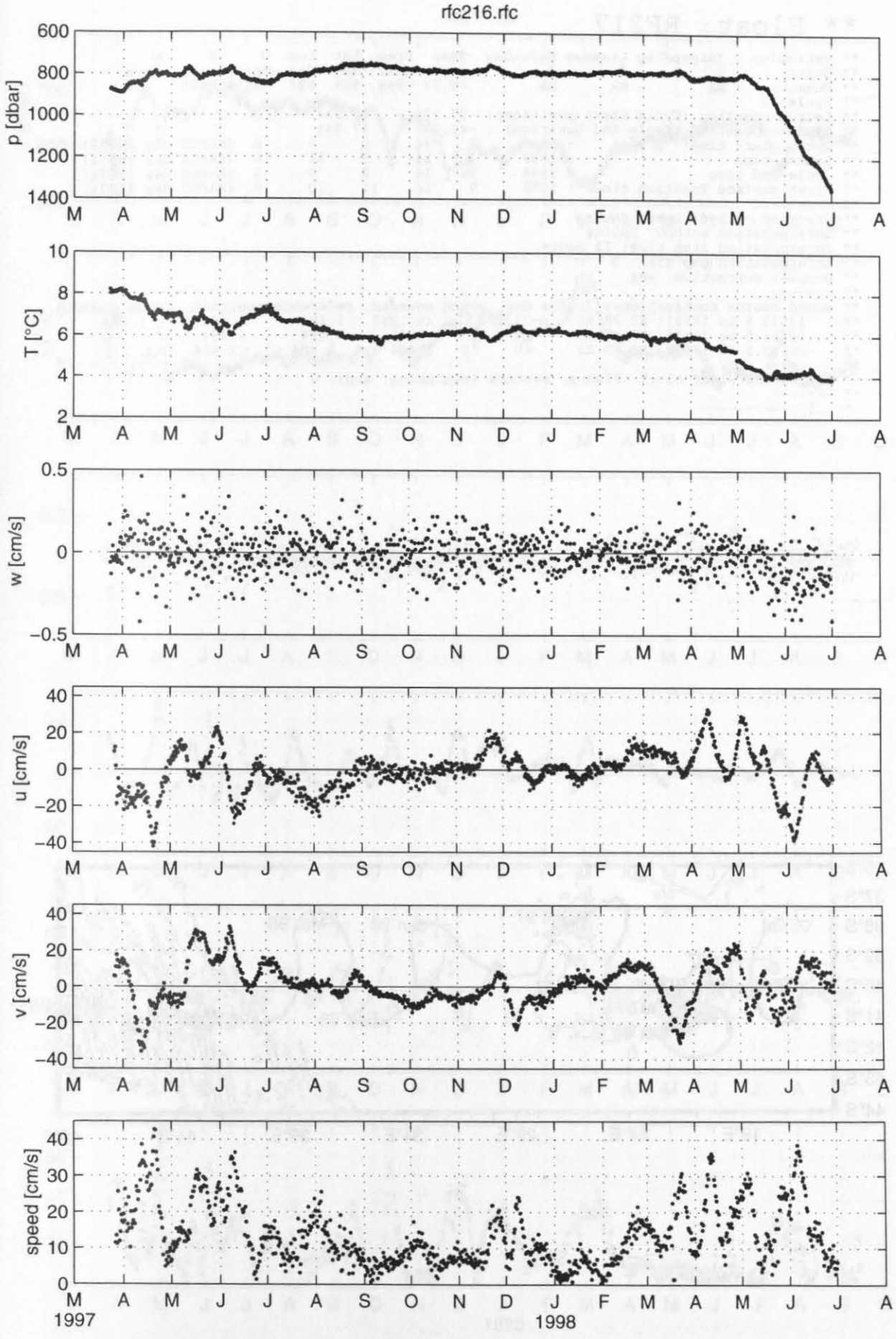



rfc215.rfc
p [dbar]
800
900
1000
1100
T [°C]
7
6
5
4
w [cm/s]
1
0.5
0
−0.5
−1
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
60
40
20
0
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF216

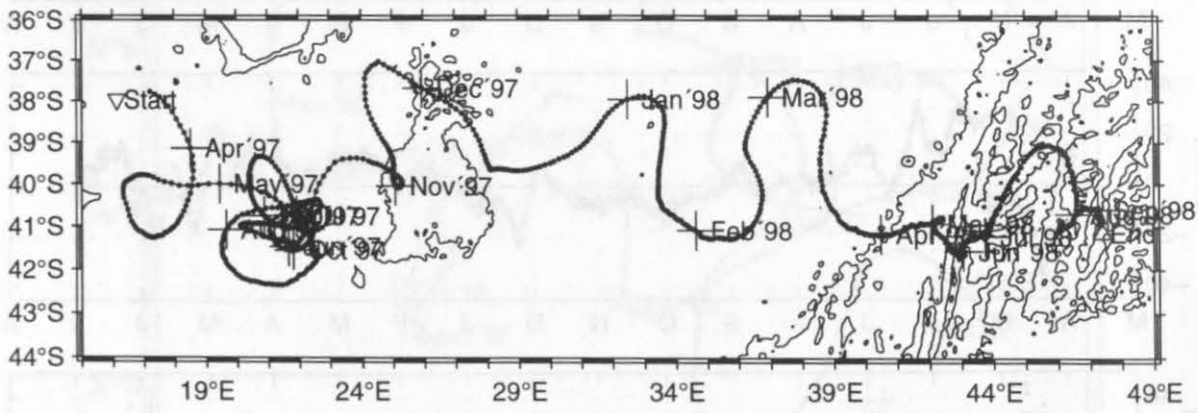
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -37.326      15.9
** Surface position (Cycle End position) : -34.16      12.62
** Cycle Start time              : 1997    3    23     0     0     0   (RAFOS day 10531)
** Launch time                   : 1997    3    23    21    33     0   (RAFOS day 10531)
** Cycle End time                : 1998    7     1     0     0     0   (RAFOS day 10996)
** First surface Position time   : 1998    7     1     2    36     0   (RAFOS day 10996)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10532 to 10534.5: no tracking     -37.326        15.9   1.488      1.488      1.488
**    10535 to 10541: K7 K8 K8     -37.326        15.9   1.488      1.488      1.488
**    10541.5 to 10891: K8 K9 K9     -37.326        15.9   1.488      1.488      1.488
**    10891.5 to 10996: K9 K10 K10     -37.326        15.9   1.488      1.488      1.488
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

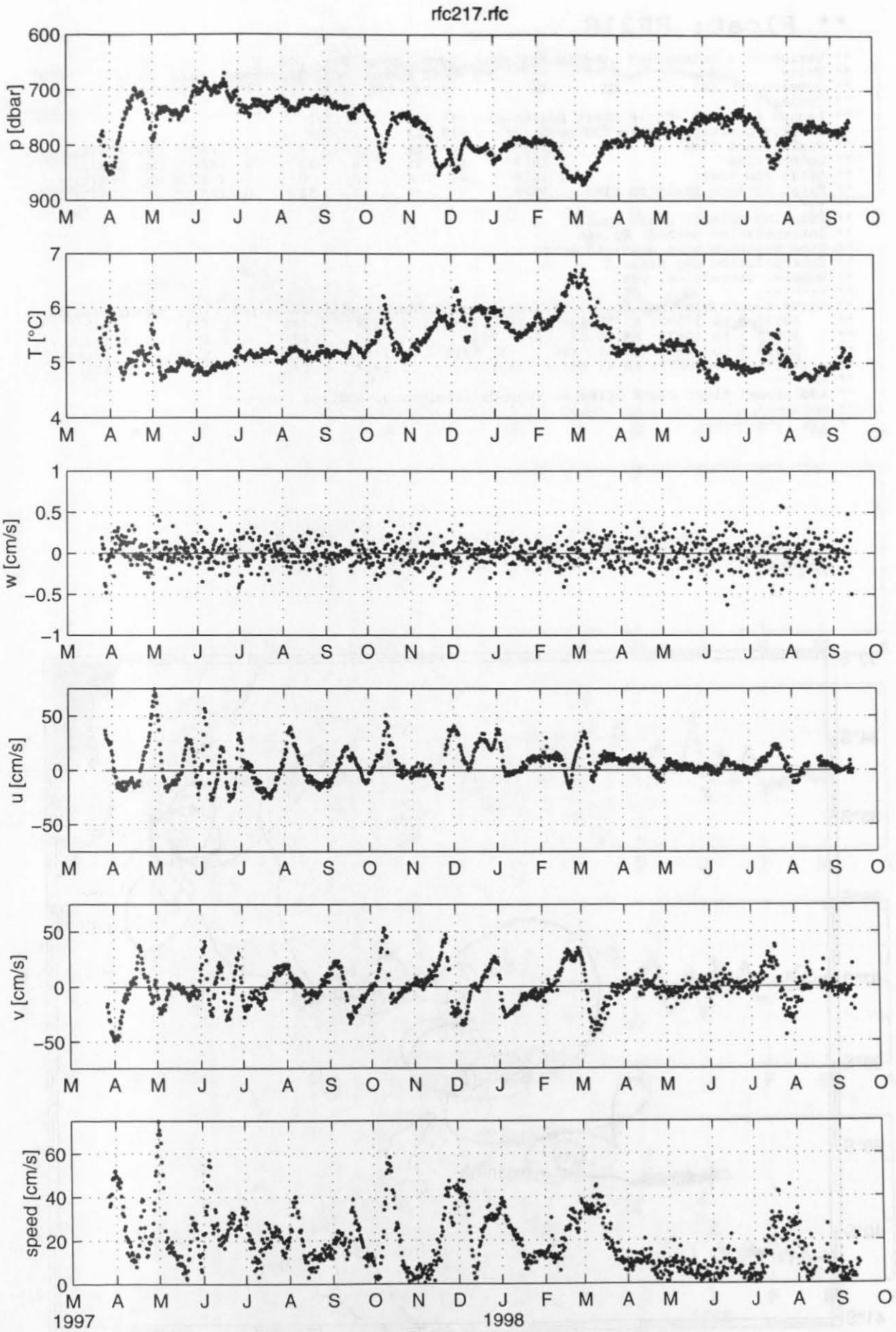



rfc216.rfc
p [dbar]
600
800
1000
1200
1400
T [°C]
10
8
6
4
2
w [cm/s]
0.5
0
−0.5
u [cm/s]
40
20
0
−20
−40
v [cm/s]
40
20
0
−20
−40
speed [cm/s]
40
30
20
10
0
M A M J J A S O N D J F M A M J J A
1997
1998

** Float: RF217

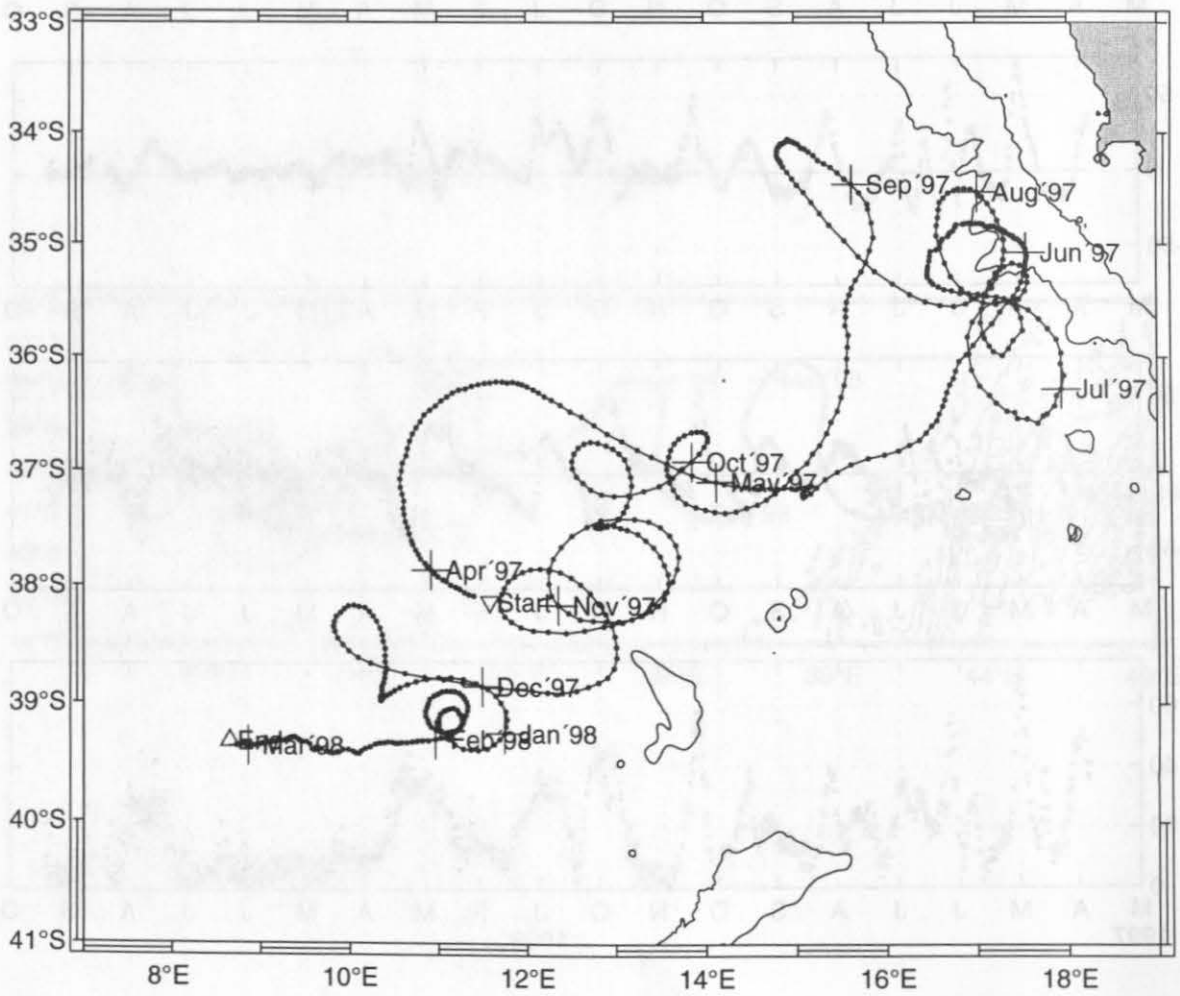
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -37.974     16.134
** Surface position (Cycle End position) : -41.148     47.381
** Cycle Start time              : 1997    3    24     0     0     0   (RAFOS day 10532)
** Launch time                   : 1997    3    24     9    51     0   (RAFOS day 10532)
** Cycle End time                : 1998    9    14     0     0     0   (RAFOS day 11071)
** First surface Position time   : 1998    9    14    11    10     0   (RAFOS day 11071)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10532.5 to 10691: K7 K8 K8    -37.974     16.1345   1.484      1.484      1.484
**    10691.5 to 10850: K7 R1 R1    -40   20    1.484      1.484      1.484
**    10850.5 to 11071: R1 R2 R2    -40    50    1.484      1.484      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 0    0
** -------
 *   1  ----------
```

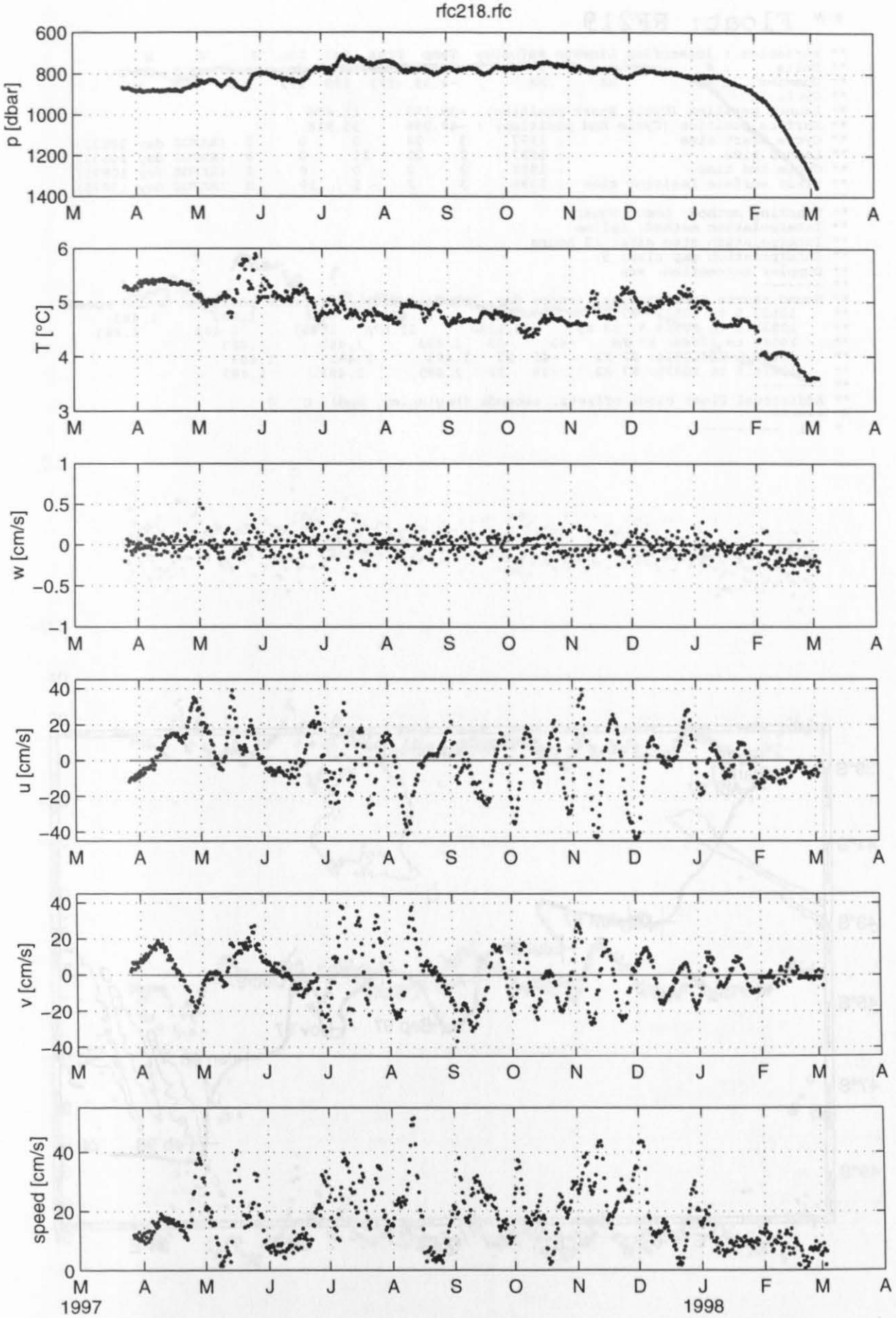



rfc217.rfc
p [dbar]
600
700
800
900
T [°C]
7
6
5
4
w [cm/s]
1
0.5
0
−0.5
−1
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
60
40
20
0
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF218

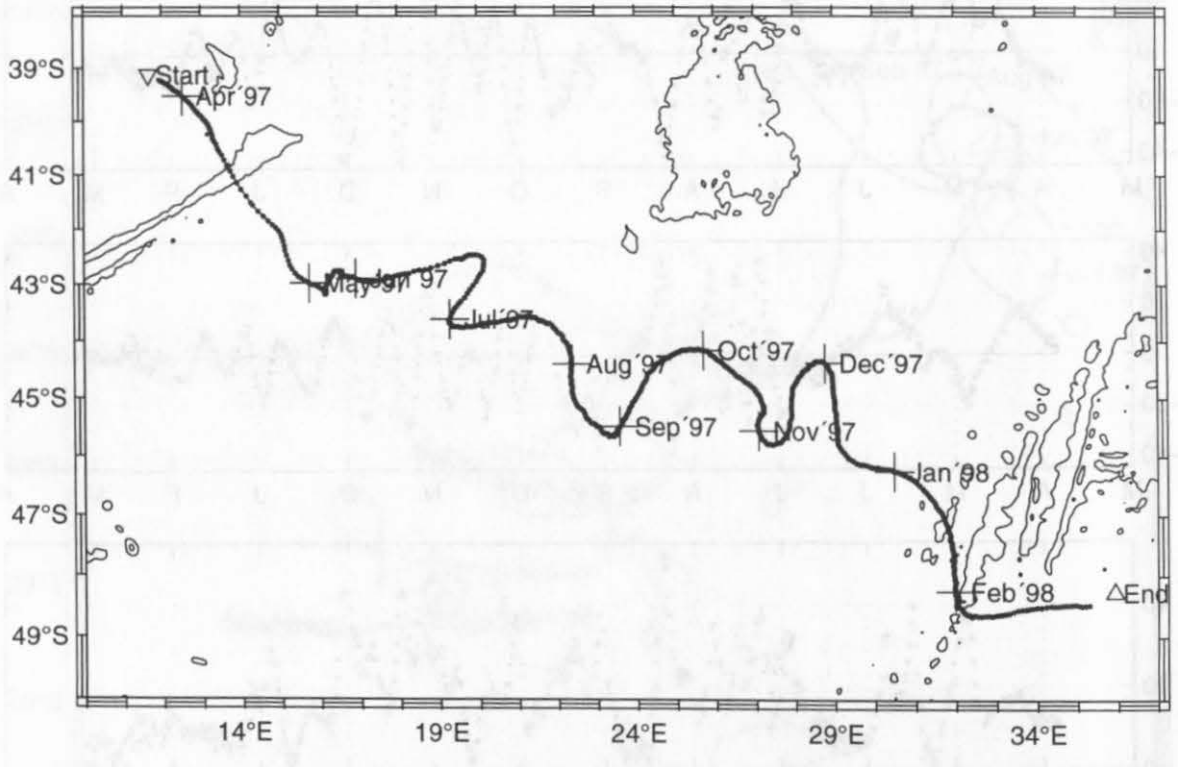
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -38.132     11.581
** Surface position (Cycle End position) : -39.323      8.658
** Cycle Start time             : 1997    3    24     0     0     0   (RAFOS day 10532)
** Launch time                  : 1997    3    25     6    33     0   (RAFOS day 10533)
** Cycle End time               : 1998    3     4     0     0     0   (RAFOS day 10877)
** First surface Position time  : 1998    3     4     4    33     0   (RAFOS day 10877)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10533.5 to 10570: K7 K8 K8     -38.1318     11.5813   1.483      1.483      1.483
**    10570.5 to 10678: K8 K9 K9     -38.1318     11.5813   1.483      1.483      1.483
**    10678.5 to 10694: K9 K10 K10    -38.1318     11.5813   1.483      1.483      1.483
**    10694.5 to 10877: K8 K7 K7     -38.1318     11.5813   1.483      1.483      1.483
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
  *   1  ----------
```

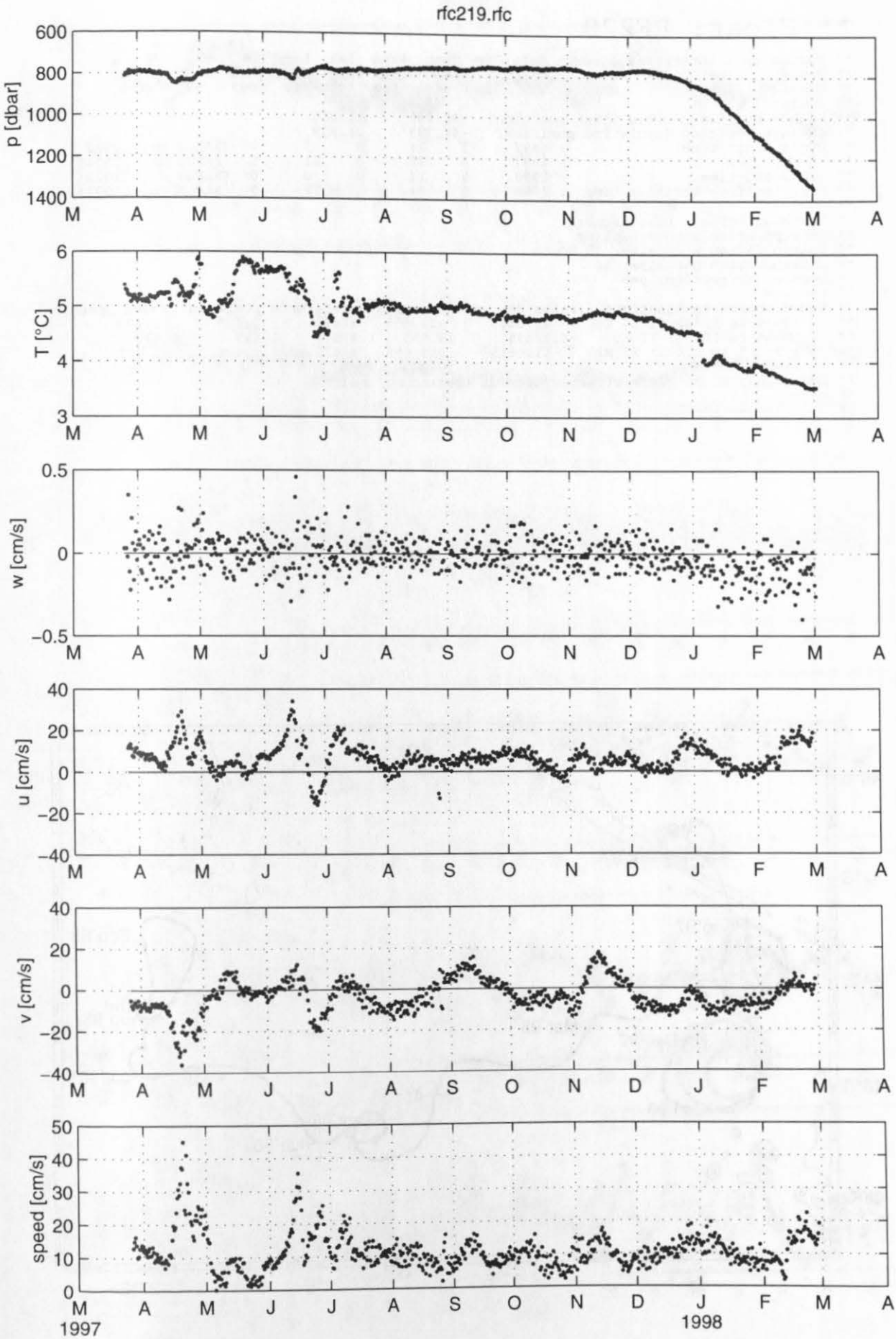



rfc218.rfc
p [dbar]
600
800
1000
1200
1400
T [°C]
6
5
4
3
w [cm/s]
1
0.5
0
−0.5
−1
u [cm/s]
40
20
0
−20
−40
v [cm/s]
40
20
0
−20
−40
speed [cm/s]
40
20
0
M A M J J A S O N D J F M A
1997
1998

** Float: RF219

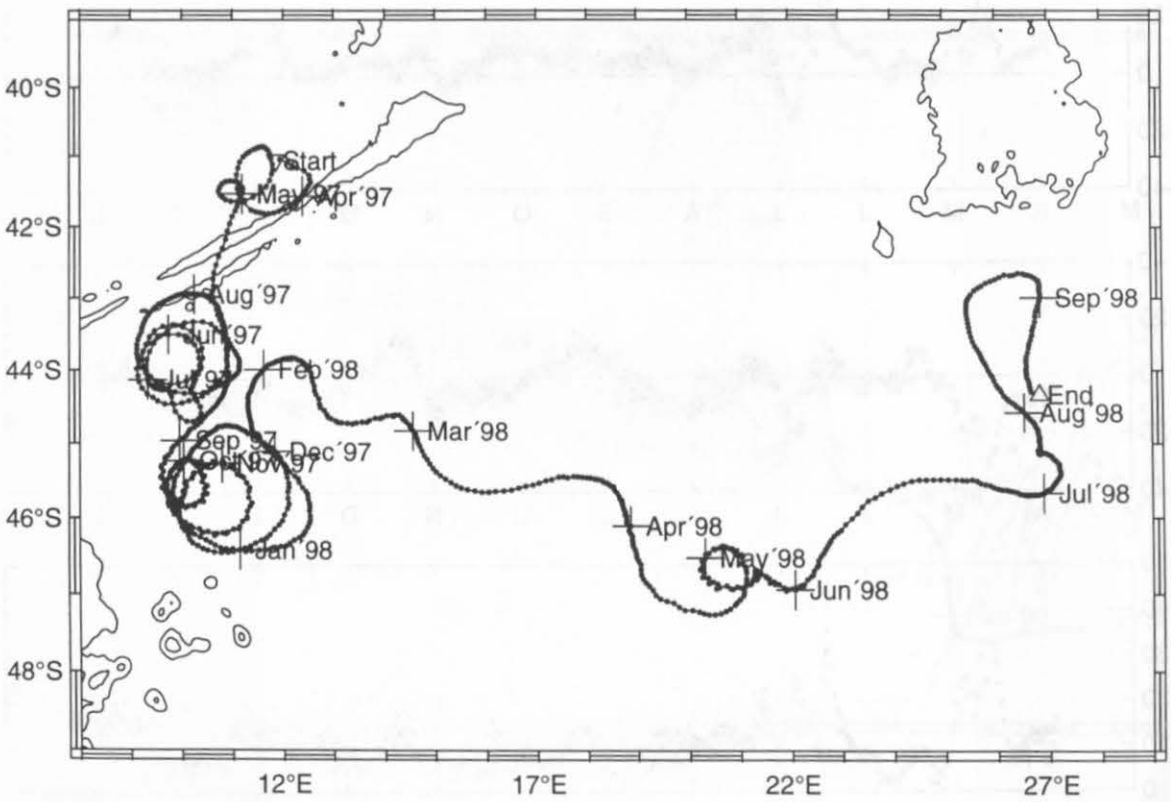
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -39.129      11.676
** Surface position (Cycle End position) : -48.266      35.918
** Cycle Start time              : 1997    3    24     0     0     0   (RAFOS day 10532)
** Launch time                   : 1997    3    25    13     0     0   (RAFOS day 10533)
** Cycle End time                : 1998    3     2     0     0     0   (RAFOS day 10875)
** First surface Position time   : 1998    3     2     5    19     0   (RAFOS day 10875)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10533.5 to 10537: K7 K8     -39.1288      11.676   1.483      1.483      1.483
**    10537.5 to 10559.5: K8 K9   -39.1288      11.676   1.483      1.483      1.483
**    10560 to 10688: K7 K8    -43     20    1.483      1.483      1.483
**    10688.5 to 10814: K7 R2    -46   25    1.483      1.483      1.483
**    10814.5 to 10875: K7 R2    -48    32   1.483      1.483      1.483
** -------
** Additional Float clock offsets, seconds (beginning, end): 0    0
** -------
 *   1  ----------
```

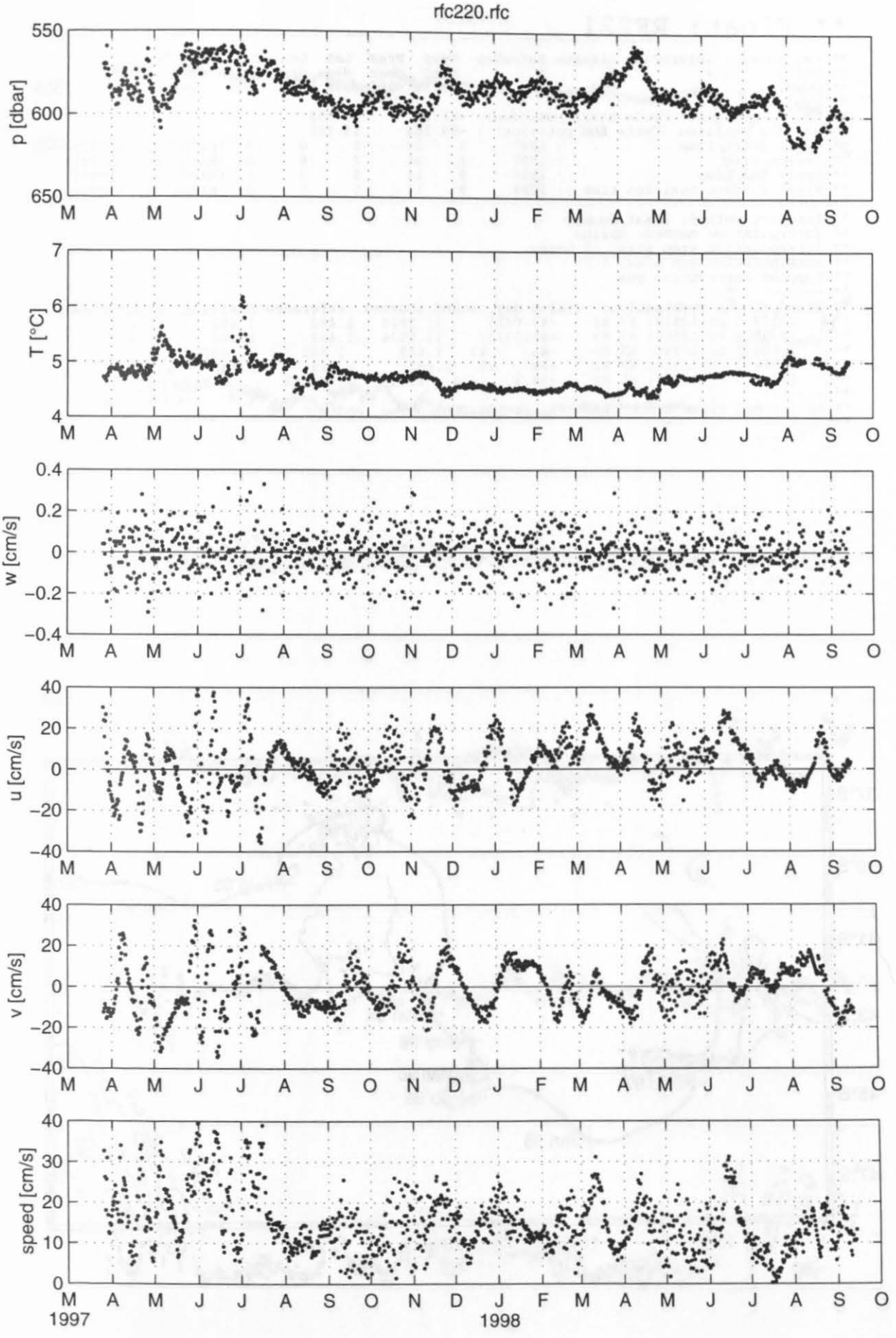



rfc219.rfc
p [dbar]
600
800
1000
1200
1400
T [°C]
6
5
4
3
w [cm/s]
0.5
0
−0.5
u [cm/s]
40
20
0
−20
−40
v [cm/s]
40
20
0
−20
−40
speed [cm/s]
50
40
30
20
10
0
M A M J J A S O N D J F M A
1997
1998

** Float: RF220

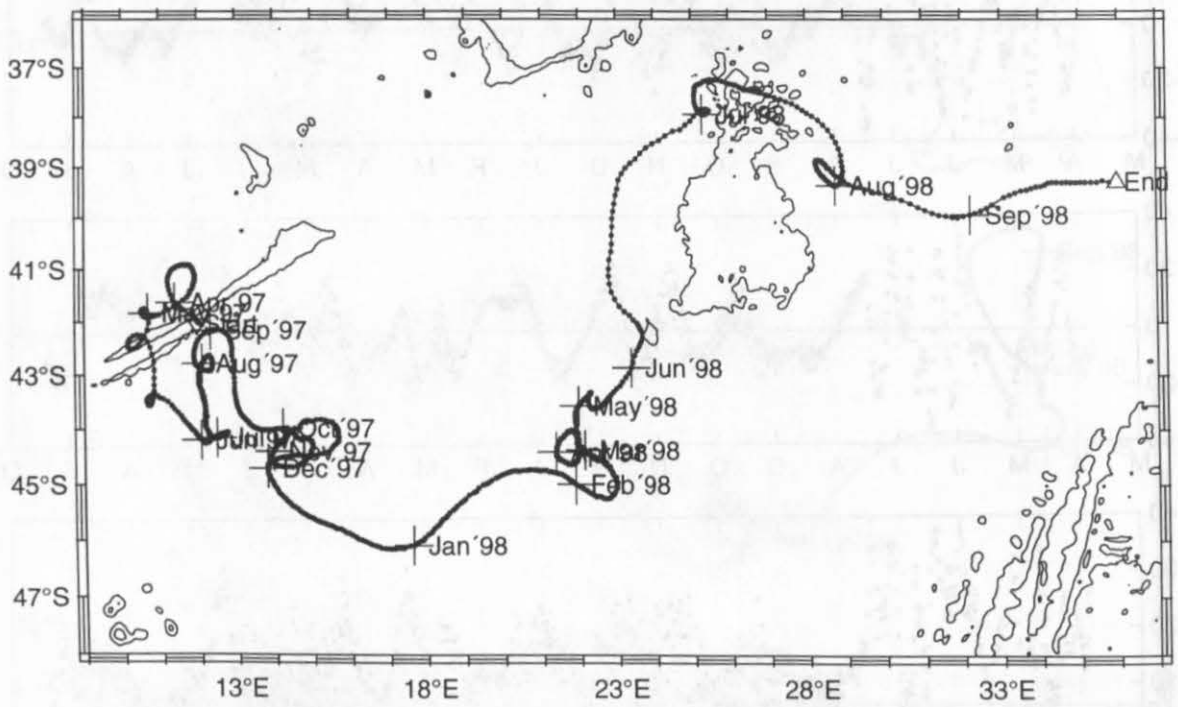
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -41.063     11.855
** Surface position (Cycle End position) : -44.333     26.829
** Cycle Start time              : 1997    3    24     0     0     0   (RAFOS day 10532)
** Launch time                   : 1997    3    26     0    41     0   (RAFOS day 10534)
** Cycle End time                : 1998    9    14     0     0     0   (RAFOS day 11071)
** First surface Position time   : 1998    9    14     3    22     0   (RAFOS day 11071)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 50
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10534 to 10545.5: K7 K8    -41.0635      11.855   1.479      1.479      1.479
**    10546 to 10950: K7 K9     -41.0635      11.855   1.479      1.479      1.479
**    10950.5 to 11071: K7 R2    -41.0635      11.855   1.479      1.479      1.479
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

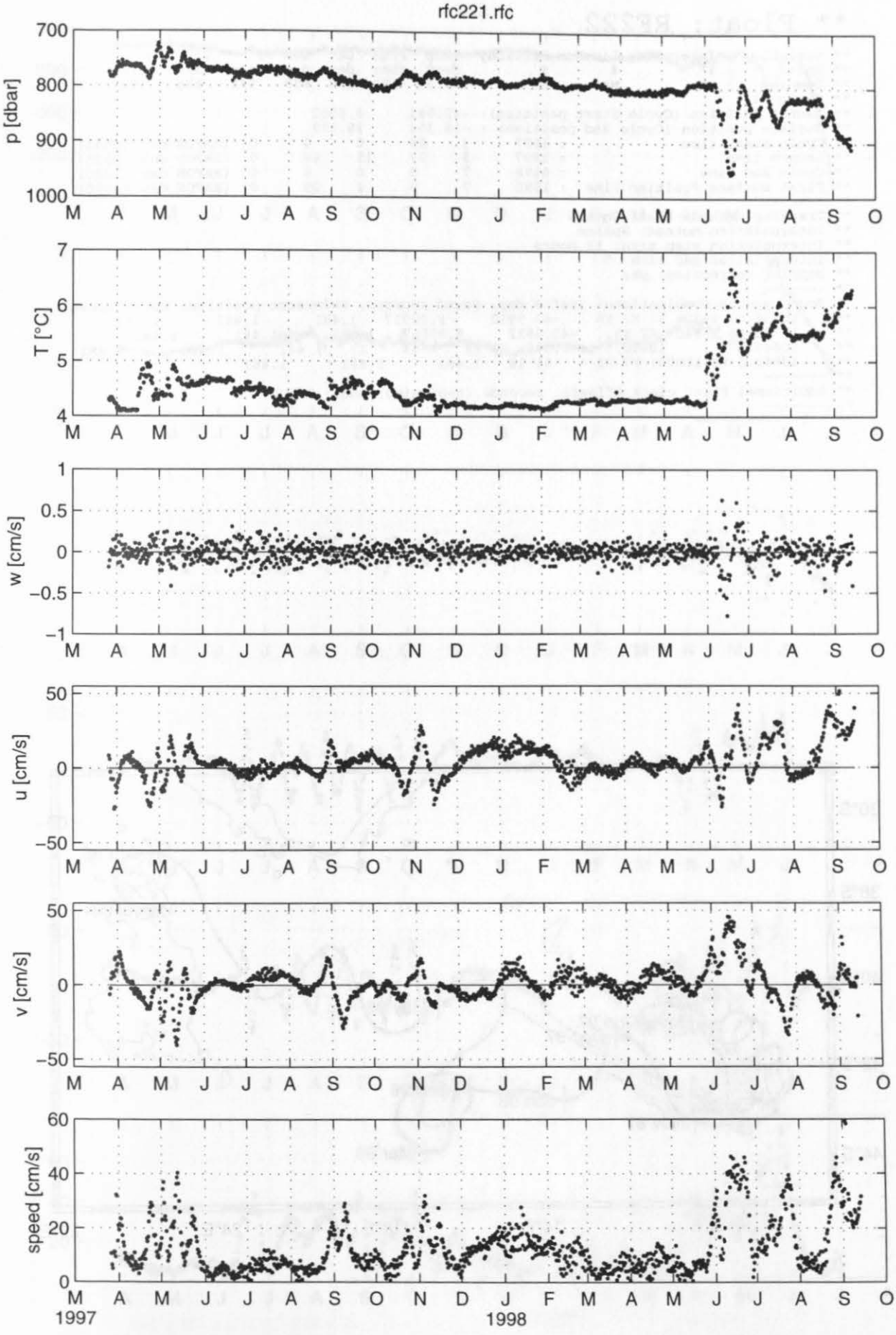



rfc220.rfc
p [dbar]
550
600
650
T [°C]
7
6
5
4
w [cm/s]
0.4
0.2
0
−0.2
−0.4
u [cm/s]
40
20
0
−20
−40
v [cm/s]
40
20
0
−20
−40
speed [cm/s]
40
30
20
10
0
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF221

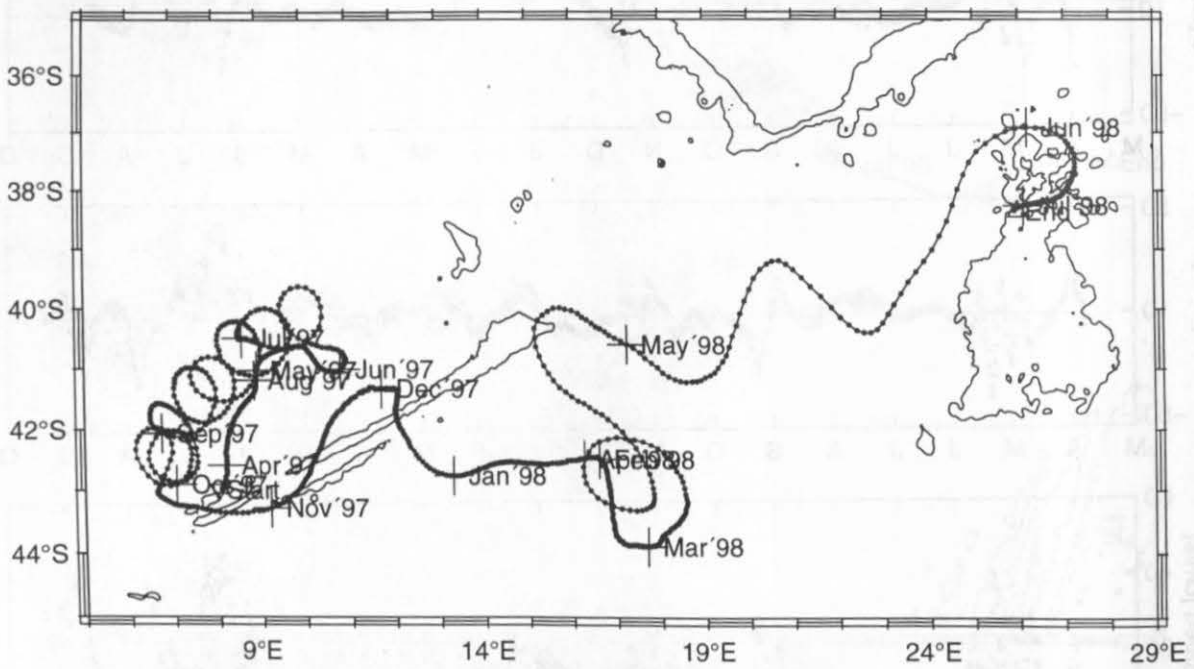
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat   Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg   deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999   999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -42.032     11.952
** Surface position (Cycle End position) : -39.264     35.968
** Cycle Start time              : 1997    3    24     0     0     0   (RAFOS day 10532)
** Launch time                   : 1997    3    26     7     6     0   (RAFOS day 10534)
** Cycle End time                : 1998    9    14     0     0     0   (RAFOS day 11071)
** First surface Position time   : 1998    9    14     5     0     0   (RAFOS day 11071)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10534.5 to 10538: K7 K8    -42.0323     11.9524   1.482      1.482      1.482
**    10538.5 to 10800: K7 K9    -42.0323     11.9524   1.482      1.482      1.482
**    10800.5 to 10990: K7 K8    -46     17   1.482      1.482      1.482
**    10990.5 to 11060: K7 R1    -38     25   1.482      1.482      1.482
**    11060.5 to 11071: R1 R2    -39.5     34   1.482      1.482      1.482
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

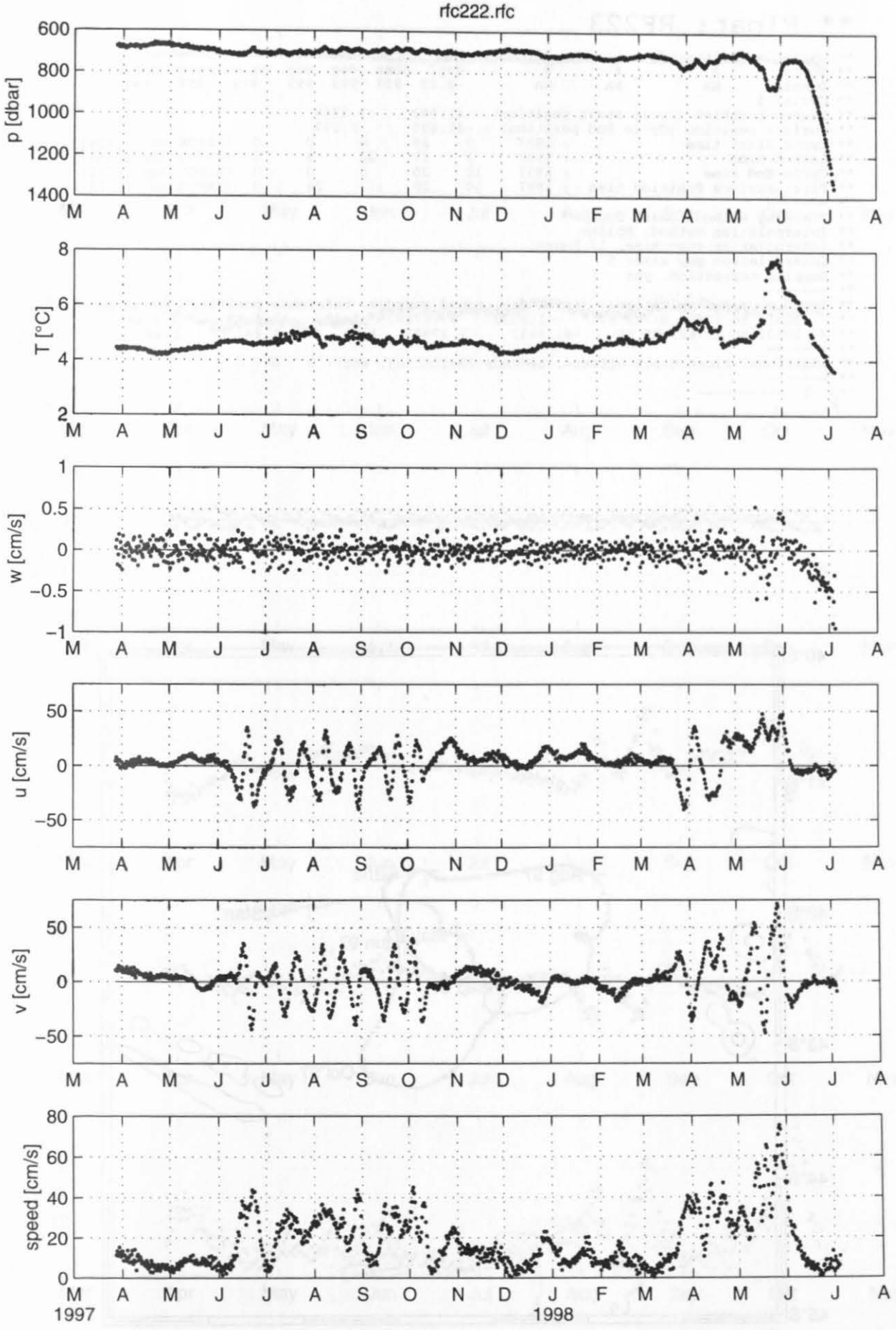



rfc221.rfc
p [dbar]
700
800
900
1000
T [°C]
7
6
5
4
w [cm/s]
1
0.5
0
−0.5
−1
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
60
40
20
0
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF222

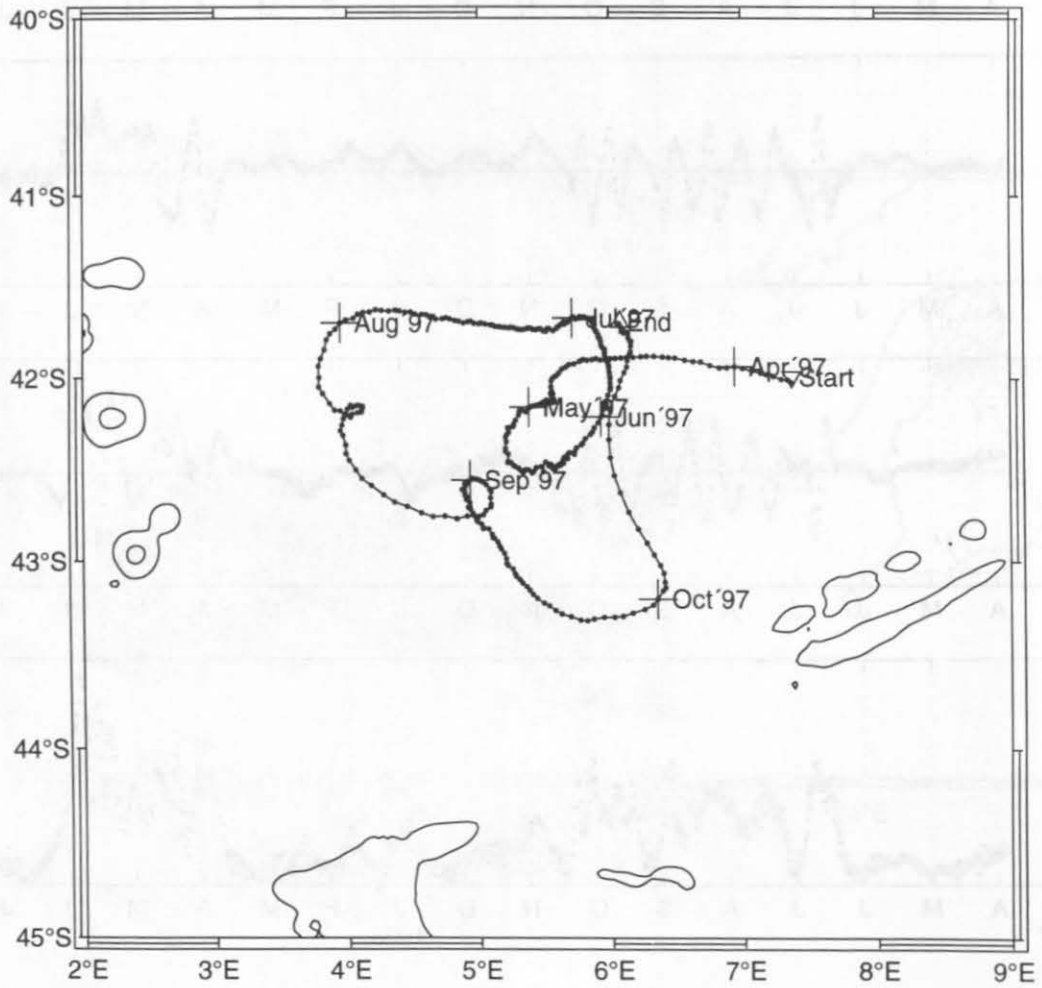
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -42.991      8.0002
** Surface position (Cycle End position) : -38.354      25.979
** Cycle Start time              : 1997    3    26     0     0     0   (RAFOS day 10534)
** Launch time                   : 1997    3    27    15    48     0   (RAFOS day 10535)
** Cycle End time                : 1998    7     5     0     0     0   (RAFOS day 11000)
** First surface Position time   : 1998    7     5     4    25     0   (RAFOS day 11000)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10536 to 10725.5: K7 K8     -42.9912     8.00017   1.481      1.481      1.481
**    10726 to 10840: K7 K9     -42.9912     8.00017   1.481      1.481      1.481
**    10840.5        10840.5 to 10940: K7 K8     -43     17   1.481      1.481      1.481
**    10940.5 to 11000: K7 R1     -41 18   1.481      1.481      1.481
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

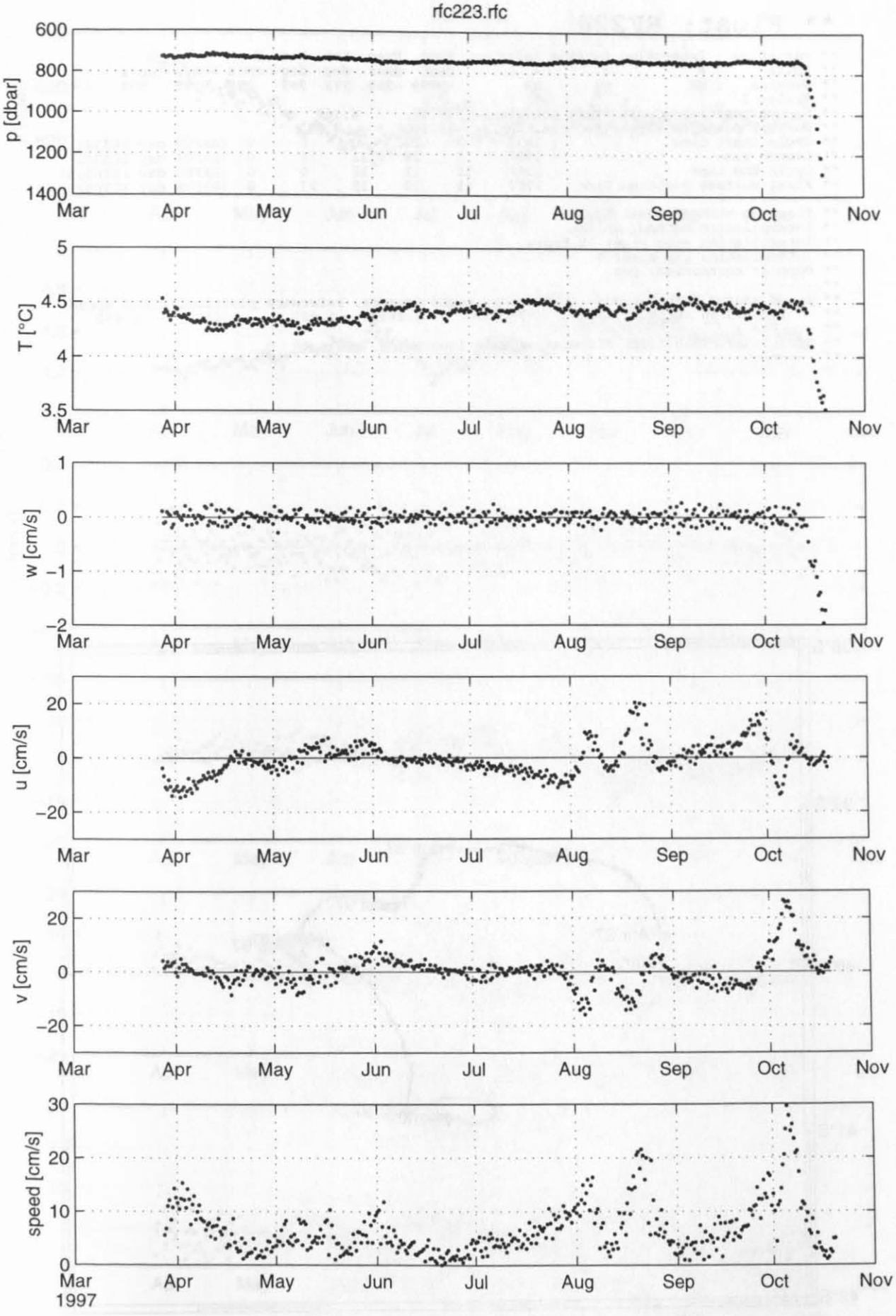



rfc222.rfc
p [dbar]
600
800
1000
1200
1400
T [°C]
8
6
4
2
w [cm/s]
1
0.5
0
−0.5
−1
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
80
60
40
20
0
M A M J J A S O N D J F M A M J J A
1997
1998

** Float: RF223

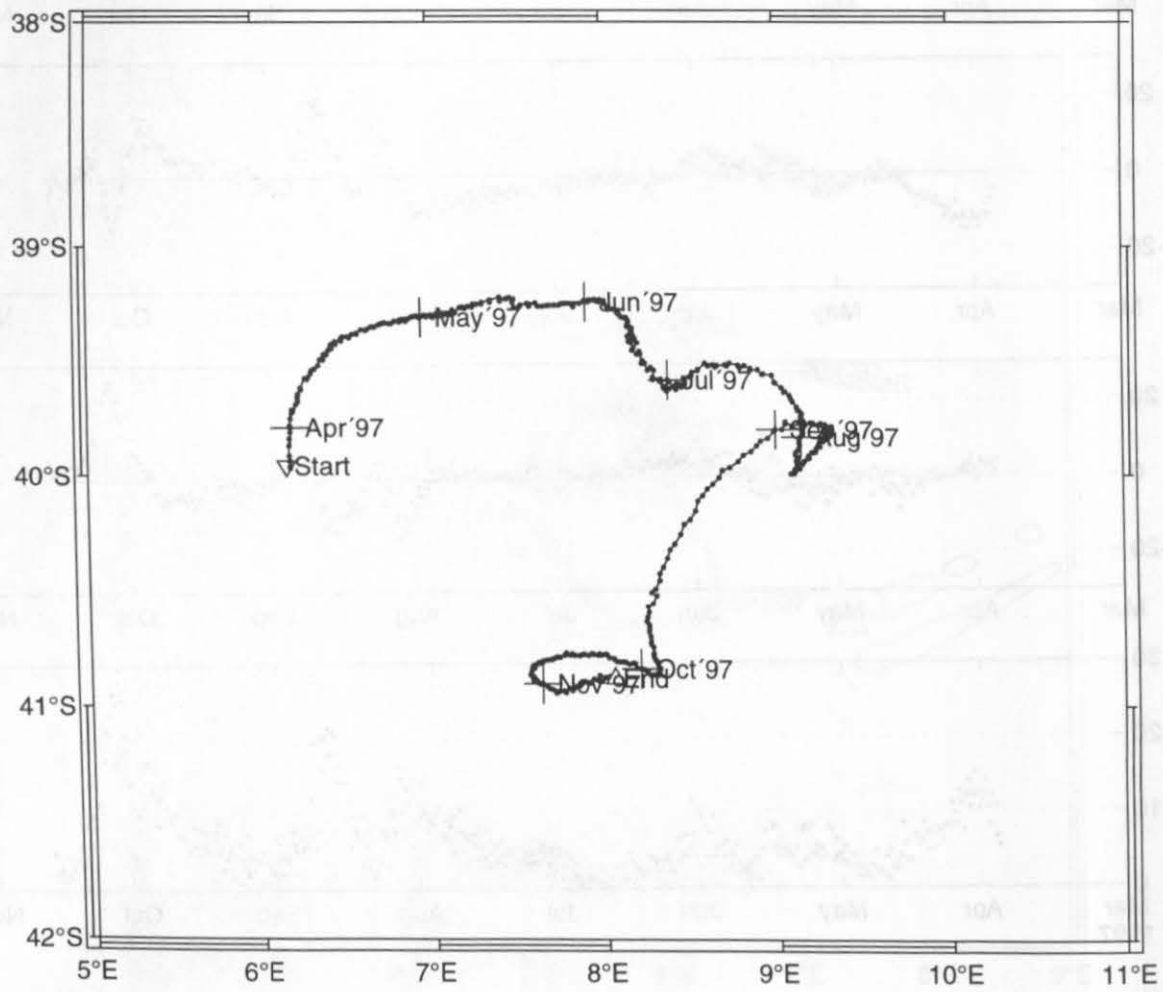
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -41.993     7.3768
** Surface position (Cycle End position) : -41.695      6.077
** Cycle Start time             : 1997    3    26     0     0     0   (RAFOS day 10534)
** Launch time                  : 1997    3    27    22     8     0   (RAFOS day 10535)
** Cycle End time               : 1997   10    20     0     0     0   (RAFOS day 10742)
** First surface Position time  : 1997   10    20     2    24     0   (RAFOS day 10742)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10536 to 10600.5: K8 K7    -41.9932     7.37683   1.48       1.48       1.48
**    10601 to 10742: K8 K9      -41.9932     7.37683   1.48       1.48       1.48
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

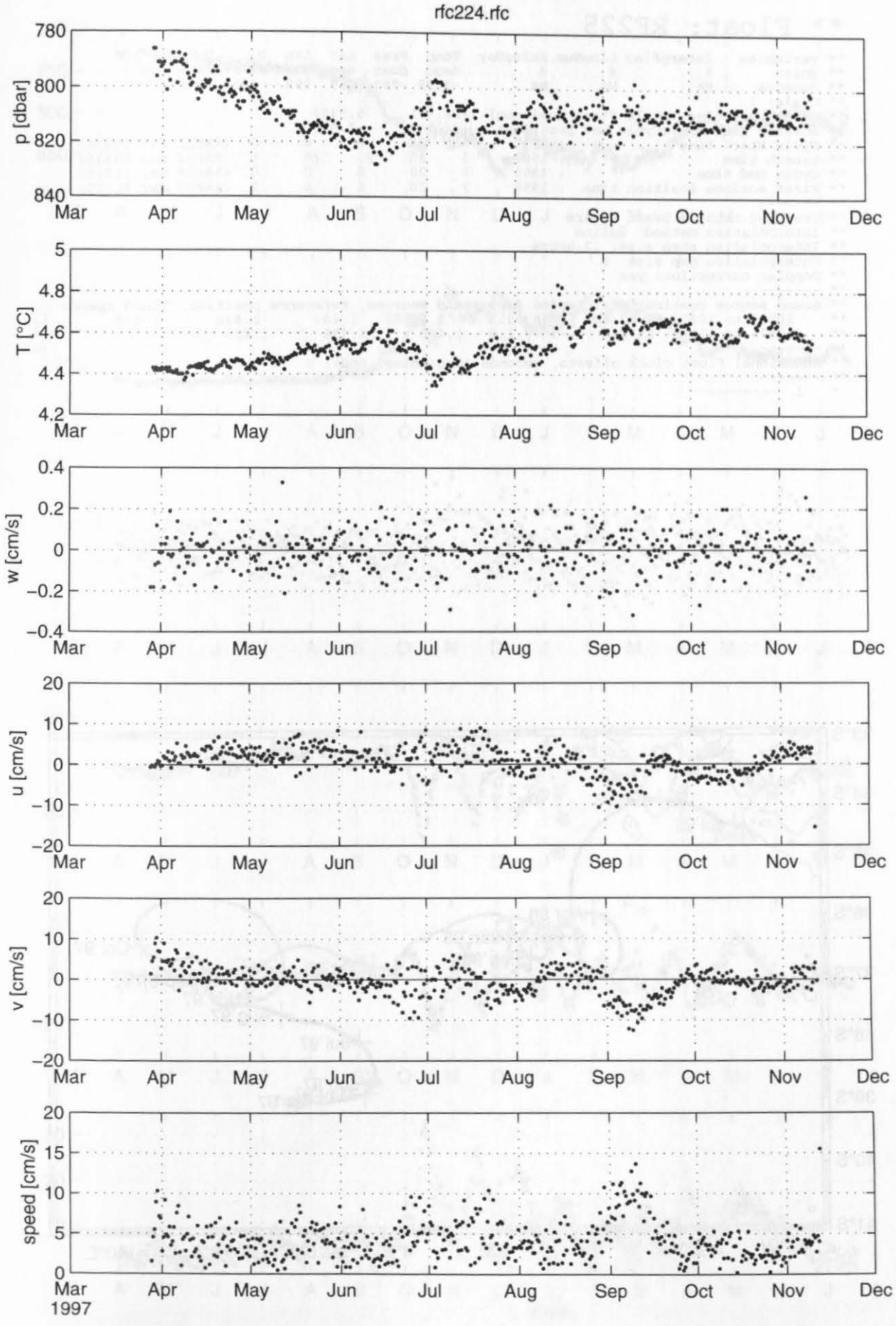



rfc223.rfc
p [dbar]
600
800
1000
1200
1400
T [°C]
5
4.5
4
3.5
w [cm/s]
1
0
−1
−2
u [cm/s]
20
0
−20
v [cm/s]
20
0
−20
speed [cm/s]
30
20
10
0
Mar
1997
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov

** Float: RF224

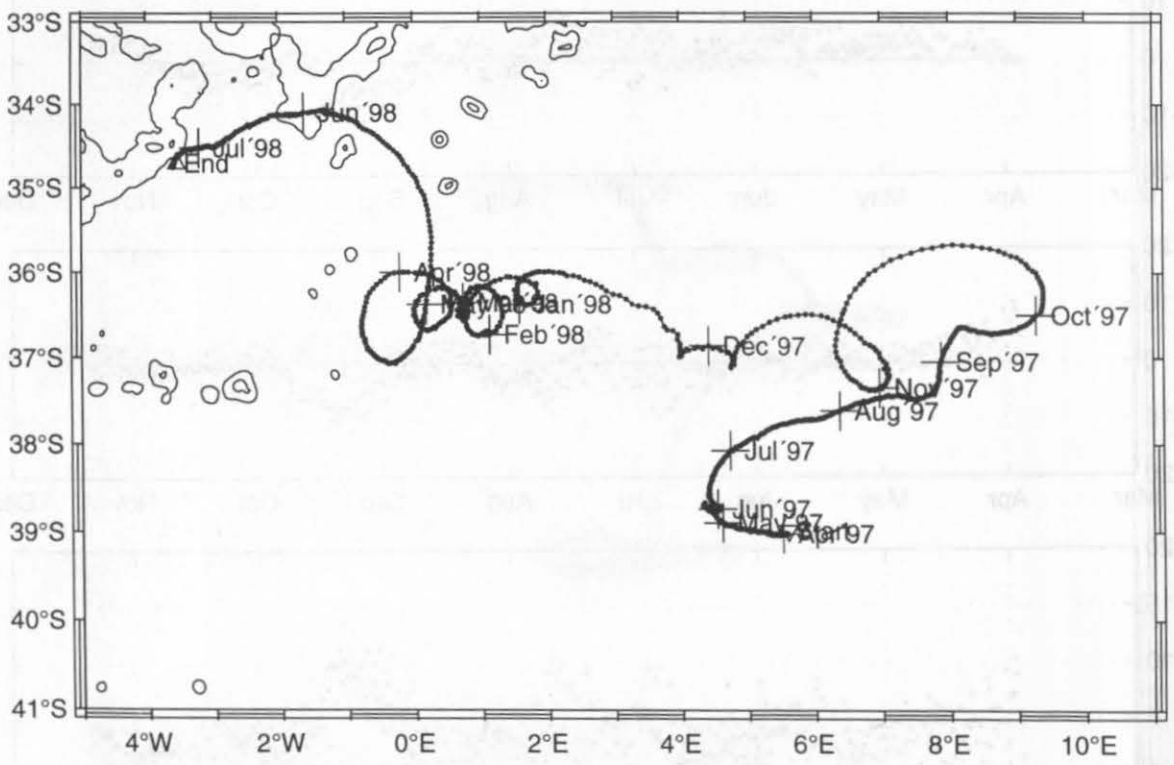
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -39.96      6.166
** Surface position (Cycle End position) : -40.882     8.05
** Cycle Start time              : 1997   3   26    0    0    0   (RAFOS day 10534)
** Launch time                   : 1997   3   28   12    5    0   (RAFOS day 10536)
** Cycle End time                : 1997  11   12   12    0    0   (RAFOS day 10765.5)
** First surface Position time   : 1997  11   12   15   27    0   (RAFOS day 10765)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10536.5 to 10765.5: K7 K8    -39.9598     6.16598   1.482      1.482      1.482
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

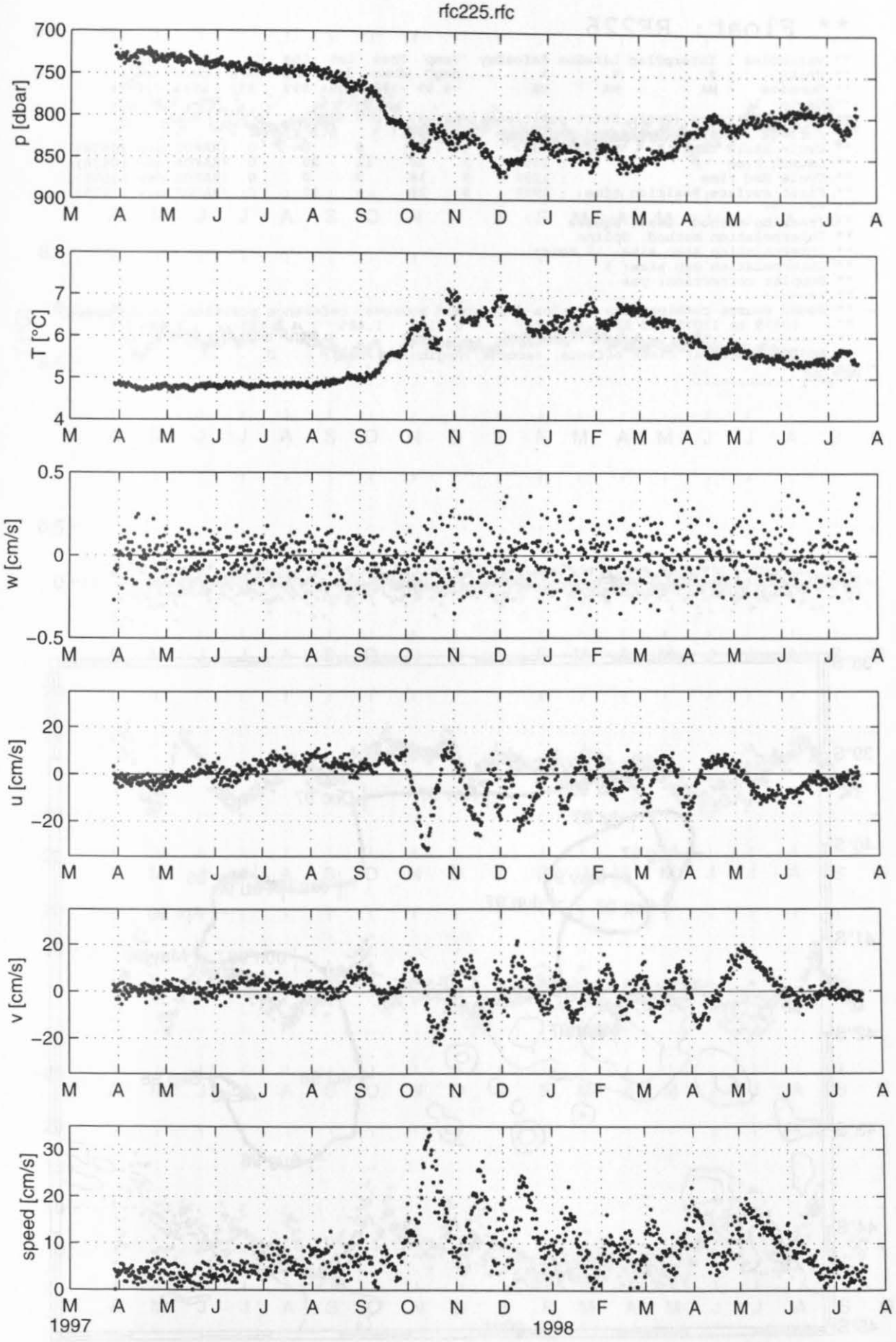



rfc224.rfc
p [dbar]
780
800
820
840
T [°C]
5
4.8
4.6
4.4
4.2
w [cm/s]
0.4
0.2
0
−0.2
−0.4
u [cm/s]
20
10
0
−10
−20
v [cm/s]
20
10
0
−10
−20
speed [cm/s]
20
15
10
5
0
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
1997

** Float: RF225

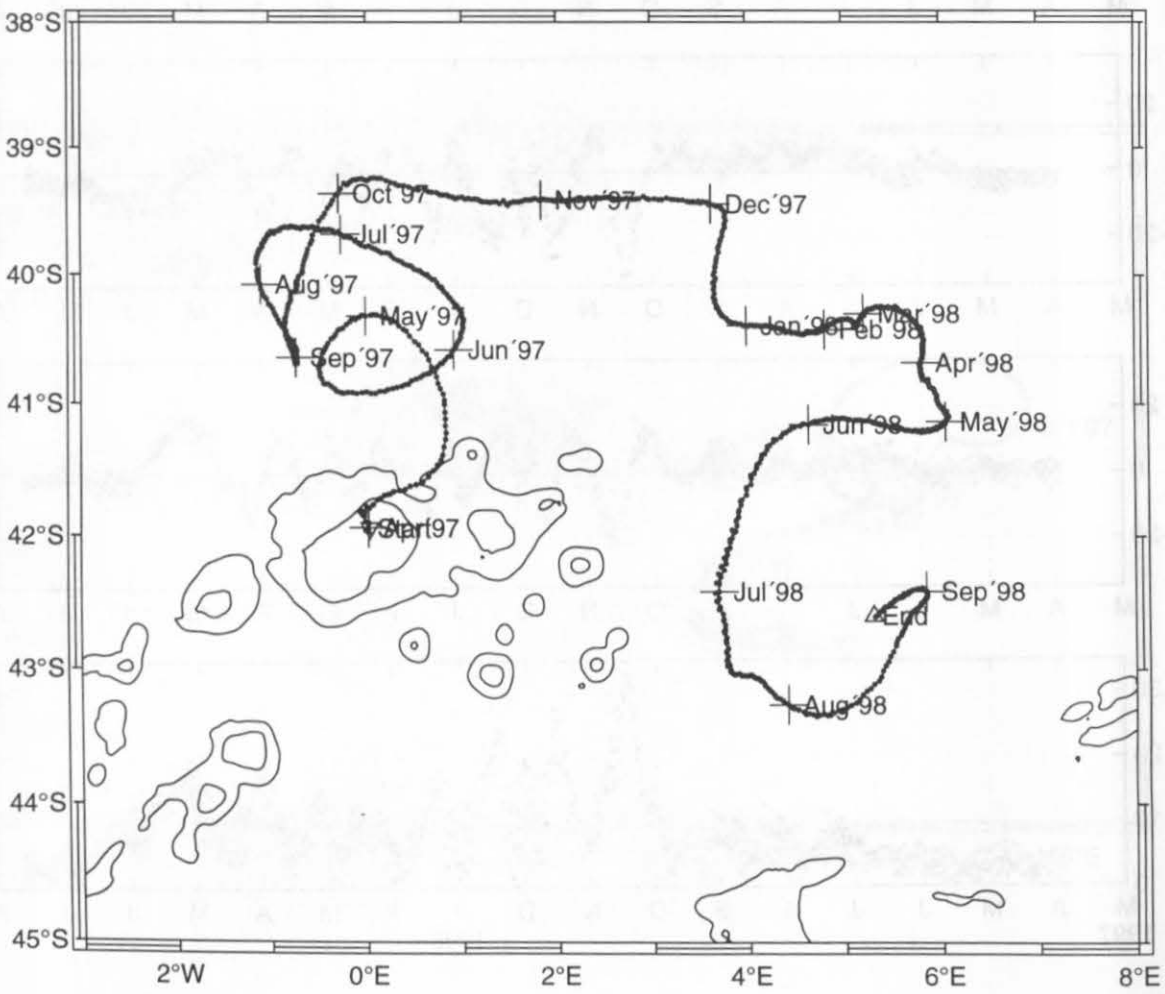
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -38.981     5.5928
** Surface position (Cycle End position) : -34.704     -3.526
** Cycle Start time              : 1997    3    28     0     0     0   (RAFOS day 10536)
** Launch time                   : 1997    3    28    20    26     0   (RAFOS day 10536)
** Cycle End time                : 1998    7    20     0     0     0   (RAFOS day 11015)
** First surface Position time   : 1998    7    20     4     8     0   (RAFOS day 11015)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10537 to 10802.5: K7 K8     -38.9813     5.59282   1.486      1.486      1.486
**    10803 to 11015: K9 K10    -36.0 2.0    1.486       1.486      1.486
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

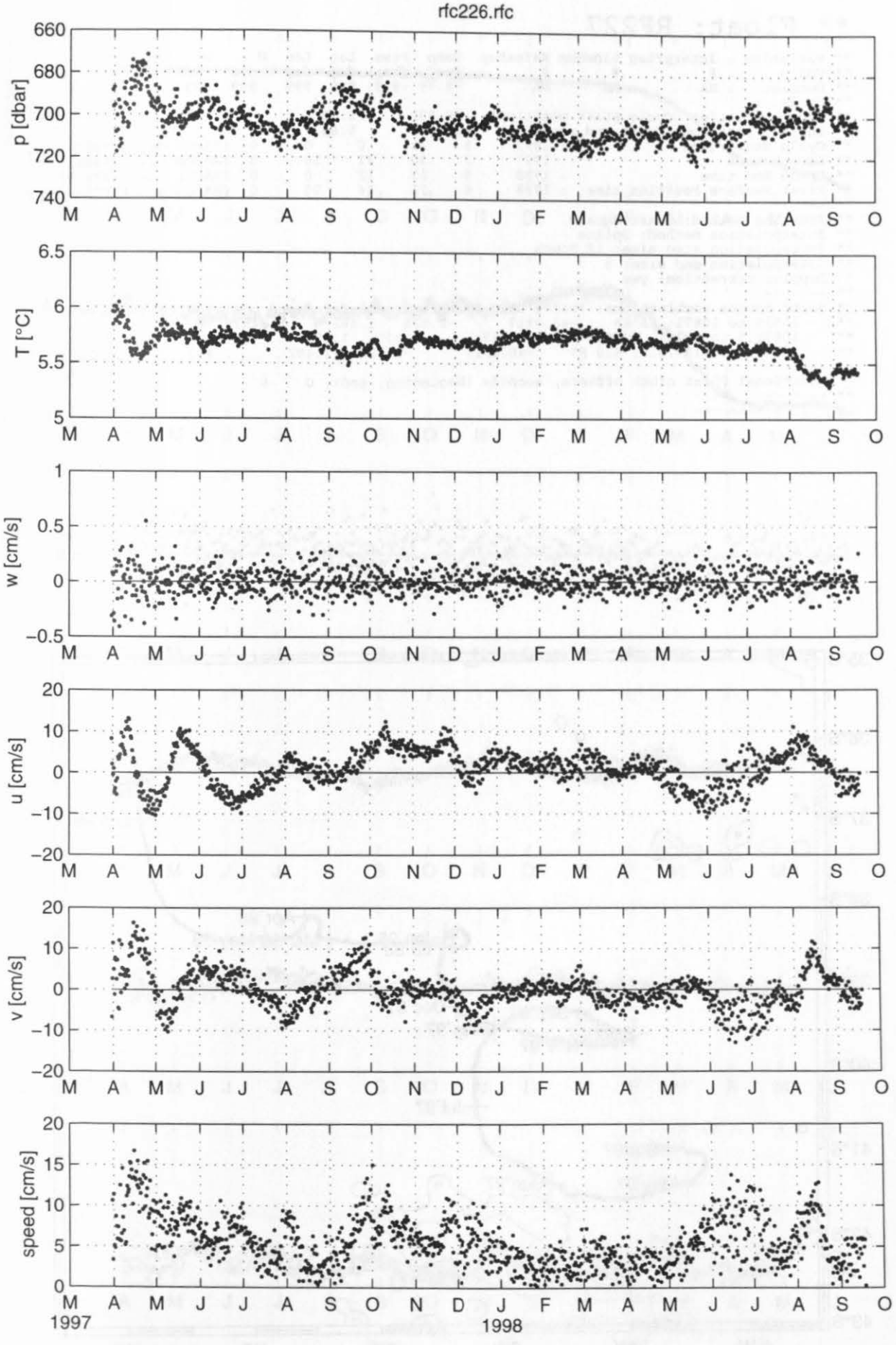



rfc225.rfc
p [dbar]
700
750
800
850
900
T [°C]
8
7
6
5
4
w [cm/s]
0.5
0
−0.5
u [cm/s]
20
0
−20
v [cm/s]
20
0
−20
speed [cm/s]
30
20
10
0
M A M J J A S O N D J F M A M J J A
1997
1998

** Float: RF226

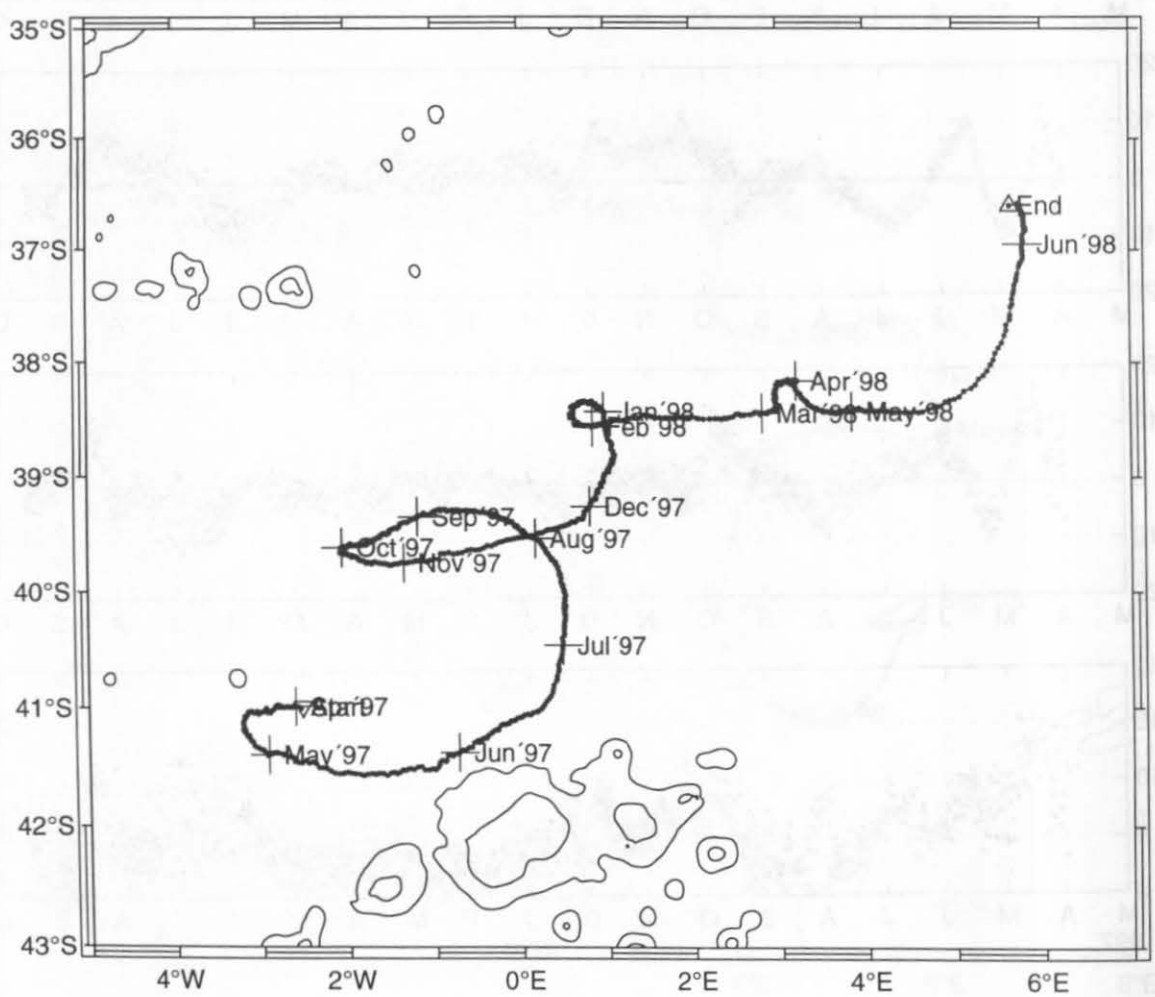
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -41.947     0.0195
** Surface position (Cycle End position) : -42.595       5.3
** Cycle Start time              : 1997    3    28     0     0     0   (RAFOS day 10536)
** Launch time                   : 1997    3    30    11    20     0   (RAFOS day 10538)
** Cycle End time                : 1998    9    18     0     0     0   (RAFOS day 11075)
** First surface Position time   : 1998    9    18     3    10     0   (RAFOS day 11075)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10539 to 11075: K9 K8    -41.947      0.0195   1.485      1.485      1.485
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

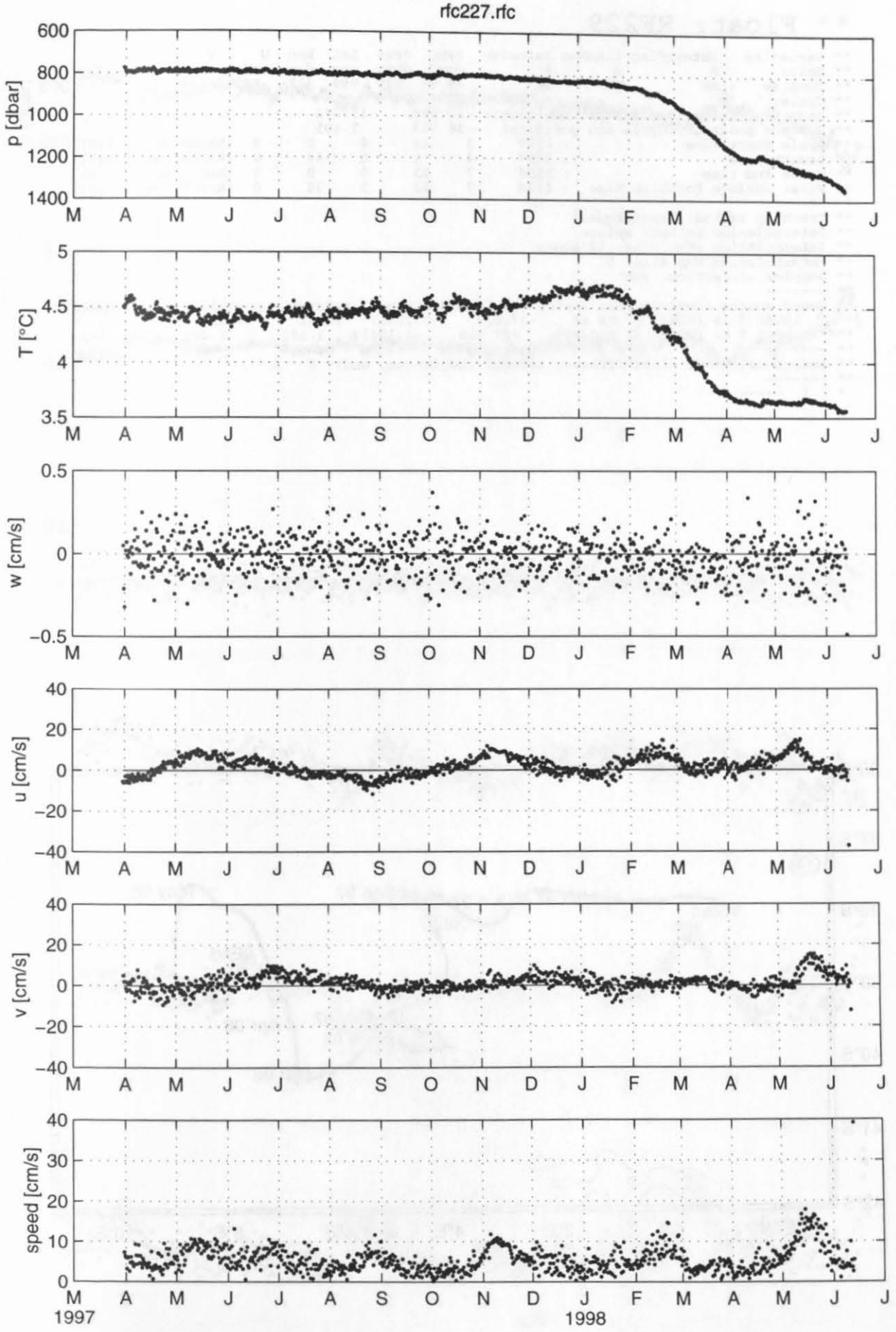



rfc226.rfc
p [dbar]
660
680
700
720
740
T [°C]
6.5
6
5.5
5
w [cm/s]
1
0.5
0
−0.5
u [cm/s]
20
10
0
−10
−20
v [cm/s]
20
10
0
−10
−20
speed [cm/s]
20
15
10
5
0
M A M J J A S O N D J F M A M J J A S O
1997
1998

** Float: RF227

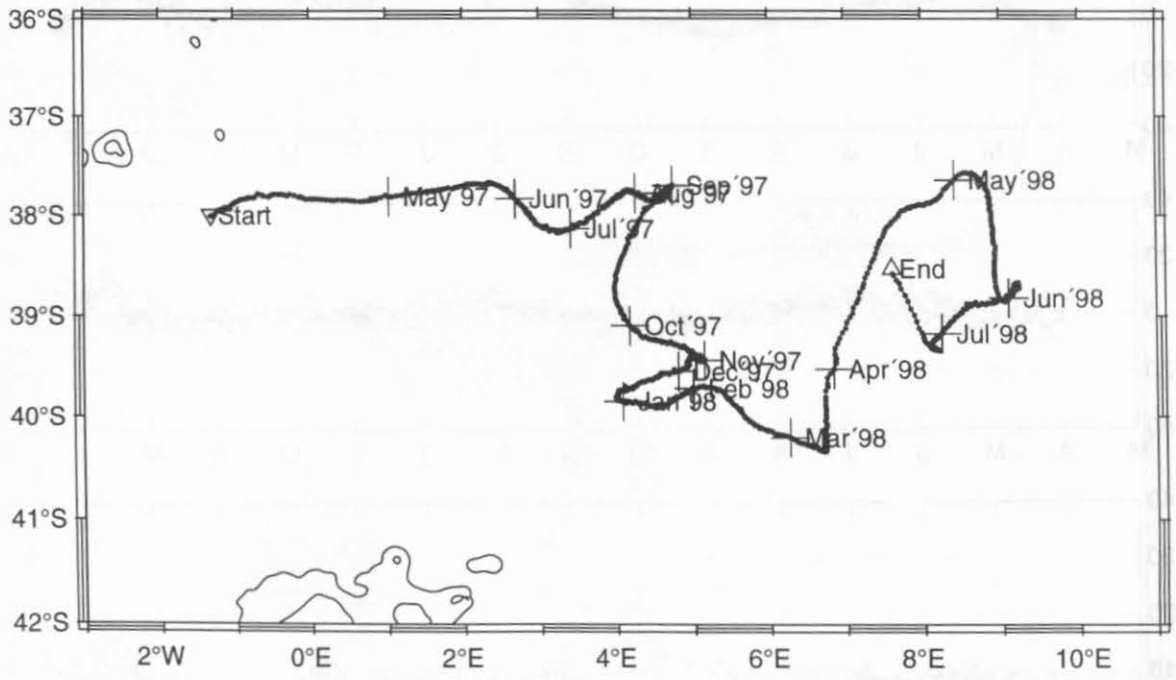
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -40.992     -2.525
** Surface position (Cycle End position) : -36.599      5.647
** Cycle Start time              : 1997    3    28     0     0     0   (RAFOS day 10536)
** Launch time                   : 1997    3    30    21    10     0   (RAFOS day 10538)
** Cycle End time                : 1998    6    13    12     0     0   (RAFOS day 10978.5)
** First surface Position time   : 1998    6    13    14    24     0   (RAFOS day 10978)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10539 to 10671: K9 K8     -40.9917      -2.525   1.482      1.482      1.482
**    10671.5 to 10759: K9 M10    -40.9917      -2.525   1.482      1.482      1.482
**    10759.5 to 10978.5: K10 K7    -40.9917      -2.525   1.482      1.482      1.482
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   -6
** -------
 *   1 ----------
```

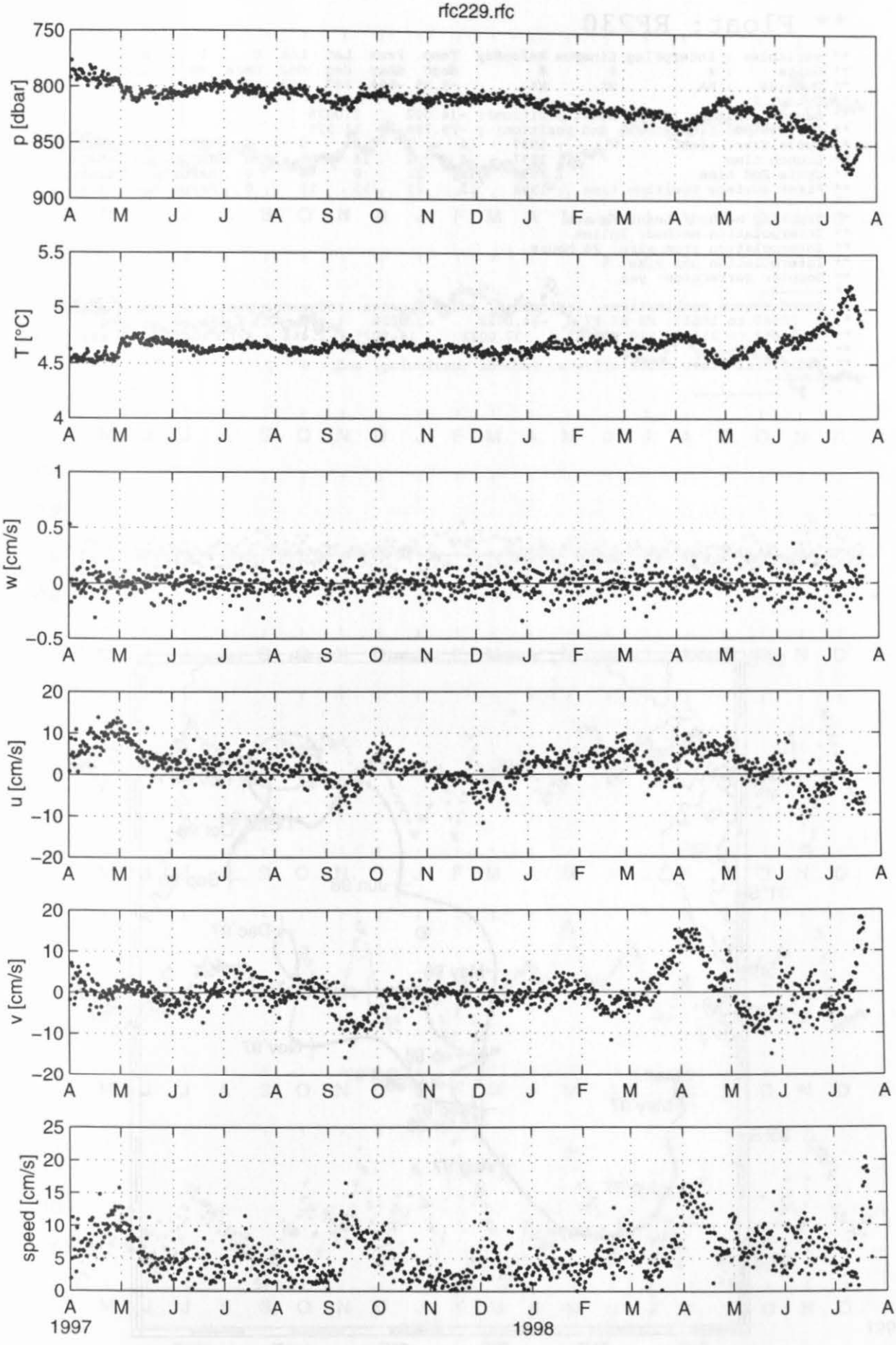



rfc227.rfc
p [dbar]
600
800
1000
1200
1400
T [°C]
5
4.5
4
3.5
w [cm/s]
0.5
0
−0.5
u [cm/s]
40
20
0
−20
−40
v [cm/s]
40
20
0
−20
−40
speed [cm/s]
40
30
20
10
0
M A M J J A S O N D J F M A M J J
1997
1998

** Float: RF229

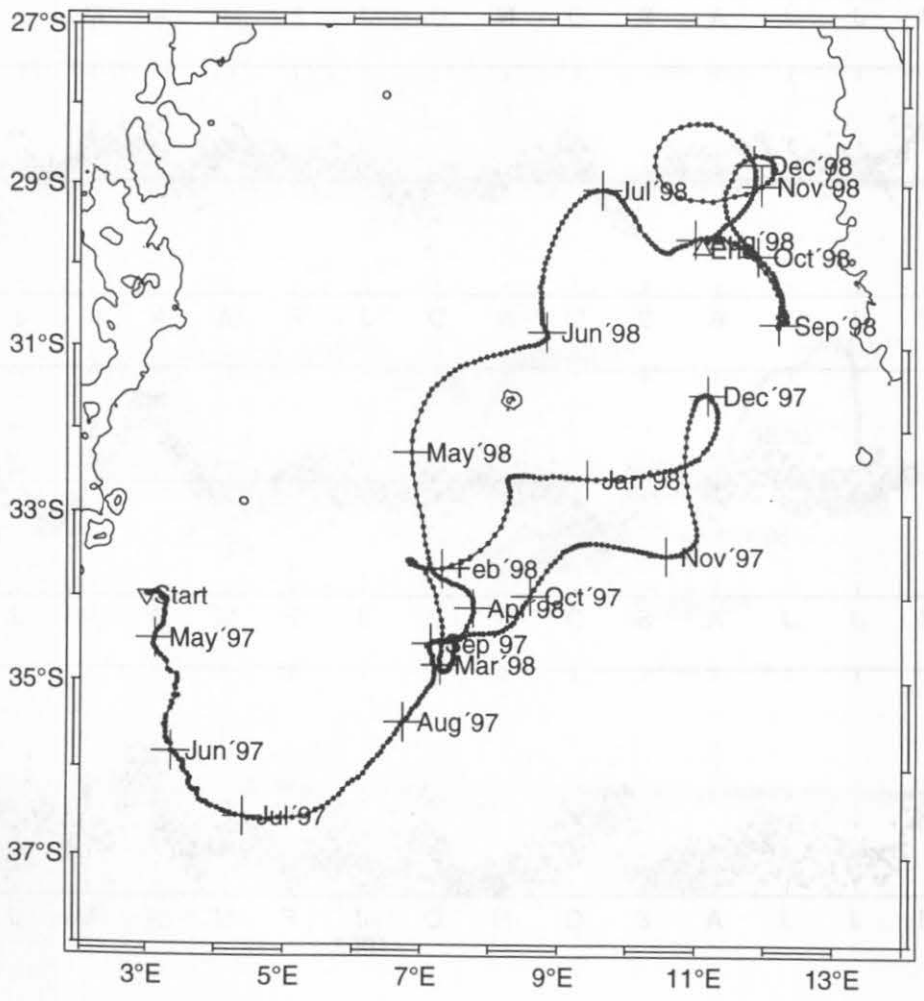
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -37.998    -1.3042
** Surface position (Cycle End position) : -38.533     7.605
** Cycle Start time             : 1997     3    31     0     0     0   (RAFOS day 10539)
** Launch time                  : 1997     4     1     5    40     0   (RAFOS day 10540)
** Cycle End time               : 1998     7    23     0     0     0   (RAFOS day 11018)
** First surface Position time  : 1998     7    23     3    36     0   (RAFOS day 11018)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10540.5 to 10543: K7 K8 K8    -37.998    -1.30417   1.482      1.482      1.482
**    10543.5 to 11018: K7 K10 K10   -37.998    -1.30417   1.482      1.482      1.482
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

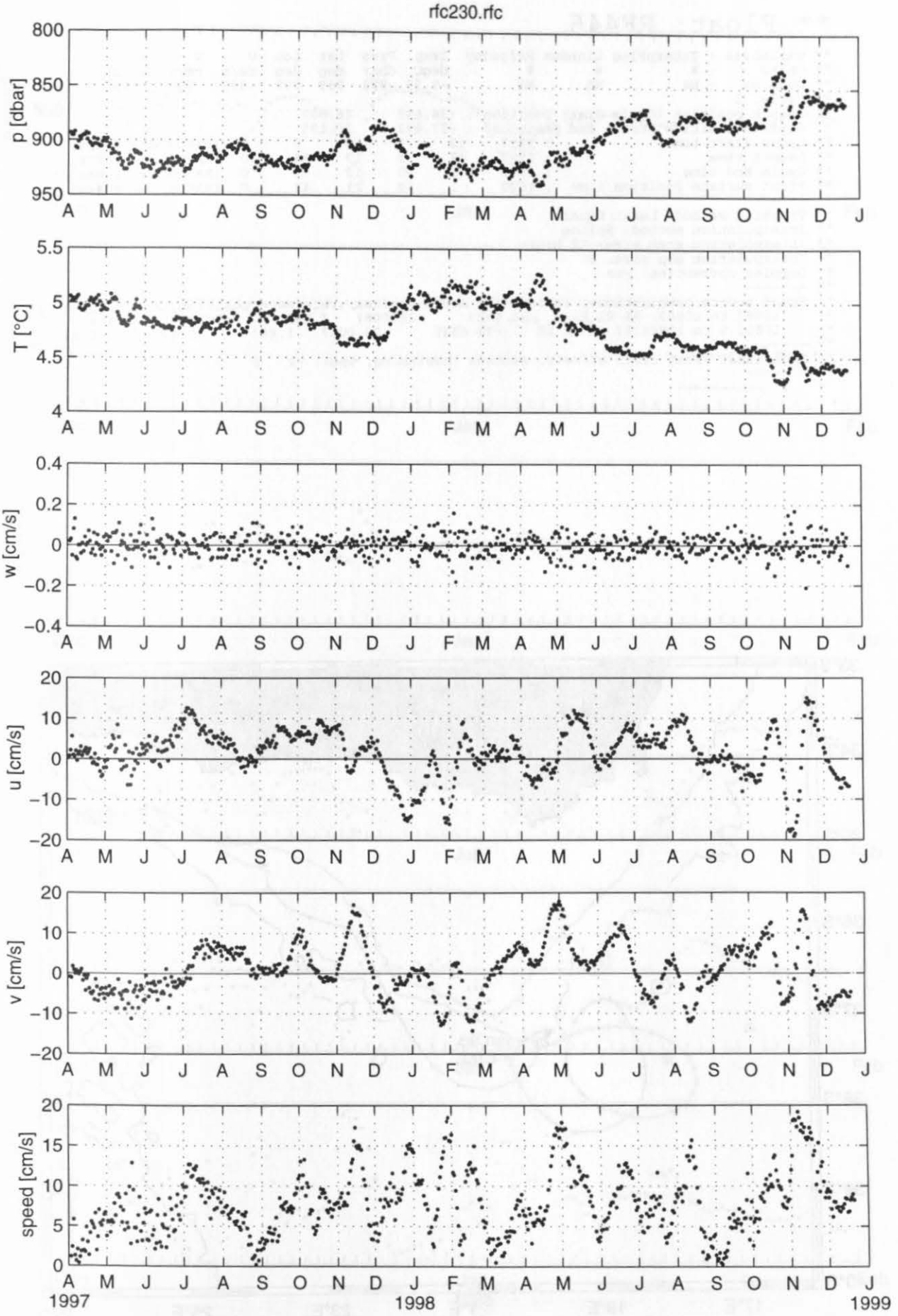



rfc229.rfc
p [dbar]
750
800
850
900
T [°C]
5.5
5
4.5
4
w [cm/s]
1
0.5
0
−0.5
u [cm/s]
20
10
0
−10
−20
v [cm/s]
20
10
0
−10
−20
speed [cm/s]
25
20
15
10
5
0
A M J J A S O N D J F M A M J J A
1997
1998

** Float: RF230

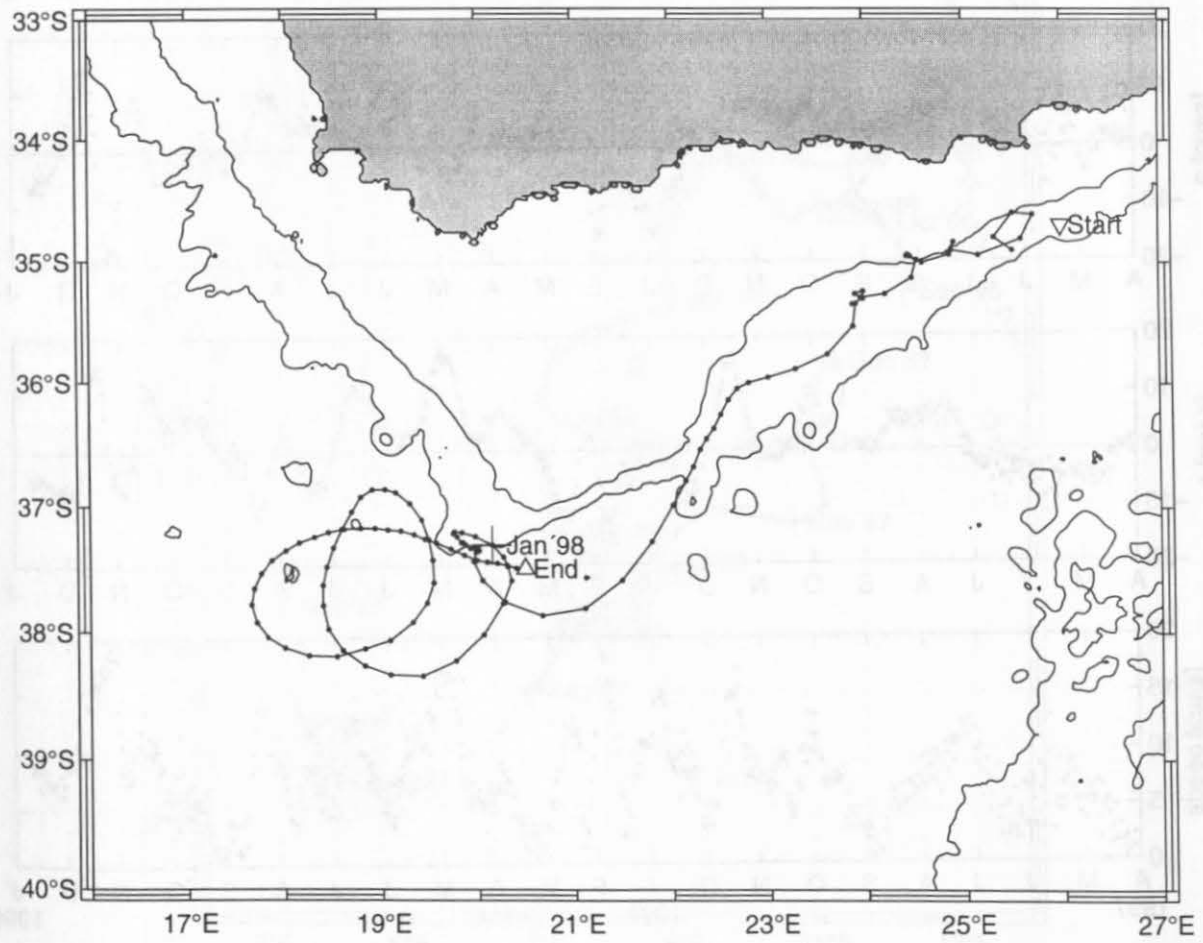
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.002     3.0025
** Surface position (Cycle End position) : -29.786     11.125
** Cycle Start time              : 1997    4     1     0     0     0   (RAFOS day 10540)
** Launch time                   : 1997    4     2    14    55     0   (RAFOS day 10541)
** Cycle End time                : 1998   12    21     0     0     0   (RAFOS day 11169)
** First surface Position time   : 1998   12    21    13    11     0   (RAFOS day 11169)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 24 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10542 to 10667: K8 K8 K7     -34.0022      3.0025   1.484      1.484      1.484
**    10668 to 11169: K10 K10 K9    -32.0022     14.0025   1.484      1.484      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
*   1  ----------
```

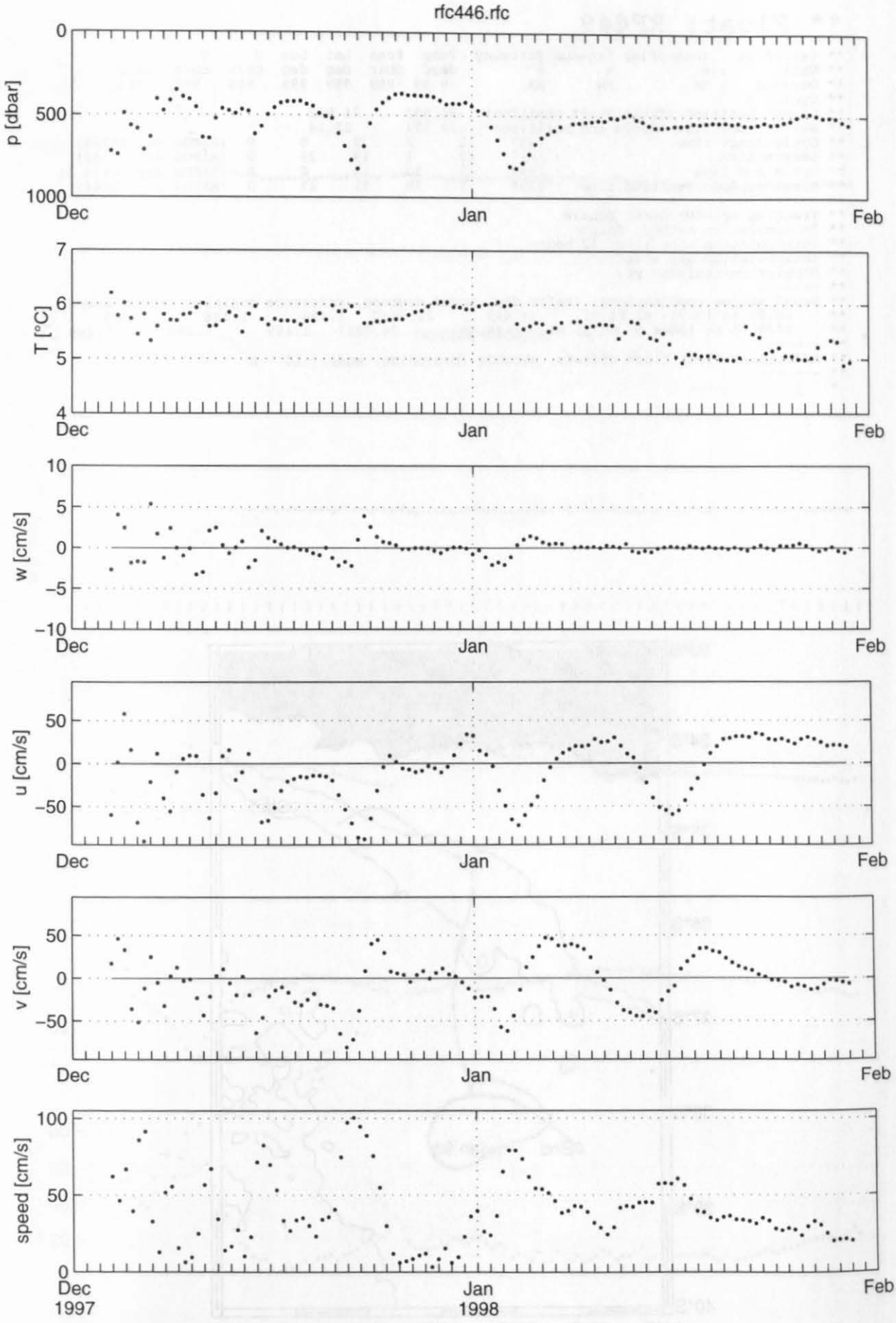



rfc230.rfc
p [dbar]
800
850
900
950
T [°C]
5.5
5
4.5
4
w [cm/s]
0.4
0.2
0
−0.2
−0.4
u [cm/s]
20
10
0
−10
−20
v [cm/s]
20
10
0
−10
−20
speed [cm/s]
20
15
10
5
0
A M J J A S O N D J F M A M J J A S O N D J
1997
1998
1999

** Float: RF446

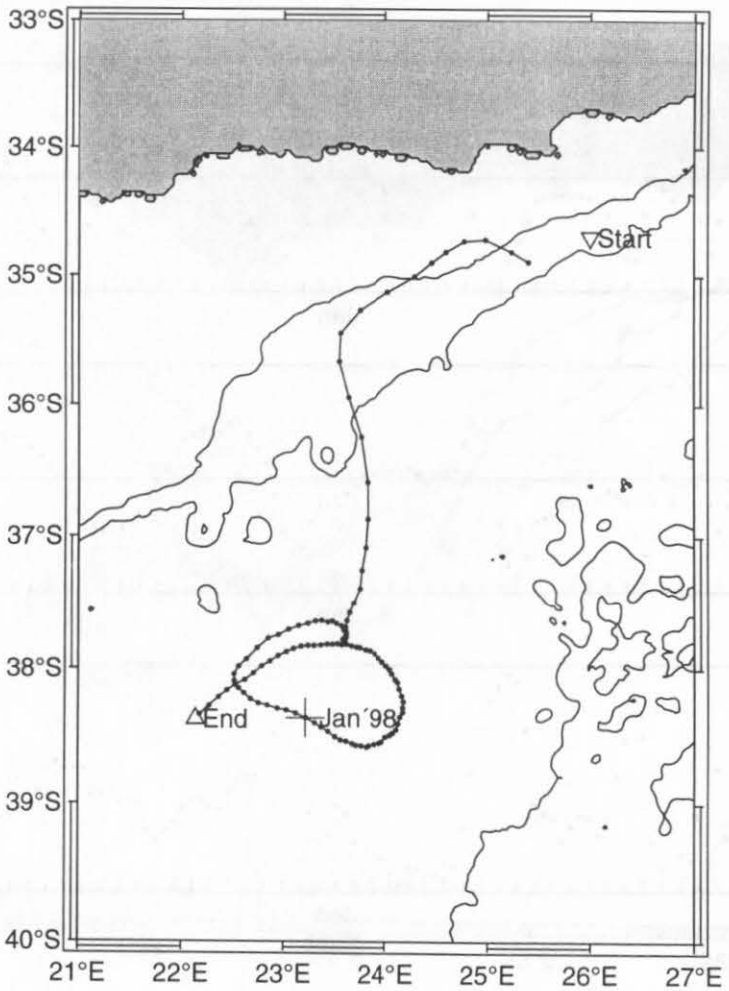
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.693     26.007
** Surface position (Cycle End position) : -37.492     20.495
** Cycle Start time              : 1997    12     2     0     0     0   (RAFOS day 10785)
** Launch time                   : 1997    12     3    17    34     0   (RAFOS day 10786)
** Cycle End time                : 1998     1    30    12     0     0   (RAFOS day 10844.5)
** First surface Position time   : 1998     1    30    21    49     0   (RAFOS day 10844)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10803: R1 R2 R2    -34.6925      26.0067   1.489      1.488      1.484
**    10803.5 to 10844.5: K7 K8 K8    -34.6925      26.0067   1.481      1.477      1.477
** -------
** Additional Float clock offsets, seconds (beginning, end): -2   0
** -------
  *   1  ----------
```

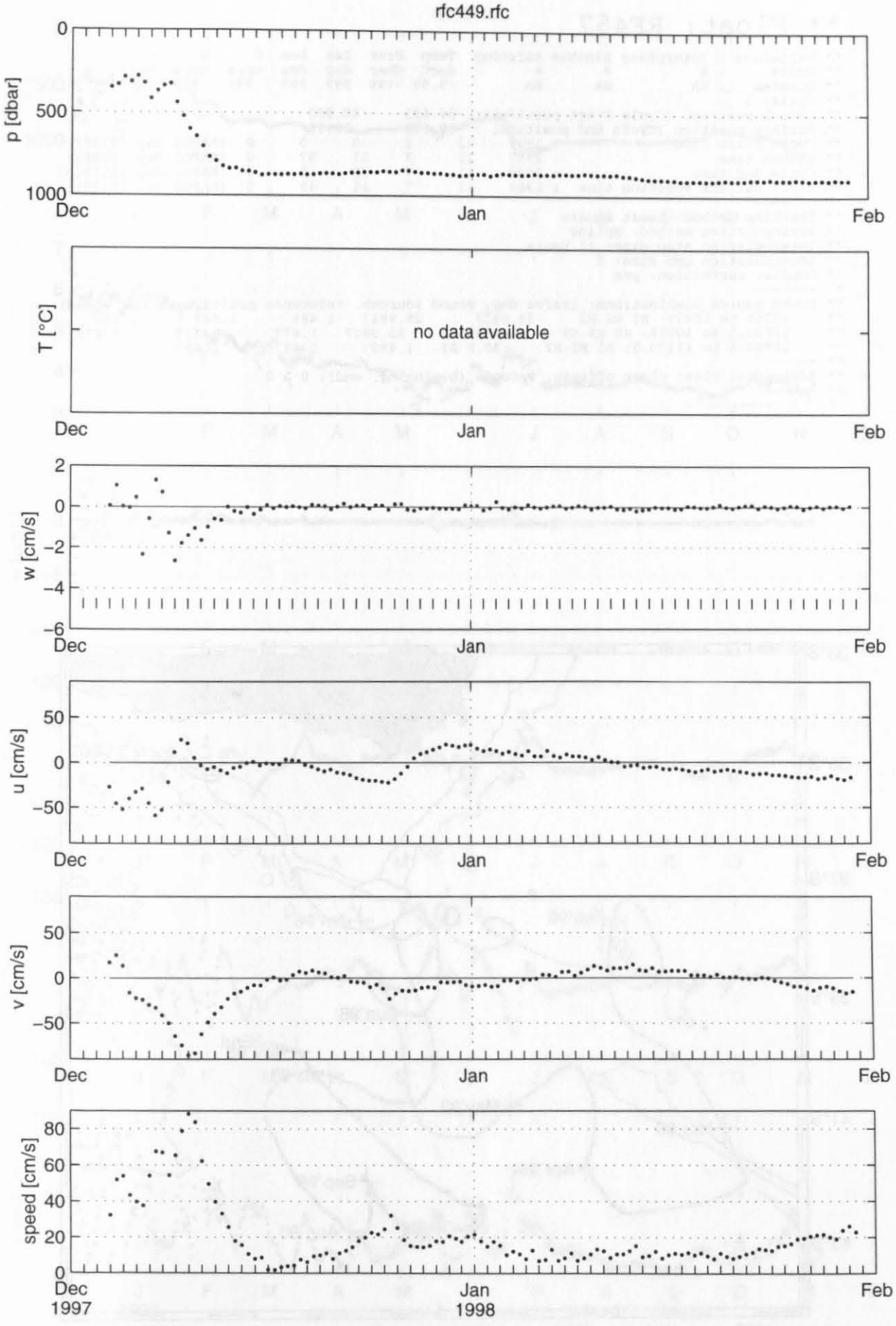



rfc446.rfc
p [dbar]
0
500
1000
T [°C]
7
6
5
4
w [cm/s]
10
5
0
−5
−10
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
100
50
0
Dec
Jan
Feb
1997
1998

** Float: RF449

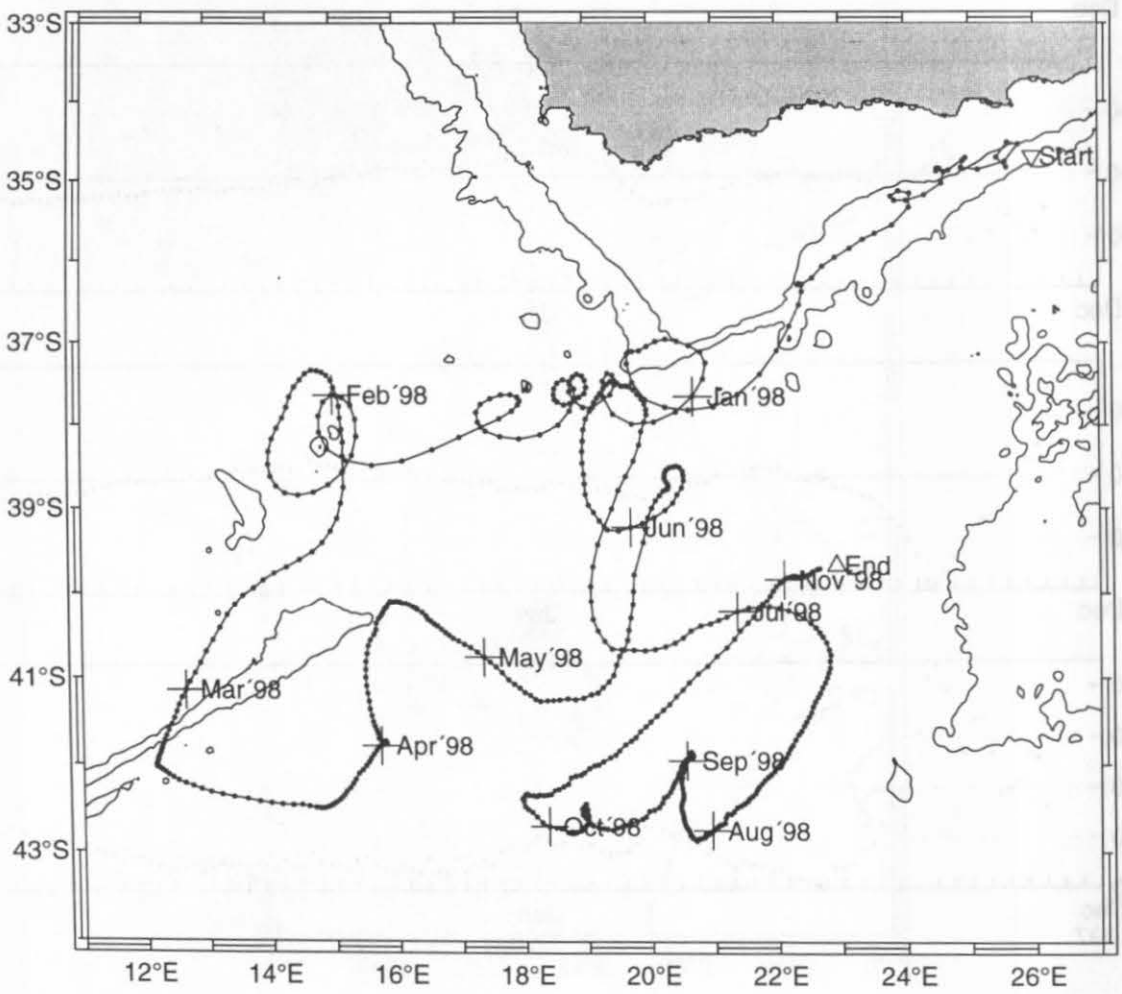
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.693     26.002
** Surface position (Cycle End position) : -38.374      22.14
** Cycle Start time              : 1997    12     2     0     0     0  (RAFOS day 10785)
** Launch time                   : 1997    12     3    19    38     0  (RAFOS day 10786)
** Cycle End time                : 1998     1    30    12     0     0  (RAFOS day 10844.5)
** First surface Position time   : 1998     1    30    21    49     0  (RAFOS day 10844)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10795: R2 R1 R1    -34.693      26.0017   1.496      1.496      1.489
**    10795.5 to 10844.5: R2 R1 R1    -34.693      26.0017   1.489      1.489      1.489
** -------
** Additional Float clock offsets, seconds (beginning, end): -10    0
** -------
 *   1  ----------
```

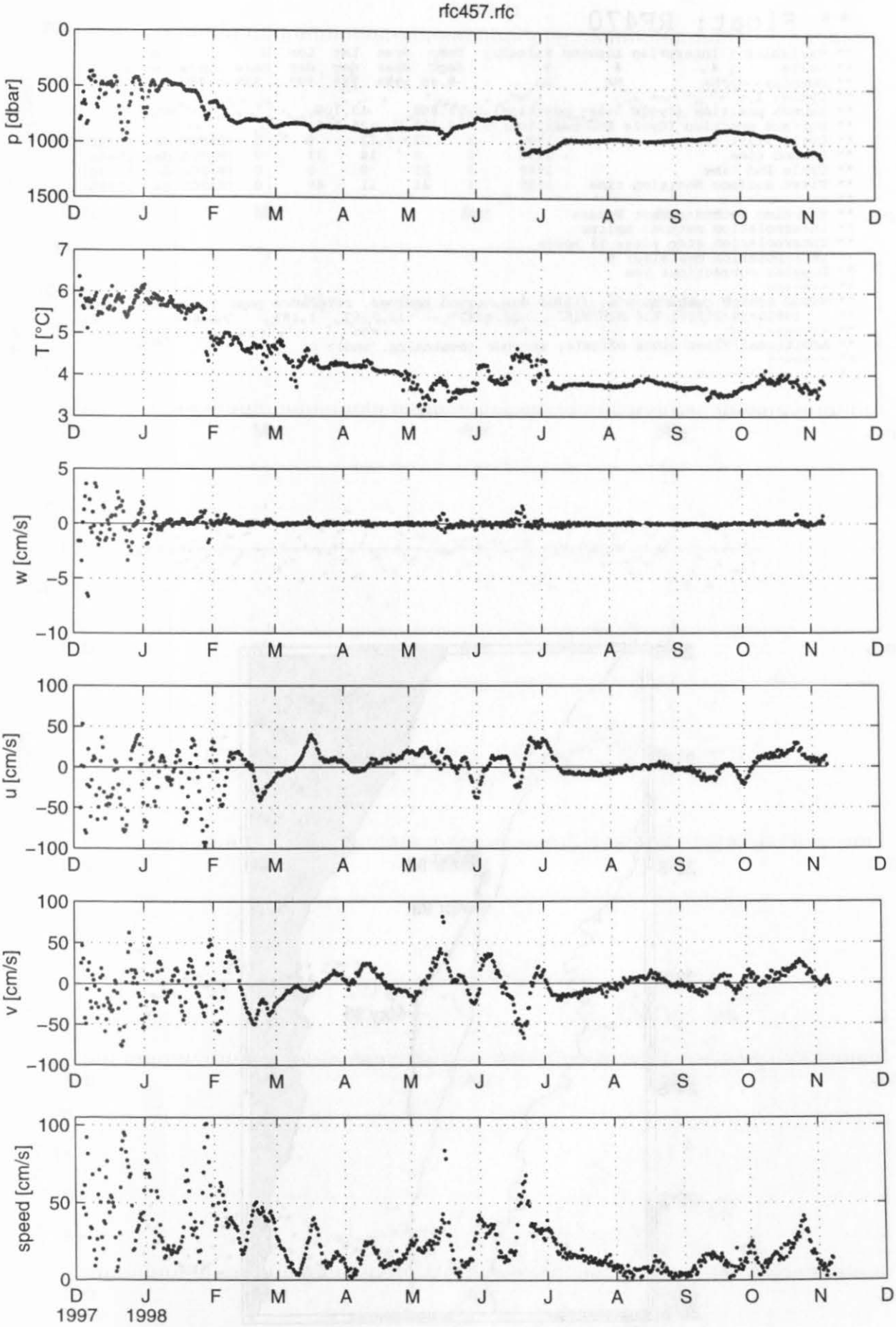



rfc449.rfc
p [dbar]
0
500
1000
Dec
Jan
Feb
T [°C]
no data available
w [cm/s]
2
0
−2
−4
−6
u [cm/s]
50
0
−50
v [cm/s]
speed [cm/s]
80
60
40
20
1997
1998

** Float: RF457

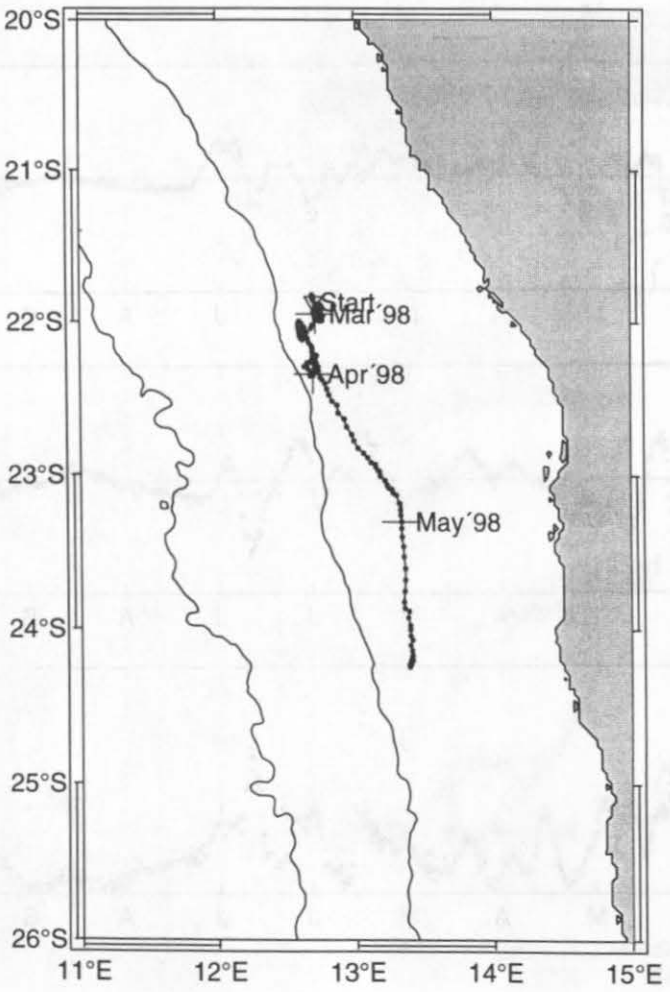
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.693     25.982
** Surface position (Cycle End position) : -39.675      22.93
** Cycle Start time              : 1997   12     2     0     0     0   (RAFOS day 10785)
** Launch time                   : 1997   12     3    17    57     0   (RAFOS day 10786)
** Cycle End time                : 1998   11     7    12     0     0   (RAFOS day 11125.5)
** First surface Position time   : 1998   11     7    21    49     0   (RAFOS day 11125)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10786 to 10820: R1 R2 R2     -34.6933      25.9817   1.489      1.487      1.487
**    10820.5 to 10950: K8 K9 K9    -34.6933      25.9817   1.477      1.478      1.478
**    10950.5 to 11125.5: R1 R2 R2    -39.5 23   1.489      1.487      1.487
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

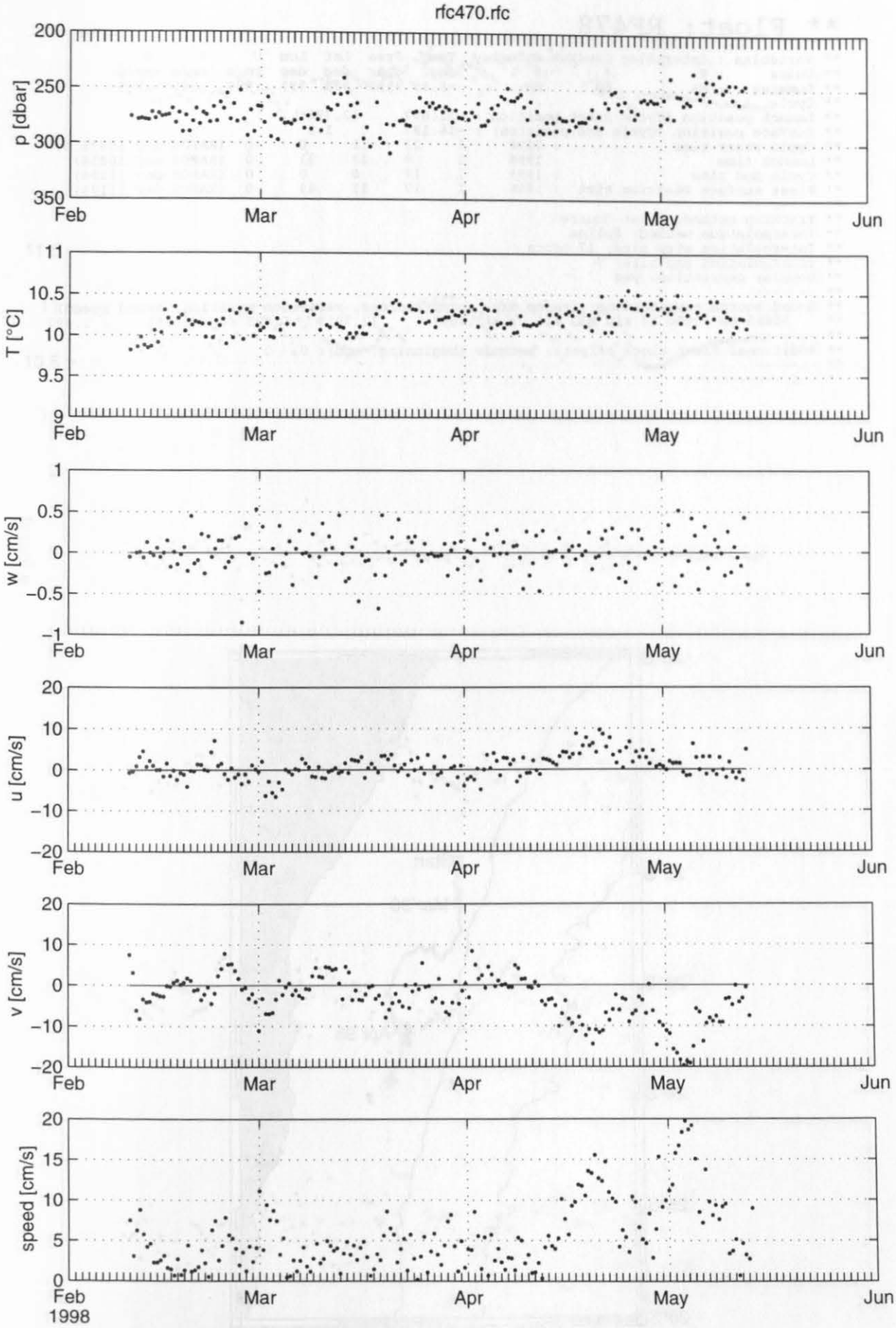



rfc457.rfc
p [dbar]
0
500
1000
1500
T [°C]
7
6
5
4
3
w [cm/s]
5
0
−5
−10
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
100
50
0
D J F M A M J J A S O N D
1997 1998

** Float: RF470

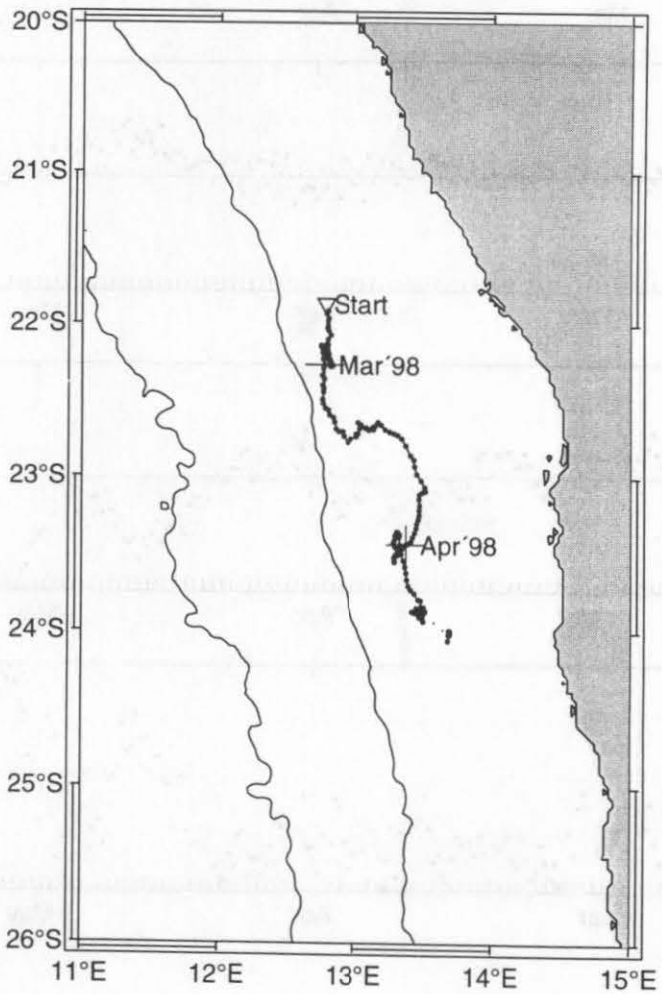
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -21.868     12.707
** Surface position (Cycle End position) : -14.399    -25.032
** Cycle Start time              : 1998     1    22    12     0     0  (RAFOS day 10836.5)
** Launch time                   : 1998     2     9    14    33     0  (RAFOS day 10854)
** Cycle End time                : 1999     4    21     0     0     0  (RAFOS day 11290)
** First surface Position time   : 1999     4    21    11    49     0  (RAFOS day 11290)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10855 to 10948: K10 M10 M10    -21.8683      12.7067   1.489      1.489      1.485
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

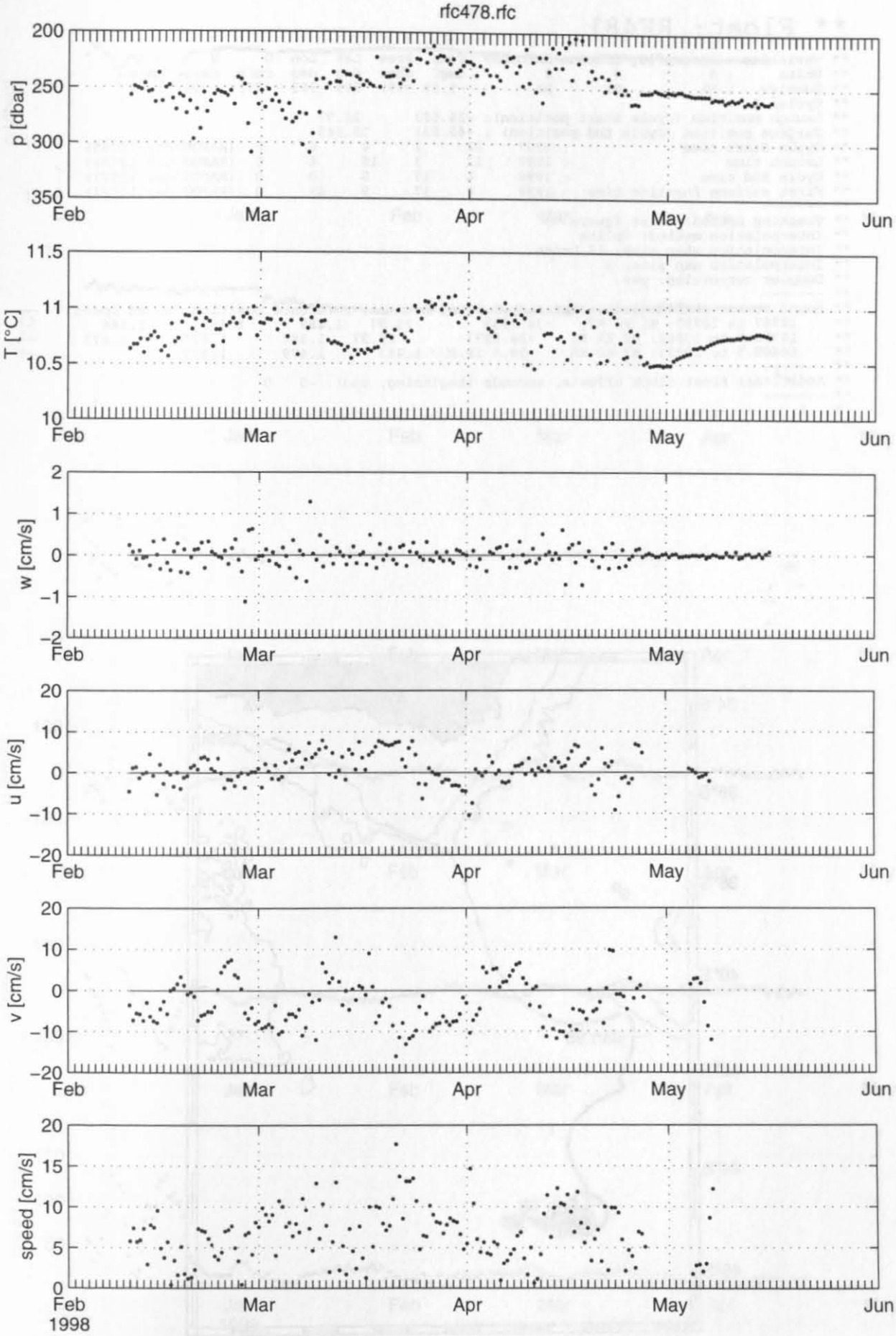



rfc470.rfc
p [dbar]
200
250
300
350
T [°C]
11
10.5
10
9.5
9
w [cm/s]
1
0.5
0
−0.5
−1
u [cm/s]
20
10
0
−10
−20
v [cm/s]
20
10
0
−10
−20
speed [cm/s]
20
15
10
5
0
Feb
Mar
Apr
May
Jun
1998

** Float: RF478

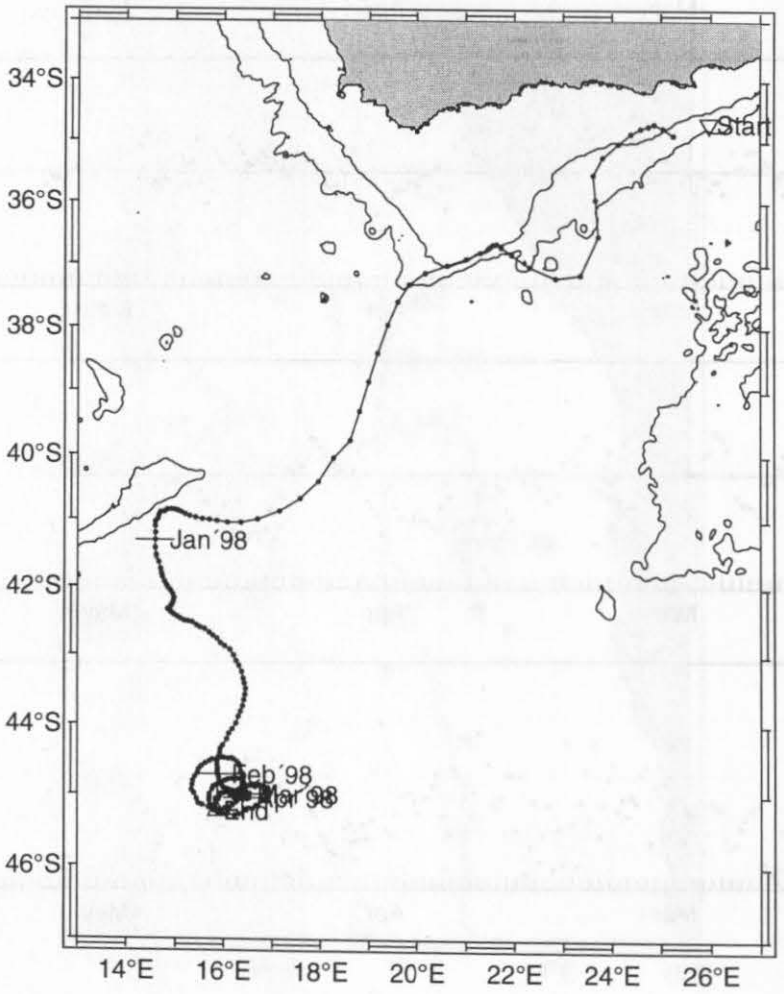
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat   Lon   U      V      W
** Units     : #          #       #         degC  dbar  deg   deg   cm/s   cm/s   mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999   999    999    999    999
** Cycle: 1
** Launch position (Cycle Start position): -21.867     12.792
** Surface position (Cycle End position) : -16.187        1.2
** Cycle Start time              : 1998     1    22    12     0     0   (RAFOS day 10836.5)
** Launch time                   : 1998     2     9    13    31     0   (RAFOS day 10854)
** Cycle End time                : 1999     1    17     0     0     0   (RAFOS day 11196)
** First surface Position time   : 1999     1    17    11    49     0   (RAFOS day 11196)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10855 to 10950.5: K10 M10 M10    -21.8667      12.7917   1.485      1.485      1.497
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
*   1  ----------
```

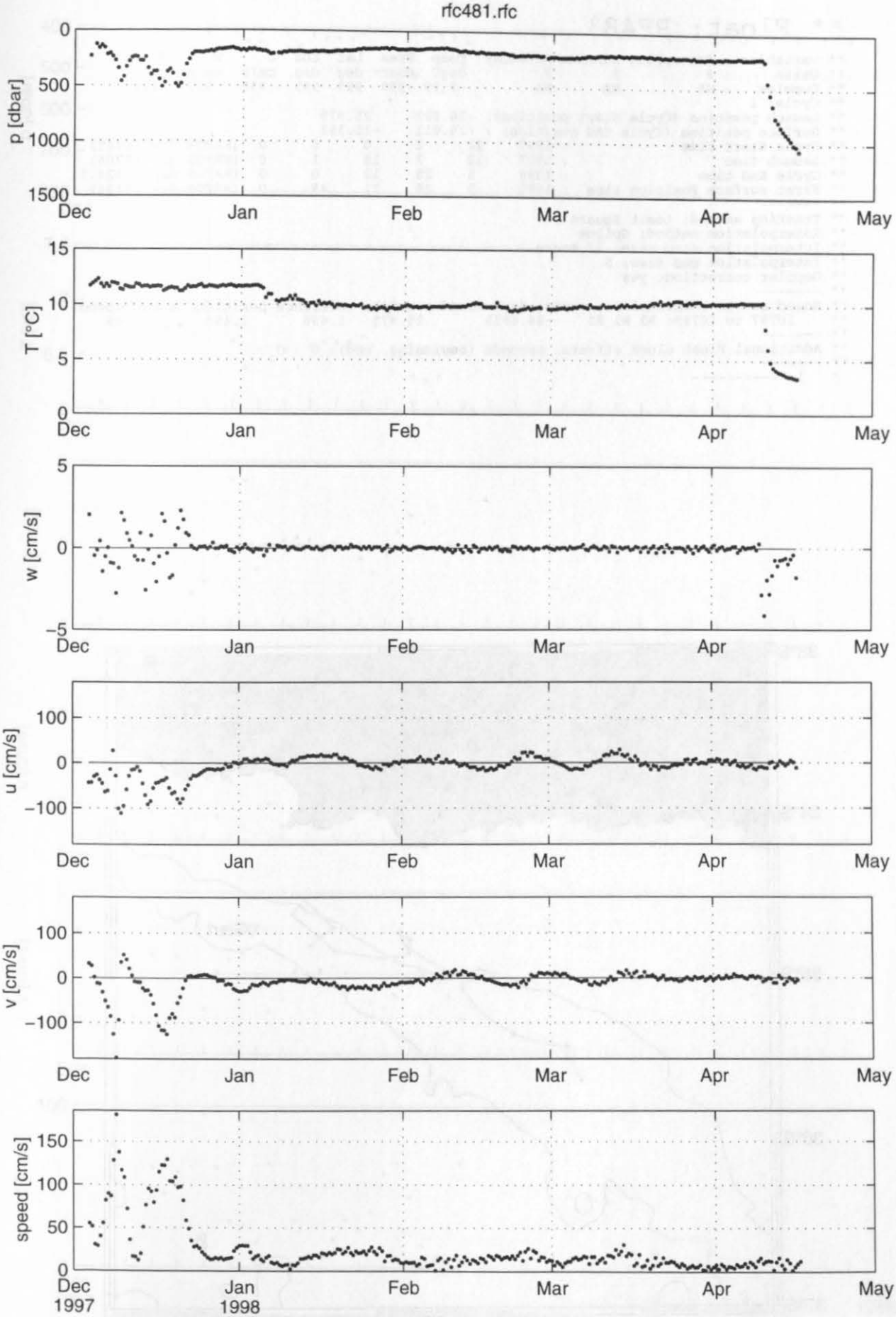



rfc478.rfc
p [dbar]
200
250
300
350
T [°C]
11.5
11
10.5
10
w [cm/s]
2
1
0
−1
−2
u [cm/s]
20
10
0
−10
−20
v [cm/s]
20
10
0
−10
−20
speed [cm/s]
20
15
10
5
0
Feb
Mar
Apr
May
Jun
1998

** Float: RF481

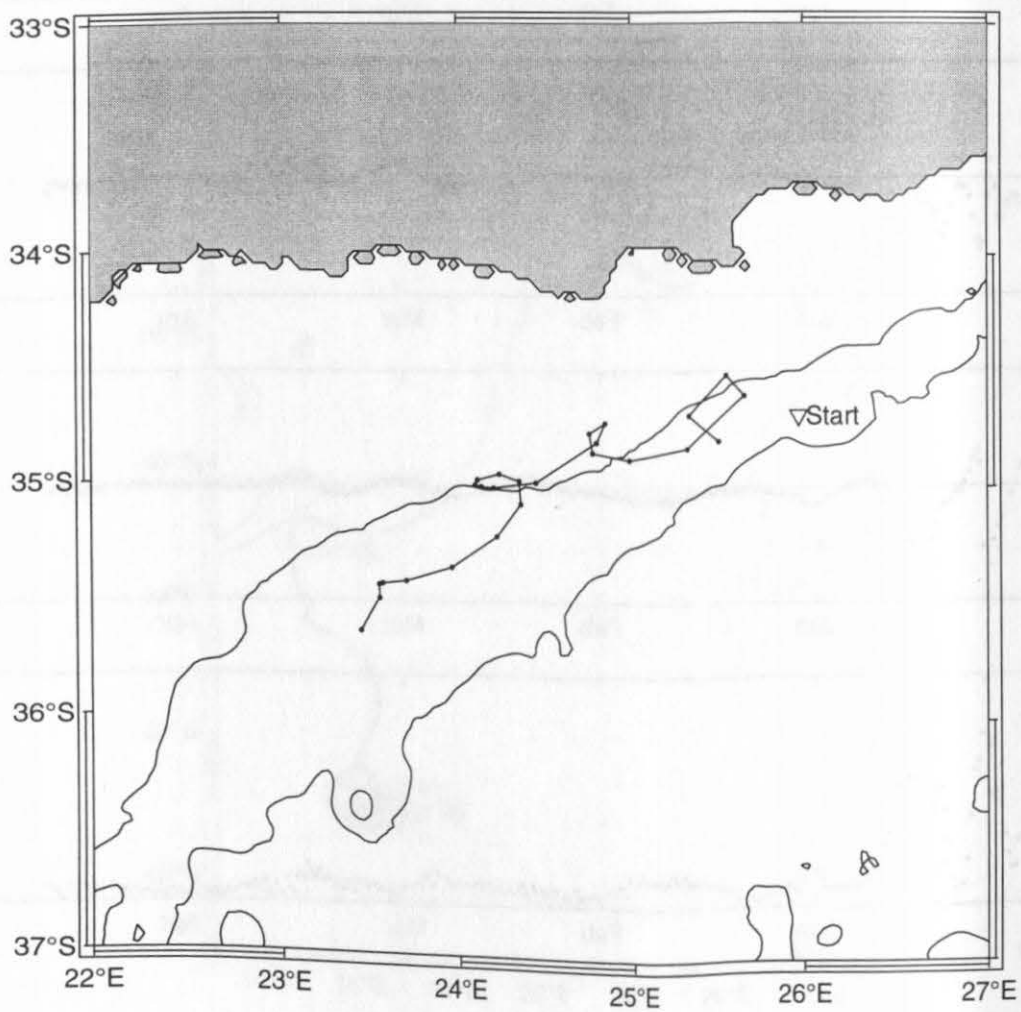
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.693      25.97
** Surface position (Cycle End position) : -45.231      15.845
** Cycle Start time              : 1997    12     2     0     0     0   (RAFOS day 10785)
** Launch time                   : 1997    12     3    18     6     0   (RAFOS day 10786)
** Cycle End time                : 1998     4    17     0     0     0   (RAFOS day 10921)
** First surface Position time   : 1998     4    17     9    49     0   (RAFOS day 10921)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10792: R1 R2 R2    -34.6933        25.97   1.489      1.487      1.484
**    10792.5 to 10802: R2 K8 K8    -34.6933        25.97   1.487      1.477      1.477
**    10802.5 to 10921: K7 K8 K8    -39.0 19.0   1.483      1.479      1.477
** -------
** Additional Float clock offsets, seconds (beginning, end): -5   0
** -------
*   1  ----------
```

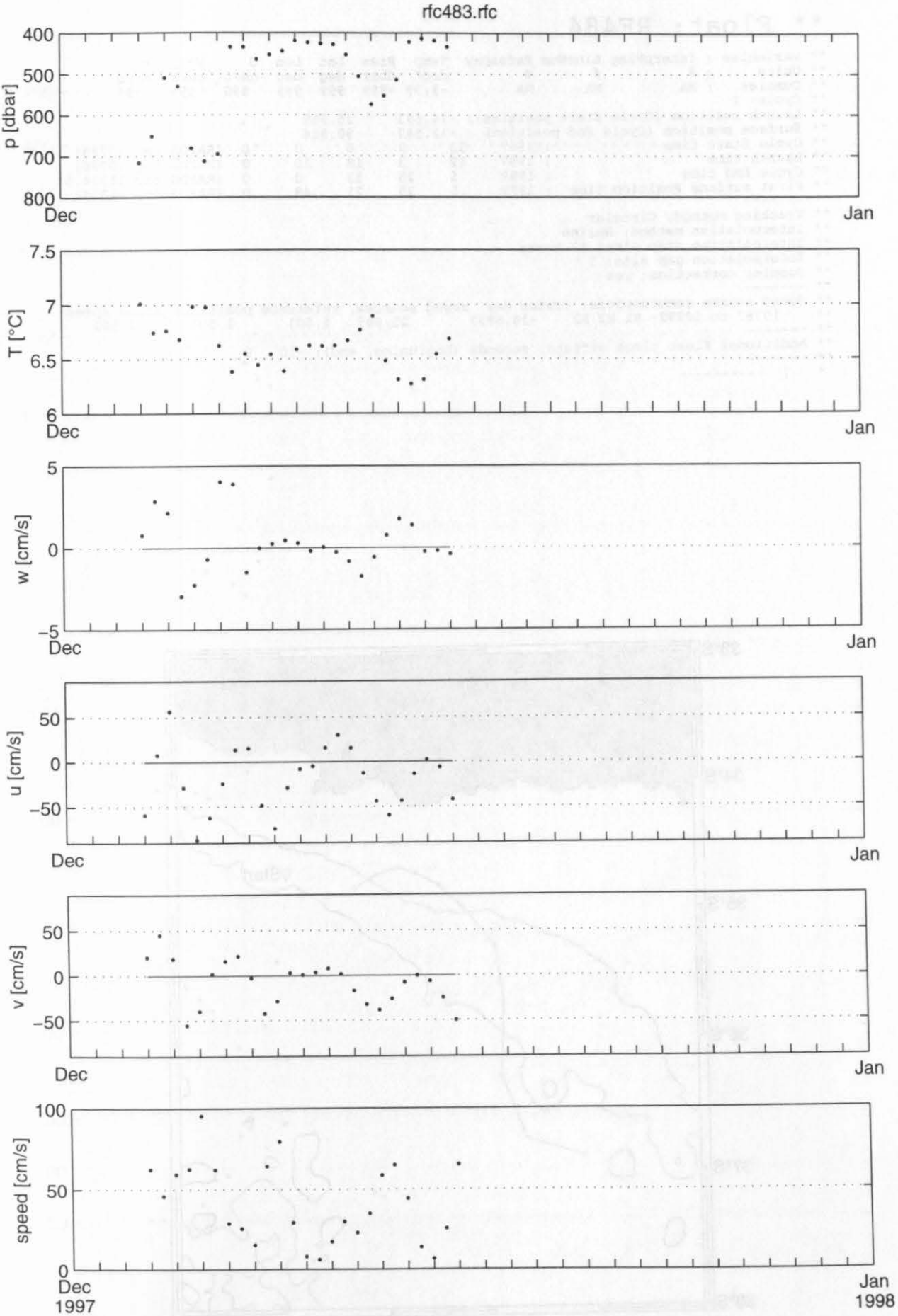



rfc481.rfc
p [dbar]
0
500
1000
1500
T [°C]
15
10
5
0
w [cm/s]
5
0
−5
u [cm/s]
100
0
−100
v [cm/s]
100
0
−100
speed [cm/s]
150
100
50
0
Dec
1997
Jan
1998
Feb
Mar
Apr
May

** Float: RF483

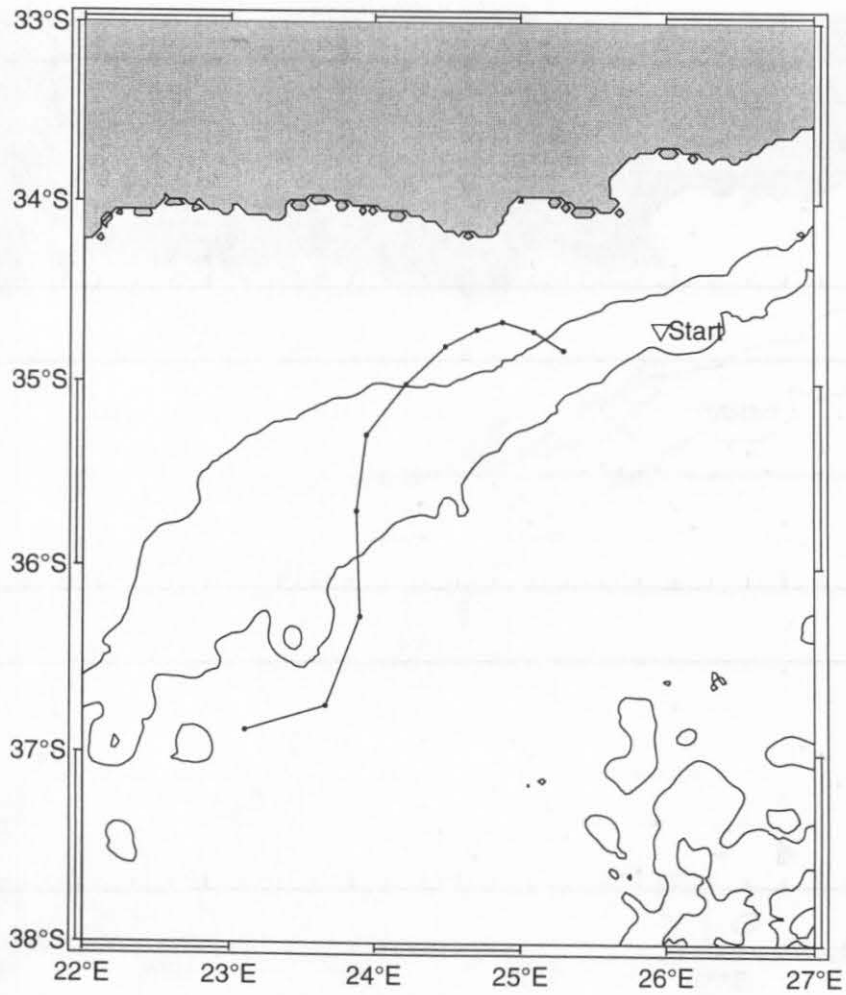
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.693     25.975
** Surface position (Cycle End position) : -26.011    -15.353
** Cycle Start time              : 1997    12     2     0     0     0   (RAFOS day 10785)
** Launch time                   : 1997    12     3    18     1     0   (RAFOS day 10786)
** Cycle End time                : 1999     5    25    12     0     0   (RAFOS day 11324.5)
** First surface Position time   : 1999     5    25    21    49     0   (RAFOS day 11324)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10799: R2 R1 R1    -34.6933       25.975   1.496      1.496       1.49
** -------
** Additional Float clock offsets, seconds (beginning, end): 0    0
** -------
 *   1  ----------
```

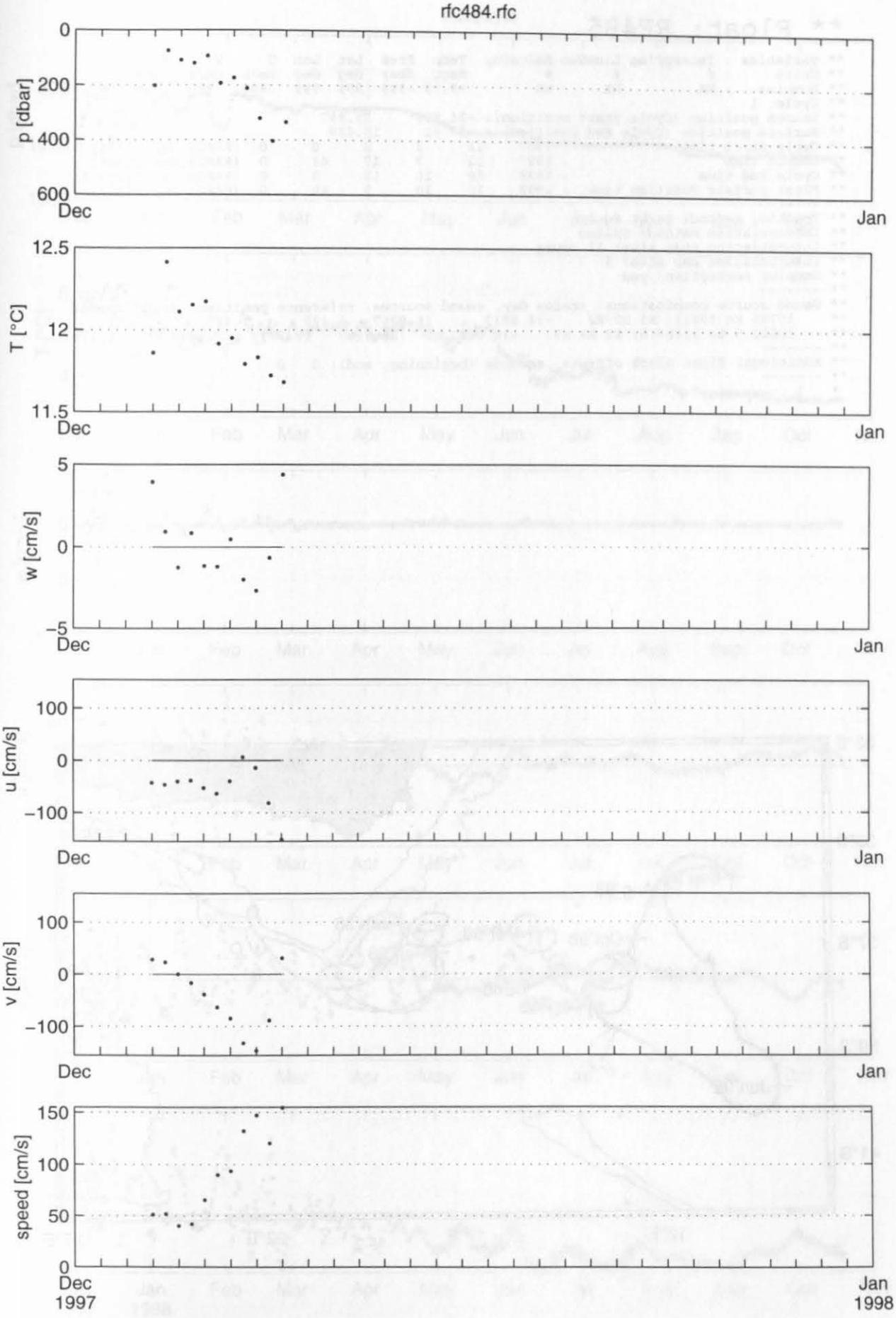



rfc483.rfc
p [dbar]
400
500
600
700
800
Dec
Jan
T [°C]
7.5
7
6.5
6
Dec
Jan
w [cm/s]
5
0
−5
Dec
Jan
u [cm/s]
50
0
−50
Dec
Jan
v [cm/s]
50
0
−50
Dec
Jan
speed [cm/s]
100
50
0
Dec
1997
Jan
1998

** Float: RF484

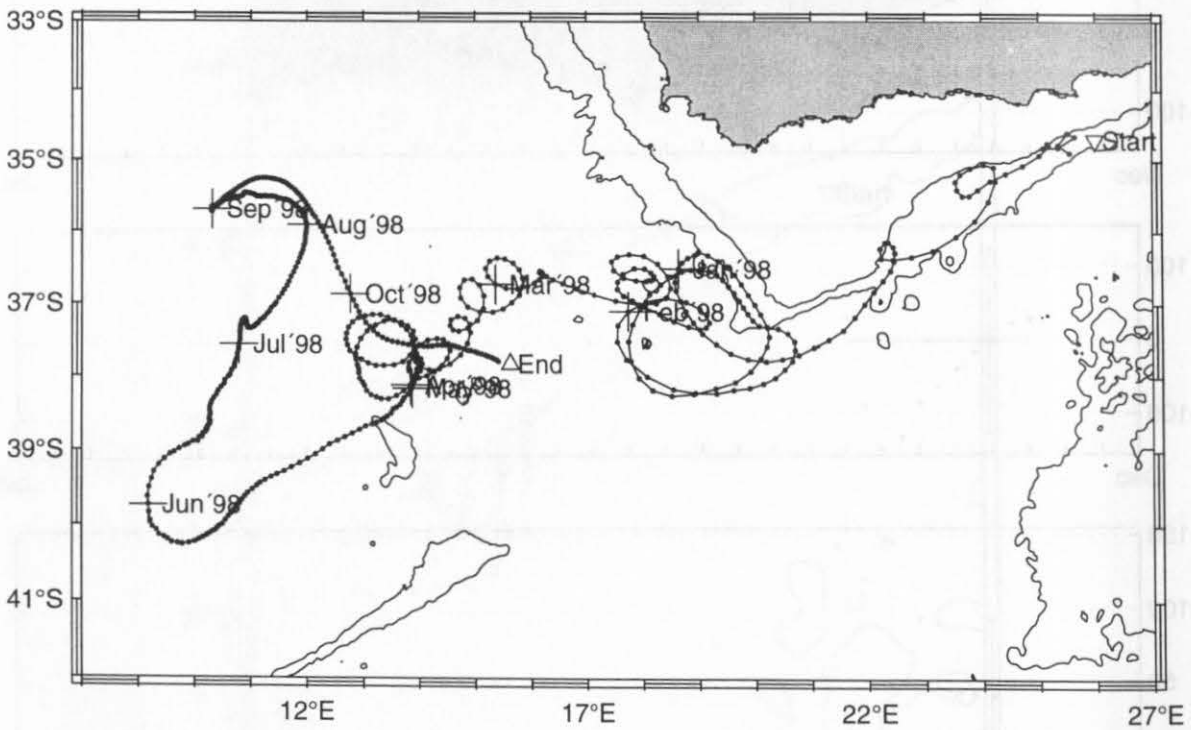
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.693     25.965
** Surface position (Cycle End position) : -32.582     90.916
** Cycle Start time              : 1997    12     2     0     0     0  (RAFOS day 10785)
** Launch time                   : 1997    12     3    18    10     0  (RAFOS day 10786)
** Cycle End time                : 1999     5    25    12     0     0  (RAFOS day 11324.5)
** First surface Position time   : 1999     5    25    21    48     0  (RAFOS day 11324)
** -------
** Tracking method: Circular
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10792: R1 R2 R2     -34.6933       25.965   1.501       1.501       1.501
** -------
** Additional Float clock offsets, seconds (beginning, end): -10   0
** -------
*   1  ----------
```

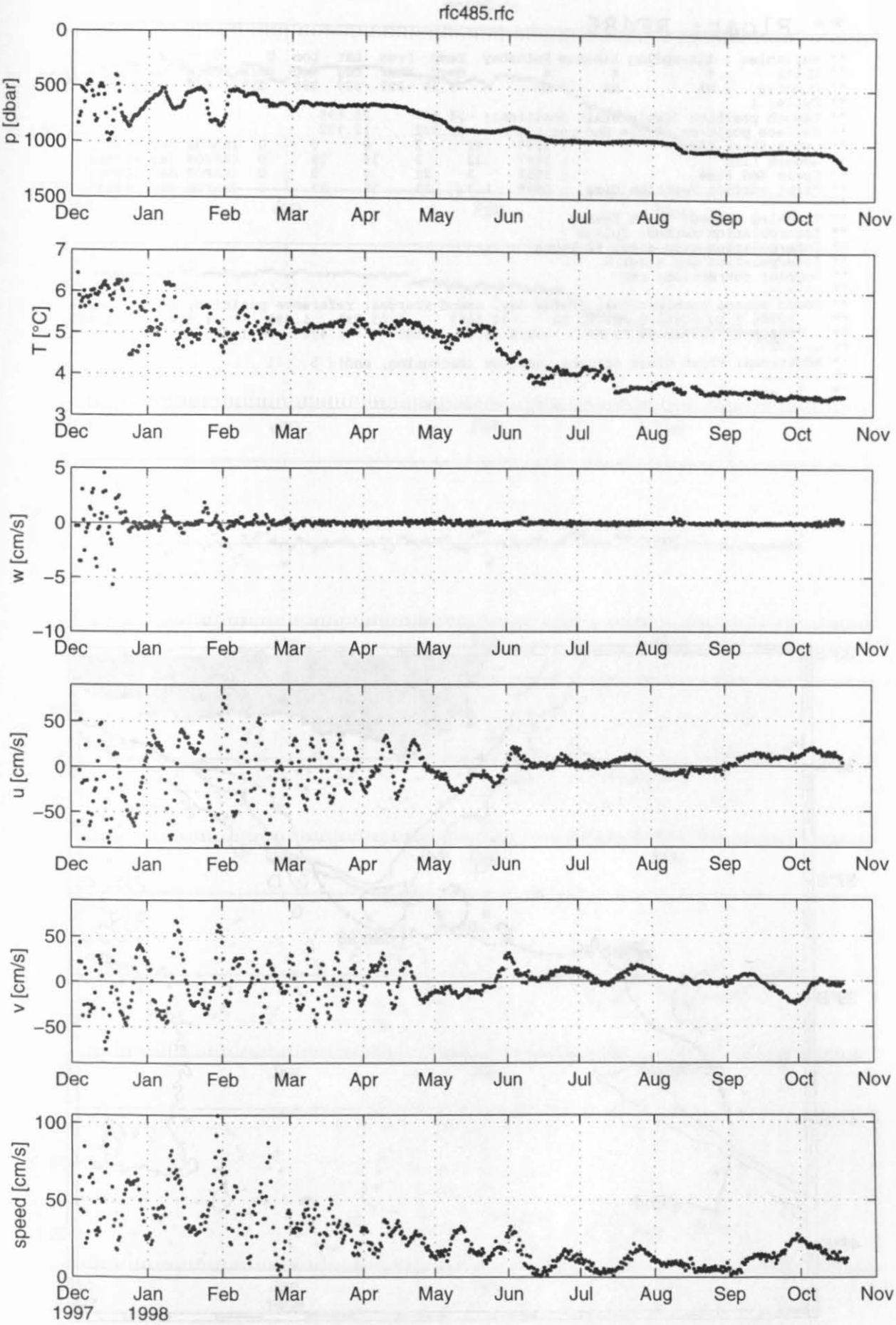



rfc484.rfc
p [dbar]
0
200
400
600
Dec
Jan
T [°C]
12.5
12
11.5
w [cm/s]
5
0
−5
u [cm/s]
100
−100
v [cm/s]
speed [cm/s]
150
50
1997
1998

** Float: RF485

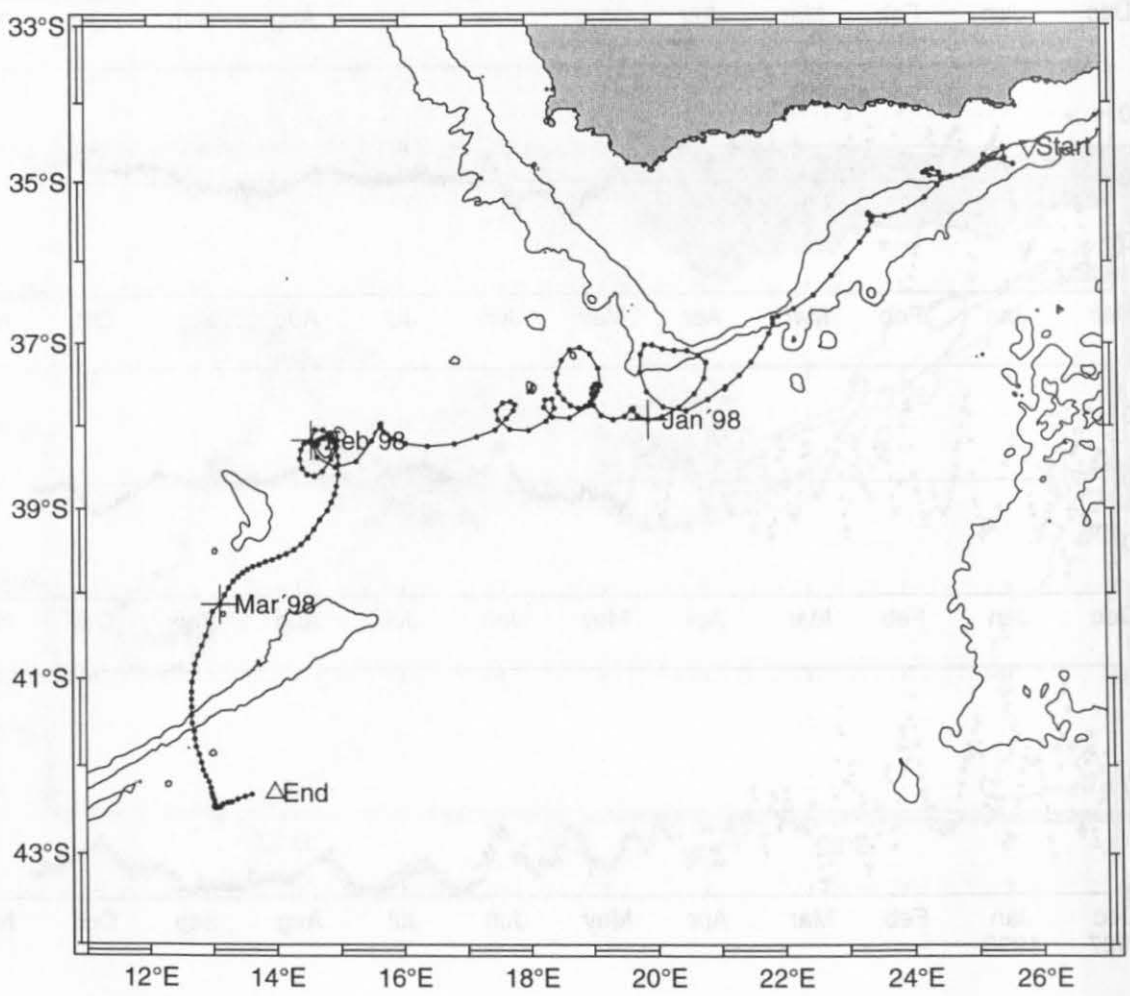
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.693     25.997
** Surface position (Cycle End position) : -37.82      15.639
** Cycle Start time              : 1997    12     2     0     0     0  (RAFOS day 10785)
** Launch time                   : 1997    12     3    17    43     0  (RAFOS day 10786)
** Cycle End time                : 1998    10    20    12     0     0  (RAFOS day 11107.5)
** First surface Position time   : 1998    10    20     9    49     0  (RAFOS day 11107)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10786 to 10811: R1 R2 R2    -34.6933      25.9967   1.489      1.487      1.487
**    10811.5 to 11107.5: K8 K9 K9    -34.6933      25.9967   1.477      1.478      1.478
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

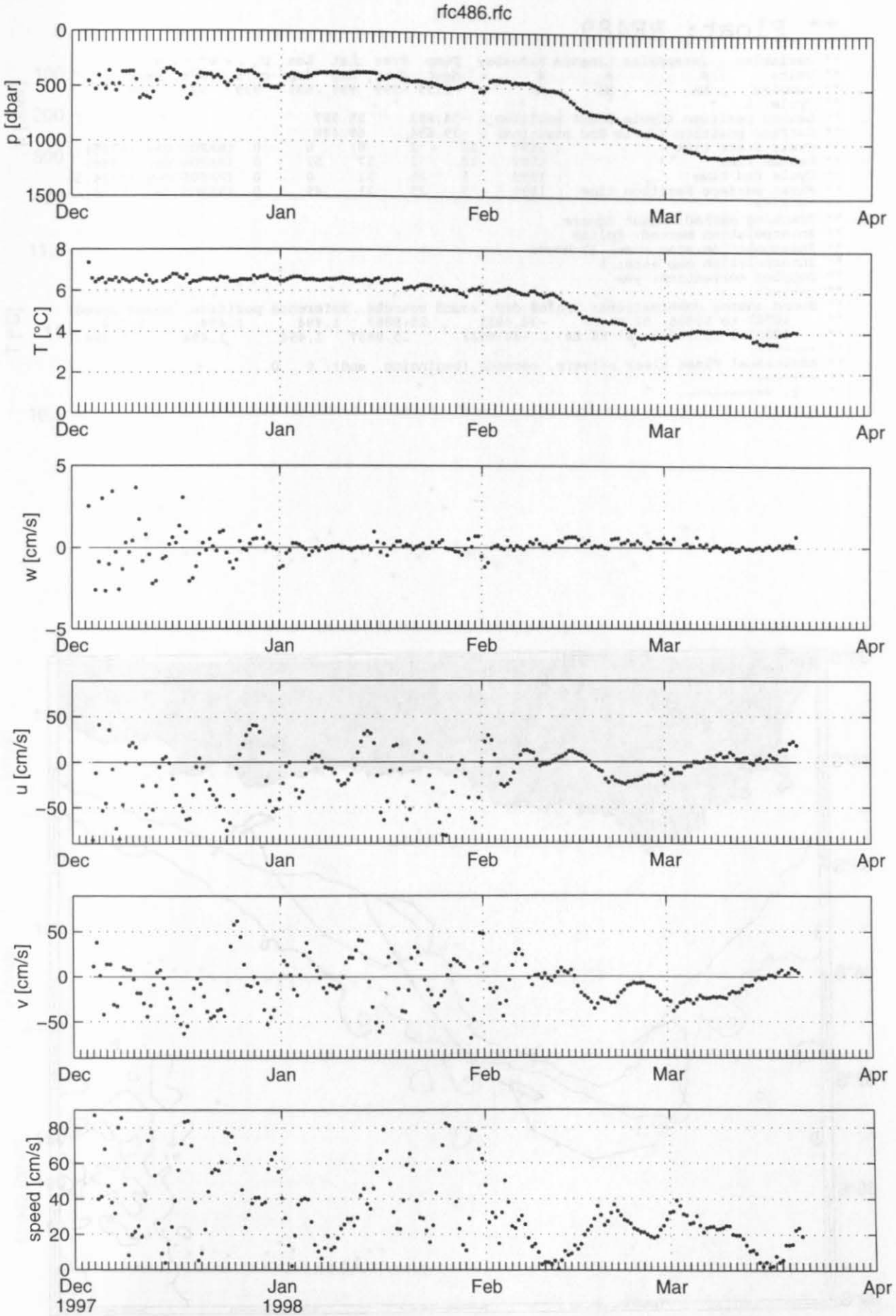



rfc485.rfc
p [dbar]
0
500
1000
1500
T [°C]
7
6
5
4
3
w [cm/s]
5
0
−5
−10
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
100
50
0
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
1997
1998

** Float: RF486

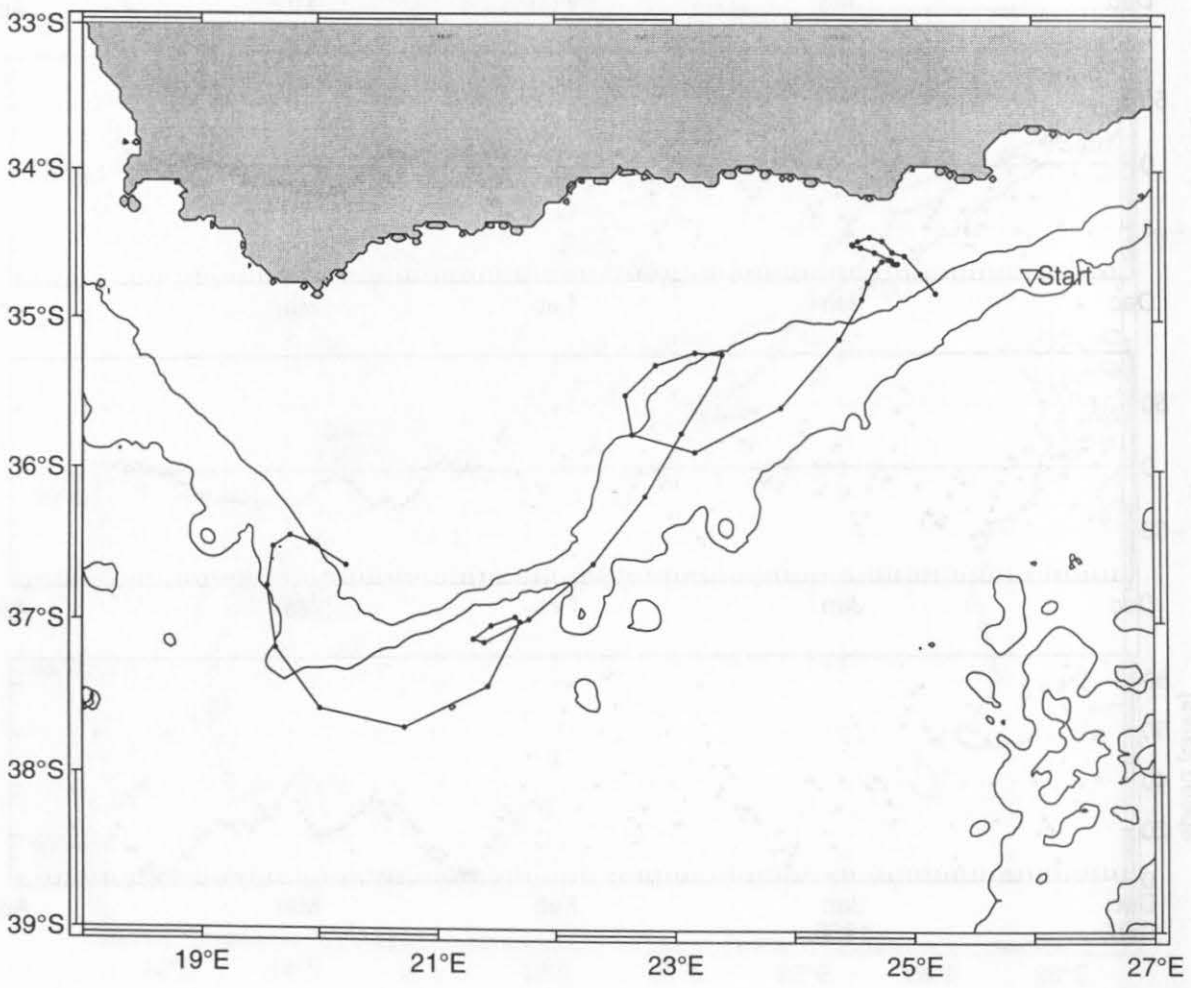
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.567     25.895
** Surface position (Cycle End position) : -42.302     13.972
** Cycle Start time              : 1997    12     2     0     0     0  (RAFOS day 10785)
** Launch time                   : 1997    12     3    19    29     0  (RAFOS day 10786)
** Cycle End time                : 1998     3    21     0     0     0  (RAFOS day 10894)
** First surface Position time   : 1998     3    21    11    53     0  (RAFOS day 10894)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10786.5 to 10864.5: R1 R2 R2    -34.5667      25.895   1.489      1.487      1.487
**    10865 to 10894: K7 K9 K9    -39.0 15.0   1.483      1.476      1.476
** -------
** Additional Float clock offsets, seconds (beginning, end): 5   -1
** -------
 *   1  ----------
```

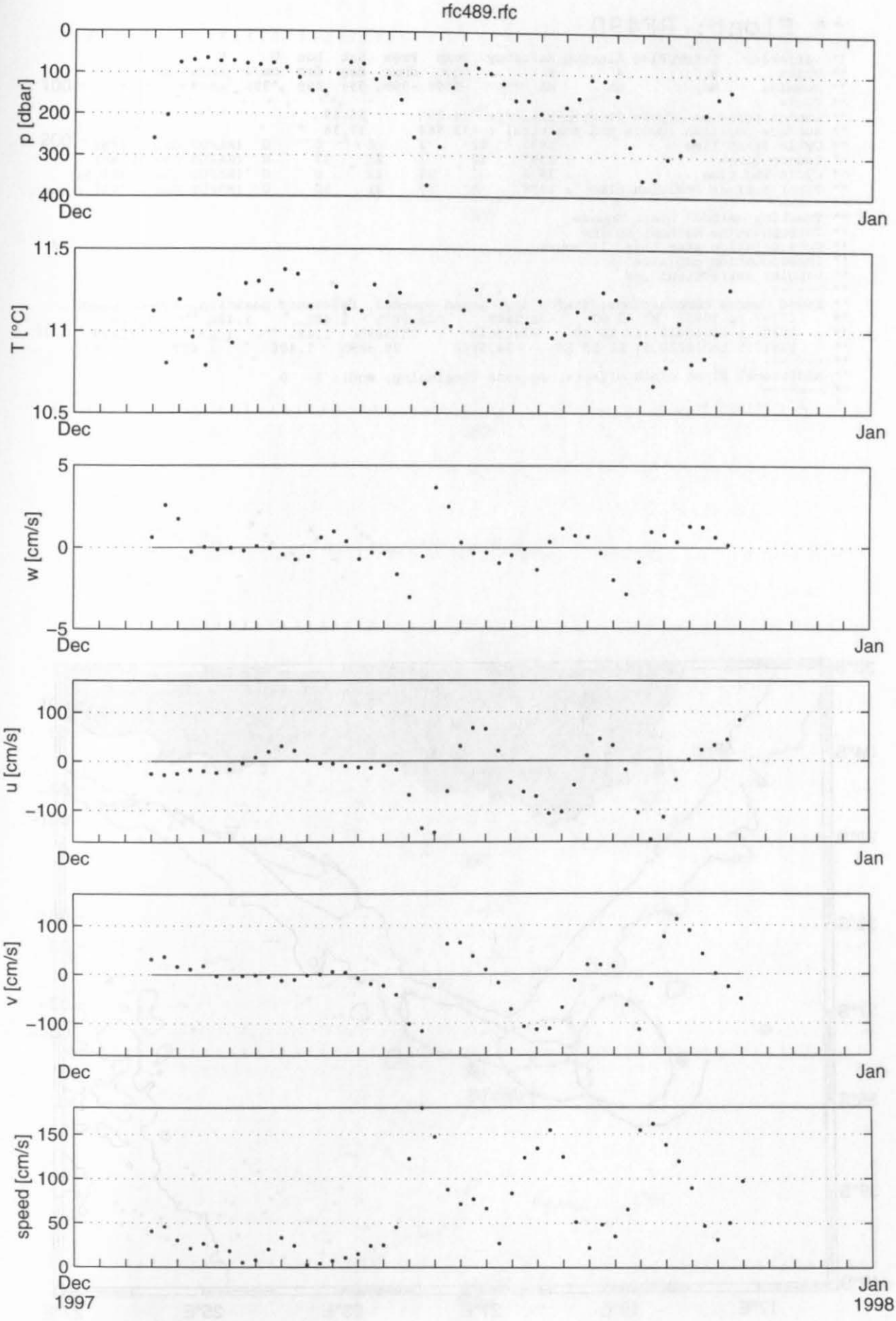



rfc486.rfc
p [dbar]
0
500
1000
1500
T [°C]
8
6
4
2
0
w [cm/s]
5
0
−5
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
80
60
40
20
0
Dec
1997
Jan
1998
Feb
Mar
Apr

** Float: RF489

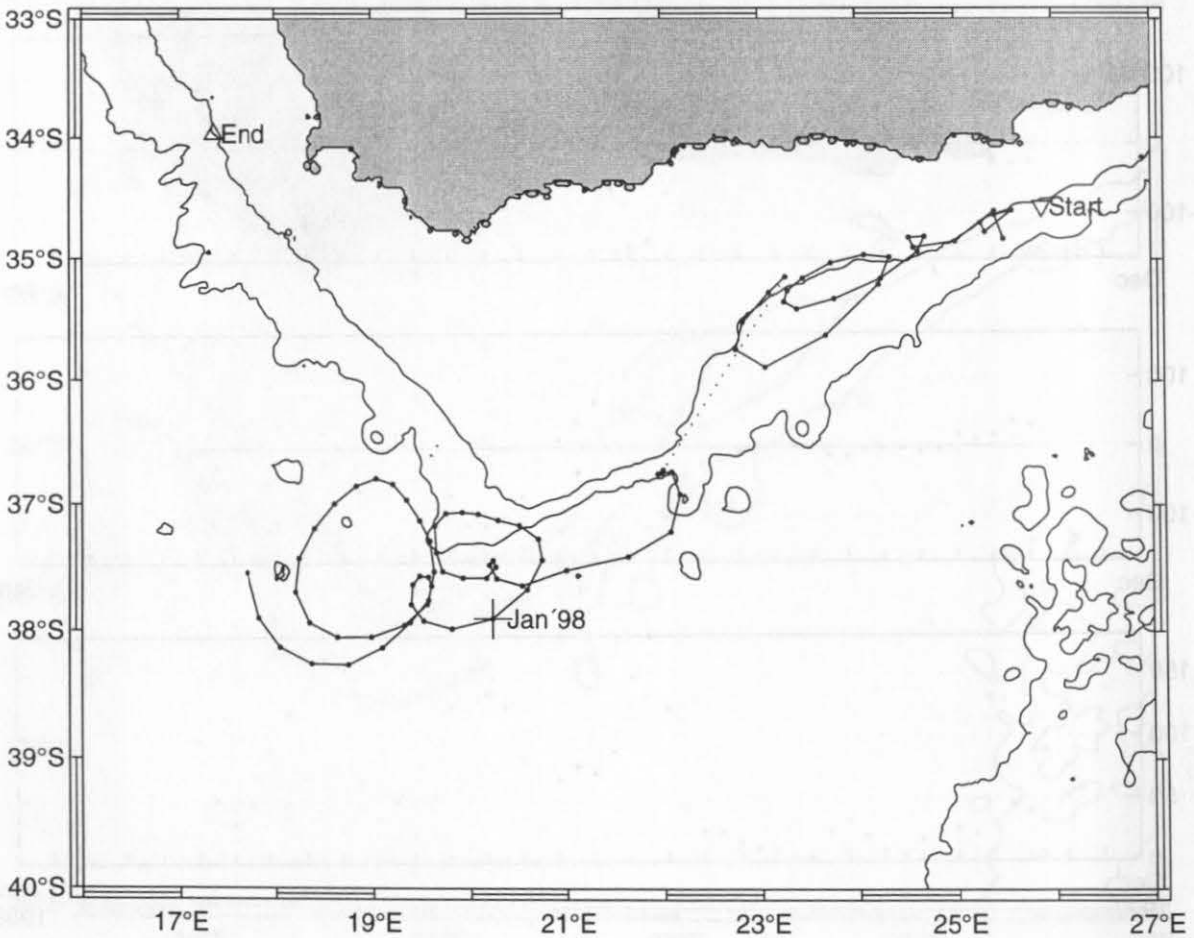
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.693     25.987
** Surface position (Cycle End position) : -39.654     69.488
** Cycle Start time              : 1997   12     2     0     0     0  (RAFOS day 10785)
** Launch time                   : 1997   12     3    17    52     0  (RAFOS day 10786)
** Cycle End time                : 1999    5    25    12     0     0  (RAFOS day 11324.5)
** First surface Position time   : 1999    5    25    21    49     0  (RAFOS day 11324)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10805: R2 R1 R1    -34.6933      25.9867   1.494      1.494      1.494
**    10805.5 to 10810: K7 K8 K8  -34.6933      25.9867   1.494      1.494      1.494
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

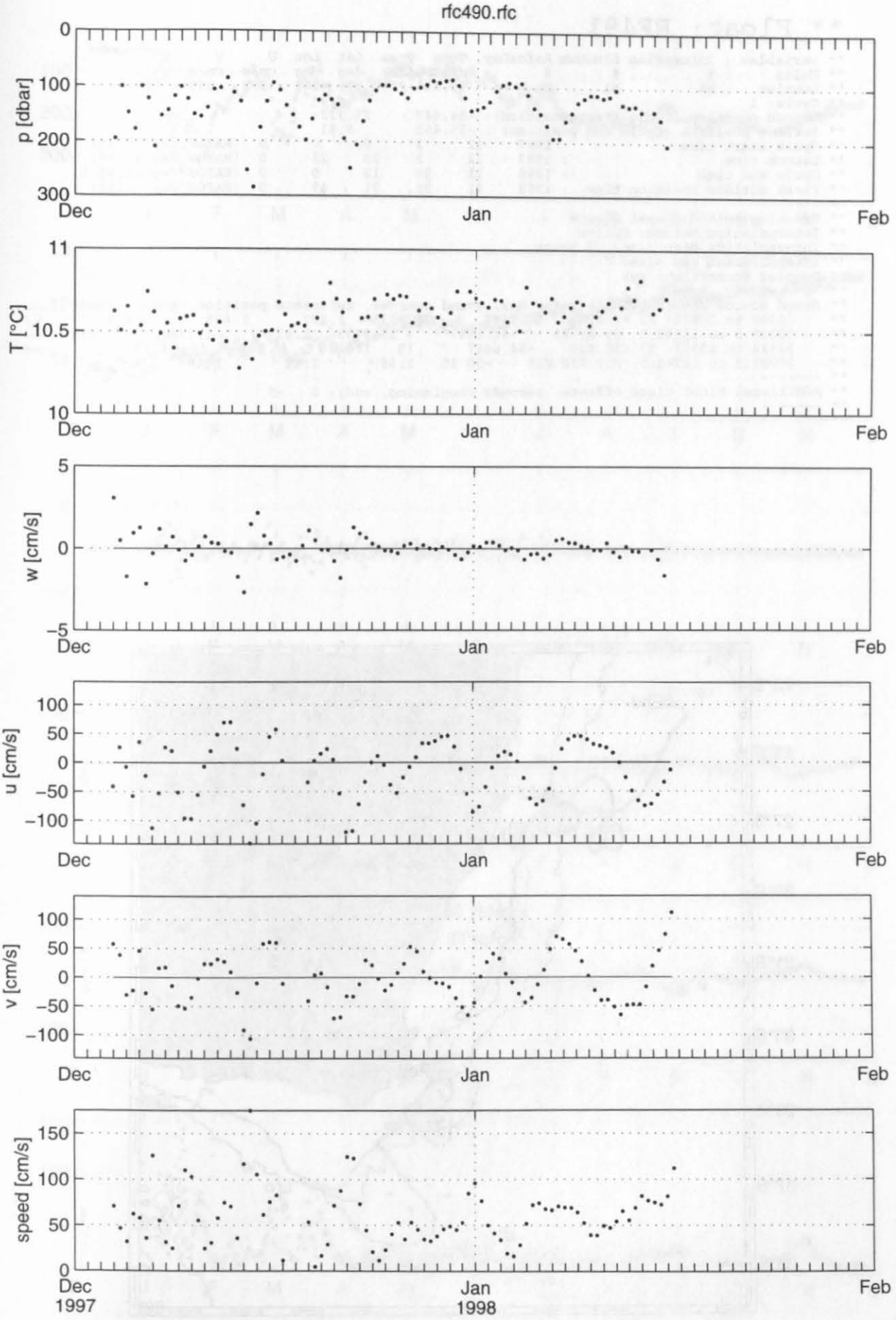



rfc489.rfc
p [dbar]
0
100
200
300
400
Dec
Jan
T [°C]
11.5
11
10.5
Dec
Jan
w [cm/s]
5
0
−5
Dec
Jan
u [cm/s]
100
0
−100
Dec
Jan
v [cm/s]
100
0
−100
Dec
Jan
speed [cm/s]
150
100
50
0
Dec
1997
Jan
1998

** Float: RF490

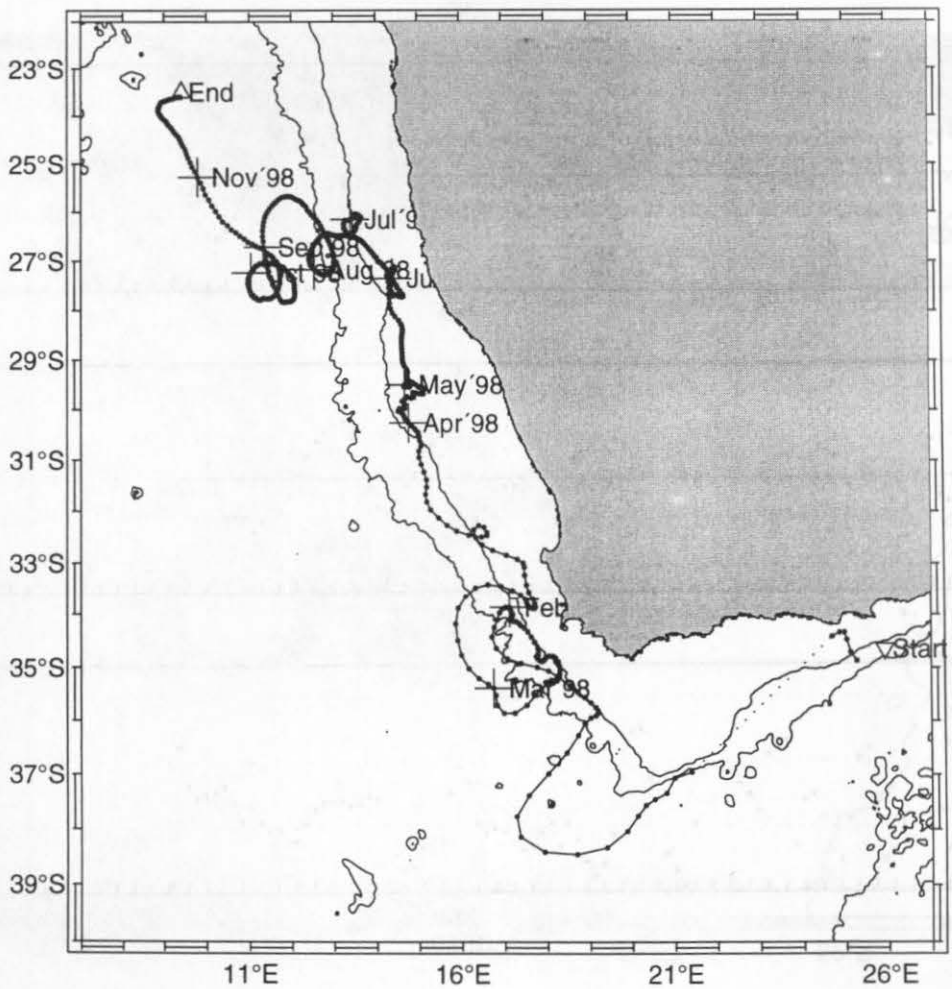
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.565      25.89
** Surface position (Cycle End position) : -33.964      17.36
** Cycle Start time              : 1997   12    2     0     0     0  (RAFOS day 10785)
** Launch time                   : 1997   12    3    21    37     0  (RAFOS day 10786)
** Cycle End time                : 1998    1   30    12     0     0  (RAFOS day 10844.5)
** First surface Position time   : 1998    1   30    21    50     0  (RAFOS day 10844)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10800: R1 R2 R2    -34.5648      25.8895   1.489      1.486      1.484
**    10800.5 to 10810: K7 K8 K8    -34.5648      25.8895   1.481      1.477      1.477
**    10810.5 to 10830.5: R2 K8 K8    -34.5648      25.8895   1.486      1.477      1.477
** -------
** Additional Float clock offsets, seconds (beginning, end): 3   0
** -------
 *   1  ----------
```

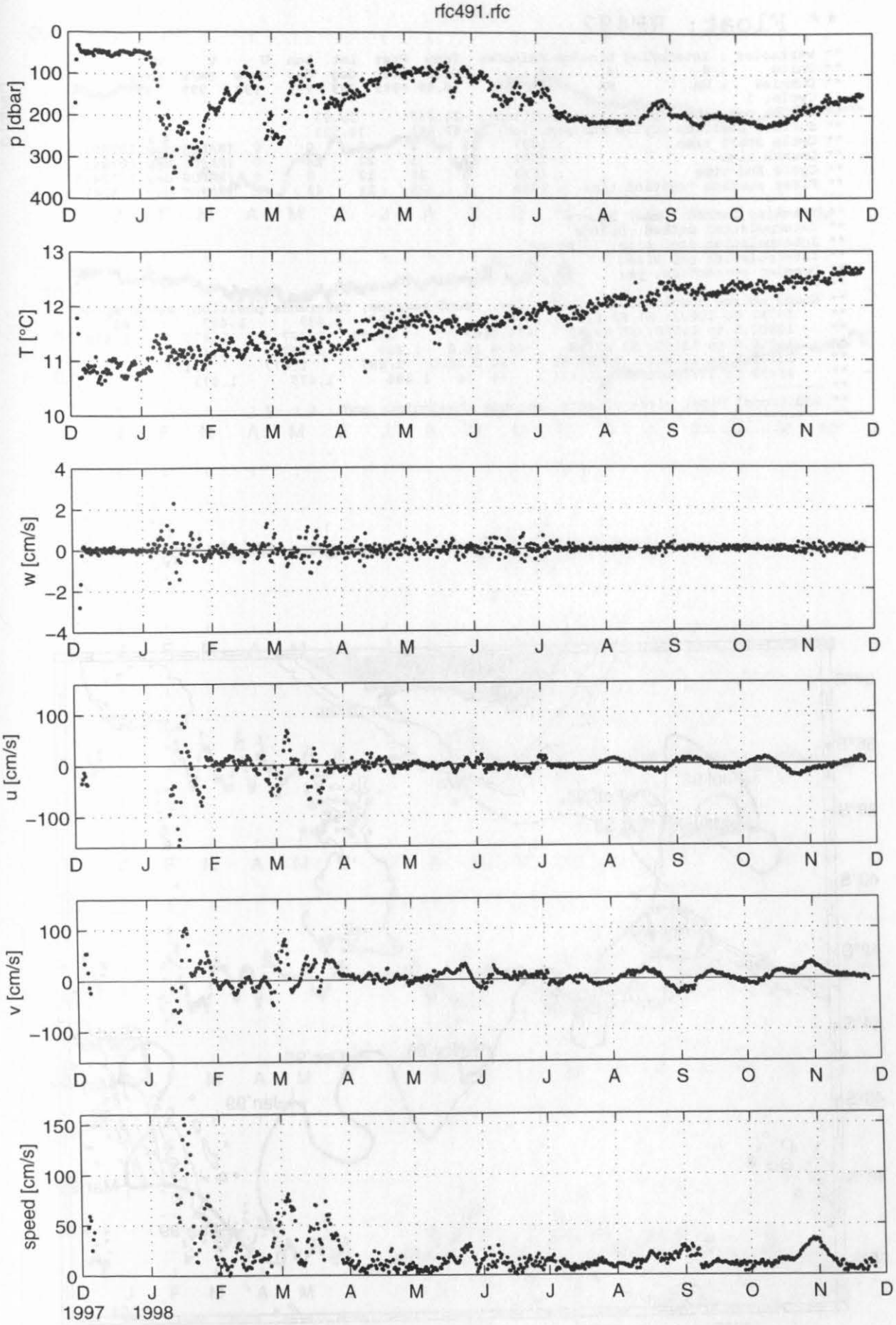



rfc490.rfc
p [dbar]
0
100
200
300
T [°C]
11
10.5
10
w [cm/s]
5
0
−5
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
150
100
50
0
Dec
Jan
Feb
1997
1998

** Float: RF491

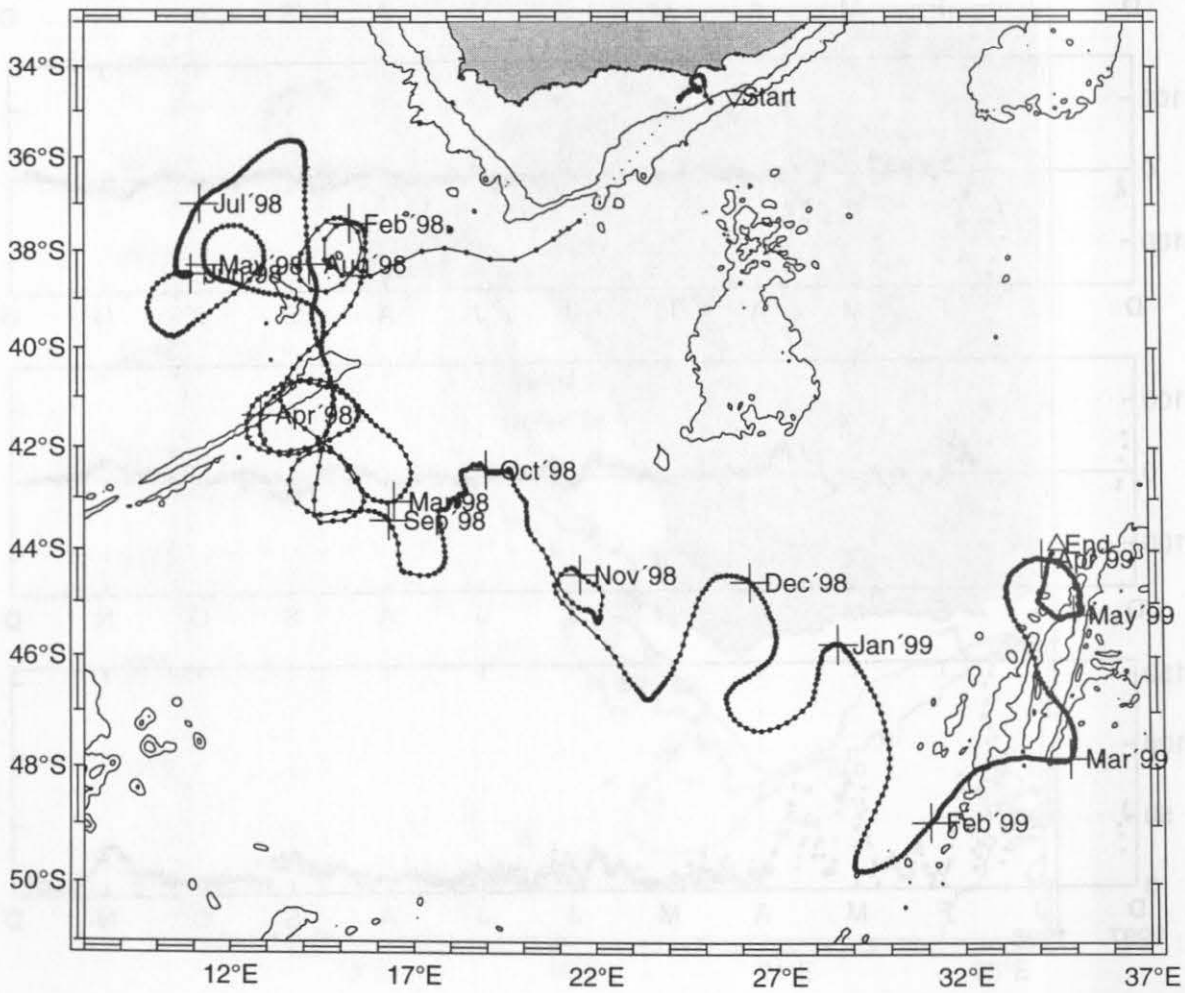
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.647     25.933
** Surface position (Cycle End position) : -23.495       9.41
** Cycle Start time              : 1997    12     2     0     0     0  (RAFOS day 10785)
** Launch time                   : 1997    12     3    20    23     0  (RAFOS day 10786)
** Cycle End time                : 1998    11    26    12     0     0  (RAFOS day 11144.5)
** First surface Position time   : 1998    11    26    21    49     0  (RAFOS day 11144)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 7
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10826: R1 R2 R2     -34.6467      25.9333   1.487      1.485      1.485
**    10826.5 to 10923.5: K8 K9 K9     -34.6467      25.9333   1.477      1.478      1.478
**    10924 to 10997: K9 K10 K10     -34.6467      15   1.478      1.48       1.48
**    10997.5 to 11144.5: M10 K10 K10     -30 15   1.48       1.48       1.48
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   -5
** -------
 *   1  ----------
```

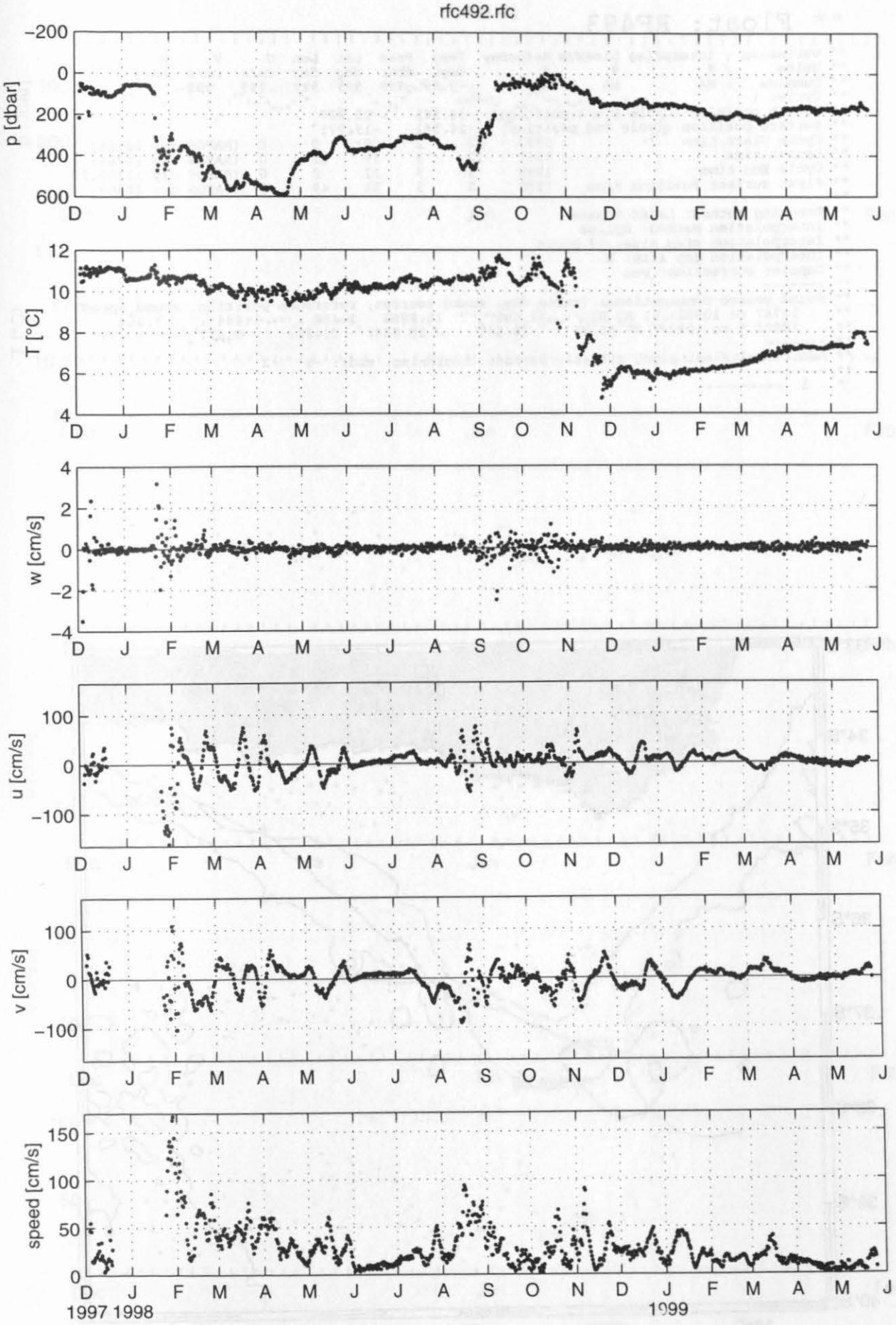



rfc491.rfc
p [dbar]
0
100
200
300
400
T [°C]
13
12
11
10
w [cm/s]
4
2
0
−2
−4
u [cm/s]
100
0
−100
v [cm/s]
100
0
−100
speed [cm/s]
150
100
50
0
D J F M A M J J A S O N D
1997 1998

** Float: RF492

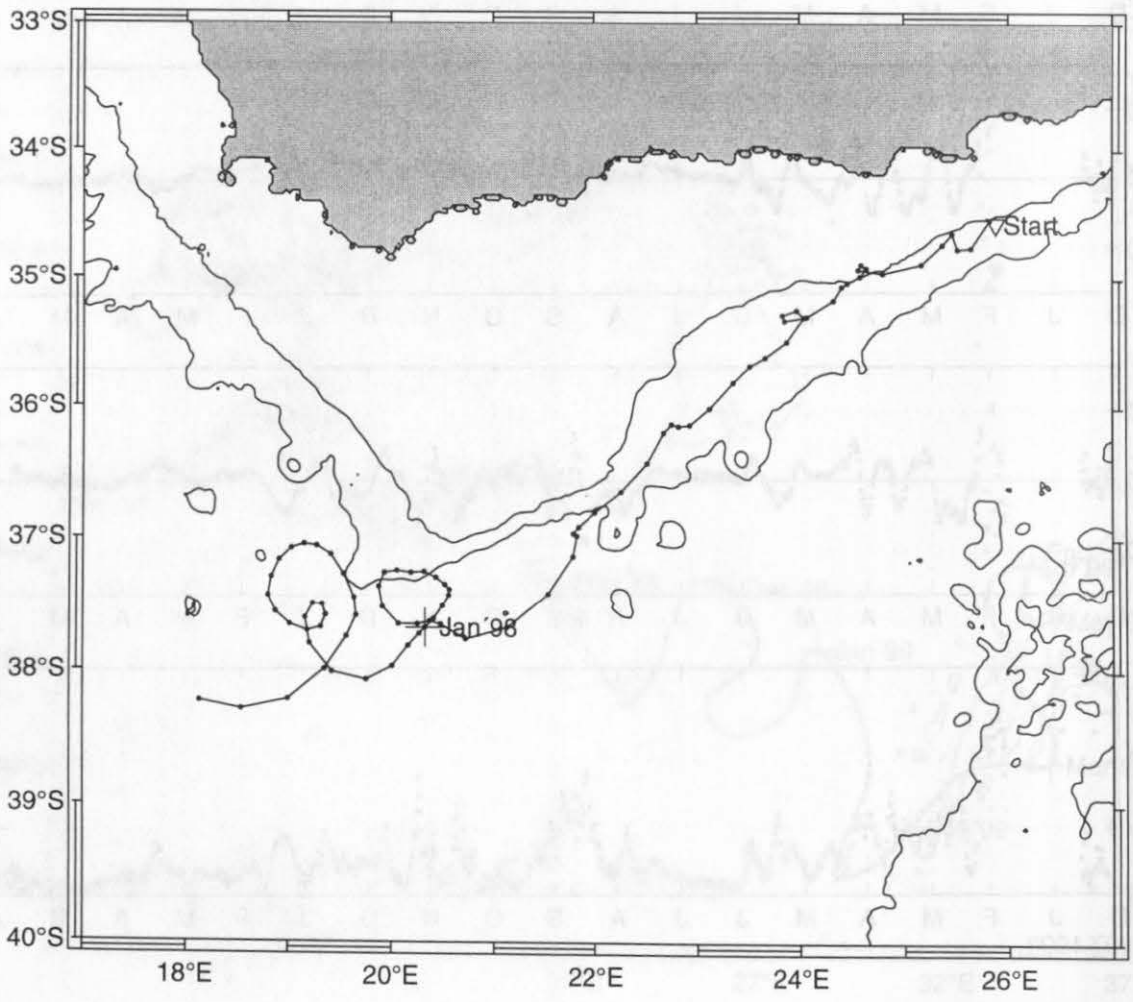
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.647      25.93
** Surface position (Cycle End position) : -43.881      34.523
** Cycle Start time              : 1997    12     2     0     0     0  (RAFOS day 10785)
** Launch time                   : 1997    12     3    22    26     0  (RAFOS day 10786)
** Cycle End time                : 1999     5    25    12     0     0  (RAFOS day 11324.5)
** First surface Position time   : 1999     5    25    21    48     0  (RAFOS day 11324)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 7
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10802: R1 R2 R2     -34.6467        25.93   1.489      1.487      1.487
**    10802.5 to 11060: K8 K9 K9    -34.6467        25.93   1.477      1.478      1.478
**    11060.5 to 11105: R1 R2 R2    -44.0 16.0   1.489      1.487      1.487
**    11105.5 to 11258.5: R2 K8 K8    -44.0 34.0   1.487      1.477      1.477
**    11259 to 11324.5: R2 K11 K11    -44  34   1.484      1.473      1.473
** -------
** Additional Float clock offsets, seconds (beginning, end): 6   -2
** -------
 *   1  ----------
```

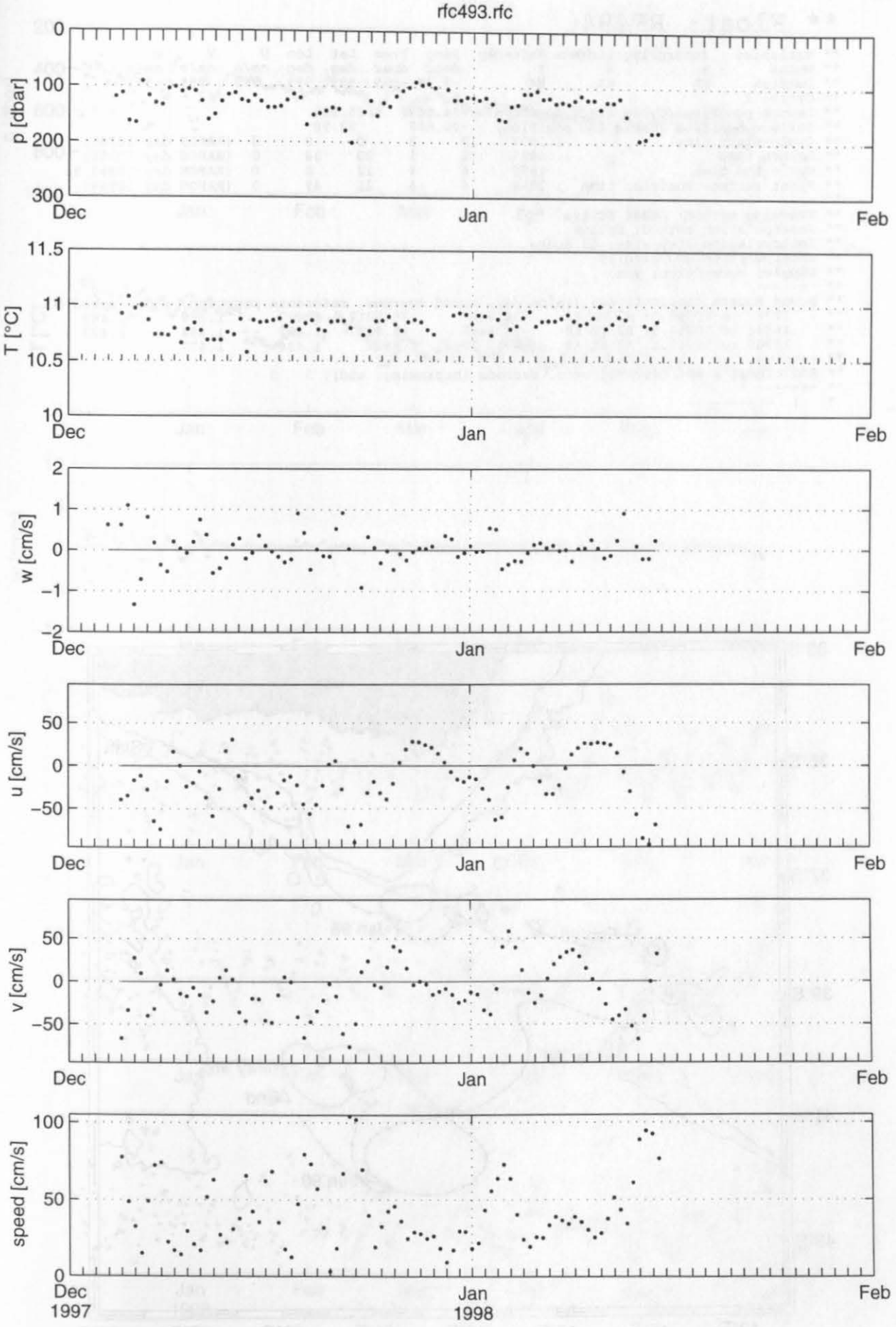



rfc492.rfc
p [dbar]
T [°C]
w [cm/s]
u [cm/s]
v [cm/s]
speed [cm/s]
D J F M A M J J A S O N D J F M A M J
1997 1998
1999

** Float: RF493

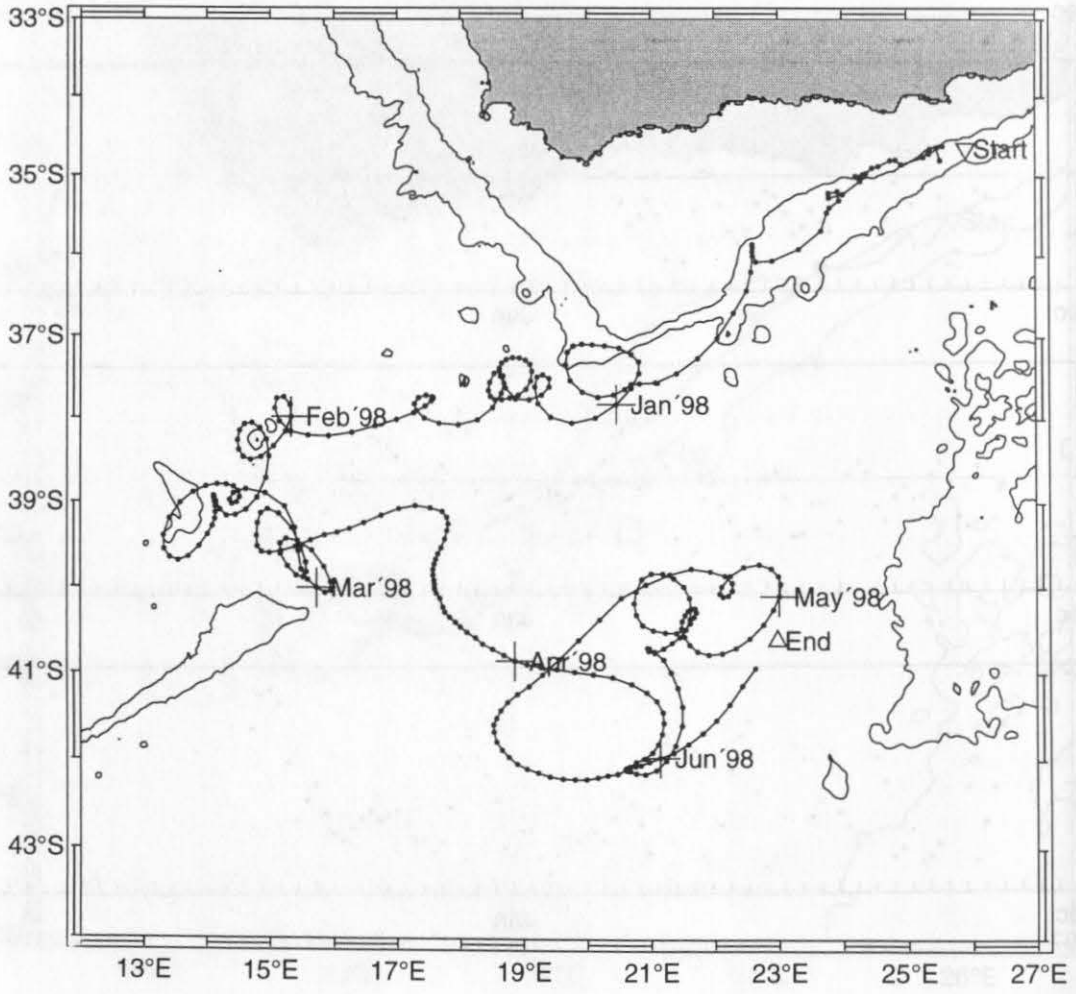
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.565     25.887
** Surface position (Cycle End position) : -24.561    -19.771
** Cycle Start time              : 1997    12     2     0     0     0  (RAFOS day 10785)
** Launch time                   : 1997    12     3    19    41     0  (RAFOS day 10786)
** Cycle End time                : 1999     5     9    12     0     0  (RAFOS day 11308.5)
** First surface Position time   : 1999     5     9    21    49     0  (RAFOS day 11308)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10822: R1 R2 R2     -34.565      25.8867   1.489      1.484      1.484
**    10822.5 to 10830: K7 K8 K8    -34.565      25.8867   1.481      1.477      1.477
** -------
** Additional Float clock offsets, seconds (beginning, end): -5   -2
** -------
*   1  ----------
```

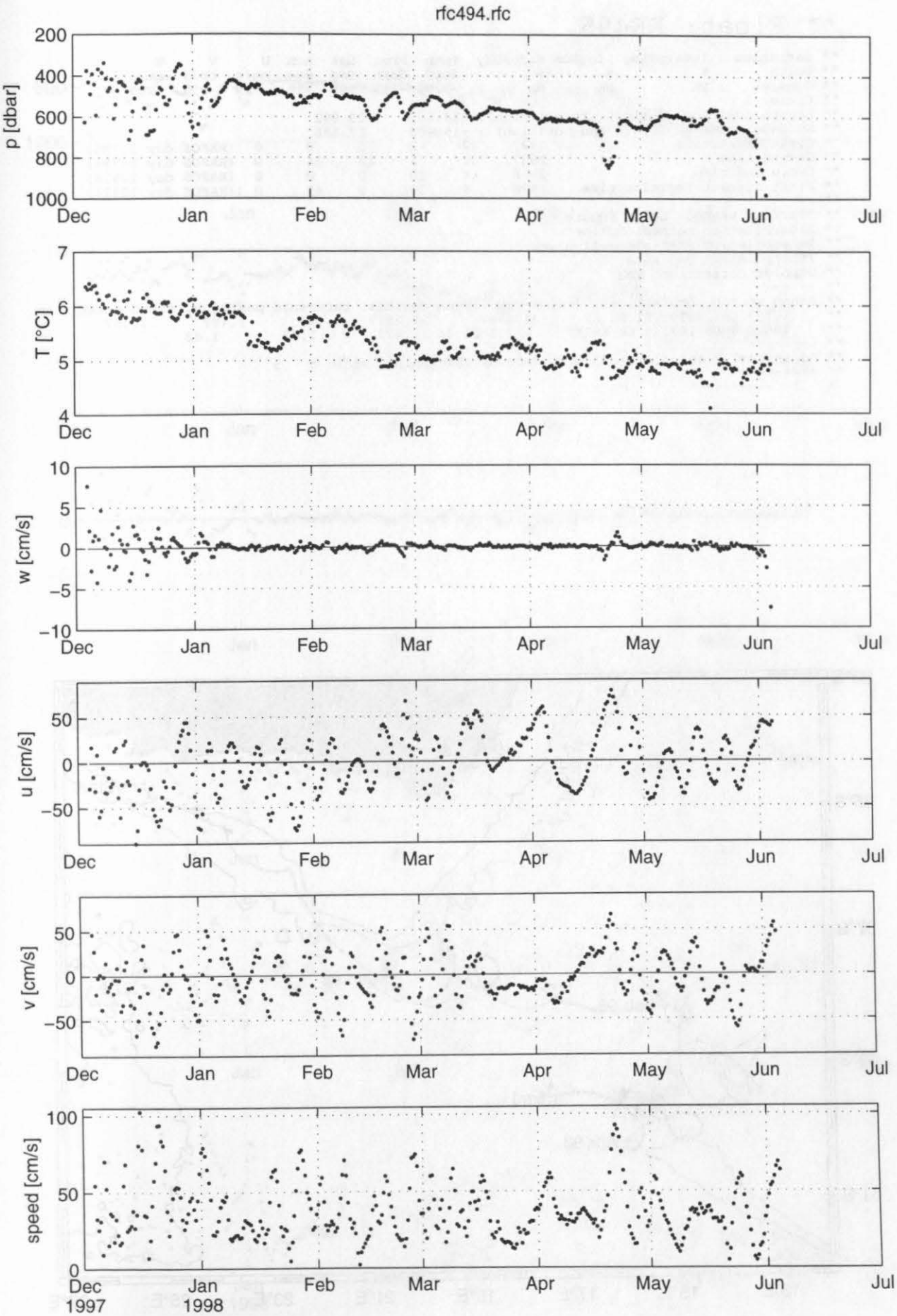



rfc493.rfc
p [dbar]
0
100
200
300
T [°C]
11.5
11
10.5
10
w [cm/s]
2
1
0
−1
−2
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
100
50
0
Dec
Jan
Feb
1997
1998

** Float: RF494

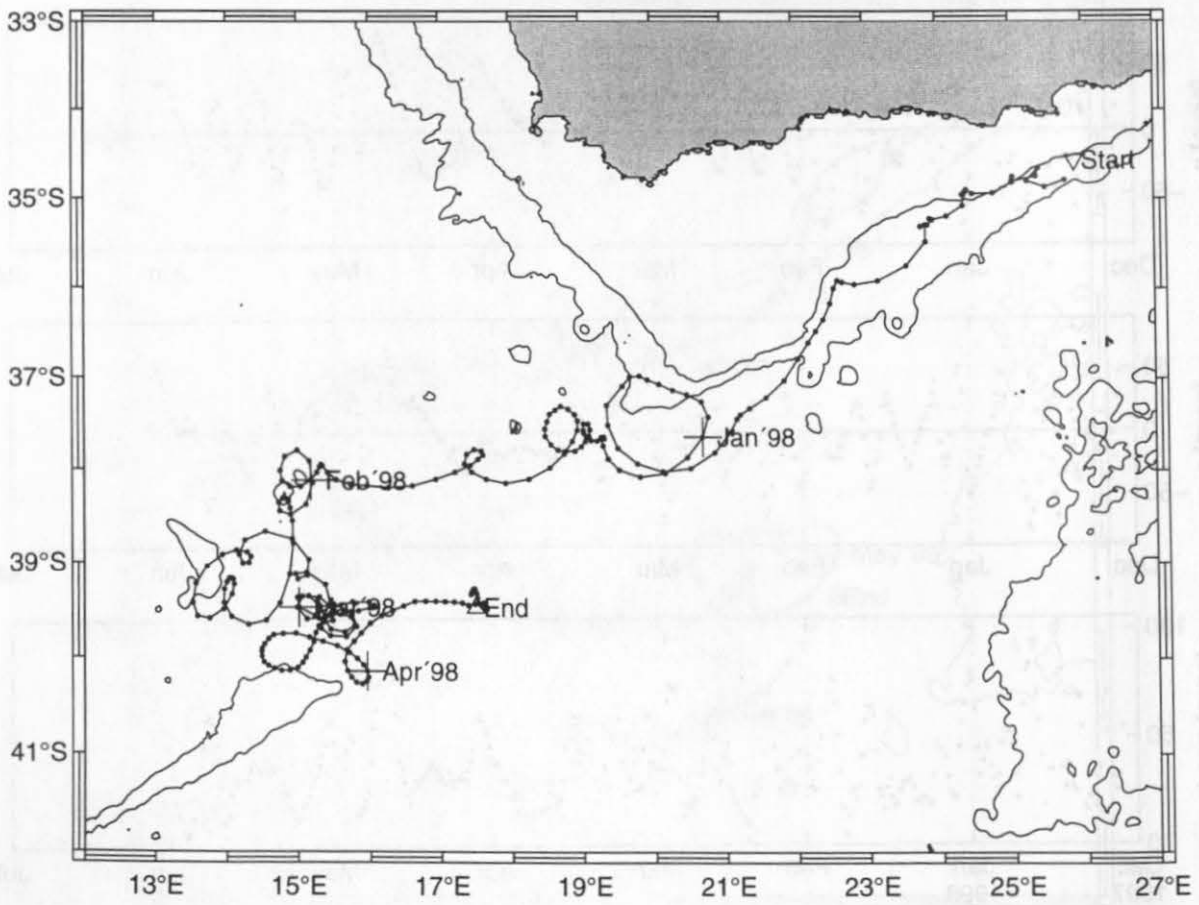
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.647     25.922
** Surface position (Cycle End position) : -40.603      22.98
** Cycle Start time              : 1997    12     2     0     0     0   (RAFOS day 10785)
** Launch time                   : 1997    12     3    20    34     0   (RAFOS day 10786)
** Cycle End time                : 1998     6     4    12     0     0   (RAFOS day 10969.5)
** First surface Position time   : 1998     6     4    21    49     0   (RAFOS day 10969)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10840.5: R2 R1 R1    -34.6467      25.9217   1.487      1.489      1.489
**    10841 to 10899.5: R2 K8 K8    -34.6467      25.9217   1.487      1.484      1.477
**    10900 to 10969.5: K7 K8 K8    -40.5 18.0    1.487     1.484      1.477
** -------
** Additional Float clock offsets, seconds (beginning, end): 3   0
** -------
*   1  ----------
```

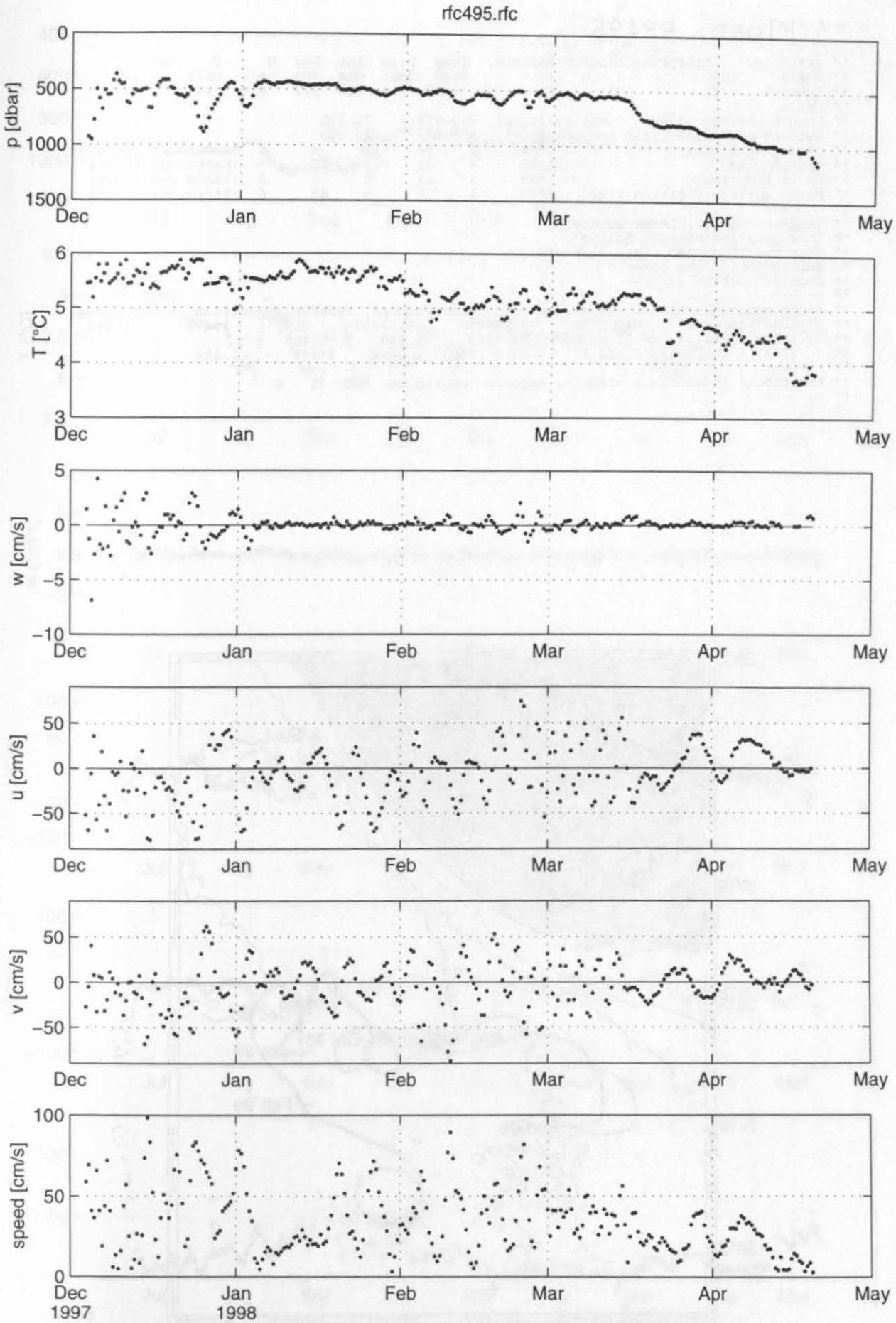



rfc494.rfc
p [dbar]
200
400
600
800
1000
T [°C]
7
6
5
4
w [cm/s]
10
5
0
−5
−10
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
100
50
0
Dec
1997
Jan
1998
Feb
Mar
Apr
May
Jun
Jul

** Float: RF495

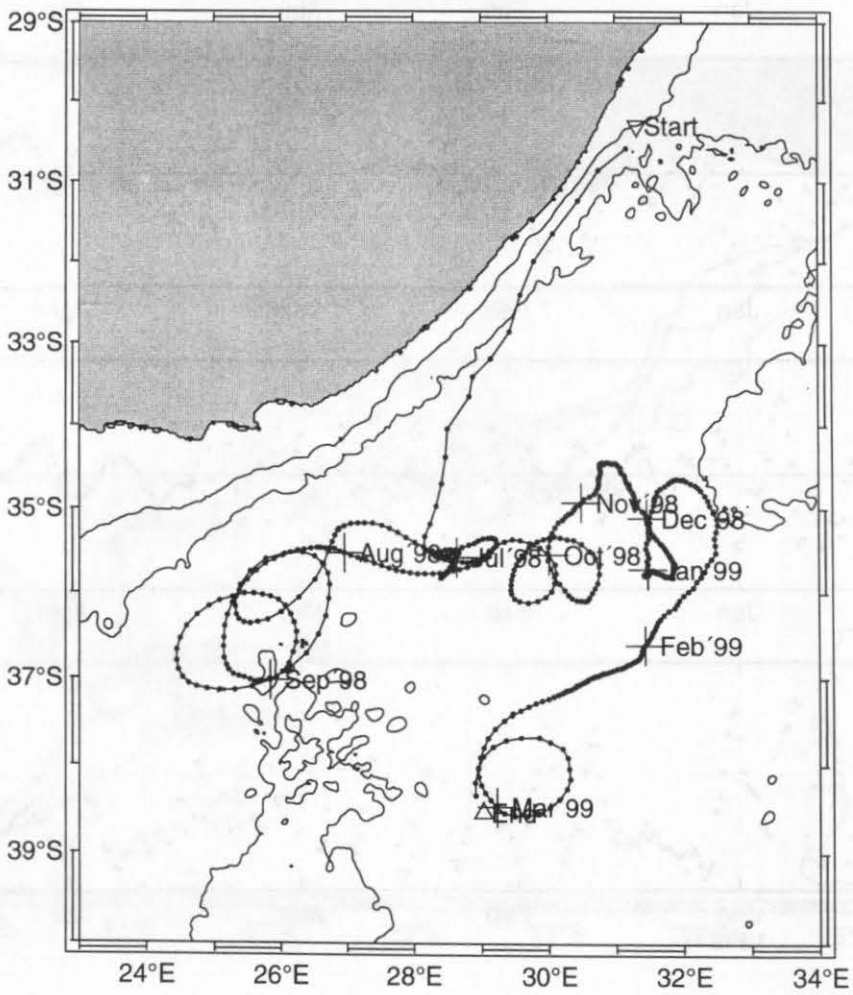
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -34.567     25.892
** Surface position (Cycle End position) : -39.468     17.496
** Cycle Start time             : 1997    12     2     0     0     0  (RAFOS day 10785)
** Launch time                  : 1997    12     3    19    34     0  (RAFOS day 10786)
** Cycle End time               : 1998     4    20     0     0     0  (RAFOS day 10924)
** First surface Position time  : 1998     4    20     9    49     0  (RAFOS day 10924)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10787 to 10810: R1 R2 R2    -34.5667      25.8917   1.489      1.487      1.487
**    10810.5 to 10924: K8 K9 K9    -37.0 22.0   1.477       1.48       1.48
** -------
** Additional Float clock offsets, seconds (beginning, end): 5   5
** -------
 *   1  ----------
```

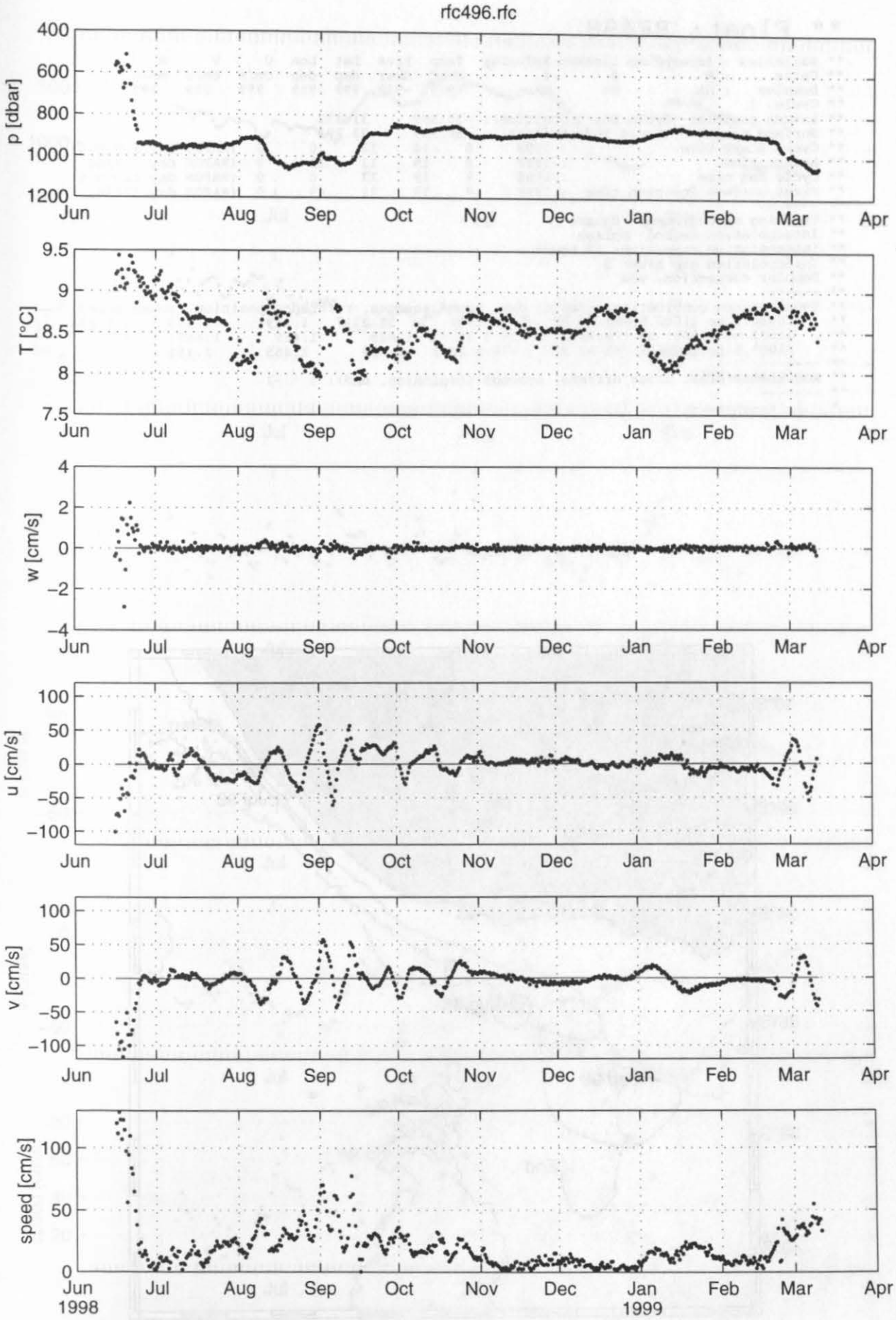



rfc495.rfc
p [dbar]
0
500
1000
1500
T [°C]
6
5
4
3
w [cm/s]
5
0
−5
−10
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
100
50
0
Dec
1997
Jan
1998
Feb
Mar
Apr
May

** Float: RF496

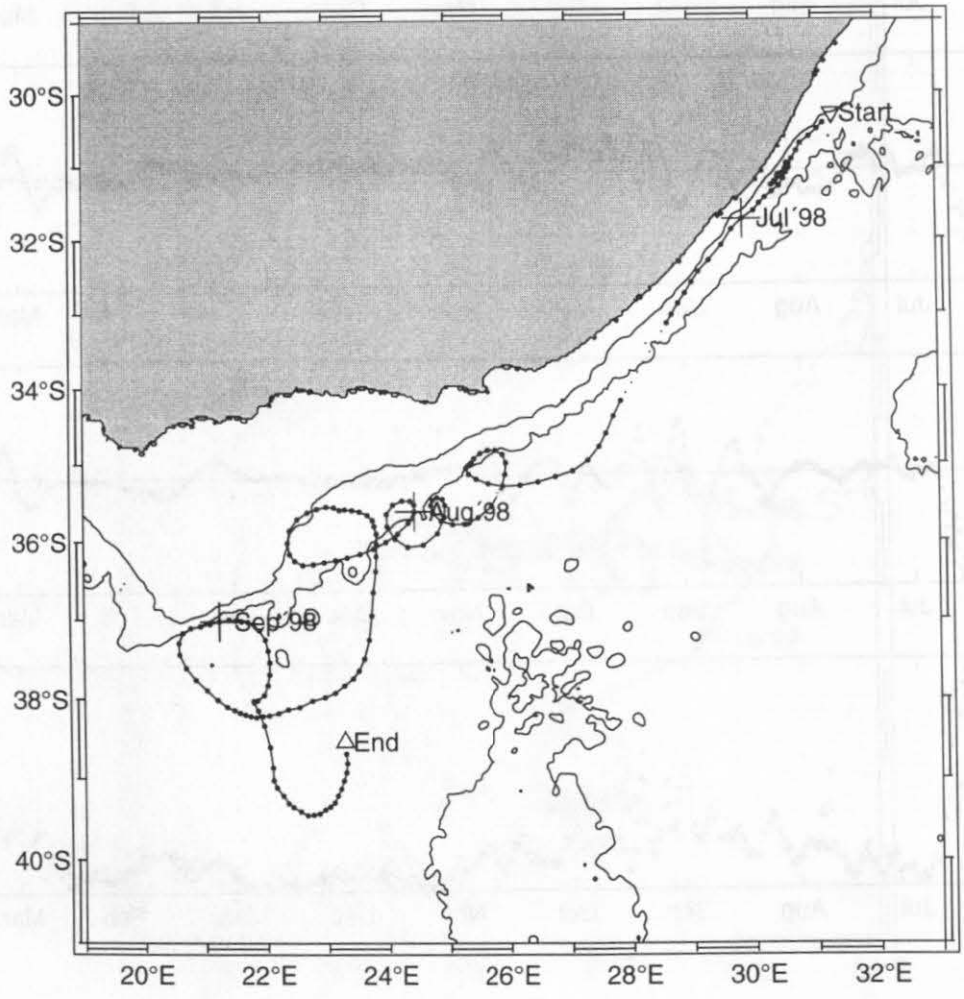
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.298     31.332
** Surface position (Cycle End position) : -38.537     29.022
** Cycle Start time              : 1998     6    14    12     0     0   (RAFOS day 10979.5)
** Launch time                   : 1998     6    15    13    17     0   (RAFOS day 10980)
** Cycle End time                : 1999     3    11     0     0     0   (RAFOS day 11249)
** First surface Position time   : 1999     3    11     9    49     0   (RAFOS day 11249)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10981 to 10985.5: R1 R2 R2     -30.2983      31.3317   1.489      1.486      1.484
**    10986 to 11233: K8 R2 R2         1.486       1.489     1.489
**    11233.5 to 11249: R1 R2 R2     -38.5 29.0    1.48      1.486      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 5   0
** -------
 *   1  ----------
```

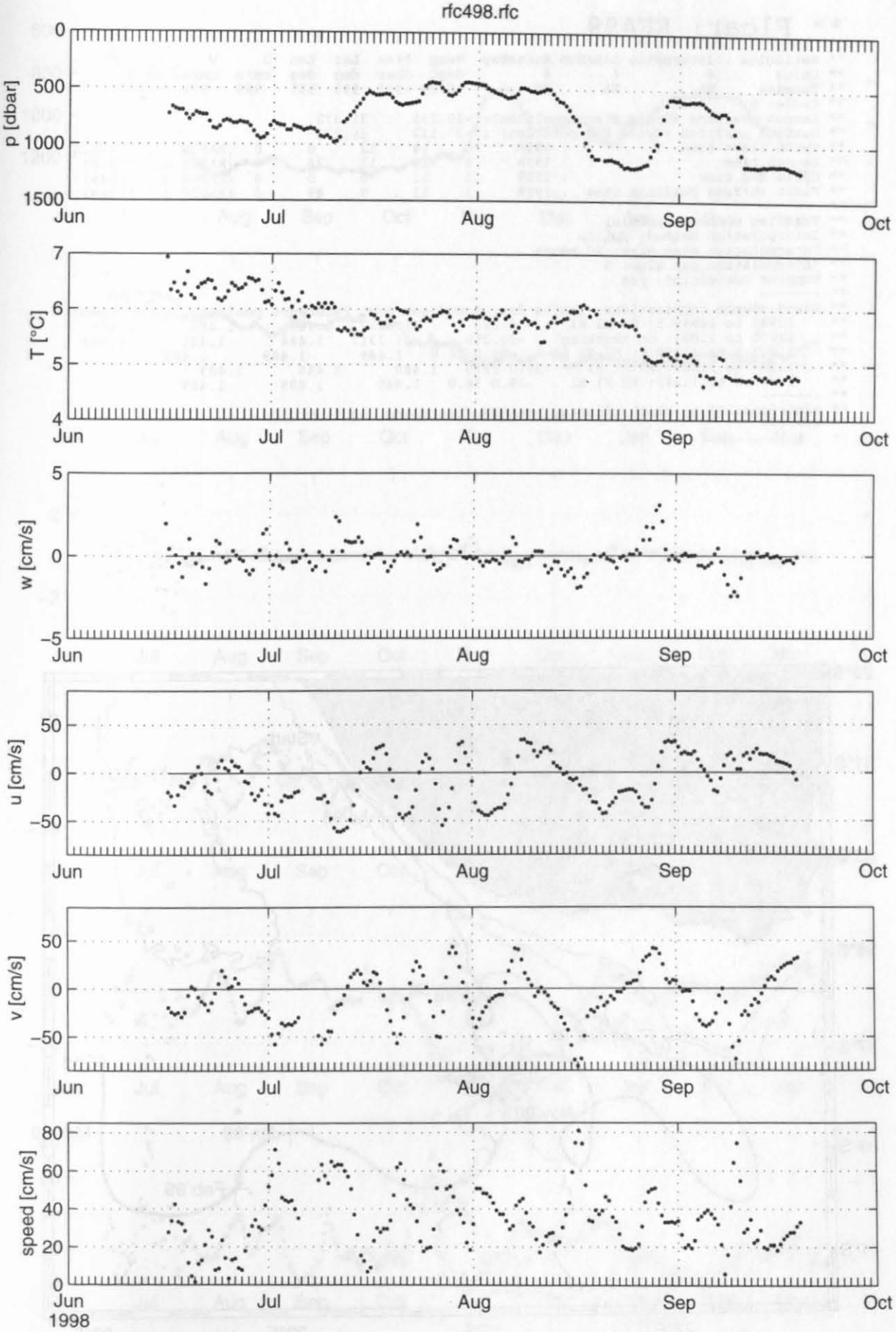



rfc496.rfc
p [dbar]
400
600
800
1000
1200
T [°C]
9.5
9
8.5
8
7.5
w [cm/s]
4
2
0
−2
−4
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
100
50
0
Jun
1998
Jul
Aug
Sep
Oct
Nov
Dec
Jan
1999
Feb
Mar
Apr

** Float: RF498

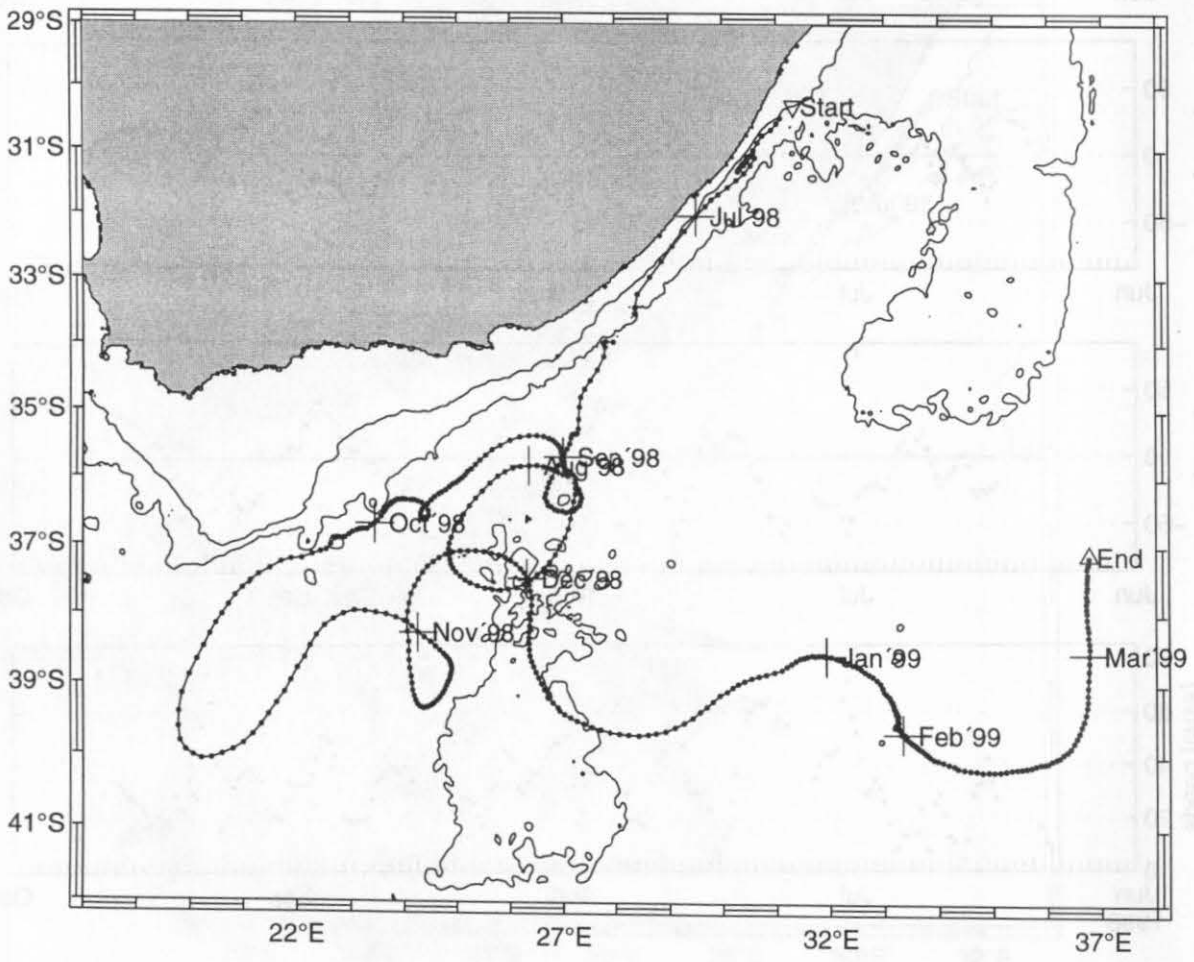
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.297     31.332
** Surface position (Cycle End position) : -38.537     23.284
** Cycle Start time              : 1998     6    14    12     0     0   (RAFOS day 10979.5)
** Launch time                   : 1998     6    15    13    19     0   (RAFOS day 10980)
** Cycle End time                : 1998     9    19    12     0     0   (RAFOS day 11076.5)
** First surface Position time   : 1998     9    19    21    49     0   (RAFOS day 11076)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 11000.5: R1 R2 R2     -30.2967      31.3317   1.489      1.485      1.484
**    11001 to 11003: no tracking     -38.5 23.3    1.489      1.489      1.489
**    11003.5 to 11076.5: R1 R2 R2     -38.5 23.3    1.489      1.485      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 5   -2
** -------
 *   1  ----------
```

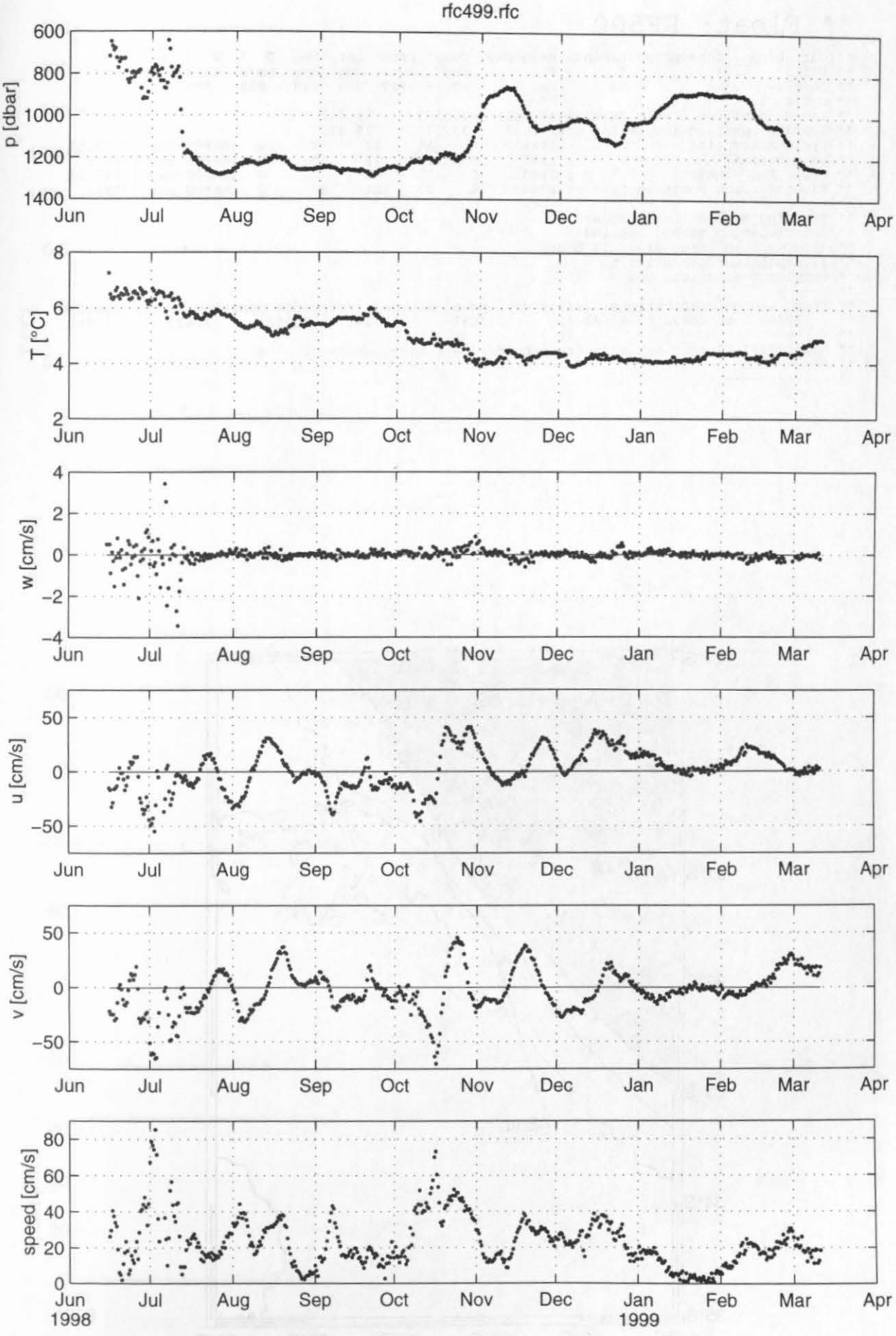



rfc498.rfc
p [dbar]
0
500
1000
1500
T [°C]
7
6
5
4
w [cm/s]
5
0
−5
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
80
60
40
20
0
Jun
Jul
Aug
Sep
Oct
1998

** Float: RF499

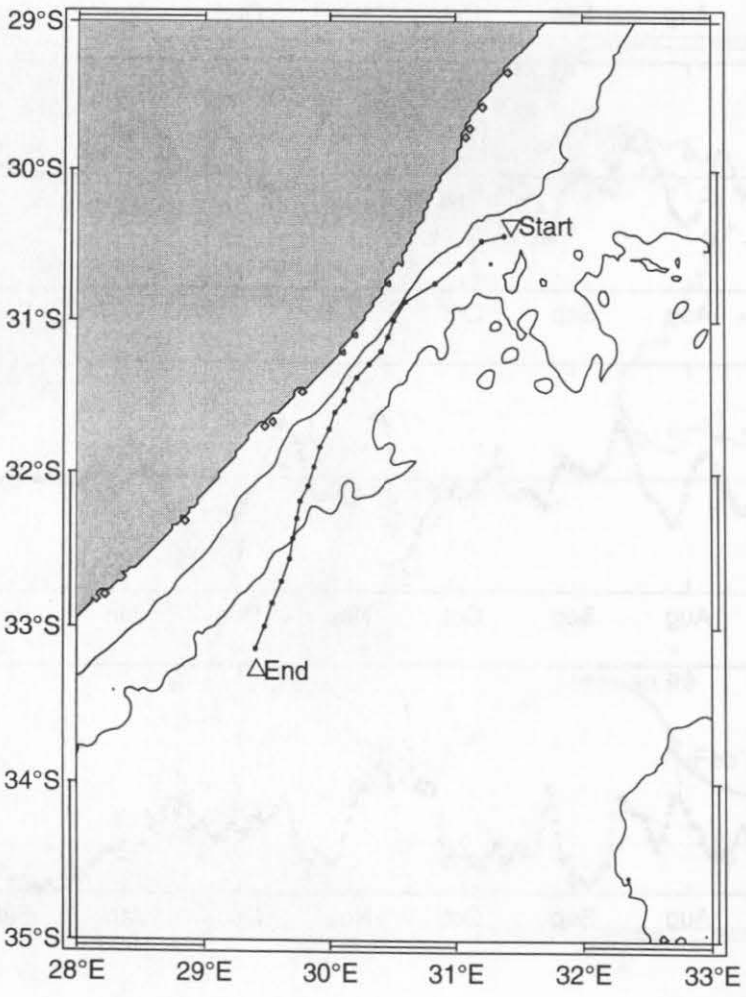
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.295      31.332
** Surface position (Cycle End position) : -37.112      36.772
** Cycle Start time              : 1998     6    14     12     0     0   (RAFOS day 10979.5)
** Launch time                   : 1998     6    15     13    26     0   (RAFOS day 10980)
** Cycle End time                : 1999     3    11      0     0     0   (RAFOS day 11249)
** First surface Position time   : 1999     3    11      9    49     0   (RAFOS day 11249)
** -------
** Tracking method: Circular
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980 to 10999.5: R2 R1 R1    -30.295      31.3317   1.489      1.489      1.489
**    11000 to 11001: no tracking   -30.295      31.3317   1.484      1.484      1.484
**    11001.5 to 11159.5: R2 R1 R1   -36.0 26.0   1.489      1.489      1.489
**    11160 to 11220: K8 R1 R1    -39.0 28.0   1.489      1.489      1.489
**    11220.5 to 11249: R2 R1 R1    -38.0 36.0   1.489      1.489      1.489
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

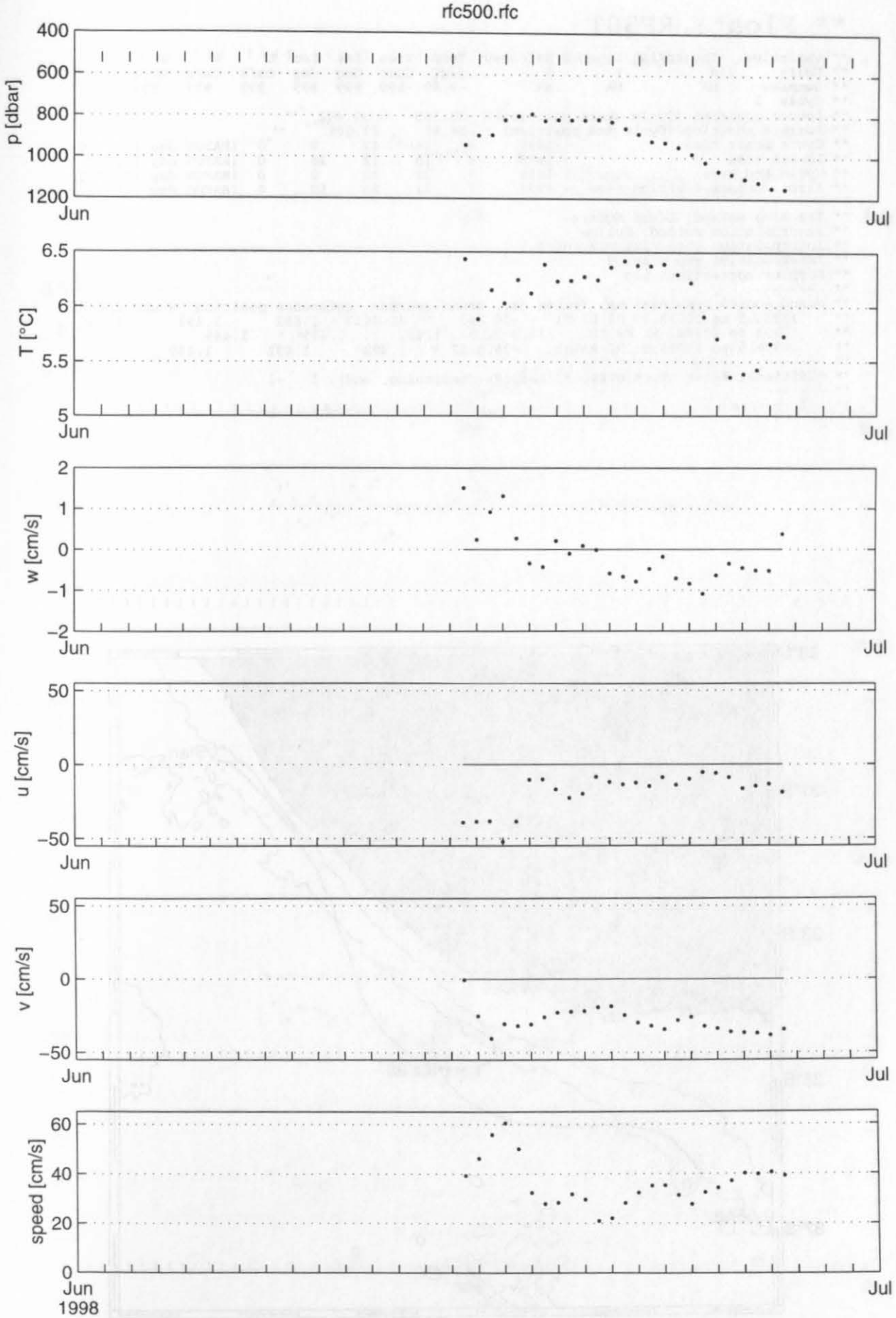



rfc499.rfc
p [dbar]
600
800
1000
1200
1400
T [°C]
8
6
4
2
w [cm/s]
4
2
0
−2
−4
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
80
60
40
20
0
Jun
1998
Jul
Aug
Sep
Oct
Nov
Dec
Jan
1999
Feb
Mar
Apr

** Float: RF500

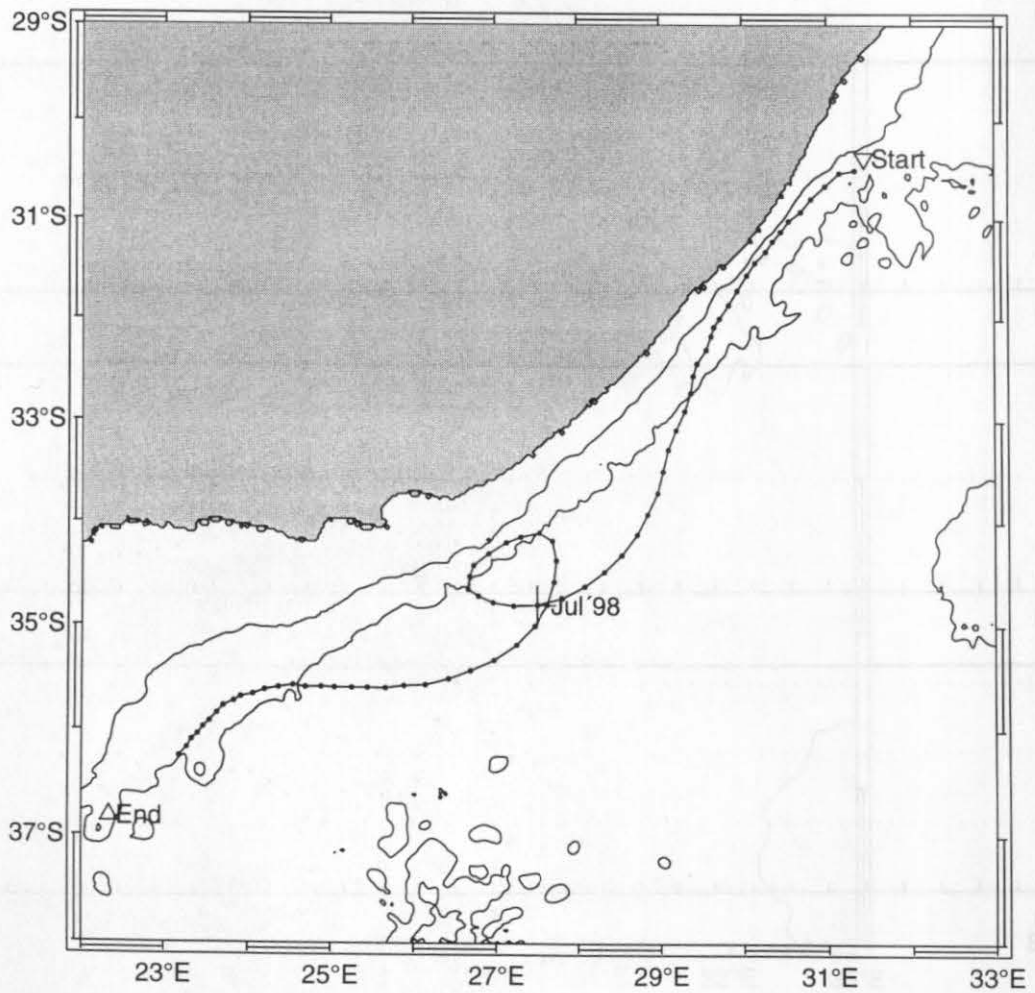
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.363     31.442
** Surface position (Cycle End position) : -33.277     29.412
** Cycle Start time             : 1998     6    14    12     0     0   (RAFOS day 10979.5)
** Launch time                  : 1998     6    15    12    30     0   (RAFOS day 10980)
** Cycle End time               : 1998     6    27    12     0     0   (RAFOS day 10992.5)
** First surface Position time  : 1998     6    27    21    50     0   (RAFOS day 10992)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10992.5: R2 R1 R1    -30.3633      31.4417   1.488      1.489      1.489
** -------
** Additional Float clock offsets, seconds (beginning, end): 10   -6
** -------
 *   1  ----------
```

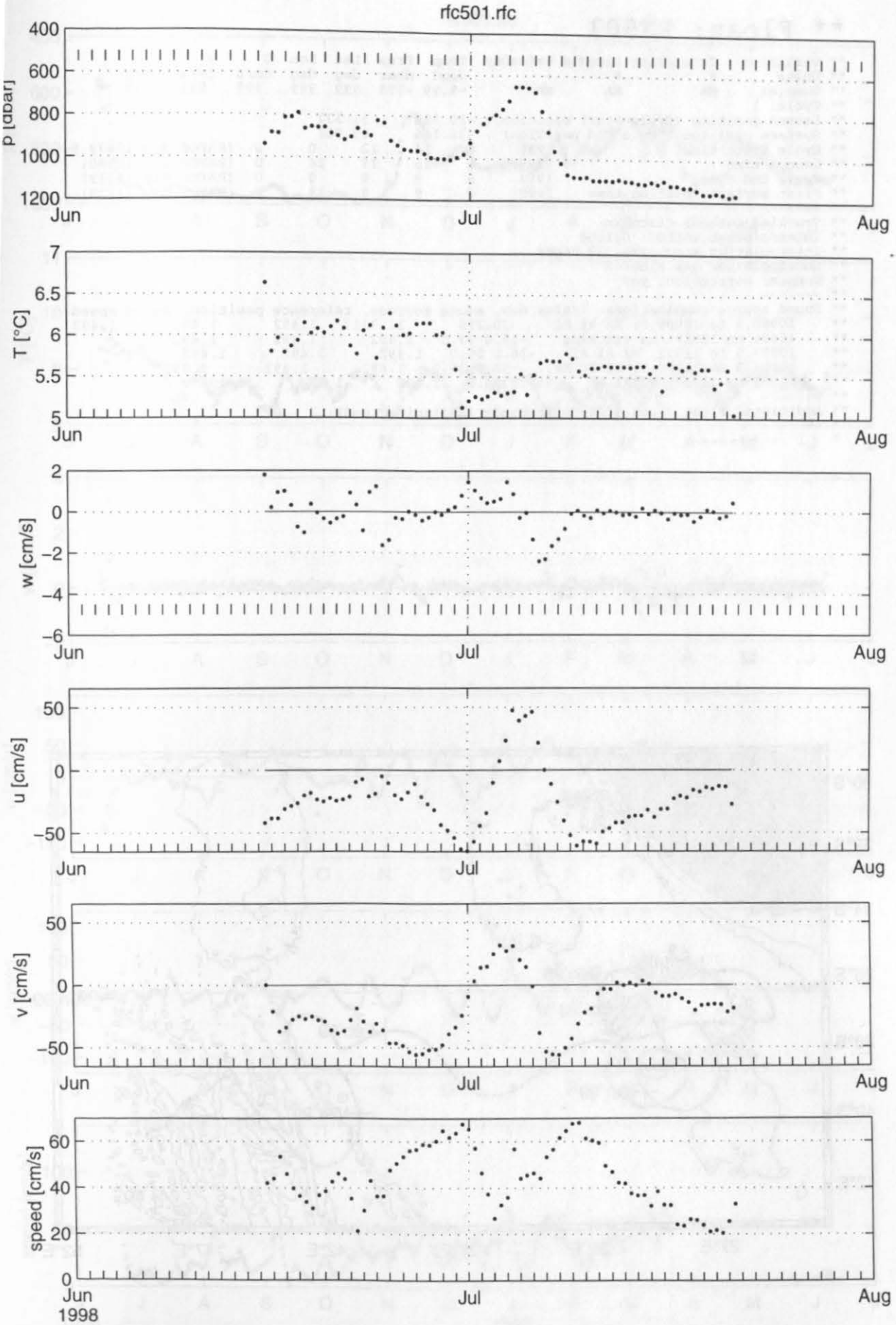



rfc500.rfc
p [dbar]
400
600
800
1000
1200
Jun
Jul
T [°C]
6.5
6
5.5
5
w [cm/s]
2
1
0
−1
−2
u [cm/s]
50
0
−50
v [cm/s]
speed [cm/s]
60
40
20
0
1998

** Float: RF501

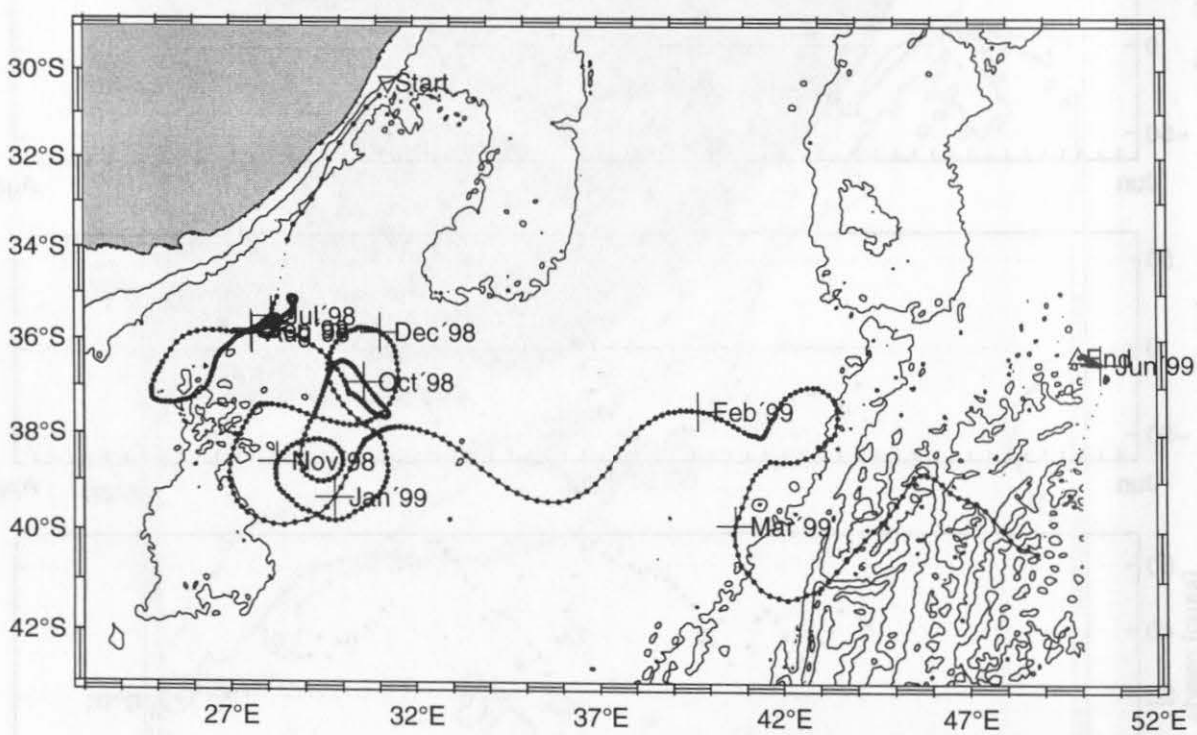
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.365     31.442
** Surface position (Cycle End position) : -36.82      22.342
** Cycle Start time              : 1998     6    14    12     0     0  (RAFOS day 10979.5)
** Launch time                   : 1998     6    15    12    28     0  (RAFOS day 10980)
** Cycle End time                : 1998     7    21    12     0     0  (RAFOS day 11016.5)
** First surface Position time   : 1998     7    21    21    50     0  (RAFOS day 11016)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10993.5: R2 R1 R1    -30.365      31.4417   1.492      1.492      1.489
**    10994 to 10998: R2 K8 K8    -36.8 22.3   1.492      1.489      1.489
**    10998.5 to 11016.5: R2 R1 R1    -36.8 22.3   1.492      1.492      1.489
** -------
** Additional Float clock offsets, seconds (beginning, end): 3   -3
** -------
 *   1  ----------
```

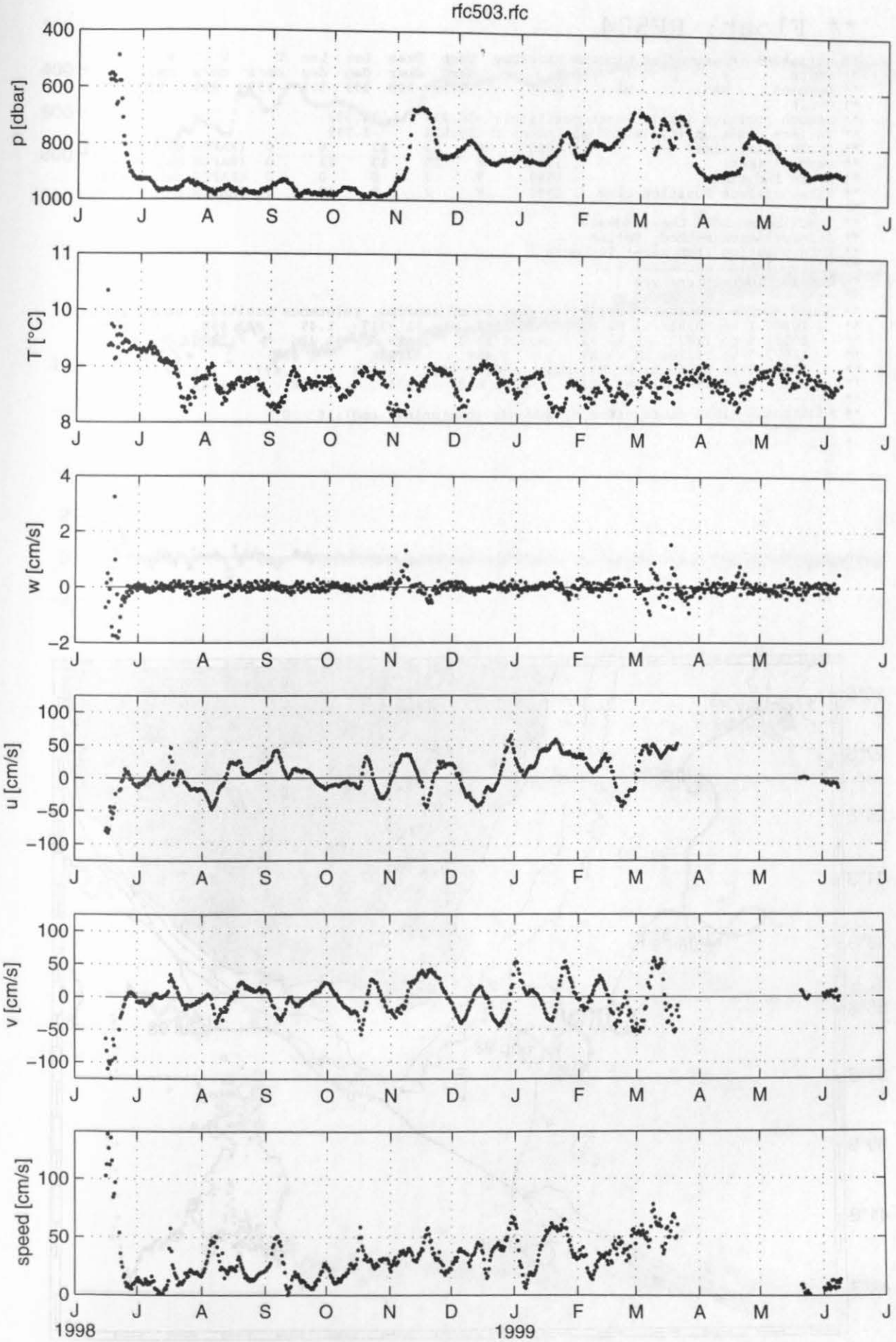



rfc501.rfc
p [dbar]
400
600
800
1000
1200
Jun
Jul
Aug
T [°C]
7
6.5
6
5.5
5
w [cm/s]
2
0
−2
−4
−6
u [cm/s]
50
0
−50
v [cm/s]
speed [cm/s]
60
40
20
0
1998

** Float: RF503

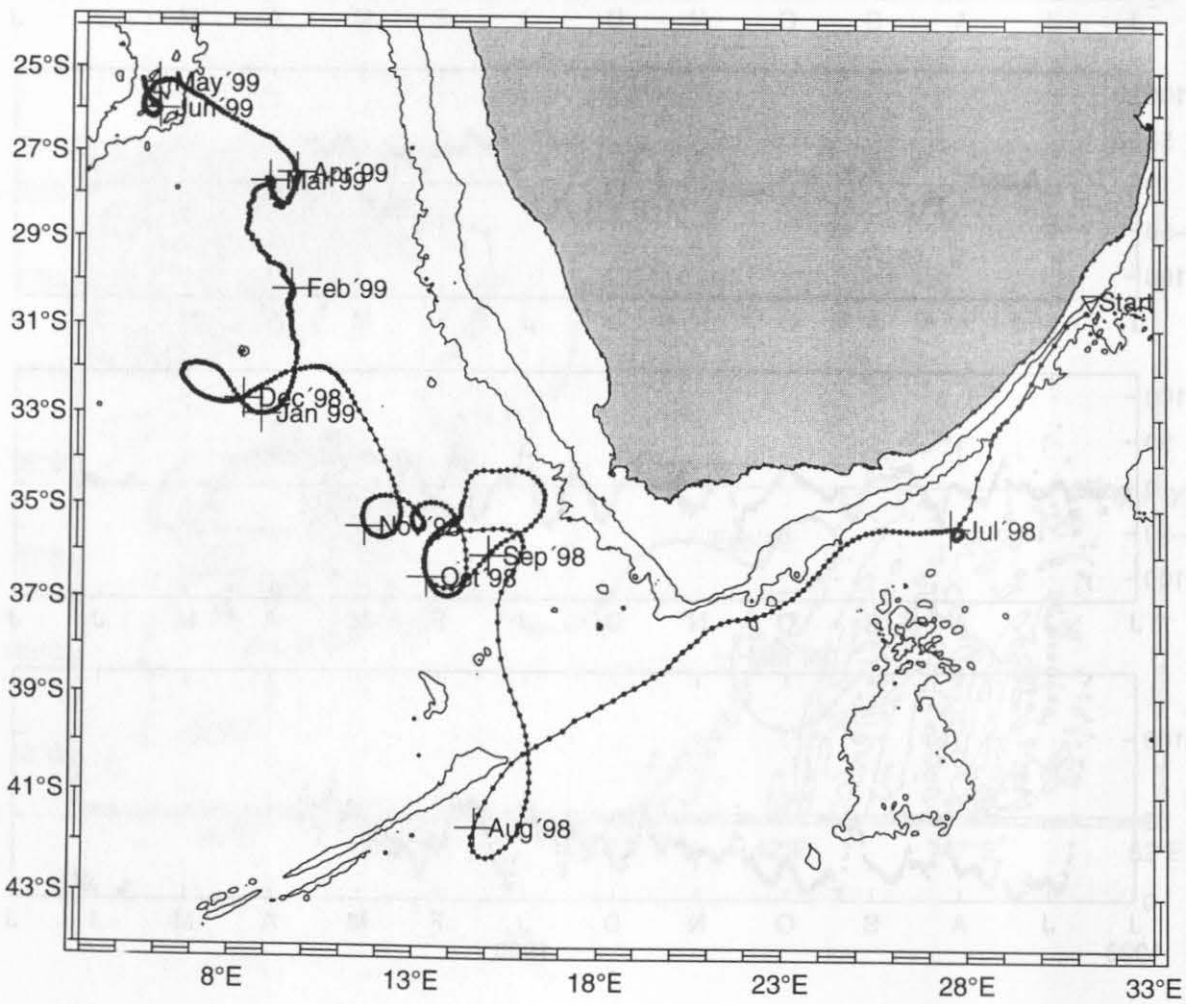
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.295     31.332
** Surface position (Cycle End position) : -36.346     49.907
** Cycle Start time              : 1998     6    14    12     0     0  (RAFOS day 10979.5)
** Launch time                   : 1998     6    15    13    24     0  (RAFOS day 10980)
** Cycle End time                : 1999     6     9     0     0     0  (RAFOS day 11339)
** First surface Position time   : 1999     6     9     9    49     0  (RAFOS day 11339)
** -------
** Tracking method: Circular
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10985.5: R2 R1 R1     -30.295      31.3317   1.492      1.492      1.492
**    10986 to 10987: no tracking     -36.0 25.0   1.492      1.492      1.492
**    10987.5 to 11011: R2 R1 R1     -36.0 25.0   1.492      1.492      1.492
**    11011.5 to 11194.5: R2 K8 K8     -36.0 25.0   1.492      1.492      1.492
**    11195 to 11339: R2 R1 R1     -39.0 36.0   1.492      1.492      1.492
** -------
** Additional Float clock offsets, seconds (beginning, end): 2   0
** -------
 *   1  ----------
```

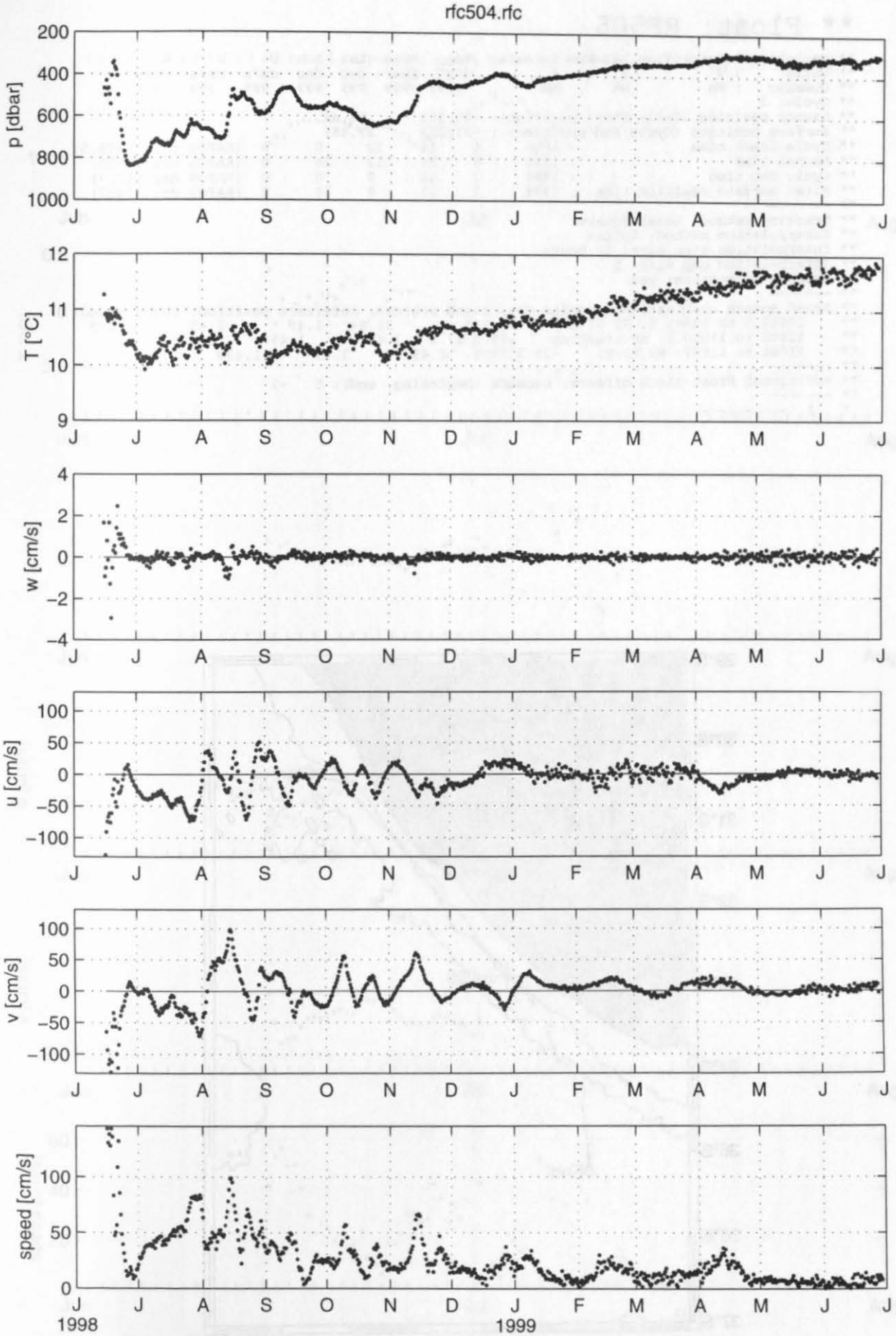



rfc503.rfc
p [dbar]
400
600
800
1000
T [°C]
11
10
9
8
w [cm/s]
4
2
0
−2
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
100
50
0
J J A S O N D J F M A M J J
1998
1999

** Float: RF504

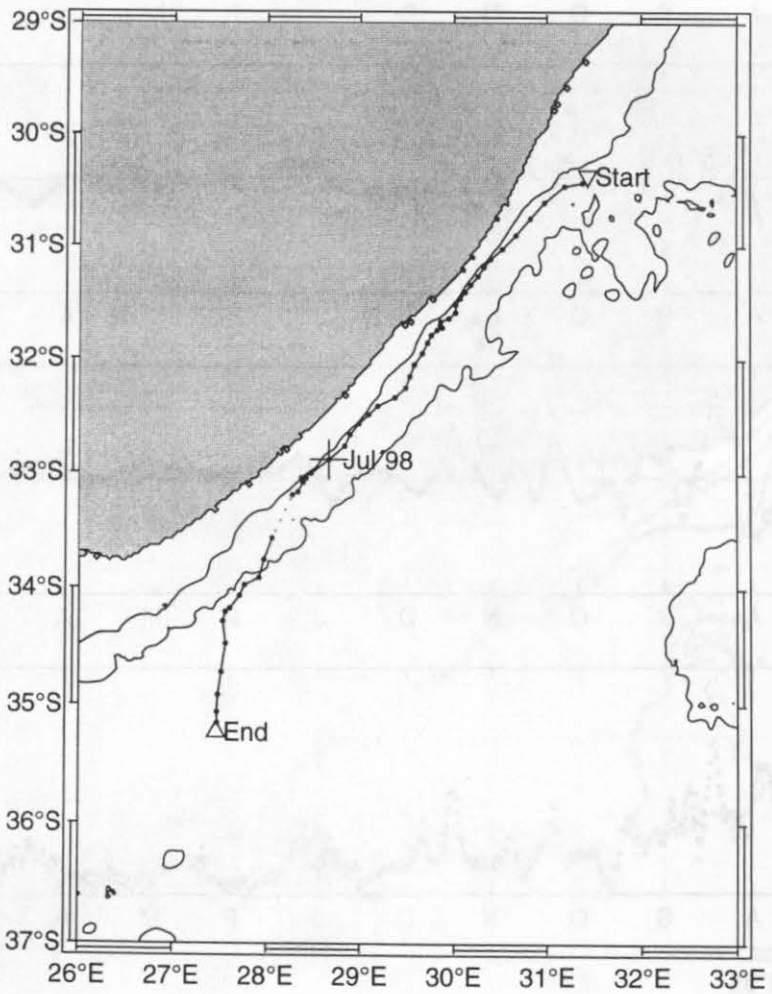
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.297     31.332
** Surface position (Cycle End position) : -19.514     -1.789
** Cycle Start time              : 1998    6    14    12     0     0   (RAFOS day 10979.5)
** Launch time                   : 1998    6    15    13    22     0   (RAFOS day 10980)
** Cycle End time                : 1999    9     7     0     0     0   (RAFOS day 11429)
** First surface Position time   : 1999    9     7     9    49     0   (RAFOS day 11429)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10986: R1 R2 R2     -30.2967      31.3317   1.49      1.488      1.488
**    10986.5 to 11022: R1 R2 R2     -36.0 28.0    1.489     1.486     1.486
**    11022.5 to 11270: K9 K8 K8          1.489      1.486     1.486
**    11270.5 to 11350.5: K9 M11 M11     -42.0 16.0   1.478      1.477      1.477
**    11351 to 11359: M11 M12 M12    -32.0 8.0   1.478       1.48       1.48
** -------
** Additional Float clock offsets, seconds (beginning, end): 6   0
** -------
*   1  ----------
```

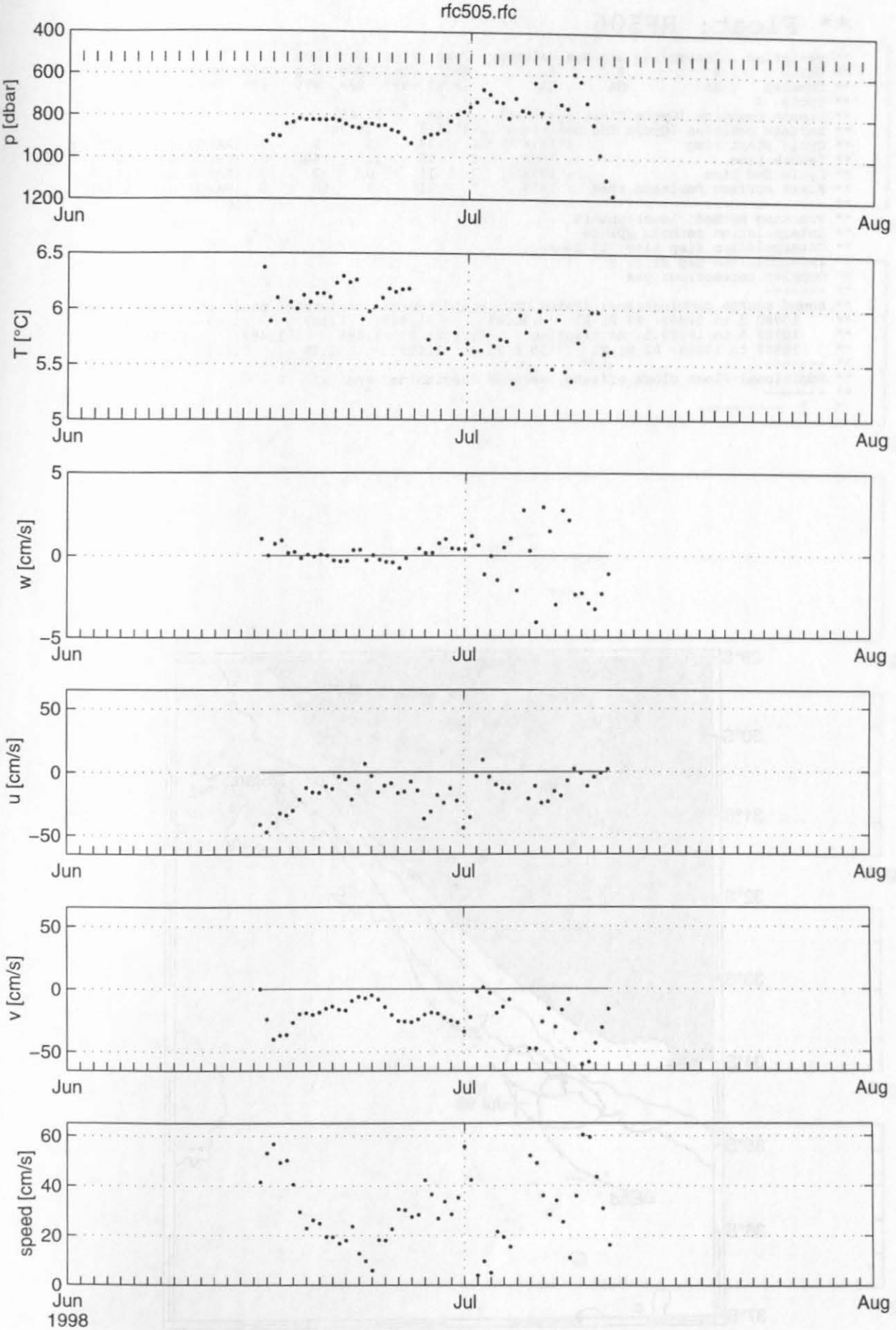



rfc504.rfc
p [dbar]
200
400
600
800
1000
T [°C]
12
11
10
9
w [cm/s]
4
2
0
−2
−4
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
100
50
0
J J A S O N D J F M A M J J
1998
1999

** Float: RF505

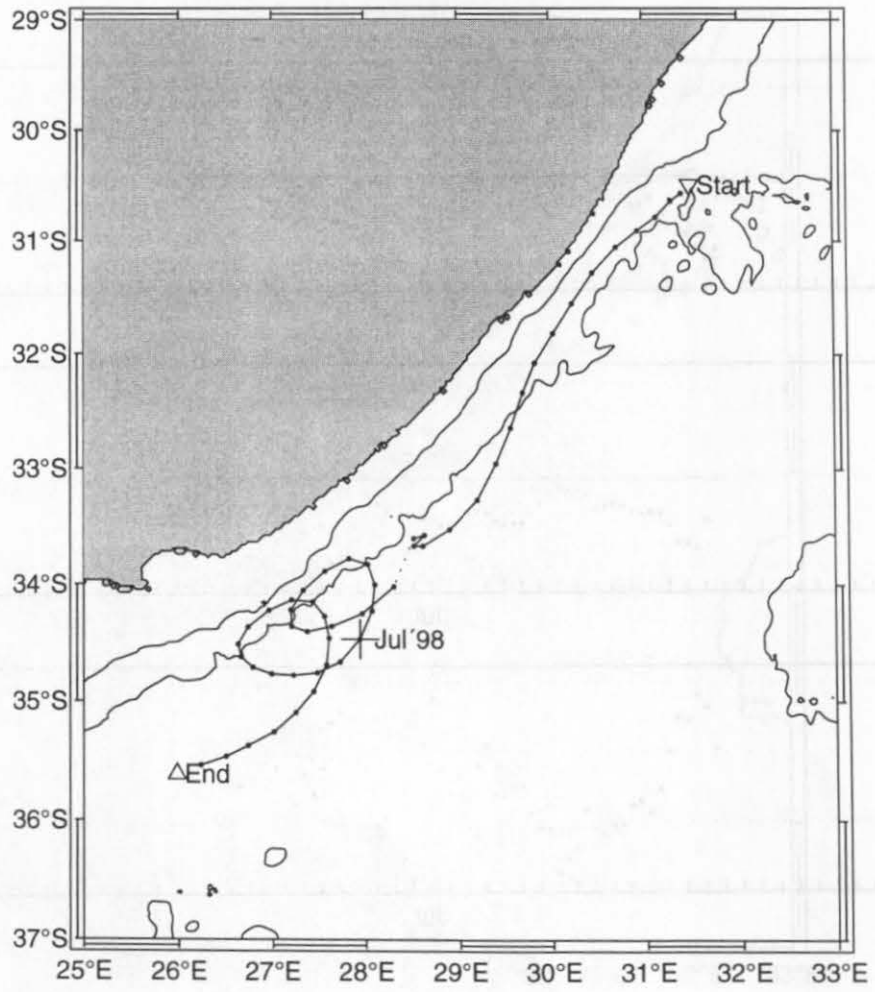
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.365      31.44
** Surface position (Cycle End position) : -35.232     27.458
** Cycle Start time              : 1998     6    14    12     0     0   (RAFOS day 10979.5)
** Launch time                   : 1998     6    15    12    26     0   (RAFOS day 10980)
** Cycle End time                : 1998     7    12     0     0     0   (RAFOS day 11007)
** First surface Position time   : 1998     7    12     9    50     0   (RAFOS day 11007)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10999.5: R2 R1 R1    -30.365        31.44   1.49       1.49       1.489
**    11000 to 11000.5: no tracking    -35.2 27.5   1.49       1.49       1.489
**    11001 to 11007: R2 R1 R1    -35.2 27.5   1.49       1.49       1.489
** -------
** Additional Float clock offsets, seconds (beginning, end): 5   -2
** -------
*   1  ----------
```

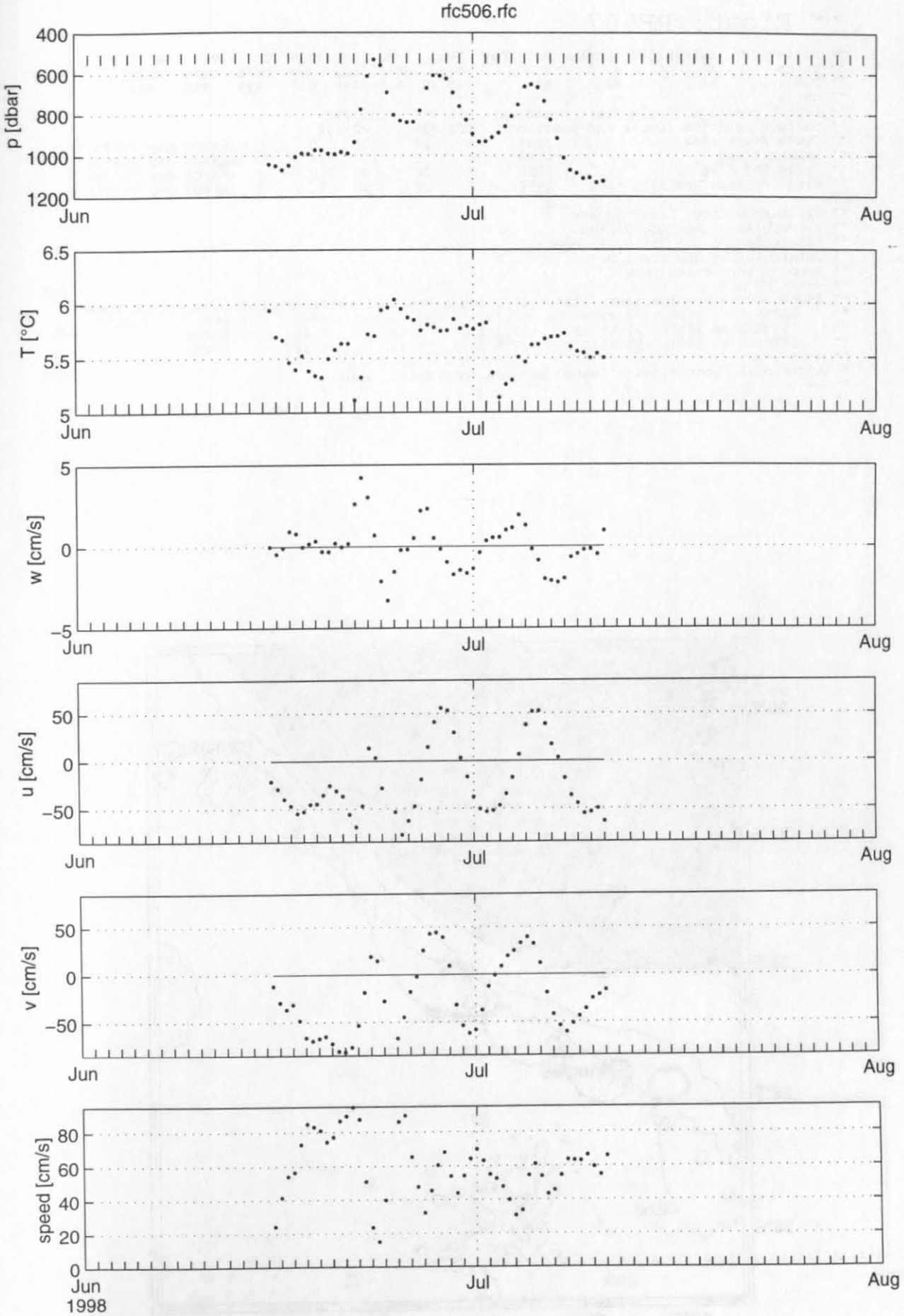



rfc505.rfc
p [dbar]
400
600
800
1000
1200
Jun
Jul
Aug
T [°C]
6.5
6
5.5
5
w [cm/s]
5
0
−5
u [cm/s]
50
0
−50
v [cm/s]
speed [cm/s]
60
40
20
0
1998

** Float: RF506

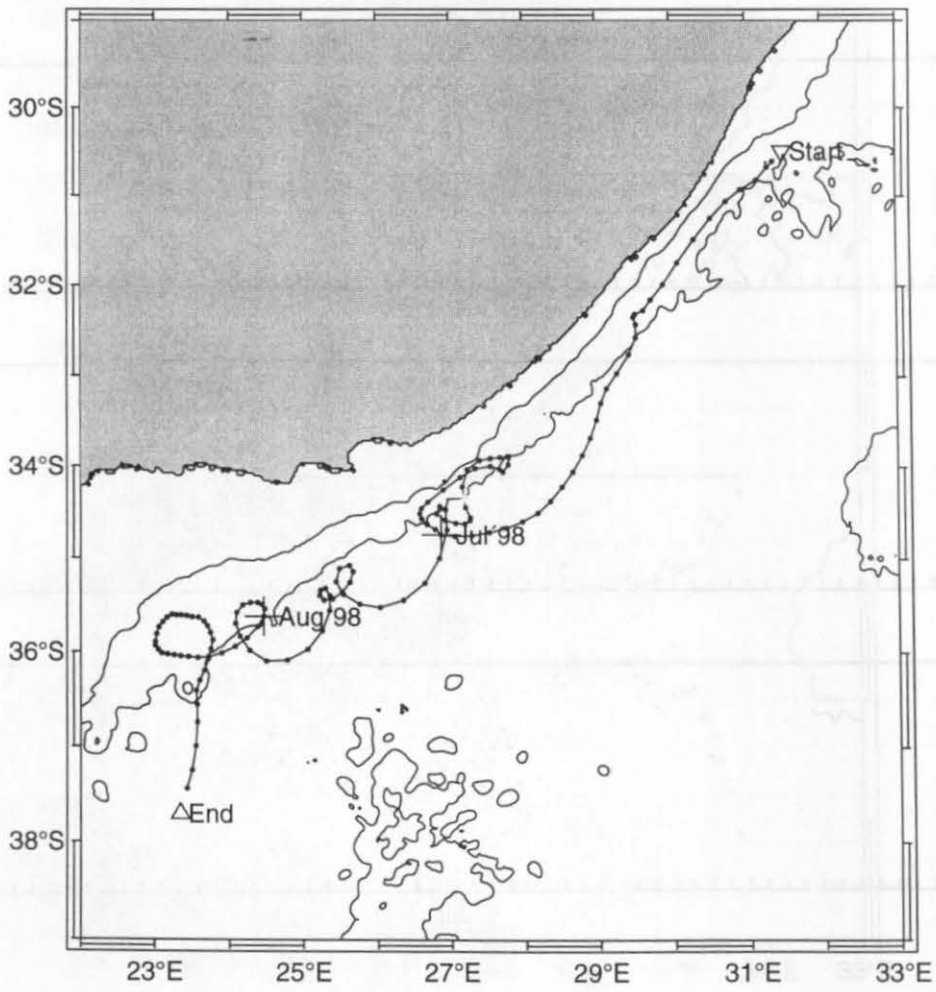
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.49     31.493
** Surface position (Cycle End position) : -35.613    25.981
** Cycle Start time              : 1998    6    14    12     0     0   (RAFOS day 10979.5)
** Launch time                   : 1998    6    15    11    18     0   (RAFOS day 10980)
** Cycle End time                : 1998    7    11     0     0     0   (RAFOS day 11006)
** First surface Position time   : 1998    7    11     9    50     0   (RAFOS day 11006)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10989: R2 R1 R1    -30.49      31.4933   1.489      1.49      1.488
**    10989.5 to 10989.5: no tracking    -35.6 26.0   1.488      1.488      1.488
**    10990 to 11006: R2 R1 R1    -35.6 26.0   1.489      1.49      1.488
** -------
** Additional Float clock offsets, seconds (beginning, end): 2   0
** -------
 *   1  ----------
```

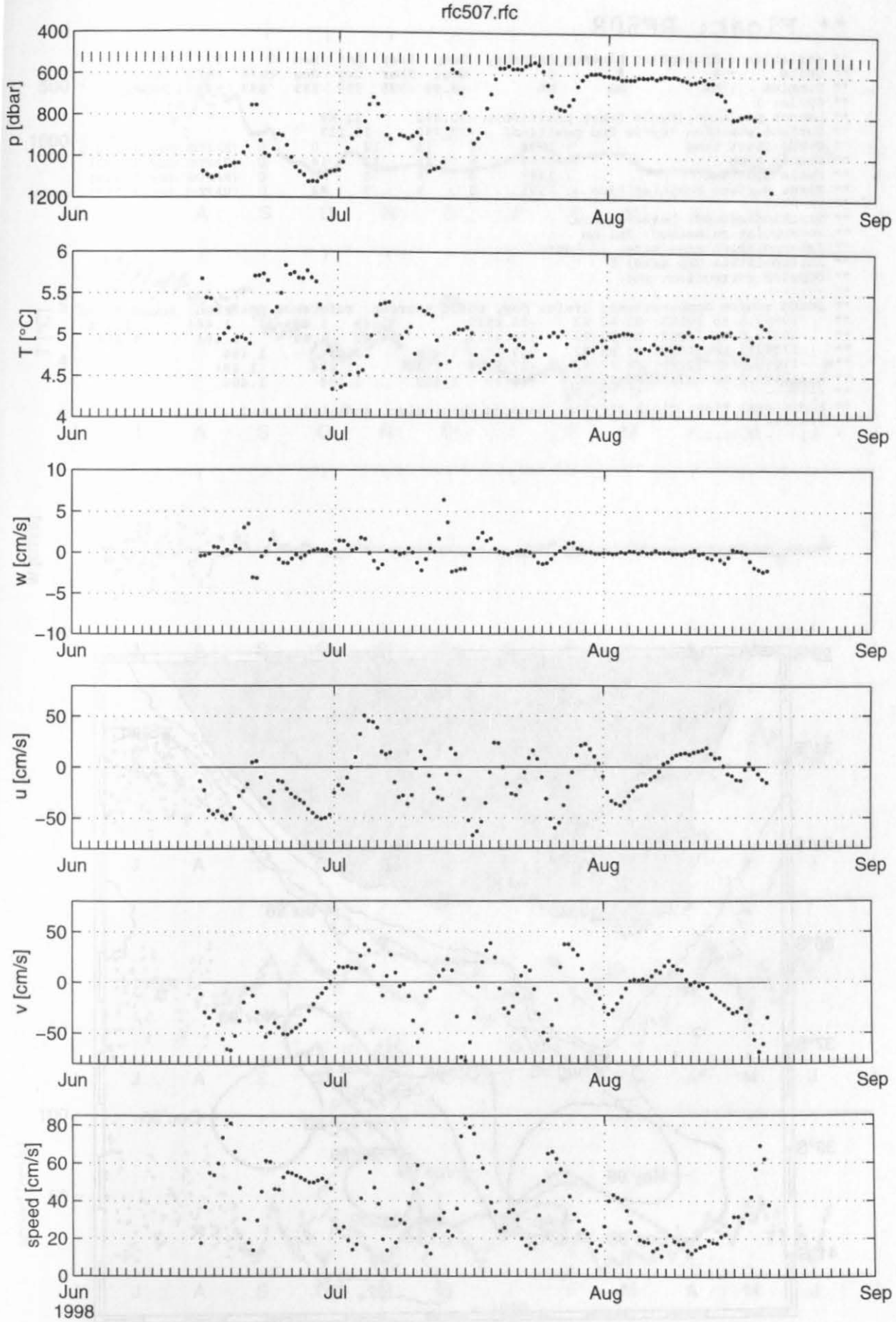



rfc506.rfc
p [dbar]
400
600
800
1000
1200
Jun
Jul
Aug
T [°C]
6.5
6
5.5
5
w [cm/s]
5
0
−5
u [cm/s]
50
0
−50
v [cm/s]
speed [cm/s]
80
60
40
20
0
1998

** Float: RF507

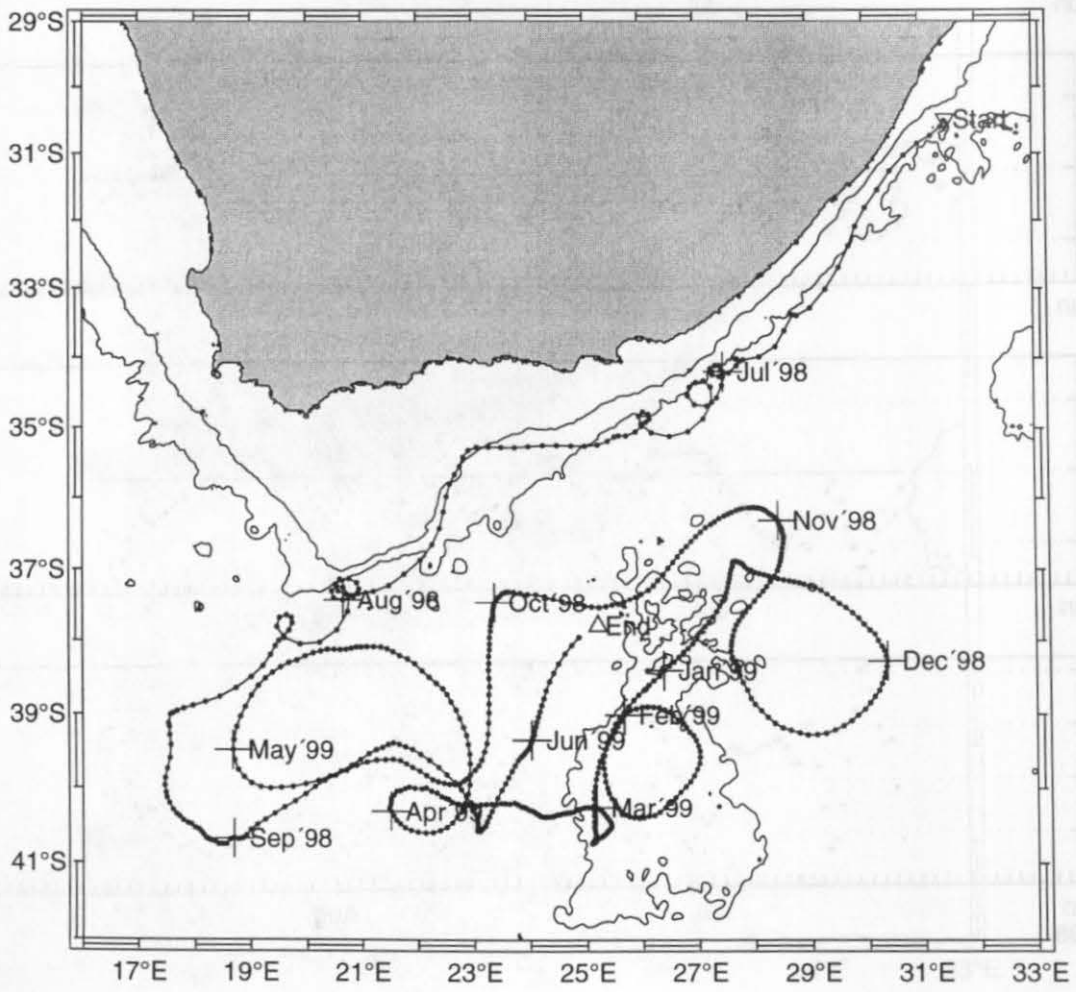
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.49     31.492
** Surface position (Cycle End position) : -37.703      23.34
** Cycle Start time              : 1998    6    14    12     0     0   (RAFOS day 10979.5)
** Launch time                   : 1998    6    15    11    16     0   (RAFOS day 10980)
** Cycle End time                : 1998    8    20     0     0     0   (RAFOS day 11046)
** First surface Position time   : 1998    8    20     9    50     0   (RAFOS day 11046)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10988: R2 R1 R1    -30.49      31.4917   1.488      1.488      1.488
**    10988.5 to 10996: R2 K8 K8    -37.3 23.3   1.488      1.488      1.488
**    10996.5 to 11046: R2 R1 R1    -37.3 23.2   1.488      1.488      1.488
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

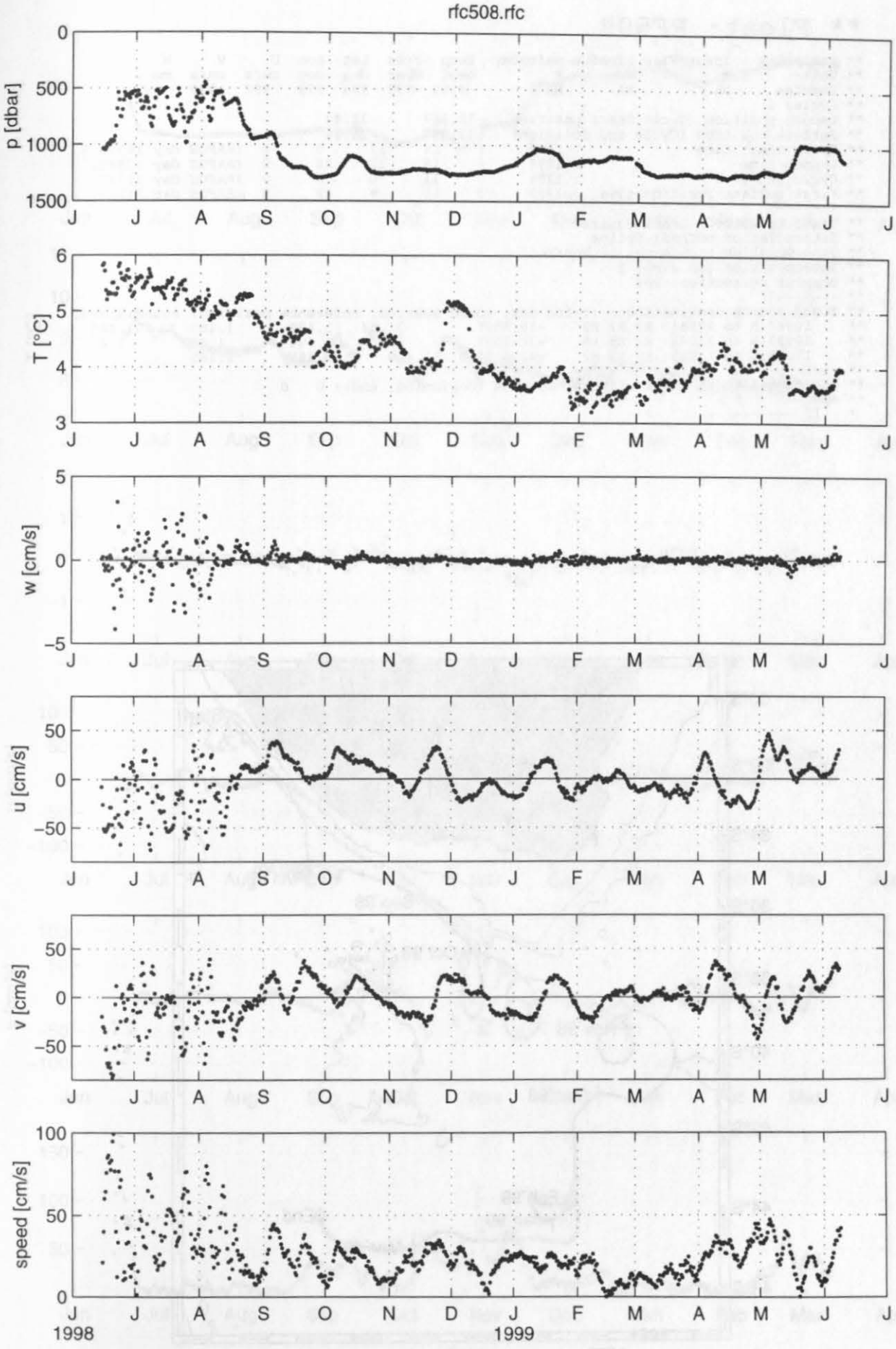



rfc507.rfc
p [dbar]
400
600
800
1000
1200
T [°C]
6
5.5
5
4.5
4
w [cm/s]
10
5
0
−5
−10
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
80
60
40
20
0
Jun
Jul
Aug
Sep
1998

** Float: RF508

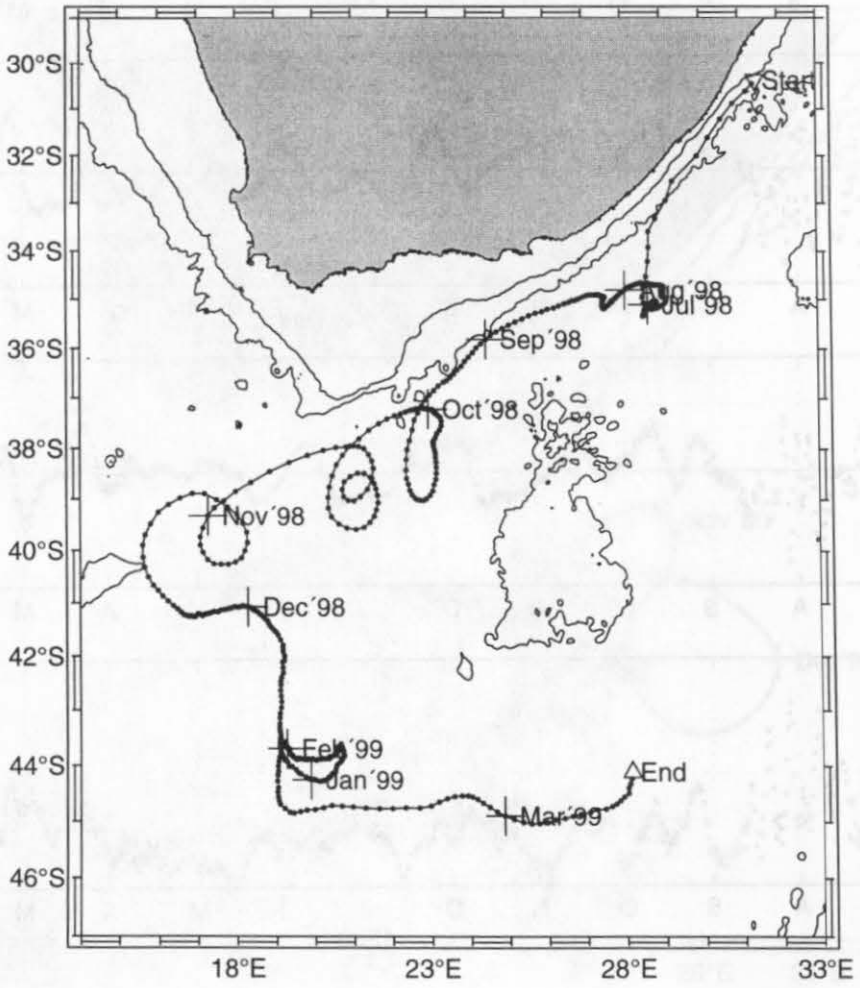
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat   Lon   U      V      W
** Units     : #          #       #         degC  dbar  deg   deg   cm/s   cm/s   mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999   999    999    999    999
** Cycle: 1
** Launch position (Cycle Start position): -30.492      31.49
** Surface position (Cycle End position) : -37.792      25.217
** Cycle Start time              : 1998    6    14    12     0     0   (RAFOS day 10979.5)
** Launch time                   : 1998    6    15    11    14     0   (RAFOS day 10980)
** Cycle End time                : 1999    6     9     0     0     0   (RAFOS day 11339)
** First surface Position time   : 1999    6     9     9    48     0   (RAFOS day 11339)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10988: R1 R2 R2    -30.4917        31.49   1.489      1.484      1.484
**    10988.5 to 11042: K8 R2 R2    -30.4917        31.49   1.48       1.484      1.484
**    11042.5 to 11090: R1 R2 R2    -39 18   1.489      1.484      1.484
**    11090.5 to 11180: K8 R2 R2    -37.5 23   1.48     1.484      1.484
**    11180.5 to 11339: R1 R2 R2    -40 25   1.489      1.484      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): -0.5   -2
** -------
 *   1  ----------
```

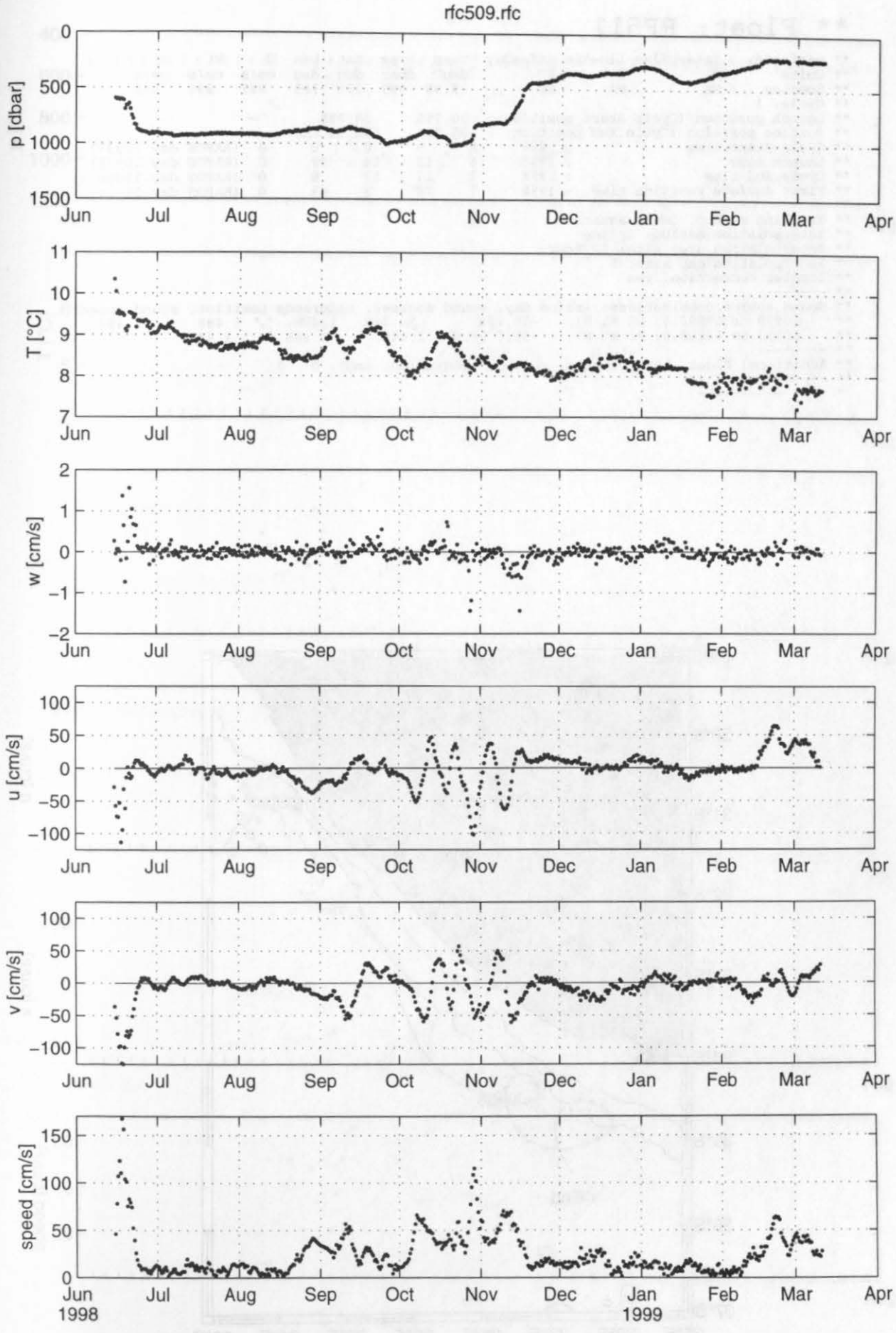



rfc508.rfc
p [dbar]
0
500
1000
1500
T [°C]
6
5
4
3
w [cm/s]
5
0
−5
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
100
50
0
J J A S O N D J F M A M J J
1998
1999

** Float: RF509

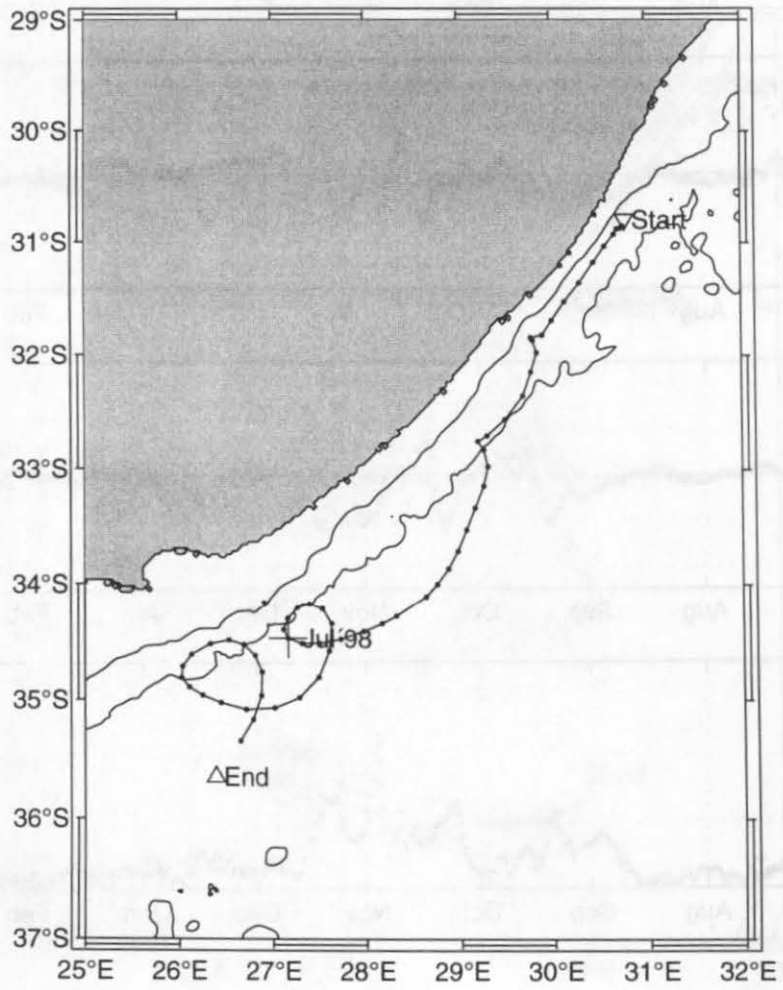
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.367      31.44
** Surface position (Cycle End position) : -44.098      28.14
** Cycle Start time             : 1998    6    14    12     0     0  (RAFOS day 10979.5)
** Launch time                  : 1998    6    15    12    24     0  (RAFOS day 10980)
** Cycle End time               : 1999    3    11     0     0     0  (RAFOS day 11249)
** First surface Position time  : 1999    3    11     9    49     0  (RAFOS day 11249)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10983: R1 R2 R2     -30.3667        31.44    1.489      1.485      1.485
**    10983.5 to 11063: R2 K8 K8     -30.3667        31.44    1.485       1.48       1.48
**    11063.5 to 11249: R1 R2 R2     -42.0 14.0   1.489       1.485      1.485
** -------
** Additional Float clock offsets, seconds (beginning, end): 0    0
** -------
 *   1  ----------
```

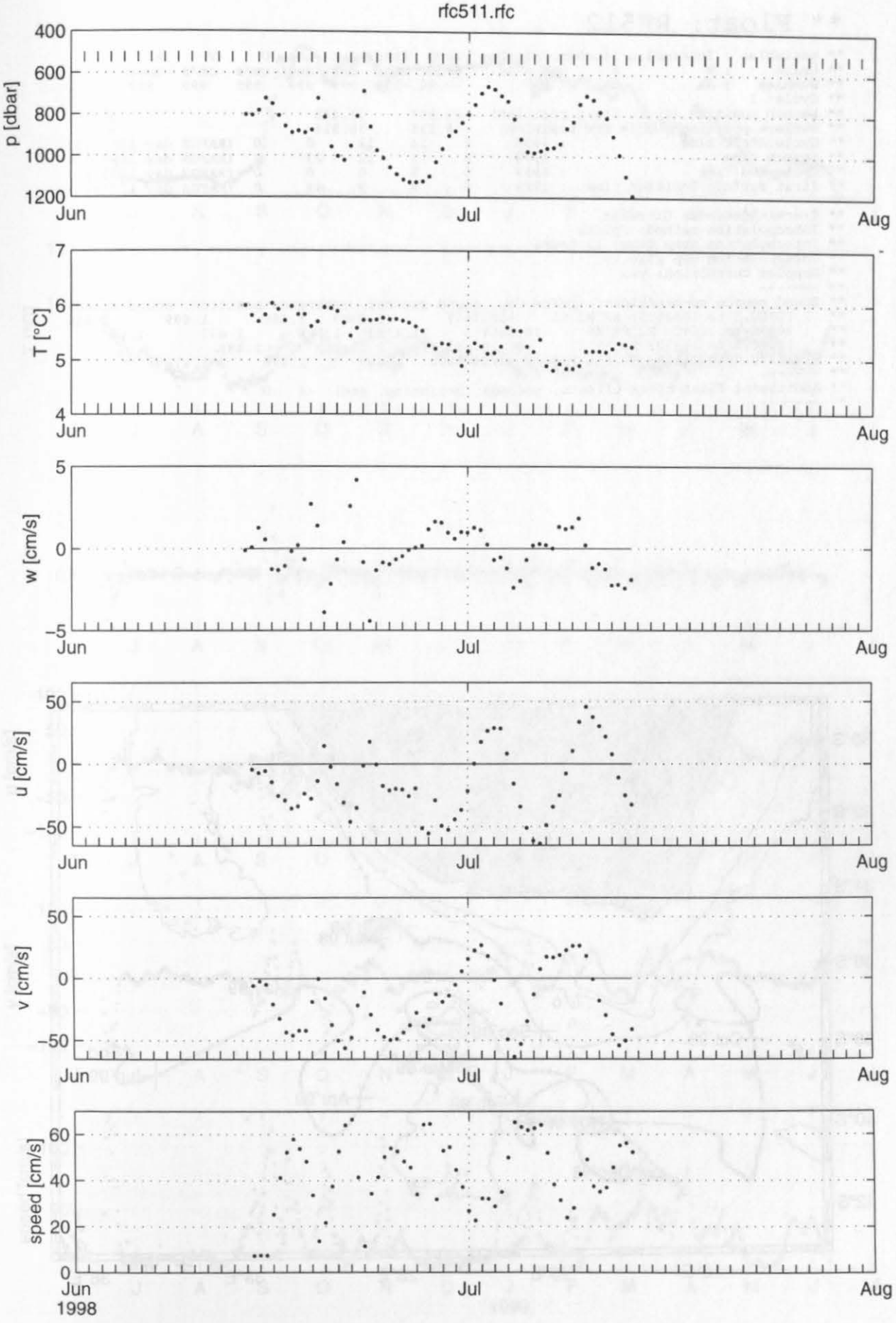



rfc509.rfc
p [dbar]
0
500
1000
1500
T [°C]
11
10
9
8
7
w [cm/s]
2
1
0
−1
−2
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
150
100
50
0
Jun
1998
Jul
Aug
Sep
Oct
Nov
Dec
Jan
1999
Feb
Mar
Apr

** Float: RF511

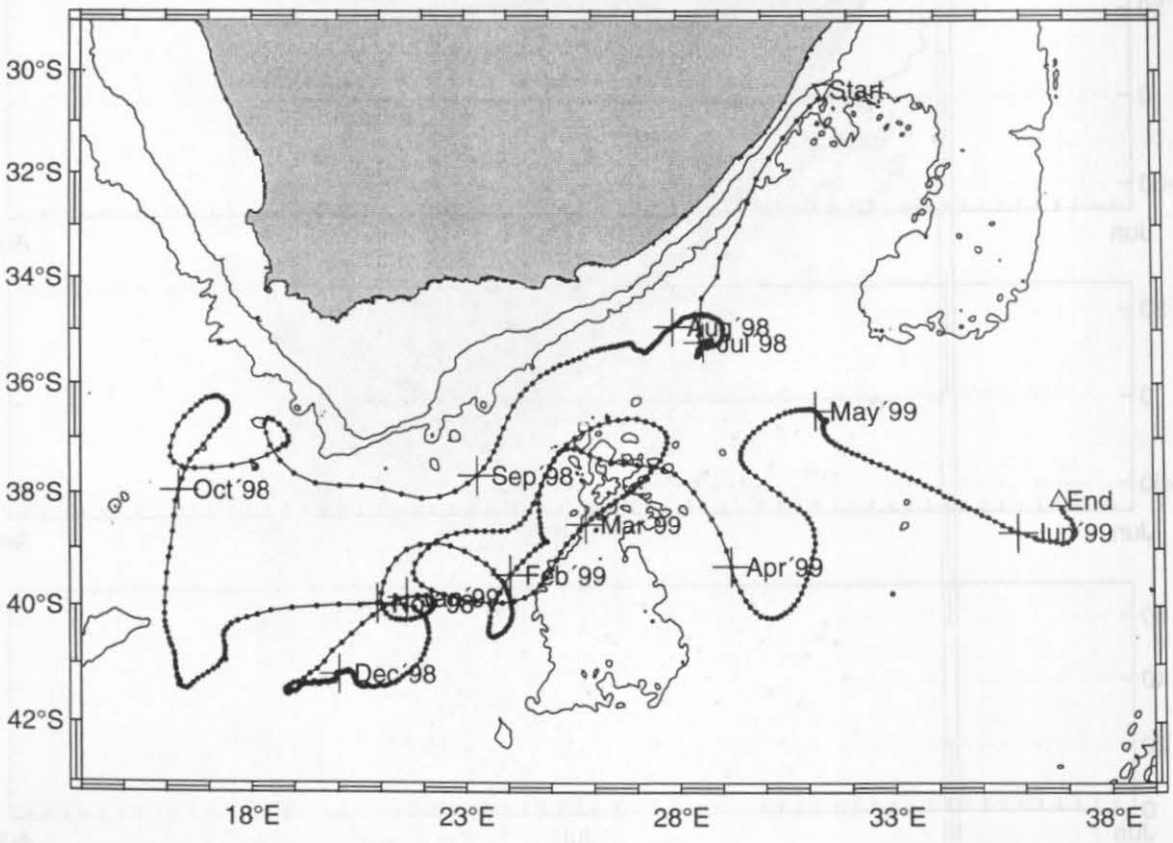
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.795     30.785
** Surface position (Cycle End position) : -35.65      26.39
** Cycle Start time             : 1998     5     3     0     0     0   (RAFOS day 10937)
** Launch time                  : 1998     6    13    14    39     0   (RAFOS day 10978)
** Cycle End time               : 1998     7    13    12     0     0   (RAFOS day 11008.5)
** First surface Position time  : 1998     7    14     9    49     0   (RAFOS day 11009)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10992.5: R2 R1 R1    -30.795       30.785   1.488      1.488      1.488
**    10993 to 11008.5: R2 R1 R1    -35.0 26.0    1.488      1.488      1.488
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

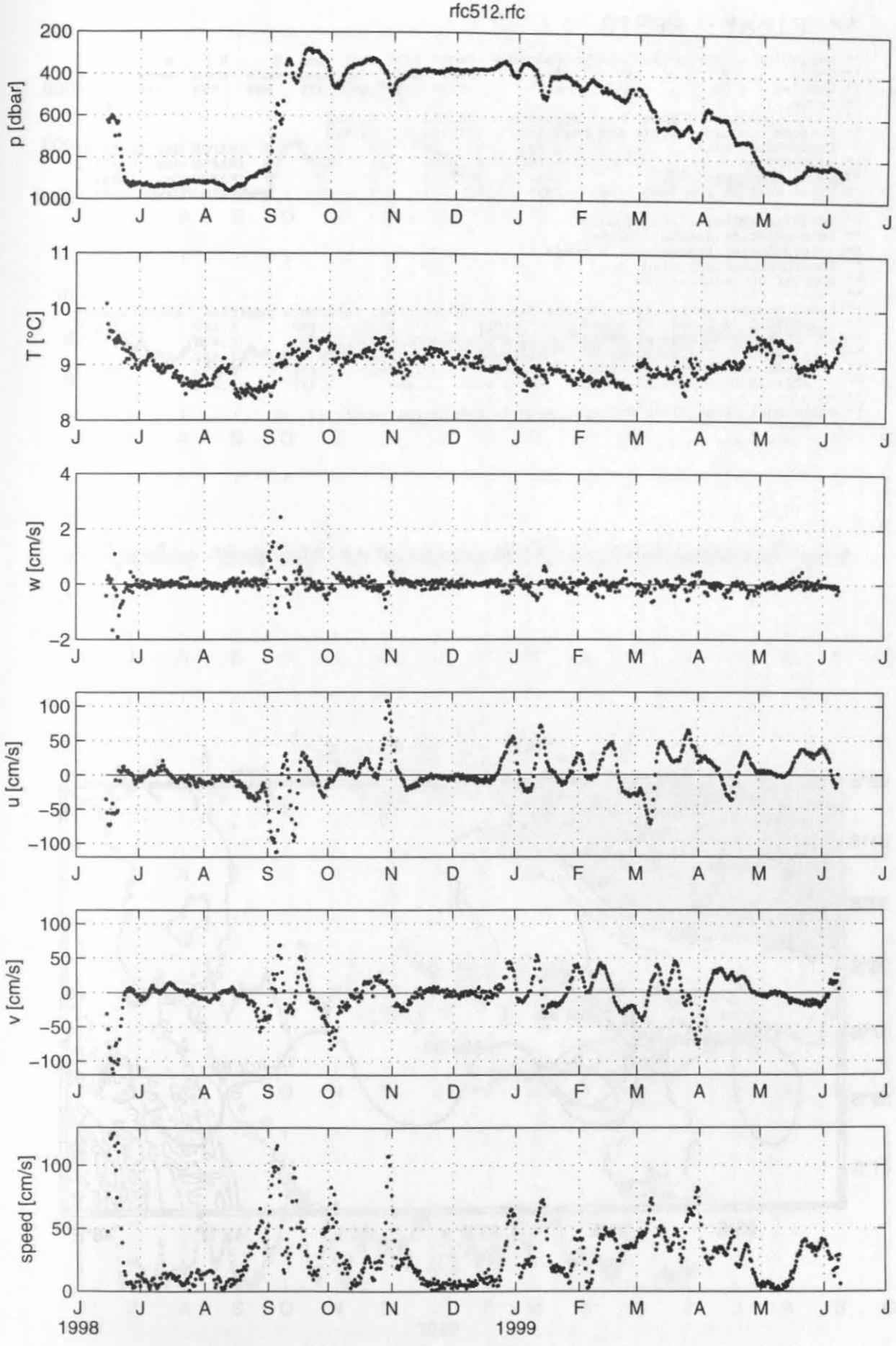



rfc511.rfc
p [dbar]
400
600
800
1000
1200
T [°C]
7
6
5
4
w [cm/s]
5
0
−5
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
60
40
20
0
Jun
Jul
Aug
1998

** Float: RF512

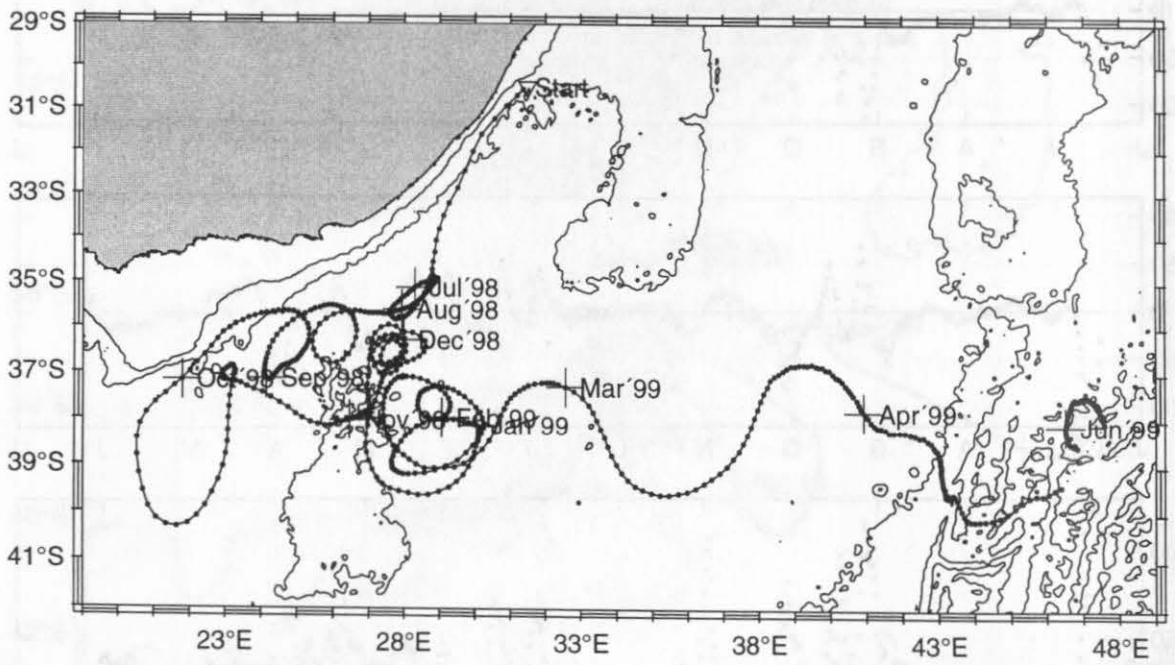
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.367     31.438
** Surface position (Cycle End position) : -38.115     36.816
** Cycle Start time              : 1998    6    14    12     0     0   (RAFOS day 10979.5)
** Launch time                   : 1998    6    15    12    22     0   (RAFOS day 10980)
** Cycle End time                : 1999    6     9     0     0     0   (RAFOS day 11339)
** First surface Position time   : 1999    6     9     9    49     0   (RAFOS day 11339)
** -------
** Tracking method: Circular
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10985.5: R2 R1 R1    -30.3667      31.4383   1.486      1.489      1.489
**    10986 to 11090: R2 K8 K8    -30.3667      31.4383   1.485      1.477      1.477
**    11090.5 to 11270: R2 R1 R1    -38 16   1.488      1.489      1.489
**    11270.5 to 11339: R1 K11 K11    -39.0 33.0   1.489      1.478      1.478
** -------
** Additional Float clock offsets, seconds (beginning, end): -6   0
** -------
 *   1  ----------
```

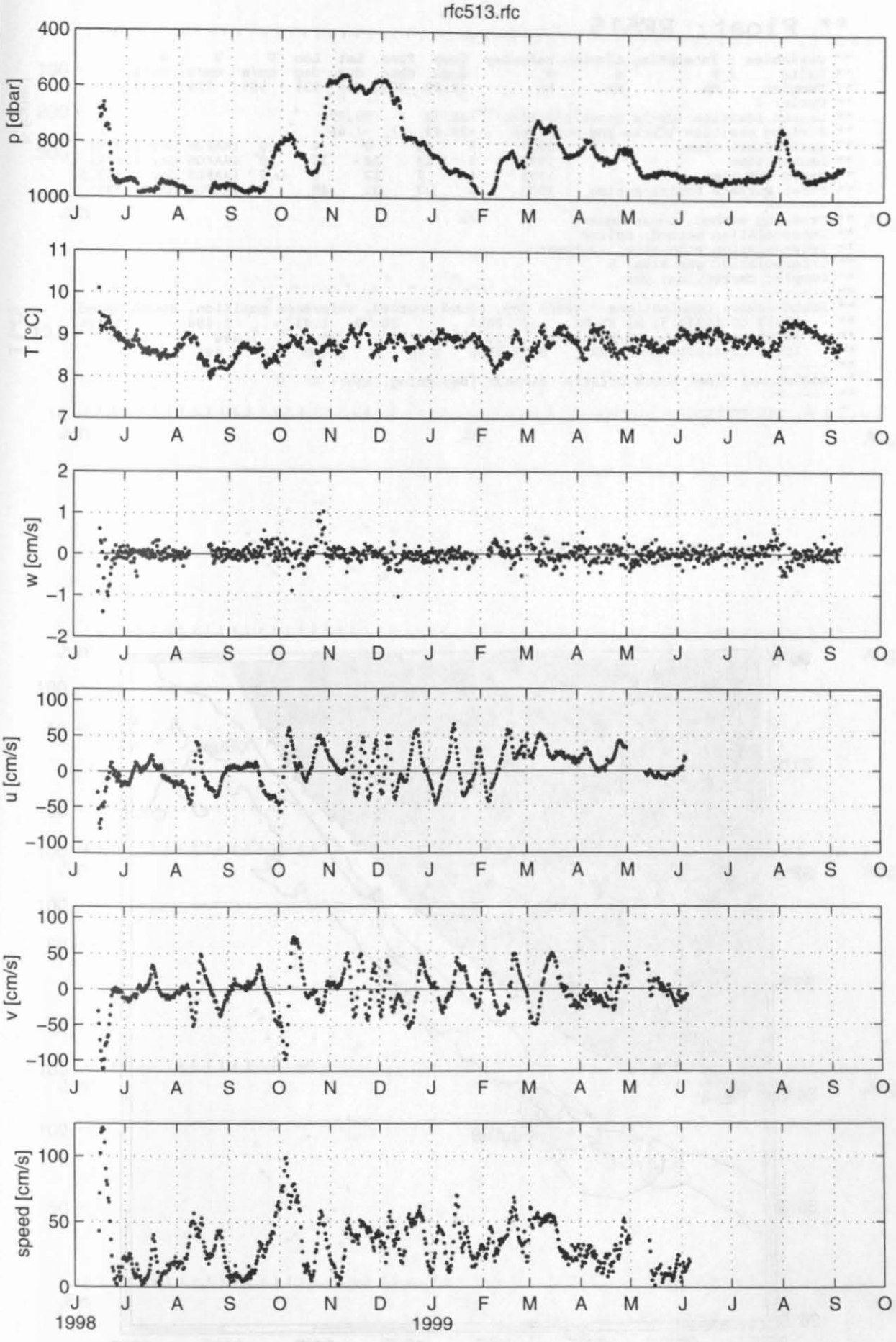



rfc512.rfc
p [dbar]
200
400
600
800
1000
T [°C]
11
10
9
8
w [cm/s]
4
2
0
−2
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
100
50
0
J J A S O N D J F M A M J J
1998
1999

** Float: RF513

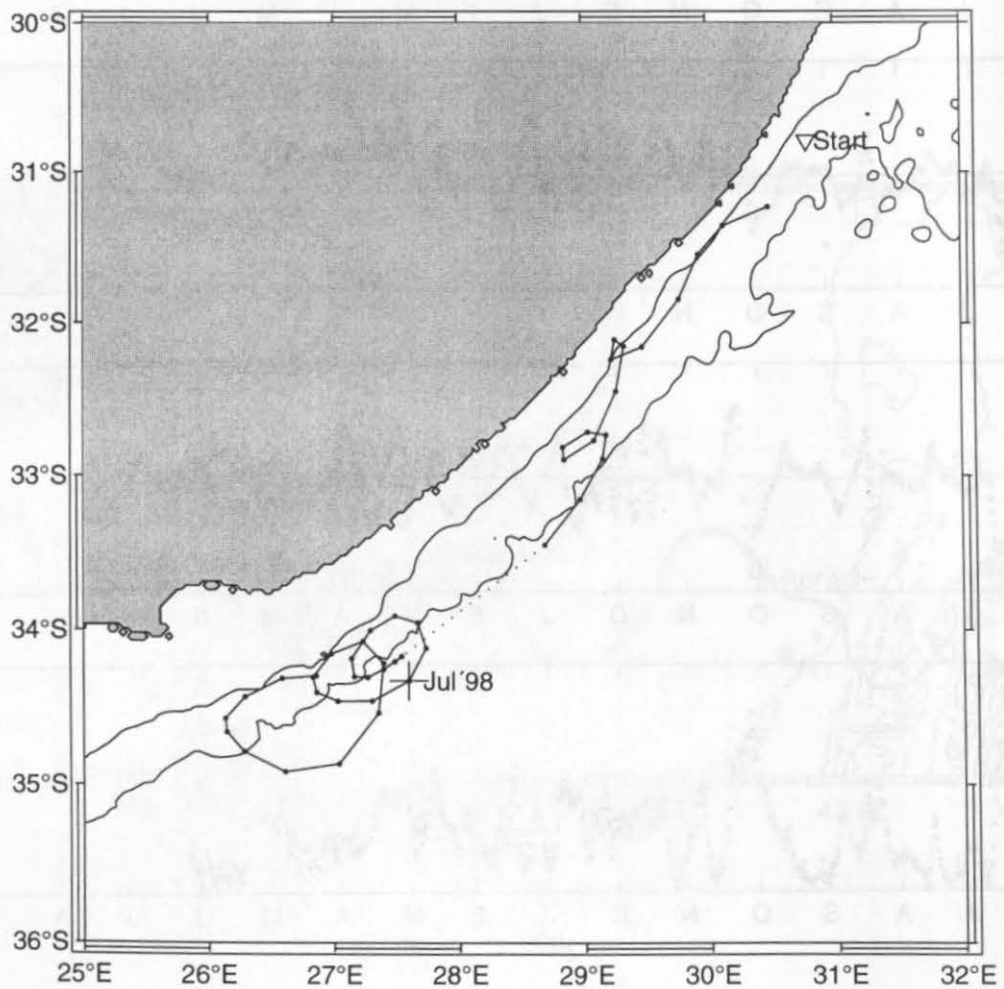
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.492     31.492
** Surface position (Cycle End position) : -40.368     52.912
** Cycle Start time              : 1998     6    14    12     0     0   (RAFOS day 10979.5)
** Launch time                   : 1998     6    15    11    12     0   (RAFOS day 10980)
** Cycle End time                : 1999     9     7     0     0     0   (RAFOS day 11429)
** First surface Position time   : 1999     9     7     9    48     0   (RAFOS day 11429)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10980.5 to 10985: R1 R2 R2     -30.4917      31.4917   1.489      1.487      1.492
**    10985.5 to 11079: R2 K8 K8     -30.4917      31.4917   1.49       1.49       1.492
**    11079.5 to 11112: R2 R1 R1     -39.0 20.0    1.492     1.492      1.492
**    11112.5 to 11240: R2 K8 K8     -30.4917      31.4917   1.492      1.492      1.492
**    11240.5 to 11429: R2 R1 R1     -42.0 40.0    1.489     1.487      1.492
** -------
** Additional Float clock offsets, seconds (beginning, end): -3   0
** -------
*   1  ----------
```

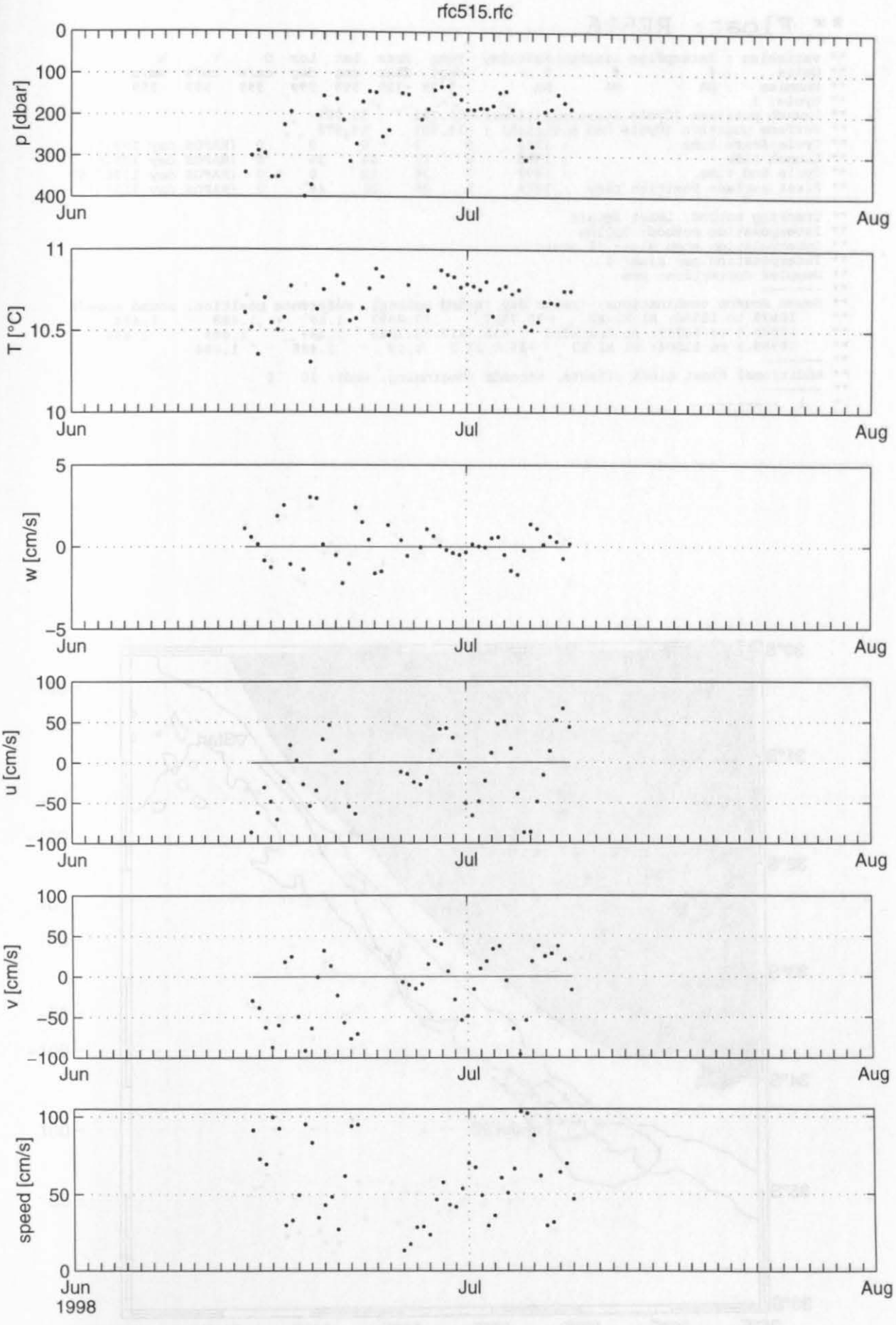



rfc513.rfc
p [dbar]
400
600
800
1000
T [°C]
11
10
9
8
7
w [cm/s]
2
1
0
−1
−2
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
100
50
0
J J A S O N D J F M A M J J A S O
1998
1999

** Float: RF515

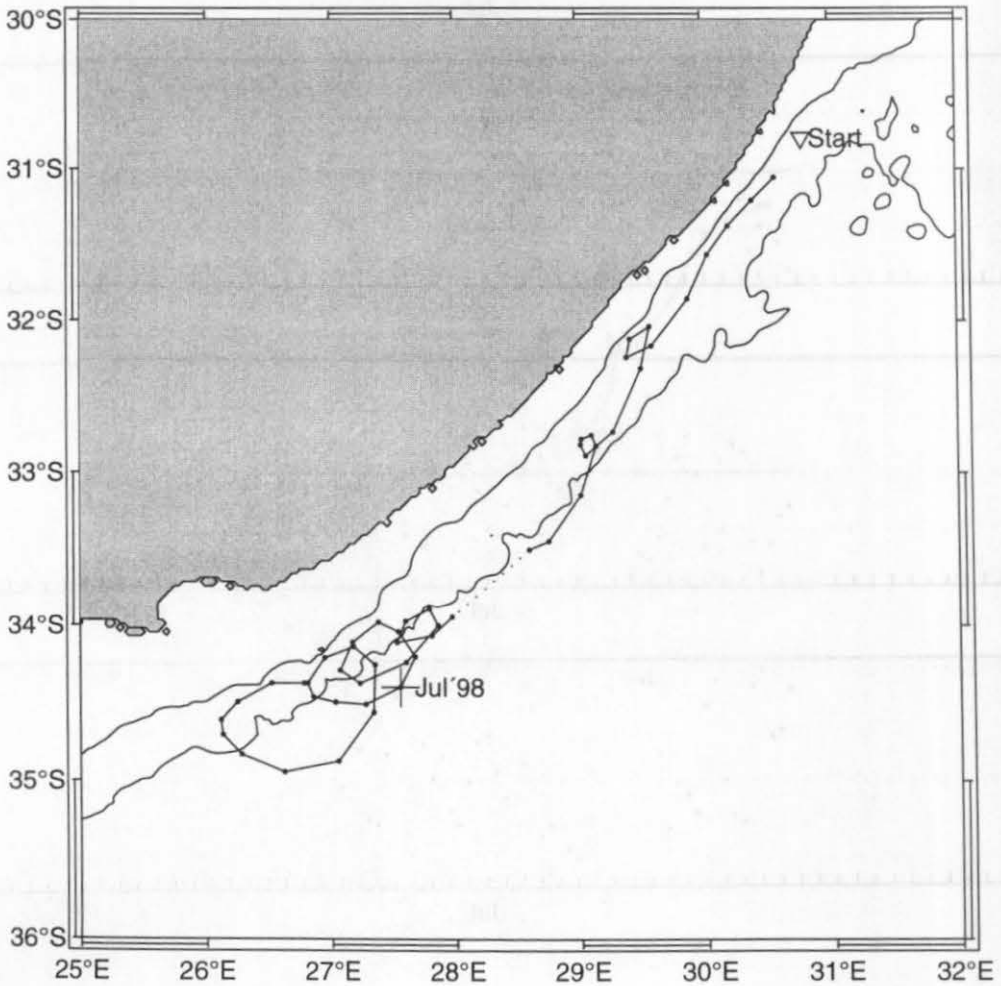
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.79       30.79
** Surface position (Cycle End position) : -26.44       -3.46
** Cycle Start time              : 1998     6    13     0     0     0  (RAFOS day 10978)
** Launch time                   : 1998     6    13    14    33     0  (RAFOS day 10978)
** Cycle End time                : 1999     6     7    12     0     0  (RAFOS day 11337.5)
** First surface Position time   : 1999     6     7    21    49     0  (RAFOS day 11337)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10987.5: R1 R2 R2    -30.7883        30.79   1.49        1.488        1.496
**    10988 to 10990.5: no tracking    -30.7883 30.79   1.496       1.496        1.496
**    10991 to 11004: R1 R2 R2    -35.0 26.0   1.49        1.488       1.496
** -------
** Additional Float clock offsets, seconds (beginning, end): 8   0
** -------
*   1  ----------
```

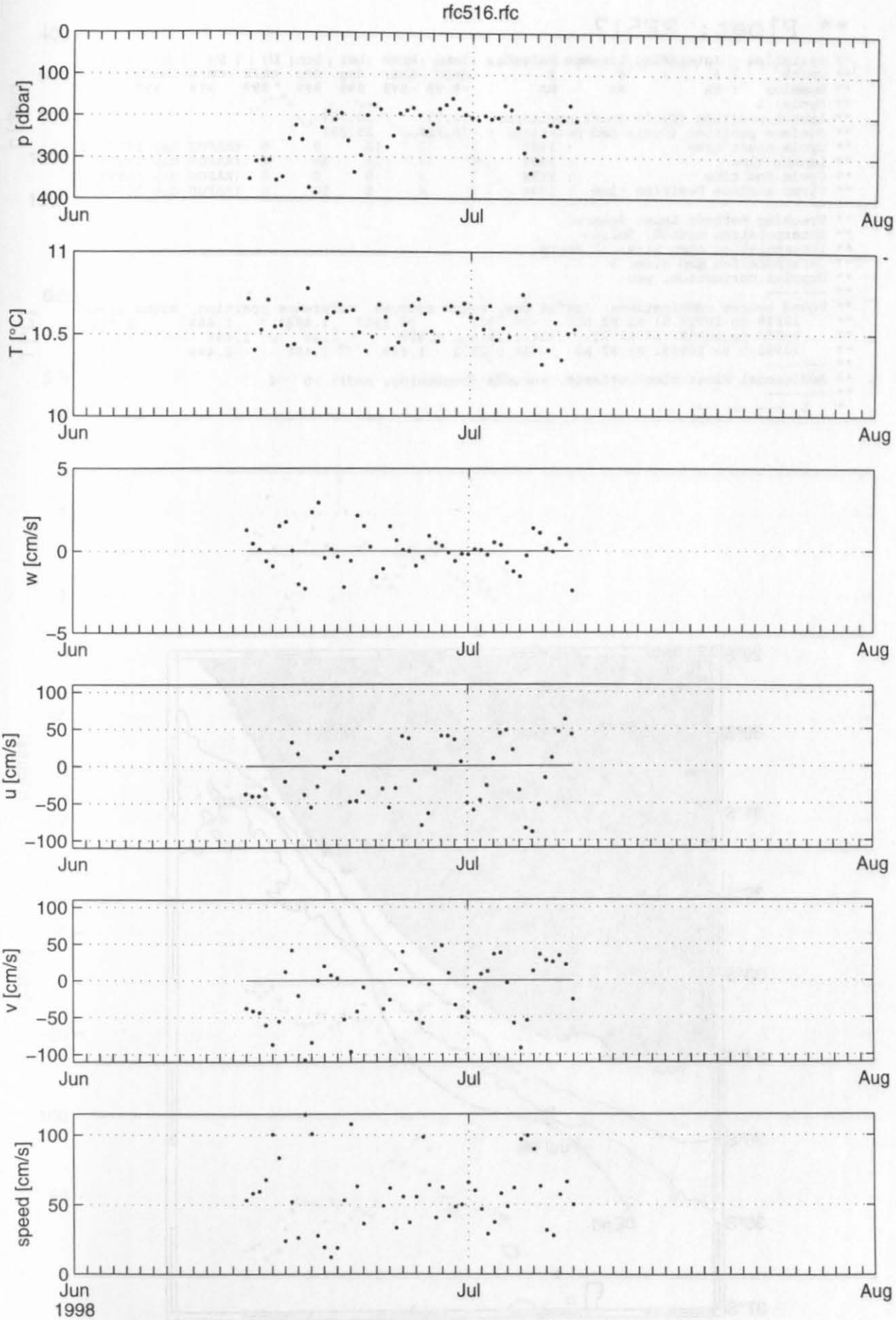



rfc515.rfc
p [dbar]
0
100
200
300
400
T [°C]
11
10.5
10
w [cm/s]
5
0
−5
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
100
50
0
Jun
1998
Jul
Aug

** Float: RF516

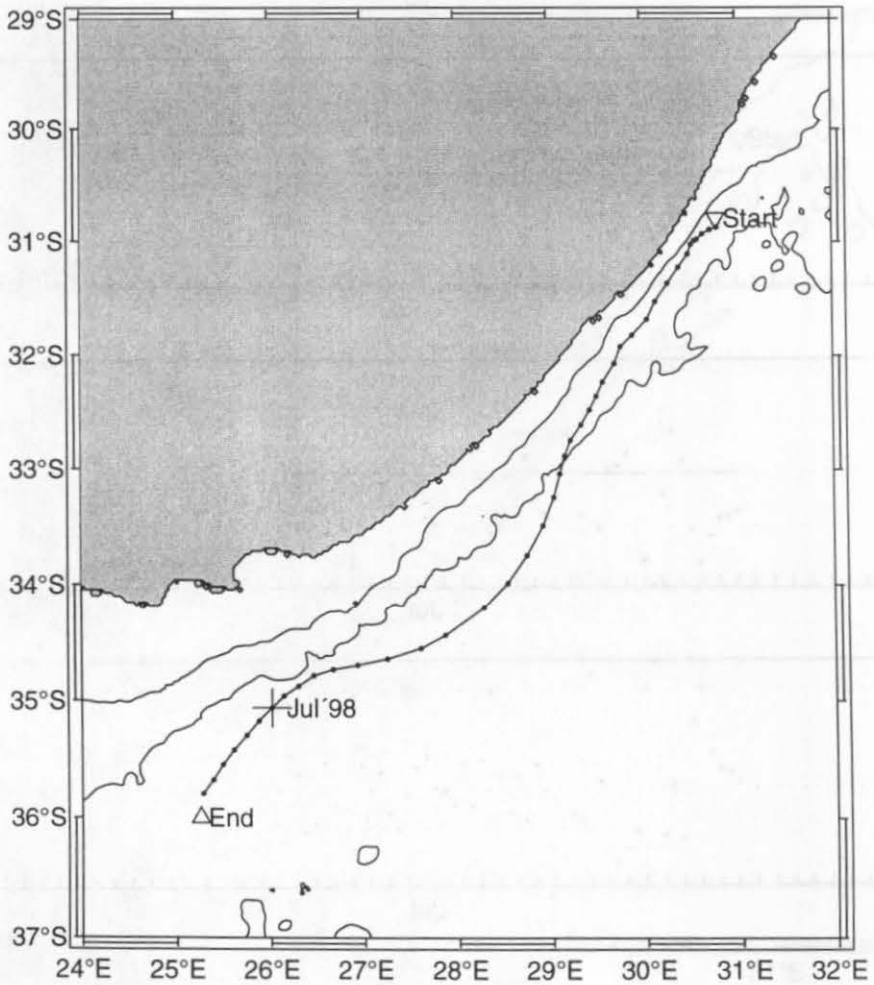
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.792      30.788
** Surface position (Cycle End position) : -31.755      56.578
** Cycle Start time              : 1998     5     3      0     0      0  (RAFOS day 10937)
** Launch time                   : 1998     6    13     14    36      0  (RAFOS day 10978)
** Cycle End time                : 1999     7    26     12     0      0  (RAFOS day 11386.5)
** First surface Position time   : 1999     7    26     21    49      0  (RAFOS day 11386)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10988: R1 R2 R2    -30.7917      30.7883   1.49      1.488      1.484
**    10988.5 to 10989: no tracking    -30.7917 30.7883   1.489     1.489      1.489
**    10989.5 to 11004: R1 R2 R2    -35.0 27.0   1.49      1.488      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 10   0
** -------
 *   1  ----------
```

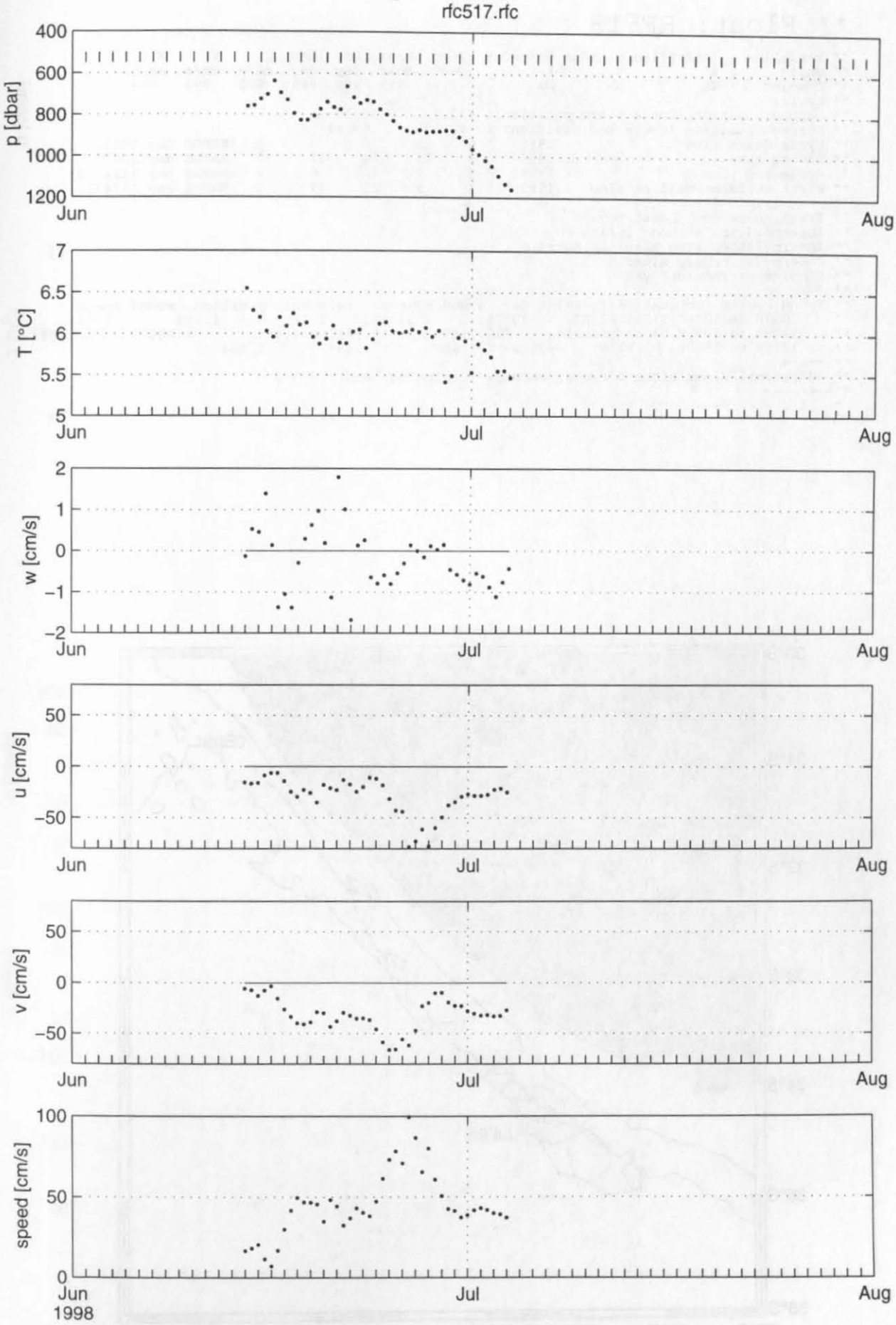



rfc516.rfc
p [dbar]
0
100
200
300
400
Jun
Jul
Aug
T [°C]
11
10.5
10
w [cm/s]
5
0
−5
u [cm/s]
100
50
0
−50
−100
v [cm/s]
speed [cm/s]
1998

** Float: RF517

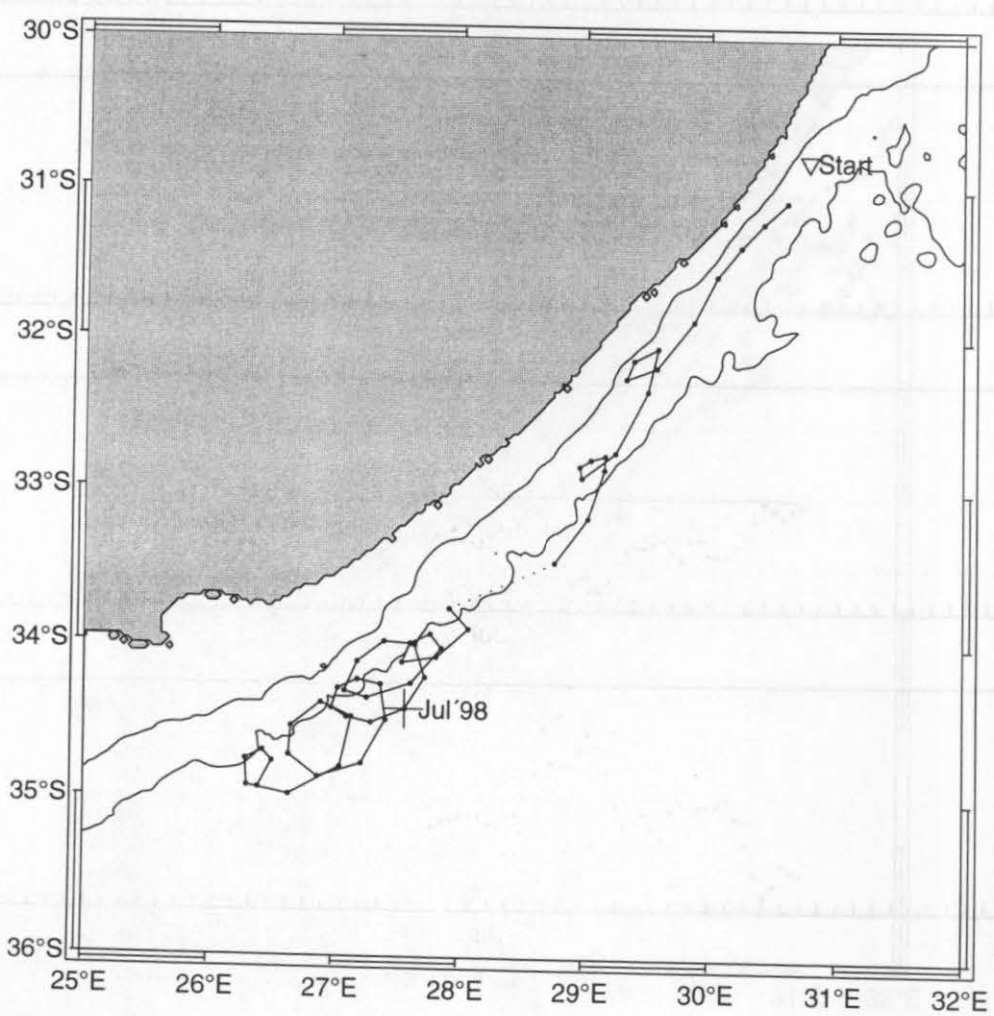
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.793     30.787
** Surface position (Cycle End position) : -35.998     25.253
** Cycle Start time              : 1998    5     2    12     0     0   (RAFOS day 10936.5)
** Launch time                   : 1998    6    13    14    38     0   (RAFOS day 10978)
** Cycle End time                : 1998    7     4     0     0     0   (RAFOS day 10999)
** First surface Position time   : 1998    7     4     9    50     0   (RAFOS day 10999)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10987.5: R1 R2 R2    -30.7933      30.7867   1.488      1.488      1.488
**    10988 to 10992: K8 R2 R2    -34.0 29.0   1.488       1.49       1.488
**    10992.5 to 10999: R1 R2 R2    -36.0 25.2   1.488       1.488      1.488
** -------
** Additional Float clock offsets, seconds (beginning, end): -5   4
** -------
 *   1  ----------
```

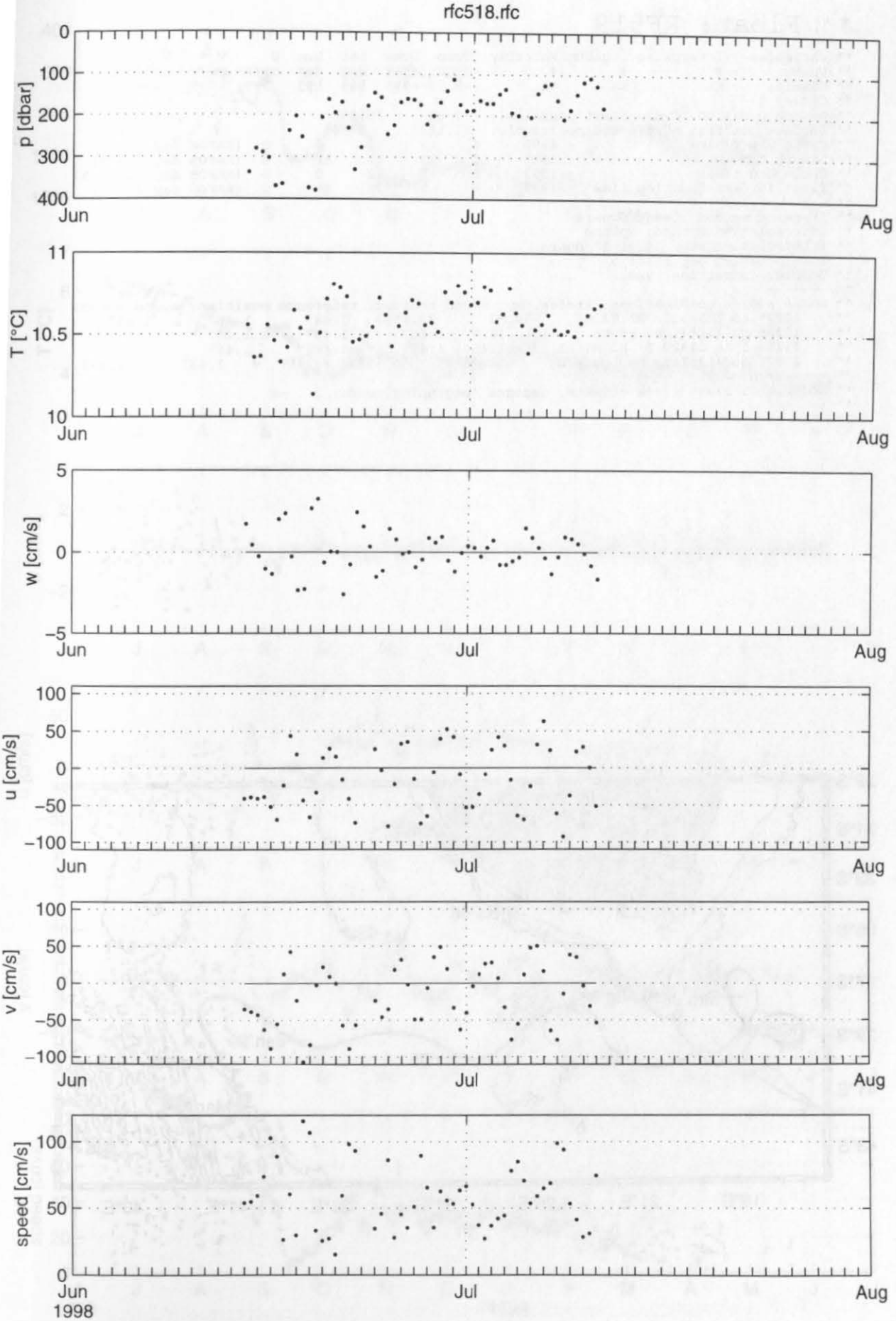



rfc517.rfc
p [dbar]
400
600
800
1000
1200
T [°C]
7
6.5
6
5.5
5
w [cm/s]
2
1
0
−1
−2
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
100
50
0
Jun
Jul
Aug
1998

** Float: RF518

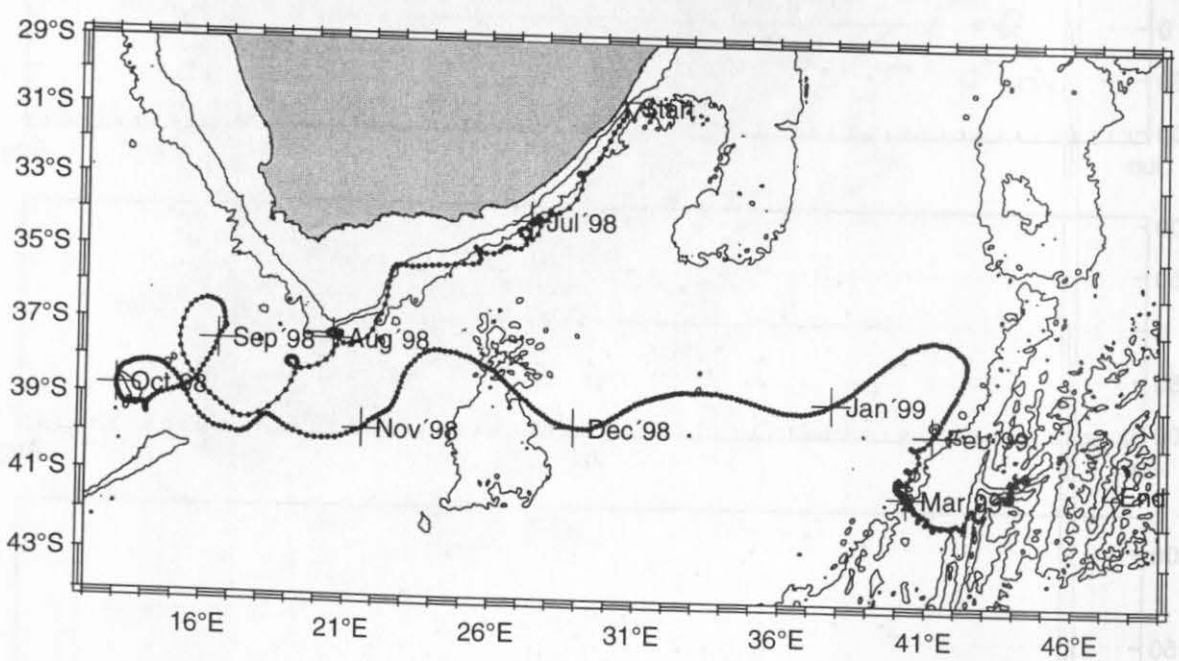
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.8       30.78
** Surface position (Cycle End position) : -41.17      69.41
** Cycle Start time              : 1998    6    13     0     0     0   (RAFOS day 10978)
** Launch time                   : 1998    6    13    14    41     0   (RAFOS day 10978)
** Cycle End time                : 1999    3     9    12     0     0   (RAFOS day 11247.5)
** First surface Position time   : 1999    3     9    21    49     0   (RAFOS day 11247)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10987.5: R1 R2 R2     -30.7967      30.7817   1.489       1.486       1.484
**    10988 to 10988.5: no tracking  -30.7967      30.7817   1.484       1.484       1.484
**    10989 to 11006: R1 R2 R2     -35 25   1.489       1.486       1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 6   0
** -------
*   1  ----------
```

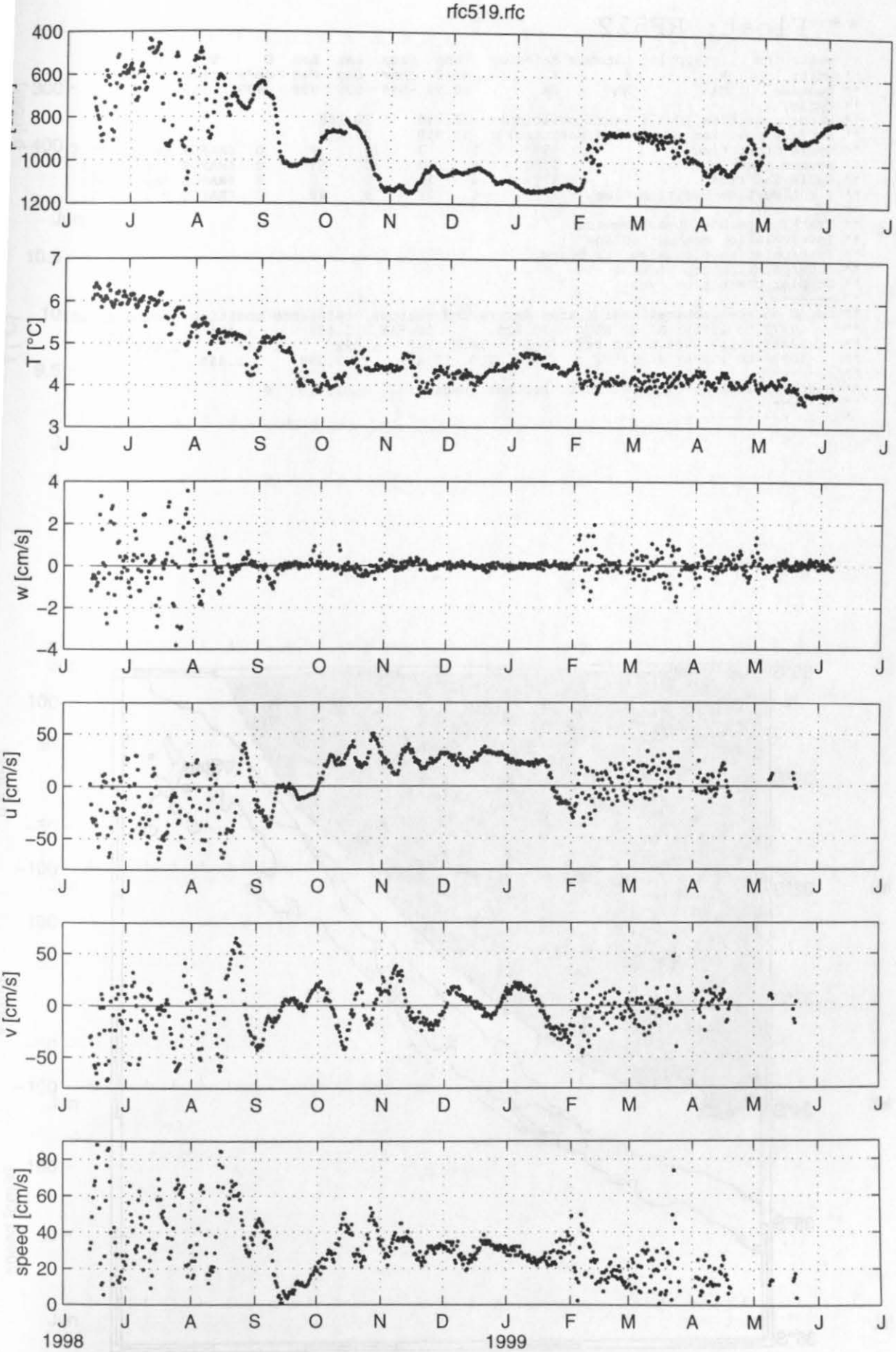



rfc518.rfc
p [dbar]
0
100
200
300
400
Jun
Jul
Aug
T [°C]
11
10.5
10
w [cm/s]
5
0
−5
u [cm/s]
100
50
−50
−100
v [cm/s]
speed [cm/s]
1998

** Float: RF519

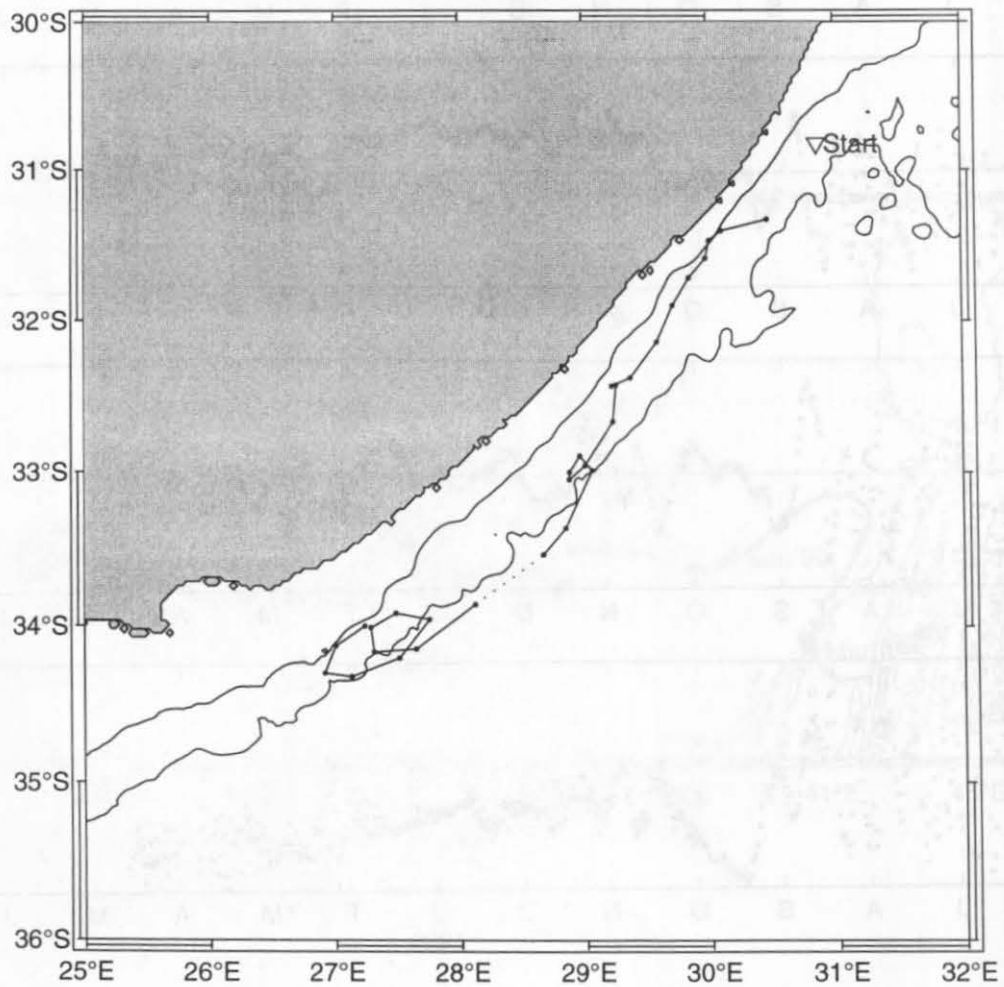
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.83     30.858
** Surface position (Cycle End position) : -41.112    47.42
** Cycle Start time              : 1998    6    13    0     0     0   (RAFOS day 10978)
** Launch time                   : 1998    6    13    13    58    0   (RAFOS day 10978)
** Cycle End time                : 1999    6    7     12    0     0   (RAFOS day 11337.5)
** First surface Position time   : 1999    6    7     21    49    0   (RAFOS day 11337)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10985.5: R2 R1 R1    -30.83      30.8583   1.487      1.487      1.487
**    10986 to 11167: R2 K8 K8    -40.0 12.0    1.487      1.487      1.487
**    11167.5 to 11320.5: R2 R1 R1    -41 46    1.487      1.487      1.487
**    11321 to 11337.5: no tracking    -30.83     30.8583   1.487      1.487      1.487
** -------
** Additional Float clock offsets, seconds (beginning, end): 2   -8
*   1 ----------
```

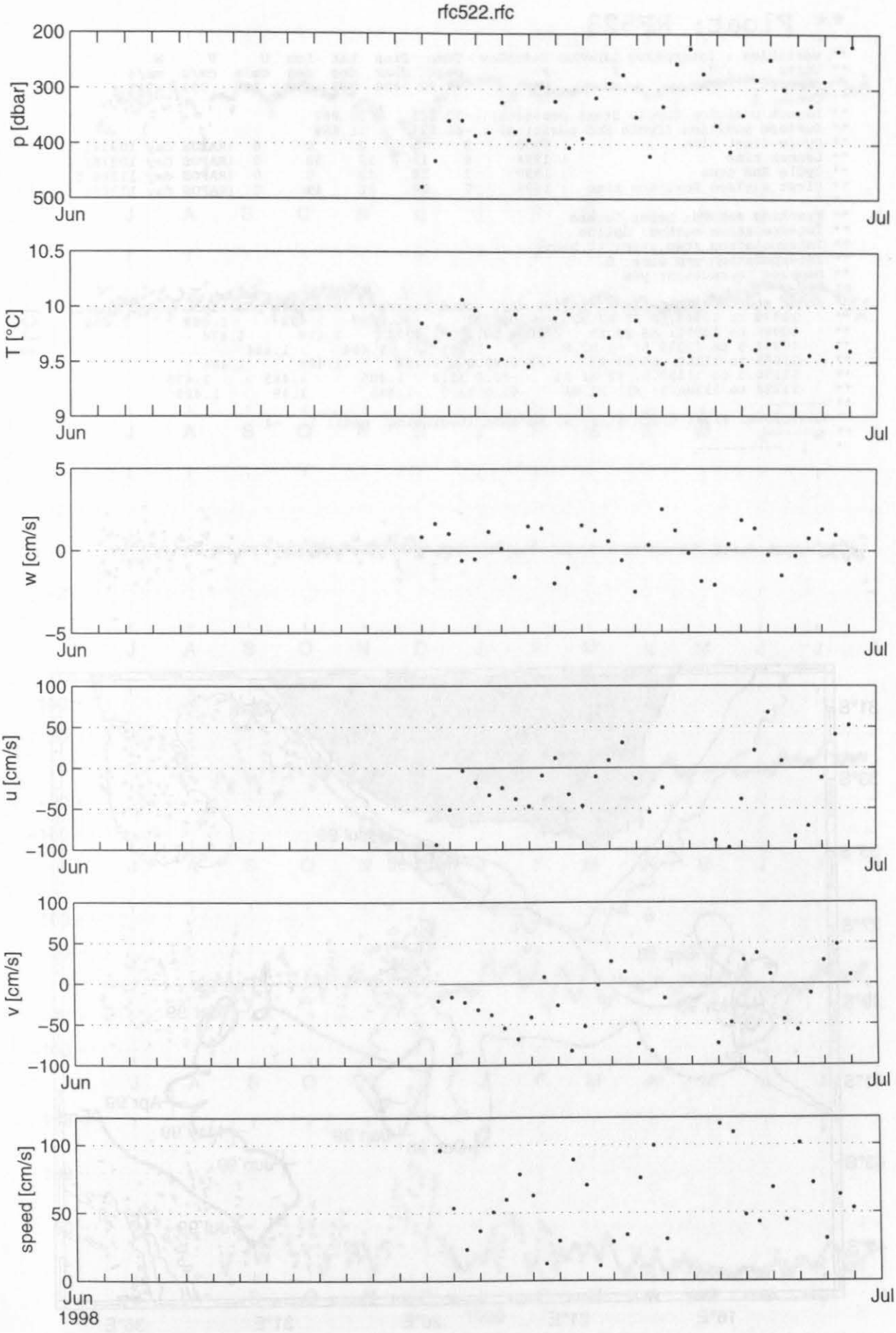



rfc519.rfc
400
600
800
1000
1200
J J A S O N D J F M A M J J
T [°C]
7
6
5
4
3
J J A S O N D J F M A M J J
w [cm/s]
4
2
0
−2
−4
J J A S O N D J F M A M J J
u [cm/s]
50
0
−50
J J A S O N D J F M A M J J
v [cm/s]
50
0
−50
J J A S O N D J F M A M J J
speed [cm/s]
80
60
40
20
0
J J A S O N D J F M A M J J
1998
1999

** Float: RF522

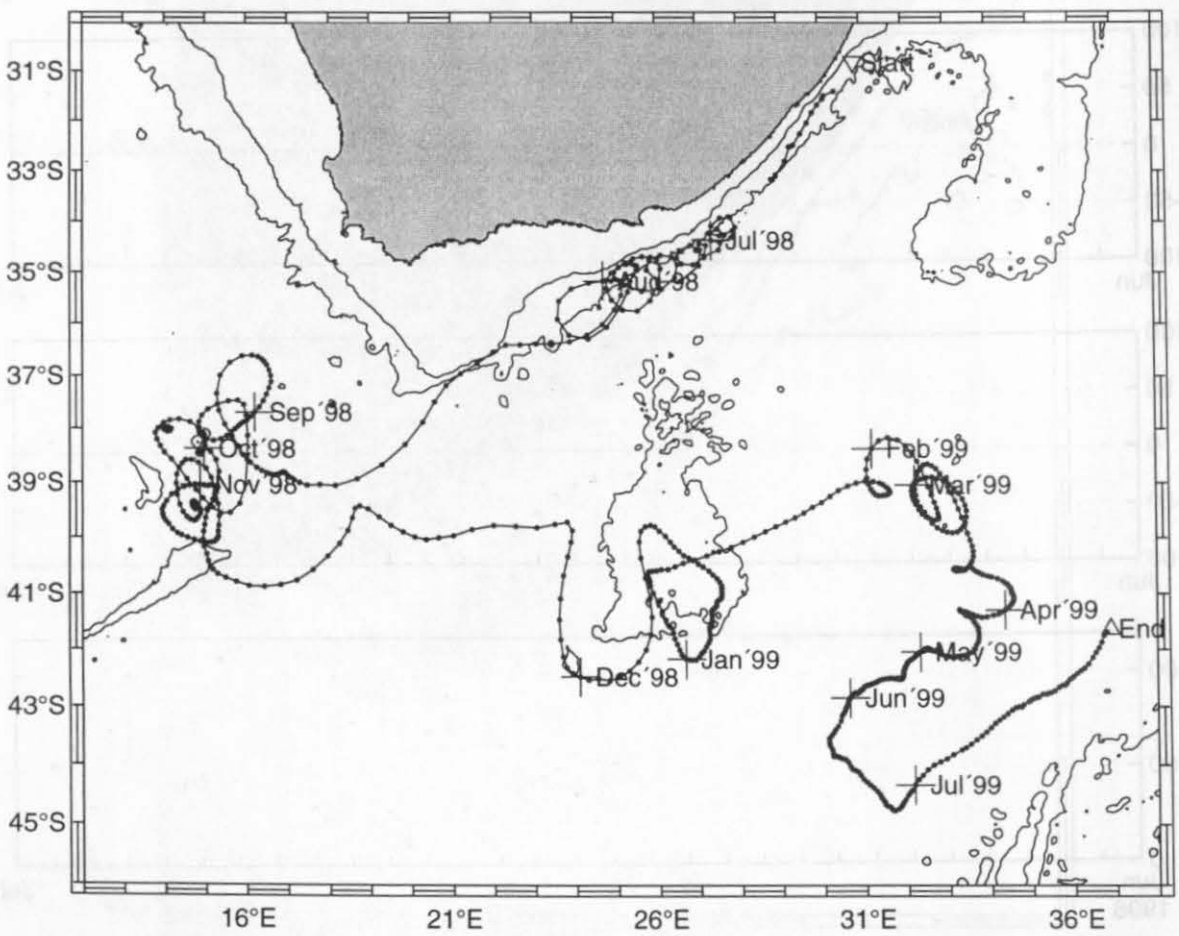
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.825     30.865
** Surface position (Cycle End position) : -35.918     20.176
** Cycle Start time              : 1998    5    3    12    0    0  (RAFOS day 10937.5)
** Launch time                   : 1998    6   13    13   53    0  (RAFOS day 10978)
** Cycle End time                : 1999    4   28     0    0    0  (RAFOS day 11297)
** First surface Position time   : 1999    4   28     9   49    0  (RAFOS day 11297)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10988: R1 R2 R2    -30.825      30.865   1.489      1.484      1.484
**    10988.5 to 10989.5: no tracking    -34.0 27.0   1.492      1.489      1.484
**    10990 to 10995: R1 R2 R2    -34.0 27.0   1.492      1.489      1.489
** -------
** Additional Float clock offsets, seconds (beginning, end): 10   0
** -------
 *   1  ----------
```

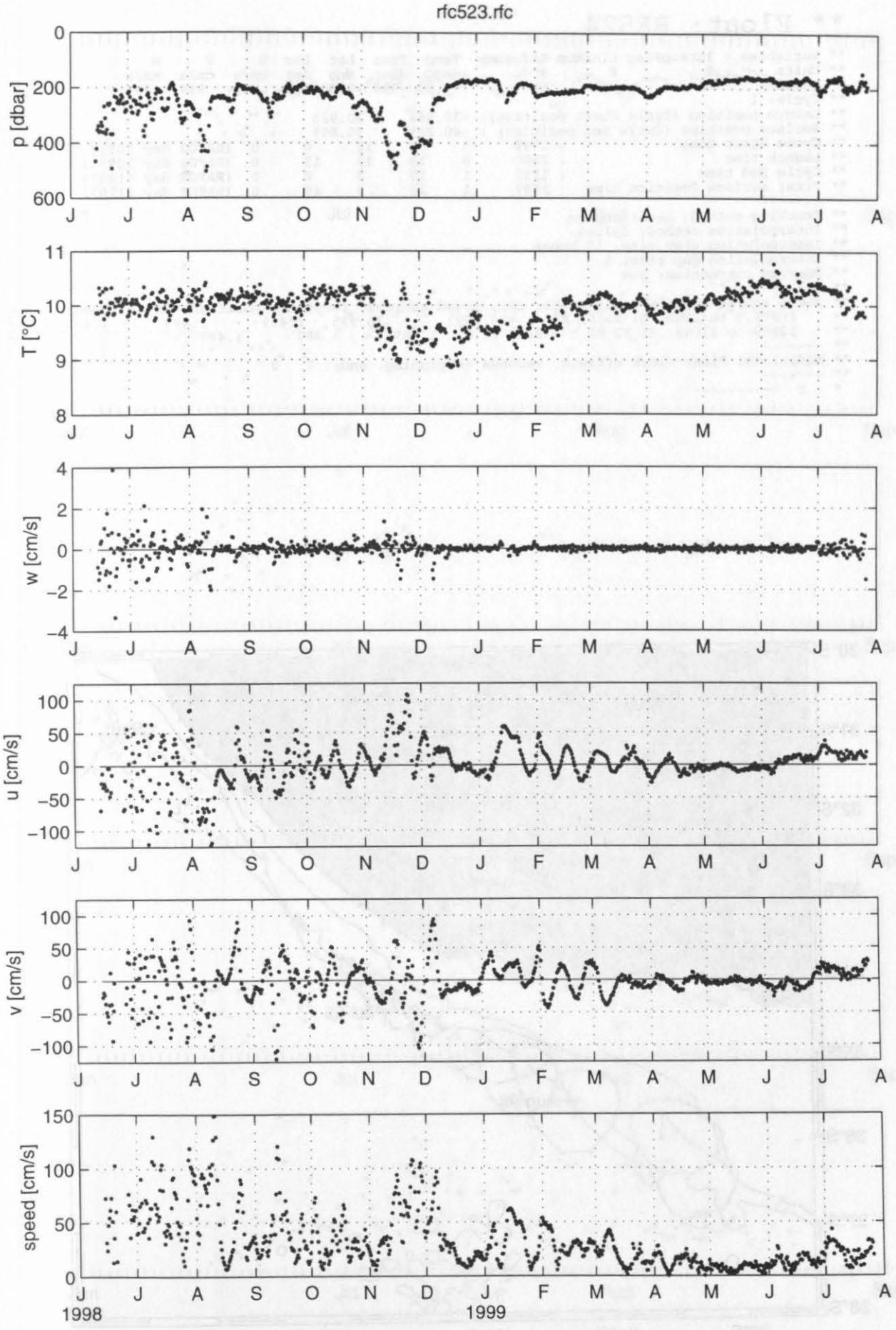



rfc522.rfc
p [dbar]
200
300
400
500
Jun
Jul
T [°C]
10.5
10
9.5
9
w [cm/s]
5
0
−5
u [cm/s]
100
50
−50
−100
v [cm/s]
speed [cm/s]
1998

** Float: RF523

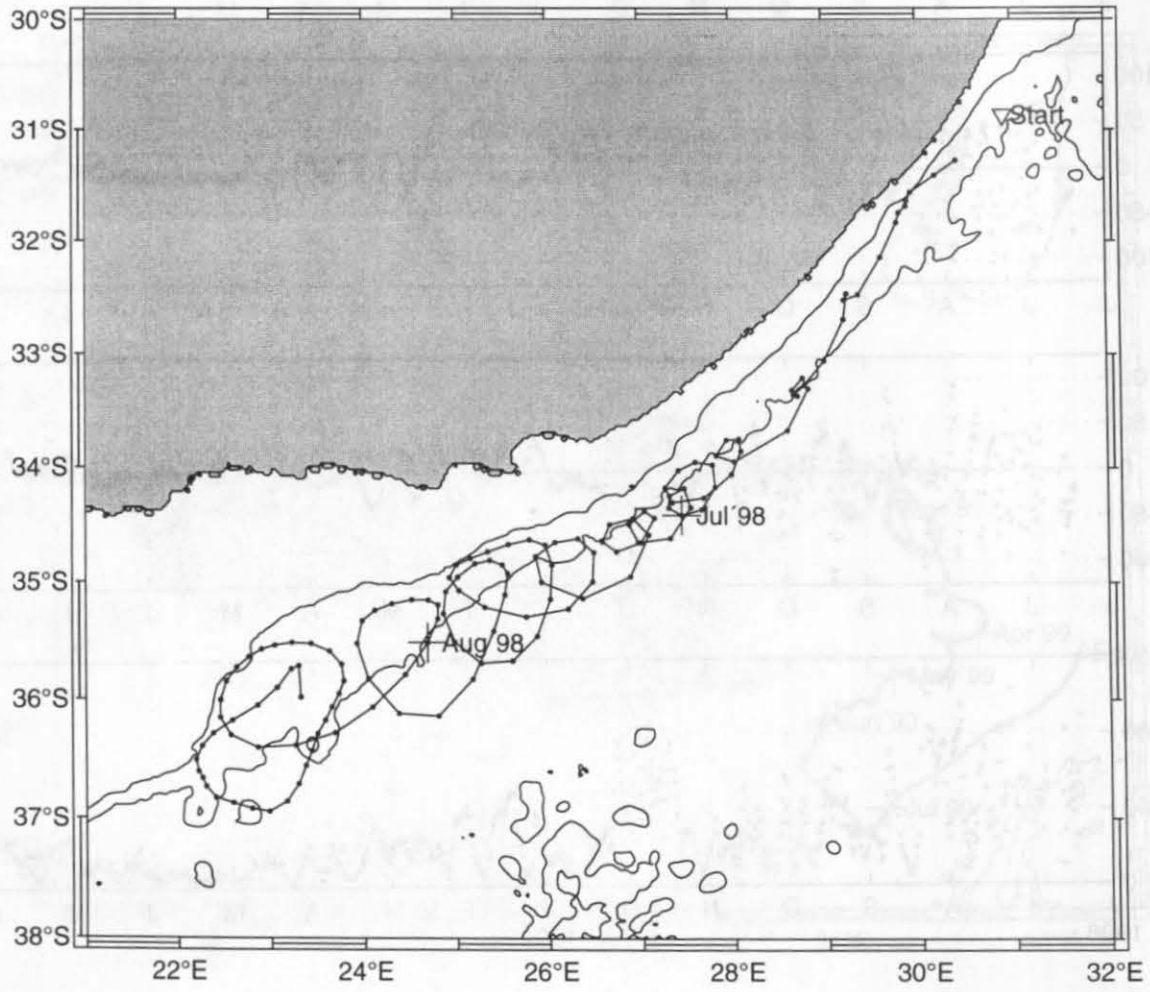
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.823     30.867
** Surface position (Cycle End position) : -41.624     36.889
** Cycle Start time             : 1998    5     3     0     0     0   (RAFOS day 10937)
** Launch time                  : 1998    6    13    13    52     0   (RAFOS day 10978)
** Cycle End time               : 1999    7    26    12     0     0   (RAFOS day 11386.5)
** First surface Position time  : 1999    7    26    21    49     0   (RAFOS day 11386)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10985.5: R1 R2 R2    -30.8233      30.8667   1.492      1.488      1.484
**    10986 to 10991: K8 K9 K9    -30.8 30.8   1.477      1.478      1.478
**    10991.5 to 11038.5: R1 R2 R2         1.489      1.484      1.484
**    11039 to 11150: K8 K9 K9    -38.0 20.0   1.492      1.488      1.484
**    11150.5 to 11258.5: K8 R1 R1    -42.0 33.0   1.485      1.485      1.478
**    11259 to 11386.5: K11 R1 R1    -42.0 33.0   1.485      1.49       1.489
** -------
** Additional Float clock offsets, seconds (beginning, end): 7   -4
** -------
 *   1  ----------
```

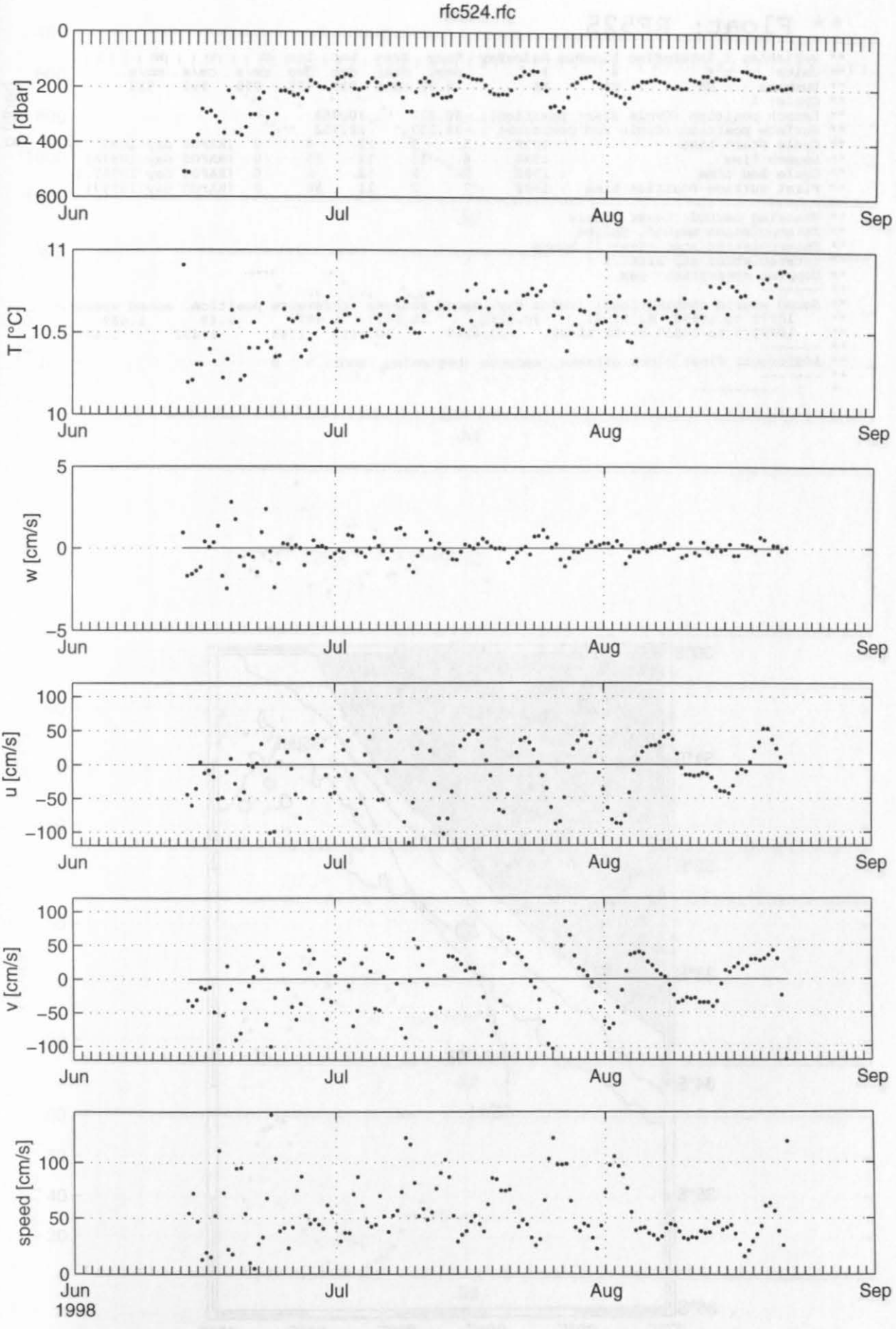



rfc523.rfc
p [dbar]
0
200
400
600
T [°C]
11
10
9
8
w [cm/s]
4
2
0
−2
−4
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
150
100
50
0
J J A S O N D J F M A M J J A
1998
1999

** Float: RF524

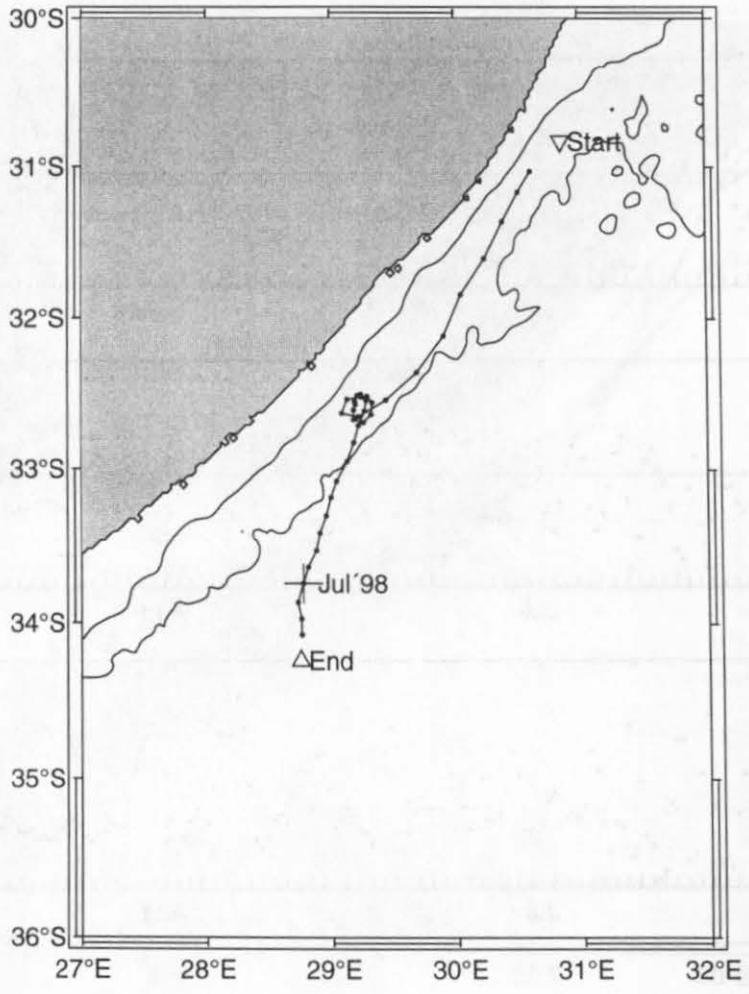
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U      V      W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s   cm/s   mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999    999    999
** Cycle: 1
** Launch position (Cycle Start position): -30.868     30.925
** Surface position (Cycle End position) : -40.289     35.069
** Cycle Start time              : 1998    5    3    12     0     0   (RAFOS day 10937.5)
** Launch time                   : 1998    6   13    13    12     0   (RAFOS day 10978)
** Cycle End time                : 1999    1   28     0     0     0   (RAFOS day 11207)
** First surface Position time   : 1999    1   28     9    49     0   (RAFOS day 11207)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10978.5 to 10988.5: R1 R2 R2    -30.8683       30.925   1.489      1.487      1.487
**    10989 to 11048: R1 R2 R2    -34.0 27.6   1.489      1.487      1.487
** -------
** Additional Float clock offsets, seconds (beginning, end): 7   0
** -------
 *   1  ----------
```

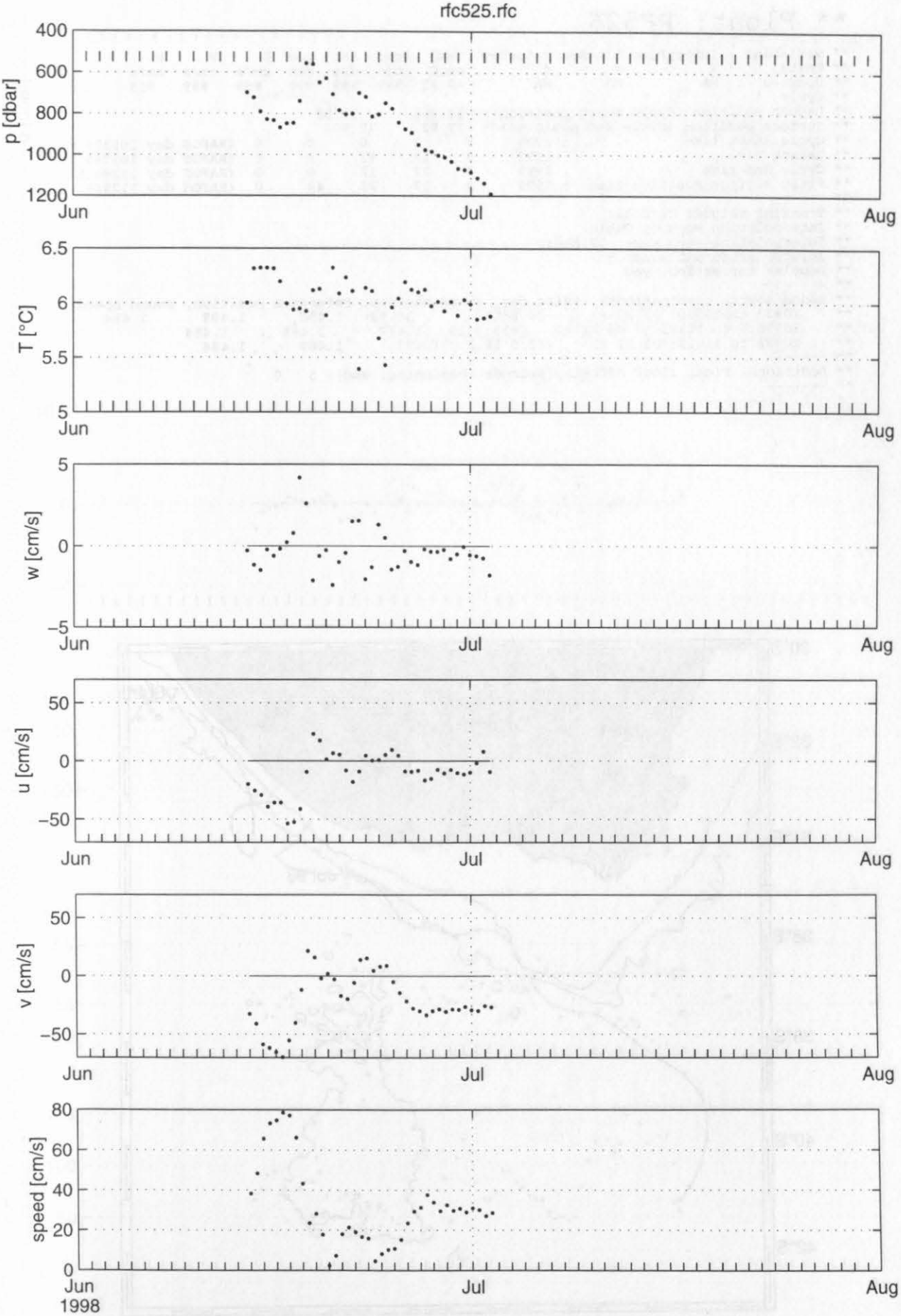



rfc524.rfc
p [dbar]
0
200
400
600
T [°C]
11
10.5
10
w [cm/s]
5
0
−5
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
100
50
0
Jun
Jul
Aug
Sep
1998

** Float: RF525

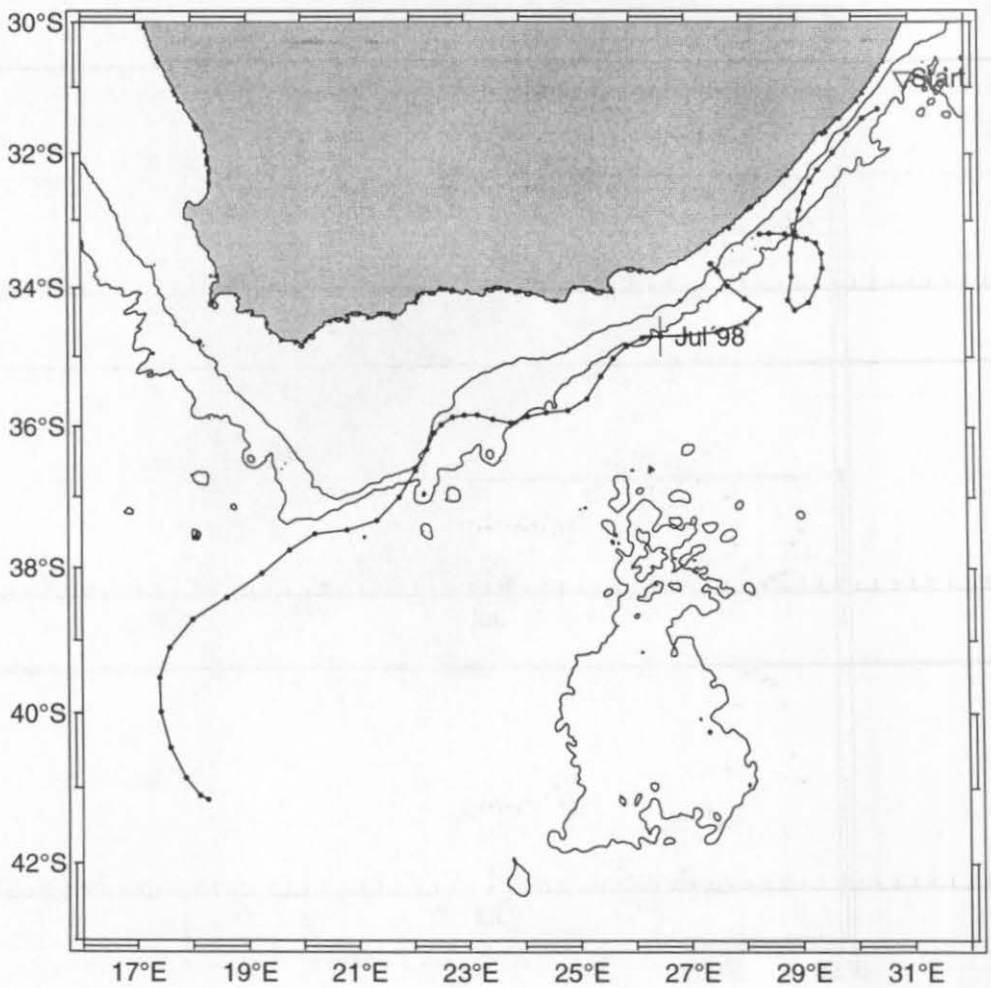
```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.827     30.862
** Surface position (Cycle End position) : -34.237     28.752
** Cycle Start time              : 1998     5     3    12     0     0  (RAFOS day 10937.5)
** Launch time                   : 1998     6    13    13    55     0  (RAFOS day 10978)
** Cycle End time                : 1998     7     2    12     0     0  (RAFOS day 10997.5)
** First surface Position time   : 1998     7     2    21    50     0  (RAFOS day 10997)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10992: R2 R1 R1    -30.8267      30.8617   1.489       1.49      1.489
**    10992.5 to 10997.5: R2 R1 R1    -30.8267      30.8617   1.49      1.491      1.489
** -------
** Additional Float clock offsets, seconds (beginning, end): 5   0
** -------
*   1  ----------
```

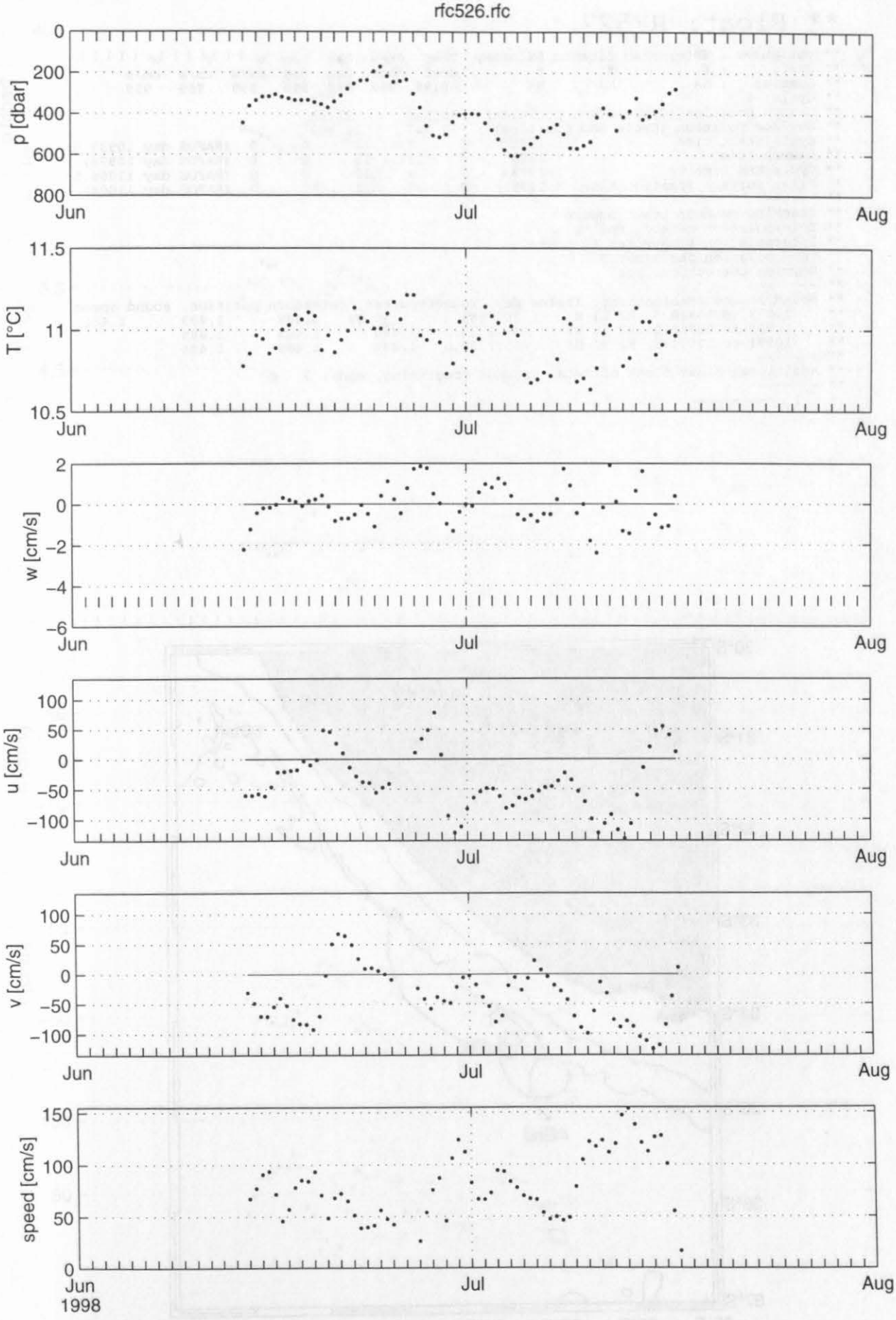



rfc525.rfc
p [dbar]
400
600
800
1000
1200
T [°C]
6.5
6
5.5
5
w [cm/s]
5
0
−5
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
80
60
40
20
0
Jun
Jul
Aug
1998

** Float: RF526

```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.862      30.93
** Surface position (Cycle End position) : -37.92      72.904
** Cycle Start time              : 1998     5     3     0     0     0  (RAFOS day 10937)
** Launch time                   : 1998     6    13    13     8     0  (RAFOS day 10978)
** Cycle End time                : 1999     4    27    12     0     0  (RAFOS day 11296.5)
** First surface Position time   : 1999     4    27    21    49     0  (RAFOS day 11296)
** -------
** Tracking method: Circular
** Interpolation method: Cubic
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10990: R1 R2 R2    -30.8617        30.93   1.493      1.489      1.484
**    10990.5 to 10991.5: K8 R2 R2    -33.3 28   1.477      1.484      1.484
**    10992 to 11012: R1 R2 R2    -41.0 18.0   1.493      1.489      1.484
** -------
** Additional Float clock offsets, seconds (beginning, end): 5   0
** -------
 *   1  ----------
```




rfc526.rfc
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400
600
800
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11
10.5
w [cm/s]
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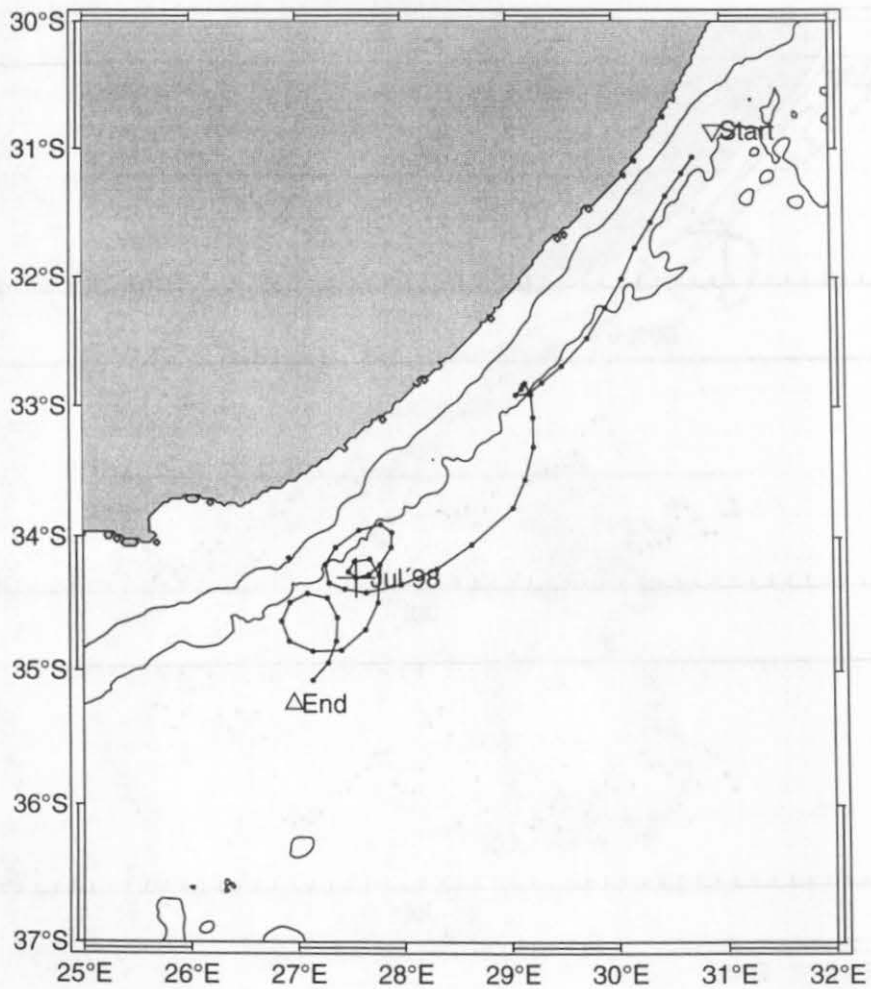
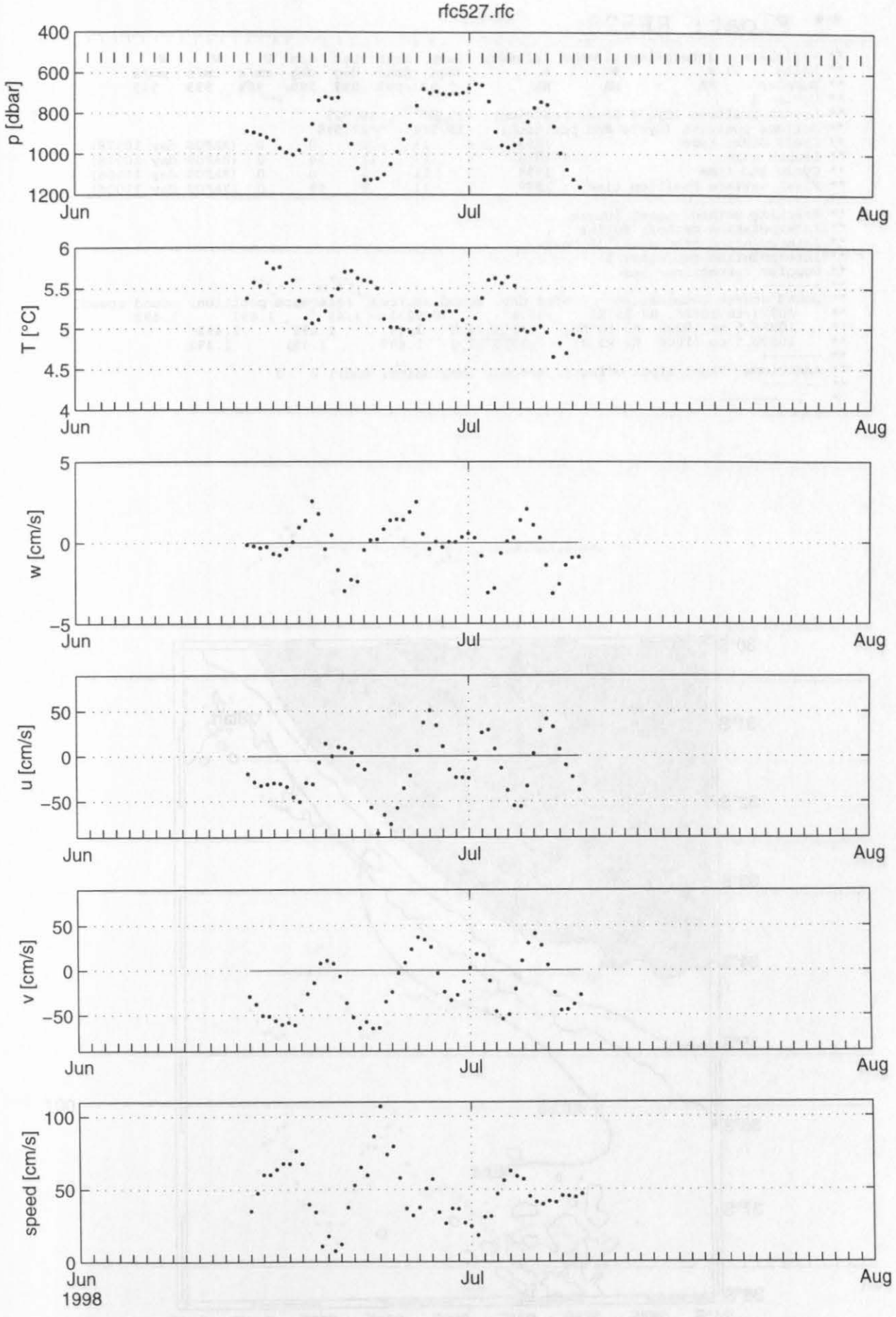
0
−2
−4
−6
u [cm/s]
100
50
0
−50
−100
v [cm/s]
100
50
0
−50
−100
speed [cm/s]
150
100
50
0
Jun
Jul
Aug
1998

** Float: RF527

```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
** Units     : #          #       #         degC  dbar  deg  deg  cm/s  cm/s  mm/s
** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.858      30.93
** Surface position (Cycle End position) : -35.247     26.962
** Cycle Start time              : 1998     5     3    12     0     0  (RAFOS day 10937.5)
** Launch time                   : 1998     6    13    13     6     0  (RAFOS day 10978)
** Cycle End time                : 1998     7     9    12     0     0  (RAFOS day 11004.5)
** First surface Position time   : 1998     7     9    21    50     0  (RAFOS day 11004)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10988.5: R2 R1 R1    -30.8583        30.93   1.486      1.489      1.486
**    10989 to 10990.5: R2 K8 K8    -35.2 27.0   1.484      1.484      1.486
**    10991 to 11004.5: R2 R1 R1    -35.2 27.0   1.486      1.489      1.486
** -------
** Additional Float clock offsets, seconds (beginning, end): 3    0
** -------
 *   1  ----------
```

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600
800
1000
1200
Jun
Jul
Aug
T [°C]
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5.5
5
4.5
4
w [cm/s]
5
0
−5
u [cm/s]
50
0
−50
v [cm/s]
speed [cm/s]
100
1998

** Float: RF528

```
** variables : InterpFlag LineNum RafosDay  Temp  Pres  Lat  Lon  U     V     W
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** Dummies   : NA         NA      NA        -9.99 -999  999  999   999   999   999
** Cycle: 1
** Launch position (Cycle Start position): -30.87     30.923
** Surface position (Cycle End position) : -36.514    27.095
** Cycle Start time              : 1998    6    13     0     0     0   (RAFOS day 10978)
** Launch time                   : 1998    6    13    13    14     0   (RAFOS day 10978)
** Cycle End time                : 1998    7    11     0     0     0   (RAFOS day 11006)
** First surface Position time   : 1998    7    11     9    49     0   (RAFOS day 11006)
** -------
** Tracking method: Least Square
** Interpolation method: Spline
** Interpolation step size: 12 hours
** Interpolation gap size: 5
** Doppler correction: yes
** -------
** Sound source combinations: (rafos day, sound sources, reference position, sound speed)
**    10979 to 10986: R2 R1 R1    -30.87      30.9233   1.49      1.491      1.492
**    10986.5 to 10990: R2 K8 K8    -35.5 27.0   1.49      1.491      1.492
**    10990.5 to 11006: R2 R1 R1    -35.5 27.0   1.489      1.491      1.492
** -------
** Additional Float clock offsets, seconds (beginning, end): 0   0
** -------
 *   1  ----------
```

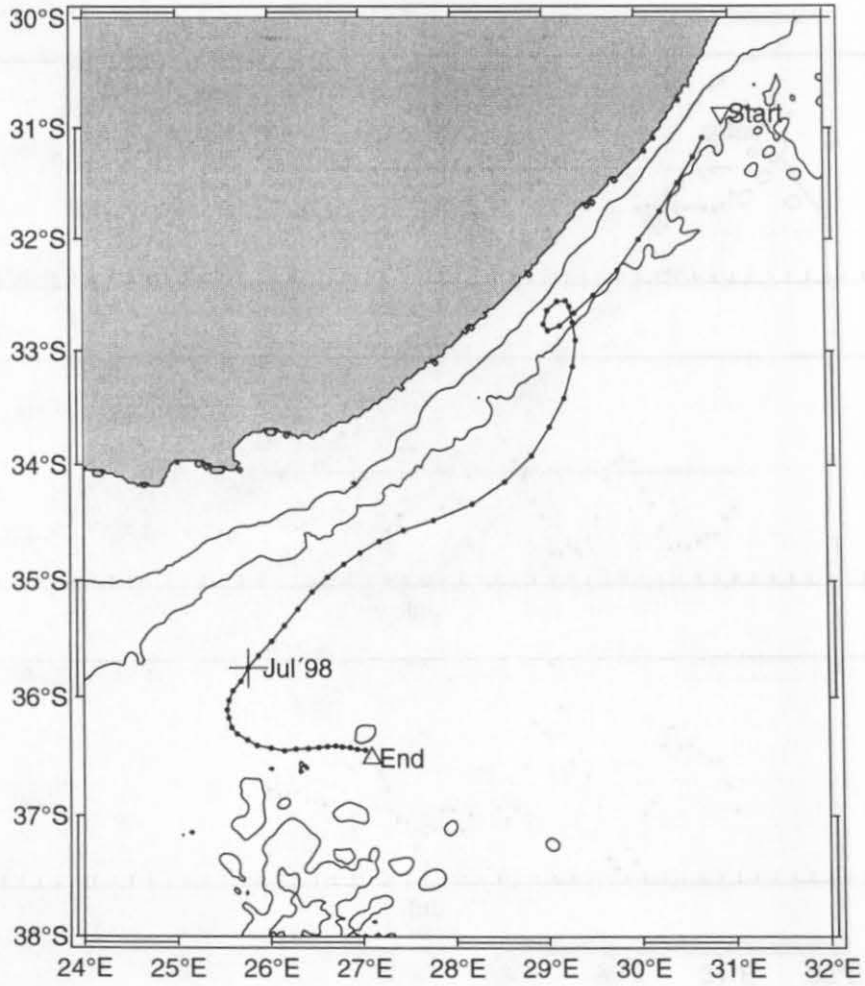

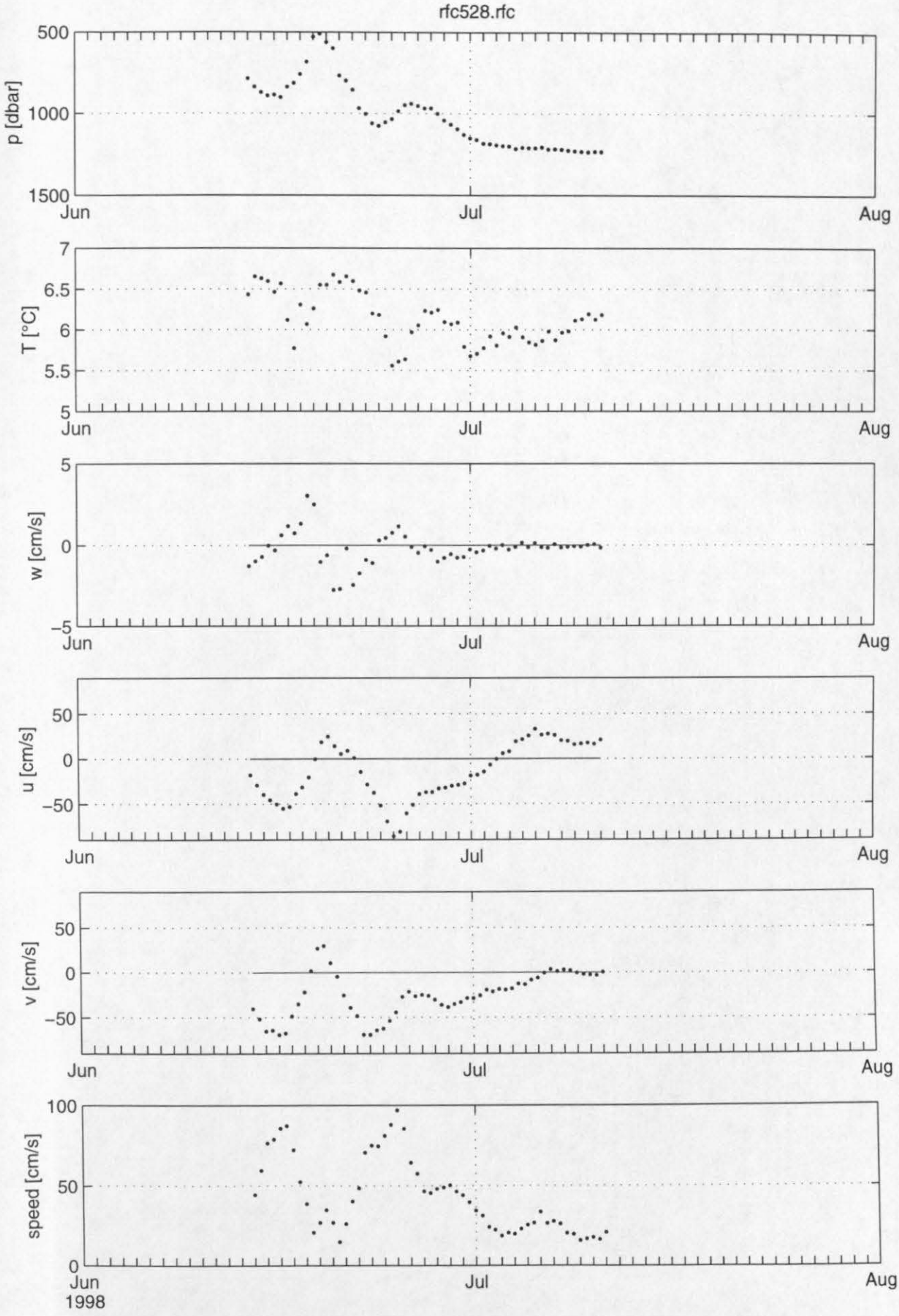
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1000
1500
Jun
Jul
Aug
T [°C]
7
6.5
6
5.5
5
w [cm/s]
5
0
−5
u [cm/s]
50
0
−50
v [cm/s]
50
0
−50
speed [cm/s]
100
50
0
Jun
1998

Appendix 1: cruise report of cruise RV Polarstern ANT XIV/4

Please refer to: The Expedition ANTARKTIS-XIV/4 of RV "Polarstern" in 1997: Physical Oceaongraphy, in *Berichte zur Polarforschung 259 by D. Fütterer and cruise participants*, Alfred-Wegener Institut für Polar- und Meeresforschung, Bremerhaven, 1998.

Appendix 2: cruise report of cruise RV Seward Johnson 97/04

Depart: Cape Town 1800L Aug. 22, 1997
Arrive: Cape Town 1400L Sept. 1, 1997

Scientific Party:

Dr. T. Rossby, GSO/URI. Chief Scientist
Dr. Olaf Boebel, UCT, Scientist
Dr. Johann Lutjeharms, UCT, Scientist
Mr. John Kemp, WHOI, Mooring specialist
Mr. Paul Bouchard, WHOI, Mooring specialist
Ms. Isabel Ansorge, UCT, Scientist
Ms. Carolyn Lander, UCT, Scientist
Mr. Craig Matthysen, UCT, Scientist
Mr. Dean Ollis, UCT, Scientist

Cruise Objective:

To deploy three sound source moorings to provide acoustic navigation for an isopycnal RAFOS float study of the Agulhas Current, its retroflection, and the loss of waters into the SE Atlantic Ocean. To obtain observations of the upper ocean thermal and velocity structure with XBTs and the shipboard ADCP system.

Narrative Summary:

After a slow start getting the vans with the moorings and winches delivered to the ship, deck preparations proceeded without significant difficulty. Similarly, the check-out and resetting the source clocks by Dr. Olaf Boebel and Mr. Paul Bouchard went smoothly. Shipping the electronics in separate padded containers appeared to have spared the electronics the damage that has occurred in the past.

We departed Cape Town at 1800 hours local at which time the ship was fully outfitted and prepared for the deployment of the three sound source (SOSO) moorings. A broken, overcast sky led to a breathtakingly beautiful view of the city and surrounding towns as we steamed south. The lights from the city caused the clouds to glow in patches of alternatingly dark and bright orange. Weather concerns were utmost on our minds. At 40° S in winter time where the moorings were to be deployed, waves exceed 12 ft 40% of the time. Cruise time had been requested for later in the year or early 1998 (Austral summer), but the opportunity provided by the RV Seward Johnson was extremely welcome. The early date required an accelerated preparation schedule to buy and prepare the moorings. Fortunately, John Kemp and his group, and Webb Research Inc. were able to meet it.

In order to build more allowance into the cruise for heavy weather, it was decided to move the proposed locations for the two southern moorings northward by 2° latitude and the northern one to the west, a rearrangement that saved about a day and half of steaming time. Second and most important, the Captain and crew were very gracious in agreeing to leave on the evening the day before to get a 'head-start'.

Weather was favorable during the first half of the cruise, permitting us to deploy the first two moorings (R3 and R2) without any delay. The first mooring was deployed in the evening of the second day out (8/24). Following winds during the transit to the second mooring and daytime conditions led to a speedy and smooth deployment. The able assistance of the ship's crew helped make this possible. By the time we arrived at the site for the third mooring (R3), easterly winds, sustained by a high pressure to the south, had picked up to 25-30 knots. On the assumption that this weather system would move to the east, we decided to wait until the next day. Instead, the winds continued from the same direction and increased to 30-40 knots at times. Since the seas had not yet built up to these wind speeds, we attempted to deploy (8/29, am), but between the motion of the vessel in the steep waves and the low working area, 'green' water broke over the working area several times making continued work hazardous. The top part of the mooring (glass balls, see mooring description below) was pulled back in. Later in the day the winds abated to ~20 knots and a second attempt was made after dinner. Although the deck was still frequently awash and during one wave Paul Bouchard was swept off his feet and bruised in the leg, the sound source was

rigged and lifted over the stern in full control. Once in the water, paying out the rest of the mooring line was straightforward. Due to the wait, this mooring deployment took almost 40 instead of the 6 hours budgeted. We consider ourselves lucky to have enjoyed good weather during the first two deployments so that Kemp, Bouchard, the ship's Captain and crew could team up under less demanding conditions. In addition, had we had similar seas at all three sites, we might not have been able to complete the cruise objectives. The principal limitation was the very low deck on the RV Seward Johnson.

Each mooring consists of three basic elements: flotation, sound source, and anchor connected by means of jacketed wire and rope. In all cases the sound source is at 1200 meters depth. The flotation, concentrated to the top of the mooring, comprises 24 17" glass balls, each in a protective hardhat and attached to 3/8" P.C. chain. Fifty meters of jacketed wire separates the flotation assembly and the sound source, which consists of one ~400 kg aluminum tube with resonator tube attached to the side. Below the sound source follows jacketed wire rope (800 meters) followed by 3/8" Samson VLS Dacron rope to the bottom except for the last 10 meters of 1/4" jacketed wire rope and 5 meters of 3/8" P.C. chain and the 2200 kg anchor. Additional short segments of rope are added at the bottom to match local depth variations. See http://po.gso.uri.edu/kapex/sj_97_04/cruise_report.html further details.

Once the mooring work was completed, we proceeded NW with an ADCP section taking XBTs hourly. As a result, we have two temperature sections across the Agulhas Current west and east of the Agulhas Plateau and one across the return current (west of the plateau). Figure 6 shows a plot of the ship's track. R1-R3 indicate the mooring sites while the smaller numbers indicate the XBTs used in the following three section plots. Figure 7and Figure 8 show isotherm depths along the Cape Town-R3 and R1 to the 100 m isobath. The Agulhas and Agulhas Return Currents show up clearly on the southbound leg. The northbound section shows the Agulhas current in the north and a cyclonic eddy between R2 and R1 (100 NM). A thermostad near 17°C is evident between the Agulhas Current and the eastward return flow to the south. Once the ADCP data have been processed we will be able to examine closely the relationship between the density and velocity field, the width of the current and the structure of the lateral and vertical shear in the current. These data will provide a very useful framework for the interpretation of the upcoming RAFOS float studies. Mostly T-7s were used. Some T-5s were used as well, but they were quite old and despite attempts to 'rejuvenate' them by rewinding the first few turns, they proved too erratic (spiky) to be trusted for continued used.

We subsequently followed the 100 meter isobath westward along the continental shelf, here called the Agulhas Bank, back to Cape Town. The objective of this operation was to look for pulses of upwelled water in the Port Elizabeth area and their possible propagation westwards along the Agulhas Bank. The thermal stratification of this economically and strategically important shelf region is most unusual. Not only is the water column seasonally warmed in the austral summer months, it is simultaneously cooled from below. This influx of cold bottom water was previously thought to come from upwelling in shear edge eddies at the landward border of the Agulhas Current. Recent work by colleagues at the University of Cape Town has instead suggested that this water comes from kinematic upwelling centred at Port Alfred, east of Port Elizabeth, and that it proceeds from there along the 100 m isobath to fill the bottom of the water column over the entire shelf. Very few data are currently available to test this new theory and the opportunity to attempt this verification was a very useful and satisfying adjunct to the main aims of the cruise This work was done with XBTs supplied by Prof. Johann Lutjeharms. Sea surface temperatures located the surface expression of the upwelling cell unambiguously. Vertical temperature profiles show the advanced vertical mixing due to summer storms, but also the localised presence of water colder than 10°C at certain locations on the shelf. This will be the first time that a line of continuous temperature profiles of this specific kind have been done here and we are convinced that these new data will be of substantial importance for a better understanding of the dynamics of this shelf region. A preliminary plot temperature along the shelf is shown in Figure 9. Results from the ADCP sections are plotted in Figure 10.

In summary, despite considerable anxiety about the winter weather conditions south of South Africa, we were able to complete the cruise objectives in full. For this we are most grateful to Mr. John Kemp, Mr. Bouchard, Captain Seiler and the ship's crew for their excellent deck work under trying conditions. We also thank Mr. Jay Grant for his excellent and imaginative dinners. A short, exciting and very successful cruise!

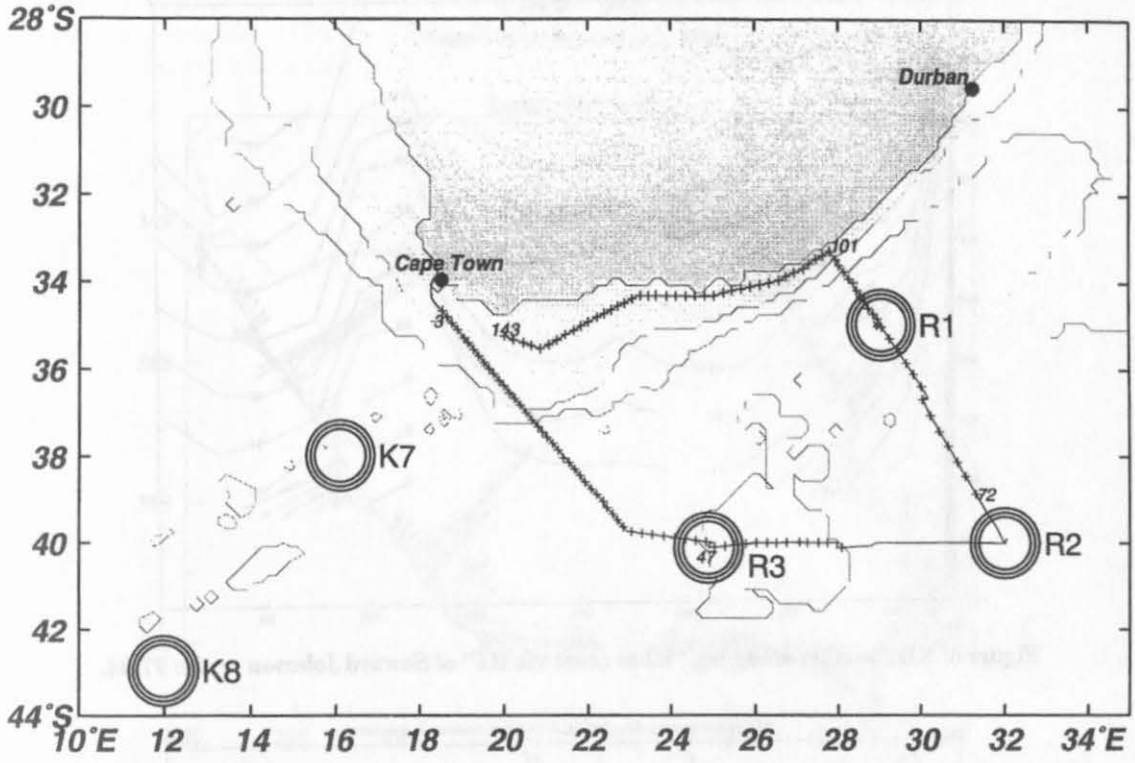

Figure 6: Cruise track of cruise Seward Johnson 97/04

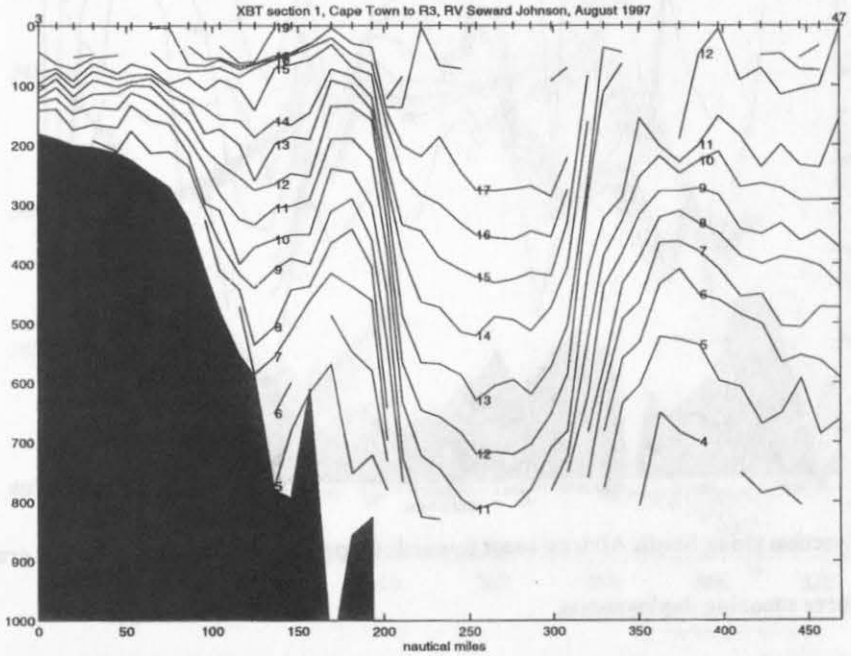

Figure 7: XBT section along leg "Cape Town to R3" Seward Johnson cruise 97/04.

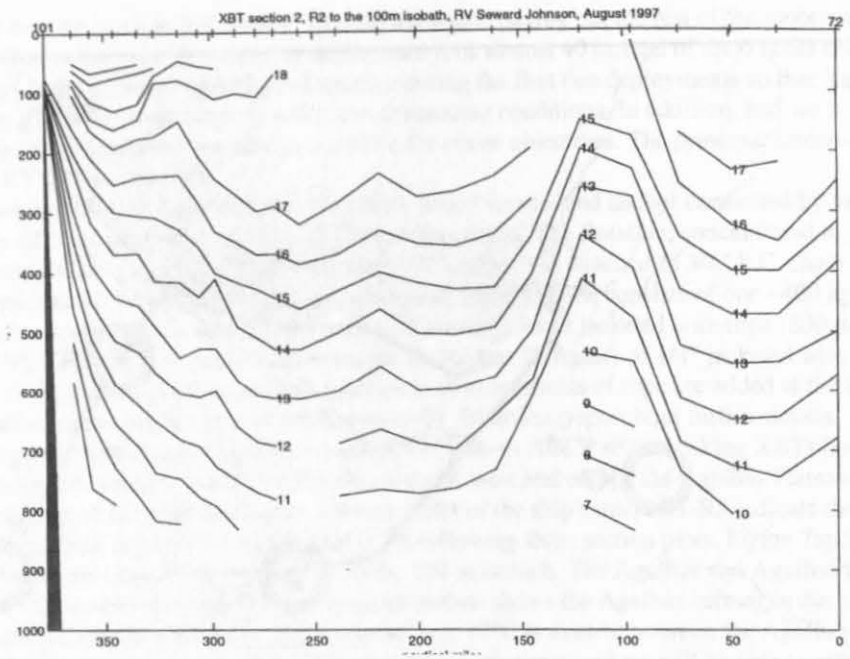

Figure 8: XBT section along leg "R2 to coast via R1" of Seward Johnson cruise 97/04.

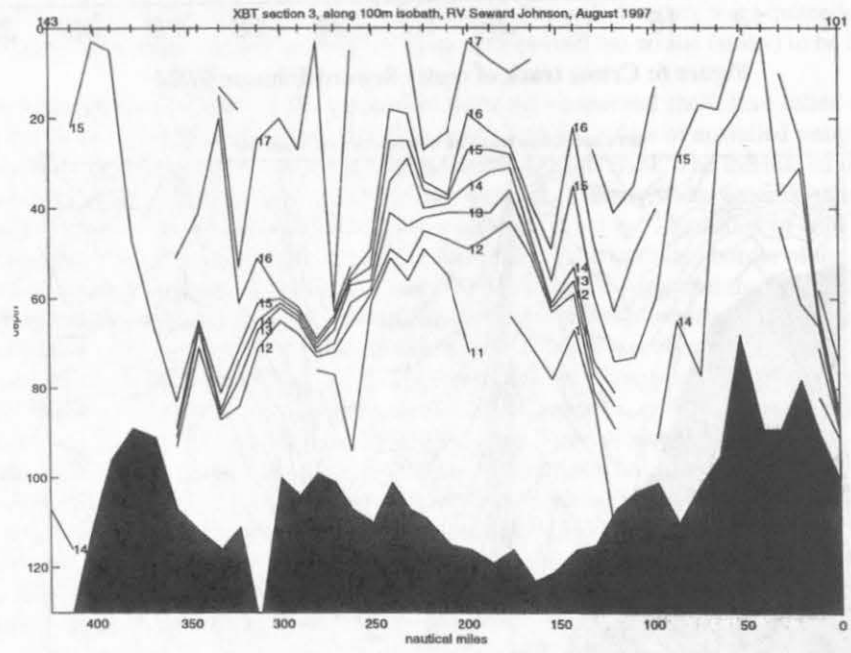

Figure 9: XBT section along South African coast towards Cape Town of Seward Johnson cruise 97/04.

Table 7: Sound source mooring deployments.

site	latitude	longitude	time	date	trans. times (GMT)
R3:	40° 06.994' S	24° 53.365' E	2029 GMT	8/24/97	0030, 1230
R2:	40° 00.275' S	31° 59.647' E	1534 GMT	8/26/97	0100, 1300
R1:	34° 58.568' S	29° 01.066' E	2023 GMT	8/29/97	0130, 1330 (no Danforth anchor)

SJ9704

August 22 to September 1, 1997

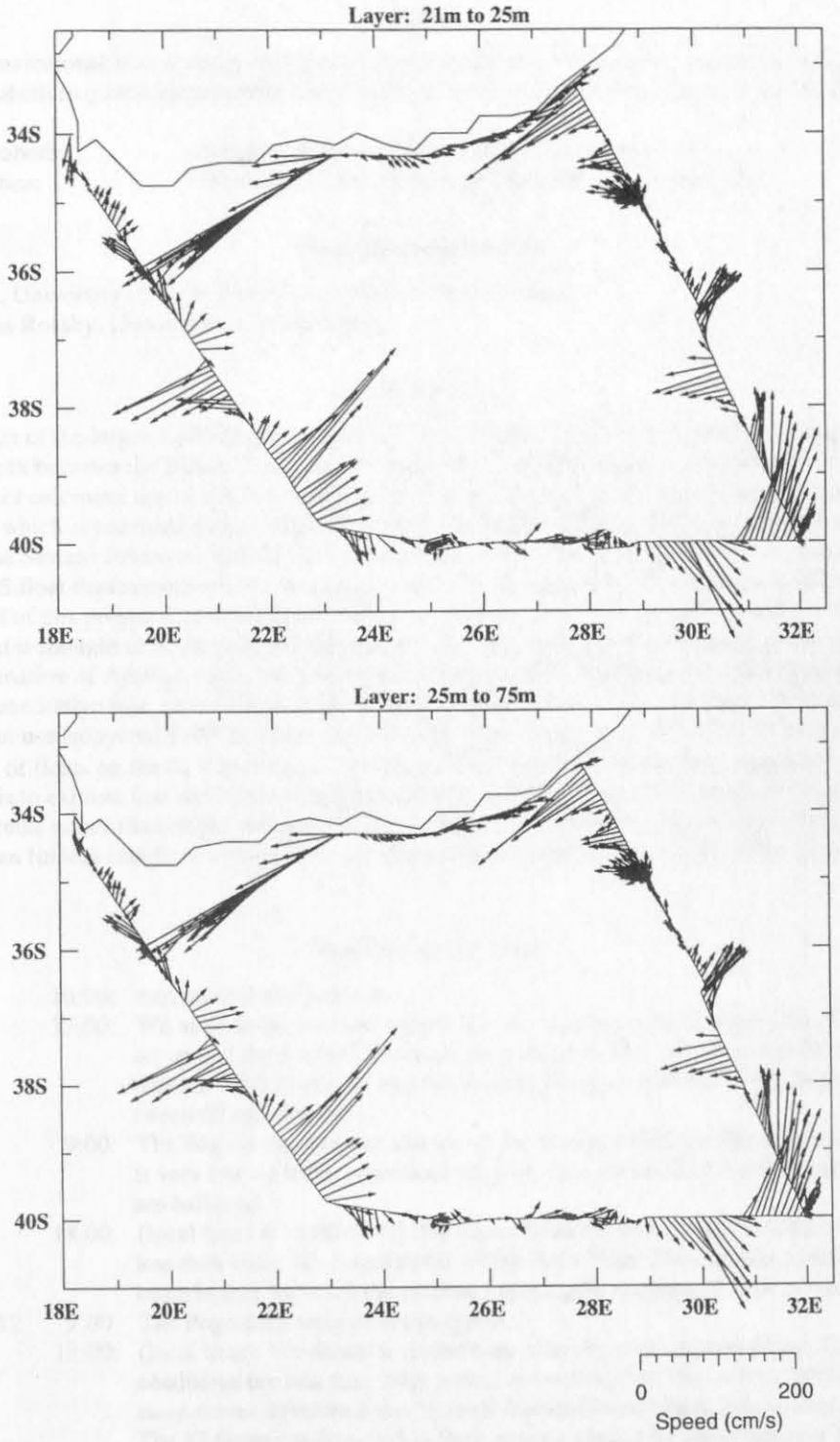

Figure 10: ADCP data from RV Seward Johnson cruise 97/04.

Acknowledgements

We would very much like to thank Captain Seiler and the ship's crew for their excellent deck work under trying conditions and for making a "head start" to use the favorable weather conditions. They were very helpful in the

preparation and execution of the experiment and gave as a warm and kind welcome. We also thank Mr. Jay Grant for his excellent and imaginative dinners. Harbor Branch provided effective logistic support during the planning stage of the cruise. We are most grateful to Mr. John Kemp, Mr. Bouchard who did an excellent mooring job.

Appendix 3: cruise report research cruise SA KUSWAG V

Dates

In contrast to conventional blue ocean research cruises, this cruise was a land based operation, using an extended stay in Port Elizabeth to pick a suitable time slot to work in the close by Agulhas current from aboard S.A. KUSWAG V.

Stay in Port Elizabeth: Sunday, 30 November to Friday 5 December 1997.
Sea going activities: Wednesday, 3 December to Thursday 4 December 1997.

Participating Scientists

Dr. Olaf Boebel, University of Cape Town, South Africa, Chief Scientist.
Prof. Dr. Thomas Rossby, University of Rhode Island.

Objectives

This cruise is part of the larger KAPEX project [Boebel et al., 1998], which focuses on the exchange of water at intermediate depth between the Indian Ocean and the Atlantic. To directly observe the pathways of water parcels, this project makes extensive use of RAFOS floats [Rossby et al., 1986]. For navigation, the RAFOS floats use underwater sound which is provided by an array of moored sound sources. The mooring activities have taken place earlier during the Seward Johnson cruise SJ 97/3 in late August 1997. The S.A. KUSWAG V cruise is the first in a series of RAFOS float deployment cruises, designed to seed the Agulhas Current with these instruments.
The overall goal of this project is to study the exchange of waters between the SW Indian and SE Atlantic Oceans, an exchange that is thought to be an essential link in the global thermohaline circulation. A major mechanism is the well-known formation of Agulhas rings, but small-scale processes such as filaments are also thought to be important, but their quantitative role, especially at depth, is largely unknown. An effective means of visualizing these mechanisms is to use isopycnal RAFOS floats to chart particle pathways in the region of exchange. To this end several releases of floats on the $\sigma_\theta = 26.8$ and 27.2 surfaces in the Agulhas current have been planned. Since the main objective is to explore loss mechanisms, most floats will be deployed in the central and cyclonic (inshore) sides of the currents rather than on the anticyclonic side where it is assumed that most floats will return into the SW Indian Ocean (unless caught in a ring). This cruise report summarizes the activities of the first deployment cruise.

Narrative of the cruise

Sunday, 30.11	16:00:	Arrival in Port Elizabeth.
Monday, 1.12	13:00:	We meet at the ship and unload the van together with the crew. The XBT system is set up and the RAFOS floats are programmed. The total expected duration of this batch is 7500 float days and the average duration amounts to 441 days, varying between 60 and 660 days.
Tuesday, 2.12	9:00:	The Pogo is checked out and set up for an initial GPS fix. We notice that one Pogo is very low on battery and does not lock onto the satellite. Subsequently both Pogos are ballasted.
	18:00:	(local time) = 16:00 GMT. We depart from the harbor. The weather conditions are less than 10kn, but deteriorated within 2h to 30kn. The decision to return to port is taken before we reach the current. Later a gale warning of 35kn is received.
Wednesday, 3.12	9:00:	The Pogo drop weights are prepared.
	13:00:	(local time). We depart a second time after the wind calmed down. The weather conditions are less than 10kn with 2 m swell against the current. Within the current steep waves developed due to swell from previous nights gale against the current. The 17 floats are launched in three groups, guided by the concurrent XBT survey: 1) At a central site (9 floats), where the 10°C isotherm reached 400m; 2.) At an extreme inshore site (4 floats) with 10° at 200m and 3.) in between these two positions (4 floats). At the extreme inshore site the wave motion was reduced because of being on the edge of the current. After the last XBT (22:20) we return to shore
Thursday, 4.12	4:00:	The ship is back in port.
	9:00:	Unloading of ship and prepare for the shipment of our equipment of Cape Town.
	12:00:	The seagoing activities are finished and we depart the ship.
Friday, 5.12	9:00:	Departure for Cape Town.

In conclusion, the execution of this cruise was seriously hampered by the problem of unreliable weather forecasts. In combination with high winds, which are said to be unusual for such a long time during this season, it was difficult to choose a time slot where low swell, waves and wind where to be expected in the Agulhas Current. Most of the time the wind were west- to south-westerly at 20 to 30 kn, against the current except for one day when it blew to the west and with the current. Generally we noted lower wind speeds and shifts to occur at night and early morning (02:00 to 06:00).

When finally at sea, the ship rolled heavily in steep waves due to strong swell from the day and night before against the current. This made it impossible to execute the planned POGO work, especially in view of the lack of any laboratory. Work on deck was hampered by the deck being awash during most of the time, making it impossible to perform the set up of the tracking instrumentation in a safe manner. Further strong motion of the small (28m long) vessel made the necessary laboratory work extremely difficult.

In conclusion the S.A. KUSWAG vessels are too small and inappropriate for the deployment, tracking and recovery of POGO in any other then perfectly calm weather. However, the RAFOS float work can proceed in an orderly manner. Our judgment is that future deployment are better situated off East London, where the Agulhas current is much closer inshore, and its sea state more predictable from ashore.

Table 8: Deployment positions and mission parameters of RAFOS floats

			South	*East*	*GMT, 3.12.1997*		*days*	*g cm^{-3}*
Float	*Argos ID (HEX)*	*Site*	*Launch Latitude*	*Launch Longitude*	*Launch Time*	*Mission End*	*Duration*	*Density σ_θ*
446	B87F9	center	34°41.55'	26°00.36'	17:34	29.01.97	60	27,20
449	B88A9	center	34°41.58'	26°00.14'	17:38	29.01.97	60	26,80
485	B91A1	center	34°41.56'	25°59.79'	17:43	21.09.99	660	27,20
487	B9226	center	34°41.59'	25°59.49'	17:48	21.09.99	660	26,80
489	B9280	center	34°41.56'	25°59.16'	17:52	24.05.99	540	26,80
457	B8A97	center	34°41.59'	25°58.87'	17:57	25.11.98	360	27,20
483	B9107	center	34°41.58'	25°58.54'	18:01	24.05.99	540	27,20
481	B90BE	center	34°41.59'	25°58.17'	18:06	25.11.98	360	26,80
484	B9154	center	34°41.61'	25°57.88'	18:10	24.05.99	540	26,80
486	B91F2	extreme inshore	34°34.01'	25°53.65'	19:29	24.05.99	540	27,20
495	B9437	extreme inshore	34°33.97'	25°53.51'	19:34	21.09.99	660	27,20
490	B92D3	extreme inshore	34°33.89'	25°53.37'	19:37	29.01.98	60	26,80
493	B939F	extreme inshore	34°33.86'	25°53.24'	19:41	21.09.99	660	26,80
491	B9339	inshore	34°38.77'	25°56.04'	20:23	25.11.98	360	26,80
492	B936A	inshore	34°38.76'	25°55.79'	20:26	24.05.99	540	26,80
488	B9275	inshore	34°38.79'	25°55.46'	20:30	25.11.98	360	27,20
494	B93CC	inshore	34°38.79'	25°55.28'	20:34	24.05.99	540	27,20

Table 9: Positions of XBT drops

	latitude S	longitude E	date	time
001	34°07.7'	25°46.1'	12-02-1997	17:05:01
002	34°12.1'	25°48.3'	12-02-1997	17:32:37
003	34°04.7'	25°45.2'	12-03-1997	12:31:45
004	34°11.4'	25°48.7'	12-03-1997	13:12:28
005	34°15.0'	25°50.9'	12-03-1997	13:36:21
006	34°18.6'	25°52.9'	12-03-1997	13:58:58
007	34°23.4'	25°55.1'	12-03-1997	14:31:30
008	34°27.1'	57°56.7'	12-03-1997	14:51:45
009	34°29.8'	25°57.5'	12-03-1997	15:07:12
010	34°33.4'	25°57.8'	12-03-1997	15:26:32
011	34°38.1'	25°55.3'	12-03-1997	15:59:34
012	34°39.6'	25°57.0'	12-03-1997	16:41:52
013	34°41.0'	25°59.9'	12-03-1997	17:07:32
014	34°41.3'	26°00.6'	12-03-1997	17:13:14
015	34°37.6'	25°54.6'	12-03-1997	18:51:49
016	34°34.5'	25°54.0'	12-03-1997	19:19:08
017	34°38.0'	25°55.8'	12-03-1997	20:12:37
018	34°34.3'	25°51.0'	12-03-1997	21:20:43
019	34°25.3'	25°49.3'	12-03-1997	22:20:29

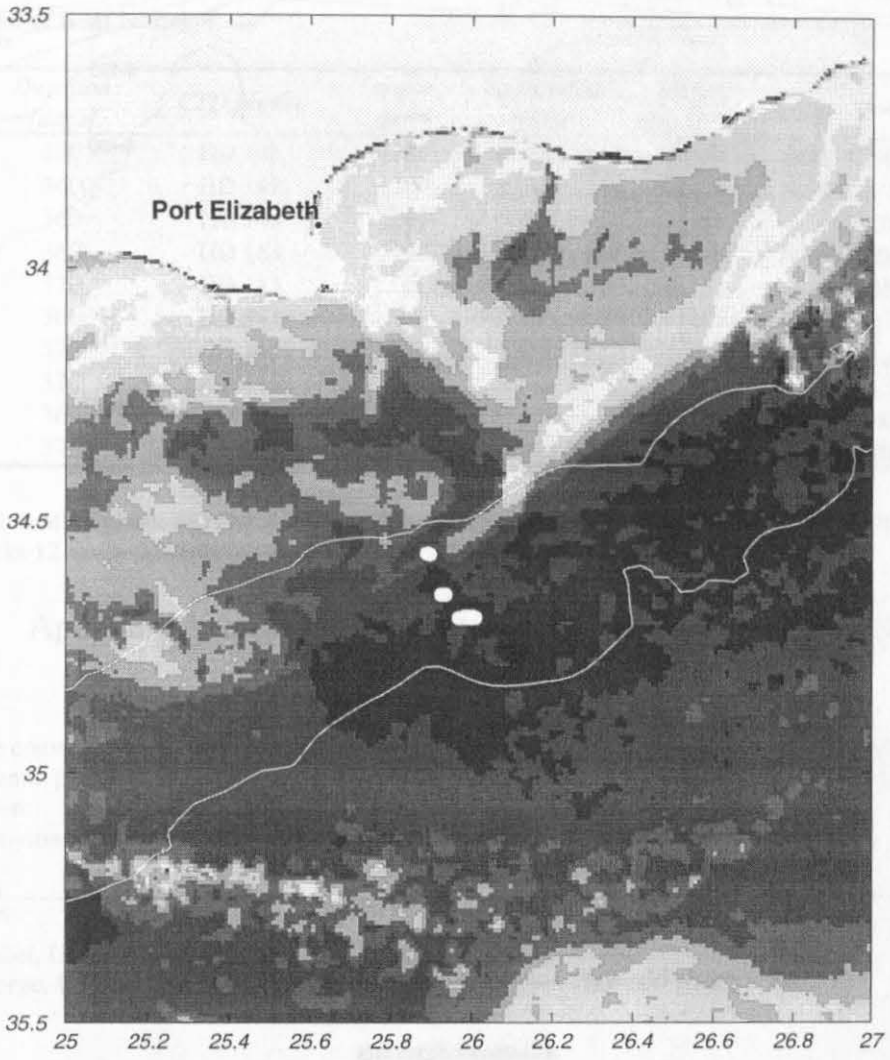

Figure 11: RAFOS float launch positions (white dots) and sea surface temperature on the 4 or 5 December 1997 . Darker (red) hues represent higher temperatures. White lines indicate the 0m, 1000m and 3000m isobaths. The continent is hatched in a light gray.

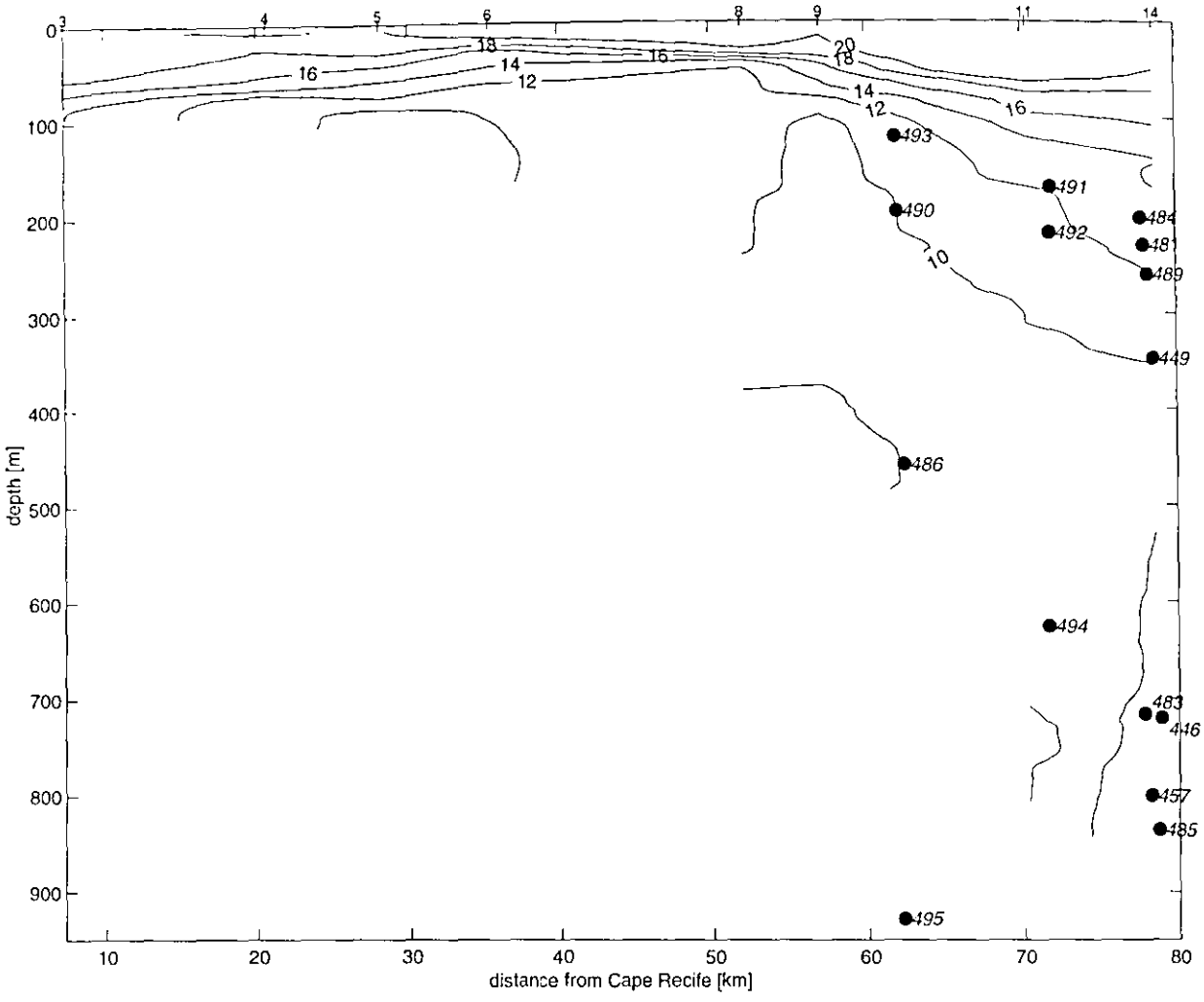

Figure 12: XBT section across the Agulhas Current

Acknowledgments

We would very much like to thank Frederick Theunis the captain of the S.A. KUSWAG V and his crew for their excellent work. They were very helpful in the preparation and execution of the experiment and gave as a warm and kind welcome. Pentow marine (David Murray and Gottfried Needham) did an exquisite job in adjusting the S.A. KUSWAG schedule to our needs. Supplemental funds by the UCT for the hire of the vessel are greatly appreciated. One of us (O.B.) kindly acknowledges his support through the German Alexander von Humboldt-Stiftung.

Appendix 4: cruise report of cruise RV Dr. Fridtjof Nansen 1/98

Table 10: List of float launches:

	Duration [days]	*CTD profile*	*water depth*	*launch date (UTC)*	*launch time (UTC)*	*launch position*	
IfM-92	180	HD 163	1197	11 Feb 98	20:17	S 20°47.38'	E 11° 45.06'
IfM-182	540	HD 149	1207	9 Feb 98	22:08	S 21°47.27'	E 12° 19.91'
IfM-470	360	HD 149	1207	9 Feb 98	22:05	S 21°47.27'	E 12° 19.91'
IfM-471	360	HD 163	1197	11 Feb 98	20:18	S 20°47.38'	E 11° 45.06'
URI-439	570	HD 143	318	9 Feb 98	11:10	S 21°50.18'	E 12° 52.76'
URI-450	360	HD 143	318	9 Feb 98	11:13	S 21°50.18'	E 12° 52.76'
URI-454	570	HD 145	403	9 Feb 98	14:30	S 21°52.12'	E 12° 42.38'
URI-470	570	HD 145	403	9 Feb 98	14:33	S 21°52.12'	E 12° 42.38'
URI-478	360	HD 144	327	9 Feb 98	13:31	S 21°52.00'	E 12° 47.47'
URI-482	570	HD 144	327	9 Feb 98	13:35	S 21°52.00'	E 12° 47.47'

For more information please refer to: Surveys of the fish resources of Namibia, cruise report no. 1/98: Surveys of the hake stocks 12.Jan. – 22. Feb. 1998, by Institute of Marine Research, Bergen, Norway.

Appendix 5: cruise report of research cruise SA KUSWAG I

Dates

In contrast to conventional blue ocean research cruises, this cruise was a land based operation, using an extended stay in Durban to pick a suitable time slot to work in the nearby Agulhas current from aboard S.A. KUSWAG I.
Stay in Durban: Friday, 12 June to Tuesday, 16 June 1998.
Sea going activities: Saturday, 13 June and Monday, 15 June 1998.

Participating Scientists

Dr. Olaf Boebel, University of Cape Town, South Africa, Chief Scientist.
Isabelle Ansorge, University of Cape Town, South Africa.

Objectives

Like the earlier KUSWAG V cruise, this cruise is part of the larger KAPEX project [Boebel et al., 1998], which focuses on the exchange of water at intermediate depth between the Indian Ocean and the Atlantic. To directly observe the pathways of water parcels, this project makes extensive use of RAFOS floats [Rossby et al., 1986]. For navigation, the RAFOS floats use underwater sound which is provided by an array of moored sound sources. The mooring activities have taken place earlier during the Seward Johnson cruise SJ 97/3 in late August 1997. The S.A. KUSWAG I cruises is the second and third out of three RAFOS float deployment cruises, designed to seed the Agulhas Current with these instruments.
The overall goal of this project is to study the exchange of waters between the SW Indian and SE Atlantic Oceans, an exchange that is thought to be an essential link in the global thermohaline circulation. A major mechanism is the well-known formation of Agulhas rings, but small-scale processes such as filaments are also thought to be important, but their quantitative role, especially at depth, is largely unknown. An effective means of visualizing these mechanisms is to use isopycnal RAFOS floats to chart particle pathways in the region of exchange. To this end several releases of floats on the σ_θ = 26.8 and 27.2 surfaces in the Agulhas current have been planned. Since the main objective is to explore loss mechanisms, most floats will be deployed in the central and cyclonic (inshore) sides of the currents rather than on the anticyclonic side where it is assumed that most floats will return into the SW Indian Ocean (unless caught in a ring). This cruise report summarizes the activities of the first deployment cruise.

Narrative of the cruise

Dates in day.month format, times in local time (GMT + 2h)
Friday, 12.6 13:00: Arrival in Durban.

14:00: Arrival at KUSWAG I. Much to our satisfaction the floats were already loaded by the crew. The XBT system is set up and the 3 RAFOS floats are reprogrammed. The remaining 12 floats, that shall be launched the next day are checked and considered O.K.

Saturday, 13.6 7:00: Departure from Durban harbor. The weather conditions are winds less than 10kn, swell 1 m. The 15 floats are launched in three groups, guided by the concurrent XBT survey: a) At a central site (5 floats), where the 10°C isotherm reached 600m; b) At an extreme inshore site (5 floats) with 10°C at 350m; and c) in between these two positions (5 floats) with 10°C at 450m. We arrive back at port at 02:00 the next morning.

Sunday, 14.6 10:00: The second batch of 15 floats is reprogrammed, the XBT sections plotted. We see no clear evidence for an eddy off Durban as visible in the pre-cruise SST data.

Monday, 15.6 7:00: Departure from Durban harbor. The weather conditions are winds less than 10kn, swell 1 m. The 15 floats are launched in three groups, guided by the concurrent XBT survey: a) At a offshore site (5 floats), where the 10°C isotherm reached 700m; b) At an central site (5 floats) with 10°C at 620 m and c) at an inshore positions (5 floats) with 10°C at 520 m. We arrive back at port at 20:00.

Tuesday, 16.6 10:30 Departure from Durban to Cape Town.

In conclusion, the execution of this cruise was significantly easier than the earlier KUSWAG V cruise due to much improved weather conditions.

Table 11: Deployment positions and mission parameters of RAFOS floats

Float Nr.	*Argos (HEX)*	*Site*	*Launch Latitude*	*Launch Longitude*	*Start Date*	*Start Time*	*Launch Date*	*Launch Time*	*Mission End*	*Duration*	*Density*
					m/d/y 1998		m/d/y 1998		m/d/y		
529	B9C9C	centre/south	30°51.0'S	30°56.2'E	5/3	00:30	6/13	13:00	7/26/99	450	26.80
527	B9C3A	centre/south	30°51.5'S	30°55.8'E	5/3	12:30	6/13	13:06	4/27/99	360	27.20
526	B9BC1	centre/south	30°51.7'S	30°55.8'E	5/3	00:30	6/13	13:08	4/27/99	360	26.80
524	B9B67	centre/south	30°52.1'S	30°55.5'E	5/3	12:30	6/13	13:12	1/27/99	270	26.80
528	B9C69	centre/south	30°52.2'S	30°55.4'E	5/2	12:30	6/13	13:14	7/25/99	450	27.20
523	B9B34	inshore/south	30°49.4'S	30°52.0'E	5/3	00:30	6/13	13:52	7/26/99	450	26.80
522	B9ADE	inshore/south	30°49.5'S	30°51.9'E	5/3	12:30	6/13	13:53	4/27/99	360	26.80
525	B9B92	inshore/south	30°49.6'S	30°51.7'E	5/3	12:30	6/13	13:55	1/27/99	270	27.20
519	B9A2B	inshore/south	30°49.8'S	30°51.5'E	6/13	00:30	6/13	13:58	6/7/99	360	27.20
521	B9A8D	inshore/south	30°49.9'S	30°51.4'E	5/3	12:30	6/13	14:00	7/26/99	450	27.20
515	B990A	ext. inshore/south	30°47.3'S	30°47.4'E	6/13	00:30	6/13	14:33	6/7/99	360	26.80
516	B9959	ext. inshore/south	30°47.5'S	30°47.3'E	5/3	00:30	6/13	14:36	7/26/99	450	26.80
517	B99AC	ext. inshore/south	30°47.6'S	30°47.2'E	5/3	12:30	6/13	14:38	1/27/99	270	27.20
511	B9815	ext. inshore/south	30°47.7'S	30°47.1'E	5/3	00:30	6/13	14:39	7/26/99	450	27.20
518	B99FF	ext. inshore/south	30°47.8'S	30°46.9'E	6/13	00:30	6/13	14:41	3/9/99	270	26.80
514	B98E0	offshore/north	30°29.5'S	31°29.4'E	6/14	12:30	6/15	11:10	3/10/99	270	26.80
513	B98B3	offshore/north	30°29.5'S	31°29.5'E	6/14	12:30	6/15	11:12	9/6/99	450	26.80
508	B9745	offshore/north	30°29.5'S	31°29.4'E	6/14	12:30	6/15	11:14	6/8/99	360	27.20
507	B9716	offshore/north	30°29.4's	31°29.5'E	6/14	12:30	6/15	11:16	3/10/99	270	27.20
506	B96FC	offshore/north	30°29.4'S	31°29.6'E	6/14	12:30	6/15	11:18	9/6/99	450	27.20
512	B9846	centre/north	30°22.0'S	31°26.3'E	6/14	12:30	6/15	12:22	6/8/99	360	26.80
509	B97B0	centre/north	30°22.0'S	31°26.4'E	6/14	12:30	6/15	12:24	3/10/99	270	26.80
505	B96AF	centre/north	30°21.9'S	31°26.4'E	6/14	12:30	6/15	12:26	6/8/99	360	27.20
501	B958E	centre/north	30°21.9'S	31°26.5'E	6/14	12:30	6/15	12:28	3/10/99	270	27.20
500	B957B	centre/north	30°21.8'S	31°26.5'E	6/14	12:30	6/15	12:30	9/6/99	450	27.20
496	B9464	inshore/north	30°17.9'S	31°19.9'E	6/14	12:30	6/15	13:17	3/10/99	270	26.80
498	B94C2	inshore/north	30°17.8'S	31°19.9'E	6/14	12:30	6/15	13:19	3/10/99	270	27.20
504	B965A	inshore/north	30°17.8'S	31°19.9'E	6/14	12:30	6/15	13:22	9/6/99	450	26.80
503	B9609	inshore/north	30°17.7'S	31°19.9'E	6/14	12:30	6/15	13:24	6/8/99	360	26.80
499	B9528	inshore/north	30°17.7'S	31°19.9'E	6/14	12:30	6/15	13:26	3/10/99	270	27.20

Table 12: Positions of XBT drops, leg 1

	latitude S	longitude E	date	time
1	29°59.5'S	31°04.3'E	13-6-98	06:02
2	30°07.3'S	30°59.5'ES	13-6-98	07:02
3	30°12.3's	30°56.9'E	13-6-98	07:29
4	30°16.0'S	30°53.2'E	13-6-98	07:58
5	30°21.6'S	30°51.6'E	13-6-98	08:28
6	30°26.7'S	30°49.5'E	13-6-98	08:58
7	30°31.7'S	30°47.0'E	13-6-98	09:27
8	30°35.0'S	30°43.3'E	13-6-98	09:57
9	30°40.5'S	30°40.3'E	13-6-98	10:29
10	30°41.1'S	30°39.9'E	13-6-98	10:33
11	30°44.9'S	30°38.6'E	13-6-98	10:58
12	30°45.4'S	30°39.4'E	13-6-98	11:05
13	30°45.4'S	30°42.8'E	13-6-98	11:26
14	30°47.1'S	30°47.1'E	13-6-98	11:55
15	30°49.1'S	30°51.7'E	13-6-98	12:26
16	30°50.5'S	30°56.0'E	13-6-98	12:54

Remarks: XBT 10 is a repeat of XBT 9 which had a surface spike
XBT 12 is a repeat of XBT 11 which was truncated too early.

Table 13: Positions of XBT drops, leg 2

	latitude S	longitude E	date	time
17	29°56.2'S	31°11.5'ES	15-6-98	06:11
18	29°56.6'S	31°11.9'E	15-6-98	06:15
19	29°58.4'S	31°13.5'E	15-6-98	06:30
20	30°02.8'S	31°15.0'E	15-6-98	06:56
21	30°08.1'S	31°15.5'E	15-6-98	07:26
22	30°08.6'S	31°15.6'E	15-6-98	07:29
23	30°13.2'S	31°16.8'E	15-6-98	07:56
24	30°17.1'S	31.19.5'E	15-6-98	08:26
25	30°21.1'S	31°22.5'E	15-6-98	08:55
26	30°24.7'S	31°26.3'E	15-6-98	09:28
27	30°28.5'S	31°29.5'E	15-6-98	09:56
28	30°32.0'S	31°32.7'E	15-6-98	10:26

Remarks: XBT 18 is a repeat of XBT 17.
XBT 22 is a repeat of XBT 21.
Upon arrival in Cape Town, the data diskette with data from leg 2 was unreadable. Data was recovered with suitable software, but still some profiles and segments had to be discarded. Figure 15 gives the resulting section to the best of our knowledge.

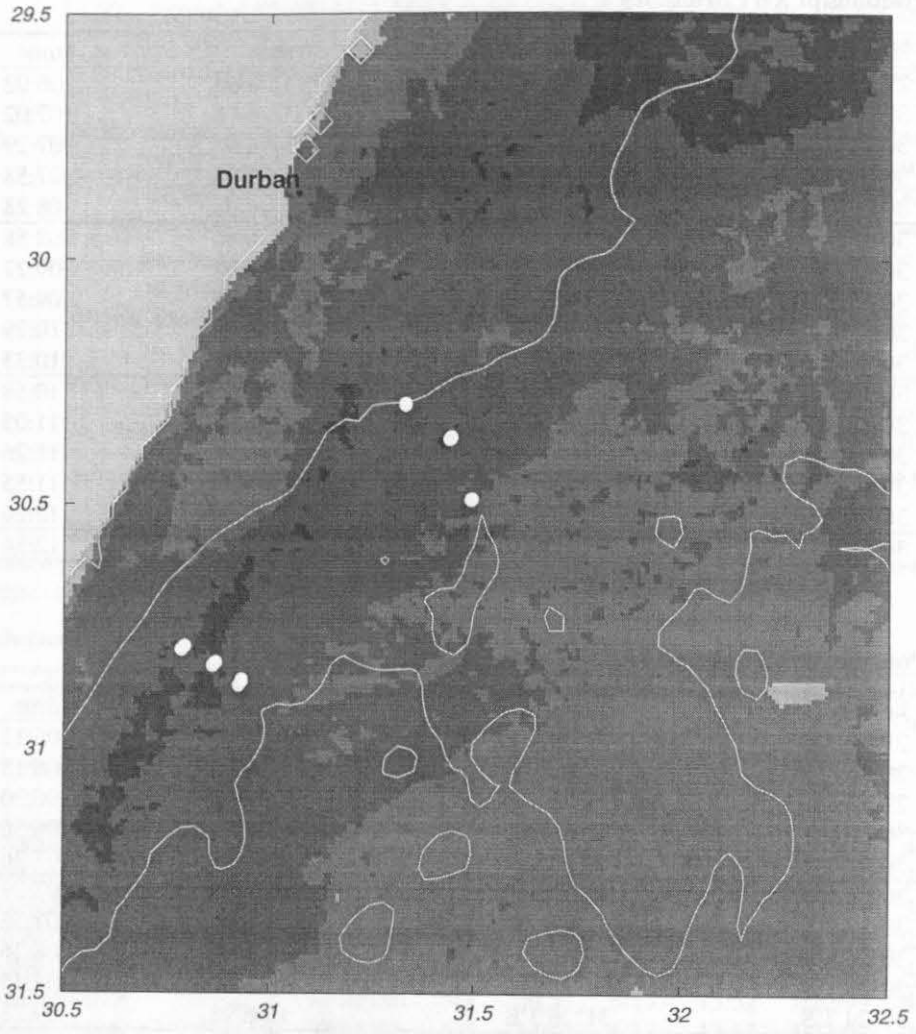

Figure 13: RAFOS float launch positions (white dots) and sea surface temperature on June 14, 1998 (5 day centered composite image). Darker hues represent higher temperatures. White lines indicate isobaths at 0, 1000 and 3000m depth. The continent is hatched in a light gray.

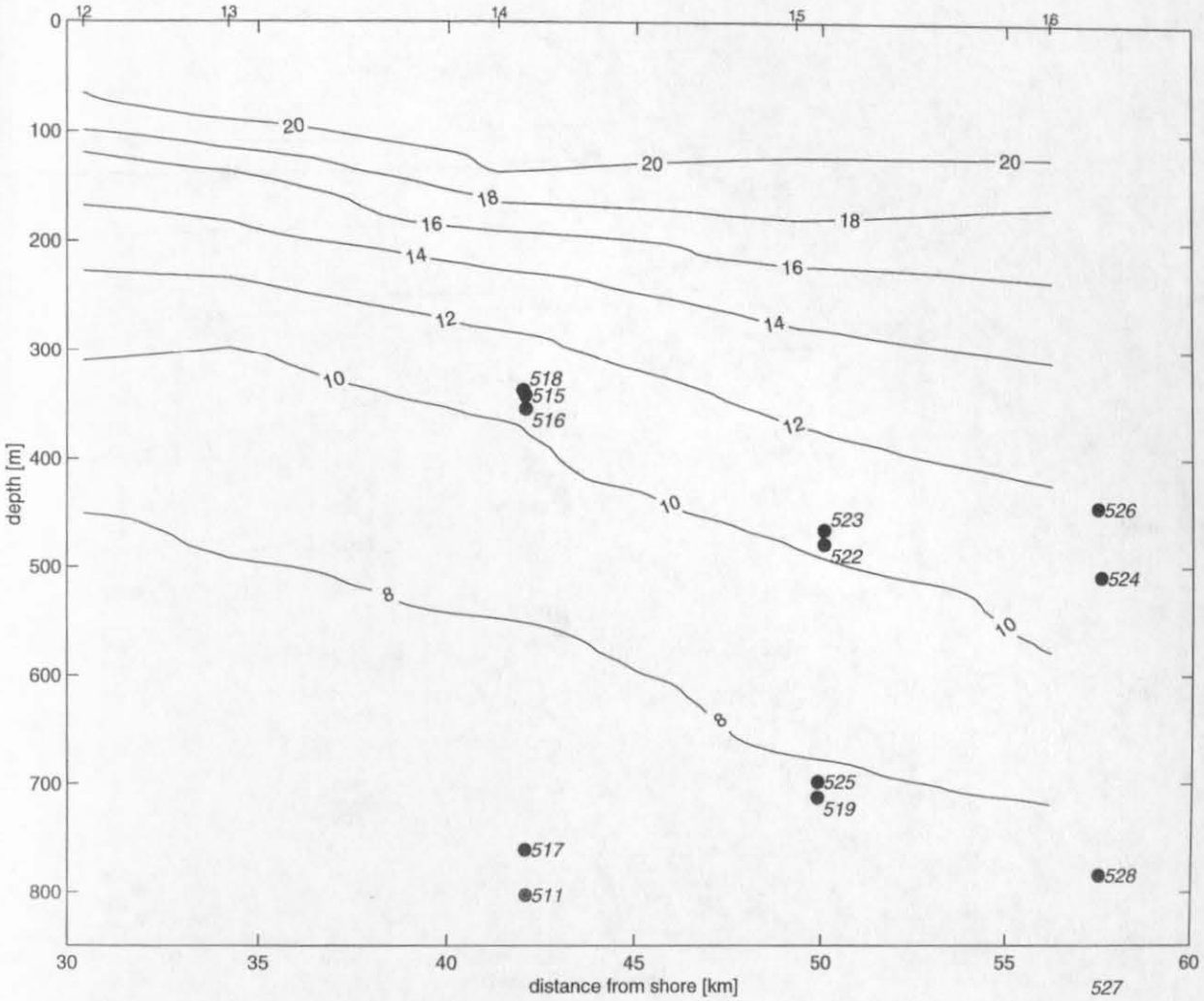

Figure 14: XBT section across the Agulhas current (section 'south')

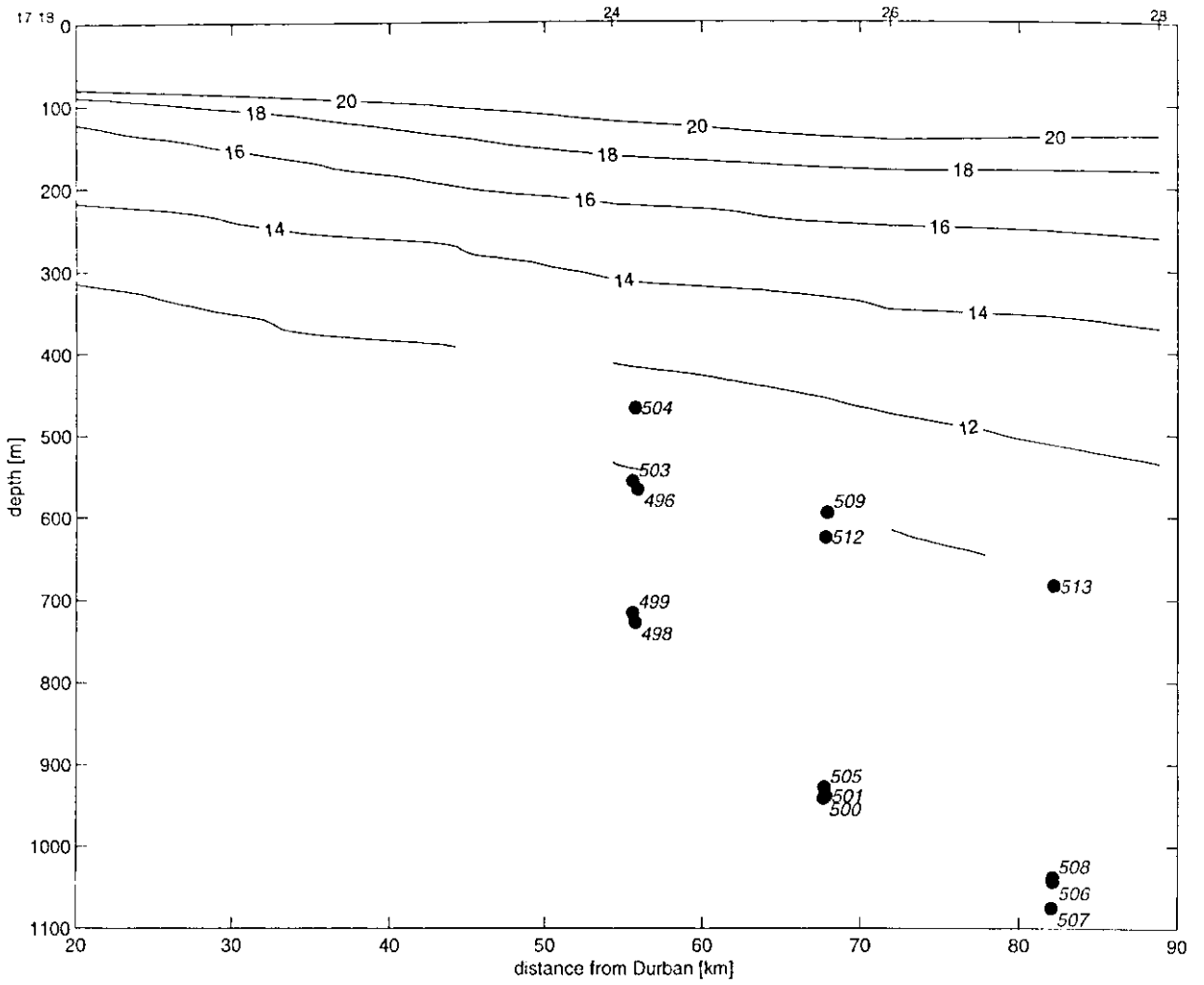

Figure 15: XBT section across the Agulhas current off Durban (section 'north')

Acknowledgments

We would very much like to thank Frederick Theunis the captain of the S.A. KUSWAG I and his crew for their excellent work. They were very helpful in the preparation and execution of the experiment and gave as a warm and kind welcome. Pentow marine (David Murray and Gottfried Needham) did an exquisite job in adjusting the S.A. KUSWAG schedule to our needs. Supplemental funds by the UCT for the hire of the vessel are greatly appreciated. One of us (O.B.) kindly acknowledges his support through the German Alexander von Humboldt-Stiftung.

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