SEISMIC CATALOGUE COMPLETENESS AND ACCURACY

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ABSTRACT

The single most important goal of seismic monitoring of a nuclear weapons treaty is the detection and accurate location of seismic events of various origins (natural and man made) globally. However, the metric for evaluating the performance of the IMS or other monitoring networks is not easily established since global catalogues, such are the ISC and PDE, have been shown to be incomplete, with large regional variability. Further, the event parameters (location, origin time and magnitudes) are often quite different from catalogue to catalogue. We propose a collaborative research project between three universities to construct an as accurate as possible catalogue for the time period of 1995 to the present in a region of monitoring interest. This is an *intensive* project and will require both a data collection effort and a substantial research effort. The data collection effort will include the concatenation of a large number of disparate data sources (IMS, GSN and Geoscope stations, temporary, portable seismic experiments, various national networks and independently operated stations). This psuedonetwork will have temporally changing capability, and establishing seismic phase correlation with regional data will be a primary task. A significant part of the research effort will focus on improving the location of seismic events which are detected on a limited number of stations, primarily at regional distances (and a very small number of teleseismic stations). We will also investigate strategies for optimizing detection capabilities on particular subregions.

The area of focus stretches from Saudi Arabia to the eastern Tien Shan in northwestern China. The data sources include 12 different networks and experiments: much of the data is not readily available to the research community at large. The various research groups (UCSD, IU and UofA) bring different expertise to the project, and the collaborative effort will provide the following: (1) a detailed catalogue that will provide a test bed for comparison of performance, (2) research on strategies for regional event location and quantification, (3) investigation on establishing realistic errors in earthquake parameters reported, and (4) investigation of optimizing detection capability by using temporally or intermittently deployed seismic assets.