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S-wave velocities down to 1 km below the Peteroa volcano, Argentina, obtained from surface waves retrieved by means of ambient-noise seismic interferometry

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The main force driving the tectonics in South America is the subduction of the Nazca Plate below the South American plate. The subduction process generated numerous volcanoes in both Chile and Argentina, of which the majority is concentrated along the Chilean Argentine border. The recent explosive eruptions of some volcanoescaused concern of the population in both countries. At the beginning of 2012, a large temporary array was installed in the Malargüe region, Mendoza, Argentina, with the purpose of imaging the subsurface and monitoring the tectonic activity. The array was deployed until the end of 2012 to record continuously ambient noise and the local, regional, and global seismicity. It consisted of 38 seismic stations divided in two sub arrays, namely the PV array of six stations located on the east flank of the Peteroa volcano, and the T array of thirty two stations spread out on a plateau just north east of the town of Malargüe. Here,the focus will be on the PV array, which has a patch-like shape. Due to the intra-station distances, we chose to use for surface-wave retrieval the bands 0.8 Hz ÷ 4.0 Hz, 10 Hz ÷ 25 Hz. At the investigated area, most of the year there is little anthropogenic noise, which normally dominates frequencies above 1 Hz, meaning that the selected frequency bands can be used for surface-wave retrieval from noise. Using beamforming, we showed that for these bands, the noise is illuminating the stations from the west. This means that a correct surface-wave arrivals can be retrieved for station pairs oriented in that direction. Because of this, we used for retrieval only such station pairs. We cross-correlated the recordings on the vertical components and retrieved Rayleigh waves. By manual picking, we estimated for both bands velocity dispersion curves from the retrieved surface-wave arrivals. The curves were then inverted to obtain the velocity structure under the stations. The obtained S wave velocity depth profiles for the 10 Hz ÷ 25 Hz show the existence of a high velocity layer (1400 m/s ÷ 2100 m/s) from about 45 m to 65 m depth and of a low velocity layer (500 m/s ÷ 1000 m/s) between 5 m and 25 m depth. Below the western part of the arrays there is second low velocity layer/body (800 m/s ÷ 1100 m/s) from 30 m to 55 m depth. The results from the 0.8 Hz ÷ 4.0 Hz band reveal a high-velocity layer (1500 m/s ÷ 2200 m/s) between 400 m and 700 m depth. All those new results will be shown in the related presentation.