Box 9.1. Continued

profiling drifting float, equips it with lift surfaces (wings), a hydrodynamic shape, and trajectory control (internal moving mass). These additions enable the vehicle to glide while diving and while surfacing along slopes as steep as 2:1 or as gentle as 1:5. With forward speeds of typically 0.25 ms^{-1}, gliders may be used as virtual moorings or on long purposeful transects. As with moored profilers, gliders will benefit from new-generation micropower sensors and from new energy sources. It is feasible that global initiatives such as the ARGO array of drifting floats may one day be replaced with an array of gliders operating as virtual moorings and on transects.

PROPELLED AUVS

Presently, propelled AUVs tend to be far larger than moored profilers, floats, or gliders (figure BX9.1). Consequently, they are more expensive to build and operate. However, because they can carry considerable energy (perhaps over 150 MJ) and have large payload spaces (up to 1000 L), they form valuable platforms for multidisciplinary process study experiments. In particular, they can carry large power-hungry sensors such as sonars and flow cytometers as well as new versions of traditional water samplers. With proven ranges in excess of 250 km, such vehicles have already made significant contributions to high-resolution marine geoscience, to fisheries research, to the measurement of oceanic turbulence and mixing, and to understanding small-scale coastal processes.

By deploying AUVs shuttling between docking stations included on deep ocean moorings, key sections may be monitored in the future without needing a ship. Propelled AUVs are very likely to be used for data gathering from otherwise impenetrable environments, for example, under Antarctic sea ice and under the floating ice shelves of Antarctica and Greenland.

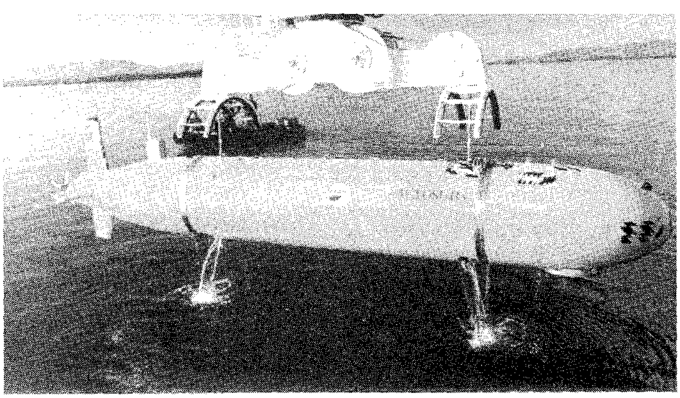

Figure BX9.1. The Autosub autonomous underwater vehicle being recovered from a trial deployment. Courtesy of S. P. Hall, Southampton Oceanography Centre.