S152-P012 **Room: Poster Session Hall** **Time: May 18**

The TOWN EFFECT and the 2007 Noto Peninsula, Japan, earthquake

Koji Uenishi[1]

[1] RCUSS, Kobe Univ.

A conventional analysis in engineering seismology usually considers a single structure on (or in) the ground subjected to dynamic vibrations. In these classical analyses, the ground is often assumed to be rigid, and even when it is deformable, the dynamic coupling effect between structures themselves through the ground tends to be neglected. However, if many structures are built densely in a small area, the dynamic interaction between each structure may become significant, and previously unrecognized mechanical behavior of structures may be found. The interest in multiple interactions between the ground and structures in an urban environment appeared after the 1985 Michoacan earthquake that had caused severe damage to Mexico City. The difficulty of classical computational methods in matching the seismological records has given the idea that part of the seismic energy transferred to the buildings may be redistributed in their neighborhood through multiple interactions between structures and the ground. Recent mathematical study on the fully-coupled problem of multiple-interaction between the ground and buildings in a town has supported the idea, and it has shown that the resonant (eigen) frequencies of the collective system (buildings or *town*) become lower than that of a single building. This phenomenon may be called the *city effect* or *town effect*. In this contribution, based on this analytically obtained result, we consider the actual damage patterns caused to the surface structures in the Doge area of Wajima City by the 2007 Noto Peninsula, Japan, earthquake. We shall show that the generation of severe damage in the area may better be explained by the *town effect*, rather than by investigating the seismic performance of each building individually. It may also be possible to evaluate the physical characteristics of incident waves inversely from the damage patterns induced to structures by the waves.