



Wavelet analysis of ac conductivity time series for the identification of compressional stress on marble samples*.

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Conductivity measurements allow for the characterization of geomaterials and can provide valuable information about physical processes that the material has suffered.

The possible impact of uniaxial compressional stress on marble samples is examined in this work, by checking the changes of ac conductivity of such samples. Examination of both compressed and uncompressed samples has revealed distinguishable differences between them, while the latter were used as reference in our analysis.

Towards this aim, recordings of the time series of ac conductivity were analysed with the use of the Wavelet Transform (WT) technique, as tool for analysis. The WT may be considered to be more effective compared to Fourier analysis, as the former is valid not only for stationary signals but also for the analysis of transient, non-stationary or time-varying phenomena. The examined time series seemed to be non-stationary, because it failed the Gaussian distribution of the detrended ac conductivity ($\Delta\sigma$) criterion of stationarity.

The characterization of the samples subjected to pressure is based on the power spectral densities calculated in the frequency domain with the use of Wavelet Transform. The proposed methodology contributes to a better understanding of the probable mechanisms that are activated during the deformation process.

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