

**STAR 2006: NOAA Ship *David Starr Jordan*
Weekly Science Report**

*Robert L. Pitman, Cruise Leader
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Science Summary: 24-30 August 2006

We spent a brutal week in the core area of the ETP and got very little useful survey done. This is an often turbulent area where the eastern Pacific manufactures hurricanes for export, generally to the north and west. It was Beaufort 5-6 most of the week: wind and whitecaps kept our observation effort in the marginal to uninhabitable zone, except the last day when it showered most of the daylight hrs. Our entire Oceanography Dept (Candy) was down hard (sick) for 4 days so we don't even have a full compliment of CTD data to show for our troubles. And to top it off, a nasty cold is slowing working its way through most of us on board. No biopsies; 1 school of dolphins 'photographed'; 3 turtles captured at dusk on day 7. All-in-all it was a trying week. Our new mammal observer this year is Adam Ū. He provides us with heavy metal music via Motley Crue for our morning coffee on the flying bridge, rather like having glass shards in your Cheerios. He is a good observer and welcome addition to *our* motley crew although I may have to impound his iPod. (Oh, oh - is this the view from the *other* side of the Generation Gap?). Crew members Sam Velez and Joao Alves are determined to rid the ocean of large, predatory fish and they are doing a fine job of it – they have been providing plenty of samples for the galley and Bob Olson's (IATTC) isotope study: Happy Hooking! Talk of Costa Rica, our next in port, is ramping up - always a sign of a slow leg. Better days are ahead.

But, despite a barrage of wind and rain (and mucous) we still had some eventful dipnetting. One hr after sunset each day, armed with long-handled (20' long) dipnets, we try our hand at sampling fish and squid that collect around the boat in the evening. This provides us with a sample of the prey field that supports the marine mammals and birds that we census during the daytime. There are 20 or so species of flyingfish that occur in the ETP and we usually catch a few individuals (sometimes dozens) every night. Myctophids (lanternfish), usually in the 1-3" size range, migrate up from the depths under cover of darkness to feed at the surface at night and we usually catch at least some, and often many of them. Spotted and spinner dolphins eat lots of myctophids, as do squids. At night, most of the squids we see (and often catch) are medium-sized, 12-18" long, although sometimes we catch juveniles down to an inch or so in length. The wily squid can travel forward or backward, depending which way it points its funnel. They swim fastest when then are traveling backwards, pointy end forward, but they can only capture things when they are moving forward so they can put their arms and tentacles to good use. This means that when they spot a potential prey item, they have to shoot past it, stop, then lurch back in the opposite direction to make the capture. It would seem to be an awkward way to do business, but it obviously works - we see squid almost every night out here and often quite a few - 100s. When a squid catches, say, a myctophid, it thrusts out its two long tentacles and grabs onto the prey with its hooks and/or suckers, then pulls it back towards its beak nestled in the middle of the arms. The squid immediately bites the fish behind the head and severs the spinal cord - no more struggle. These squid are voracious enough that they will often have 2-3 whole myctophids tucked in among their arms, while they are feeding on a different one, and still hunting for more. Sashimi - breakfast, lunch and dinner.

A game of Murder has broken out onboard the mighty DSJ - the ‘murderer’ plants a card with a yellow dot on it around the ship; if you stumble across it you are dead. The players have to figure out who the serial killer is before everyone is dead. It has provided endless amusement on a dreary leg, but it makes me feel like I am traveling across country with my family and playing license plate bingo. Are we there yet?

Sightings and Effort Summary for Marine Mammals

Date	Start/ Stop Time	Position	Total nm	Average Beaufort
082406	0727	N07:19.47 W112:12.30	108.7	4.1
	1853	N06:07.18 W110:50.64		
082506	0713	N05:09.21 W109:45.04	78.4	5
	1850	N05:35.46 W108:14.99		
082606	0704	N05:53.56 W106:35.96	48.8	5.2
	1903	N06:24.53 W104:37.00		
082706	0646	N06:49.02 W103:02.66	22.8	5.4
	1846	N07:12.53 W101:32.83		
082806	0639	N07:33.13 W100:12.87	60.8	4.8
	1837	N07:55.33 W098:41.34		
082906	0639	N07:41.17 W097:19.61	72.1	4.9
	1820	N07:07.25 W095:33.07		
083006	1014	N06:32.46 W093:31.07	39.6	3.9
	1748	N06:15.05 W092:25.70		

Code	Species	Number of Sightings
2	<i>Stenella attenuata</i> (offshore)	8
10	<i>Stenella longirostris orientalis</i>	3
13	<i>Stenella coeruleoalba</i>	12
15	<i>Steno bredanensis</i>	1
17	<i>Delphinus delphis</i>	1
49	ziphiid whale	1
79	unid. large whale	1
Total		27

Photography (Cornelia Oedekoven and Laura Morse)

This was the slowest week for photo-id as far as I can remember my days with SWFSC. The entire week we had either too rough conditions to work or when we did finally find dolphin schools they were all running away from us. However, literally during the last few minutes of this week a school of rough-toothed dolphins came over to ride the bow. Due to the dim light before sunset, the images are good enough to identify the species – at best.

Species	Weekly photographs		Total	
	Individuals	Schools	Individuals	Schools
<i>Stenella attenuata</i> (offshore)				9
<i>Stenella longirostris</i> (unid.)				5
<i>Stenella longirostris</i>				2
<i>St. l. orientalis/a</i> (offshore)				2
<i>Stenella coeruleoalba</i>				2
<i>Steno bredanensis</i>	1			6
<i>Delphinus delphis</i>				10
<i>Tursiops truncatus</i>				9
<i>Grampus griseus</i>				5
<i>Globicephala macrorhynchus</i>				1
<i>Physeter macrocephalus</i>			20	
Ziphiid whale				1
<i>Berardius bairdii</i>				3
<i>Balaenoptera edeni</i>				1
<i>Balaenoptera physalus</i>			2	
<i>Balaenoptera musculus</i>			15	
<i>Stenella attenuata</i> (unid.)				1
<i>Balaenoptera borealis/edeni</i>				5
Total	1	0	37	62

Biopsy (Juan Carlos Salinas and Ernesto Vásquez)

Species	Common Name	Weekly		Total	
		Samples	Takes	Samples	Takes
<i>Balaenoptera edeni</i>	Byrde's whale	0	0	3	3
<i>Balaenoptera musculus</i>	Blue whale	0	0	8	16
<i>Delphinus delphis</i>	Short-beaked common	0	0	15	32
<i>Globicephala</i>	Short-finned pilot whale	0	0	8	19
<i>Physeter macrocephalus</i>	Sperm whale	0	0	8	8
<i>Stenella attenuata</i>	Pantropical spotted	0	0	12	23
<i>Stenella coeruleoalba</i>	Striped dolphin	0	0	1	3
<i>Stenella longirostris</i>	Eastern spinner dolphin	0	0	6	20
<i>Stenella longirostris</i>	unidentified spinner	0	0	21	33
<i>Steno bredanensis</i>	Rough-toothed dolphin	0	0	2	2
<i>Tursiops truncatus</i>	Bottlenose dolphin	0	0	14	24
Total		0	0		

Bird Buzz (Rich Pagen and Chris Cutler)

Seabird Report - Rich Pagen and Chris Cutler

As northerners heading south to study the tropical ocean, it's easy to have a particular appreciation for the birds that make a similar seasonal journey to these low latitude waters. We encountered all three species of jaegers (Pomarine, Parasitic and Long-tailed) this week, most frequently as lone individuals attending feeding flocks. Jaegers spend the northern summer raising their young on lemmings and birds in the Arctic, followed by a long journey south and

out to sea, where they spend the winter. As lemmings are “a rare commodity” in the open sea, jaeger life in the pelagic realm makes a dramatic shift, becoming an existence of intimidation, harassment and physical abuse. Taking advantage of the fact that seabirds can regurgitate food at will (seabirds evolved that ability to be able to provision their chicks back at the nest after feeding), jaegers torment other seabirds to the point where regurgitating their food load to escape the assault becomes their best option (called kleptoparasitism).

The Kermadec Petrel takes the jaeger story to the next level. We encountered several Kermadec Petrels this week, frequently with feeding flocks, and the first thing that comes to mind when panning across a bird flock and coming across a Kermadec Petrel is, “Is that a jaeger”? They have developed a body shape and markings (most notably the white wing patches) very similar to those of the jaegers and, although not kleptoparasites themselves, they may benefit by looking like one (after all, a free lunch is a free lunch).

These outer tracklines continue to provide us with interesting bird sightings, even while the mammal and turtle densities have dropped way off. The windy conditions which dominated much of the week are the ideal setting for watching *Pterodroma* petrels in the heart of their element. Black-winged, White-winged, Juan Fernandez, Tahiti, and Cook’s Petrels were all seen this week. Other noteworthy sightings this week include Markham’s and Harcourt’s Storm-petrels, Audubon’s and Christmas Shearwaters, Bulwer’s petrels, and a smattering of White Terns. Nazca Booby encounters are becoming more frequent as we get closer to their main breeding sites in the Galapagos Islands (Ecuador) and Malpelo Island (Columbia).

The marine debris highlight of the week was a FAD (fish aggregating device, complete with a radio transmitter), this particular one a 6ft x 4ft raft of burlap and wood. It was accompanied by an immature masked booby, as well as an assortment of fish including large school of mahi mahi, and some wahoo, yellow-fin tuna, and a small shark (perhaps ‘silky’). We left it just as we found it, except for a gift of a fishing lure, generously donated by one of the fishermen.

Turtle Operations (Lindsey Peavey, et al.)

We hadn’t caught a turtle all week. With less than two hours left in the week, and rain clouds filling the sky, my weekly report was not going to have anything to report. As Rich and I stared out into the sheets of rain from a very soggy flying bridge, we laughed about how the birders work through just about any weather. I was just about to leave when Rich spotted a mating pair of turtles on the bow! We dropped a marker float, then another - we didn’t want to lose these guys. “Launch the small boat!” Bob shouted. A team of us raced out to scoop up the lovebirds, and then the first float, and then the... “Wait! There’s another turtle right next to the second float!” A perfect and quick example of how turtles tend to associate with flotsam in the open ocean – when it rains, it pours. [Ed. Note: the turtles weren’t actually mating – the male was attached with his claws but she was having no part of it. No love lost here.]

Species	Common name	Number sampled	
		Weekly	Total
<i>Caretta caretta</i>	Loggerhead	0	8
<i>Lepidochelys olivacea</i>	Olive ridley	3	40
Total		3	48

Squid Ops (Iliana Ruiz-Cooley)

During this week, I have been fortunate to observe four squid species at surface: *D. gigas*, *Onychoteuthis* sp., *S. oualaniensis* and *Thysanoteuthis rhombus*. The dominant species has been the purpleback squid, *S. oualaniensis*, but on 26 August I was happy to see my first diamondback squid, *T. rhombus*. This is an epipelagic species (i.e., occurs at the surface) that is usually observed swimming in pairs. It is a powerful swimmer with a very muscular mantle and long fins that occupy the entire length of the mantle. Many of the scientists came to the wet lab to take pictures and have a better look at this rare and wonderful species. The two specimens we caught had mantle lengths that measured 25 cm (10”) and 45 cm (18”), respectively. Definitely, this was great week and I am fortunate to be sailing with many interesting people and scientists on board the DSJ, and share these unique experiences. I have three more days before the second leg finish. So...wait for more squid news!

Fish Sampled for Diet and Isotope Analysis

Species	Samples	
	Weekly	Total
Yellowfin Tuna	5	18
Skipjack*	0	9
Wahoo	0	3
Mahi Mahi	5	11
Yellowfin Tuna	5	18

*Includes black skipjack

Oceanographic Operations (Candy Hall)

Well, after a couple of days of being cabin-bound it's great to get the CTD back into the swing of things (not literally!). Due to the diligence of Lindsey Peavey and our two international observers, Christian Naranjo and Juan Cordova, the daily chlorophyll and XBT stations continued despite my absence. As we sail toward Costa Rica, our CTD and XBT casts are now depicting classic, text-book style traces, allowing the capriciousness of field oceanography a brief moment of tranquility...

Date	CTD	XBT	Bongo tow	Manta tow
24 Aug	0	5	1	1
25 Aug	0	5	1	1
26 Aug	0	5	1	1
27 Aug	1	3	1	1
28 Aug	2	3	1	1
29 Aug	2	3	1	1
30 Aug	2	3	1	1
Weekly Total	7	24	7	7