

## Velocity and strain field estimation from episodic GNSS campaigns (2012-2021) for the region of Attica, Greece

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**Abstract.** The region of Athens is essentially a transition area between the region of Corinth Gulf/Viotia, characterized by intense seismic activity, and the regions of South Attica and Cyclades Islands with low deformation rates.

A network of 14 campaign sites was established in 2012 in the framework of ARCHIMEDES research project, 13 of which are pillars of the Hellenic trigonometric network. In 2021 GNSS observations were repeated out on these sites. Also, permanent GNSS stations DYNG and TEIA were used to validate the results and implement the reference frame.

GNSS data were analyzed using two different methods, Precise Point Positioning and Double Differences processing. For the both processing methods, ITRF2014 has been implemented as a reference frame. With the exception of some specific sites with challenging observation environment, the differences between the two methods are of the order of centimeters.

A velocity field was calculated in ITRF2014 and with respect to a stable Europe, using the results from Double Differences processing. The velocities with respect to a stable Europe range from -20 to -27 mm/yr in the North – South direction and from -12 to -19 mm/yr in the East - West direction. The region of Attica moves uniformly to the SW direction. Comparing velocities of selected points with the officially published velocities of the DYNG station, as well as with recent published studies, it is clear that despite the episodic campaigns of observations the results are reliable.

Finally, different kinematic models were estimated for the region and the strain tensor parameters were calculated for a grid of points and delaunay triangles covering the region.