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High-resolution catalog of the the Maurienne Swarm (French Alps) based on template matching and double-different relocation

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Since 2017, the Maurienne Valley (French Alps) has been affected by an episode of seismic unrest. In this study we focused on the seismic swarm that occurred in 2017 and 2018, which was characterized by 8 events with $ML > 3$ and a maximum magnitude of 3.7. The goal was to extend the existing SISmalp catalog, and also to provide accurate locations and magnitude estimations.

The employed data was recorded by a local seismic network composed of 6 broadband stations. The use of template matching allowed us to detect more than 70000 events, increasing the detection rate by more than ten times compared to the original catalog. We obtained high resolution locations applying a double difference relocation method, providing as input differential times calculated by cross-correlating templates with their respective detections. Finally, we estimated magnitudes using template-family-based linear regression analysis, in order to include even the weakest events. The seismic locations will be discussed in the tectonic and geological setting of the Maurienne Valley.