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Micro-seismicity, seismic-wave velocity model and earthquake clustering in the Akarnanian region (western Greece)

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Characterized for the first time in 2013, the Island Akarnanian Block (IAB) is a micro-plate located in the western Greece. This micro-plate accommodates the deformation in between larger scale tectonic structures as the Gulf of Corinth (South-East), the Hellenic subduction (South) and the Apulian Collision (West).

We started a micro-seismic survey (MADAM) at the end of 2015 with a dense seismological network over the area, between the Gulf of Patras and the Gulf of Amvrakikos. In order to obtain precise locations of the recorded events, we better constrained the local velocity model. In fact, several velocity models (local or regional) have been proposed for this area. However, the velocity model generally used by the scientific community remains the Hasslinger 98 velocity model. This model, nevertheless, raises some questions about its physical meaning, mainly due to a low velocity layer between 4 and 7 km-depth.

Thanks to our seismological network and permanent networks of the Corinth Rift Laboratory and the Hellenic Unified Seismic Network, we collected and analysed a huge quantity of data acquired between October 2015 and December 2017. Those analyses of more than 10,000 events allowed us to develop a new and robust local velocity model, which is consistent with the seismic data and the geophysical observations.

The observed seismic activity is characterized by the presence of numerous clusters. The clusters are analysed in detail by relative relocations in order to appraise their physical processes and their possible implications in the fault activity to finally have a better understanding of the deformation mode(s) of the IAB micro-plate.