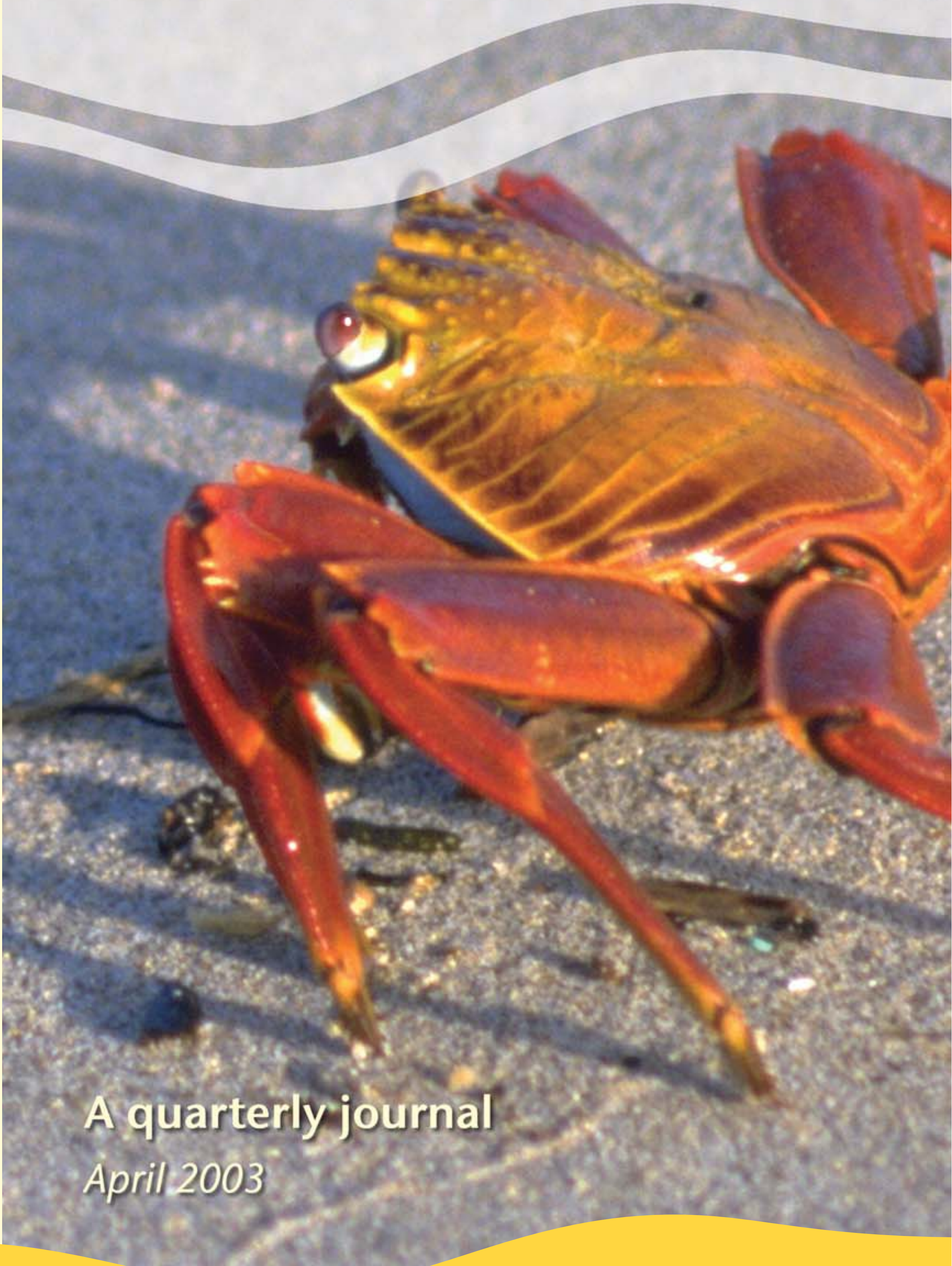
# The Marine Observer

Met Office



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# The Marine Observer

Vol. 73 No. 360 April 2003

## Contents



LONDON: THE STATIONERY OFFICE


This section of *The Marine Observer* comprises reports of interest and scientific value which have originated from the following sources:

- completed ships' meteorological logbooks or individual correspondence;
- e-mails and CDs direct from ships, or from individual observers;
- additional observations files associated with TurboWin records;

All reports are welcome in the Observation Supply section of the Met Office and, wherever possible, they are forwarded to the relevant sources of expertise for comment and analysis. Reports are also welcome from ships recruited to observing fleets other than that of the UK.

All temperatures in this publication are given in degrees Celsius unless otherwise stated, and the barometric pressure is given in millibars (mb) although the standard international unit is the hectopascal (hPa) which is the numerical equivalent. Where mentioned, 'mile' and 'miles' are to be taken as the nautical measurement.

## m.v. *P&O Nedlloyd Drake*

- **5 April 2002**
- **Captain K. Worthington**
- **At Masan anchorage, South Korea**
- **Observers: S. Foster (2nd Officer)**
  **A. Farthing (1st Officer)**
  **G. Taylor (3rd Officer)**

**Bat:** On arrival at Masan anchorage following a three-week lay-up period off Qingdao (China), a bat was reported to have been trapped between a plastic patio chair and the accommodation hand rail. Subsequent investigation confirmed that the bat was obviously in distress.

The bat's body was covered with short dark-brown fur which became longer and thicker around its head and shoulders, but its face was free of fur and was slightly darker. There was a single row of quite sharp looking teeth on the upper and lower jaws, with two slightly larger canine teeth in the upper jaw. The bat's wing-span was estimated at 210 mm, while its body was approximately 40 mm wide and 110 mm long. Skin extended from both 'ankles' to the tip of the tail, totally enclosing it.

After an initial attempt to free the bat failed owing to frantic flapping and the high-pitched screeching noise which it made on any move to free its trapped wing, a second and more gentle approach was made. This time the bat managed to free itself and then fell the short distance to the shaded deck where it was left to recover. Frequent checks made on it during the next couple of hours revealed it remaining very still initially, at which time the general consensus of opinion was that it would not survive. However, despite this pessimistic view the bat moved and, on the last inspection, was nowhere to be found on the deck. It was assumed that the bat had recovered enough to fly to a much cooler place in which to rest until dusk.

## m.v. *Toisa Coral*

- **11 April 2002**
- **Captain K.J. McClymont**
- **Strait of Malacca**
- **Observers: Captain McClymount**
  **C. Williams (Chief Engineer)**
  **A. Sage (Chief Officer)**

**Whales and dolphins:** On the morning of the 11th the vessel was in position 05° 49′ N, 96° 30′ E, heading 287 ° and travelling at 11 knots in slight seas. The skies were clear, and the water depth was around 1,300 m. At 0330 UTC, two whales were observed approximately half a mile ahead of the vessel on the starboard bow.

They were heading slowly in a westerly direction, and were passed by the ship at 400 m on the starboard side. The whales' dive sequence occurred every 15 – 20 seconds; first the head popped up almost clear of the water, then dipped down, and the bulk of the body would then arch out of the water, but no tail was observed. The body colour was dark-brown, showing no signs of any scarring, while the head was small and dolphin-like in shape, with some white or cream colouration around the sides. The dorsal fin was quite prominent. It was estimated that the whales were between four to five metres in length, and were possibly of one of the beaked species.

On the 14th at 0500 UTC, in position 05° 50′ N, 81° 26′ E, again in slight seas with good visibility, a pod of 30 or so dolphins were spotted one mile ahead of the vessel. They were clearly visible due to the amount of acrobatics being performed, including backward somersaults and clearing the water by approximately three metres. As the vessel approached, the majority of the pod headed straight for it, and then about 10 or so individuals were observed bow-riding.

The dolphins leapt clear of the water before landing on their sides, and could be easily identified as striped dolphins. After about five minutes they tired of bow-riding and veered off to rejoin the rest of the group which continued the display astern.

## m.v. *Mairangi Bay*

**Seals:** On 18 April 2002 the ship was in the Cape Town replenishment area when large numbers of seals were seen along both sides by the ship's company. There were approximately 60–80 seals in total, all very curious about the *Mairangi Bay* and the replenishment vessel, and remaining in very close proximity throughout the 45-minute period of activity. The seals varied in length from roughly one to two metres.

## m.v. *Kiribati Chief*

- **17 May and 15 July 2002**
- **Captain H.C. Ratcliff**
- **Bismarck Sea**
- **Observers: S. Edwards (3rd Officer) N.M. Hennessy (Chief Officer)**

**Fireballs**: On 17 May whilst on passage from Brisbane to Noumea, a bright-green flash (bearing 035°) lit up the sky at about 1146 UTC. Lasting for roughly two seconds, it was slightly below Vega (bearing 046°) and fell at high velocity, illuminating the surrounding area. The Third Officer wondered if the sighting had been caused by a satellite re-entry since the object was much brighter than any of the surrounding stars and planets. The vessel's heading at the time was 070° in position 22° 50′ S, 164° 50′ E.

Another, more spectacular, fireball was witnessed by Chief Officer Hennessy on 15 July when the vessel was on a heading of 189° in position 18° 26′ S, 157° 41′ E in the Coral Sea. At 1859 UTC a green flash lit up the surrounding sea area just as the observer was preparing an early morning cup of coffee. As he had never before seen 'green lightning' he first checked the coffee for hallucinogenic substances before going out to the bridge wing to investigate!

A falling object was then sighted in the morning twilight sky, initially observed at 80° declination, bearing 030°. It had a very pronounced tail which was coloured bright white nearest the main body, before changing to orange/yellow about half-way along, and then turning a 'fuzzy' green at the end. The fireball, then at a declination of about 50°, bearing 055°, disappeared behind clouds. However, its tail lingered for a few seconds before dissipating. The whole phenomenon lasted nine seconds.

*Editor's note*. The *Kiribati Chief* is recruited to the Australian Volunteer Observation Fleet.

## m.v. *Pacific Pintail*

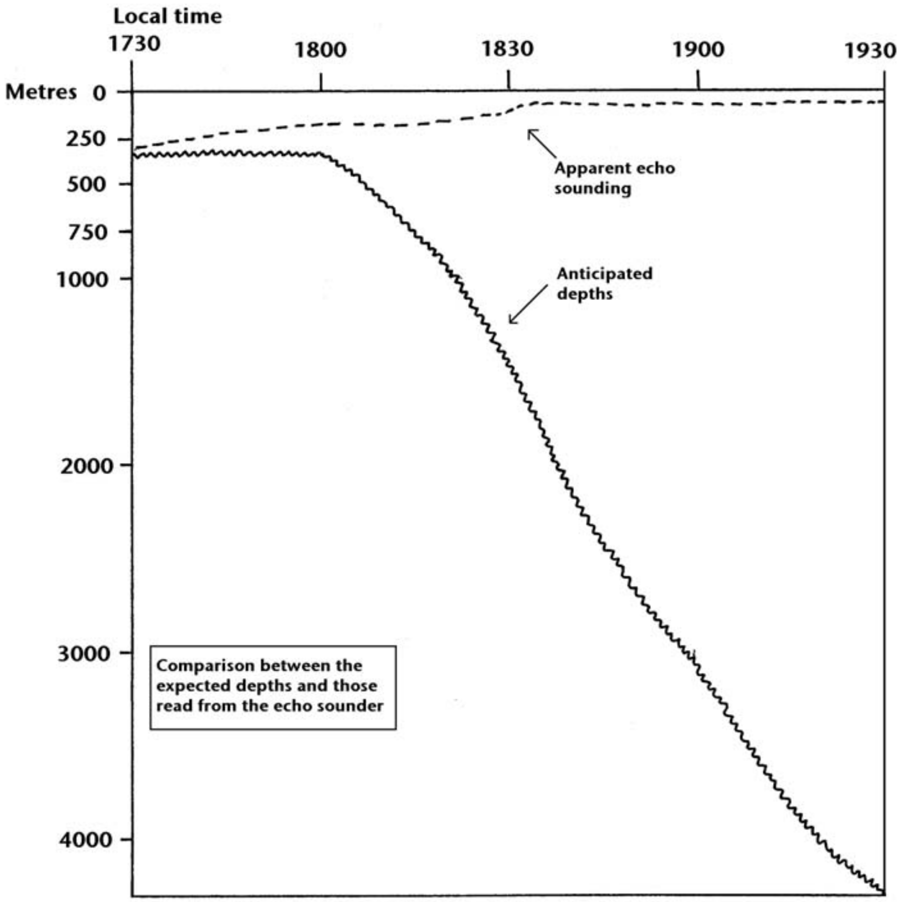
- **18 May 2002**
- **Captain A.G. Lacey**
- **Eastern North Pacific**
- **Observers: Captain Lacey Members of the ship's Company**

**Spurious soundings:** The ship was on a heading of 280°, roughly in line with the Clipperton Ridge, at a speed of 14 knots. One echo sounder was running continually on the range of 0–500 m, with periodic changes of range to check for deeper soundings. It was known that the ship's position (approximately 10° N, 110° W) lay within the 1,000-m contour but with a scarcity of charted soundings, the nearest one shown was 393 m.

From about 0000 UTC soundings in the region of 270 m were shown, which was plausible and strong enough not to be ignored (although the trace was not as crisp as would be expected from this depth).

At 0135, as the trace then showed 100 m and reducing, the ship's course was initially altered to 000°, then to 340°, which disturbed the trace. The amended course should have led to rapidly increasing depths, but the trace continued to shallow until 0205 when it steadied at around 60 m for several hours.

The graph opposite shows the comparison between indicated and expected depths.




A stronger trace and multiple echoes would have been expected at a genuine depth of 60 m, but were not evident. The ship's positions were checked by several methods and appeared correct, and the course of 280° was resumed at 0245. It was thought that a thermal layer or a variation in salinity caused the event.

## m.v. *Teno*

- **31 May 2002**
- **Captain S.P. Harris**
- **Indian Ocean**
- **Observers: Captain Harris**
  **W.U.C. Mendis (2nd Officer)**
  **I.U.M. Mahotty (3rd Officer)**
  **M.S. Gunaseera (Cadet)**

**Tide rips:** The ship was on passage from Davao (Mindanao) towards Sharjah and, at 0600 UTC was in position 06° 14.7′ N, 94° 35.2′ E (passing from the Strait of Malacca into the Indian Ocean).

At this time four to five miles ahead of the ship a stationary line target about four miles long and lying north–south, was observed on the radar. When searching this area visually, a line of disturbed water that exactly matched the radar observation was seen.

Suspecting that the *Teno* was about to pass through a tide rip, a series of observations was made: at 0608, with the tide rip three miles ahead, the ship was making 16.3 knots (engines 94 r.p.m.), and steering 269°, while the sea temperature was recorded as 31°. The tide rip was crossed at 0619 with no changes noted to steering or speed. At 0624 the ship's speed dropped noticeably to 14.8 knots and the sea temperature fell to 30.3°. After a further 20 minutes, the speed had come back to 16 knots (still at 94 r.p.m.). At the position of the tide rip the sea conditions were 'force 2' with very low swells which made the disturbed water clearly visible.

## m.v. *Pacific Swan*

- **5 June 2002**
- **Captain G.P. Farrell**
- **North Pacific Ocean**
- **Observers: J. Anderson (3rd Officer)**
  **B. Worthington (2nd Officer)**
  **M. Sharpe (SG1A)**
  **L. Rogers (SG1A)**

**Bioluminescence:** Between 1200 UTC and 1600, when in approximate position 34° 00′ N, 147° 24′ E, bioluminescence was noted around the ship. The intensity was exceptionally bright, consisting of a green light which spread out from the bow wave to about five metres from the hull, and along 80 m of the ship's sides. During the observation, small flashes of light were seen in the calm water immediately ahead of the bow wave, but between the bow wave and the hull there was simply a milky-white glow with no flashes.

Random flashes of the extremely bright luminescence were also visible some miles away from the ship, and it was thought that these could have been caused by dolphins or large fish breaking the surface.

*Editor's note.* Professor P.J. Herring, of the Southampton Oceanography Centre, said of this report:

"The observers describe the effects of sailing through a dense population of tiny dinoflagellates. By day the patch might have had a pinkish tinge and appeared as a 'red tide'. 'Blooms' of these organisms are not uncommon in this region, and the distant bioluminescence was probably dolphins or other large animals breaking the surface. Other vessels would have produced bow waves also visible from a great distance."

## m.v. *Franconia*

- **14 June 2002**
- **Captain K.D. Mandal**
- **Gulf of Mexico**
- **Observers: Captain Mandal**
  **G.C. Sekhar (2nd Officer)**
  **S. Ball (3rd Officer)**

**Waterspout:** The ship had been experiencing light airs with cloudy skies prior to the observation, and then a squall was noticed on the radar. It was about three miles away (vessel's position 22° 10′ N, 93° 28′ W and approaching from the north-west, but no waterspout was visible at this stage. At 2015 UTC when the squall was about two miles away, a waterspout was clearly visible ahead of it. The waterspout was distinct from a height of about eight metres above sea-level, and extended up to thick, greyish cumulus cloud based at about 200 feet. At the sea surface, the base of the waterspout was not clear, but the churning water where it met the sea was obvious and had a diameter of roughly two metres.

The waterspout passed the ship at a distance of half a mile, leading the squall. During the squall itself, gusts of wind up to 30 or 35 knots were experienced accompanied by heavy rain showers and poor visibility. After it had passed, the weather returned to the earlier conditions.

*Editor's note.* The *Franconia* is not a UK Voluntary Observing Ship.

## m.v. *Canelo Arrow*

- **19 June 2002**
- **Captain P. Moseley**
- **Indian Ocean**
- **Observer: Captain Moseley
A. Jarbadan (2nd Officer)
P. Linardic (Electrician)**

**Whales:** The ship was in position 26° 48′ S, 35° 54′ E bound for Maputo from Sharjah in fairly calm conditions, a large disturbance was seen off the starboard bow at 1245 UTC. Closer inspection with binoculars revealed the underside of a large upright tail projecting from the water. The tail was spread wide for one or two metres and was white with black 'trim'; it was observed in the same position above the water for around 20 seconds.

Another whale in close proximity then launched itself almost clear of the water. This one had a very heavy build, was at least 15 m long and had a small, gently sloping dorsal fin set well back on its body. It had a black, or very dark upper body with a mottled — practically white — under body. The head was bulky and appeared to be heavily covered with a barnacle type growth.

Their behaviour continued as the vessel approached, with the one whale appearing to be passive while the other was much more active — either launching itself out of the water which, for such a large creature, was truly a spectacular sight — or rolling just under the surface of the water, displaying its 'two-metre plus' flukes above the surface.

As the vessel closed further, this activity stopped and a pair of whales and what appeared to be a juvenile whale were seen headed in the opposite direction to it, passing about 75 m away. Dorsal fins and a section of their backs were all visible as they did so, the two larger whales occasionally blowing. Once the ship was clear of the whales, their earlier behaviour, described above resumed.

It was assumed by the observers that the vessel had interrupted some form of courtship ritual but the presence of the much smaller whale was deemed a little odd for this kind of behaviour.

## *Cormorant Alpha*

- **21 June 2002**
- **Oil Installation Manager D. Kempton**
- **North Sea**
- **Observers: S. Martin<br>M. Murray<br>Dr R. Cheesman**

**Killer whales:** At approximately 1120 UTC the Master of the *Grampian Falcon*, the standby vessel to the *Cormorant Alpha* platform, reported that a pod of killer whales was in close proximity to the platform. On investigation, a pod of possibly six killer whales and a calf was indeed visible from the helideck to the north side of the platform, and was about 500 m away. The Master also reported that there had been a much larger pod to the south side earlier but it had obviously split up whilst chasing herring and mackerel. The markings of the killer whales were clearly visible as they moved effortlessly in and out of the water. The pod circled the platform and then headed west-south-west. The *Cormorant Alpha* is located in 61° 06′ 09′′ N, 01° 04′ 22′′ E.

## m.v. *Resolution Bay*

- **28 July — 1 August 2002**
- **Captain M. Moore**
- **Indian Ocean**
- **Observers: S. Foster (2nd Officer)<br>J. Broughton (3rd Officer)**

**Propagation:** When four days out of Fremantle on a passage from Cape Town the vessel began to receive Navtex messages from various sources including Singapore, Bahrain, and Bangkok. On the 31st however, when the ship's position was 35° 10′ S, 87° 15′ E, a message originating in Japan (timed at 1300 UTC) travelled the greatest distance — having covered 5,179 miles at the time of receipt (around 1530 UTC that day). On 1 August a message originating in Malaysia was received, having covered 2,345.2 miles.

These distances were well beyond the expected maximum range of 400 miles given in the instruction manuals for the reception equipment. The only explanation for the extraordinary range of the messages was propagation of the radio waves. At the time, the vessel was in the middle of an anticyclone that spread over a vast proportion of the southern Indian Ocean — the pressure varying between 1031 mb and 1033 mb. The sea temperature was 13.7°, the dry-bulb read 13.0° while the wind was SW'ly, force 3.

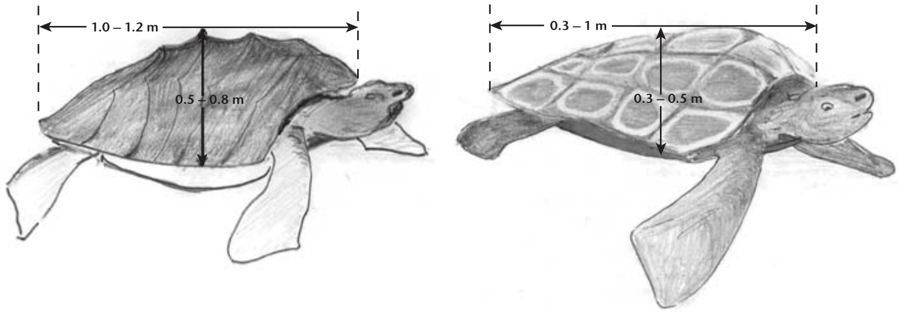
## R.M.S. *St Helena*

- **23 August 2002**
- **Captain D.N.R. Roberts**
- **North Atlantic Ocean**
- **Observers: Captain Roberts<br>R.Young (Chief Officer)<br>M. Henry (Cadet)**

**Turtles:** A large number of turtles, approximately 50–60, were sighted throughout the 4–8 watch during the afternoon. There appeared to be two types of turtles, as depicted in the sketches made on board. Both paddled at the surface, some in a northerly direction while others headed south. Even when passing within metres of the vessel they showed a reluctance to dive below the surface, and simply allowed themselves to be jolted along in the ship's wake.

The sizes of the turtles varried. 'Type 1' (the larger of the two, shown in the left-hand sketch) had a shell size of about one metre long by 50–80 cm across. It was assumed that the longer ones were adults, of which at least 10 were sighted. Their shell colour was a dark grey-green and there were three distinctive ridges along the centre of the shell.

The 'Type 2' turtles had more rounded shells, estimated to be 30–100 cm long and 30–50 cm wide. The colour of these was a pale rusty-brown and also evident was a well-defined 'square' pattern.




The ship's course at the time was 170° at 14.6 knots in light airs and calm, rippled seas. When the turtles were sighted the ship's position was 31° 29.6′ N, 16° 33.6′ W, and they were last seen at 30° 33.6′ N, 16° 39.4′ W.

*Editor's note.* Dr Graeme Hays, of the University of Wales, Swansea, thanked the observers for this report, commenting:

"I am not sure what species the turtles would be from the drawings. Usually it is immature (small) turtles that have the ridges on the shell, not larger ones as described. So it would probably need some photos to be able to make a positive identification. However, it is quite well known that in this area around Madeira and the Canary Islands, juvenile loggerhead turtles (mostly originating from Florida) are seen. They will have been carried across the Atlantic within the North Atlantic Gyre and eventually make their way back to the east coast of the USA. So my best bet would be that these were loggerhead turtles.

"I am also unsure why there would be so many congregated in one place, but this might be due to some affect of the oceanography leading to a local aggregation, e.g. associated with lots of food."

## m.v. *P&O Nedlloyd Kobe*

- **9–10 September 2002**
- **Captain J.L. Peterson**
- **Luzon Strait**
- **Observers: Captain Peterson**
  **T. Oliver (Chief Officer)**
  **I. Renders (2nd Officer)**
  **A. Graham (3rd Officer)**
  **Ship's company**

**Tropical depression:** The vessel was in the Bashi Channel in position 22° 24′ N, 123° 25′ E on passage from Shimizu towards Singapore. At about 0300 UTC rain clouds were observed on the radar screen and visually on the port side. As the clouds approached, so the visibility began to reduce and, by 1230, heavy rain showers were being encountered which further reduced the visibility to less than a mile at times. There were continual showers throughout the afternoon, some of them quite heavy.

By 1100 the rain was at its heaviest and continued for three hours during which time the visibility varied between less than one mile and four miles, depending on the intensity of the rain. The wind, however, was light and variable but would quickly increase in the squall-like conditions.

It was noted that the pressure remained fairly steady throughout, although there was a 'dip' as the vessel passed the Philippine Islands, and it was thought that the ship had passed through a tropical depression. This was supported by a weather fax received from Tokyo at 1500 which indicated a stationary area of low pressure south-west of Taiwan, while the next weather fax six hours later showed a tropical depression where the ship had recently passed. During the morning 12–4 watch, with the wind by this time W'ly, force 6, the rain stopped and the visibility improved.

## R.R.S. *James Clark Ross*

- **24 September 2002**
- **Captain C.R. Elliott**
- **South Atlantic Ocean**
- **Observers: R. Paterson (Chief Officer)**
  **P. Adams (Cadet)**
  **Dr A. Baker (Scientist, University of East Anglia)**

**Bioluminescence:** On passage from Grimsby, the ship was approaching Ascension Island from the north-north-west when several bands and patches of bioluminescence were observed between approximately 0500 UTC and 0530. The stationary, parallel bands were estimated to be between about four and five metres wide, stretching as far as the eye could see on both sides of the ship, and lying between 110° and 290°. The bands and patches were composed of dense concentrations of discrete organisms, having the appearance in both intensity and size to small green diode indicator lights. The ship's searchlights and the Aldis signal lamp were shone on them but no apparent effect was observed. Sampling was also attempted, but was unsuccessful owing to the speed of the ship.

The ship's position at the start of this observation was 07° 09.5′ S, 14° 33.9′ W; its ground track was 169° at a speed 12.2 knots. The night was dark, with about seven oktas of thick cloud cover and no moon. There had previously been very light rain showers, hence the presence on the bridge of Dr Baker, who was attempting to collect rainwater samples.

The wind at the time was from 140° with an estimated speed of 17 knots. Other variables were: air temperature 23.5°, wet bulb 20.3°, seawater temperature 24.6°, pressure 1014.2 mb.

*Editor's note.* Professor Peter Herring commented:

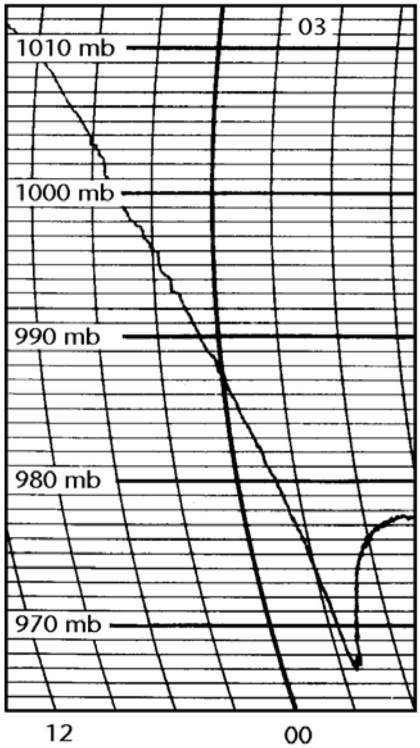
"This report is interesting because although bands of bioluminescence are frequently reported (usually as windrow accumulations of organisms) it is unusual for such a density of discrete sources ('...small green diode indicator lights.') to be responsible. I am not clear from the description whether each source was glowing steadily or giving shorter flashes. If it was glowing I expect the bands contained many small pyrosomas; if it was flashing I could only guess that accumulations of small jellies were responsible, whose flashes would have given a similar appearance."

## m.v. *Colombo Bay*

- **2–5 November 2002**
- **Captain L. Johnson**
- **North Pacific Ocean**

- **Observers: Captain Johnson**
  **C. Moss (2nd Officer)**
  **Ship'scompany**

**Depression:** On passage from Seattle towards Kaohsiung the vessel passed through a number of depressions. The largest of such was first encountered around 1500 UTC on the 2nd when the barograph trace started to fall at an alarming rate, as shown. Weather faxes obtained from Point Reyes and Honolulu indicated that the ship was proceeding towards an on-coming depression, with winds of storm force to be expected.




By 0500 on the 3rd, the wind was SSE'ly, force 7 while the pressure was 986.1 mb and the dry-bulb temperature was 14°. Three hours later the observers recorded a minimum pressure of 967.9 mb in position 48° 29′ N, 150° 55′ W. At that time the wind was observed to be SW'ly, force 11, becoming force 10 by 1400. The dry-bulb by then read 9°.

By 2100 the wind had veered to WxS'ly, force 10, causing the seas to act directly on the bow. As a result, speed was reduced and frequent alterations of course were made to ease the stress of weather.

On the 4th at 0200, conditions started to improve — the pressure had risen to 978.8 mb, while the wind had eased to SW'ly, force 8. Such severe conditions did not return during the day, although a stormy period was again experienced between 1900 on the 4th and 0300 on the fifth when winds of force 9 and 10 were encountered. In all, the ship was obliged to proceed at reduced speed for three and a half days.

## m.v. *Al Zohal 1*

- **4 November 2002**
- **Captain D.S. Winser**
- **Celebes Sea**

- **Observers:**
  **Y.M. Karanasundara (Chief Officer)**
  **W.M. Wijeratne (Deck Cadet)**

**Waterspout:** The ship was on passage from Davao towards Sharjah in position 05° 54′ N, 124° 12′ E when, at 2300 UTC, a well-developed waterspout was observed five points on the port bow. It was at an approximate distance of five miles from the ship. There were showers in the vicinity from cumulonimbus clouds, and these might have obscured the formation of the waterspout since it was fully developed when first

Anon

observed. Having a strong vertical extent, its height was estimated to be approximately 1,500 feet. After three minutes, the waterspout started to dissipate, this taking several minutes more.

Weather conditions at the time were: air temperature 28°, wet bulb 25.5°, pressure 1009.3 mb, wind WNW'ly, force 3.

*Editor's note.* Mr Mike Rowe, of the Tornado and Storm Research Organisation said of this report:

"This is a useful observation of a classic waterspout. The photograph is a valuable addition to the report. The lighter core to the spout is an interesting feature which is frequently observed. The fact that the waterspout was practically vertical indicates that the wind speed and direction were reasonably constant from sea surface to cloud base."

## m.v. *P&O Nedlloyd Tasman*

- **12 November 2002**
- **Captain P.J.R. Manson**
- **North Pacific Ocean**
- **Observer: Captain Manson**

**Unexpected calms:** The ship had been under the influence of a depression since passing south of Japan on the 9th on a passage towards Los Angeles. Winds had been E'ly or ExN'ly, force 8 to a maximum of force 9, with a moderate easterly swell. This was the situation at 1600 UTC on the 12th although the wind appeared to be slackening and the sun was managing to break through the cloud occasionally. At this point the ship's position was 40° 40′ N, 171° 22′E.

Between 1615 and 1630 the vessel passed through three separate areas of almost complete calm, each lasting no more than a few minutes. In these areas the sea appeared glassy, with only the tops of the larger swell waves breaking. The demarcation between the windy and calm areas could be clearly seen. As the ship left each calm area, the wind immediately rose to a maximum of 43 knots, varying in direction between about ENE'ly and ESE'ly. After the third calm area the wind settled to near E'ly, force 7. When checked after leaving the last calm area, the barograph trace showed that the pressure had fluctuated rapidly by two or three millibars.

## m.v. *Providence Bay*

- **14 and 17 November 2002**
- **Captain R.T.M. Whelan**
- **Strait of Malacca**
- **Observers: Captain Whelan and Officers on Watch during the period**

**Whales and dolphins:** Whilst on passage from Singapore towards Colombo, approximately six black fins were spotted at 0005 UTC within three cables of the port bow. Using binoculars the observers were able to see the distinct, black, rounded dorsal fins of pilot whales, unmistakable from other blackfish species. It could not be determined whether they were short-finned or long-finned pilot whales. However, on consulting the Eyewitness Handbook *Whales, Dolphins and Porpoises*, the ship's position (05° 51′ N, 96° 07′ E) suggested they could only have been short-finned pilot whales.

After observing the group closely it was decided that it consisted of 15–20 individuals. At the same time, three dolphins were observed making full breaches within one cable of the starboard bow. These were not identified.

At 0830 by which time the ship was in position 06° 06′ N, 92° 55′ E and in sunny conditions with very calm clear seas, numerous dolphins were seen breaching ahead mostly on the starboard side.

They all appeared to be moving at speed towards the bow of the vessel, where they began to bow-ride. However, they could not keep up so began to make complete breaches alongside the vessel. This action was notable in that it often involved leaps of two or three metres clear of the water before landing in belly-flop fashion with the flukes raised. The mammals were also observed wake-riding.

The water was clear enough to see that there were easily two or three times as many dolphins below the surface as above at any time. It was difficult to estimate the number involved. Certainly there were more than 100, and estimates of up to 250 were made. There was a variety of sizes amongst the individuals — some were easily over three metres in length. Typically they were a dark greyish-blue colour. Using binoculars they were readily determined to be bottlenose dolphins. It took between five and 10 minutes for the show to finish.

A little later on, at about 1700 in approximate position 06° 06′ N, 92° 44′ E and in similar conditions, two sperm whales were spotted two or three cables on the port side of the vessel. The observers described seeing single blows directed forward and to the side, although the blow intervals were not noted. Estimates of around 15 m including flukes were made for the whales' length. Further identification features were the large blunt head and small hump approximately three-quarters of the way down the body.

On 17 November, when the ship was on passage from Colombo towards Suez, at least six dolphins were sighted at 0540 UTC in position 08° 03′ N, 72° 45′ E. Through binoculars, the animals were seen back-flipping and back-somersaulting alongside the vessel within 10 m of the hull. They had unmistakably pink undersides and dark-grey or blue-grey bands of colour on their bodies, and prominent beaks. They were approximately two metres long and were identified as striped dolphins.

## m.v. *Greenwich Maersk*

- **5 December 2002**
- **Captain [Not stated]**
- **Gulf of Aden**
- **Observers: G. Guthrie (2nd Officer)**
  **G. Ryie (3rd Officer)**
  **S. Platten (Cadet)**
  **K. Myerscough (Cadet)**

**Sperm whales:** Whilst heading 245° on passage from Salalah towards the Suez Canal when, at 1045 UTC in position 14° 30.0′ N, 51° 43.2′ E, two large spouts of water were seen about three-quarters of a mile ahead of the vessel. They appeared to be quite close together.

These were produced by whales which, as they approached the ship, were passed at less than 200 m on the starboard side. They were both dark-grey in colour and were swimming within a few metres of one another. Each had a small dorsal fin about three-quarters of the way down its back, while its blowhole was near the front of its body, just behind the head. They both seemed to be at least 10 m in length, but could have been up to — and maybe more than —15 m.

The heads of the whales seemed very square and did not have any prominent or distinguishing marks such as nodules. After looking at previous editions of *The Marine Observer*, it was thought that two sperm whales had been seen. However, the observers were curious as to why these should have been in such warm waters (31°) at this time.

*Editor's note*. Dr Kelly MacLeod, of the Gatty Marine Laboratory, University of St Andrews, commented:

"The observers correctly identify their sighting as sperm whales. Males reach lengths of 18 m whilst females are much shorter at 11–12 m. The huge, square head of the sperm whale makes it distinguishable from the other large whale species. The head of males may account for about one-third of the body length, and the size of the head has been linked to the frequency and intensity of their vocalisations, which are mainly composed of clicks. Males may judge the characteristics of these clicks as indicators of the overall size of their opponents during competition for females. Other distinguishing features of the sperm whale are its bushy, forward blow and lack of prominent dorsal fin. The dorsal surface of this species is a uniform colour of dark-grey, brown or bluish/black.

"Adult sperm whales are geographically segregated by sex for most of the year. Females and sub-adults of both sexes reside as nursery groups at lower latitudes and tend not to range beyond 40° N–40° S. Therefore, such groups are commonly observed in temperate and tropical waters throughout the year. As the males approach sexual maturity, they leave the nursery groups and move into higher latitudes to form bachelor groups. As males grow older, they may leave the bachelor groups and become solitary and their distribution extends into polar waters.

"Males only move into warmer waters to join nursery groups with mature females for opportunities to breed. The timing of the breeding season and the migration routes of the males to warmer waters are not well known. Sperm whales occur throughout the Indian Ocean, including the Gulf of Aden and Oman, and the Arabian Sea. Those of the Arabian Sea may be an isolated population. Single animals and small groups of up to five individuals are common in this area.

## m.v. *Pharos*

- **14 December 2002**
- **Captain W. Tulloch**
- **North Minch**
- **Observers: J. Ross (Chief Officer)**
  **S. Tyler (2nd Officer)**
  **G. Small (AB)**

**Killer whale:** The vessel had just left Stornoway harbour and was on a south-easterly passage to Loch Ewe. At 0955 UTC in position 58° 04′ N, 06° 05′ W, a single killer whale was seen surfacing on the port side 300 m from the ship. Attention was drawn to the fact that it was slow moving and had a large dorsal fin. The whale surfaced several times at one-minute intervals, and the white markings behind the eyes could be seen as it closed to approximately 100 m from the ship. At this point the whale dived and resurfaced on the starboard side, appearing to be heading south-west towards the Shiant Island.

# Bird migration *

## Steve Portugal

By now [Autumn 2002], most of the UK's visiting summer birds will have left and headed for sunnier pastures. Replacing them, as winter draws near, are millions of birds arriving from their breeding grounds in northern Europe and the Arctic. These tortuous journeys are made worthwhile by the advantages of summertime habitat with an abundant food source, plus similar advantages on wintering grounds.

Bird migration is a topic that has fascinated mankind for centuries and it is only relatively recently that we have begun to understand more about it and, in particular, migration routes and wintering grounds. Although much remains to be discovered, we have come along way since thinking that swallows (right)) winter at the bottom of lakes and barnacle geese spend the summer inside shellfish of the same name!

K. Dunphy

Crown copyright

Birds put a lot of effort into preparing for their journeys, wherever they may take place, as timing is critical. Leave too early and they may not have the body reserves to last the journey, but leave it too late and they may encounter harsh weather and too strong an opposing wind. Navigation is possibly the most important factor of a successful journey. Birds use three main compasses to ensure they fly in the right direction for the correct length of time: the sun, the stars and the Earth's magnetic field. Which one they use will often depend on the time of day the bird is travelling — another factor to consider.

***Above:*** *Osprey — a migrant sometimes sighted on observing ships.*

## To swim or to fly — and by which route?

Birds use a huge variety of techniques when migrating, often dependent on the terrain they are crossing or the distances they are travelling. The chicks of many seabird species have not yet learnt to fly when they fledge, so, accompanied by their moulting parents, must swim from their breeding grounds to their chosen wintering quarters.

Many songbirds double their body weight in autumn, enabling them to migrate long distances without several stops to refuel. The sedge warbler, for example, averages an additional fat load equal to 100 per cent of its normal weight, and it can probably cover more than 3,000 km in one non-stop flight of perhaps three or four days.

In mainland Europe, large birds such as storks, cranes and ibis have to rely on hot wind thermals to carry them, as they cannot rely on flapping their wings since this would not be energy efficient. Nor can they land on water, so this collection of birds has to take a migration route that avoids large bodies of water and seek out the kinds of landforms that generate rising thermal currents. This often results in large numbers of birds being channelled through an area relatively small, which fulfils their requirements. One such place is the Strait of Gibraltar, which provides adequate thermals and the shortest crossing distance over the Mediterranean Sea.

* Reproduced from *Birds Of Britain, The Monthly Web Magazine for Birdwatchers* (November 2002) with permission of the Editor and author. Steve Portugal writes for a variety of 'birding' guides and for www.birdsofbritain.co.uk

## The Arctic tern — the ‘Pole-to-Pole’ traveller

M.B. Casement

Some migrations undertaken by birds truly are awe-inspiring. Perhaps the most renowned migrator in the bird kingdom is the Arctic tern (shown below). These birds breed in the northern hemisphere, from temperate latitudes to the most northerly land in the world, then winter on the edge of the Antarctic pack-ice. The complete round trip for a single Arctic tern may be as much as 40,000 km, an astonishing feat. Another feature of the Arctic terns’ phenomenal travels is their record of experiencing more hours of daylight than any other living thing.

Birds breeding in the north of the arctic circle experience the 24-hour daylight that occurs there in the summer months, and then, by travelling south of the Antarctic circle, find the same conditions during the southern summer.

## Different species — different routes

The quail and corncrake are long-distance migrants, something which can come as a surprise considering how reluctant they are to break cover during the breeding season. However, these skulking birds cross large expanses of sea and desert during their twice-yearly migration. Both species favour the south-west of Africa to winter, and most British breeding birds would appear to cross the Mediterranean via Gibraltar.

Red-backed shrikes that nest in western Europe take a lengthy route to their wintering grounds in the southernmost parts of South Africa. All breeding birds head over the eastern Mediterranean an down through the savannah areas of the Great Rift Valley. One advantage the shrikes have over most other migrant birds is that they are able to prey on their fellow migrants, so they always have a food supply.

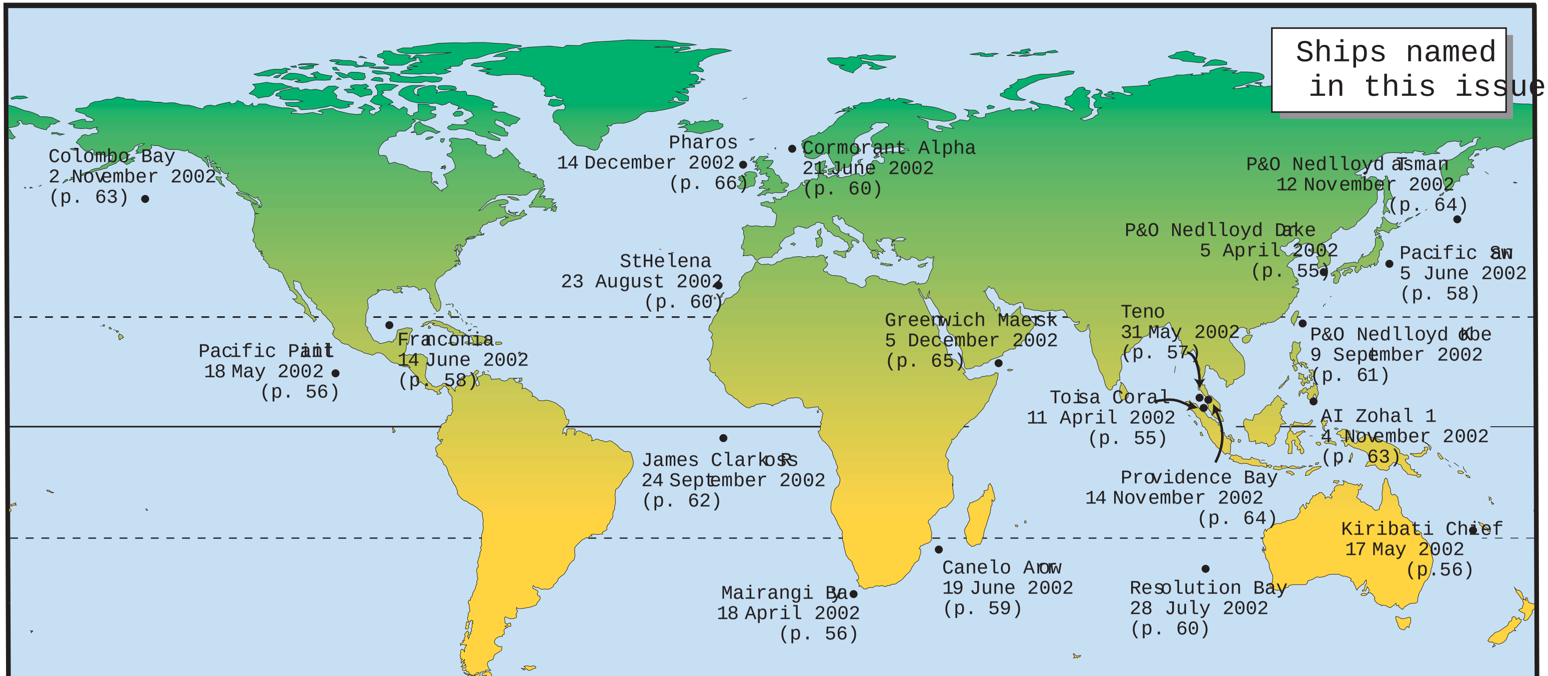
A large number of birds that do not breed in the UK still use it as a ‘stop over’ during migration. Many wading birds exhibit this behaviour. Birds such as knot, curlew sandpiper and little stint that breed in the high Arctic and winter in South Africa stop over in Britain en route to take advantage of the rich food source to be found in estuaries and marshes. These birds are not taking the obvious route to their African wintering ground so it really must be worth their while migrating via Britain to refuel.

## When migration misses the target

Many birds less characteristic of Britain regularly over shoot their usual breeding grounds and appear in spring and autumn. Birds such a wrynecks, hoopoes (shown on the left) and bee-eaters typically appear at these times of year. They are often blown west off their usual migration course, particularly in spring and, on occasions, have stayed to breed.

Crown copyright

The natural phenomenon of migration — how birds manage to navigate and locate themselves, often in the case of young birds with no prior knowledge, and how they can time their journey to take advantage of good weather conditions as their bodies reach an optimum condition — truly is a wonder.

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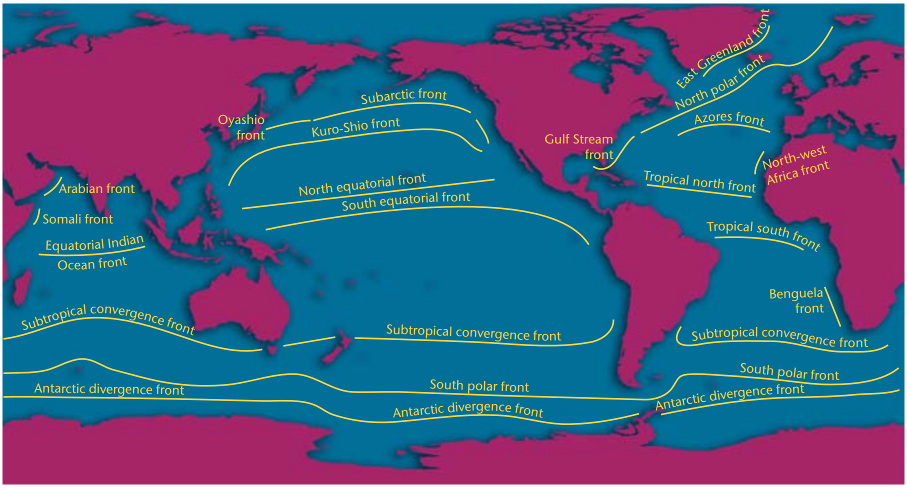
# Ocean fronts*

The concept of the ocean front arose at the start of the twentieth century in meteorology, but only in the 1970s in oceanography. In comparison with atmospheric fronts, oceanic or hydrological fronts correspond to the 'frontier' between two masses of water of different density. This difference can have its origin in a contrast of temperature — when it is called a thermal front. It can also be caused by a difference in salinity[1] between bodies of water (a haline front), or even as a combination of the two (a thermohaline front). From one part of a thermal front to another, the temperature of the surface of the sea can vary by more than 10 °C over some kilometres, and even by several degrees over hundreds of metres.




*Above: Oceanic fronts of the world*

Fronts are visible structures at the surface, extending in depth over tens or hundreds of metres, sometimes more. The width of fronts is usually a few nautical miles, but their length can attain several hundred, indeed thousands of nautical miles. In the proximity of a front, the water masses are in permanent movement: horizontal movements parallel with or perpendicular to the front, and vertical movements up or down.

Fronts are therefore dynamic structures which evolve in the course of time, and which oscillate about an average position. These periodic displacements can attain many nautical miles and take place, according to the range of temperatures, over a few days to a few months. The wind[2] also has an influence on the structure of fronts. Certain fronts are permanent, others are intermittent. However, this simple explanation of fronts is deceptive, as the term 'front' covers numerous systems from different origins — currents, tides, outflow of water from rivers, etc.

* First published as 'Les Fronts Océaniques by Patrick Geistdoerfer, in *Met Mar* (the marine journal of Météo-France) in September 2002, and freely translated with permission.

1 The density of sea water increases when its temperature drops or its salinity rises.

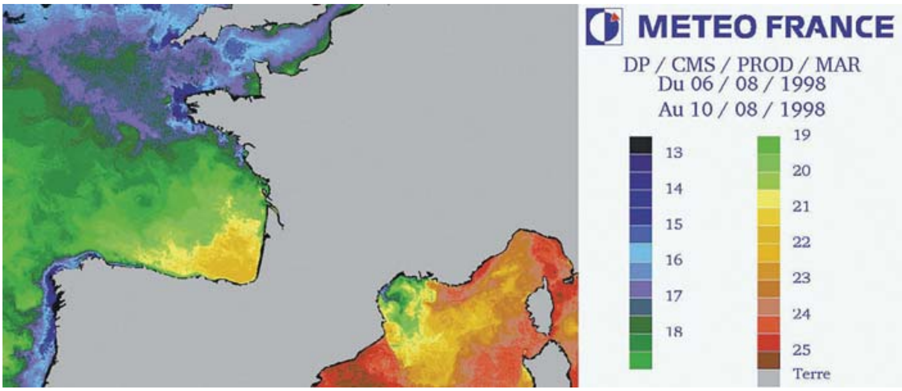
2 A strong wind may increase the pitch and thickness of a front and obliterate traces of it on the surface.

## The rhythm of the tide

The tide and currents play an essential role in the appearance of thermal fronts. In summer [in French latitudes], the upper layers of the ocean are warming up; this establishes a stratification with the colder waters lying deeper. The tidal current is strong in shallower waters, creating a turbulence which mixes the body of water on the top. The well-marked border between the mixed layer (cold on the surface), and the stratified layer (warm on the surface) constitutes the front.

Tidal fronts are very common in summer on the continental shelf of north-west Europe (the Channel, the Irish Sea, Celtic Sea, etc), and notably on the continental shelf around Brittany. Tidal phenomena, greatly accentuated, play a dominant role in the structure of the water column. In the Iroise Sea, there are two distinct fronts.

At depths of 100–150 metres, the seasonal Ushant front becomes established in the spring, to several nautical miles to seaward of this island (approximately to the level of the maritime traffic separation zone). It forms between widely stratified waters — warm surface water of 15°–17°, and cold water of 11°–12° at depth — and a coastal zone of cold mixed waters of 12.5°–14° (notably in the Iroise Sea).




***Above:*** *Sea surface temperature seen by satellite.*

*In the absence of clouds, infrared satellite radiometers allow the calculation of sea surface temperature, and therefore identify fronts of thermal origin. On this thermography made in the summer (6–10 August, 1998), the tidal fronts of the Iroise Sea and the English Channel are clearly shown (the turbulence engendered by the tidal currents cools the surface water which demarcates the warmer waters of the open sea).*

*Also shown is the upwelling of cold water which aligns itself along the continental slope in the sea of Brittany. Other limits between cold water and warm water are also apparent (warm water in the Bay of Biscay, cold water off the coasts of Spain and Portugal, and in the Golfe du Lion). However, these variations of temperature are tied to meteorological conditions; they constitute temporary fronts.*

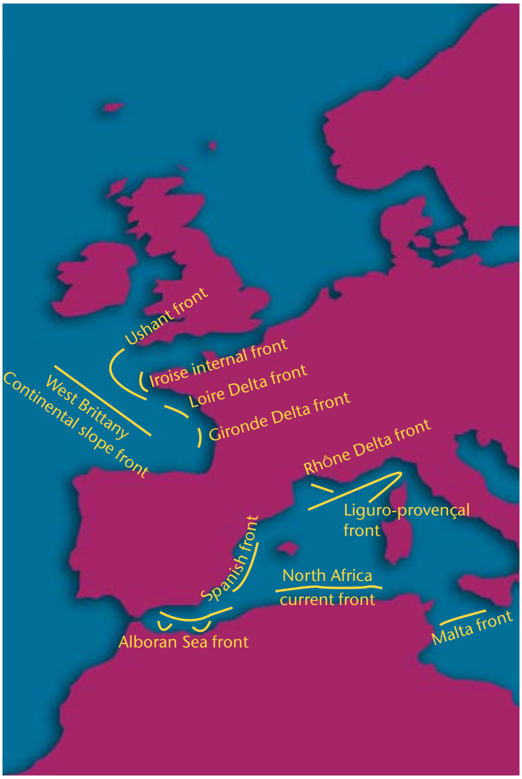
At depths of 30–40 metres, the coastal front of the Iroise Sea, which is also seasonal, is opposite the Baie de Douarnenez and the outflow of the natural harbour at Brest. It is situated between the warm coastal waters and the cold waters of the Iroise Sea; this front is thermohaline owing to the arrival of fresh water from the rivers of south Brittany which creates a layer of fresher water several metres thick at the surface.

The characteristics of tidal fronts, notably their positions, are dictated essentially by the periodicity of the tide. Thus, in the period of high-water the Ushant front is wider than in a period of low water, because the currents are more vigorous; the mixing of water is at maximum, and the mixed area is therefore greatly extended.

At the level of the Brittany continental slope, between the waters of the open sea and those of the continental shelf, from the surface to 150 metres depth, there also exists a tidal front, but its origin is much more complex. It is perhaps associated with the progression of the tide and the modifications it undergoes while passing from the depths of the Bay of Biscay towards the shallower depths of the continental shelf.

## Fronts and 'jets' in the Mediterranean

The main permanent fronts, thermal or thermohaline, are associated with strong permanent surface currents — 'jets' — that mark the border with surrounding waters. In the western Mediterranean, these are in the Ligurian Sea and the Alboran Sea.




**Above:** *Fronts of permanent character on French coasts*

The Almeria-Oran front is essentially haline. The flow of Atlantic water that penetrates the Mediterranean at the surface through the Strait of Gibraltar generates two anticyclonic vortices and a strong current — a jet — the speed of which is in the order of metres per second. It is the start of a front that is more than 200 km long, and 70–150 metres in depth, with strong physico-chemical gradients[3]. This front separates light, warm Atlantic waters, entering the Mediterranean basin, from the salty dense Mediterranean waters that lead towards the Atlantic. The frontal circulation comprises the jet which leads eastwards along the African coast, and the vortices that it creates on the coast.

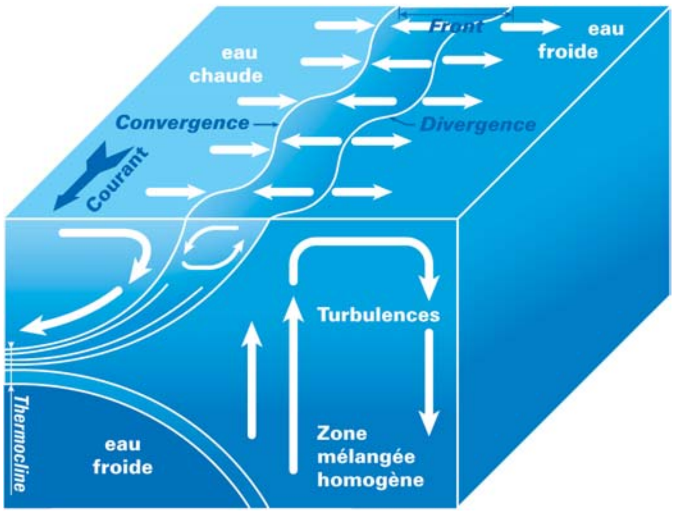
In the Ligurian Sea, the Liguro-Provençal front is essentially haline. Between Corsica and the coast of Provence, it separates waters of the open sea — weak vertical layering where dense, very salty[4] waters are formed in winter — from the peripheral zone which is dependent upon the permanent circular cyclonic current whose speed at the surface is 40 cm/sec. The general outline of the circulation is similar to the Almeria-Oran front.

3 Horizontal gradient of density greater than 0.4 kg/m3 for 10 km.

4 Salinity greater than 38.

Associated with a front of 300 metres thickness with numerous meanders, is a secondary circulation on the right-hand side of the frontal system, with vertical and descending movements which plunge as far as 300–400 metres deep in the direction of the continental slope. The Liguro-Provençal front is a permanent haline front that produces a salinity gradient of 37.95 [5] (near the coast) to 38.40 (at sea, more marked in winter than summer): it is about 15 nautical miles wide, and spreads beneath the surface to a depth of about 200 metres.

Secondary circulations linked to the Liguro-Provençal and Almeria-Oran fronts produce vertical components that drive upper water layers deeper. Contrary to the 'jet' parallel to the front, they have not been in evidence that recently. They are of great importance from the point of view of the dynamic of the frontal system and biological production. The oceanographic campaigns of the Institut des Sciences de l'Univers programme — Almofront I and II in 1992 and 1997–1998 respectively — on board the oceanographic vessel the *Atalante*, have shown the specific characteristics of these secondary currents and their role in the structure and nature of the ecosystem[6] associated with the front.




***Above:*** *Oceanic front with current-jet of the Ligurian Sea type. This type of front is the seat of a complex circulation, including a convergence zone with plunging of warm stratified coastal water and a zone of divergence with rising of cold, deep water.*

Besides these two fronts, well studied by French oceanographers, the principal permanent fronts in the Mediterranean are the north Balearic, Sardinia–Sicily, Malta, south Adriatic, Aegean Sea, and south of Crete.

5 Salinity is expressed without units. The number is equivalent to: g/kg (grams of salt per kilogram of water); o/oo; psu (practical salinity unit).

6 An ecosystem is an assembly formed by living beings and the medium in which they live. Together, they exist through numerous interactions.

## Large currents and 'upwellings'

Permanent thermal fronts associated with large surface currents are on an ocean scale and their annual displacement can attain many tens of nautical miles. Among these are:

- the Gulf Stream front, which constitutes the 'frontier' between the warm waters of the current and those cold waters of the Labrador Current that border to the north;
- the north polar front, which extends the Gulf Stream eastwards (from Newfoundland to the Shetland Islands), creating a large number of unstable fronts between 45° N and 55° N; it is extended towards the north as the arctic polar front;
- the Azores front, the north tropical and the south tropical fronts of the Atlantic;
- the subtropical convergence front (at the northern limit of the Antarctic Ocean);
- the Antarctic or south polar front, circumpolar in the average position of 55° S;
- the equatorial and the equatorial counter-current fronts in the Indian Ocean;
- the Kuro-Shio and the Oyashio fronts, subarctic front, north and south equatorial, and tropical convergence in the Pacific Ocean.

Large oceanic currents 'sprout' branches along the edges of the main vein, giving rise to vortices (warm vortex in a more cold water mass, or the reverse). These vortices, of about a hundred kilometres in diameter and of weeks to several months in duration, produce marked thermal gradients at their edge, thus the fronts.

This, for example, is the case in summer in the sea off Portugal (north wind dominant), the sea off the coasts of Morocco, Mauritania and of Senegal under the effect of the north-east trade wind, off Somalia during the south-west summer monsoon, on the Atlantic side of South Africa, Gulf of Oman, and on the coasts of California and Peru.

## Estuarine plumes

The fronts of estuarine 'plumes', or delta fronts, form the separation between sea water and fresh river water. In estuaries, when sea and river water encounter each other, the lighter fresher water forms an upper layer under which the saltwater tide runs. This layering, with sea water below and fresh water at the surface, extends to the sea in a strong plume; this is as true for small rivers like the Vilaine, as for the large ones like the Loire and the Rhône. At the sea surface, the fresh water/sea water boundary forms a haline front. Fronts of this type are very numerous; they are wider when the outflow of the river is significant. The waters of the Loire spread to both sides of the mouth, towards the south and especially towards the south-west. They form a layer of desalinated water (salinity of 33) a few metres in thickness and 15–20 nautical miles wide, extending along the southern coast of Brittany, reaching the area of Sein Island in the west (south of Iroise). In the same manner, the waters of the Gironde flow northwards off the coasts of Charente-Maritime and Vendee. Estuary plumes are particularly visible at the end of winter when the outflow from rivers as at maximum.

## A great biological production

Fronts have an essential biological role: to supply nutrients vertically towards the euphotic zone[7], while large phytoplanktonic biomasses, a diversity of trophic chains, transfer organic material towards the deep layers.

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7 Euphotic: the upper layer of the ocean in which light penetrates (to tens or hundreds of metres depending on the clarity of the water).

The frontal regions are the sites of biological production, notably primary production[8]. At the level of fronts like the Liguro-Provençal and Almeria-Oran, the production of planktonic algae is higher than in the adjacent ‘poor’ waters. There is a permanent enrichment in nutritive substances, because of the influence of ascending currents. It permits the development of an ecosystem with a long food chain — phytoplankton, zooplankton, herbivores, carnivores. Moreover, at the front, the secondary circulation assures the transfer of some of the planktonic algae produced in the upper layers towards the deeper layers (in the order of 100–300 metres according to area), where the absence of light does not allow the existence of dense populations of animal zooplankton, crevettes and small fish.

The largest phytoplankton biomass[9] is not therefore situated there where the algae are produced — that is to say where there is primary production — but deeper. This structure, well known in the ecosystem associated with jet fronts, has been in evidence in recent years, within the context of the ‘Frontal’ programme, more in the Ligurian Sea than in the Alboran Sea.

The two Almofront campaigns had as the objective not only to understand the dynamics of the front, but also to measure and quantify the physical components and the transfer of organic material from one depth to another.

The ecosystem of an estuarine plume front is distinct from that of a plume of fresh water or that of salty waters of the open ocean. Favoured by the supply of organic material and nutrient salts of river origin that accumulate near a front, the production of planktonic algae and bacteria is much greater there. This characteristic has been clearly seen at frontal plumes like those of the Rhône and the Loire.

In the case of tidal fronts, things are more complicated, and they cannot be presented here other than in an extremely schematic form. At the Brittany continental slope, the continued supply of nutrients in the upper waters permits the establishment of a long food chain: phytoplankton, zooplankton, herbivores, carnivores. But conversely, in the open sea of Ushant, the food chains are short, of the type bacteria-protista-zooplankton. In effect, the enrichment of the surface waters by the nutrient salts is intermittent. Being tied to the mixing of the water column by tidal currents, this enrichment varies according to whether there is a period of ‘live’ water or ‘dead’ water. This is an example where physical processes govern biological processes. From spring, when the brightness of sunlight is sufficient for photosynthesis to be active, the supply of nutrient salts permits an important growth of planktonic algae, which brings about the appearance of ‘red water’.

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8 Plankton consists of the body of organisms in suspension in the sea, having reduced horizontal movement in comparison with the water mass. It comprises vegetable plankton (single-celled algae of some hundreds of microns in size) and animal plankton (of several millimetres or centimetres long for the most part).

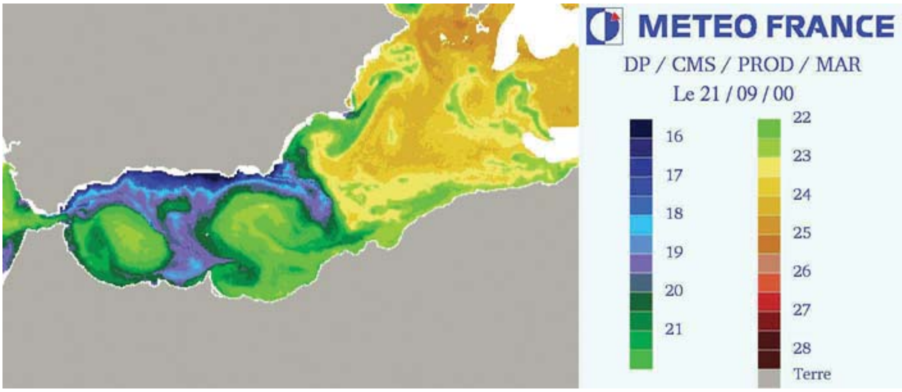
Primary production is the first stage of the marine trophic chain. Phytoplankton grow from carbon dioxide and nutrient salts present in the water (nitrates, phosphates, silicates). Light is indispensable for photosynthesis, which locks primary production in the euphotic layer. Then come zooplankton which feed on the algae and which themselves will be food for carnivorous species. Sometimes the food chain is short: firstly bacteria, then single-celled organisms, and lastly the zooplankton.

9 Quantity of living material.

## Satellites and models

If the data essential to the understanding of oceanographic phenomena cannot be acquired by measurements at sea, then, for several years, satellites have proved useful tools. In effect they offer a near instantaneous view of a whole ocean, or a more limited region, and can follow this over time. On the other hand, they are limited to the sea surface and most of the instruments are inoperable in the presence of cloud.

Satellite images, in infrared and visible light, clearly show the signature of thermal fronts. A local temperature gradient higher or equal to 1° for 5 km is sufficient to be seen on satellite images. The analysis of these data contribute equally to the understanding of certain dynamic phenomena like currents close to fronts. In France the Centre of Space Weather (Météo-France), in Lannion, has processed weather satellite images[10]. Satellite imagery of the sea colour permits equal specification of the biological environment of a structure (front, resurgence, etc) and the richness of the surface water in phytoplankton.



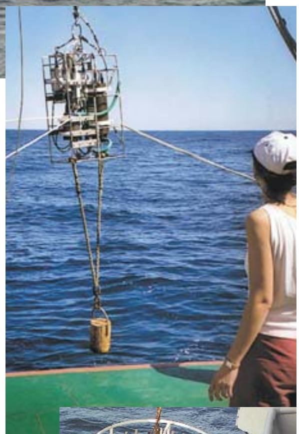
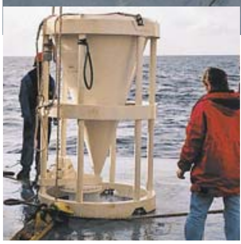

***Above:*** *Temperature of the surface of the Alboran Sea (21 September 2000). Atlantic water, colder than the Mediterranean but lighter because it is salty, penetrates the Mediterranean through the Strait of Gibraltar. It progresses eastwards and forms vortices, clearly visible when there are no clouds.*

*Image prepared by the Météo-France centre for space meteorology, from NOAA satellite data.*

## Summary

Fronts are highly active interfaces and their material structures have specific hydrodynamics and ecosystem(s). The place that they occupy in the dynamic, chemical and biological balance of the global ocean remains to be precisely determined, but it will be considerable.

10 The Shom and Météo-France have produced an atlas of thermic fronts, after NOAA satellite images, for the Nordic sea, the north-west Atlantic and the Mediterranean.


*To study the biological activity and circulation of the oceans, oceanographic ships put diverse instruments in the water: plankton filters; particle traps; conductivity-temperature-depth recorder (to measure temperature and salinity at various depths), and hydrological bottles (to get water samples).*

In all the world's oceans, fronts are zones of active exchange of material and energy between the surface waters and the deeper waters. The flow of material, as much horizontal as vertical, is significantly modified in their vicinity. Concentrations of living material, active or passive, generally increase biological productivity in relation to that of the surrounding waters, and have an essential biological role. At their level live not only small planktonic species, but also much larger animals (fish, seabirds, etc) which find reserves of food there. Fronts also constitute barriers for certain species which do not tolerate strong variations of temperature or salinity.

The propagation of sound in the oceans is greatly affected by changes in the sea environment, that can be stationary or fluctuating. From the point of view of naval operations, oceanic fronts have considerable importance. It is necessary to gain as good a knowledge as possible of their spatio-temporal evolution[11]. Additionally, the intense biological production which manifests itself in the frontal area leads to an accumulation of planktonic organisms and particles of all natures, which contribute to the absorption of sounds.

Our knowledge of ocean fronts has greatly increased recently, both here and abroad, allowing a wider understanding of their structure and function. Nevertheless, knowledge remains patchy; fronts have various types, are numerous, changing and complex phenomena. For oceanic fronts, as for the whole field of marine phenomena, oceanographic studies allow a good knowledge of this environment, its mastery and best possible use.

11 The variations in temperature of 1–4° C drives variations of speed of 3.1–12.4 m/s; variations in salinity of 0.5–1.4 drive variations in speed of 0.5–1.4 m/s.

# Travels with a fruit bat

**Thomas M. Bowker**

**(Chief Officer, m.v. *Safmarine Concorde* *)**

During the morning of 23 October 2002, several hours after the ship's pilotage out of the River Wouri (Cameroon), the Third Officer observed a bat in poorly condition at the port aft side of the bridge wing. Being on watch and cautious about bats, he alerted Chief Engineer Martinhus N. de Bruyn, who was knowledgeable on matters of wildlife.

The 'Chief' was dismayed at the condition of the unfortunate creature. He found it squirming on a hot green deck in the tropical heat, emitting a strange squeaking or rasping sound, and attempting to hide its head in the thin shadow of a handrail stanchion. There were holes in the membranes of its wings and a wound on its body too. The bat was taken below to recover in the cool, quiet and subdued conditions of his cabin whereupon it crawled under a piece of furniture, remaining there until the evening. When it emerged, it was fed a meal of sliced apple and water — it spurned the water but ate the apple.

In the days that followed, its health improved and it was housed in an old overall within which a wire frame had been attached for the bat to hang on to. The *Safmarine Concorde* was heading north to Europe, where the Chief signed off, so it was decided that the Chief Officer (the author) would take over the duties of 'Keeper of the Bat' until the vessel returned to West Africa where it would be released.

During the southbound run many photographs were taken of the bat and it was studied closely, providing the following information:

T.M. Bowker

**Vital statistics** — From wing-tip to wing-tip the bat measured about 61 cm; a small tail approximately 6 mm was present, while the measurement from the nostrils to the end of the tail was 154 mm. The body was covered in a soft downy fur like that of a hamster or a lemming. From the neck upwards the appearance was almost canine; there was a normal set of teeth (none of the vampire credentials), while small whiskers were present on its muzzle. The bat's knees seemed to bend backwards. It was suspected that the gender of the bat was female.

T.M. Bowker

T.M. Bowker

**Food** — its diet was expanded to include pears, melons and bananas (bananas appeared to be favourite). At no time would it eat meat or bread, and it ignored any water that was presented. On one occasion when the author was enjoying some grape juice, the bat flew on to his shoulder and tried to push its head between his face and the rim of the glass. A small amount of juice was then offered to the bat which drank it by lapping with its tongue. Otherwise, it seemed to derive all its liquid needs from the fruit it ate.

T.M. Bowker

**Activity** — It slept all day, particularly in the colder latitudes, but was active by night. Like a cat, it spent much time cleaning and preening itself. On the ground it moved awkwardly, and employed a small hook at the end of an appendage on each wing to climb vertical surfaces (rather like an alpinist using two ice-picks). The bat would even use its mouth for gripping, while the back feet 'paddled' it about like a penguin. Its flying abilities, however, were excellent and were carried out with great precision.

T.M. Bowker

**Senses** — The bat's vision seemed to be good up to about one metre for identification purposes, and its sense of smell and hearing were extremely sharp (its ears moved continually). Aside from when it was first discovered, the bat emitted no sounds at all.

**Social skills** — the bat would only be at ease with people following a formal identification exercise which involved it putting its nose against that of the visitor.

T.M. Bowker

On 23 November the vessel was off Lagos — the bat was in good health and making regular circuits of the cabin. During the evening of the 24th, it was fed a healthy meal of apples, bananas and sweet melon by the Chief Officer who then opened the porthole and retired to bed. The following morning it was found that the 'bat had flown', a month to the day after it came on board.

Although many observations were made, many questions about the bat remained unanswered, such as: Was it a rodent, marsupial or avian? Was it a female, if so, how many young were there in a litter? Was it a fruit bat or a fox bat? How long would it live?

*Editor's note 1.* Bats are mammals that probably have their ancestral roots in the shrew family, and are the only mammals to possess true flapping wings for powered flight. The 'finger' bones of the forelimbs have become greatly elongated and provide the framework over which a fine double layer of skin membrane is stretched to form wings. The same membrane extends from the fingers to the ankles and tail, creating as large a surface area as possible for the wings. The thumb protrudes through the leading edge of the wing and has become a 'hook' for use in clambering through trees and for roosting. Many species are insect-eaters, but some have developed more specialised diets. Among these are the fruit bats (the largest of which are also known generally as 'flying foxes').

From references available to us, we think that the description given for the straw-coloured fruit bat most closely resembles the appearance and behaviour of the long-distance traveller on the *Safmarine Concorde*. This is the most widely distributed of Africa's fruit bats, being found from the south-western parts of the Arabian Peninsular and across many forest and savannah regions south of the Sahara.

The bat in question may have been an adult male since these show cinnamon-coloured hairs on the sides of their necks, and this colouring seems to be shown in this photograph taken on board the ship. On land, the roosts of this species are usually within easy reach of forests or fruit plantations. Food usually comprises the juices of various fruits.


T.M. Bowker

The wings of this species are long and narrow, being designed for covering long distances, and it is thought the bats forage nightly to distances of 30 km from their roosts, while also undertaking much longer seasonal migrations within Africa.

The straw-coloured fruit bat sometimes occurs in huge colonies of up to 1,000,000 individuals, and it is thought that their mating season in the Nigerian region occurs between April and June. However, female bats employ delayed implantation whereby the fertilised egg is withheld from further development, and it is thought that the females wait until September or October before 'allowing' their young to develop. The single young are born in February and March, coinciding with the start of the wet season which should bring optimum conditions for their survival. The longest-lived bat of this species has been recorded at around 21 years of age.

Just how the bat in this report managed to get itself into the situation which resulted in it taking a month-long round trip to Europe is only to be guessed at, but it certainly owed its survival to the diligence of the Chief Engineer and Chief Officer — not to mention the patience of the cabin steward, who was very relieved to see it go!

*Editor's note 2.* (The *Safmarine Concorde* is recruited to the South African Voluntary Observing Fleet.)

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http://www.press.jhu.edu/books/walker/

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Dorling Kindersley.

# The *Duyfken* — 'Little Dove'

**Malcolm Young**

**Port Meteorological Agent, Fremantle.**

The first known chart of the Australian coastline was made by the original *Duyfken's* Dutch skipper, Captain Willem Janszoon during his 1606 voyage of discovery. This was also the first recorded contact by outsiders with the Aboriginal Australians.

To recognise this fact, a committed group of community-minded people set up the *Duyfken* reproduction project in Fremantle, Western Australia, in 1992. After a cost of around AU $4.2 million, the Replica Sailing Vessel *Duyfken* left Fremantle on 8 April 2000 equipped as a member of the Australian Volunteer Observation Fleet (AVOF). Her mission was to retrace the vessel's original route through the Indonesian islands to the Gulf of Carpentaria in northern Queensland and then down the coast to Brisbane.

After a re-fit on the Gold Coast, near Brisbane, she sailed for Sydney. There it was decided to re-trace the spice route back to Holland and join the commemoration for the 'Vereenigde Oost-Indische Compagnie' better known as VOC (United East India Company) which was founded 400 years ago.

The *Duyfken* set off northwards around Australia on 4 May 2001 for Djakarta. She then traversed the Indian Ocean via Gale, Mauritius, Cape Town and eventually to the port of Ouldeschild at Texel Island, off the coast of Holland, where she arrived on 28 April 2002. Full coverage of that epic two-year 65,000-km adventure is available on the project's web site at: www.duyfken.com

The *Duyfken* has finally returned to Fremantle aboard the container vessel m.v. *World Glory*. Though a seemingly ungracious mode of return for such a proud little vessel, there was much fanfare in the port in early November 2002 as she was unloaded. Back in the water again after another re-fit, she joined the sail-past at the opening of the new Western Australian Maritime Museum at the entrance to Fremantle Harbour on 1 December last year.

West Australian Newspapers

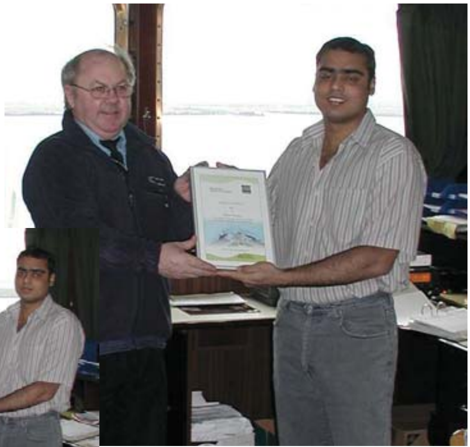
***Above:*** *The* Duyfken *returns to Fremantle in November 2002*

At a speed often as low as two or three knots the crew consistently produced good quality meteorological observations and distributed them via Inmarsat C. The Australian Bureau of Meteorology received 555 sets of observations all of which were sent world-wide on the Global Telecommunication System. Following her re-fit the *Duyfken* will continue to be based in Fremantle. A job very well done!

# We would like to thank...

**... Vikram Misquitta**, *Cadet for his work with ASAP on board the* CanMar Pride.

*Captain Edward J. O'Sullivan (Manager, Marine Networks, Met Office) presents Vikram (on right) with a certificate and special award (inset) recognising his assistance with the program.*



G. Allen

G. Allen

Anon

**...Captain J. Harris** *and the observing officers on the* City of Cape Town *for participating in the VOSClim Project.*

*Captain Harry H. Gale (Port Met. Officer for South-east England) presents a VOSClim certificate to Captain Harris (on left).*

D. Kishor

**...Captain H.P. Lobo** *and the observing officers on the* CanMar Honour *for participating in the VOSClim Project.*

*Captain Lobo (on left) is presented with a VOSClim certificate by Steve Keys (Port Met Office for South-east England), while the inset shows him receiving an award on behalf of the ship in recognition of the large number of weather observations transmitted during 2001 using TurboWin.*

# We would like to thank...




**...Captain G.M. Long** *(left) and the observing officers on* R.R.S. Discovery *for participating in the VOSClim project.*

*Captain Long is pictured holding a VOSClim certificate and special award presented to the ship by the Met Office as a gesture of thanks for assistance in drifting buoy deployments.*

**...Captain M. Samwell** *and the observing officers on the* Grasmere Maersk *for their participation in the VOSClim Project.*

*Captain Samwell (on right) is presented with a VOSClim certificate by Captain Harry H. Gale).*



**...Jan W. Schaap** *(Port Met. Officer for De Bilt and The Netherlands) for his valued co-operation in administering to the needs of UK Voluntary Observing Ships in his area.*

*When Jan W. Schaap (on right) visited the Met Office recently, the opportunity was taken to thank him. Captain Edward J. O'Sullivan (Manager, Marine Networks) was pleased to make an informal presentation.*

# ASAP's 'ambassador' to the UK VOF

Geoff Allen (Technical Liaison Officer, Observations Supply–Marine Networks) retired on 10 February 2003 at the end of a career with the Met Office spanning more than 43 years.


P.Whiteley

**Above:** *Captain Edward J. O'Sullivan (Manager, Marine Networks) makes a presentation to Geoff.*

Having joined the Met Office in 1959, Geoff's first posting was to R.A.F. Hemsby where, among other aspects of meteorology, he was trained in radiosonde procedures. In 1963 he joined the staff rostered to man the UK's weather ships, which operated out of Greenock and kept station at fixed locations in the North Atlantic Ocean.

Geoff became an expert in all aspects of marine observations and, on weather ships, was among the 'lucky' people whose job was to sit out Atlantic storms whilst continuing to make both routine radiosonde ascents and surface weather observations.

It became clear that Geoff's forte was upper-air work and, between 1971 and 1973 he further added to his repertoire by making manual upper-air observations on board the *Sugar Exporter* as part of the World Weather Watch. At the end of this detachment he returned to weather ships until 1983.

Geoff was promoted to Scientific Officer in that year, and a spell ashore followed during which he worked at the Experimental Site of the Met Office at Beaufort Park, (near Bracknell) in the UK lightning detection unit. By 1985 he was alternating this work with the developing UK ASAP* system, then operating on board the *CP Ambassador* sailing between Canada and the UK. In 1987 ASAP was switched to the *Manchester Challenge* (later to become *OOCL Challenge*) and, in 1988 the program also took in the *CanMar Europe*. Geoff lent his expertise to alternating voyages with these ships, imparting his considerable meteorological experience to the ships' observing officers.

At the end of ASAP operations in 1991 he was posted to the Marine Observations section at Bracknell, as Technical Liaison Officer for the UK Voluntary Observing Fleet. However, his experience in upper-air observations was vital when the UK ASAP was reintroduced by the Met Office in the late 1990s and, during 1999 to 2000, Geoff sailed on three voyages of the *CanMar Pride* to guide the cadets in operating the system.

We are sure that all those ships' officers who have known Geoff during his long and distinguished career would want, like his many friends and colleagues at the Met Office, to thank him for all he has done, and offer sincere wishes for a very happy and well deserved rest.

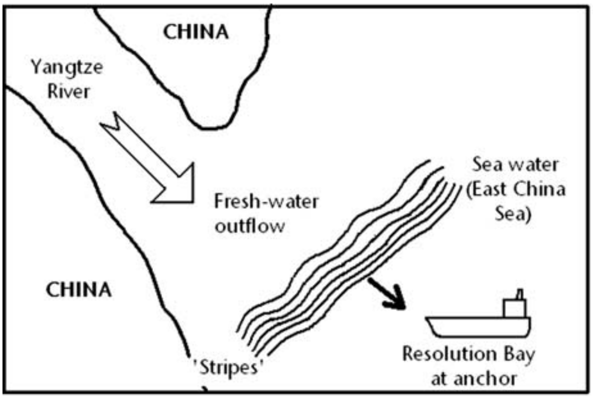
* ASAP. Automated Shipboard Aerological Programme

# The *Resolution Bay* bows out of the UK VOF with reports from the Yangtze River

Whilst at anchor in the outer approaches to Shanghai in September 2002, the *Resolution Bay* awaited the final pilot for the transit of the Yangtze River and subsequent arrival at the recycling berth. Even at this late stage of the ship's life, the observing officers continued to note sightings of interest, two of which follow.

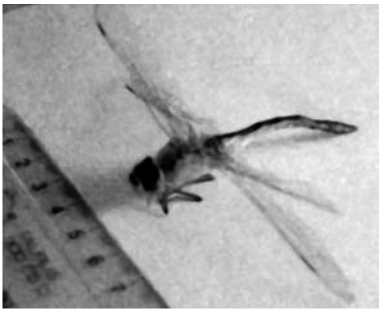
On 12 September at 1600 UTC, Captain M. Moore together with Second Officer S. Foster and 2OT M. McKenney watched a series of 'stripes' on the sea surface at a distance of about five miles from the ship. Each stripe was estimated to be about 15 m wide, stretching over a distance of roughly six miles.

Over a period of time these stripes drifted past the ship, becoming clearly visible as they did so, and it was found that they were in fact areas of calm water adjacent to areas of rough seas. The stripes continued to drift by and could be seen several miles astern.




At this time no explanation could account for this pattern of calm and rough water, although one hypothesis suggested that it was somehow connected with the outflow of water from the Yangtze River. After much scratching of heads and looking in books, the answer was discovered in a back-issue of *The Marine Observer* ('Waves beneath the sea', 2001, 17).

The alternating calm and rough stripes were the result of underwater waves — fresh water being discharged from the Yangtze River was lying on a layer of heavier sea water (see diagram). The lower layer had been disturbed, either by the seabed or possibly by a passing vessel, and the waves in the heavier water caused the calm and rough surface conditions.



Anon

In contrast to this observation were sightings of numerous dragonflies, and one in particular caught the attention of those on board. Shown in the photograph, it was picked up from the deck of the bridge wing on the 14 September. It was a very distinctive lime-green colour and measured 10 cm overall, with a wing-span of about 11 cm. There were two wings arranged 'fore' and 'aft' on either side of the body, their structure being highly delicate latticework covered by a very thin, transparent membrane.

The dragonfly's body consisted of three parts. First, the head which contained the eyes, mouth, two small antennae about five millimetres long, and a yellowish forward-facing 'bulge' — all in all giving a length of seven millimetres and a width of 10 mm. Next there was the main body which was around 25 mm long, housing the wings and six legs. It was slightly hairy on the underside and had several 'plates of armour' along the length. The final part of the assembly was the tail which was 50 mm long, narrowing from seven millimetres wide at the body to two millimetres at the tip, and ending in two pincer-like 'stabilisers'. In general the 'shell' seemed tough and fairly cumbersome, with only the occasional 'linkage' to add a degree of flexibility.

Many smaller and slightly less colourful dragonflies had been spotted at the same time (and earlier too), also lying dead on the bridge wings, but the cause of death was uncertain. One possibility considered was that they had been intoxicated by the funnel fumes, although these were only light.

The wind during this time was predominantly E'ly (meaning that it was not coming from land) and never rose above force 4.

*Editor's note.* Unfortunately, the photograph of the dragonfly was not clear enough to enable certain identification of the species by Dr Andrew Whittington, (Geology and Zoology Department, National Museums of Scotland). However, given the details that are shown, he said that the dragonfly may have been *Anax guttatus* (Burmeister, 1839), which is a widespread east Asian species, whose larvae develop in still water (i.e. lakes and ponds).

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# Who was who in 2002

Staff and visitors at the Met Office (Marine Networks) in November 2002.

*Left to right: Jan W. Schaap (visiting Port Met. Officer for De Bilt and The Netherlands); Captain Edward J. O'Sullivan (Manager, Marine Networks); Graeme S. Ball (visiting Senior Meteorologist, Australian Bureau of Meteorology, Melbourne); Michelle Ayres (Administration, Marine Neworks); Paul Whiteley (Databuoy Co-ordinator, Marine Networks); Sarah C. North (Nautical Officer, Marine Networks); Geoff Allen (Technical Officer, Marine Networks.)* *See page 92 of this edition.*

# Observations Supply (Marine Networks) Annual Report for 2002

## 1 — Voluntary Observing Fleet (VOF)

At the close of 2002 the numbers of voluntary observing ships and rigs recruited by the UK and reporting in the Ship's International Meteorological Code (FM13-XI SHIP Code) were as follows:

- 426 'Selected' ships which transmit weather messages using the full code and are equipped with complete sets of meteorological instruments and stationery. These vessels are currently operating in all ocean regions.
- 28 'MARID' ships which transmit information on sea-water temperature together with non-instrumental weather observations, and which operate in UK coastal or near continental areas.
- 23 'Auxiliary' ships which are requested to transmit limited observations. Such ships will normally be equipped with their own instruments and generally operate in areas where observation data are in short supply.
- 33 Offshore units comprising 15 fixed and 15 mobile installations, and 3 FPSOs. These units report in the SHIP Code and operate in the North Sea oil fields as well as other areas of exploration on the UK continental shelf.

The figures represent an overall reduction of 33 ships and installations reporting in Ship Code since the start of the year. In addition there are some further ships that are scheduled to be withdrawn but, due to their absence from the UK, we have been unable to recover their observing equipment. [Note. Graphs showing the changes in fleet size during the previous 10 years are appended to this report.]

## 2 — Ship Observations

The UK voluntary fleet continued to make a significant contribution to the WMO Voluntary Observing Ships scheme. Observations received in real time from the UK fleet of 'Selected' observing ships totalled 87,635 in 2002, equating to an average number of 7,303 observations per month (see Figure 1).

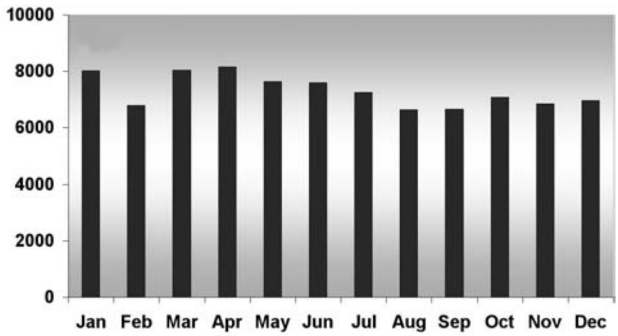


***Figure 1:*** *Monthly totals of marine observations*

The slight decline over the year was due in part to a number of our most conscientious observing ships having reached the end of their service lives. However it is anticipated that this trend will be reversed in the coming months when a number of new replacement ships are recruited. It should be noted that these figures do not include the additional delayed mode observations that are continually received in the form of logbook observations which, for one reason or another, it has not been possible to transmit in real time. Moreover they do not include the observations received from the Marid fleet (which submitted 1,565 observations during 2002), the Auxiliary fleet or the offshore units (see Paragraph 3).

The timeliness of observations received from Selected ships during 2002 is shown in Figure 2. On average, for all ocean areas, 97.2 per cent of observations were received within the mesoscale model cut-off time of 115 minutes, whilst 45.3 per cent were received within 20 minutes of the observation time.

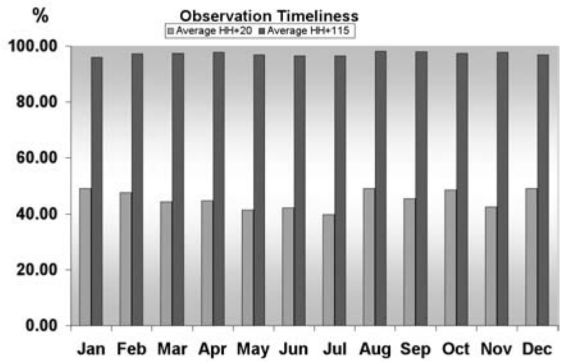


***Figure 2.*** *Timeliness of marine observations*

Ships recruited to work in the Selected category carry a precision aneroid barometer, a marine barograph and a marine screen containing dry- and wet-bulb thermometers. For recording sea-water temperature they also carry a sea-water bucket with thermometer, or are fitted with distant reading equipment. 'MARID' ships are equipped with the necessary tested thermometers and their contribution is vital for the prediction of fog and, in appropriate meteorological conditions, icing.

Anemometers are not normally used for observations made by the UK voluntary fleet, the surface wind speed and direction being estimated from the sea state.

In the course of the year 32 Selected ships were recruited and 51 withdrawn (or being processed for withdrawal); no 'MARID' ships were recruited but six were withdrawn; and two 'Auxiliary' ships were recruited and three withdrawn.

## 3 — Offshore installations

At the close of 2002 the number of offshore oil and gas installations contributing to the VOF was 33. In addition to these a further 15 platforms and one FPSO were hosts to automatic weather stations which provide data every 10 minutes to the Met Office weather consultants in Aberdeen.

The number of observations received from offshore installations that have been made using TurboWin software (see also Paragraph 5) has increased every year since its introduction, but dipped slightly in the last quarter of 2002 owing to a downturn in the drilling industry, with several rigs being laid up temporarily. In 2000 the Met Office received 20,417 observations. By the end of 2001 this annual figure had grown to 21,758, and at the end of 2002 the total had reached 21,004.

## 4 — PMO Network

The voluntary observing fleet continued to be serviced by a team of six dedicated Port Met. Officers (PMOs) and one Port Met. Assistant, based at principal ports around the UK. The offshore units were co-ordinated by the Offshore Adviser, based in Aberdeen.

Although the number of Port Met Offices has been constant throughout the year the duties of the incumbent PMOs have been enhanced during 2002 to include the inspection of land-based meteorological sites, as well as some additional technical work.

The PMOs and the Offshore Adviser continue to visit ships and installations to offer advice and to check instruments. The PMOs, together with the Marine Networks staff, also liaise with their counterparts around the world, so strengthening international co-operation and encouraging more ships to become involved with observing. PMOs also visit ships of other countries' fleets, if required, to assist observing personnel.

In total, during the year the Port Met. Officers performed 538 UK VOS ship inspections whilst the Offshore Adviser inspected 23 offshore installations.

## 5 — TurboWin

Significant improvements to the Royal Dutch Meteorological Institute (KNMI) TurboWin electronic logbook software were introduced in 2002. The latest issue (Version 3.03) includes a new 'Classic Form' to permit experienced observers to enter their observations directly into Ship Code.

Based on input from Marine Networks staff a new facility was added to permit observers to also record additional non-coded observations which would otherwise have been entered in the Additional Observations pages of ships' logbooks. At present this is for text-only accounts (photographs, sketches and barograms, etc, continue to be forwarded separately).

By the end of the year some 82 Selected ships had access to TurboWin software (or previous DOS-based versions of the program), of which some 53 were equipped with dedicated laptop computers for running the program in isolation from ships' computers. In addition 32 offshore installations used TurboWin software to code their observations.

With its built-in quality control checks, TurboWin automatically codes each observation from the data entered by observers. The observation can then be downloaded to floppy disks for subsequent real time transmission to the Met Office via Inmarsat-C. The coded observations are subsequently downloaded by the visiting PMOs at routine intervals as log files. This delayed mode data is further processed for climatological purposes.

## 6 — Logbooks

The number of ships' meteorological logbooks received during 2002 was 380 compared to the previous year's total of 504. This continued reduction is owed, in part, to the increased use of TurboWin software for coding ship observations, but also due to a number of prominent observing ships having reached the end of their service lives.

Logbook data undergo a series of quality control checks before being stored on a database for uses such as marine climatology and climate research. The logbooks themselves are destined to become permanent public records held in the National Meteorological Archive, at Bracknell.

As a consequence in the decline in ships' meteorological logbooks, there has been a corresponding reduction in the number of reports noted on the 'Additional Observations' pages of ships' meteorological logbooks. However, this reduction has been balanced by the increased use of TurboWin and e-mail *† for reporting additional observations. Wherever possible these reports are published in *The Marine Observer* and copied to consulting experts who voluntarily give their time and knowledge to comment upon sightings.

## 7 — Observation transmission systems

The number of dedicated Inmarsat Sat-C systems fitted by Marine Networks staff on UK observing ships has fallen to four, following the removal of the equipment from the *European Seafarer*. The ships which continue to make use of this system are the *Baltic Tern* , *European Envoy*, *Tor Baltica* and the UK ASAP ship *CanMar Pride*.

The system, which is linked to a dedicated notebook computer, provides one of the solutions to the problem of transmitting observations from ships that are not required, owing to their service areas, to be fitted with Inmarsat terminals. In view of the reliability of the Inmarsat system, the use of the earlier Met Office system known as MOSS (Meteorological Observing System for Ships) has now been discontinued.

The 'Automet' Automatic Weather Station that was tested on board the *OOCL Belgium* over a year ago is currently undergoing modification at the manufacturers. It is hoped to refit this system — which automatically measures and transmits atmospheric pressure and air temperature data via Inmarsat — to a suitable UK observing ship in the near future.

## 8 — ASAP

The UK Automated Shipboard Aerological Programme (ASAP) is installed on the container ship *CanMar Pride* which operates on the North Atlantic (Thamesport–Antwerp–Le Havre–Montreal) route. It comprises a dedicated 10-ft container housing the radiosonde balloon launcher whilst the necessary equipment for processing and transmitting the sounding in TEMP SHIPcode (FM36–XI) is installed on the bridge.

Thanks to the dedicated efforts of the ship's staff a total of 182 sondes were successfully launched during 2002, reaching an average terminal sounding height of approximately 23.6 km.

The UK observing ship *Palliser Bay*, which hosted the ASAP system used in connection with the Worldwide Recurring ASAP Project (WRAP), reached the end of its service life at the close of the year. The upper-air equipment was withdrawn from the ship at the end of May 2002, and efforts are now being made to find a suitable replacement WRAP ship.

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* See *The Marine Observer*, 2002, 184

† Group e-mail address: obsmar@metoffice.com

‡ See 'It's a WRAP!', *The Marine Observer*, 2001, 124

## 9 — VOS Climate Project (VOSClim)

By the end of 2002, a total of 19 UK voluntary observing ships had been recruited to participate in the VOSClim project, with further ships having been identified as suitable future recruits.

A meeting of the international team overseeing the project was held in Southampton in January 2002 when a number of actions were taken to steer it into an implementation phase. The Met Office is acting as the Real Time Monitoring Centre for the project and is now monitoring the real time quality observations from participating ships on a monthly basis. The monitoring results are thereafter transferred to the Data Assembly Center for the project based in Asheville NC, and are made available on a dedicated web site *.

## 10 — Drifting and moored buoys

Marine Network's involvement in moored and drifting buoy operations continued to increase during 2002. In particular, the section is now fully responsible for maintaining the UK's contribution to the extensive network of drifting buoys in the North Atlantic which is co-ordinated by the European Group on Ocean Stations (EGOS). As the lifetime of drifting buoys is currently in the order of one year, seeding of the ocean with new buoys is an ongoing process.

Drifting buoy deployments by ships primarily take place from Icelandic ships of opportunity operating between Reykjavik and Newfoundland. However, to ensure a good network distribution, an increasing number of buoys were deployed from UK observing ships during the year. Notably *CanMar Pride*, R.R.S. *Discovery* and *OOCL Belgium* kindly assisted with North Atlantic deployments in 2002. In addition three buoys were shipped to the Southern Ocean by the R.R.S. *Ernest Shackleton* and subsequently transshipped and deployed by the R.R.S. *James Clark Ross* whilst en route to Antarctica.

In addition to sea deployment, a large number of Met Office drifting buoys are now air deployed on our behalf by the US Naval Meteorology and Oceanography Command.

At the end of the year the Met Office had 23 fully operational and five partially operational drifters in the North Atlantic; three fully operational buoys in the Southern Ocean; and two drifting ice buoys in the Arctic.

## 11 — International activities

Marine Networks staff were actively involved in a wide range of international matters related to marine observations.

In February we participated in the first session of the newly formed Ship Observations Team (SOT) held in the National Institute of Oceanography on Goa. This new team has been established by JCOMM † to integrate the marine observing activities of Voluntary Observing Ships, Ships of Opportunity and ASAP ships.

Throughout the year we were also instrumental in laying the foundations of an ambitious new surface marine program for the Eumetnet Composite Observing System (EUCOS). It is envisaged that this optional programme will initially run from 2003 to 2006 and probably beyond, and will encompass the drifting buoy, moored buoy and

* http://lwf.ncdc.noaa.gov/oa/climate/vosclim/vosclim.html.

† Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology

VOS networks of all participating European member countries. The first two years will focus on developing an integrated network design and thereafter, following thorough review of the design, it is hoped that the programme will enter an implementation phase. *

Section staff also maintained a close involvement in the work of the European Group on Ocean Stations (EGOS) attending meetings held in Oslo in May 2002 and in Geneva in December 2002 (see also Paragraph 10).

The Offshore Adviser visited KNMI, De Bilt, from where an offshore visit was made with the KNMI Offshore Inspector, Paulien van Eif, to two NAM† platforms in the Dutch sector of the North Sea.

Active participation in the VOSClim Project continued, and the Office currently chairs the project team overseeing the project's implementation (see Paragraph 9, above). We were also closely involved in the Worldwide Recurring ASAP Project, ensuring the efficient operation and re-supply of the upper-air equipment (see also Paragraph 8).

Other areas of international involvement included matters arising from the JCOMM Data Buoy Co-operation Panel, the Argos Joint Tariff Agreement, and the ongoing development of TurboWin software improvements in liaison with KNMI (see also Paragraph 5).

## 12 — National and Branch activities

The year proved to be an extremely busy one for Marine Networks staff. Substantial efforts were made throughout 2002 to prepare relevant work instructions and quality documentation to assist the Met Office to achieve ISO 9000 quality accreditation. The Met Office achieved accreditation during November.

Staff also attended several meetings held at the Maritime and Coastguard Agency (MCA) to provide meteorological perspective on a variety of radio-communications and navigational issues. Close links were also maintained with the Hydrographic Office and the MCA on Maritime Safety Information issues — notably with respect to the changes made to the Shipping Forecast sea area boundaries which were implemented on 4 February 2002, and which introduced the new sea area FitzRoy.

The section also welcomed a number of international visitors including Graeme Ball (Marine Observations Unit, Australian Bureau of Meteorology); Jan Schaap (Port Met. Officer, De Bilt, KNMI); Jim Nelson (retired Port Met. Officer for Houston); Ron Fordyce (Superintendent, Marine Data Unit, Environment Canada); and Craig Engler (Manager, Global Drifter Centre, Miami). In addition, the opportunity was also taken to meet with Elizabeth Horton (Drifting Buoy Program Supervisor, US Naval Oceanographic Office) during a stopover at RAF Lyneham.

Throughout the year we continued to field a variety of marine enquiries from the general public and shipping company representatives. We were also closely involved in a wide range of internal initiatives within the Office, including the trials of prototype plastic marine screens as potential replacements to the wooden variety.

Two new members joined the Marine Networks Team at the end of the year: Paul Whiteley (Databuoy Co-ordinator), and Andy Moffatt (Ship Co-ordinator/Technical Officer) who succeeded Geoff Allen following his retirement.

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* See page 95 of this edition

† Nederlandse Aardolie Maatshappij B.V.

## 13 — Marine publications

A meeting with The Stationery Office (TSO), publishers of many of our marine publications, was held in July 2002 to consider future revisions and reprints of our marine titles. Consequently a temporary reprint of *Meteorology for Mariners* was initiated pending the finalisation of a revised text for a new edition planned for mid-2003. Preparations for an updated version of the observing aid *Cloud Types for Observer*s also began, and initial plans for a future revision of the *Marine Observer's Handbook* were laid.

*The Marine Observer* was prepared and published quarterly in accordance with the print schedule, and the enabling agreement with TSO was extended for a further year. The style and layout of the publication was further updated and revised to incorporate corporate branding requirements. A survey of readers' attitudes and opinions towards *The Marine Observer* was issued with the July 2002 edition of the journal. *

## 14 — Awards

Annual Excellent Awards were awarded to Masters and observers serving on Selected ships who had returned meteorological logbooks during 2001, the contents of which were assessed as being of the highest quality. The top performing Marid ships were also recognised.

Given the reduced number of hardcopy logbooks being returned in recent years, it was decided to introduce a new award to recognise the submission of reports using TurboWin software. A framed certificate was presented to each of the top four ships and an award made to the principal contributors of observations on each of those ships.

Book titles selected for these awards were *Philips Great World Atlas*; *Origins*; *Rain later. Good*; and *Sealife*, supplemented by unclaimed titles carried over from the previous award year.

Six shipmasters were nominated for presentation of long-service awards (which included two awards carried over from previous years), but for logistic reasons it was necessary to postpone the formal presentation of the barographs in Bracknell until 2003.

As opportunity permitted, framed certificates were also presented by UK PMOs to ships participating in the VOSClim Project. A small number of Special Awards were also made to overseas PMOs whose efforts had been of particular assistance to the UK observing fleet, and to ships' staff whose contributions had been particularly helpful e.g. concerning the deployment of drifting buoys, or in connection with the Automated Shipboard Aerological Programme. †

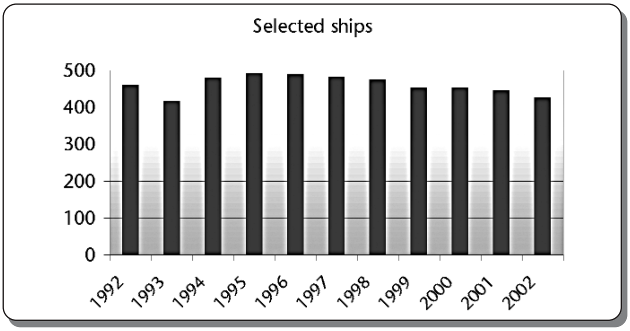
In addition to the above book awards, 15 observers working on offshore installations also received book awards this year in recognition of their contributions.

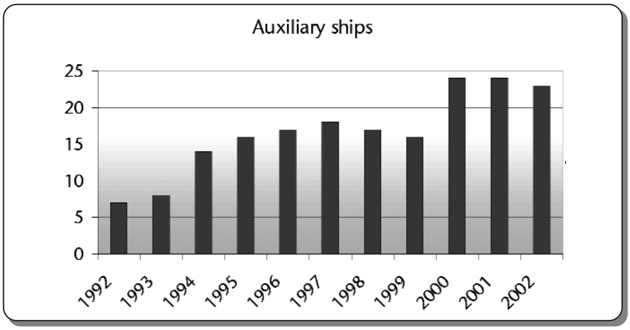
* See page 97 of this edition for some results of the survey

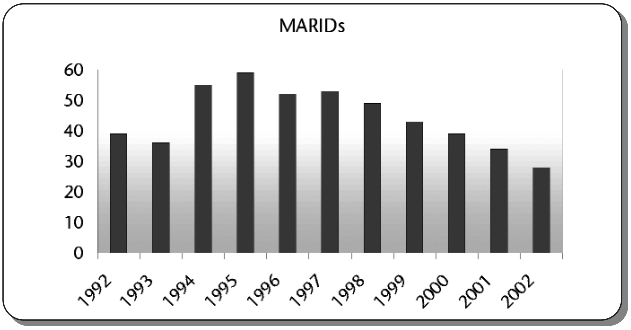
† See page 82 of this edition.

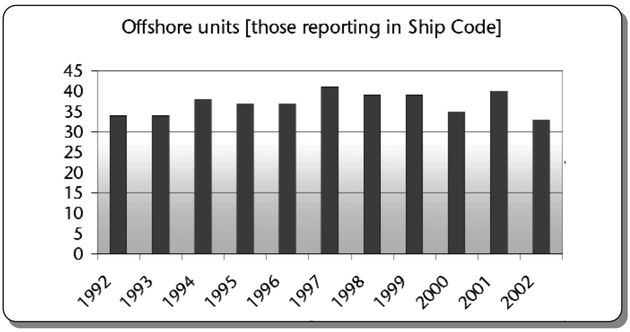
## Appendix

Numbers of Selected ships, MARID ships, Auxiliaries and offshore units recruited to the UK Voluntary Observing Fleet for the years 1992–2002.



# Marine Observations – the European view

In recent years some important steps have been made towards the development of co-operative European meteorological programmes in fields such as observing systems, data processing, basic forecasting products, research and development, and training. These have been initiated under the auspices of EUMETNET — a network grouping of 18 European National Meteorological Services — and are now starting to address a number of marine observing activities, including voluntary observing ships.

## EUCOS

One programme of great significance is the EUMETNET Composite Observing System (EUCOS), which ambitiously aims to establish and operate a truly integrated European observing network. Following the design and implementation phase, completed at the end of 2001, the 'EUCOS Operational Programme' was formally established on 1 January 2002, to run initially until 2006, and probably beyond. It offers the potential for optimised European observing networks, targeted observations and maximum cost-effectiveness, leading to heightened services and benefits for the whole European Community. Activities covered within the programme include land-based upper-air and surface observations; ship borne upper-air observations; upper-air data recorded by aircraft; and observations from voluntary observing ships and data buoys.

The area of interest to EUCOS is bordered by 10°–90° N, and 70° W–40° E; within it, the data considered are primarily upper-air profiles, and surface measurements of temperature, wind, humidity and precipitation. Whilst satellite observations are not strictly included, EUCOS recognises the need to carefully plan and co-ordinate the contributions from the space and terrestrial components.

## Contribution of surface and upper-air observations from ships

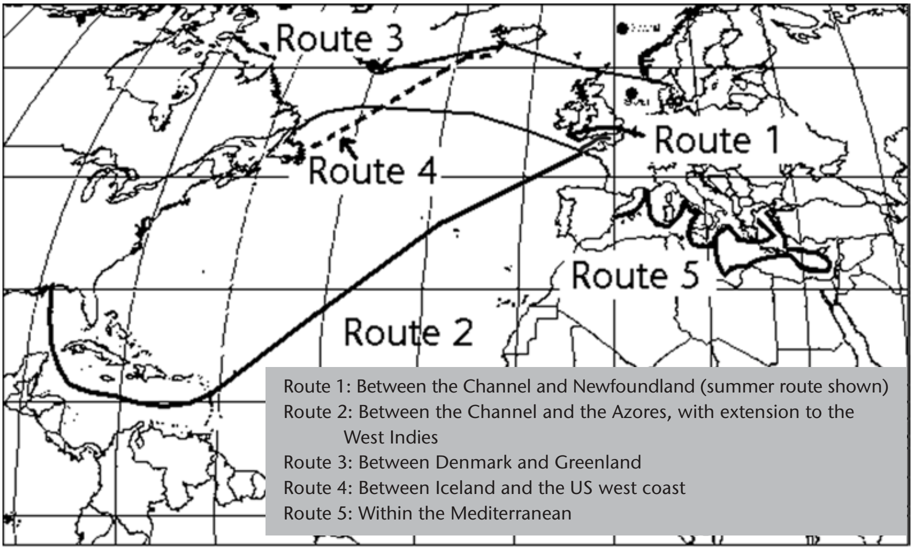
Surface marine surface data will be made available to EUCOS through an optional surface marine programme, which forms an integrated component of the main EUCOS Operational Programme. It is scheduled to run from 2003 to 2006, with the first two years focusing on developing a comprehensive design for the network and, subject to approval, implementation following thereafter at the start of 2005.

The surface marine programme design will address observations derived from specified voluntary observing ships, moored buoys and drifting buoys operated by EUMETNET members. Approximately 1,700 observing ships operated by participating member nations are initially expected to contribute data .

EUCOS requirements for marine upper air observations are already addressed by the EUMETNET-ASAP (E-ASAP) Programme. By integrating the management of the existing national ASAP systems it is anticipated that significant cost savings and network efficiencies will be recognised. During the course of the programme the number of E-ASAP ships operating is expected to increase to 18 by 2006. Observations from the UK ASAP ship *CanMar Pride* (left) are already contributing to this programme.

Anon

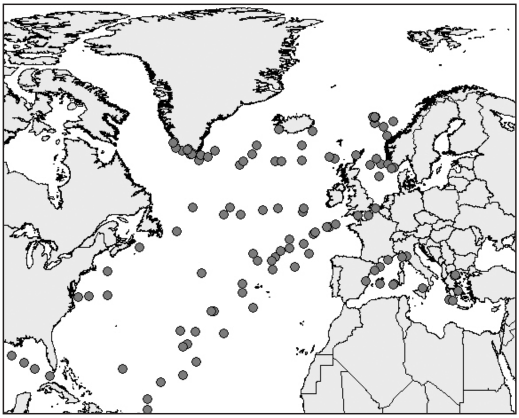
***Below:*** *Shipping routes of interest to EUCOS. (Note. The weather ship station 'Mike', and the Ekofisk platform in the North Sea, both also providing upper-air data, are shown by '● '). The overall objective is to attain 6,300 profiles annually within the EUCOS area by 2006.*




After EUMETNET/EUCOS

## Current ships participating in upper-air profiling within EUCOS

| Ship | Callsign |
|---|---|
| *Arina Arctika* | OVYA2 |
| *CanMar Pride* | ZCBP6 |
| *Douce France* | FNRS |
| *Esperanza del Mar* | EBUQ |
| *Fort Fleur d'Epee* | FNOU |
| *Fort Desaix* | FNPH |
| *Fort Royal* | FNOR |
| *Hornbay* | ELML7 |
| *Irena Arctika* | OXTS2 |
| *Nuka Arctika* | OXYH2 |
| *Peljasper* | SWJS |
| *Polarfront ('Mike')* | LDWR |
| *Sealand Achiever* | WPKD |
| *Skogafoss* | V2XM |



After EUMETNET/EUCOS

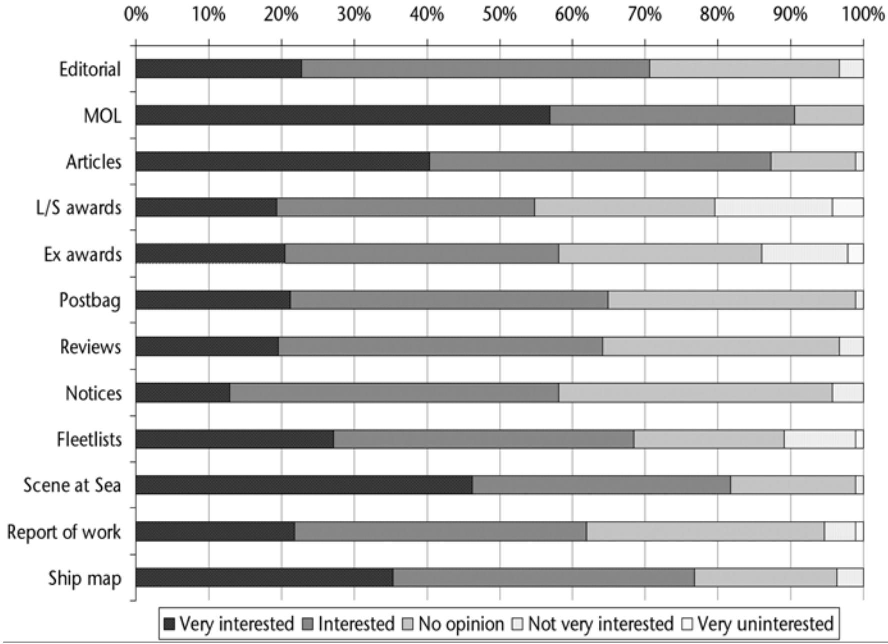
**Above**. *Upper-air profiles made during January 2003 within the EUCOS area of interest.*

*Editor's note.* This article has merely introduced EUCOS and its component programmes relating to marine observing. As these programmes gather momentum they will become of increasing relevance to voluntary observers serving on UK and other European recruited ships. We hope to publish updates on developments in due course.

# *The Marine Observer* readers' survey — 2002

Readers will recall that in the July 2002 edition of *The Marine Observer*, we invited views and opinions about the journal. We would like to thank everyone who took part.

Readers have certainly indicated their likes and dislikes — a graphical representation of these, as indicated by answers to Question 5, is shown below. We will take account of all views when planning future editions (within the restraints of available resources).

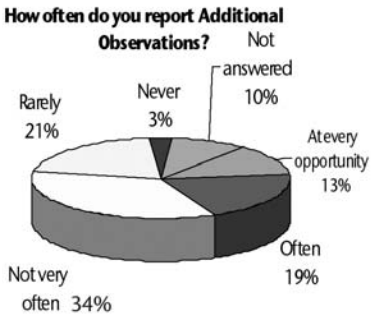



**Above:** *Readers' views on the contents of The Marine Observer.*

## Other findings and comments

**The 'Marine Observers' Log':** Many respondents requested an expansion of this section. While we would like to oblige every time, we are limited by the amount of material to hand when planning each issue. Our land-locked editorial team relies entirely on what is submitted by observers 'at the sharp end', therefore the content of the 'log section' is directly proportional to the input.

**Additional Observations:** One surprise revealed by the survey concerned Additional Observations. As the chart (overleaf) shows, it appears that approximately one-third only of observing officers may be responsible for the majority of these reports. Only two respondents reported that other duties precluded making observations, three said that nothing significant was ever seen, while one was unaware of the importance of these observations.




However, no respondents indicated that there was a lack of interest in making these reports. We hope therefore, that many observing officers who, until now, have not submitted any of their own sightings to the journal, will consider doing so in the future. Their reports will contribute to the pool of information from which the 'The Marine Observers' Log' section is drawn.

**E-mailing reports to obsmar@metoffice.com:** It was encouraging to note the proportion of observing officers (29 per cent) who now intend to use e-mail to send in their additional sightings. E-mail will enable us to simplify the processing of reports and will assist in keeping relevant experts abreast of the latest reports.

**'Scene at Sea' and colour illustrations:** There were many requests for increases in both the overall amount of colour used in the journal, and in the number of observers' own photographs in the 'Scene at Sea' at section.

Current arrangements for publishing *The Marine Observer* allow for 16 pages of colour work in each edition, on four of which we would like to publish observers' own camerawork. However, the reality is that many photographs and images that accompany reports lack sufficient clarity and resolution to enable good reproduction (although they may well be sufficient for identification and expert comment). Photography at sea presents many difficulties, not least of which are the ship's motion and often distant subjects; nevertheless it is felt that readers prefer to see sharp images.

**Quality of other illustrations:** In respect of simple line-drawings that sometimes accompany a report, it is accepted by the editorial team at least that the majority of ships' observers do not profess to be trained artists. It is felt that where sketches and diagrams (however basic) add clarity to a narrative these should be included; again, even rough sketches can aid the identification of species. In addition, copyright issues greatly affect the amount of work that can be carried out to improve or 'clean up' an original sketch or diagram.

**Suggestions for future topics:** A selection of readers' suggestions follows:

- **Marine weather** — encounters with severe storms; structural damage to ships; climate change; seasonal storm patterns; quarterly weather summaries.
- **Forecasting** — developments in technology and techniques;
- **Wildlife** — more guidance on the identification of marine species; information about the migration of birds and mammals;
- **Astronomy** — monthly or quarterly star charts; significant events;
- **History** — history of marine observations;
- **General** — more emphasis on weather events in home waters and the North Sea.

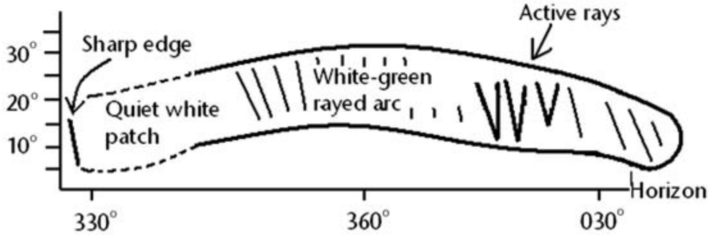
We appreciate these ideas and will try to take account of as many as possible in the future.

# Postbag

## Aurora borealis

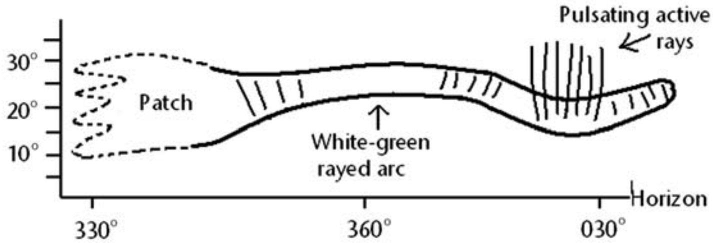
Formerly a meteorological officer with the UK Ocean Weather Ship service, my old observing habits die hard, and I therefore offer this report of the aurora from the fishery research vessel *Clupea*. The ship was working in the North Sea in position 56° 27′ N, 02° 02′ W when, on the night of 1/2 October 2002, a display of the aurora borealis was noted when the ship's head was brought round to the north at 2100 UTC.

The area of activity covered an arc from 330° to 040°, with most action happening in the region of 020°. The first diagram (below) shows what was seen at 2105.

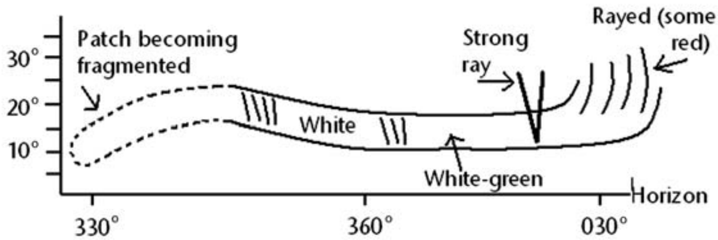



2105 UTC

During the next five minutes the defined edge to the end of the patch softened, and the active rays moved further towards the other end of the rayed arc. At 2115, the patch was becoming much less defined, but the active rayed area was now pulsating and showing some red colouration. Ten minutes later, the patch was starting to fragment, while the entire band formation took on a more regular shape. The active area now comprising a single strong ray and a separate rayed section that still showed red at times. (See diagrams below.)




2115 UTC




2125 UTC

By 2130 the display was much less pronounced — the patch was breaking up, the rayed band had reduced to a homogeneous band, but the active area still showed pulsating active rays. However, between 2140 and 2150 the display faded completely.

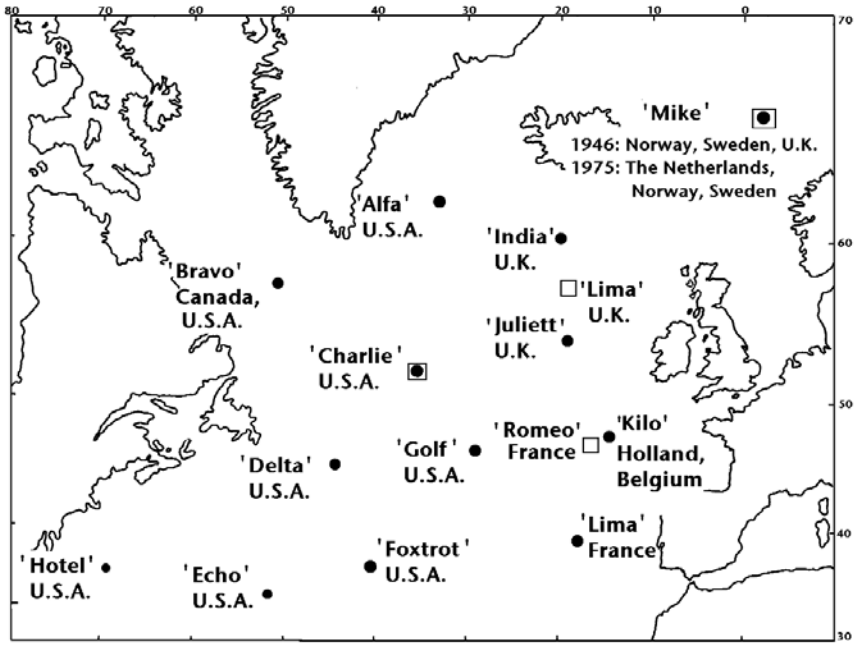
From M. Hatch (Steward, f.p.v. *Clupea*)

# Corrections to *The Marine Observer* — January 2003

## Page 42:

Figure 1 did not fully identify those countries involved with operating station 'Mike'. The amended map (below) shows that in 1946 this station was made the responsibility of Norway, Sweden and the UK. After the weather ship network was restructured in the 1970s, station 'Mike' was manned by The Netherlands, Norway and Sweden.

Our apologies to those officers who have manned that station.




## Page 50:

*Harmane Spirit* should read *Hamane Spirit*

*St Sunnniva* should read *St Sunniva*

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