

Measurement of the rotational motion induced by the Amatrice earthquake (24/08/2016), Italy, with a portable Ixblue sensor at the Low Noise Underground Laboratory (LSBB), Rustrel, France

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During 2 month, from the 14 July 2016 until the 15 September 2016, the iXblue company installed in the gallery of the LSBB (Low Noise underground Laboratory, Rustrel, France), a prototype of a new portable rotational sensor (blueSeis), composed of 3 single component IFOG loops allowing to measure the vertical rotational ground motion. The purpose of this experiment was to demonstrate the ability of this new sensor to record seismic rotational signal on field condition. To this end, the LSBB underground permanent seismic network has been completed by 9 additional temporary broad band stations. Thank to this dense small-aperture seismic network, the vertical rotation motion has been estimated based on array finite difference approximation of the spatial derivatives of the local ground motion. During the night of the 24 August 2016, a magnitude 6.2 earthquake severely hit the region of Amatrice, Central Italy, at 3h36 local time. Located at less than 650 km away for the LSBB, the event was clearly recorded by the IFOG sensors and all broad band seismometers with a high signal to noise ratio. The comparison of the array derived rotation on the frequency band [0.02 - 0.33]Hz, with direct observation done by IFOG sensors demonstrates the capacity of this new portable IFOG sensor to measure rotational motion with an amplitude lower than 0.5×10^{-7} rads $^{-1}$.