

2009/10 AMLR Field Season

Volume 1

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Highlights

- Krill were present in low abundances compared to previous years
- *Salpa thomsoni* and *T. macrura* were prevalent in all samples areas.
- Local climate forces created unusual weather patterns during the first cruise leg.

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Leg I Summary

The first leg of the 2010 AMLR field season began on 25 January 2010 and ended in Punta Arenas on 13 February. Given the shortened length of this leg, a restricted set of objectives were planned and included a biological and oceanographic survey of the Elephant Island Region (the longest continuous time series in the Antarctic), and camp support for the Cape Shirreff field station.

This year the local weather patterns detrimentally affected completion of the at-sea survey work. In contrast to typical El Niño summers, where east winds are derived from broad scale atmospheric patterns, a series of local, strong low pressure systems brought nearly continual easterly winds to the sampling area. These easterly winds were strong (often gail or storm force) and made sampling the ocean environment difficult.

Between 28 January and 2 February, 18 CTD stations were completed in the Elephant Island Area. An

additional 12 stations within the Elephant Island Area, five stations within the South Area, and a single station in the West Area were also sampled for water column properties by 8 February.

Water samples from discrete depths (0-200m) were collected determine the distribution of phytoplankton biomass in the upper water column. From each CTD station nutrient (Silicate, nitrate+nitrite, and phosphate), chlorophyll *a*, HPLC pigment concentrations and a 10 m sample is being



The Moana Wave offshore of Cape Shirreff.

preserved with 5% buffered formalin for taxonomic identification of phytoplankton. A Profiling Reflectance Radiometer (PRR) was also deployed at each noon station to examine the multi-spectral profiles of downwelling irradiance and upwelling radiance with depth. Of the 20 stations sampled around Elephant Island between the 28th of January and 2 February, the surface (5 m) chl *a* concentrations ranged between 0.06 -1.14 mg chl *a* m⁻³ and a mean concentration of 0.32 ±



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These preliminary values appear slightly lower than historical chl *a* concentrations for this region.

Thirty-one (31) Elephant Island stations have been completed from five of the eight planned line transects. *Euphausia superba* adults were caught at 24 stations, although catch was low (mean: 14 (sd±34) per 1,000 m⁻³; median 1.9 per 1,000 m⁻³) compared to past surveys. In general, the larger catches occurred offshore with the exception of the largest (176 per 1,000 m⁻³), caught between Elephant & Clarence Islands. Larval stages of *E. superba* were caught at 8 stations north of Elephant Island and off the shelf. The male:female ratio was 1.3:1 and 18% of the krill encountered were juveniles (n=741). Of the sub-adults and adults, 94% of the females were sexually mature compared to 79% of the males. Both males and females had a unimodal distribution with median lengths of 47 mm and 46 mm, respectively.

Salpa thompsoni were present at 30 stations and in relatively high abundance (mean: 1,564 (sd±3833) per 1,000 m⁻³; median: 316 per 1,000 m⁻³). Nearly all *S. thompsoni* were the aggregate form with mean and median length at 23 (sd±9) and

23 mm (n=2,741), respectively. Other dominant zooplankton included *Thysanoessa macrura*, copepods, amphipods, *E. frigida*, and *T. macrura* larvae. *T. macrura* occurred at every station (mean: 103 (sd±130) per 1,000 m⁻³; median 58 per 1,000 m⁻³). Their length frequency ranged from 8 to 23.5 mm (median: 17.5 mm; n = 995).

Of the five stations completed from the north-east section of the South Area, *E. superba* was only found at only 2 stations. Within this same area *T. macrura* was caught at all five stations and at a higher rate than the Elephant Island Area (median 182 per 1,000 m⁻³). The “biological highlight” of the South Area was an extraordinary catch of 181 liters – all salps (44,241 per 1,000 m⁻³).