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HIGH-RESOLUTION SEISMOLOGICAL DATA OF THE COLLALTO SEISMIC NETWORK REVEALS THE DEEP GEOMETRY OF THE MONTELLO BLIND THRUST (NORTHEAST ITALY)

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Faults images can be obtained by several techniques able to investigate the earth crust at different depths, each one featuring its own resolution power and uncertainties. Besides to surface structural or geomorphological analyses and some geophysical methods, typically useful to map the fault plane trace or to detect its existence in the first hundreds meters of depth, seismicity pattern analyses may outline the geometry of fault planes in the first kilometers of depth. In Northeast Italy, the Montello thrust belongs to the fold-and-thrust system of the Southern Alps. Even if not outcropping, this active fault has been recognized by integrating surface and sub-surface geomorphological, geodetic and geophysical data. From the seismological point of view the Montello thrust is defined 'silent', as no significant earthquake has been associated to it, neither in historical times, nor recently. Nonetheless, geometrical considerations assign it a very high seismogenic potential, as it is considered capable of earthquakes with M > 6. Over geological times, the activity of the Montello thrust has generated a gentle anticline, the Montello hill hosting a natural gas reservoir formed at about 1.5 km of depth. After its depletion, since 1994 this reservoir has been exploited as gas storage by Edison Stoccaggio S.p.A., and since 2012 it has been monitored by a local seismic network, installed for safety issues to detect the seismicity eventually induced by the storage activities. This monitoring network, named Collalto Seismic Network (in Italian Rete Sismica di Collalto, RSC), features high-resolution power as well as high sensitivity, being very dense above the reservoir and having sensors deployed underground for reducing the anthropic noise effect. In about six years of continuous recording, more than seventeen hundreds earthquakes have been located in a 50 km x 50 km area surrounding the reservoir, with local magnitude ranging from -1.8 and 3.8; a completeness magnitude of about 0.0-0.2 has been estimated in the area close to the reservoir. All the seismicity is located at more than 3 km distance from the reservoir boundaries, thus it can be considered entirely of natural origin for this kind of activity, according to the Italian Ministerial Guidelines for monitoring the underground activities. Moreover, the deep pattern of microearthquakes depicts a listric geometry likely corresponding to the Montello thrust surface. In this presentation, we describe the most recent and detailed picture of the natural microseismicity obtained by analyzing the data acquired by RSC. They provide the first clear imaging of the geometry and microseismic activity of the Montello thrust, a picture ever seen until the today's increase of monitoring capabilities.