Filling the Moho gap: High resolution crustal structure of the Eastern Alps

Stefan Mroczek\textsuperscript{1,2}, Frederik Tilmann\textsuperscript{1,2}, Jan Pleuger\textsuperscript{2}, Xiaohui Yuan\textsuperscript{1}, Ben Heit\textsuperscript{1}, and the AlpArray Working Group\textsuperscript{*}

\textsuperscript{1}GFZ German Research Centre for Geosciences, Potsdam, Germany (mroczek@gfz-potsdam.de)
\textsuperscript{2}Freie Universität Berlin, Berlin, Germany
\textsuperscript{*}A full list of authors appears at the end of the abstract

The dense SWATH-D seismic network in the Central-Eastern Alps gives an unprecedented window into the collision of the Adriatic and European plates. Previous studies have suggested a Moho gap overlying a subduction polarity switch. This switch, from European subduction in the west to Adriatic subduction in the east, was suggested by teleseismic tomography where low velocity zones in the mantle were interpreted as two slabs with opposite subduction polarity. The TRANSALP profile at 12°E indeed showed a gently southward dipping European Moho truncated by a nearly flat Adriatic Moho in receiver function (RF) images, which clearly indicated southward directed subduction. In contrast, RF images derived from the EASI profile at 13.3°E were interpreted to show Moho topography consistent with underthrusting Adriatic Moho, which would support the hypothesized polarity switch, but the image is actually ambiguous.

We apply the receiver function method to stations in the dense SWATH-D broadband seismic network, covering approximately the area from 45-49°N and 10-15°E, supplemented by the AlpArray Seismic Network and the EASI data. We construct common conversion point stacks in order to pick the Moho conversion and its multiples. The 15 km average station spacing has allowed us to fill in areas where previously the Moho was too weak to image. In this more comprehensive image, the asymmetry of the Moho in the TRANSALP profile can be traced to continue to at least the longitude of the EASI profile, suggesting continued southward-directed underthrusting of the European crust along the extent of the Eastern Alps, in conflict with the popular polarity switch hypothesis. At the eastern border of our study area we capture a sharp transition from European to extended Pannonian crust. Here the Adriatic Moho retreats and dips below the Pannonian Moho as it continues beneath the Dinarides.

the AlpArray Working Group: The complete member list of the AlpArray Working Group can be found at http://www.alparray.ethz.ch.