



Sit. Rep. #06
20 February 2008
US AMLR Vessel Survey (*R/V Yuzhmorgeologiya*)
South Shetlands, Antarctica

We began the transit along 60S to the south Orkneys on the 17th of February. Our transect east consisted of 6 stations. However, almost immediately the weather picked up forcing us to minimize sampling at the first three stations. We hope to pick these stations up at some point during the Leg. We arrived at the South Orkneys grid on the 19th and have now completed all station north of the South Orkney Islands. Although weather has forced the delay and cancellation of one station in this northern area we have calculated the acoustic biomass. At present we are steaming north on the second line towards Signy Island. Ice conditions of the east side of the Orkneys would be considered light, and little delay has been caused by it.

Acoustics

Acoustically derived biomass of the northern fraction of the South Orkney islands grid (north of 60.5S) an area smaller than the Joinville Island Area of the South Shetlands grid was more than 650 Ktons of krill. This northern area is approximately 10800 km². The estimated CV of the five transects was 29%, well within useable limits. Mean density of krill estimated in this small area was 59 g/m². Previous estimates for the entire South Orkney islands Area calculated during CCAMLR2000 survey was 3 million tons (CV 55%), but was calculated using the Greene Algorithm.

Krill and Zooplankton – Northern South Orkney Island Area

Krill have been collected by 12 of the 14 net tows taken so far over the northern shelf of the South Orkney Islands. The largest catch of 3100 individuals (1350 per 1000m³) was located at the northwest island shelf break adjacent to a submarine trench. This is also near the area where three krill fishing vessels were working. Three other relatively large catches (113-741 per 1000 m³) were located in offshore waters north and northwest of the island shelf. Krill have been sparse in samples taken on the eastern portion of the survey area. The overall mean and median abundance values (180 and 8 per 1000 m³) are similar to those from the South Shetland Island Area sampled during January Survey A (126 and 8 per 1000 m³).

Krill lengths ranged from 22-51 mm but the length-frequency distribution was strongly dominated by one-year-old krill (29 mm mode). While there was a secondary mode at 42 mm representing two-year-old krill, 80% of the total catch was comprised on individuals less than 35 mm in length (i.e., one-year-olds from the very successful 2006/07 year class sampled during Survey A). The length-frequency distribution and maturity stage composition here (66% juveniles and 22% immature stages) most resembled that of the Joinville Island Area. Larval krill were present in generally low numbers in four offshore samples northwest of the Islands.

The remaining zooplankton catches have been numerically dominated by copepods, with mean and median abundance values (2390 and 1600 per 1000 m³) twice those from Survey A. Copepod abundance in the Elephant Island Area typically demonstrates a seasonal abundance increase of this magnitude between the two surveys. As with Survey A, *Calanoides acutus*, *Metridia gerlachei* and other unidentified copepods were most numerous. Other relatively abundant taxa include chaetognaths and postlarval *Thysanoessa macrura*.

Oceanography and Meteorology

During the southbound transit across the Drake the convergence's northern edge was crossed at latitude 57° 30' S, showing a slight shift to the south from observations made during the northbound transit at the end of Leg1 the week before. The weather for the last week was mostly overcast with winds mainly from the north averaging at around 20 knots. A drop in air pressure (from 988 to 972dbars) on Tuesday caused a change in the winds to a more westerly direction and an increase in wind speeds to around 30 knots, gusting over 40 knots.

18 CTD casts were successfully completed on the transit towards the South Orkney Islands and the northern part of the survey area, with 2 stations being aborted due to rough weather. XBT casts were made at the aborted stations to compliment the CTD data collected. CTD and XBT data have been processed to a stage ready for presentation in Ocean Data View and verified against salinometer/bottle sample comparisons. Routine maintenance, and the usual running repairs on the CTD system (mainly underwater connectors), were limited to the transits between stations, resulting in no time being lost due to CTD technical problems.

Phytoplankton

Two stations sampled in West Area. Station 15-05 located in the ACC had surface concentrations of 0.1 mg Chl-a m⁻³ to 50 meters, and deep maximum of 0.3 mg Chl-a m⁻³ at 75 meters. In contrast, Station 1510 in coastal waters had 1.3 mg Chl-a m⁻³ to ~20 meters that dropped off to 0.13 mg Chl-a m⁻³ at 75 meters.

For the South Orkney Islands area, pelagic waters north and northwest of the shelfbreak had surface concentrations of chlorophyll-a at 0.9-1.3 mg m⁻³ within a shallow pycnocline 20-30 m deep formed by ice melt (cold, low salinity waters), with concentrations dropping off quickly to 0.2-0.3 mg m⁻³ by 75 meters. In contrast, northwestern shelf waters had surface phytoplankton concentrations of ~0.6 mg Chl-a m⁻³ in the upper mixed layer of 30-40 meters, with tapering concentrations to 0.2 mg Chl-a m⁻³ at 75 meters. Highest chlorophyll-a was found at the shelf/shelfbreak at 45°W with ~2 mg Chl-a m⁻³ in the 30 m pycnocline.

Birds and Marine Mammal Observations

Data on the distribution, abundance and behavior of seabirds and mammals were collected during underway ship operations on the north shelf of the South Orkneys. 15

transects were collected covering approximately 328 nautical miles of survey effort. The seabird community north of the South Orkneys consisted of (percentage-wise): Cape Petrel, Southern Fulmar, Chinstrap Penguin, Prions, Black-browed Albatross, White-chinned Petrel, Black-bellied and Wilson Storm Petrel, Southern Giant Petrel and Grey-headed Albatross. The northwest shelf contained the highest densities of flying seabirds. In the vicinity of the Inaccessible Islands, numerous aggregations of seabirds (primarily Cape Petrels and Southern Fulmars numbering in the thousands) were observed continuously during transit for 30 nautical miles. In this same region we observed three krill fishing vessels (a few km away from our survey line), one of which was actively fishing. We did not encounter any seabird aggregations east of this region. A total of 34 Fin and 5 Humpback Whales were observed and were found in the northwest shelf region near Coronation Island and Inaccessible Islands.

Report submitted by AMLR researchers aboard the *R/V Yuzhmorgeologiya*, conducting surveys of the pelagic ecosystem in the peninsula region of the Antarctic. These reports are posted at <http://swfsc.noaa.gov/aerd-field.aspx>.