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**An optimization approach to the automatic identification of
signals originating from underwater explosions**

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Data recorded by the International Monitoring System (IMS) of the Comprehensive Test-Ban Treaty Organization are used to illustrate the different types of signal that are routinely received on IMS hydrophone stations. It is shown that automated methods for characterizing the source of these signals sometimes fail to identify signals arising from underwater explosions.

A new approach to the automatic identification of such signals is presented. The approach uses Receiver Operating Characteristic (ROC) curves to investigate the trade-off between false-alarm rate and probability of detection. It applies a threshold to a parameter developed as a measure of the likelihood of a signal being associated with an explosion. A numerical Measure of Performance (MoP) is derived from the ROC curves and the definition of the likelihood parameter is tuned so as to maximize this MoP. Optimization of the parameter definition is achieved using an approach based on genetic algorithms.