



## **Seismic and High-frequency Acoustic Recording Packages (SHARPs) for long-term, broad-band monitoring in the waters off of Antarctica during the International Polar Year**

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Advances in consumer computer technology have allowed for the development of autonomous seafloor instrumentation capable of recording acoustic, seismic and environmental data at relatively high-bandwidths and over extended periods. Four SHARPs (Seismic and High-frequency Acoustic Recording Packages) are being developed specifically for the International Polar Year (IPY) for long-term (over one-year), circumpolar deployments around the Antarctic. These instruments will advance the understanding of seismic and biological activity in the Southern Ocean. Data will be collected on acoustic call and source level characteristics for a broad range of marine mammal species. This improved technology for passive monitoring will allow us to expand the range of marine mammal species monitored to include all the mysticetes (baleen whales), odontocetes (toothed whales) and pinnipeds (seals). These acoustic data will be used to investigate the seasonality and abundance of species in the Southern Ocean, as well as the ways that physical and biological processes interact to determine the patterns of distribution and abundance. At the same time these instruments will fill a large gap in global seismic monitoring coverage by placing seafloor seismic sensors at Southern Ocean locations, far from existing sites. These seismic sensors will lead to a more uniform coverage for seismic wave propagation within the Earth, and better understanding of local seismicity in the Southern Ocean. SHARP capabilities include: longer than one-year autonomous deployments, continuous, acoustic, 16-bit recordings up to 30 kHz (or multiple, non-continuous recordings up to 200 kHz), 3 channel seismic and 1 channel differential pressure gauge recordings at 100 Hz and

24-bits, 4 channels of 1 Hz, 12-bit environmental sensor (e.g., temperature) recordings, high-precision/low-drift clock, broadband Trillium seismometer (manufactured by Nanometrics), and close to 2 TB of data storage via 16 laptop computer hard disk drives.