

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

Lisa Ballance, Cruise Leader
31 October 2007

Science Summary: 21-30 October 2007

“Gee, this sure is different from last leg.” This is the prevalent theme for the week and it emphasizes not only the difference in the weather (recall that the winds last leg hardly ever topped 10 knots, whereas last week we never saw winds less than 10 knots), but the difference in the animals – their identity and abundance. Whereas last leg the cetacean sightings were so numerous we feared we would run out of sighting forms, this leg cetaceans are few and far between (so few that on one closing mode day there were no sightings to close on). Whereas last leg the rafts of Wedge-tailed Shearwaters were seemingly endless, this leg has seen the first day without a single one of these birds recorded in the strip transect data. The water has been uncharacteristically green to our eye (an indication of higher surface chlorophyll – the oceanographic data will tell us whether our gestalt impressions are justified). And so, our experiment is teaching us something. Despite the fact that we are surveying exactly the same lines this leg as last, the system has changed – and in a way that does not require statistics to tease out the initial signal.

Fortunately for us, our weather this week has been nothing short of glorious: low winds, flat seas, crisp and clear air. After the weather horrors of last week (combined with other horrors), we’ve been enjoying work and life in general. Some highlights include: Our first sperm whale of the cruise! (wouldn’t you know it – on a passing mode day. Water surface pocked with literally hundreds of dinner plate-sized subadult turtles on Tuesday, floating in the sheen of a Beaufort 0.

Two nights later one of these innocently floats by the dipnetters, only to be scooped up, admired by everyone within radio and camera reach, and then set free again. A HUGE bolus of jellies comes up in the bongo tow on Sunday night. One of our precious dipnets slips from the grip of a topnotch dipnetter and is *recovered* by frenzied efforts of scientists and crew with fishing lines, grappling hooks, and helmsmanship. (“If you never lose one, you’re not trying hard enough” – RLPitman.) Our first small boat deployment of the leg on false killer whales – is successful with a biopsy sample from these difficult-to-approach animals. While they are working, the ship is too and Yin successfully samples an animal in the quarterwake, Adam and Michael locate the distant dart, and our CO and Mike maneuver the ship alongside so that Nick can recover the dart (with sample!) with a dipnet. Now that’s impressive teamwork! Green flashes become almost common at night – and even on the morning sunrise. Killer whales! – on a closing mode day! - and in Beaufort 2! But not so fast! Rain squall envelops us from the west and obscures the horizon – then everything. Our very own colony of boobies forms on the jackstaff on more than one evening as Red-footed and Brown boobies vie for the space at the top. How can anyone not love these birds? (See tribute at the end of this report.) Biopsy samples collected from bowriding spotted and spinner dolphins! And an all-night oceanographic sampling marathon on Sunday evening successfully samples variation in time (see report below).

On the Personals page: Kudos! to the Steward’s Department for fantastic food and particularly outrageous barbecues on the fantail (featuring, among other things, egg rolls and sushi for appetizers, hamburgers, hot dogs, steak kabobs, and crab legs for dinner, cake for dessert). Congratulations to Nick Kellar who bested our CO in the finals of the cribbage tournament (and a close match it was). Our hearts go out to those San Diegans who have lost their homes. Sadly, this includes our colleagues, Wayne and Sue Trivelpiece, who escaped with their family intact, and lost everything else.

This report concludes Leg 3. We are now in Manzanillo for a few days. Among those to leave the ship is

our Field Operations Officer, Mary Barber, who has been with the ship for a couple of years now. We send her off to her next assignment on land for a few years. Good luck Mary. You will be sorely missed.

Sightings and Effort Summary for Marine Mammals

| Date | Start/ Stop Time | Position | Total nm | Average Beaufort | Mode of Operations |
|--------|---------------------|----------------------|----------|---------------------|-----------------------|
| 102007 | 1005 | N12:28.11 W104:29.89 | 68.8 | 4.0 | Closing |
| | 1929 | N13:41.47 W103:39.37 | | | |
| 102107 | 0915 | N13:45.53 W103:39.93 | 97.4 | 4.0 | Passing |
| | 1915 | N15:07.06 W104:34.95 | | | |
| 102207 | 0923 | N13:44.70 W103:39.09 | 90.4 | 3.6 | Closing |
| | 1921 | N15:00.27 W104:30.85 | | | |
| 102307 | 0921 | N14:59.68 W104:30.38 | 95.7 | 1.3 | Passing |
| | 1917 | N13:39.45 W105:24.08 | | | |
| 102407 | 0902 | N14:59.78 W104:30.11 | 55.9 | 1.0 | Closing |
| | 1936 | N13:56.05 W105:15.14 | | | |
| 102507 | 0909 | N14:51.28 W105:24.89 | 96.1 | 3.7 | Passing |
| | 1914 | N16:12.01 W106:19.04 | | | |
| 102607 | 0857 | N14:49.98 W105:24.27 | 57.7 | 3.1 | Closing |
| | 1931 | N15:56.50 W106:12.09 | | | |
| 102707 | 0921 | N14:49.19 W107:06.74 | 91.0 | 3.5 | Passing |
| | 1930 | N13:31.62 W106:13.32 | | | |
| 102807 | 0902 | N14:49.60 W107:06.07 | 76.5 | 3.3 | Closing |
| | 1934 | N13:34.18 W106:17.37 | | | |
| 102907 | 0857 | N13:34.18 W106:14.87 | 73.4 | 3.2 | Closing |
| | 1901 | N14:47.97 W105:25.40 | | | |

Marine mammals (Richard Rowlett, Juan Carlos Salinas, Suzanne Yin, Ernesto Vázquez, Adam Ü, and Robert L. Pitman)

| Code | Species | Number of Sightings |
|------|---|---------------------|
| 1 | <i>Mesoplodon peruvianus</i> | 1 |
| 2 | <i>Stenella attenuata</i> (offshore) | 29 |
| 3 | <i>Stenella longirostris</i> (unid. subsp.) | 1 |
| 10 | <i>Stenella longirostris orientalis</i> | 16 |
| 13 | <i>Stenella coeruleoalba</i> | 2 |
| 18 | <i>Tursiops truncatus</i> | 1 |
| 21 | <i>Grampus griseus</i> | 1 |
| 32 | <i>Feresa attenuata</i> | 1 |
| 33 | <i>Pseudorca crassidens</i> | 1 |
| 37 | <i>Orcinus orca</i> | 1 |
| 46 | <i>Physeter macrocephalus</i> | 1 |
| 48 | <i>Kogia sima</i> | 3 |
| 49 | Ziphiid whale | 3 |
| 51 | <i>Mesoplodon</i> sp. | 1 |

| Code | Species | Number of Sightings |
|--------------|------------------------|---------------------|
| 77 | Unid. dolphin | 5 |
| 78 | Unid. small whale | 4 |
| 96 | Unid. cetacean | 3 |
| 177 | Unid. small delphinid | 26 |
| 277 | Unid. medium delphinid | 2 |
| Total | | 102 |

Plots at the end of this report depict locations cetacean sightings.

Photography (Adam Ū and Nick Kellar)

This has been the best week yet for photographs. We've had more opportunities than normal to get close to our target animals (despite the presence of Nick Kellar on board; the animals usually run screaming at the first sight of his crossbow) and collected images from five different species. spotters, spinners, *Tursiops*, and *Pseudorca* came over to the ship and the small boat was able to get close to a group of *Feresa*. Numerous laser dot shots were collected from the spotters and from the one and only spinner that has ridden the bow for the entire cruise. We're hoping we can carry this momentum into the fourth and final leg. Stay tuned!

| Species | Common Name | Weekly photographs | | Total photographs | |
|------------------------------|-------------------------|--------------------|---------|-------------------|---------|
| | | Individuals | Schools | Individuals | Schools |
| <i>Stenella attenuata</i> | Pantropical spotted | 5 | 101 | 16 | 337 |
| <i>Stenella longirostris</i> | Eastern spinner dolphin | 2 | 112 | 4 | 150 |
| <i>Stenella coeruleoalba</i> | Striped dolphin | | | 2 | 20 |
| <i>Tursiops truncates</i> | Bottlenose dolphin | 1 | 2 | 3 | 76 |
| <i>Grampus griseus</i> | Risso's dolphin | | | 1 | 42 |
| <i>Feresa attenuate</i> | Pygmy killer whale | 1 | 23 | 6 | 327 |
| <i>Pseudorca crassidens</i> | False killer whale | 1 | 63 | 2 | 89 |
| Total | | 10 | 301 | 34 | 1041 |

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

| Species | Common Name | Weekly | | Total | |
|-----------------------------|-----------------------------|---------|-------|---------|-------|
| | | Samples | Takes | Samples | Takes |
| <i>Pseudorca crassidens</i> | False killer whale | 2 | 7 | 3 | 11 |
| <i>Stenella attenuata</i> | Pantropical spotted dolphin | 2 | 2 | 4 | 12 |
| <i>Tursiops truncatus</i> | Bottlenose dolphin | 0 | 0 | 2 | 8 |
| Total | | 4 | 9 | 9 | 31 |

Acoustic Squeakly (Megan Ferguson, Sophie Webb and Suzanne Yin)

Leg 3 concludes with no array breakdowns and successful recording on all passing mode days!

Seabird Report (Michael Force and Sophie Webb)

It was a quiet news week so we turn our attention to dispatches from the special events desk where our intrepid correspondent reports on a large number of lost Cattle Egrets meandering aimlessly through the eastern tropical Pacific. In fact, Cattle Egret was probably the most abundant bird out here this week, commonly seen in flocks of up to 50 birds. They are clearly lost. What we don't know is how many of these flocks were re-sights. Cattle Egrets, as do many species of herons, have a very strong post-breeding dispersal, not truly migrating, but rather simply wandering in all directions. The birds we see out here obviously made a "bad choice" of direction in which to wander. A couple of immature Laughing Gulls, another species known to stray from the beaten path, were seen this week; however, their chances for survival are considerably better than that of the egrets'.

Other than plenty of Leach's Storm-Petrels, our daily watches on the flying bridge appear to be fairly quiet. Pretty well gone are the large flocks of Juan Fernandez Petrels and Wedge-tailed Shearwaters, heading off to their nesting colonies. Nevertheless, it was a diverse ten day "week," our most diverse ever this cruise! We found an amazing 30 species this week, well above our average of 22. What padded our total was a long list of wayward migrants, many new for the cruise. Among these were Merlin, Killdeer, and Tennessee and Nashville Warblers. We also saw our first Brown Noddy, Black Tern and Red-necked Phalarope for the cruise and one of the mammal observers reported a Sooty Shearwater, also a first. A single Cook's Petrel that crossed our bow on Saturday was only the third or fourth of the entire trip. Missed in all of the excitement of last week was our first Red-tailed Tropicbird. Considering their scarcity in the eastern tropical Pacific we felt it shouldn't go unnoticed. Last, but certainly not least, is a big thank you to our departing Cruise Leader, Lisa Ballance, for helping to keep us on line and on time.

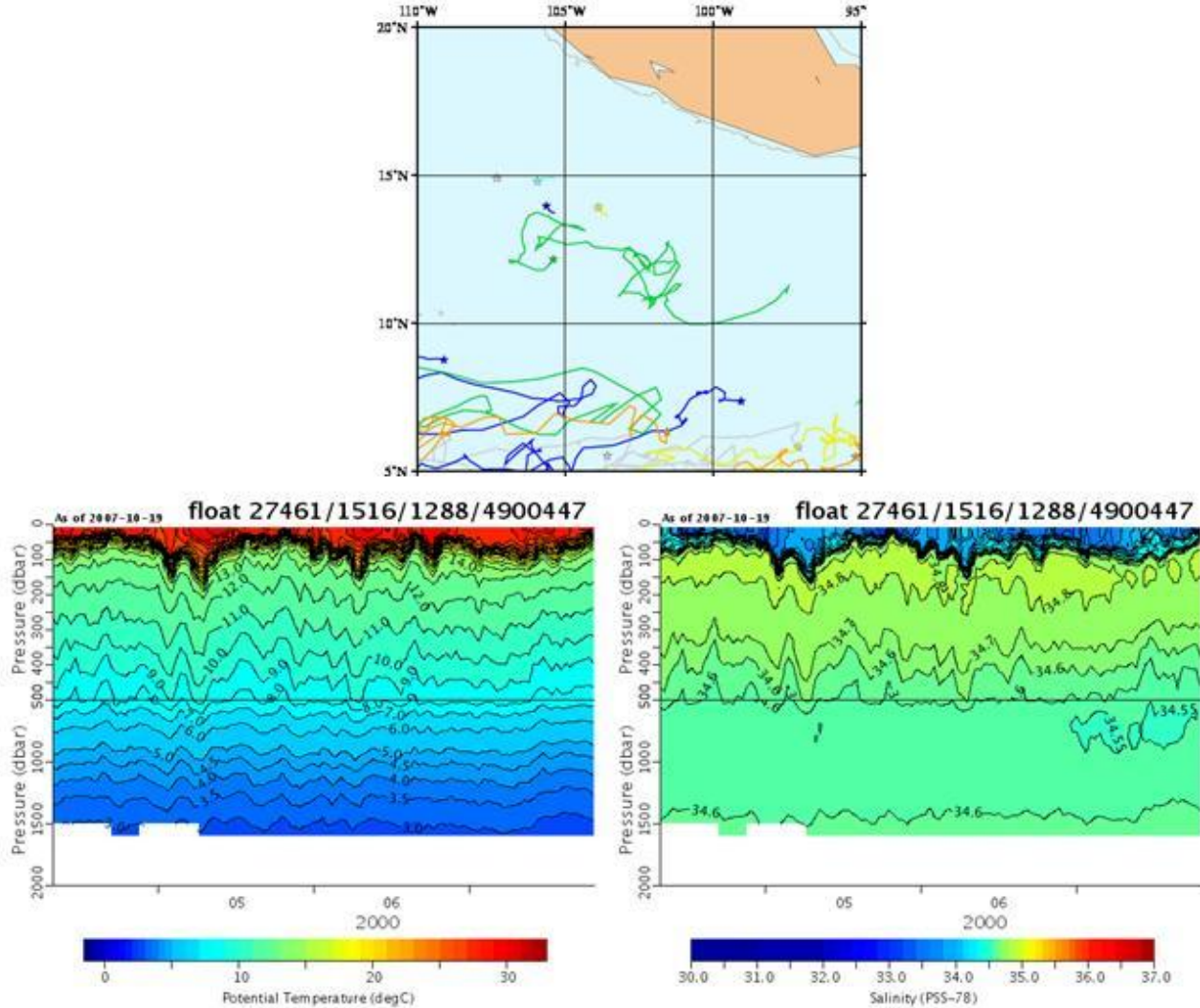
Plots at the end of this report depict location of seabird feeding flocks.

Oceanographic Operations (Candice Hall and Ryan Driscoll with assistance from Annette Henry, Nick Kellar, and Megan Ferguson)

As Leg 3 draws to a close, the perfect opportunity arises to recap on STAR-LITE 2007's ancillary projects and what we can learn from the data. Our four Argo floats are working perfectly, transmitting data via satellite every 10 days as per their programming. Gregory Johnson, PMEL, has provided us with an update on the location (see map below) for our four floats. As they are newly deployed, little horizontal displacement data are available. He has included other PMEL float trajectories on the map, including one deployed in early 2004 (green track).

To show the scope of data available, a graph of potential temperature and salinity data from the 2004 float, contoured as a function of time and pressure, is include below. Greg reports that 'there are some rather large eddy signatures in the winter that appear to have a time-scale of a month or less, resulting in vertical displacements of isotherms at least down to 1000 dbar or deeper. Those may be eddies spun up by the strong winter gap winds through the Central American isthmus. There is also a seasonal cycle in thermocline depth, with very shallow thermoclines in the latter portion of each year, and deeper thermoclines in the early part of each year. On top of that, there is a visible seasonal modulation in mixed layer temperature. Argo is of course making this sort of information available throughout the global Open Ocean, and efforts like yours are a vital part of making that happen.' Many thanks to Gregory Johnson and Elizabeth Steffen, PMEL, for making this year's deployments easier than ever! More information on

these and other floats may be found on the Argo website (www.argo.net).



Due to the repetitive nature of this cruise, similar data may be obtained from our CTD and XBT profiles. By combining the Argo data set and our information for this region, besides confirming individual sensor readings, we are able to obtain a more in-depth understanding of the region's oceanographic variation. Not only does this allow us to determine what is going on now, but these data may be used to create more accurate prediction models, used, in our case, for mammal density assessments and ecosystem studies.

We had an interesting week investigating the plankton of the ETP. The oceanography team has become used to the low productivity of tropical waters yielding an average Bongo tow volume of 49 ml. So imagine our surprise when the first Bongo of the week came up filled halfway to the top. The reason was obvious at a glance. Somewhere near the surface our net passed through a dense swarm of Scyphomedusae. The 4cm pink jellies squeezed themselves down as the bongo lifted out of the water. In the end we were left with 19,220ml of sample and quite a few stings. We also started sorting our Manta tows from the first leg. Fish eggs, Halobates, larval fish and cephalopods were separated out from the diverse assemblage of plankton. Spindly Zoeas, spiny Copepods, larvae with weird and unusual names like Pluteus and Gastrozooid; sorting gives a deeper glimpse into the busy life of the clear blue waters of the eastern tropical Pacific.

Thank you again to Annette, Megan and Nick for all of your invaluable help this leg. As always, it is a pleasure to sail with you, Megan and Nick. Annette, welcome to the fold! The three of you are most welcome to join our team anytime!

| Date | CTD | XBT | Surface Chlorophylls | Bongo tow | Manta tow |
|--------------|-----|-----|----------------------|-----------|-----------|
| 102107 | 2 | 4 | 4 | 1 | 1 |
| 102207 | 2 | 4 | 4 | 1 | 1 |
| 102307 | 2 | 4 | 4 | 1 | 1 |
| 102407 | 2 | 4 | 4 | 1 | 1 |
| 102507 | 2 | 4 | 4 | 1 | 1 |
| 102607 | 2 | 4 | 4 | 1 | 1 |
| 102707 | 2 | 4 | 4 | 1 | 1 |
| 102807 | 5* | 4 | 4 | 0 | 0 |
| 102907 | 2 | 5** | 4 | 1 | 1 |
| 103007 | 2 | 4 | 4 | 1 | 1 |
| Total | 23 | 41 | 40 | 9 | 9 |

* Yo-yo CTD sampling night

** Comparative XBT

Flying Fish Report (Juan Carlos Salinas, Ernesto Vázquez, Adam Ü, Ryan Driscoll, and Robert L. Pitman)

This reporting of dipnet effort is the last for the third leg of STAR-LITE. This past week the weather conditions improved considerably, with an average of B-3. The brightness of the moon negatively influenced our catch for some of the stations, but it was a good week with 93 specimens collected and 42 stomach samples preserved during nine stations. Other pelagic species encountered (but not collected) during dipnetting efforts this week were Lanternfish (Myctophidae), snake mackerels (Gempylidae), needlefish (Belonidae), 2 medium sized (~3m) Carcharhinid shark and one juvenile turtle (*Lepidochelys olivacea*).



DU Kevin Lackey holding the olive ridley turtle encountered during dipnetting. Photo: S. Webb.

| Fish collected | Weekly total | Grand total |
|--|--------------|-------------|
| Two-winged flyingfish (<i>Exocoetus</i> sp.) | 44 | 220 |
| Four-winged flyingfish (<i>Cheilopogon</i> , <i>Hirundichthys</i> , <i>Prognichthys</i>) | 36 | 136 |
| Short-winged flyingfish (<i>Oxyporhamphus</i>) | 12 | 94 |
| Lantern fish (Myctophidae) | 0 | 8 |
| Unidentified fish | 1 | 4 |
| Total | 93 | 462 |

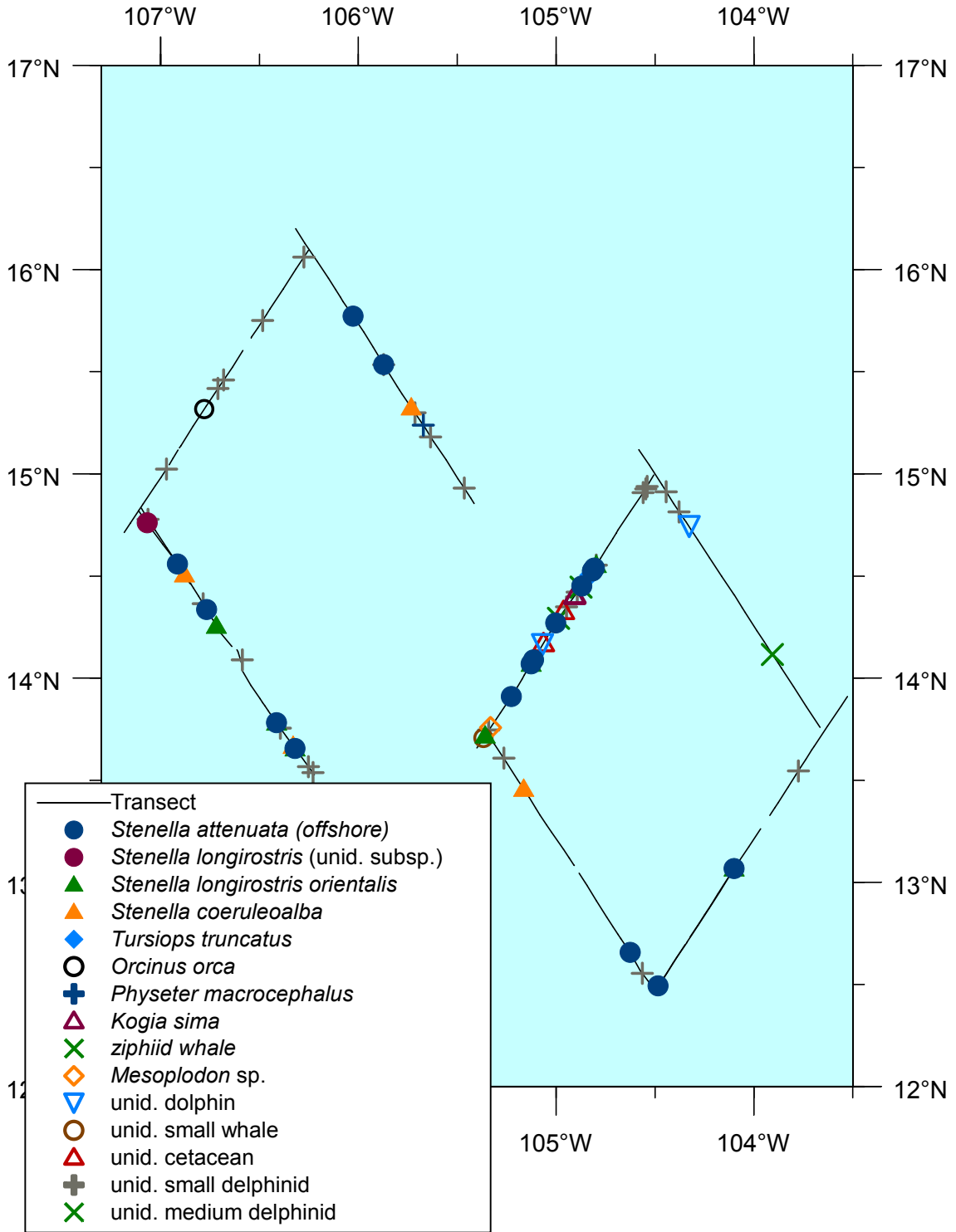
| Stomach samples collected | Weekly total | Grand total |
|--|--------------|-------------|
| Two-winged flyingfish (<i>Exocoetus</i> sp.) | 20 | 142 |
| Four-winged flyingfish (<i>Cheilopogon</i> , <i>Hirundichthys</i> , <i>Prognichthys</i>) | 16 | 84 |
| Short-winged flyingfish (<i>Oxyporhamphus</i>) | 6 | 13 |
| Total | 42 | 239 |

Parting Thoughts (Annette Henry)

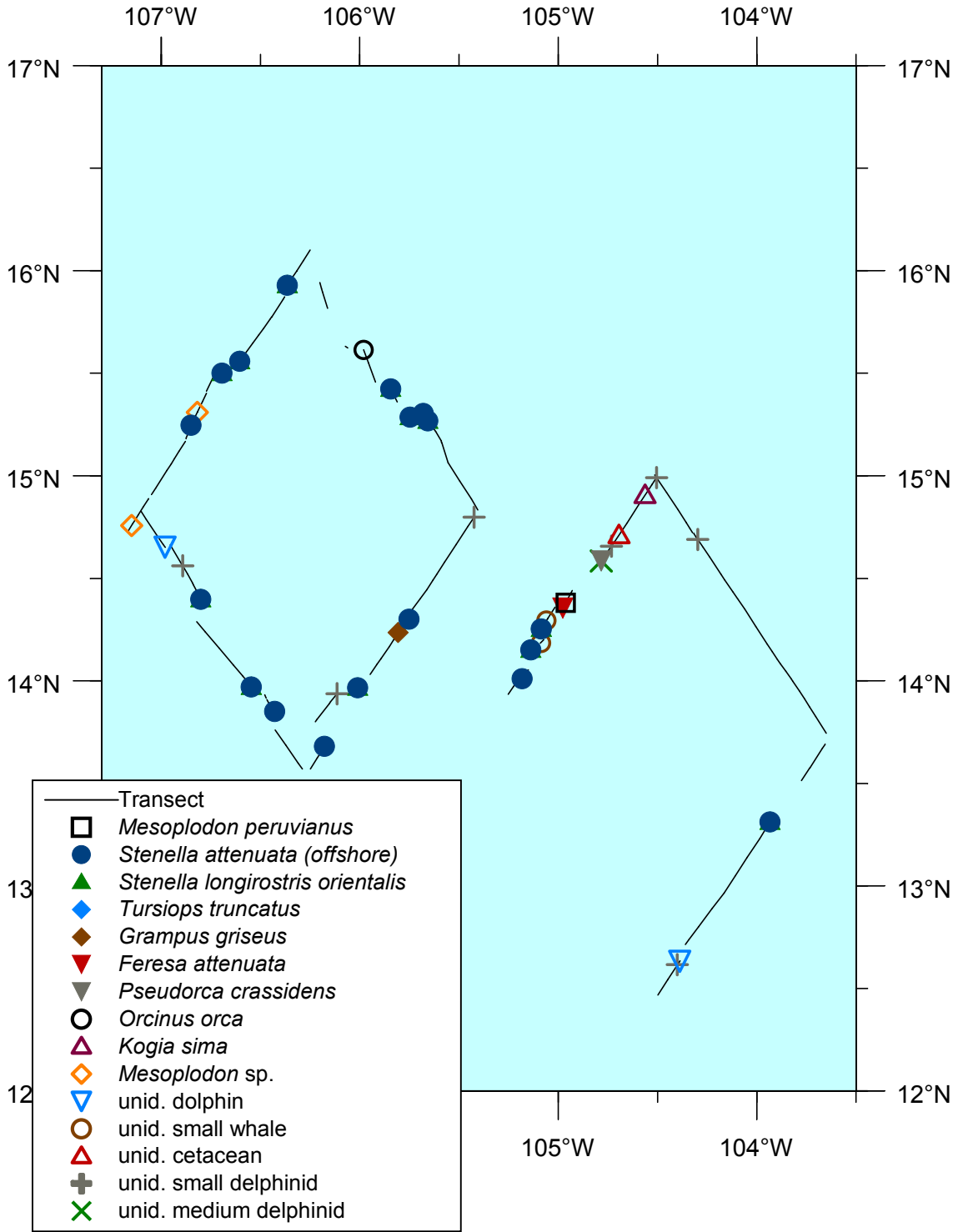
Red-footed Boobies are known for their beautiful red feet and their skills at catching flyingfish. All the usual Red-footed Boobies were present and accounted for on the cruise. Winged boobies photos: Sophie Webb; Non-winged photo: Adam Ü.



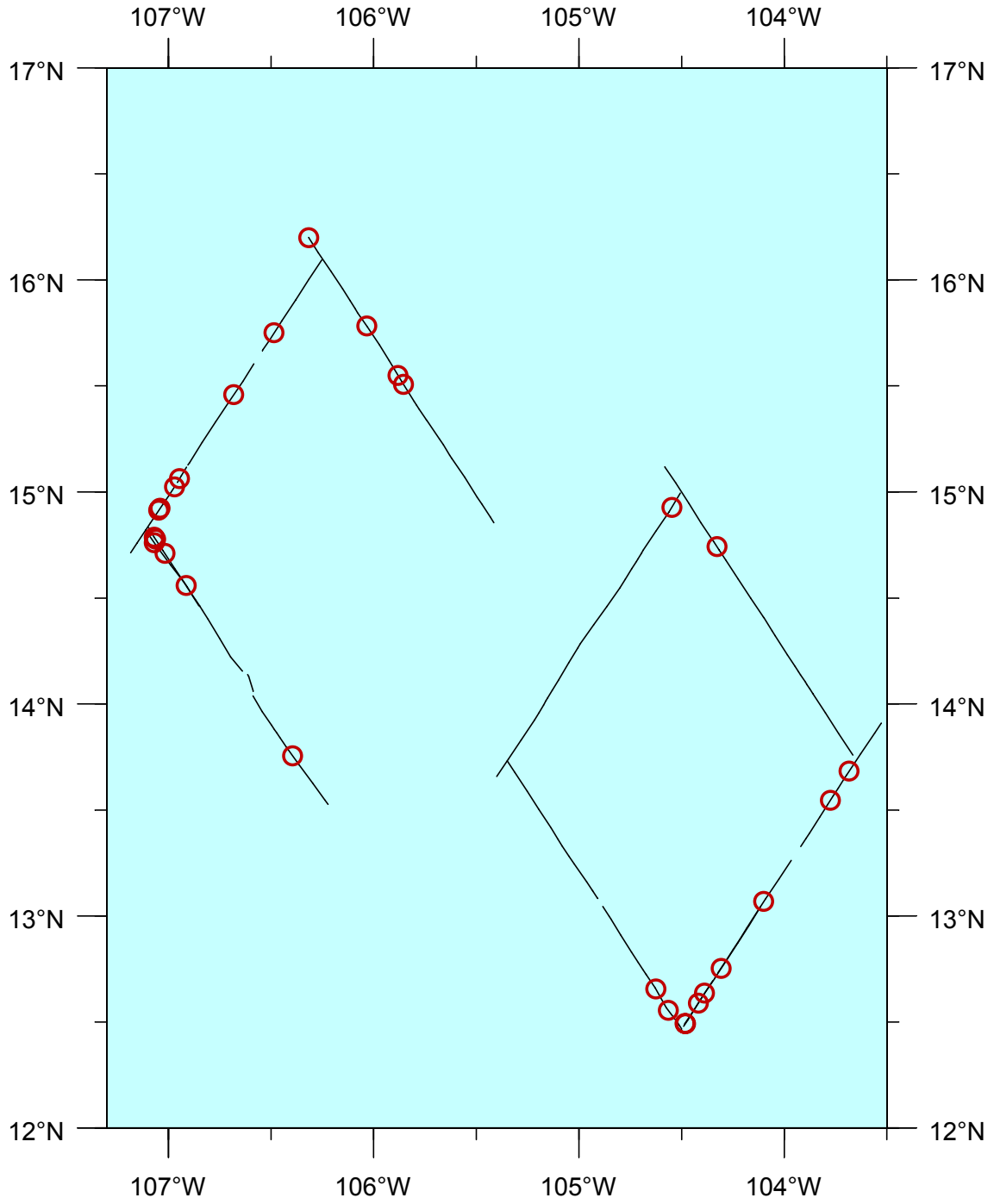
Cetacean Sightings, Leg 3; Passing Mode



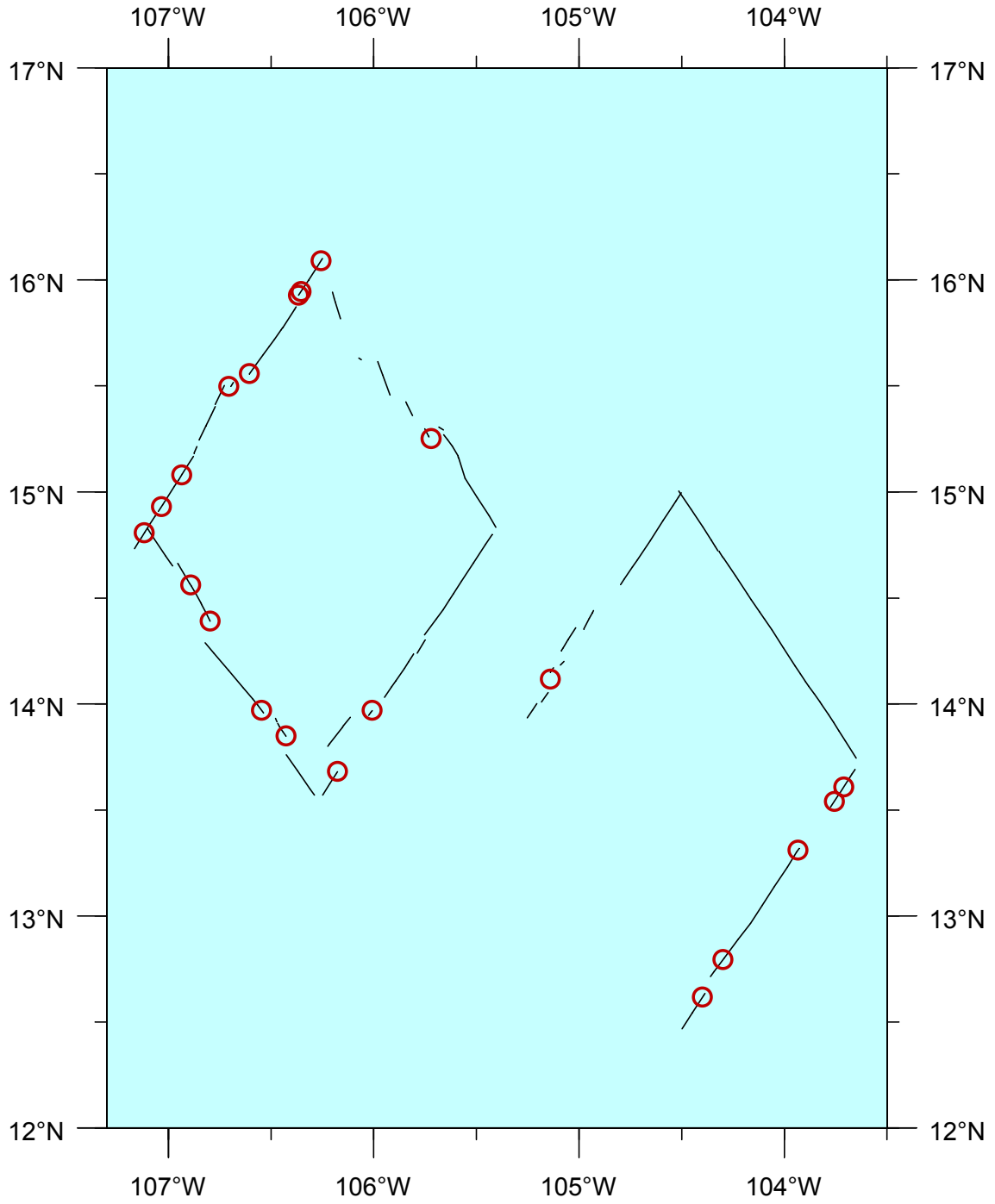
Cetacean Sightings, Leg 3; Closing Mode



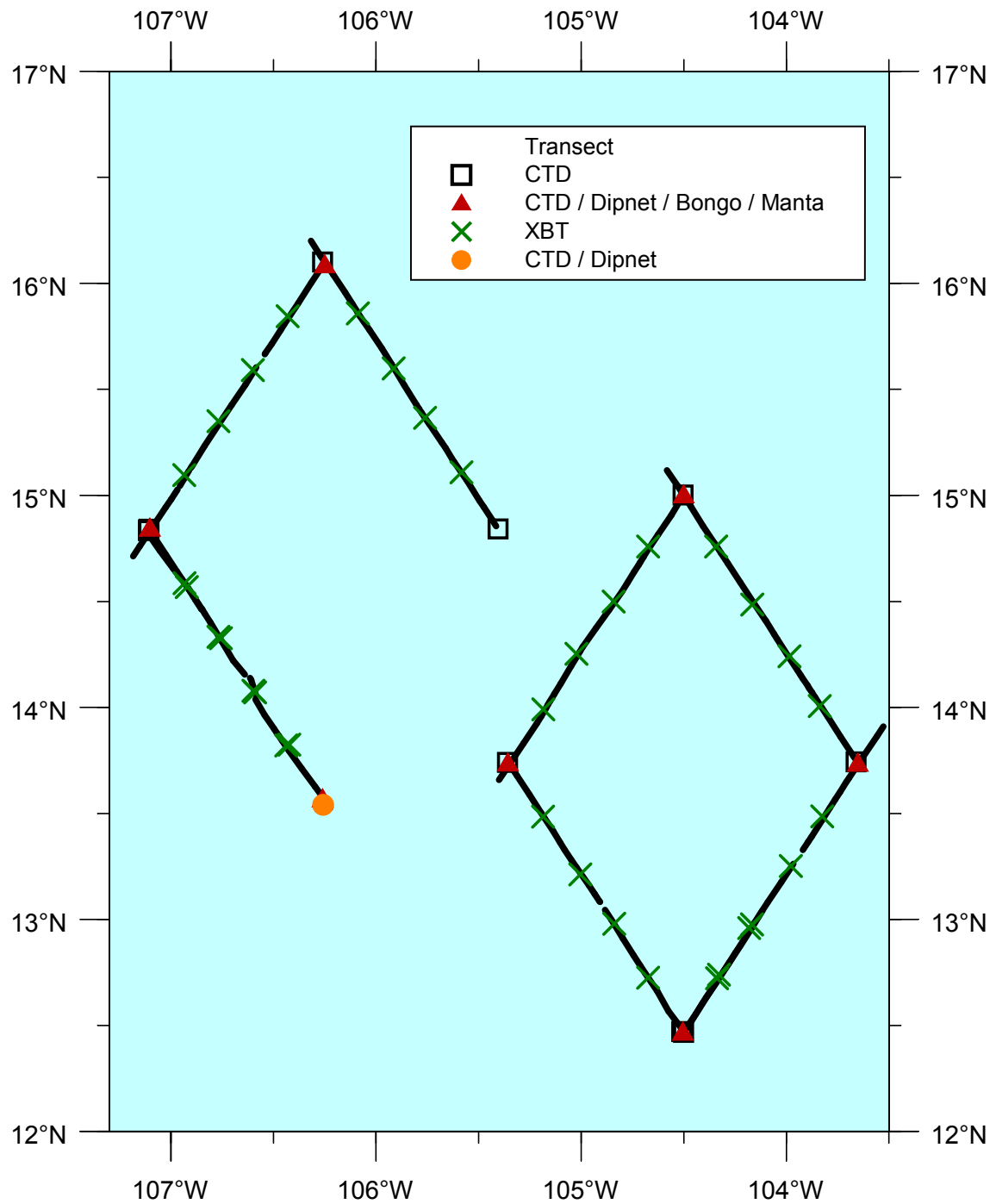
Seabird Flocks, Leg 3; Passing Mode



Seabird Flocks, Leg 3; Closing Mode



Ecosystem Sampling Stations, Leg 3; Passing Mode



Ecosystem Sampling Stations, Leg 3; Closing Mode

