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AMBIENT NOISE IN THE OCEAN AS AN INDICATOR OF ICE DISINTEGRATION PROCESSES ON THE ANTARCTIC ICE SHELF.

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Change in the intensity of ice disintegration processes on the Antarctic ice shelf is one of the major factors of global climate change. Ice rifting and breaking events produce an intense sound that can reach surrounding waters and propagate further in the ocean over large distances. The feasibility of monitoring of Antarctic ice disintegration processes by listening to ambient noise in the ocean at remote hydroacoustic receive stations is considered in this work. An analysis of long-term acoustic recordings at the hydroacoustic station, installed off Cape Leeuwin in Western Australia as part of the International Monitoring System of the Comprehensive Nuclear-Test-Ban Treaty, has shown that an overwhelming majority of low-frequency continuous and pulse-like signals arrive from the Antarctic continental shelf. The pulse-like signals located in the direction to Antarctica revealed strong frequency dispersion distinctive for long-range propagation in the ocean acoustic channel in the polar environment. The signal waveform and dispersion characteristics were consistent with the results of acoustic propagation modelling. It was deduced from inversion of the acoustic propagation model that those signals should be as short at the origin as fractions of a second and were emitted most likely by ice rifting and breaking events and possibly by icebergs collisions. The spatial distribution of the ice-related events located from the Cape Leeuwin station along the Eastern Antarctic coast revealed a number of regions within which the events were much more often observed. The occurrence of ice-related acoustic events varied irregularly in time, although in summer their overall rate was noticeably higher than that in winter.