Marine Robots: Advanced Tools for Marine Science.
Discovery and Exploration of Deep Sea Hydrothermal Vent Sites using Autonomous and Remotely Operated Vehicles

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This talk presents results from recent oceanographic cruises were we have used Autonomous and Remotely Operated vehicles to discover and explore deep sea hydrothermal vents. The paper presents a three-phase survey technique that utilizes the capability of the Autonomous vehicle to locate new vent sites starting with measurements of faint plume tracers high in the water column. In a sequence of nested surveys, detailed maps of the hydrography and seafloor are built as the location of vent fields are refined. Then, the autonomous vehicle can photograph the vent site in preparation for more detailed, close-up mapping and sampling by the remotely operated vehicle. These techniques are illustrated with results from the Lau Basin (21 9'S, 157 12W), Southern Mid-Atlantic Ridge (7 57'S, 14 22'W), and Manus Basin (3 46'S, 151 53'E) using the ABE autonomous vehicle and the Qwest and Jason2 Remotely Operated Vehicle systems.