STAR 2000: McARTHUR WEEKLY REPORT
20 September 2000
Sarah L. Mesnick

SCIENCE SUMMARY: 14 - 20 September 2000

This week, we continued to traverse eastward along our southern-most trackline until waypoint 6, where we turned northward and crossed back into the northern hemisphere and waypoints 7 and 8. Currently, we are steaming northeasterly toward the core area, at 3N 104W, from where this report comes. Our weather continues to be dominated by an equatorial trough (an area of low pressure near the equator formed as warm air rises), which produces moderate tradewinds blowing steadily at 10 - 25 knots. We've had a couple of low Beaufort sea state days but generally the keen-eyed mammal observers work the edge between B5/B6. Increased convective activity associated with rainshower/thunderstorms caused winds to reach near gale force levels (B8) on 19 September. The mammal observers are forced below on such days but provide company to the windblown birders who remain on the flying bridge and the oceanographic team (scientists, crew and command) who successfully wrestle with winds, currents and nets each evening on the fantail. We are blessed with a moderate-sized swell off the bow such that our ride remains relatively calm. All operations continue to function smoothly (a 5 on a scale of 1 to 4 -- Harry Cane, chief engineer).

The unofficial rivalry between the visual and acoustic observers came full circle this week, with the visual observers bemoaning the loss of the acoustic array. On the nights of 16 and 17 September, as we straddled the equator, we were besieged with large Dosidicus squid at the evening CTD and dipnetting station -- squid eating squid, squids squirting, squid flashing colors, squid flying, and squid on the line (to the joy of the fantail fishermen and fisherwomen). These large squid (some we caught were a meter in length and the ones that got away approaching 1.5m) are also a favored food of sperm whales. By day, the mammal observers surveyed in B3/4 conditions and boat drivers were readied, but sadly (to this sperm whale biologist at least) in vain. The acoustic array, our ears in the water, was sorely missed as their uncany ability to detect sperm whales is now widely agreed upon. Just north of the equator, we crossed a thermal front that caused water temperatures to abruptly rise over 30C. We left the squid behind in the colder waters. (We crossed a similar thermal front in reverse at the same latitude last week as we ventured south). The abundance of flying fish increased noticeably on 19 and 20 September in the warmer waters.

This week we encountered large stretches of trackline nearly devoid of life. Mammal sightings have been few and far between (0, 1, 2 - 5 sightings/day). Striped dolphin schools were our most common sighting, some with large numbers of calves. The behaviorists among us are keenly watching the behavior of these schools as compared to those schools without calves. There were two sightings of Pseudorca, both caught on tape by the acousticians, and one of which provided unparalleled photo ops; a couple of Bryde's whales; one sperm whale sighting (on 14 September); one spotted dolphin

sighting and no spinner/spotted schools. Jim Cotton summed up the week succinctly, "a lot of habitat and not much in it".

This week also saw the final transformation of pollywogs into shellbacks. The colorful ceremonies are secret, and of such ancient vintage that their origins are lost, but suffice to say that all pollywogs were found worthy to enter the ancient order of the deep, and that the fresh water supply was heavily called upon to clean up the mess. A ship full of shellbacks now, we look forward to entering the core area in the coming week.

ACOUSTICS SQUEAKLY REPORT: (Shannon Rankin and Megan Ferguson)

Now that the diversions of the equator crossing are finally over, the reality of our situation has settled in, and quite an unsettling truth it is. What is an acoustics-less acoustician to do with her countless spare hours during the day? In truth, we have plenty of work, it is the motivation that is lacking. The days are spent hugging the countertop to keep from sliding across the room as we try to edit data or fix a computer glitch. An office at sea is no life for me. I miss my array, and even the good old sound of the props churning away the (nautical) miles. If I promise to be a good girl, can I have my toys back?

On a higher note (literally), we did have some success on the sonobouy front. We started the week with a successful sonobouy recording of a dispersed school of Psuedorca crassidens and on Friday we deployed a sonobouy on a confusing sighting of Globicephala. The middle of the week was slow, and our next sonobouy was not until the closing of the week, on Wednesday. We started off the morning with a small group of typically quiet Bryde's whales, and then closed the day with a very vocal group of our favorite Psuedorca. Our sonobouy performance has returned to the typical 50% success rate, especially with the high frequency sonobouys. We deployed a total of 7 sonobouys on four sightings.

BIRD SUMMARY: (Brett Jarrett and Chris Hoefer)

Seabird numbers have been low this week although diversity has been high, with 20 September yielding an amazing 20 species from about 80 birds*. We are now back into Frigatebirds as we come within reach of their breeding haunts on the Galapagos Islands. White-winged Petrels have kept Chris and I awake most of the week, as did the delightfully (-NOT-) high number of flying fish. The avian marvel of the week were 2 Henderson's Petrels, a bird which has recently been split off from the Herald Petrel. One came within 150 meters of the ship, giving Chris a rare close-up view.

*Small numbers of Leach's, Galapagos and Harcourt's Storm Petrels; Tahiti, Kermadec, Juan Fernandez, Dark-rumped and Stejneger's Petrels; Sooty Terns; and Parasitic and Long-tailed Jaegers have been the backbone to a very slow week.

SIGHTINGS AND EFFORT SUMMARY FOR MARINE MAMMALS: 14 - 20 September 2000

091400 0654 S04:19.85 W117:35.17 65.0nmi 5.2
1831 S04:16.97 W116:04.49

091500 0635 S04:09.34 W114:41.52 91.9nmi 5.1
1827 S04:03.38 W112:53.48

091600 0623 S03:29.09 W111:57.57 81.1nmi 4.6
1823 S01:48.44 W111:32.59

091700 0617 S00:51.67 W111:18.16 83.7nmi 3.9
1817 N01:00.86 W110:52.84

091800 0612 N02:07.35 W110:35.25 102.5nmi 3.8
1806 N03:57.36 W110:04.25

091900 no effort due to weather

092000 0601 N02:54.70 W106:28.47 104.1nmi 5.0
1745 N03:50.29 W104:57.54

Code	Species	Tot#
99	Balaenoptera borealis/edeni	1
72	Balaenoptera edeni	1
36	Globicephala macrorhynchus	1
46	Physeter macrocephalus	1
33	Pseudorca crassidens	2
02	Stenella attenuata (offshore)	1
13	Stenella coeruleoalba	7
18	Tursiops truncatus	1
77	Unid. dolphin/porpoise	2
TOTAL		17

Common dolphins 0
Spotted/spinner 0
Blue/humback wh. 0
Other delphinids 3
Other cetaceans 2

BIOPSY SUMMARY: (Ernesto Vazquez)

Species	Number of Samples	Cumulative Total
Balaenoptera edeni	0	1
Globicephala macorhynchus	0	7
Stenella attenuata subsp.	0	1
Tursiops truncatus	0	3
Grand Total		12

35mm PHOTO SUMMARY: (Annie Douglas)

Species	Number of Schools/Individuals	Cumulative Total
Stenella attenuata	0	6
Stenella longirostris (SW)	0	7
Stenella coeruleoalba	0	1
Tursiops truncatus	0	2
Grampus griseus	0	1
Globicephala macrorhynchus	0	3
Indopacetus pacificus	0	1
Orcinus orca	0	2
Balaenoptera edeni	0	2
Pseudorca crassidens	1	0
Grand Total		26

OCEANOGRAPHIC SUMMARY: (Pierre Malan)

The past week saw us crossing the equator for the second time. The oceanographic features are dominated by a distinct temperature and salinity front situated on the equator. Temperatures changed from the mid 22° C range just south of the Equator to 25° C water just north of it. Water temperatures fluctuated markedly in a 1°C range in this warmer water area. Salinities changed from above 35 ppt in the south to the mid-34 ppt range in the north. A body of more saline water (ñ35 ppt) underlies the lower salinity surface water to the north-west of the front. This results in a sharp density gradient, ranging from a sigma-t value of 22.8 at the surface to 26.25 at 170 meters.

Thermoclines in the region are shallow and strong, with no appreciable mixed layer near the surface. Sea surface temperatures this year are rather warmer than in the similar area last year, being 1°C to 4° C warmer. The tongue of cool water intruding from the south-east is about 4°C warmer than last year.

Chlorophyll values are somewhat higher than previously seen in this area, with a less marked chlorophyll maximum. The cool tongue of water brought large numbers of giant squid with it. These animals devoured our lures, and each other, but promptly disappeared as we crossed the temperature front at the equator.

Operation	This Week	Total
CTDs	14	83
XBTs	21	145
Manta Tows	7	42
Ring Net Tows	6	17
Bongo Tows	7	42