



COMPARATIVE ANALYSIS OF SEISMOLOGICAL RECORDINGS OF THE FEBRUARY 26TH 2012 AND APRIL 7TH 2014 BARCELONETTE EARTHQUAKES IN TWO RC BUILDINGS IN NICE AND GRENOBLE (FRANCE).

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The main goal of the National Building Array Program (NBAP), supported by both the French Ministry of Ecology, Sustainable Development and Energy and the French Ministry of Land Planning and housing and managed by the French Accelerometric Network (RAP) is the seismic response analysis of typical French buildings for seismic vulnerability assessment purposes.

In the frame of NBAP, two tall reinforced concrete (RC) building were instrumented with seismological arrays, one in the city of Nice and the other in Grenoble (Figure 1). These arrays are recording continuously, allowing the analyse of both the ambient vibrations and the ones due to local seismicity.

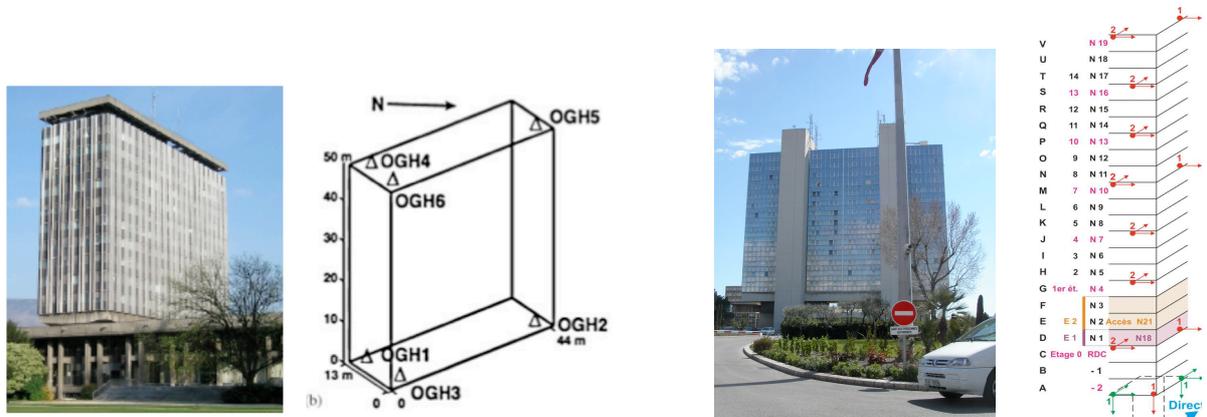


Figure 1. Instrumented buildings studied: Grenoble city hall (left) and Nice administrative office building (right).

The building in Nice is a 67-meters tall tower composed of 20 levels and 2 basements raised in 1979. The structure is made of concrete slabs connected to two kernels that include the staircases and the elevators. Since July 2010, the building has been monitored by 24 accelerometric sensors distributed

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along the building elevation. We found that the fundamental mode of deformation is characterized by a frequency close to 1.2 Hz in both translational directions.

The city hall of Grenoble is a RC building constructed in 1967. It is divided into two parts : a 2-story horizontal building and an independent 13-story tower. This tower is 52-meters tall and its horizontal dimension are 44mx13m. Two inner cores, located at two opposite sides of the building and consisting of RC shear walls, enclose the staircases and lift shafts. Since 2004 18 sensors distributed in the tower are recording its deformation under seismic sollicitation or ambient vibration. The translational fundamental modes are characterized by a frequency of 1.22 Hz and 1.16 Hz and the first torsional mode is observed at 1.45 Hz.

Two earthquakes stroke the Ubaye valley in the southeastern France in february the 26th, 2012 and april the 7th, 2014 with a magnitude (Mw) of 4.1 and 4.9 respectively. Both of the epicenters were located close to the village of Barcelonette laying in-between Grenoble and Nice, at a common distance of around 100 km from both of the cities. Figure 2 shows the recordings obtained in the building in Nice.

The analysis of the recordings of these two earthquakes is a good opportunity to compare the behaviour of two tall RC-building under seismic loading.

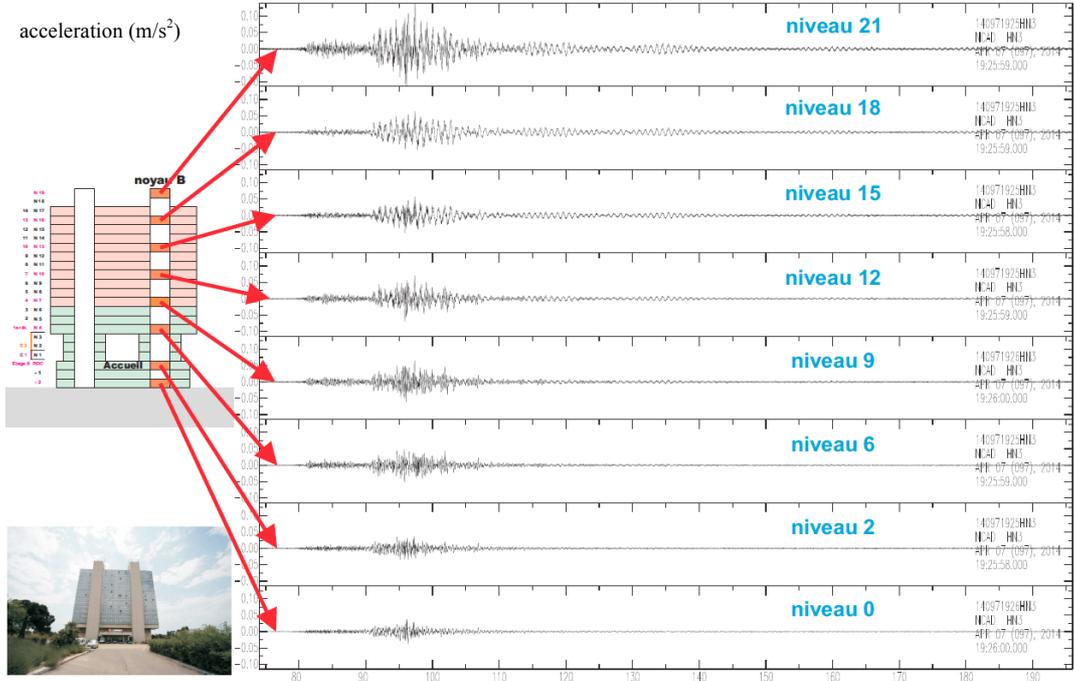


Figure 2. Recordings of the April 7th 2014 Barcelonette earthquake (Mw 4.9) in Nice administrative office building.