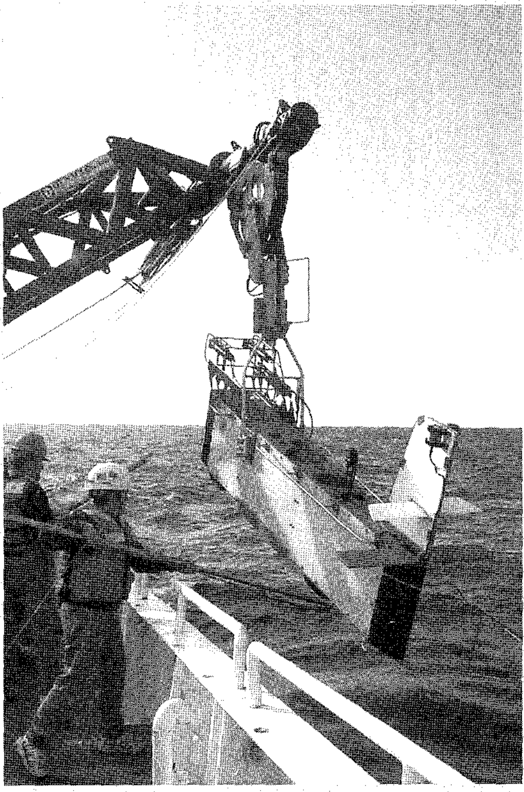
Box 6.3 *continued*



Box 6.3, Figure 1 Deployment of BIOMAPER-II at sea (Peter Wiebe).

acoustics data can augment the interpretation of the net tow data taken concurrently. There were clear day/night shifts in some of the profiles of volume backscattering indicating diel vertical migration. During the day, depths below 100 m generally had higher backscattering and surface values were lower. The reverse generally occurred at night. Ground truthing the acoustics data to provide biologically meaningful information has been a significant aspect of the work (see papers by Chu and Wiebe (2003); Warren *et al.* (2003); Benfield *et al.* (2007); Lavery *et al.* 2007).

BIOMAPER-II was also used on the four Southern Ocean GLOBEC broad-scale surveys on the Western Antarctic continental shelf region in the Marguerite Bay environs. In this work, krill distribution and abundance were determined on two austral fall cruises and two winter cruises when pack ice covered the entire survey region. Acoustic volume backscattering was used as an index of the overall biomass of zooplankton. Distinct spatial and seasonal patterns were observed that coincided with advective features (Lawson *et al.* 2004). The general pattern of backscattering across most of the survey area involved low backscattering in the surface mixed layer, moderate backscattering in the pycnocline, a midwater zone that typically had faint scattering, and when the bottom was within range of the transducers, a well-developed bottom scattering layer extending 40 to 100 m above the bottom. More sophisticated methods that capitalize on the full multi-frequency data set were developed. These distinguished the scattering of krill from that of other zooplankton taxa, delineating krill aggregations in the acoustic record, and then estimated krill length, abundance, and biomass in each acoustically identified aggregation (Lawson *et al.* 2008a,b). The distribution of krill was characterized by many small aggregations closely spaced relative to one another, punctuated by much fewer aggregations of very large size that accounted for the majority of overall biomass in the region. The greatest number of aggregations was found at depths less than 100 m, but aggregation biomass was usually greatest at deeper depths. There was little association between the characteristics of individual aggregations and the mean length of krill estimated acoustically, and thus little evidence for any size- or age-related changes in aggregative behavior.

Peter H. Wiebe