

AdriaArray – a passive seismic experiment to study plate deformation in the central Mediterranean: Status in September 2023

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The densely populated area around the Adriatic Sea is prone to strong multi-geohazards including earthquakes, tsunamis, landslides, flooding and volcanic activity as the Adriatic Plate is presently consumed in a tectonically active belt spanning from Sicily, over the Apennines to the Alps, the Dinarides and Hellenides. The Adriatic Plate and its active margins, which regularly generate earthquakes up to magnitude 7, represent a natural laboratory to study geodynamic causes of geohazards. To identify drivers of associated plate deformation, the plate configuration including slabs and plate boundaries, properties of active fault systems and of the acting stress field have to be determined. AdriaArray, a dense plate-scale regional array deployed in the central Mediterranean, will provide data necessary for passive seismic imaging of the crustal and upper mantle structure and for the analysis of seismic activity. AdriaArray consists of 995 broad-band stations (corner period: 30 s and larger) and 446 broad-band temporary stations from 24 mobile pools. Currently, 390 of the planned temporary stations, corresponding to 87 %, have already been installed. The average station spacing amounts to about 50 km. For the first time, a homogeneous coverage by broad-band stations in an area from the Massif Central in the west to the Carpathians in the east, from the Alps in the north to Sicily and the Kefalonia Fault Zone in the south will be achieved. The backbone network - operated between 2022 and 2025 - is complemented by several locally densified and LargeN networks for example in the western Carpathians, Croatia, in the Vrancea region, and Albania. Recorded data is archived at 8 EIDA nodes mostly by transmission of real-time data streams. Regular data quality checks ensure high data availability and data quality. AdriaArray, the largest passive seismic experiment that has been performed in Europe so far, is based on intense cooperation between local network operators, mobile pool operators, field teams, ORFEUS, EPOS and interested research groups. Altogether, more than 60 institutions are participating in the AdriaArray experiment and are forming the AdriaArray Seismology Group founded in 2022. Currently, Collaborative Research Groups are established to coordinate the data analysis.