



Active seismic investigation of December 22, 2009 detonation at Kambarata (Kyrgyzstan) site for a dam fill construction

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Records of the December 22, 2009 explosion in Kambarata, Kyrgyzstan are unique materials for seismological research, both in the field of velocity modeling and for assessment of seismic impact. It was quite fortunate that at the time of the explosion, several networks of digital seismic stations operated on Kyrgyzstan's territory. These were permanent networks of CAIAG, IS NAS KR and RS RAS, as well as temporary networks established under joint projects of GFZ and CAIAG: the TIPAGE and the FERGANA projects. A temporary Consortium was formed in Kyrgyzstan for organization and performing works concerning the scientific use of the explosion data. The following institutions became partners of the Consortium: CAIAG, IS NAS KR, RS RAS, ISB GENONOM, KRSU, as well as the partners of the LADATASHA-983289 project. The "GIDROSPECPROJECT" has become the leading partner. According to the agreement, all participants of the Consortium have equal rights to the use of the explosion data.

Two seismic profiles were created to the south and southwest from the explosion site for the purposes of velocity modeling research. The following conditions determined the reasons for the profile choice. The meridian profile would be a continuation of the trans-border profile established in the "TIPAGE" project and would run from the explosion point up to the zone of the Pamir-Hindukush concatenation. The southwest profile was located in the mountains framing the Fergana basin where the temporary network of the "FERGANA" project was concentrated. This allowed creating two adequate profiles without significant additional equipment input. Thirteen high-frequency one-component sensors attached to single-channel data loggers (DSS-Cube) and four three-component broadband stations (STS-2) have been used, in addition to the existing stations. Three DSS-Cube instruments were installed near the explosion site to determine the origin time, and the other DSS-Cube instruments and STS-2 sensors were positioned along the profiles. In addition, another big industrial detonation with fixed origin time took place at the same site on February 8, 1975. It was recorded by analog stations situated approximately along the profiles selected by the Consortium. This gives the opportunity for comparison of the results and combined use of these results for solving the problems of velocity modeling.

The December 22, 2009 explosion was done for the purpose of dam fill construction on the Naryn river to provide for water descent inside the Kambarata Hydroelectric Power Station-2. According to the methodology for the creation of this type of dam, two explosions were done with an interval of 1.7 seconds and the general power of 2860 tons of ecdonite (saltpeter and solar oil combination). The power of the second explosion was approximately twice that of the first one. All records have been kept in the mSEED format. From a preliminary analysis of the seismic recordings, a time-distance curve of the first arrivals along the two profiles selected by the Consortium and along a third profile in the northeast direction from the explosion point, where the permanent nets of IS NAS KR and RS RAS are located was plotted. Preliminary velocity models along the profiles will be presented and discussed.