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Extracting robust splitting measurements for the AlpArray using the splitting intensity method

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Seismic anisotropy is an important tool for studying geodynamic processes in the Earth, and a common way of constraining it is to analyse shear-wave splitting of seismological body-wave phases,
i.p. SKS. Different techniques exist to quantify shear-wave splitting, but they do not always give the same result, raising the question of how stable they are, and whether there are systematic biases. Furthermore, the strength of the splitting ("splitting delay") has generally been more difficult to determine than the other (the "fast orientation").
A robust technique for determining shear-wave splitting can be set up
based on the splitting intensity method. That technique can in particular also constrain the splitting delay well. Ambient noise can however lead to an underestimation of splitting delay, and it needs to be accounted for, e.g. by a least-squares Wiener filter.
We apply that modified splitting intensity method to data from the AlpArray. We have processed 3 years of teleseismic earthquake data for 336 stations of the AlpArray deployment and additional 315 stations of the Italian network to get a potentially broad and more complete image of anisotropic structures in and outside the Alpine region.
The technique makes restrictive assumptions, e.g. assuming single-layer anisotropy. Yet, the new constraints, especially the one of the splitting delay are rather useful for understanding the deformation under the mountain belt and around it.