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The transition zone between the Eastern Alps and the Pannonian Basin imaged by ambient noise tomography

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In the last decades dense seismic networks showed their importance and possibilities in studying the structure of the lithosphere and the upper mantle. In order to better understand the Alps-Apennines-Carpathians-Dinarides orogenic system the AlpArray Seismic Network was created, which is a European, transnational research initiative with more than 600 seismological stations involved.

In this work we have studied the transition zone between the Eastern Alpine orogenic zone and the Neogene extensional Pannonian basin system, where topography gradually changes from high mountains into deep sedimentary basins in a relatively short distance. These geological features are associated with strong velocity contrasts. The aim of our research was to map sedimentary and crustal thickness variations and to detect the main structural lines.

We have used data from the permanent stations of the studied region together with the AlpArray Network, as well as the temporary stations of the Carpathian Basin Project, which collected data in this area during 2006-2007. Vertical component noise cross-correlation functions were computed and Rayleigh wave dispersion curves were determined using the frequency-time analysis method. Group velocity tomography and S-wave velocity inversion were carried out for the transition zone. The resulting maps reflect the known, large scale geological features and provide unprecedented resolution for the velocity distribution of the area.