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On the impact of RN network coverage on event selection and data fusion during the 2009 National Data Centres Preparedness Exercise

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The so-called National Data Centres (NDCs) to the Provisional Technical Secretariat of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty (CTBT) Organization are in charge to provide for the final judgement on the CTBT relevance of explosion events encountered in the PTS International Monitoring System (IMS). The latter is a 321 stations network set-up by the PTS (to date completion level: 80%) in order to globally monitor for occurrence of CTBT relevant seismo-acoustic and radionuclide signals. In doing so, NDCs learn about any seismo-acoustic or radionuclide event by active retrieval or subscription to corresponding event lists and products provided by the International Data Centre (IDC) to the PTS.

To prepare for their instrumental role in case of a CTBT relevant event, the NDCs jointly conduct annually so-called NDC Preparedness Exercises. In 2009, NDC Germany was in charge to lead the exercise and to choose a seismo-acoustic event out of the list of events provided by the PTS (Gestermann et al., EGU2010-13067). The novelty in this procedure was that also the infrasound readings and the monitoring coverage of existing (certified) radionuclide stations into the area of consideration were taken into account during the event selection process (Coyne et al., EGU2010-12660).

Hence, the event finally chosen and examined took place near Kara-Zhyra mine in Eastern Kazakhstan on 28 November 2009 around 07:20:31 UTC (Event-ID 5727516). NDC Austria performed forward atmospheric transport modelling in order to predict RN measurements that should have occurred in the radionuclide IMS. In doing so the fictitious case that there would have been a release of radionuclides taking place at the same location (Wotawa and Schraik, 2010; EGU2010-4907) in a strength being typical for a non-contained nuclear explosion is examined. The stations indicated should then be analysed for their actual radionuclide readings in order to confirm the non nuclear character of the event (negative testing scenario). Obviously only stations already set up and 'certified' of being capable of full operations, could be recruited for this. In doing so an issue was encountered with regard to the availability of RN data at certified RN stations.

Despite the support to the event selection, PTS also supplied so-called data fusion bulletins that apply a method to collocate the RN and seismo-acoustic source location results (Krysta and Becker, EGU2010-10218). In this paper we demonstrate the impact of gaps in network coverage that appear due to the aforementioned reduced RN data availability for source location capacities. Network coverage assessments for the set of certified stations and the reduced set of stations actually sending data shall therefore be discussed. Furthermore, the capabilities and constraints of the data fusion method to make up for the RN source location accuracy losses related to reduced RN data availability at certified stations shall be presented.