



A test to identify signals associated with underwater explosions

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Hydroacoustic data from the International Monitoring System are presented to illustrate cases where signals associated with underwater explosions are incorrectly identified as T-phases by the default rules for phase identification used in automatic processing at the International Data Centre of CTBTO. The default rules have no test specifically for H-phases and signals are only identified as H-phase if they fail to pass tests for T- and N-phases. A test is proposed to be carried out before signals are input to the existing default rules. This test is designed to identify signals associated with underwater explosions. Such signals would be assigned as H-phases, thus avoiding potential misclassification. The test is based on the production of a parameter which expresses the likelihood of a signal being associated with an explosion. This parameter is a function of various waveform descriptors associated with detections by existing automatic processing. A threshold is applied to the parameter so that signals with parameter values above the threshold are identified as coming from underwater explosions. The parameter and the threshold value are calculated in an approach based on considerations of trading-off probability of detection and probability of false alarm via a receiver operating characteristic curve. The results of the new test are described in terms of the number of signals identified as being associated with explosions and the remaining levels of missed detections and false alarms.