530

RESULTS OF MBARI'S INTEGRATED MULTIBEAM, SIDESCAN AND SUBBOTTOM AUV OPERATIONS FOR OCEANOGRAPHIC SCIENCE

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The Monterey Bay Aquarium Research Institute (MBARI) has made operational an autonomous seafloor mapping capability for deep ocean science applications. The Multibeam AUV (MBAUV) is a Dorado-class vehicle modified to carry four mapping sonars. The primary sensor is a custom built 200 kHz multibeam sonar producing swath bathymetry. The vehicle also carries a dual frequency 100 kHz and 410 kHz chirp sidescan sonar and a 2-16 kHz sweep chirp subbottom profiler. Operating simultaneously, this system is producing state of the art science data and maps. Navigation and attitude data are obtained from an inertial navigation system (INS) incorporating a ring laser gyro and a 300 kHz Doppler velocity log (DVL). The vehicle also includes acoustic modem, ultra-short baseline navigation, and long-baseline navigation systems. The system delivers a standard mission duration of 12 hours at a typical speed of 1.5 m/s overall. The system is considered full ocean depth rated to 6000 m, allowing MBARI to conduct high-resolution mapping and contour following of the deep-ocean seafloor. The sonar package can also be mounted on a remotely operated vehicle (ROV), allowing surveys at altitudes less than 10 m at topographically challenging sites. During 2005 the MBARI team completed a number of science survey operations while completing the integration and testing of the complete suite of sonar sensors and most sub-systems. MBARI is now using this capability in both autonomous and ROV-mounted surveys to observe the changing morphology of dynamic systems such as submarine canyons and active slumps, to map deep-water benthic habitats at resolutions comparable to ROV and submersible observations, to provide base maps for ROV dives, and to provide high resolution bathymetry and subbottom profiles in support of seafloor observatory installations. The MBAUV has demonstrated a new level of mapping capability that can be imitated and or applied to Antarctic waters for bottom detail mapping or reconfigured for under ice imagery.