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Application of Detection Probabilities in the IDC Global Phase Association Process

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The Global Association (GA) process at the IDC is an automated procedure that associates detections by stations in the International Monitoring System (IMS) in order to form event hypotheses. These hypotheses will later be reviewed by analysts before the Reviewed Event Bulletin is issued. We have begun investigating ways to improve the GA process for seismic data, in particular by incorporating amplitude data and station detection probabilities in the automatic process. We build on a previous study which has provided regional detection capability estimates for individual primary and auxiliary IMS stations, and use these estimates to develop and test various consistency measures. The purpose of these measures is to provide a means to assess the validity of automatically defined seismic events and the consistency of individual phases associated with such events. By feeding the results of such assessments back to the GA procedure, we anticipate that the results of the global association can be iteratively improved. An important contribution to these assessments will be provided by incorporating the results of the continuous IDC Threshold Monitoring process. The initial results of this study are promising, and this paper will present some case studies illustrating our approach.