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## Contribution for seismic hazard assessment with local scale focus on Durrës (Albania) and damage observation after the ML 5.4, 21st September 2019 earthquake

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The city of Durrës was recently struck by a Mw 6.2 mainshock event (<http://cnt.rm.ingv.it/event/23487611>) that caused considerable damage and 51 victims. The city is located on an actively seismotectonic belt where seismic catalogues report few past events with magnitude higher than 6.

Surface geology is generally considered to influence the ground motion recorded on site. The analysis of the influence of local effects on seismic response at ground surface appears relevant also considering that Durrës is a densely populated city prone to high seismic risk and is characterized by several important archeological and cultural heritage sites.

Preliminary results obtained from recent geophysical in-situ measurements and geological surveys, carried out in Durrës after the ML 5.4, 21<sup>st</sup> September 2019 event, are presented with the aim of providing new elements for the assessment of local seismic hazard and following a comprehensive approach to the modifications induced by the site.

Twenty-nine single-station noise measurements, processed through the HVSR technique, two MASW surveys and two 2D array measurements were performed. Results from noise measurements define a zone eastward of the historical centre, where the characteristics of surficial soil layers are responsible for modification to the seismic demand. In particular, HVSR curves in this area show amplification higher than 4 at a period higher than 1s. Moreover, on this location a surface waves-velocity profile obtained from a joint inversion of Rayleigh curves from MASW and 2D array with ellipticity individuates a class D soil, EC8 sensu, corresponding to marshy soil of very poor geotechnical quality. These data may be considered as key elements in the site-specific response analyses, i.e. realized according to the international codes (EC8, NEHRP), which allow to quantify the expected ground motion. These results are potentially useful for correlating construction typologies and period vibration of the buildings with the site amplification.

In addition, a damage survey was carried out in one of the most damaged zones after the 21<sup>st</sup> September 2019 earthquake. Because of the following stronger event of the 26<sup>th</sup> November 2019, we think that these preliminary results may provide useful information for the post-earthquake

reconstruction and enhancement of the urban resilience.

The activities are carried out within the framework of the CNR/MOES Joint research project "Seismic risk assessment in cultural heritage cities of Albania" in the biennium 2018-2019 (<https://www.cnr.it/en/bilateral-agreements/agreement/60/moes-ministry-of-education-and-sport-of-the-republic-of-albania>).