A semi-automated, interactive tool for review of acoustic detection and localization data collected during towed hydrophone array surveys for line-transect density estimation

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Precise localization is necessary for density estimation of cetaceans using passive acoustic based distance sampling methods. Line-transect methods require data about perpendicular distances of detected animals from survey tracks. For vessel-based towed hydrophone surveys, localization of animals is typically conducted in real-time by experienced operators who commonly use a method called 'target motion analysis' (TMA). In TMA, a series of rays or bearings, leading from a hydrophone pair (on the towed array), to each detection, is plotted. The operator examines the plot and visually approximates the point where the bearing lines best converge. The resulting localizations results can be imprecise, at best, and erroneous, at worst. Therefore, it is often necessary to be review and quality control the data later. This process can be complicated and time-consuming. It usually requires re-analyzing the acoustic data, re-plotting the bearing data and then comparing the real-time and post-processed results.

We are developing an efficient and reliable algorithm to quickly review localization data and, if needed, re-analyzed the data. The output of this program will be verified perpendicular distances of calling animals from the survey track. This program, named 'Boinger' is a Matlab® based user-interactive algorithm written by one of us (R.A). The details of the program will be explained with examples provided. One important capability of Boinger is that individual identification characteristics from calls are automatically extracted during the call detection process. These data are incorporated into bearing map/plots using a color-scale gradation. This provides important additional information that can be used for identifying bearing lines from different calling animals.

We anticipate that, with modifications, this program can be used to review data for other species. This should greatly improve the effectiveness and reliability of passive acoustic data collected from towed hydrophone arrays during line-transect survey for density estimation of vocally active cetaceans.

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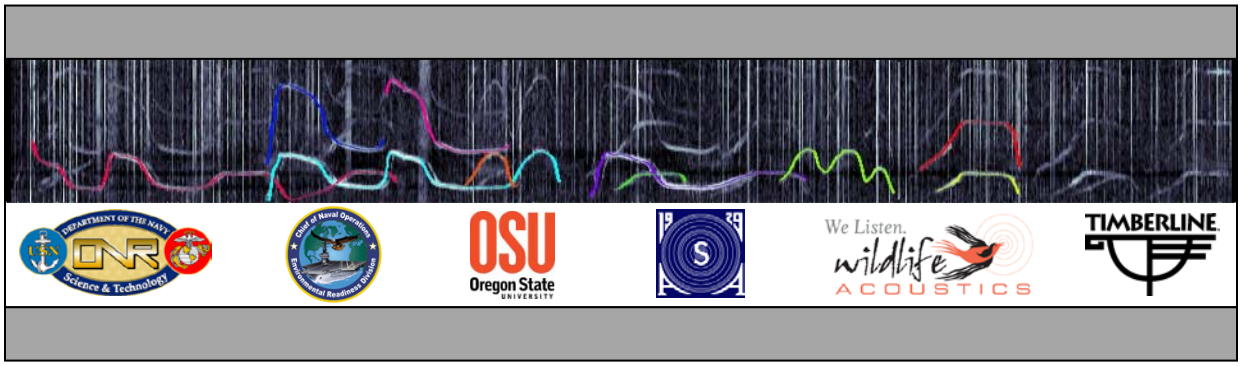

Fifth International Workshop on Detection, Classification, Localization, and Density Estimation of Marine Mammals using Passive Acoustics

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ABSTRACTS

The abstracts for oral presentations and posters at the 5th International Workshop on Detection, Classification, Localization, and Density Estimation of Marine Mammals using Passive Acoustics, predominantly focus on odontocete sounds and analytical methods for classifying clicks and whistles, as well as density estimation. Research on baleen whale sounds and some non-cetacean marine mammals is also featured, and provides further information about important methodologies.

These biennial DCLDE workshops are intended for exchanging information that advances understanding of acoustic methods to detect, classify, locate, track, count, and monitor marine mammals in their natural environment. The goal is to encourage interdisciplinary approaches to solve real-world problems related to the study of marine mammals and the effects of human activities on their behavior.

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