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## Optimization of ambient seismic noise interferometry to monitor groundwater level variations.

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In this work, we test the cross-correlation of ambient seismic noise method in monitoring underground water variations. Within this perspective we applied the abovementioned technique to study the water table changes occurring both in areas exploited for drinking water needs and inside landslides. Into detail, surveys were carried out in Crépieux-Charmy and Ventasso water catchment fields and in the Cà Lita landslide, respectively. Our aim is to optimize the outcome of the method by studying the effect of different processing steps involved in the computation of the cross-correlation technique. For this purpose, we analyzed the influence of filter types and different time windows length. Additionally, in order to address the problem of localization of the change in the medium the seismic velocity variations have been also derived from limited frequency bandwidths according to the characteristics observed in the signals spectrum. This work has shown the potential of this methodology as a valuable non-destructive toll to accurately describe hydrogeological dynamics. The monitoring system could thus be coupled with the traditional tools to improve the reconstruction of the underground water variations.