Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

SSS023-12 Room:IC Time:May 23 11:30-11:45

H/V spectral ratio of microtremors and velocity structure in the Mexico basin

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It is essential to detect the subsurface velocity structure beneath urban area to mitigate seismic disaster. In order to estimate the velocity structure, we have proposed a new theory to calculate the H/V spectral ratio assuming that wave propagation is completely diffuse. We measured micortremors in five sites in the Mexico basin, where there were severe damage during the 1985 Michoacan Earthquake several hundreds of kilometers away from the source region, to obtain data so that we can compare the observed H/V spectral ratios to the theoretical ones to check if our theory is applicable. Among the three stations observed in downtown Mexico City which are in a 1km range from east to west, at the most western site Plaza Cibeles, the H/V spectral ratio of NS and EW components look alike and has a peak of about 0.6Hz. The middle site Plaza Rio de Janeiro has a peak of about 0.5Hz for both NS and EW components. Jardin Pushkin, the most eastern site has two peaks for NS component, 0.5 and 0.7Hz respectively, and for EW component the peak is at 0.6Hz. Previous studies show that the predominant frequency for H/V spectral ratio of strong motions at Plaza Ciberes is abouth 0.5Hz (Salinas, 2010). On the other hand, the peak at Coyoacan, which is in the south part of Mexico City, is around 1.4Hz for NS and EW components and at CENAPRED, which is sitting on lava outcrop has no apparent peak. We will make detail analysis of the data and compare with the theoretical H/V spectral ratio calculated by our new theory from previously known velocity structures.

Keywords: Mexico Basin, Microtremor, H/V Spectral Ratio, Diffuse Field, Velocity Structure