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Direction dependent Love and Rayleigh wave noise characteristics using multiple arrays across Europe

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Seismic noise has become an important signal source for tomography and monitoring purposes. Better understanding of the noise field characteristics is crucial to further improve noise applications. Our knowledge about common and different origins of Love and Rayleigh waves in the microseism band is still limited. This applies in particular for constraints on source locations and source mechanisms of Love waves.

Here, 3-component beamforming is used to distinguish between the different polarized wave types in the primary and secondary microseism noise field recorded at several arrays across Europe. We compare characteristics of Love and Rayleigh wave noise, such as source directions and frequency content. Further, Love to Rayleigh wave ratios are measured and a dependence on direction is found, especially in the primary microseism band. Estimates of the kinetic energy density ratios propose a dominance of coherent Love waves in the primary, but not in the secondary microseism band. The seasonality of the noise field characteristics is examined by using a full year of data in 2013 and is found to be stable.