Geophysical Research Abstracts
Vol. 13, EGU2011-11993, 2011
EGU General Assembly 2011

Inferring the Elastic properties of the Low Andarax River Valley (SE Spain) by Means of Array Analysis of Ambient Noise

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The elastodynamic structure of the Low Andarax River Valley is being investigated by using techniques of ambient noise processing such as the surface-wave interferometry and several SPAC-like array methods. The Single Circular Array technique (SCA) for Love wave analysis is one of them. This a recently developed approach for processing of three-component records obtained in a centerless circular array in which situations with anisotropic illumination and/or possible correlations between Rayleigh and Love wave arrivals or between waves coming from different azimuths are properly dealt with.

An experiment has been conducted at a test site located 900m upstream from the mouth by using the SCA method with five pentagon-shaped arrays of up to 94 m radius as well as the vertical SPAC method for pentagonal and triangular arrays of up to 420m radius. The derived S-wave velocity profile shows several impedance contrasts which can be interpreted on the basis of nearby boreholes. An upper $\sim$20m thick layer, corresponding with Holocene alluvial deposits (Vs$\sim$500m/s) was found. A second layer, consisting of Pleistocene gravels and sands, spreads down to about 60m. The stiff basement (Triassic dolomites and phyllites, Vs> 1800m/s) underlies a thick layer of Miocene marls with estimated thickness of 500 m and mean Vs about 1000m/s.

A second S-wave velocity profile obtained at another point of the delta, 2.1Km NE of the mouth, reveals a significant variation in the velocity of the shallow layer ($\sim$37% decrement in the top 15m). This variability can be explained by the very different sand content in the shallow layers.

Our tests also confirms that joint inversion of Rayleigh and Love wave velocities contributes to reduce uncertainties in the inverted models, especially those regarding the tradeoff between P and S wave velocities of the layers.