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## Insights into a tectonic swarm-like seismic Sequence related to a Low Angle Normal Fault system from a Seismic Catalog enhanced by Template Matching

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**The Alto Tiberina fault (ATF) system (Northern Apennines, Italy) is dominated by a low-angle normal fault with syn- and antithetic splay faults located in the hanging wall. Starting in August 2013 the hanging wall has been affected by a swarm-like sequence that lasted until the end of 2014. Within this period more than ~20k events are listed to have nucleated along the same fault segment with the largest events having magnitudes of ~Mw 3.9.**

**In this study we aim to constrain the physical forces driving the swarm-like sequence (e.g. pore pressure diffusion, transient slow slip) in this fault segment by combining a template matching approach with continuous seismic data from a borehole array deployed in the near field of the ATF. This array approach helps us to identify small events which are hidden in the background noise and usually undetected with conventional picking approaches.**

**We are able to extend the preexisting catalog by a factor > 5. The new detected events decrease the magnitude of completeness and the inter-event time resolution. We use the extended catalog to analyze the spatio-temporal evolution, scaling properties and statistical behavior to enhance insights on the physical forces driving this swarm like sequence.**