SITE EFFECT ASSESSMENT IN NARYN (KYRGYZSTAN) USING EARTHQUAKE AND NOISE DATA

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Naryn, the capital of the Naryn district in Kyrgyzstan is located in a narrow valley along the Naryn River. The city has been struck in the past by the 1902, M 5.4 Naryn earthquake (I=VI-VII) and the 1948, M 4.9 Kulanak earthquake (I=VII-VIII). The local SZ-95 zonation attributes an intensity of VIII to Naryn with a recurrence interval of 200 years, later refined to 180 years (Januzakov et al. 2005). The existing Seismic Micro zoning covers only the central part of Naryn city, and assigns intensities ranging from VIII, in the western part of the town, to IX, around the Naryn River. Hence, increasing knowledge and awareness of both local authorities and decision makers is necessary for mitigating the consequences that might occur from the forecasted strong ground motion. To this regard, more effective countermeasures can be taken if an improved seismic hazard assessment (in term of spatial resolution) is carried out providing one of the key elements for the calculation of more realistic earthquake risk scenarios. With this aim, the Earthquake model of Central Asia (EMCA), the regional partnership of the Global Earthquake Model (GEM) in the region, aims at triggering microzonation activities for the urban areas of Kyrgyzstan, Uzbekistan, Kazakhstan, Tajikistan and Turkmenistan.

In cooperation with the EMCA initiative, the Site effect studies in Naryn city project, is aiming at site effect estimation in the urban area of the Naryn city. During the first phase of the project, a temporary seismological network of 16 stations was installed in the city of Naryn for four months. 84 seismic events with magnitude ranging from 2.5 to 6.5, as determined by the Kyrgyz Institute of Seismology of the National Academy of Science, have been extracted from the whole data set and analyzed. Moreover, seismic noise recordings were collected by means of 134 single station noise measurements as well by three small-size seismic arrays installed in three different areas of the town. The results will be obtained by using the Standard spectral ratio (SSR) method will show us that broad band amplification (starting at 0.5 Hz frequencies) is affecting the site response of all the stations located in the basin. Discrepancies between Horizontal-to-vertical spectral ratio (HVSR) and SSR results can be ascribed to the large amplification of the vertical component of ground motion. The single station noise results, once their reliability was verified by the comparison with the earthquake data, have been used to produce the first fundamental resonance frequency map for the city Naryn.

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