

**STAR-LITE 2007: NOAA Ship *David Starr Jordan*  
Weekly Science Report**

*Susan Chivers, Cruise Leader  
23 September 2007*

**Science Summary: 16-22 September 2007**

Take 2. This week we began the second leg of STAR-LITE. During this leg we will repeat the track lines that were established for the project for the second time. As on Leg 1, we will repeat each side of the diamond pattern (see figures below) twice. On the first day, we will travel down the line in passing mode (constant steaming throughout daylight hours). On the second day, we repeat the same line in closing mode (aka 'chase' mode), which means that we approach all sightings to positively identify the species and to estimate group size. But I have gotten ahead of myself, because we were only at sea for the latter part of this week.

At the start of this week, Sunday and Monday, we were in Manzanillo, Mexico. This was our first inport of the cruise during which crew and scientists alike enjoyed some rest and relaxation in addition to refueling and reprovisioning for Leg 2. Among the inport festivities was a 'wetting down' party hosted by NOAA Corp officers Mary Barber and Josh Slater. We all enjoyed great food and beverages around the pool of a local hotel to celebrate their upcoming promotions. Congratulations, Mary and Josh.



Friendly Spotted dolphin (*Stenella attenuata*). Photographed by Adam Ü.

Tuesday we sailed from Manzanillo, Mexico and steamed for about 20 hours to reach our first waypoint. The first day of survey effort was windy and sightings were few (n=3). The second day, when we repeated the transect line in closing mode, the seas were calm and more sightings were recorded (n=16). The sightings along this transect were predominantly of pantropical spotted dolphin (*Stenella*

*attenuata*) groups.

Similarly, spotted dolphins were the most frequently identified species on the same transect during Leg 1. The main difference was that we recorded far fewer sightings during passing mode on the same transect this leg (*i.e.*, 3 vs 38 in passing mode and 16 vs 19 in closing mode on Leg 2 and Leg 1, respectively). The sighting record differences can likely be largely attributed to weather; we had worse weather than was encountered on Leg 1 on the passing mode day. Also in part, the acoustic detections recorded on the first passing mode day outnumbered the number of visual sightings. You can see this visually by looking at the ‘Acoustic detection’ plot below and comparing it to the ‘Cetacean Sightings; Passing Mode’ plot. On Friday and Saturday, we completed the next transect line in passing and closing mode. The number of sightings was comparable on the two days: 25 and 20 in passing and closing mode, respectively. Again, the dolphin groups identified to species were mostly pantropical spotted dolphins. Several mixed species groups of spotted and eastern spinner dolphins (*S. longirostris orientalis*) were also sighted. In addition to the spotted and spinner dolphin sightings, which are the species of most interest to this project, we had several sightings of striped dolphin (*S. coeruleoalba*), rough toothed dolphin (*Steno bredanensis*), dwarf sperm whale (*Kogia sima*) and beaked whales, including *Mesoplodon peruvianus*. In contrast, sightings recorded on the same transect during Leg 1 were few: 6 and 4 sightings on passing and closing mode days, respectively. As you might predict from the few sightings recorded, the weather during Leg 1 transects was worse than during the transects on this leg. But whether the difference in the number of sightings also reflects a change in dolphin density between the legs will have to await post-cruise analyses. I have described some of the differences in sightings recorded between this leg and last leg, because one of the questions being addressed by this cruise is the variability of a region within the eastern tropical Pacific Ocean. That is, how does the oceanography, and the species composition and density change from day-to-day and leg-to-leg? The data being collected on this cruise will help quantify this variability, thereby improving our understanding of this ecosystem and of the variability we observe in abundance estimates for these dolphin species between years. A series of plots is included at the end of this report to show you where we went, what we did and what we saw during the first four days of this leg. These plots are included to try to give you a flavor of the day-to-day and transect-to-transect variability. We will add to these plots in the coming weeks.

On Friday we deployed the fourth and final ARGO buoy for STAR-LITE 2007. Argo buoys descend to 1000m and remain there for 10 days, before dropping to 2000m and returning to the surface to transmit their data via satellite. All STAR-LITE 2007 deployments have been smooth, with the buoys successfully returning oceanographic temperature and conductivity data relative to depth. Almost 3,000 of these buoys have been deployed worldwide amassing an unprecedented amount of oceanographic data. See the oceanography report for more detail.

**Sightings and Effort Summary for Marine Mammals**

Date	Start/Stop Time	Position	Total nm	Average Beaufort	Mode of Operations
091607		Manzanillo In port			
091707		Manzanillo In port			
091807		Manzanillo In port			
091907	1042	N16:05.49 W106:15.34	89.1	4.3	Passing

Date	Start/ Stop Time	Position	Total nm	Average Beaufort	Mode of Operations
	1950	N14:50.63 W107:05.54			
092007	0719	N16:05.66 W106:15.64	70.0	2.1	Closing
	1934	N14:53.55 W107:12.03			
092107	0929	N14:50.09 W107:06.16	96.0	2.2	Passing
	1906	N13:29.55 W106:12.25			
092207	0904	N14:49.46 W107:05.66	47.9	2.0	Closing
	1928	N13:40.02 W106:16.16			

**Marine Mammal Sightings (Jim Cotton, Richard Rowlett, Juan Carlos Salinas, Suzanne Yin, Ernesto Vázquez, Adam Ü)**

Code	Species	Number of Sightings
001	<i>Mesoplodon peruvianus</i>	2
002	<i>Stenella attenuata</i> (offshore)	23
010	<i>Stenella longirostris orientalis</i>	4
013	<i>Stenella coeruleoalba</i>	5
015	<i>Steno bredanensis</i>	3
048	<i>Kogia sima</i>	2
051	<i>Mesoplodon</i> sp.	4
077	unid. dolphin	1
096	unid. cetacean	4
177	unid. small delphinid	22
<b>Total</b>		<b>70</b>

**Photography (Adam Ü)**

Once again, this week was cut short by our first in-port and a day of transiting back to the study area; we have only had four days of effort. Unfortunately, the only subjects close enough for photographs have been the boobies fighting over perching space on the jackstaff and one surfboard. All cetacean sightings have maintained their distance. We're hoping for better luck in the future!



Boobies vying for space aboard NOAA Ship *McArthur II*. Photographed by Adam Ü.

**Biopsy (Juan Carlos Salinas, Ernesto Vásquez and Suzanne Yin)**

This week we collected no new biopsy samples, but it was a short week... Stay tuned.

Species	Common Name	Weekly		Total	
		Samples	Takes	Samples	Takes
<i>Pseudorca crassidens</i>	False killer whale	1	4	1	4
<i>Stenella attenuata</i>	Pantropical spotted dolphin	2	10	2	10
<i>Tursiops truncatus</i>	Bottlenose dolphin	1	7	1	7
<b>Total</b>		<b>4</b>	<b>21</b>	<b>4</b>	<b>21</b>

**Squeakly Report (Shannon Rankin)**

Leg two has started relatively smoothly, with no major hiccups. Sophie Webb and Yin are now professionals at deploying and retrieving the array, and with their help, I am managing to survive this leg without my assistant, Liz Zele. The first passing mode day showed the greatest discrepancy between the visual and acoustic detection of dolphins. The acoustics team had a whopping 27 detections of dolphin schools, of which only a single dolphin school was matched to a visual sighting. There were 21 acoustic detections on the following passing mode day, of which 12 were matched with visual sightings.

## **Seabirds (Michael Force, Sophie Webb)**

Trying to keep up with our flock counts over dolphins was our primary objective this week, practically subsuming all of our other census duties (see plots below showing flock locations; indicator species only were used to plot the flocks). It was busy, obtaining counts of 38 flocks in this short week. Again, as in previous weeks, Juan Fernandez Petrels and dark morph Wedge-tailed Shearwaters were by far the most abundant species. Emphasizing the importance of this feeding association to the survival of pelagic seabirds in the eastern tropical Pacific Ocean was the appearance of a uniquely marked South Polar Skua in three different feeding flocks. This species, which nests on the fringe of the Antarctic continent, migrates to the north Pacific during the non-breeding season and is a scarce passage migrant through our study area. Although difficult to prove, seeing a single identical bird sporting an identical moult pattern in three closely spaced flocks is highly suggestive. Two of the flocks were within 15 nm of each other, only a matter of minutes of flying time for a skua. Why wander over hundreds of square kilometres of open ocean trying to scrape up a decent meal, when one can simply visit these numerous piscine “drive-ins” for some fast food? Species diversity remains unchanged from previous weeks: our weekly total was 20 species, and the daily average was 13. A Cliff Swallow, an aerial insectivore, persisted around the ship for one day; another passage migrant although not as lucky as the skua. In fact, it could very well become the skua’s next meal.

## **Oceanography (Candice Hall, Ryan Driscoll, Fionna Matheson and Vicky Pease)**

Now that we have our stylishly ‘Croc’ed feet wet (even SST Lacey has a pair!), STAR-LITE 2007 leg 2 oceanography has commenced with a splash. All of our operations are at full capacity, ably assisted by our new team members, Vicky and Fionna. Our average sea surface temperatures this week has been 29.51 °C, while sea surface salinity has maintained steady at 33.81 psu.

Our new oxygen sensor on the CTD is functioning superbly, creating an additional data set to complement our dual conductivity and temperature CTD profiles. The conductivity and temperature sensor redundancy ensures the collection of highly accurate oceanographic data and will be a standard feature on all PRD cruises in the future.

Deploying the last of our Argo buoys for this cruise, we have guaranteed success in our part of this international collaboration. Follow our buoys’ progress as they go up and down on [www.argo.net](http://www.argo.net), as the Argo programme aims to reach its 3000<sup>th</sup> deployment since its inception. Viva le Argo!

Turning our attention to the biological, acoustic backscatter recorded several plankton uprising as the sun began to set but things have generally calmed down by morning. Recently the Manta and Bongo tows have managed to capture some of the major players, which have been henceforth detained. Currently in custody are a diverse range of invertebrate classifications and several scaly vertebrate ringleaders, including the usual suspects of Halobates, Myctophids, salps and copepods. One correction on a previous report has been the discovery that what we thought were ribbonfish are actually eel larvae. Thank you, Shannon, your skills are boundless, please visit more often.

<b>Date</b>	<b>CTD</b>	<b>XBT</b>	<b>Surface chlorophylls</b>	<b>Bongo tows</b>	<b>Manta tows</b>	<b>Other</b>
19 Sep 07	2	4	4	1	1	
20 Sep 07	2	4	4	1	1	
21 Sep 07	3	4	4	1	1	Argo buoy S/N 3093

Date	CTD	XBT	Surface chlorophylls	Bongo tows	Manta tows	Other
						deployment
22 Sep 07	2	4	4	1	1	
<b>Total</b>	<b>9</b>	<b>16</b>	<b>16</b>	<b>4</b>	<b>4</b>	

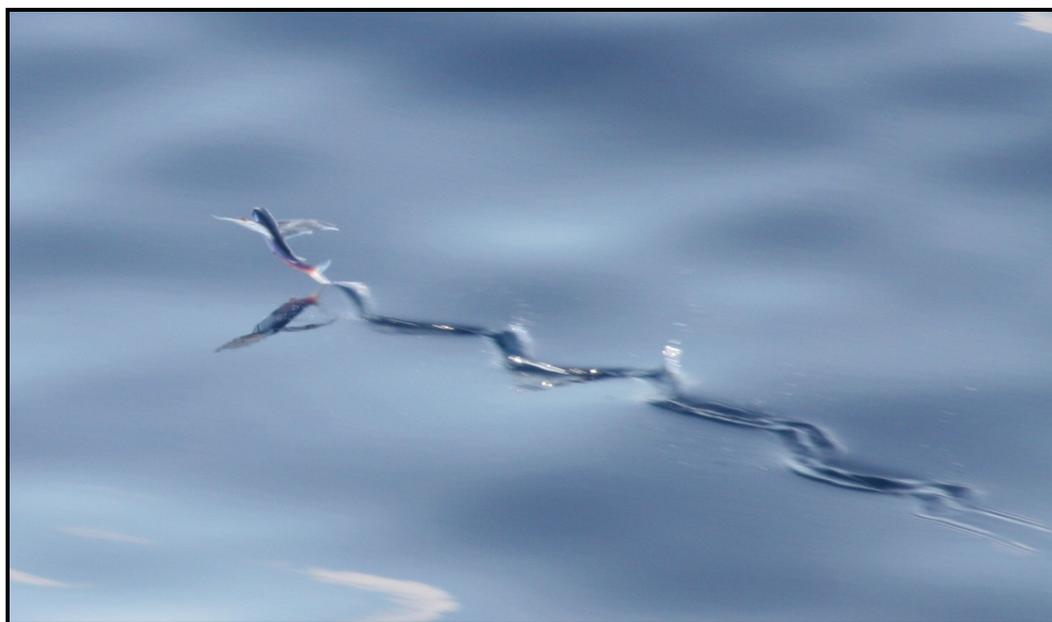
**Dippers Doldrums (Jim Cotton, Juan Carlos Salinas, Ernesto Vázquez, Adam Ü, Ryan Driscoll)**

This reporting of dipnet effort and specimen collecting encompasses one morning and four evening dipping sessions. The one hour dipnet stations were characterized by very few fish seen and calm conditions. Compared to last leg the average number of flyingfish seen during a station was down by 82% even though the average sea state was substantially better. The brightness of the moon negatively influences the number of fish collected and our specimen totals reflect the fact that the moon was visible and waxing all week.

The most abundant organism observed this past week were chain salps, a colonial invertebrate often exceeding two meters in length. Other animals seen but not collected were; Lantern fish (Myctophidae), short-winged flyingfish (*Oxyporhamphus*), snake mackerels (Gempylidae), juvenile mahi mahi (Coryphaenidae) and purple back squids (*Sthenoteuthis*).

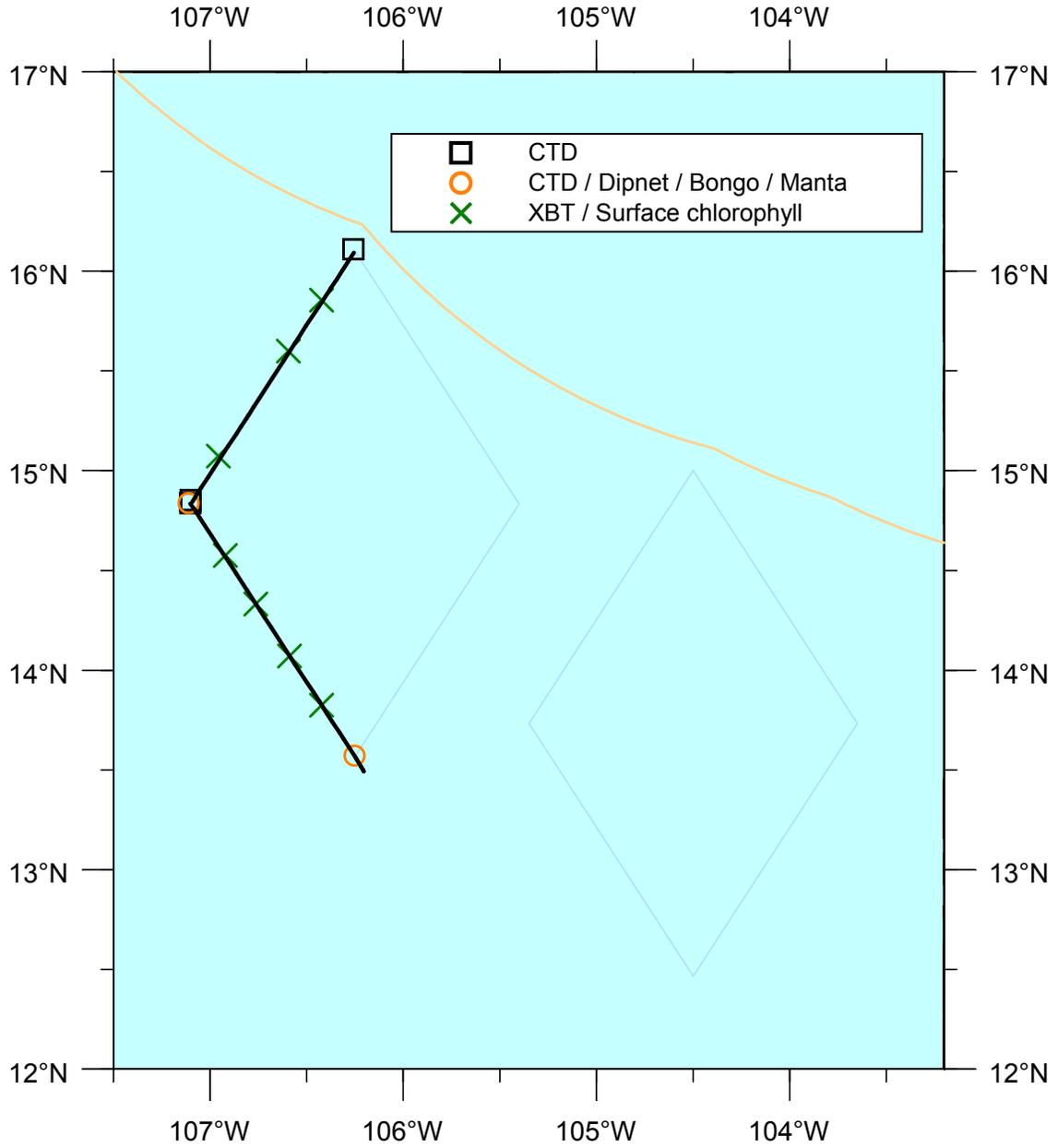
Specimens collected:

- 2- Two-winged flyingfish (*Exocoetus*), one stomach preserved for food habits studies
- 1- four-winged flyingfish (*Cheilopogon*)



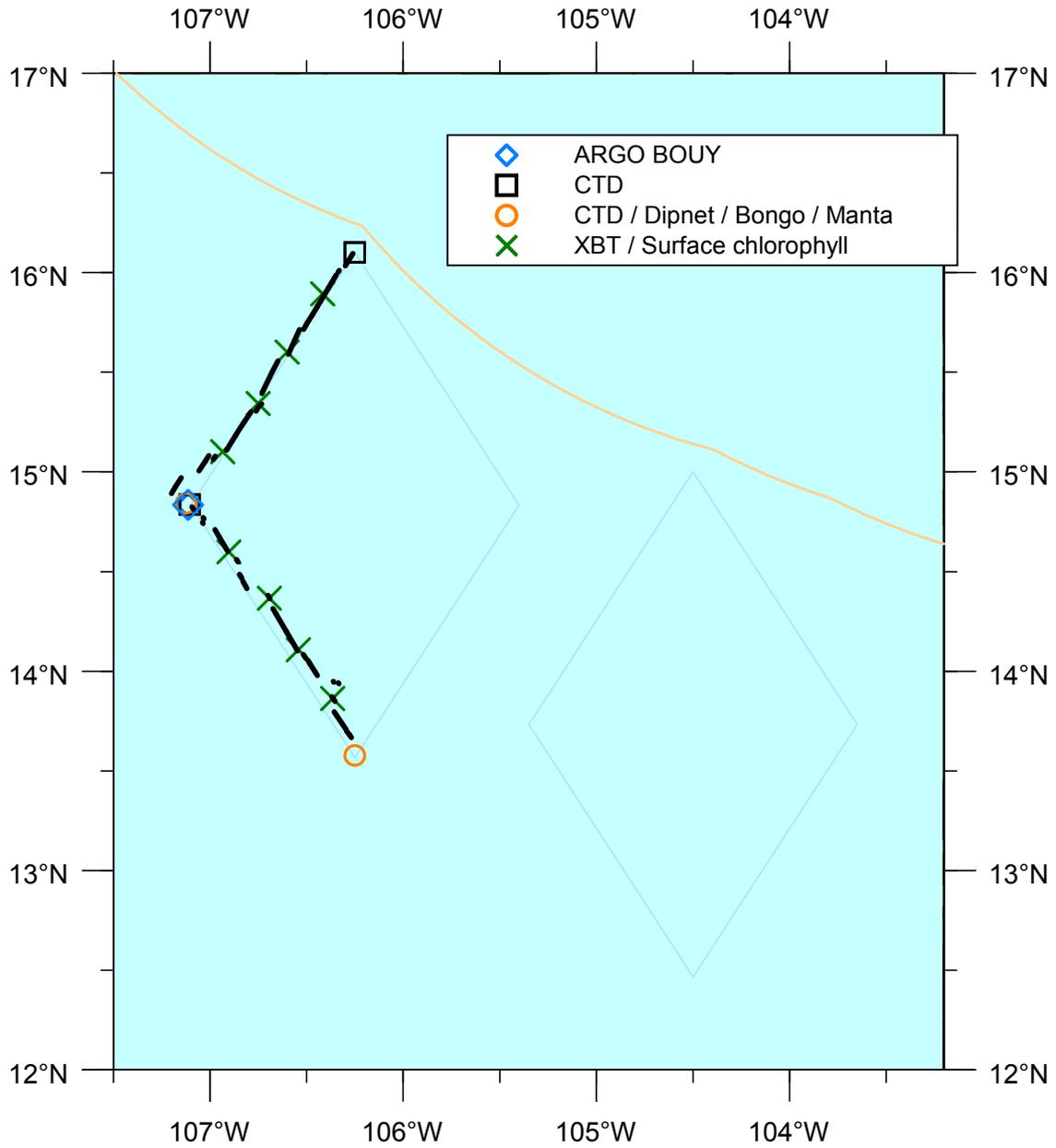
Flying fish making tracks. Photographed by Eric Lewallen.

# Sampling Effort; Passing Mode



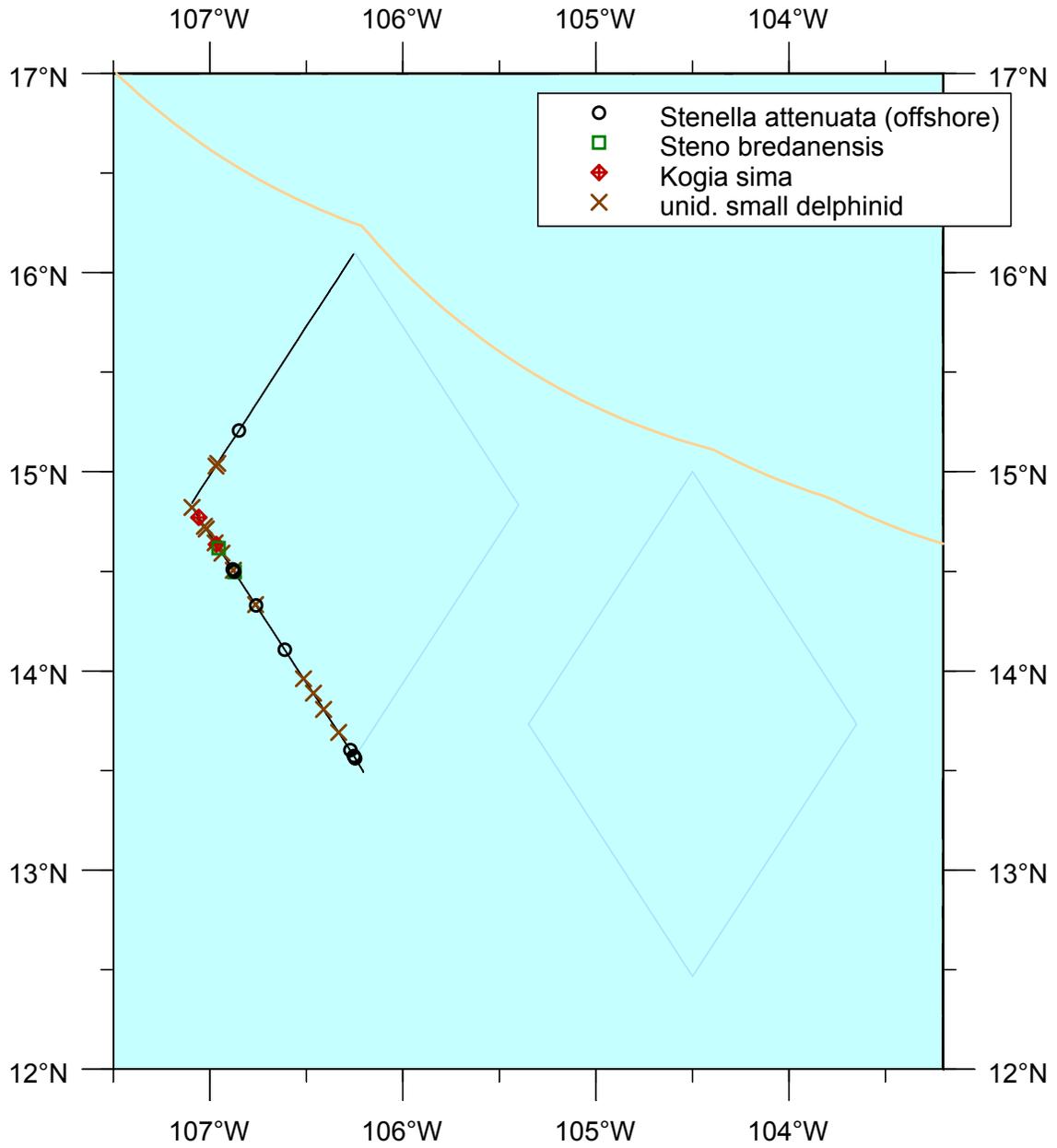
Transect effort and oceanography on passing mode days.

# Sampling effort; Closing Mode



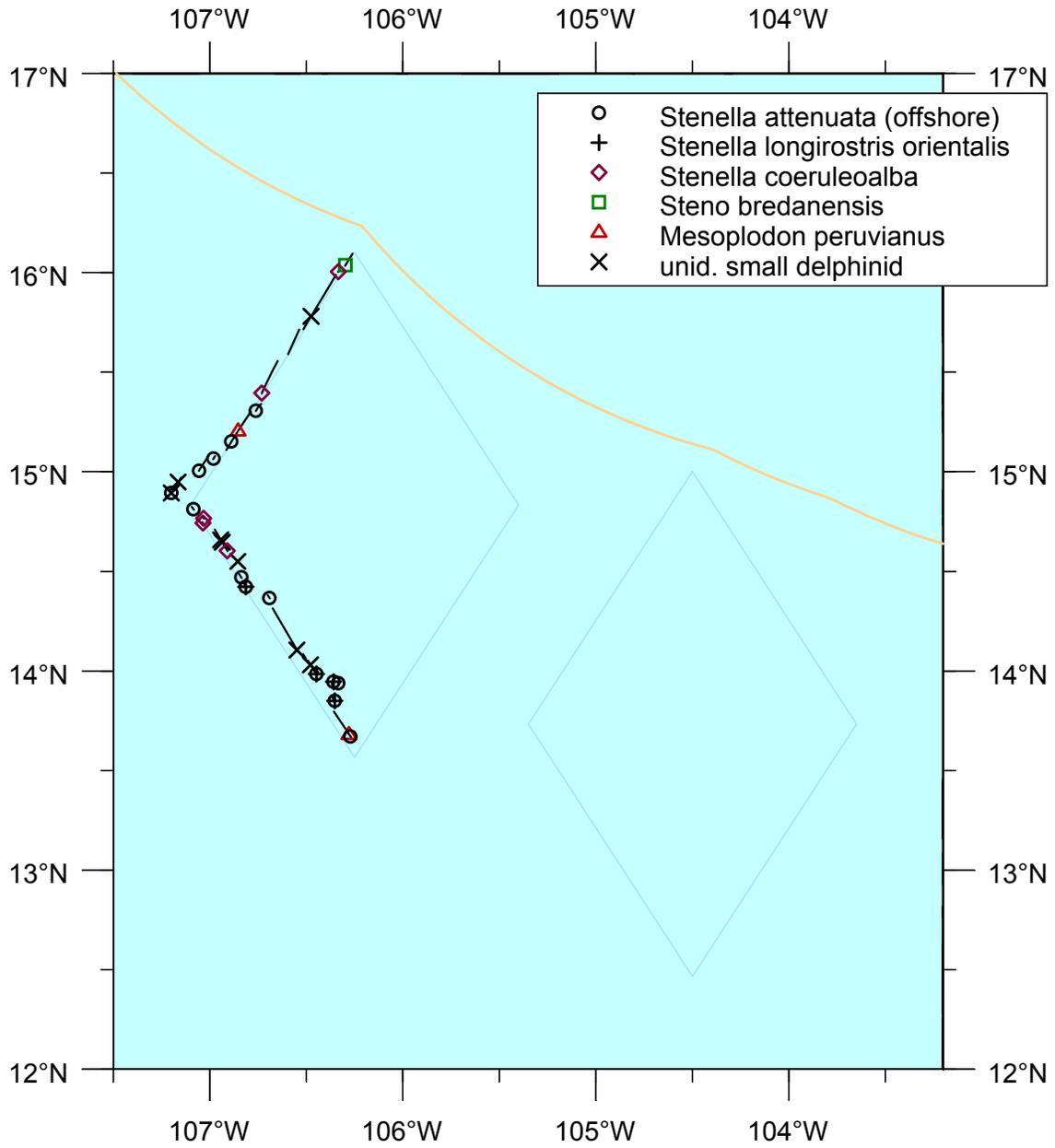
Transect effort and oceanography on closing mode days.

# Cetacean sightings, Passing mode



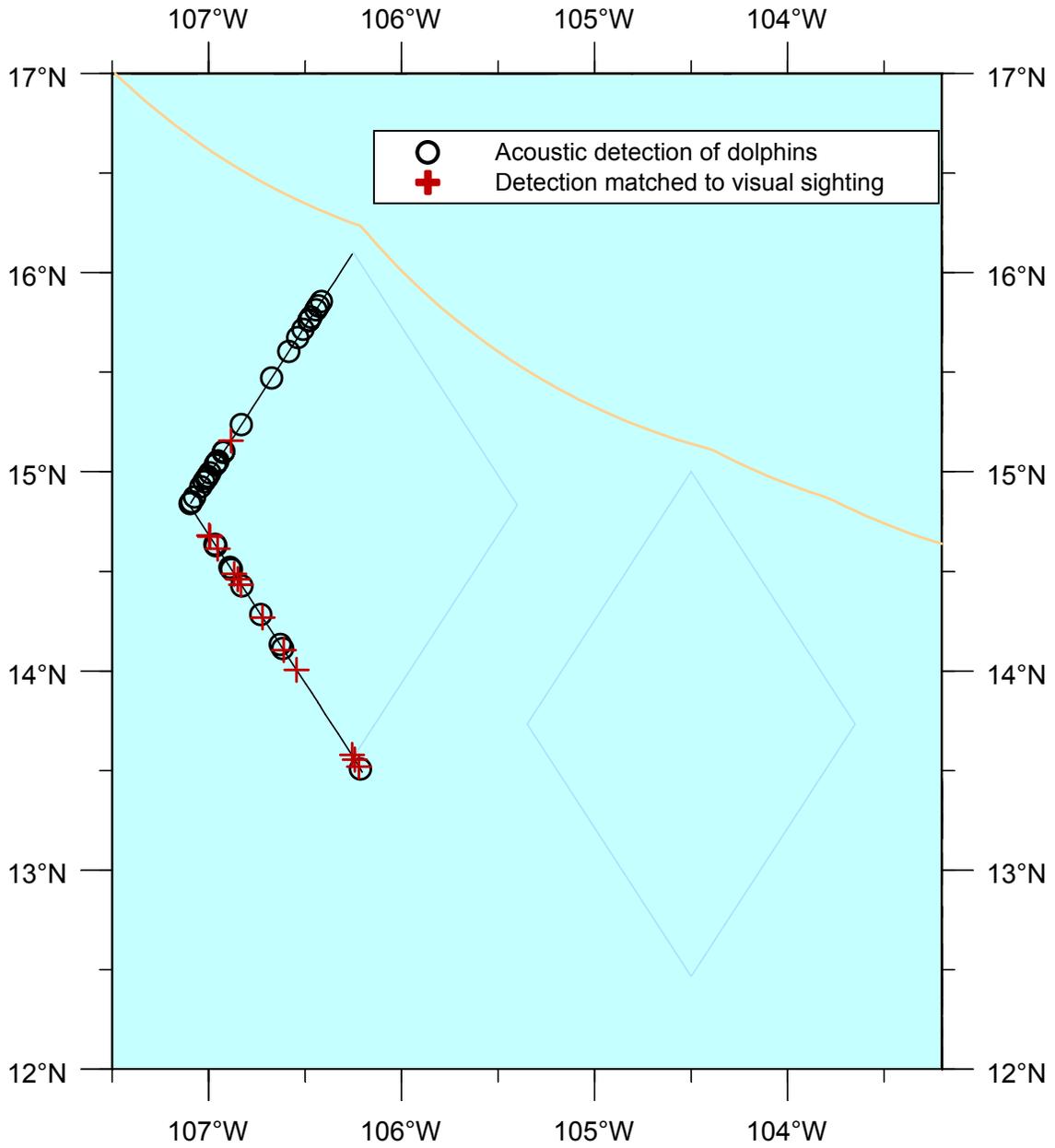
Cetacean sightings on passing mode days.

# Cetacean sightings, Closing mode



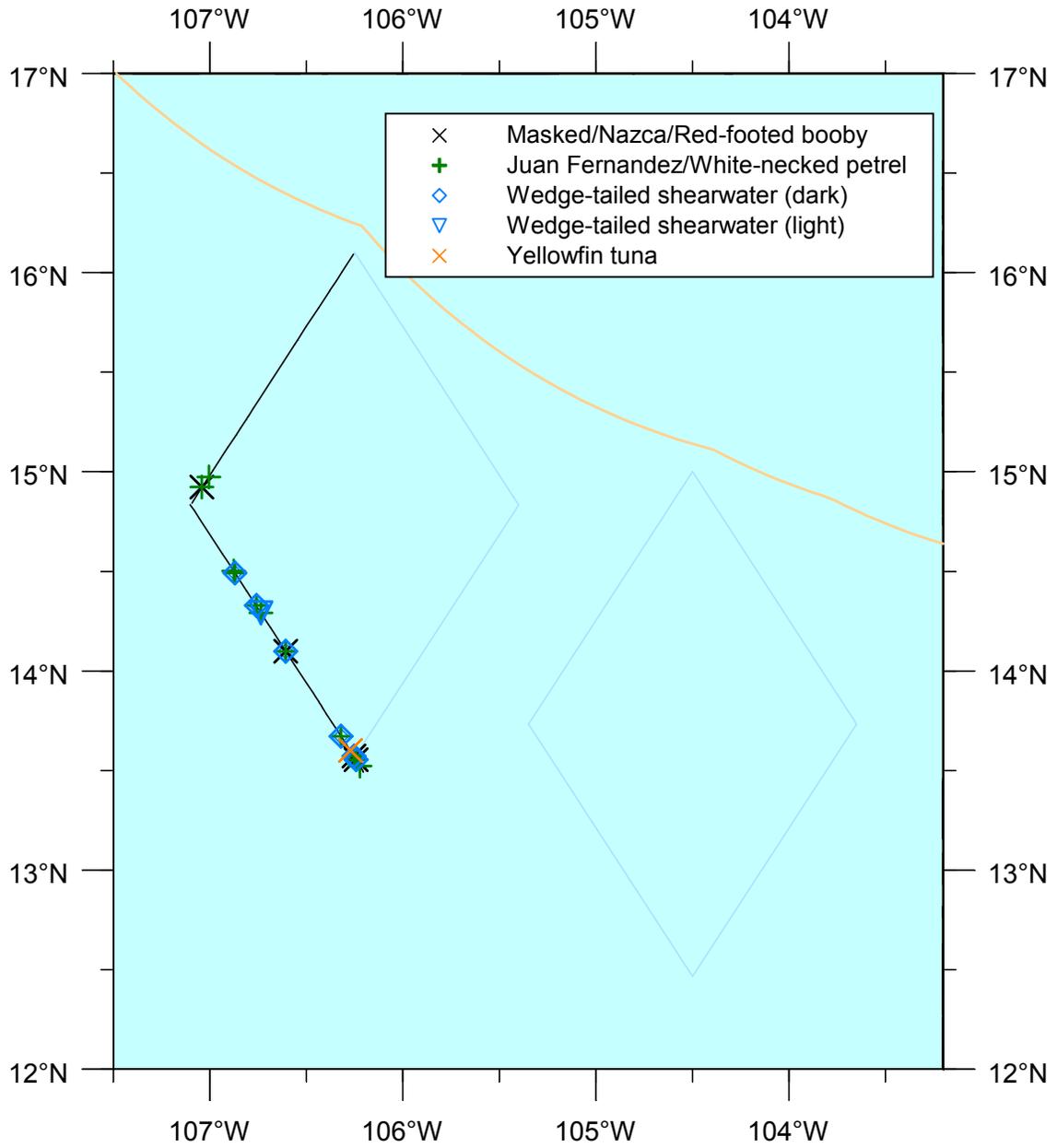
Cetacean sightings on closing mode days.

# Acoustics, Passing Mode



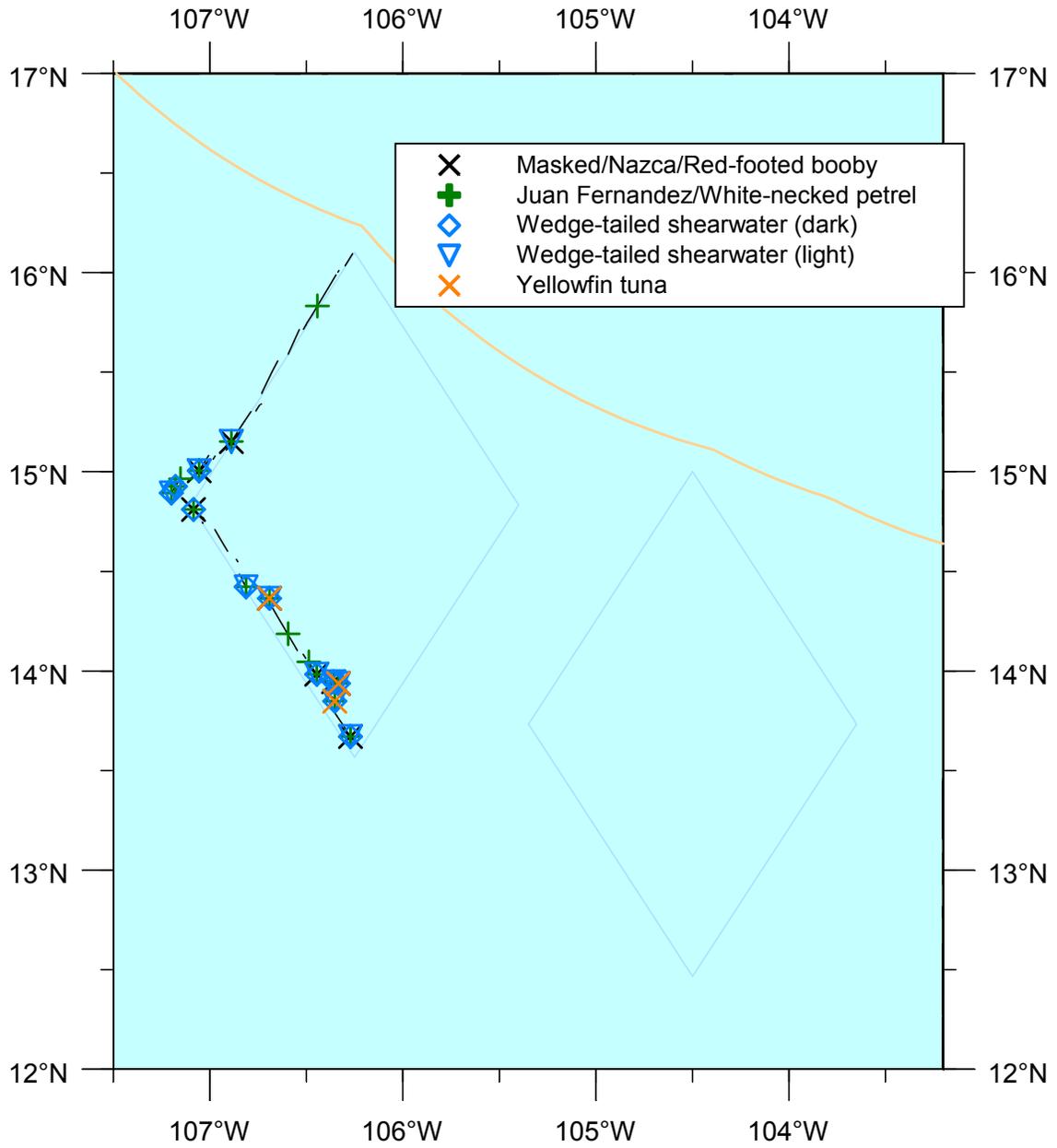
Acoustic detections on passing mode days.

# Seabird Flocks; Passing Mode



Seabird sightings on passing mode days.

# Seabird Flocks; Closing Mode



Seabird sightings on closing mode days.