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New site-dependent dynamic characteristics for shallow porous aquifers in Bucharest, Romania, using SCPTU-techniques.

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Site characterization and site-specific near-surface ground response analyses are important for the evaluation of the amplification of ground motions during earthquakes together with the dominant period range in the response spectra. It is known that the local geologic and soil conditions at a site have a profound influence upon the characteristics of earthquake ground motion and the corresponding response spectra. Hydrogeologic factors, which can also influence the earthquake ground motion, are generally less taken in consideration. The same statement can be made about their impact upon the liquefaction potential of a site. In earthquake-endangered regions with large and thick sedimentary basins of soft soil sequences, porous aquifers within these sediments can have an important impact upon the earthquake ground motion and site effects. Site-dependent and variable groundwater saturations respectively variable groundwater levels, variable permeabilities and groundwater flow conditions contribute to variable state parameters and dynamic characteristics of the particular sandy layers. Suchlike geologic and hydrogeologic conditions occur in Bucharest, the capital of Romania. Bucharest, hit often by strong earthquakes occurring in the Vrancea seismogenic zone, is situated on thick Quaternary soft soil deposits (100-300 m), comprising within them three main aquifer systems. The impact of hydrogeologic conditions to instrumentally observed site effects is studied within the frame of the Collaborative Research Center (CRC) 461: “Strong Earthquakes: a Challenge of Geosciences and

Civil Engineering", which is funded by the Deutsche Forschungsgemeinschaft (German Research Foundation) and supported by the state of Baden-Württemberg and the University of Karlsruhe. Recently, last year, at 10 sites in Bucharest, Seismic Cone Penetration Tests (SCPTU) with continuous measurements of pore water pressure and selective pore pressure dissipation tests were performed for the investigation of the near-surface geologic underground. These measurements have enabled to obtain new dynamic characteristics for the penetrated geologic layers and particularly for two shallow aquifers in the area of Bucharest. Shear-wave velocities of the corresponding sandy layers under fully saturated, partially saturated and practically dry conditions were obtained, showing quite different values. Through the measured cone resistance and sleeve friction, significant site-relevant *in situ* state parameters, as compactness, cementation status, stiffness behaviour, strength behaviour and effective stress, density (void ratio) and grain size were deduced. Through the performed pore pressure dissipation tests the effective piezometric groundwater level of the different aquifers were determined as well as the permeability of the particular sandy layers too.

The obtained detailed site-dependent state parameters and dynamic characteristics of the geologic layers, but especially that for the sandy layers, are used in linear and non-linear computed models for site-specific ground response analyses. The cyclic resistance ratio (CRR) of a soil layer, which may liquefy, necessary for the calculation of the factor of safety against liquefaction, is deduced also from the SCPTU-measurements.