

STAR 2006: NOAA Ship *McArthur II*
Weekly Science Report

Susan Chivers, Cruise Leader
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Science Summary: 16- 22 November, 2006

We spent the first three days of this week continuing our work with the aerial photography team. However, while I was writing last week's report Hurricane Sergio was brewing, making it look like our calibration data collection efforts would be in vain. And the first day, they were, so we hunkered down to wait out the storm. Fortunately, Hurricane Sergio lost some of its strength and the inshore area where we were (off Punta Muldanado, Mexico, which is south and east of Acapulco) became calm enough for us to find dolphins and the plane to photograph them. And we found lots of animals! Lots of pantropical spotted dolphins scattered in groups of twos and threes, some Bryde's whales, and several Central American spinner dolphin and short-beaked common dolphin schools. So during our last two days working with the plane, we were able to collect calibration data from 6 more schools for a grand total of 16.

While we were working inshore off Punta Muldanado, we sighted four turtles with flipper tags. Unfortunately we couldn't read the tags, but we couldn't help but wonder if we were seeing some of the turtles the R/V David Starr Jordan had tagged just a couple of weeks ago or perhaps some turtles tagged by researchers working on the nesting beaches of Mexico.

Having completed our work with the plane, we returned to our primary mission of this cruise: collecting data for estimating abundance of spotted, spinner and common dolphin populations that inhabit the eastern tropical Pacific Ocean. Well, almost. We had one more visit to Acapulco to pick-up a replacement XBT computer before we could leave the coastal area and head offshore to begin running our line transect survey tracks. The XBT computer stores the temperature-depth profiles we obtain using XBT probes (expendable bathy-thermograph), and the computer we had went belly-up just as we got the CTD working. The replacement computer we picked up during a very brief stop in Acapulco was up and running immediately and we are once again back to doing full oceanographic operations.

Our survey track this week took us offshore to the southwest of Acapulco. We enjoyed calm seas and many cetacean sightings while we were still inshore. We had one exceptional sighting of pygmy killer whales during which we recorded their vocalizations (see the 'squeakly' report below). But once we were offshore, things were different. A big storm that originated in the Gulf of Tehuantepec brought us such big swells and high winds that we completed very little survey effort and recorded only a few sightings: one sighting each of rough-toothed dolphin, bottlenose dolphin and a mixed school of spotted and spinner dolphins.

We wish all our family, friends and fans a Happy Thanksgiving.

Sightings and Effort Summary for Marine Mammals

DATE	Start Stop Time	Position	Total Distance	Average Beaufort
111606	0820	N16:10.83 W098:35.89	24.6 nmi	4.1
	1203	N16:15.55 W098:49.48		
111706	0653	N16:10.27 W098:48.29	39.5 nmi	2.0
	1737	N15:50.78 W097:58.99		
111806	0704	N15:57.32 W098:31.79	72.6 nmi	1.5
	1746	N15:40.56 W098:05.25		
111906	0640	N14:34.54 W099:11.63	39.4 nmi	3.1
	1502	N15:32.29 W099:10.70		
112006	1247	N16:38.92 W099:52.63	28.3 nmi	2.1
	1749	N16:04.76 W099:47.79		
112106	0646	N14:15.07 W099:28.87	47.1 nmi	5.0
	1227	N13:33.46 W100:00.31		
112206	1533	N10:23.11 W103:06.82	26.8 nmi	5.3
	1819	N10:04.03 W103:25.88		

CODE	SPECIES	TOT#
002	Stenella attenuata (offshore)	16
003	Stenella longirostris (unid. subsp.)	4
010	Stenella longirostris orientalis	5
015	Steno bredanensis	8
017	Delphinus delphis	9
018	Tursiops truncatus	6
021	Grampus griseus	1
032	Feresa attenuata	1
051	Mesoplodon sp.	1
070	Balaenoptera sp.	1
077	unid. dolphin	1
079	unid. large whale	1
088	Stenella longirostris centroamericana	3
090	Stenella attenuata (unid. subsp.)	5
099	Balaenoptera borealis/edeni	3
177	unid. small delphinid	11
277	unid. medium delphinid	2
TOTAL		78

Special report: Aerial photography (Wayne Perryman)

The aerial team completed its work with the *McArthur II* on Saturday, November 18th. We collected school size data from 16 schools, which is one more school than the

minimum we needed for this project. During our time with the *McArthur II*, we collected school size data for schools of mixed pantropical spotted and eastern spinner dolphin (n=6), and pure schools of the Central American spinner dolphin (n=3), eastern spinner dolphin (n=2), short-beaked common dolphin (n=2), pantropical spotted dolphin (n=1), bottlenose dolphin (n=1) and pygmy killer whale (n=1).

After completing our work with the *McArthur II*, we packed up and headed home. We had a very successful field project working with the *R/V David Starr Jordan* and *McArthur II* to collect calibration data. In addition to the hard work by officers, crew and scientists on their respective ships, this project was a success because of the incredible support we received from NOAA Aircraft Operations office in Tampa, FL and the excellent pilots who flew the NOAA-Twin Otter for us. Thank you.

Biopsies (Suzanne Yin and Erin LaBrecque)

Species	Common Name	Weekly		Total	
		Samples	Takes	Samples	Takes
<i>Balaenoptera edeni</i>	Bryde's whale			1	1
<i>Balaenoptera musculus</i>	Blue whale			9	10
<i>Delphinus delphis</i>	Short-beaked common dolphin			2	3
<i>G. macrorhynchus</i>	Short-finned pilot whale			18	21
<i>Pseudorca crassidens</i>	False killer whale			3	5
<i>Stenella attenuata</i>	Pantropical spotted dolphin	1	1	8	17
<i>S. attenuata graffmani</i>	Coastal spotted dolphin			1	2
<i>S. attenuata subsp.</i>	Unidentified spotted dolphin subspecies	7	11	8	12
<i>S. longirostris orientalis</i>	Eastern spinner dolphin	3	5	3	5
<i>Tursiops truncatus</i>	Bottlenose dolphin			24	47
Total		11	17	77	123

Photo-id Report (Isabel Beasley and Jim Cotton)

Finally after three and a half months at sea we have had nearly a full week of playful bow-riding dolphins! Spinner and spotted dolphins featured prominently, with some very nice images of bow-riding Central American and eastern spinner dolphins, photographed close to the Mexican coast.

We also photographed a large, cooperative group of pygmy killer whales that came to within 100m of the ship – providing us with nice photographs and some good vocalizations for the acoustic team.

Species Code	Species	This week	Total
002	<i>Stenella attenuata</i> (offshore)	9	17
003	<i>Stenella longirostris</i> (unid. subsp.)	2	3
006	<i>Stenella attenuata graffmani</i>	1	1
010	<i>Stenella longirostris orientalis</i>	7	9
011	<i>Stenella longirostris</i> (whitebelly)		6

Species Code	Species	This week	Total
088	<i>Stenella longirostris centroamericana</i>	3	3
103	<i>Stenella l. centroamericana/orientalis</i>	1	1
090	<i>Stenella attenuata (unid. subsp.)</i>	1	2
101	<i>Stenella longirostris</i> (southwestern)		4
013	<i>Stenella coeruleoalba</i>		13
015	<i>Steno bredanensis</i>	1	2
017	<i>Delphinus delphis</i>	5	17
018	<i>Tursiops truncatus</i>	1	16
021	<i>Grampus griseus</i>		1
026	<i>Lagenodelphis hosei</i>		2
031	<i>Peponocephala electra</i>		1
032	<i>Feresa attenuata</i>	1	2
033	<i>Pseudorca crassidens</i>		6*
036	<i>Globicephala macrorhynchus</i>		29*
037	<i>Orcinus orca</i>		4*
046	<i>Physeter macrocephalus</i>		4
072	<i>Balaenoptera edeni</i>		9*
075	<i>Balaenoptera musculus</i>		17*
076	<i>Megaptera novaeangliae</i>		1
TOTAL		32	171

* Individual whales photographed

Seabird and Marine Debris (Michael Force and Sophie Webb)

We spent the first three days of this week involved in the marine mammal observer calibration effort on or near the continental shelf and, as a result, saw many species typical of this coastal area. Here we found unbelievable numbers of Galapagos (Audubon's) Shearwaters (actually uncountable would be more appropriate!). One morning off Punta Muldanado, not far south of Acapulco, we witnessed an impressive east-northeasterly movement of Galapagos Shearwaters with tens of thousands flying in front of the ship as far as one could see. During a 45 to 60 minute period, they streamed past the ship nonstop at a rate of roughly 100 birds per minute. Concentrations such as these severely tax our survey methodology, designed for lower densities typical of the high seas pelagic environment. Complicating matters even further were thousands of Black Terns and hundreds of both species of phalaropes (Red and Red-necked); one late afternoon, 500 phalaropes were seen in a 30 minute period. It's safe to say that we probably finished the week with 15-20,000 Galapagos Shearwaters and 7-8000 Black Terns, many of these in feeding flocks over shoaling fish. With thousands of birds everywhere one looked, it was hard to know where one flock ended and another began. For those of you keeping track, we found 36 species, tying our highest weekly total, with an average of 16 species per day. A lost Savannah Sparrow and our first Franklin's Gull about 200 NM from the beach rank as our highlights this week.

Not to be outdone, garbage and plastic bottles were everywhere. Soon we won't need a ship for these surveys. We'll simply be able to walk on the garbage as the human race

fills the ocean with plastic. Perhaps harvesting plastic from the ocean will be a future source of energy as the fossil fuels from which it is made disappears...?

Oceanographic Operations (Melinda Kelley)

Date Range	Day	CTD	XBT	Bongo	Manta
Leg 4	Thursday	0	1	1	1
	Friday	1	0	1	1
	Saturday	2	0	1	1
<u>11/16</u>	Sunday	2	0	1	1
To	Monday	0**	3	0**	0**
<u>11/22</u>	Tuesday	1*	4	0*	0*
	Wednesday	0*	5	0*	0*
	Totals	6	13	4	4

*Weather

** Acapulco for XBT computer pick up

Many great things were accomplished this week. After much hard work and effort from many individuals on the ship and the beach, the CTD system is finally up and running. The data look great and life is once again flourishing on the back deck during morning and evening operations.

Another great accomplishment was the replacement of our XBT computer. Late in the day Thursday the XBT computer went down. The XBT system the ship uses is old and requires the use of a slow running, early Pentium processor. The now lifeless system was the only early Pentium system on the ship. Contacts were made early Friday morning to identify the problem and troubleshooting ideas were put into action. I am very happy to report that early Monday morning we pulled into Acapulco where we picked up a replacement XBT computer system. The system is on loan from Scripps Institution of Oceanography, Volunteer Observing Ship Program. A big thanks goes to Glenn Pezzoli and his team for loaning us this critical piece of equipment, you saved the day. Also, I am very thankful, amazed, and impressed by those who support us back on the beach; your efforts are appreciated more than you know. Problem on Friday, fixed by Monday! Thank you to all involved!

A bit of relaxation was felt as the sun set Monday evening; all oceanographic equipment was once again fully operational. Although relaxation was in the air, the remainder of the week was full of high winds and large swells. CTD casts were cancelled as well as net tow stations. XBT probes were dropped at each station in the place of the scheduled CTD casts. The XBT's allowed us to obtain valuable temperature profiles. With all the bad weather and CTD cancellations it was priceless to have a working XBT system to deliver us data.

As we headed south west through the swells, sea surface temperatures dropped from 30 degrees Celsius to 27 degrees Celsius. Salinity held steady while the thermocline fell only to rise again. As we headed out of Acapulco the observed thermocline depth was 35-40 meters. Continuing down the track line, that depth fell to approximately 75-80

meters at about 100 °W and 13°N. The observed thermocline depth once again returned to 35-40 meters as we continued to head south west.

Thanks again to all, what a week!

Squeakly Report (Shannon Rankin and Liz Zele)

This has been a week of ups and downs, for acoustics and everyone else on the ship. We only had four days in the water this week, but still managed 46 detections, including recordings from spotted and spinner dolphins, bottlenose and rough-toothed dolphins, as well as common dolphins. The grand highlight was five minutes of incredible vocalizations from *Feresa attenuata*, the pygmy killer whales. It is astonishing how similar these animals look to the false killer whales, and how utterly different their vocal behavior can be. While false killer whales never seem to shut up, pygmy killer whales rarely vocalize. The sounds they make are as different as night and day, as well. The low this week (besides the one sending us all this bad weather) was the death of our high frequency hydrophone. It had a good, long life, and it will be remembered fondly.

As an aside: Congratulations to new mom, Julie Oswald!

Notes from our visiting scientist

Sofie Van Parjis writes: Two weeks of intensive acoustic initiation has left my brain rather full to say the least. However some down time during the calibration and due to bad weather have let things slowly settle. Shannon has been incredible in spending so much time teaching me everything she possibly can about how the towed array works, as well as all the tricks of the trade that she had to learn the hard way. She and Liz have answered my million questions and are not sick of me yet (I think?). I look forward to proving to myself how much I do/don't understand about the whole process in the weeks to come. I think I have only begun to realize the full implications of what Shannon has been doing with the acoustic data and how it can help to answer a lot more questions than I thought was possible.

It has also been really interesting to understand how the visual team works and how these two components link up.

Thanks to everyone for their time & efforts but especially to Shannon & Liz!