U.S. Antarctic Marine Living Resources Program

2010-2011 Weekly Field Reports
R/V Moana Wave

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Ship-board research:

The US AMLR Acoustic biomass and oceanographic sampling continues to go well during the second week of the survey. Fifty two stations (on 1/25/2011) have been sampled through the West Shelf and Elephant Island regions of the survey area. We have averaged approximately 7 stations per working day, with only a 24 hour break, due to weather, in sampling near end of the West Shelf. Fifty percent of the elephant Island Area has been surveyed.

Oceanography:

The new Sea-Bird SBE-911plus CTD, carousel water sampler, dissolved oxygen sensor, transmissometer, altimeter and PAR sensor were interfaced together as a system. The two "old" PAR sensors were also added to do a comparison with the new PAR sensor. A mast mounted PAR reference sensor was also installed, feeding data directly into the CTD system. The new Chelsea Instruments submersible fluorometer failed on first power up. Spare parts have been ordered to repair this.

The CTD system worked well, with the only problem being that twelve General Oceanics sample bottles broke when the CTD was accidently dropped onto the ship during a retrieval operation. Spare bottles were installed and the broken bottles are being repaired. Repaired bottles have been successfully used and will be used for shallow samples and as spares in the case of future bottle breakage. Twenty-two CTD stations were successfully completed in the West Area and all data processed.

A slow fall of the barometer and a gradual shift of easterly winds to the southwest across Tuesday, Wednesday and Thursday, saw an increase in wind speed from an average of 20knots, to 30knots on Friday.

In general two water masses representing the Antarctic Circumpolar Current (ACC) and coastal waters are found in the West Area. During this survey, most water was classified as Type II, reflecting modified ACC water, with less defined Winter Water at 70-100 meters depth.

Acoustics and krill biomass:

Acoustic data are being collected on four frequencies (38, 70, 120 and 200kHz) using an ES-60 echosounder. After calibrating the acoustic transducers at Admiralty Bay, the system has been logging data continuously. The West Area was surveyed during the first week, and preliminary estimates of biomass are about 2.6 million tons in this area, with a mean biomass of about 70 g m^{-2}, and a CV of 8%. Energy attributed to krill was fairly evenly distributed over the shelf with both small and large krill contributing to the acoustic energy. These preliminary estimates are in line with previous estimates in terms of both mean biomass and total area biomass.

National Marine Fisheries Service
Southwest Fisheries Science Center

Zooplankton

Twenty-two (22) of 25 West Area stations have been completed. *Euphausia superba* adults were caught at 11 stations although catch was low (mean: 9.4 (sd± 16.5) per 1,000 m^3; median 0.9 per 1,000 m^3) compared to past surveys. In general, the larger catches occurred nearshore. *E. superba* larvae were observed at 59% of the stations (mean: 627 (sd± 2,180) per 1,000 m^3 although adults and larvae only co-occurred at four stations. The male:female ratio was 2:1 and 12 % of the krill encountered were juveniles (n= 801). Of the sub-adults and adults, 29% of the females were sexually mature compared to 48% of the males. Male and female median lengths were 51 mm and 49 mm, respectively.

Salpa thompsoni were present at 100% of the stations and in relatively high abundance (mean: 509 (sd±629) per 1,000 m^3; median: 232 per 1,000 m^3). Highest salp catches occurred at the inshore stations. Nearly all *S. thompsoni* were the aggregate form.

Other dominant zooplankton included *Limacina helicina*, Copepoda (mostly *C. acutus* and Calanidae copepidites), Chaetognaths and *T. macrura* larvae. *T. macrua* occurred at 82% of the stations (mean: 80 (sd±130) per 1,000 m^3; median 28 per 1,000 m^3).

Phytoplankton

The phytoplankton team has been collecting water samples to look at the distribution of phytoplankton biomass in the upper water column (surface to 200 m). From each CTD station samples are being collected to measure nutrient concentrations at 15 m depth and kept frozen at -20° Cfor further analysis of Chlorophyll-*a* concentrations and HPLC pigment concentrations. A sample from 10 m is preserved with 5% buffered formalin for taxonomic identification.

To date we have sampled a total of 22 stations in the West Area, consisting of 209 Chlorophyll-*a* samples. Surface (5 m) concentrations range between 0.60 -1.61 mg Chl-*a* m^{-3} and a mean concentration of 0.52 ± 0.52 mg Chl *a* m^{-3}. These preliminary values appear slightly lower than Chl-*a* concentrations for this region recorded in 2008.

Seabird and Mammal Observations

Underway mapping of the abundance and distribution of seabirds and mammals in the AMLR survey area (south of 60°) commenced on 14 January. To present, a total of 71 hours of observations, covering approximately 1,316km of survey transects, have been made. The majority of effort was collected in the West Area and to and from field camps on the South Shetland Islands via Nelson's Strait. The seabird community is primarily represented by (percentage-wise): cape petrels,

chinstrap penguin, Wilson's and black-bellied storm petrels, Southern giant petrel, Antarctic prion, blue petrel, gentoo penguin and white-chinned Petrel. In general, numbers of flying seabirds are low and their distribution pattern appears to be clumped along regions of shelf break. Feeding aggregations of cape petrels were found in only two locations offshore of Livingston and King George Islands at locations where the southern ACC front crosses the shelf break. There have been very few sightings of black-browed and grey-headed albatrosses, but numbers of other sub-Antarctic breeders such as blue petrels and prions (small plankton consumers) are higher than average. Other interesting seabird observations include Antarctic petrel (6), light-mantled albatross (11), and snow petrel. Observations of cetaceans include humpback whale, (34 sightings, 62 individuals), fin whale (2, 2), minke whale (2, 2) and one southern bottlenose whale. The largest concentrations of humpback whales were observed east of King George Island near Cape Melville, at the north and south of Nelson's Strait and within Hero Bay en route to Cape Shirreff, Livingston Island.

Submitted by the Chief Scientist of the US AMLR oceanographic survey