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Mapping the Moho with ambient noise autocorrelations across a N-S profile crossing the Bohemian Massif and Eastern Alps (EASI)

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In the field of seismic interferometry, cross-correlations are used to extract Green's function from ambient noise data. By applying a single station variation of the method, using auto-correlations, we are able to retrieve zero-offset body wave reflections for vertical, and under favourable conditions, horizontal components. At a test station (HYB - Hyderabad, India) we determine the Moho P-wave and S-wave reflection times and find agreement with receiver function results. Applying this method to the EASI (Eastern Alpine Seismic Investigation) profile across the eastern Alps, we are able to identify the primary Moho reflection and estimate the crustal average Vp/Vs ratio for the Bohemian Massif. In the Alpine section of the profile the Moho becomes more difficult to image and our interpretation diverges from Moho depths based on receiver functions and the autocorrelation of teleseismic earthquake coda. Conventional receiver functions contain ambiguity between Vp, Vs, and depth. P- and S-wave reflection times constrained with autocorrelations can be used in combination with receiver function multiples to determine interface depths, Vp and Vs independently. The phase weighted autocorrelation stacks become stable after approximately two months of data which benefits studies with shorter deployment times