The 2019 September 15th Stigliano natural seismic sequence revealed by a local network designed for induced seismicity monitoring

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In 2014, after the public debate about the possibility that the industrial activities in the Emilia region (North Italy) could have triggered the Magnitude Mw 6.1 earthquake occurred on 20 May 2012, the Italian Oil & Gas Safety Authority (DGS-UNMIG, Ministry of Economic Development) published a set of guidelines that establish the need to monitor seismicity in areas subject to industrial activities such as hydrocarbon production, waste water injection and natural gas storage operations. In this framework, TOTAL E&P ITALIA, company owner of the Gorgoglione Concession for hydrocarbon production in the Basilicata region (Southern Italy), is monitoring the seismicity with a local microseismic network. The network, installed and managed by SOLGEO srl on behalf of TOTAL E&P ITALIA, consists of 12 seismic stations, each equipped with two sensors (surface seismometer (11 short period and 1 broadband) + accelerometer). In this work, we focus on the seismic sequence occurred on 2019 September 15th, near the Stigliano town, in the eastern edge of the local microseismic network. In order to demonstrate how the data integration of local and national networks can produce better results, both in terms of number of detected events and location quality, we show the comparison of the catalogues produced by analysing the data from the national seismic network, the local microseismic network and the combination of the two. While the INGV catalogue based on the national seismic network shows only 4 events associated with this sequence, by using the data of the local seismic network, we detected and located more than 25 events with local magnitude between 0.2 and 2.0. Since the smallest events are visible only at the closest station, we used a new single station location technique that allow to better constrain the location of clustered seismic sequences.

Keywords: earthquake location, single station location

