



## **Constraining the depth of earthquakes in Iran and Central Asia using a combination of Array techniques and waveform modeling at regional and teleseismic distances**

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Reliable estimation of depth of earthquakes and seismic disturbances is of crucial importance to various disciplines in seismology such as studies of seismic hazard, plate tectonics and monitoring of compliance with Comprehensive Nuclear Test Ban Treaty. In a region of high seismic activity, where distribution of seismic stations is rather sparse, located seismic events often suffer from poor depth resolution due to lack of seismic stations in the proximity of the epicenter. In this ongoing study we are investigating independent means of constraining the depth of earthquakes using array techniques to identify and enhance the pP and sP depth phases of seismic events in Iran and central Asia as recorded by various seismic arrays and stations at regional and teleseismic distances around the globe. We rely on well established array techniques such as beam forming and FK analysis to identify the correlated signals propagating across the arrays. We have identified anomalously deep earthquakes at the northwestern corner and the southeast end of the Zagros seismic belt whose origin from the upper mantle is supported by identification of clear depth phases in seismic arrays in Europe, northern America, and Australia. To validate our results we perform waveform modeling and solving for components of moment tensor solutions for various depths to obtain the optimal depth for which the best waveform fit is achieved.