

An heuristic ocean ambient noise classifier

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Narrowband energy derived from long-averaged Short Time Fourier Transforms (STFT) of moored hydrophones contains data produced by the ocean and man-made sources with amplitude variation spanning multiple time scales, e.g., wind and wave noise, distant shipping, nearby shipping and frontal or storm passage noise. These contributions to the overall noise level are additive in producing the total measured noise level at any time.

A scheme based on determining the local mean noise level over the period of several hours is used to determine the positive and negative peak values of the data relative to the local mean. The statistics of the negative peaks are used to eliminate large positive peaks (outliers) resulting from distant and nearby shipping. The mean determination and positive peak elimination process is performed multiple times until the statistics of the positive peaks are similar to those of the negative peaks.

The resulting classification of the noise data appears useful in estimating ship traffic statistics as well as wave and wind noise sources. The elimination of peaks in the data due to shipping does not appear to significantly affect the gross percentile statistics used to characterize overall ambient noise.

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