**STAR 2000: McARTHUR WEEKLY REPORT**
7 September 2000
Sarah L. Mesnick

**SCIENCE SUMMARY: 31 August - 6 September**

This week, we have traversed southwest 15 degrees of latitude and 20 degrees of longitude, from 19N 153W at the beginning of the week to 5N 133W, waters where wogs are wogs and shellbacks don't let them forget it. Although the week started out rough, buffeted by the trade winds (we were shut down entirely on 31 August), each day steadily improved, bringing lower winds and gentler seas (average B4 conditions). Four full days out of Hawaii, we entered the study area at 1630 on 3 September, celebrating the occasion at the fantail BBQ (complete with a heaping platter of tropical fruit, fresh wahoo and mahi and topped of by one of Leroy's stunning cakes). It wasn't until yesterday, at 7N, that ITCZ conditions dominated our weather. However, drenching rains did not deter the intrepid oceanographers, crew and dipnetters that work the dawn hours. Then, huddled behind a makeshift shelter the birders recorded their first bird of the day, and our 14th for STAR2000, a rare collared petrel. Not to be outdone, the mammal observers came on effort strong and, between showers, recorded the first spinner/spotted school of the leg.

While our mammal sightings have been sparse, we may have to leave our birders here, where the Pterodromo petrels flourish. On 4, 5 and the morning of 6 September, each sighting was heralded by an exclamation marking another exotic species. Traversing about 250 miles of trackline during this time, Chris and Brett recorded nearly a third of the world's Pterodromo species and perhaps the second northern hemisphere record for the Great-wing petrel. A number of these species hail from small, threatened or endangered populations that breed on isolated South Pacific Islands. Their existence on the breeding colonies is continually threatened by the introduction of rats, cats, stoats (pronounced with a distinct Australian accent, it is a member of the weasel family), humans and exotic plants. This has resulted in the death of many individuals, the loss of entire colonies and, in the worse cases, extinction. Populations number in the low thousands for some species, but in this small stretch of ocean, we encounter up to 40 individuals from these difficult to see species (see below). This week's cruise track runs north of and nearly parallels the cruise track from Leg 1/Week 4, in which Lisa similarly noted a seascape dominated by Pterodromo petrels (E of our location). As we wonder what might account for this, Pierre Malan and Joe Shook pull up a full color visualization of the water column characteristics and we entertain ourselves by conjuring up possible explanations (see below). Now, if only they had a way to tell us why there aren't more mammals here.

Perhaps some of best news is that all our operations are running smoothly. Earlier this week, however, the acoustic array, which was functioning perfectly, decided to quit. Shannon and Megan worked dawn to dusk for days diagnosing the problem and then preparing the backup array. They now wield strap wrenches like pros and we wouldn't recognize them without their ever-present volt-ohm-ammeter. The Markey winch used to

raise the CTD has been plagued by some tracking problems, which are under intense scrutiny by the command and deck crew and we're using the last backup flowmeter for the net tows. Richard, Brett and Leroy seem to catch fish off the stern lines nearly every day -- a wahoo, 2 mahi and a gorgeous rainbow runner. Besides the 360-degree sunsets and an occasional rainbow, these fishes are the most brilliant colors we see out here -- hydrodynamic marvels wrought in gold, silver, blues, yellow and greens.

We will continue on our southwesterly track for the next few days, before entering the jaws of Davey Jones's locker. Wish all of us wogs luck and a clean shower ....

**Acoustics Squeakly Report: (Shannon Rankin)**

The week began decidedly dull, with a lack of distinct dolphin schools. Most detections were of a handful of faint whistles followed by hours of nothing. The acoustic highlights were several sperm whale detections (four separate groups in the first three days), with detection of at least one sperm whale for what appeared to be well over 15 nm on September 1st. Even on the fateful Labor Day, we managed a successful sonobouy recording of a Bryde's whale 42 Hz vocalization. Just as I had become re-accustomed to the droning of the Mac in stereo, our smooth-as-butta operations turned lumpy. The array decided to take Labor Day off. While I completely sympathize with this sentiment, I am not very accepting of this type of behavior in inanimate objects. The prognosis looks bad, and with every diagnostic test, the prospects become more bleak. It just refuses to play with us anymore (power supply failure within the array). Megan and I alternate running tests on the array and prepping the back up (which had a leak to be sealed). Meanwhile, my gray matter (already shorting due to excessive overloading) was contemplating whether it was sabotage ... was it my "trusty" partner Megan, the lazy apathetic overworked Wog who was determined to get her fair share of "cruise" during this cruise? Was it old faithful fisherman Leroy who is willing to do anything (ANYTHING?) to toss over his port stern handlines? Or was it good ole' Jim Cotton, who has been known to plead (with his evil cackle) "Job Security!". Alas, I am at a loss. Possibly what is needed is a sacrificial Wog? The old array is currently safe in its nest and the back-up will be functional by the time this goes to print. Stay tuned....

**Bird News (Brett Jarrett and Chris Hoefer):**

The leg started out very quiet, less than a bird an hour (an hour and a half was needed to make the bird fly properly), and gradually increased to several hundred a day, thanks to sooty tern flocks. Diversity and abundance peaked during 4-6 September in which we recorded no fewer than 36 Black-winged petrels, 40 Pycroft's petrels, 40 Phoenix petrels, 23 Cook's petrels, 3 Collared petrels, 23 White-winged petrels, 8 Kermedec, and 45 New Zealand shearwaters ("Puffinus beaslii"). After the morning of 6 September, diversity and abundance dropped dramatically. Regarding the usual suspects: sooty terns have been consistent, several hundred seen each day; Juan Fernandez petrels and dark morph Wedge-tailed shearwaters, maybe a 100 per day; and very few storm petrels.

**SIGHTINGS AND EFFORT SUMMARY FOR MARINE MAMMALS: 31 August - 6 September 2000**

083100 No effort due to high winds

090100 0600 N18:37.04 W151:49.06 130.6nmi 5.0
1814 N17:29.96 W149:51.93

090200 0641 N16:26.45 W148:01.37 131.7nmi 4.0
1856 N15:15.22 W146:05.10

090300 0721 N14:07.65 W144:02.21 107.4nmi 4.9
1834 N12:57.33 W142:09.94

090400 0618 N11:59.38 W140:59.82 123.0nmi 4.3
1814 N10:38.90 W139:21.07

090500 0607 N09:39.21 W138:09.34 122.2nmi 4.2
1751 N08:10.95 W136:32.95

090600 1015 N06:53.63 W134:49.02 75.1nmi 4.5
1750 N06:01.45 W133:46.43

| Code | Species | Tot# |
|---|---|---|
| 72 | Balaenoptera edeni | 1 |
| 02 | Stenella attenuata (offshore) | 1 |
| 13 | Stenella coeruleoalba | 2 |
| 11 | Stenella long. hybrid (Whitebelly) | 1 |
| 77 | Unid. dolphin/porpoise | 5 |
| 79 | Unid. large whale | 1 |
| OTHER | | 1 |
| TOTAL | | 12 |

Common dolphins 0
Spotted/spinner 2
Blue/humback wh. 0
Other delphinids 0
Other cetaceans 0

**BIOPSY SUMMARY: 31 August - 6 September**

| Species | Number of Samples | Cumulative Total |
|---|---|---|
| Globicephala | 0 | 7 |
| Tursiops truncatus | 0 | 3 |
| Stenella attenuata | 0 | 1 |
| Grand Total | 0 | 11 |

**35 mm PHOTO SUMMARY: 31 August - 6 September**

| Species | Number of Schools/Individuals | Cumulative Total |
|---|---|---|
| Stenella attenuata | 0 | 6 |
| Stenella longirostris | 0 | 6 |
| Stenella coeruleoalba | 0 | 1 |
| Tursiops truncatus | 0 | 2 |
| Grampus griseus | 0 | 1 |
| Globicephala macrorhynchus | 0 | 3 |
| Indopacetus pacificus | 0 | 1 |
| Orcinus orca | 0 | 1 |
| Grand Total | | 21 |

**OCEANOGRAPHIC SUMMARY: 31 August - 6 September (Pierre Malan)**

Oceanographic sampling has been progressing smoothly despite a continuing problem with the spooling gear on the Markey winch. This problem slows down the retrieval of the CTD to some extent, but is not critical. Temperature and Salinity data from the CTD casts have been imported into Ocean Data View, an oceanographic software package written by the Alfred Wegener Institute in Germany, which allows us to produce vertical sections along the trackline.

The temperature structure is characterised by warm surface water and strong thermoclines, which become weaker as we move to the south-east. The salinity profile is much more interesting, showing a strong salinity front in the region of 134$^{o}$30'W and 6$^{o}$30'S. To the west of this front the surface salinity was as low as 33.31 ppt, although with a plug of 34.7 ppt water at about 200 meters. Surface salinities to the east of the front are in the region of 35.1 ppt. It is hoped that the ability to visualise the oceanographic conditions will prove to be useful to the dolphin and bird observers by giving greater insight into the environment.

The XBT casts have been successful with only one probe proving to be faulty.

| Operation | This Week | Total |
|---|---|---|
| CTDs | 7 | 55 |
| XBTs | 24 | 104 |
| Manta Tows | 4 | 28 |
| Ring Net Tows | 0 | 9 |
| Bongo Tows | 4 | 28 |