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Long-term variations of ice breaking noise in Antarctica

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Numerous low frequency transient signals arriving from Antarctica have been detected in five-year sea noise recordings in 2002-2006 at the hydroacoustic listening station deployed off Cape Leeuwin in Western Australia as part of the International Monitoring System of the Comprehensive Nuclear-Test-Ban Treaty. The majority of these signals consist of a single arrival of mode 1 which dominates the higher modes and undergoes strong frequency dispersion due to long-range propagation in the polar ocean environment. These signals are believed to be emitted primarily by ice rifting and breaking events on the Antarctic shelf. Several regions along the Antarctic coast associated with certain glaciers and ice tongues were found to persistently be much more active in generating ice noise than other parts of the Antarctic shelf. An analysis of long-term changes in the frequency of occurrence of ice events showed noticeable seasonal cycles, but did not reveal any significant interannual variations against the background of short-term fluctuations. Some of the ice events detected at the Cape Leeuwin station were also identified in sea noise recordings made on autonomous acoustic loggers deployed on the Antarctic shelf, which allowed us to investigate characteristics of the acoustic signals from ice events near their origins.