



Spatio-temporal behavior of an extremely focused seismicity swarm during the Maupasacq experiment (Pyrenean foreland, France)

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The Maupasacq experiment, a six-month international passive seismic survey, was conducted in 2017 in the Mauleon basin, SW France. Situated north of the Pyrenean range, this basin consists of a former Cretaceous hyper-extended rift, inverted during the Pyrenean (Alpine) orogeny. For imaging purposes, a dense network of more than 400 seismic stations (broadband and short period sensors) was deployed in a 40x40 km² area with moderate seismic activity. As a prerequisite for the classical goals of the experiment (travel time tomography, ambient noise tomography), the local seismicity was studied in detail. It mostly proved compatible with its hitherto knowledge, that resulted from decades of monitoring with a permanent, though much sparser network. However, the exceptional density of the Maupasacq setup allowed the recording of an highly unusual seismic sequence, unprecedented in the local catalogues. The sequence consisted of about 150 events, very close to each other, concentrated around 4 km depth, with extremely similar waveforms, located in a part of the basin where only one event had been detected in the previous 20 years. This cluster behaves as a swarm, with no mainshock-aftershock relationship. Double-difference relocation, based on cross-correlation calculated arrival times, reduces the spatial extent of this cluster to dimensions in the order of 100-150 meters (vertical and horizontal). Slow seismicity migration is clearly observed during the 3-months following the onset of the swarm, suggesting a behavior driven by fluid diffusion. In this presentation, we will describe the spatio-temporal and mechanical characteristics of the swarm, and its relationship with the local geological setting.