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## In situ estimation of effective rock elastic moduli by seismic ambient vibrations

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In this study, we performed a non-invasive ambient noise investigation of unsaturated rock structures in the Bohemian Paradise (Bohemian Cretaceous Basin, Czech Republic). Our study focused on two key topics: 1) An *in situ* elastic moduli estimate of competent, horizontally deposited sandstone layers using ambient noise array measurements. Recordings were processed using an f-k array analysis, from which frequency-dependent Love and Rayleigh wave dispersion curves, as well as Rayleigh wave ellipticity, were retrieved. Data were inverted for the P- and S-wave velocity profiles, from which Young's and shear moduli were successfully estimated. 2) A study of the local response of the Kapelník rock tower. We analysed a dataset of ambient noise recordings obtained from the top of the tower and its foot. Information regarding tower oscillation frequencies and directions, together with amplification ratios, were retrieved from a particle motion polarisation analysis and from site-to-reference spectral ratios. Euler-Bernoulli beam theory was also employed for interpreting measured data using elastic moduli estimated from noise array measurements.