Wavelet Based processing of Microtremors Signals

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Horizontal to Vertical Spectral Ratio (HVSR) of microtremors has been evaluated by many researchers as a valuable tool for microzonation studies. More or less HVSR processing algorithms has been standardized providing to the analyst the opportunity of an automatic procedure. However one point of interest between researchers is the validity of the microtremors signals.

It is well known (especially in urban areas) that there are artificial noises that can superimposed at measured microtremors producing unexpected amplification ratios. Several studies focus on this problem mainly identify (and in some cases eliminate) short period transients with amplitude more or even equal to the amplitude of pure microtremors. At our two-stage proposed approach we focalize initially on the scouting of these artificial noises when they have amplitude even or less than microtremors one. After the identification of the signal's components that contaminate the final HVRS we eliminate them with appropriate filtering.

Our method is based on wavelet analysis provide us the ability to analyze the measured signal in scale-by-scale mode. Wavelets has proven to be excellent tools for the identification of singularities in signals where by traditional frequency domain procedures these singularities are often undetectable. By using this attribute our method is able to identify the beginning and end times of undesirable components on measured signal. The final outcomes are microtremors signals prepared for HVSR calculation without "hidden" non-stationarities.

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