



## Buoy Recovery Techniques

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### South African Weather Service Experience

#### RETRIEVAL OF ARGOS DRIFTER 25790

Courtesy of South African Weather Bureau, for details or questions please contact the South African Weather Service



It was decided to attempt a retrieval of a drifting weather buoy during the buoy deployment voyage from Gough island. The reason being that the manufacturers wanted to find out what the condition of a buoy is after it has been in the sea for a longish period. The buoy which we were to retrieve must have been in the sea for quite some time, and the success of the operation would depend on the weather conditions and the time of day when we reach the buoy.

Four drifters were identified as possible candidates for retrieval. During the buoy deployment voyage the first buoy was bypassed due to bad weather. The second had moved too far from the

buoy deployment course. The third had also moved off course and if we did make a detour we would reach it in darkness. In the meantime the last buoy had moved so far south that it was now almost directly on the return route to Gough island. The weather looked good and we decided to make an attempt to retrieve it.

Month, Position Deployed

- October 1997, 44S 57W
- November 1997, 42S 54W
- December 1997, 46S 54W
- January 1998, 49S 50W
- February 1998, 47S 45W
- March 1998, 48S 40W
- April 1998, 46S 537W
- May 1998, 42S 38W
- June 1998, 42S 32W
- July 1998, 44S 27W
- August 1998, 42S 23W
- September 1998, 43S 20W

Position at end of month

The retrieval exercise lasted about seven hours. The ship reduced speed to arrive at the latest known position of the buoy at first light on 20 September. By that time the latest Argos position was about 6 hours old. We had plotted the movement of the drifter in an attempt to determine the speed and direction in which it was moving, and to estimate where it will be when we get there. The wind was calm with a swell of 1 metre, and visibility was excellent. Wandering albatrosses - which are only slightly smaller than the buoy - could clearly be seen sitting on the water more than a kilometre away, and we were confident that if the buoy was there, we would see it. But we searched in vain. Local eddies and upwellings had rendered our estimate of the buoy's position useless.

(A similar exercise was attempted from the SA Agulhas three years ago with the aid of a borrowed direction finder. Visibility was good but the wind was 25 knots with a 2 - 3 metre swell and many whitecaps. The ship searched a grid covering the area but nothing was seen and the direction finder never made a beep. The buoy would have had to be within about 50 metres from the ship to be seen. The search was called off after eight hours).

An updated fix on the position was requested from our Pretoria office. As it was a Sunday the people who normally work with buoys were not available and we kept our fingers crossed that they guys who were on duty would know how to find the correct information. But this time luck was on our side. A new position was received about ten minutes before we were due to terminate the search. The new fix was two hours old and placed the buoy about 6 nautical miles from our present location.

The ship steered towards the new fix and the buoy was spotted about 15 minutes after our arrival at the new position.



In rough sea it would have been impossible to see the drifter (click on picture for close up look at the drifter).

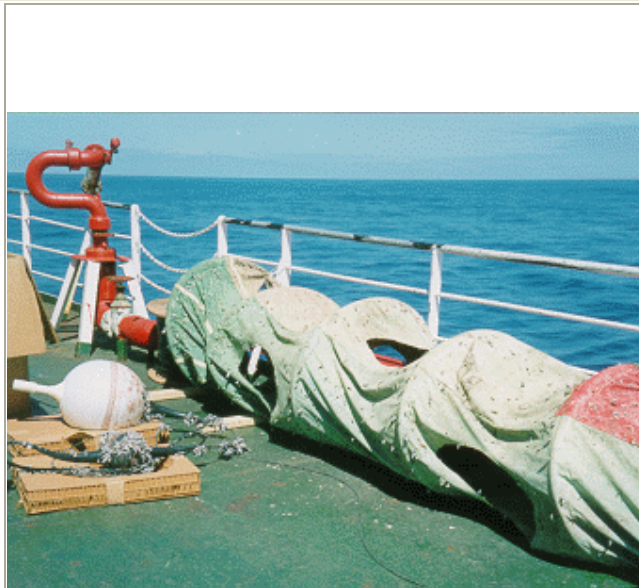
The ship moved closer to the drifter until it was alongside, and it was hauled on board by the crew, and displayed on deck. It seemed in a very good condition. All the paint and markings on the float were gone. The drogue had a small tear, and a number of mussels were clinging to the float, cables and drogue. There were no seaweed or other marine life attached to it. It was still transmitting.



The retrieved buoy is being hauled on board



The float on deck - at last!



The drogue was stretched out on the top deck to dry and get rid of the smell of dying mussels before we reach Cape Town  
(click on picture for close up view)

And they said it couln(t be done ...

The retrieved drifter will be returned to the manufacturer for analyses and we await their findings with interest.

## Meteorological Service of New Zealand Experience

Any agency which deploys Drifting Buoys may wish to try to recover failed or beached buoys for future reuse. Establishing a Recovery Plan will help agencies to be prepared. The following notes are based on MetService New Zealand Ltd's extensive experience with the recovery and refurbishment of FGGE style Drifting Buoys.

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### Recovery Plan

1. Mark Buoys with Owners name/contact details
2. Mark Buoys with ID number for easy identification (a plate bolted to the flange stamped with Buoy ID number, owner's name and phone number, has proved to be very effective)
3. Consider offering a reward incentive to finders. Mark Buoys with "Reward may be Payable" to encourage finders to report location

### Reward Payment

Based on the value of the buoy to the owner, establish a range of reward payments that might be paid to a finder. The reward scale might be based on the age and condition of the buoy. eg.

- New and fully operational – highest reward
- Old and no longer reporting (useful for parts only) lower reward

The scale will not apply in every case, but can be used as a guide. Every recovery is unique as both the condition of the buoy and the circumstances of the recovery will be different.

eg. MetService NZ Ltd pays a reward to a finder for reporting and securing a buoy, but may also pay expenses to the finder if they assist further by moving or storing the buoy.

### Position Monitoring

During a buoy's operational lifetime monitor its position so that steps can be taken to recover the buoy when it nears the coast. If a buoy is likely to beach in an accessible position, it may be possible to recover it directly from the beach. If the coastline is remote or rugged and the buoy is likely to be damaged on beaching, it may be best to attempt to recover the buoy from the sea.

### Sea Recovery

1. Alert coastguard, fishing clubs and local shipping that a buoy is in the area and advertise that the owner would like it recovered if it is sighted.
2. Obtain the latest buoy position from Argos Login and relay the position to ships in the area.
3. When the buoy is located, marine growth may make the buoy too heavy for a small craft to lift onboard, so the buoy may need to be towed into the nearest harbour.
4. Advise recovery ship of correct handling to prevent damage to buoy, eg. lift below antenna/hull flange to avoid damaging fibreglass antenna section.



### Beach Recovery

1. In populated areas, someone will soon report finding a beached buoy.
2. In remote areas it may be necessary to advise local communities or fishermen of the buoys approximate location and ask for assistance to look for the buoy.

3. Once located seek the co-operation of the finder to secure the buoy. Marine growth will need to be scraped off the buoy to lighten the weight, before removing from the beach on a truck or trailer.
4. Advise finder of correct handling to prevent damage to buoy, eg. lift below antenna/hull flange to avoid damaging fibreglass antenna section.

### **Stop Data Processing**

As soon as buoy has beached or been recovered remove the buoy from Argos GTS processing to stop the distribution of the data worldwide.

If the buoy is processed by an LUT remove the ID from LUT processing.

### **Post Recovery Examination and Testing**

1. Return recovered buoy to owner's agency for dismantling or send agency technician to recovery location to dismantle and collect the buoy.
2. Note external condition of buoy hull, sensors and drogue (if fitted) for any signs of wear, corrosion or deformation.
3. Before powering down buoy, check buoy outputs using portable Satellite Uplink Receiver. Compare sensor outputs with reference sensors.
4. Compare post recovery calibrations with pre-deployment calibrations to determine sensor drift during operation.
5. Check out/test any sensors that were 'flagged' as defective during the buoy's operational lifetime to determine the cause of the bad outputs.
6. Power down buoy before disconnecting antenna from PTT.

### **Refurbishment**

Is Buoy suitable for refurbishment and future redeployment ?

1. Check buoy's operational history and the results of the post-recovery calibrations.
2. Replace any sensors that are faulty.
3. Install new battery pack and replace any other worn or missing components eg. drogue line and weight
4. Calibrate again prior to deployment.

### **Benefits of Recovery**

1. Cost Effective – refurbishment produces a 'new buoy'.
2. Data Verification – comparison of post recovery sensor calibrations with pre-deployment sensor calibrations will show any sensor drift. It may be interesting to compare the 'actual' drift (or sensor accuracy) with the model statistics produced for that sensor during its operational lifetime. Special attention should be paid to sensors that have been highlighted by the models or BUOYQC feedback as unreliable to see if this is borne out in testing.
3. Product Improvement – Recovered buoys present the opportunity to examine component and sensor performance. Identification of faults and weaknesses in recovered buoys has led to modifications and improvements being implemented by manufacturers. Feedback to

manufacturers from MetService NZ Ltd has resulted in improvements to anemometer bearings, drogue attachment fittings and power supply line reliability.

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