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# of changes in the acoustic environment of the southern Indian Ocean using long term trend analysis on CTBTO data collected at Cape Leeuwin

Monitoring of deep-ocean low-frequency sound is challenging, but data have been reported for the Northeast Pacific Ocean and Indian Ocean in a number of recent publications. The CTBTO (Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization) has made available data from their deep-ocean hydro-acoustic stations, so that researchers may examine the existence of trends and features in the recorded sound. In the case of some of the stations, the data cover more than ten years of recordings. Here, we present trend analysis of data from one CTBTO observatory at Cape Leeuwin (Australia) to examine the rate and magnitude of change in low frequency sound (5-105 Hz) over the period 2003 - 2015. The analysis involves the application of regression to percentile levels in limited frequency bands and employs bootstrap resampling as a non-parametric approach for the necessary quantification of the uncertainties associated with the estimated trends. Results obtained by linear and more complex regression models are compared and the effect of aggregating data over various time intervals is also examined. Finally comparisons are drawn between trends observed in adjacent frequency bands.

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