



Estimation of Strong Motion and Building Damage Survey for the 2011 Northern Nagano Earthquake

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ABSTRACT: We conducted a damage survey of wooden structures and collected very dense ambient noise measurements in the near-source region of 2011 Northern Nagano earthquake. The percentage of totally collapsed buildings exceeded 30% in Aokura and Yokokura districts in Sakae village, Nagano prefecture. The percentage in Mori district, where strong motion was recorded during the mainshock, was less than 10%. We estimated the strong motion in the Aokura and Mori districts from the ambient noise measurements and strong motion records. The estimated strong motion distribution reflects the soil conditions, and varies in that small area. The correlation of estimated strong motion and damage ratio of wooden structures is reasonably high, which indicates the estimated ground motions are realistic. The damage curve obtained from this research shows the collapse ratio exceeds 50% around 150 cm/s of input ground motion.

Key Words: 2011 Northern Nagano earthquake, Building damage survey, Wooden structure, Strong motion, Ambient noise, H/V spectrum